KARPAGAM ACADEMY OF HIGHER EDUCATION
(Deemed to be University)
(Established Under Section 3 of UGC Act 1956)
Pollachi Main Road, Eachanari Post, Coimbatore - 641021
(For the candidates admitted from 2018 onwards)

DEPARTMENT OF CS, CA&IT

Semester – V

16ITU504B MULTIMEDIA AND ITS APPLICATIONS 3H – 3C

Instruction Hours / week: L: 3 T: 0 P: 0 **Marks:** Int : **40** Ext : **60** Total: **100**

SCOPE

Acquire basic knowledge on Multimedia devices. Understand current trends in multimedia by experiencing a variety of applications and development packages.

OBJECTIVES

- This course in curriculum is an introduction to the multimedia and its applications.
- This course enables students to understand how the web pages are designed interactively.
- How to critically evaluate website quality, learn how to create and maintain quality web pages learn to create and manipulate images.
- To gain the skills and project-based experience needed for entry into web design and development careers.

UNIT I

Multimedia – An overview: Introduction – Multimedia presentation and production – Characteristics of Multimedia presentation – Hardware and Software requirements – Uses of Multimedia. Text: Types of text – Font- Text file formats. Image: Image data representation – Image file formats – image processing software. Graphics: Advantages of graphics – Uses – Component of a graphics system.

UNIT II

Audio: Sound waves – types and properties of sound – components of audio system – Digital audio – Musical Instrument Digital Interface (MIDI) – Audio file formats – Audio processing software. Video: Motion video – Television systems – Video file formats – video processing software. Animation: Uses of animation – computer based animation -Animation file formats – Animation software.

UNIT III

Introducing photoshop elements: About elements – welcome screen – create mode – menu bar – toolbox – options bar – panels. Organizing images: Obtaining images -tagging images –

searching for images – opening and saving images. Selecting areas – Layers – Text and drawing tools.

UNIT IV

Understanding flash: Understanding flash basic elements – creating a simple animation. Learning Flash toolbox: Learning the toolbox – using tools. Learning flash panels: Understanding the panels. Using timeline and layers: Understanding how timeline works – Understanding layers. Drawing objects: Drawing lines and fills – using colors – Rotating, skewing and scaling – grouping objects. Creating animation – How animation Works – creating motion tweens – creating shape tweens. Understanding masks – creating masks.

UNIT V

Creating symbols and using the library: Learning about symbols – creating symbols – using libraries. Learning Basic Actionscript concepts: Actionscript basics – data type basics. Learning basic actionscript programming: Applying Actionscript – Using Actionscript to control actions – Using Actionscript to control properties – Understanding Actions and Event Handlers.

Suggested Readings

1. Ranjan Parekh (2013). Principles of Multimedia (2nd ed.). TataMcGraw Hill.
2. Nick Vandome (2011). Photoshop Elements 9. TataMcGraw Hill.
3. Brian Underdahl (2002). Macromedia Flash MX – A Beginners Guide. Dreamtech Press.
4. Tay Vaughan (2002). Fundamentals of Multimedia (5th ed.). TataMcGraw Hill.
5. Bill Sanders (2001). Flash 5 Actionscript (1st ed.). New Delhi DreamTech Press.

Websites

1. en.wikipedia.org/wiki/Multimedia
2. www.arena-multimedia.com/
3. www.nextwavemultimedia.com/

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DEPARTMENT OF INFORMATION TECHNOLOGY

SUBJECT : **MULTIMEDIA AND ITS APPLICATION**

SEMESTER : V

SUBJECT CODE: **16CTU504B** **CLASS** : **III B.SC (CT)**

LECTURE PLAN

S.No.	Lecture Duration (Hours)	Topics to be Covered	Support Materials
Unit – I			
1	1	**Multimedia – An overview:** Introduction	T1: 1
		➢ Multimedia presentation and production	T1: 1
		➢ Characteristics of Multimedia presentation	T1: 2-4
2	1	➢ Hardware and Software Requirements	T1: 5
		➢ Uses of Multimedia	T1: 6
3	1	➢ Text – Introduction,Types of text	T1: 39
		➢ Font	T1: 45-46
		➢ Text File formats	T1: 49-52
4	1	**Image:**Introduction, Image data representation	T1: 55-56
		➢ Image file formats	T1: 137-138
		➢ Image processing software	T1: 139-143
5	1	**Graphics:** Advantages of graphics	T1: 155
		➢ Uses of Graphics	T1: 156
		➢ Components of a graphics system	T1: 157
6	1	Recapitulation and Discussion of important	

		questions	
Total No. of Hours Planned for Unit-I			**6 Hrs**
Unit – II			
S.No.	**Lecture Duration (Hours)**	**Topics to be Covered**	**Support Materials**
1	1	**Audio:** Introduction, Sound waves	T1: 248-249
		➢ Types and properties of sound	T1: 251-258
		➢ Components of audio system	T1: 261-266
2	1	➢ Digital audio	T1: 267-268
		➢ Musical Instrument Digital Interface (MIDI)	T1: 270-275
		➢ Audio file formats	T1: 317-323
3	1	➢ Audio processing software	T1: 332-334
		Video: Introduction, Motion video	T1: 340
		➢ Television systems	T1: 353-354
4	1	➢ Video file formats	T1: 384-388
		➢ Video processing software	T1: 393-395
5	1	**Animation:** Introduction ➢ Uses of animation	T1: 399-400
6	1	➢ Computer based animation	T1: 404-410
		➢ Animation file formats,Animation software	T1: 422-426
7	1	Recapitulation and Discussion of important questions	
Total No. of Hours Planned for Unit-II			**7 Hrs**
Unit – III			
S.No.	**Lecture Duration (Hours)**	**Topics to be Covered**	**Support Materials**
1	1	**Introducing Photoshop elements:** About elements	T2: 7-9

		➢ Welcome screen,Create mode	T2: 10-15
		➢ Menu bar, Toolbox, Options bar, Panels	T2: 18-21
2	1	➢ Organizing images: Obtaining images	T2: 27-29
		➢ Tagging images, Searching for images, Opening and saving images	T2: 38-40, 42-43, 46-47
3	1	➢ Selecting Areas: Marquee, Lasso	T2: 109-111
		➢ Magic wand, Selection brush	T2: 112-115
4	1	➢ Quick selection, Smart brush, Inverting a selection, Feathering, Editing Selections	T2: 115-120
5	1	**Layers:** Layering images, Layers panel, Adding layers	T2: 121-124
		➢ Fill and adjustment layers, Working with layers	T2: 125-127
		➢ Layer masks, Opacity, Saving layers	T2: 128-132
6	1	➢ Text and Drawing Tools: Adding and formatting text, Distorting text, Text and shape masks, Adding shapes	T2: 133-140
		➢ Layer styles, Paint bucket tool, Gradient tool	T2: 141-144
7	1	➢ Brush and pencil tools, Impressionist brush tool, Working with color	T2: 145-148
		Recapitulation and Discussion of important questions	
Total No. of Hours Planned for Unit-III			**7 Hrs**
Unit – IV			
S.No.	**Lecture Duration (Hours)**	**Topics to be Covered**	**Support Materials**
1	1	**Understanding Flash:** Understanding Flash basic elements – Creating a simple animation	T3: 10-24

2	1	➢ Learning Flash Toolbox: Learning the toolbox , Using tools	T3: 25-47
3	1	➢ Learning Flash Panels: Understanding the panels	T3: 55-72
		➢ Using timeline and layers: Understanding how timeline works	T3: 77-88
4	1	➢ Understanding layers	T3: 89-98
		➢ Drawing objects: Drawing lines and fills	T3: 103-109
		➢ Using colors	T3: 110-118
		➢ Rotating- skewing and scaling	T3: 119-123
5	1	➢ Grouping objects	T3: 124-128
		➢ Creating animation – How animation works	T3: 133-137
6	1	➢ Creating motion tweens	T3: 142-145
		➢ Creating shape tweens	T3: 146-151
		➢ Understanding masks - Creating masks	T3: 168-176
7	1	Recapitulation and Discussion of important questions	
Total No. of Hours Planned for Unit-IV			**7 Hrs**
Unit – V			
S.No.	**Lecture Duration (Hours)**	**Topics to be Covered**	**Support Materials**
1	1	**Creating symbols and using the library:** Learning about symbols	T3: 183-187
		➢ Creating symbols	T3: 189-197
		➢ Using libraries	T3: 202-210
2	1	➢ Learning Basic ActionScript concepts	T3: 295-298
		➢ ActionScript basics	T3: 299-310
3	1	➢ Data type basics	T3: 312-315

		➢ Learning basic ActionScript Programming, Applying ActionScript	T3: 321-325
4	1	➢ Using ActionScript to Control actions	T3: 329-335
		➢ Using Actionscript to Control properties	T3: 336-339
		➢ Understanding Actions and Event Handlers	T3: 340-342
5	1	Recapitulation and Discussion of Important Questions	
6	1	Discussion of Previous ESE question papers	
7	1	Discussion of Previous ESE question papers	
8	1	Discussion of Previous ESE question papers	
		Total No. of Hours Planned for Unit-V	**8 Hrs**
		Total No. of Hours Planned for the Course	**48 Hrs**

Text Books

T1: Ranjan Parekh, 2013, Principles of Multimedia, 2nd Edition, Tata McGraw hill .

T2: Nick Vandome, 2011, Photoshop Elements 9, Tata McGraw hill.

T3: Brian Underdahl, 2002, Macromedia Flash MX – A Beginners Guide, Dreamtech Press.

T4: Tay Vaughan (2002). Fundamentals of Multimedia (5th ed.). TataMcGraw Hill.

T5: Bill Sanders (2001). Flash 5 Actionscript (1st ed.). New Delhi DreamTech Press.

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UNIT – I

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INTRODUCTION

The word 'multimedia' comes from the Latin words *multus* which means 'numerous' and *media* which means 'middle' or center. Multimedia therefore means 'multiple intermediaries' Multimedia is a combination of following elements. They are

- Text (e.g. books,letters,newspapers)
- Images and graphics (e.g. photographs,charts,maps,logos,sketches)
- Sound (e.g. radio, gramophone records and audio cassettes)
- Video and animation (e.g. TV, video cassettes and motion pictures)

MULTIMEDIA PRESENTATION AND PRODUCTION

The multimedia presentation is basically a digital show in which the contents are expressed through various media types like text, images, audio, video etc., The end users who execute and watch the presentation are called viewers or target audience.

The multimedia presentation is basically playback on a personal computer either from hard disk or the CD-ROM. Sometimes when the audience consists of the large number of people, the presentation may be projected on a big screen using a projection system. Before a presentation can be viewed, however it has to be created. This process is known as multimedia production.

The production work is carried out by a team of professionals equipped with the required skills and knowledge. These professionals are called the developers or the authors and the development work is called the authoring.

CHARACTERISTICS OF MULTIMEDIA PRESENTATION

Multimedia is any combination of text, graphics, art, sound and video elements. The following are the important characteristics of Multimedia presentation. They are

- Multiple media
- Non-linearity

- Interactivity
- Digital representation
- Integrity

Multiple Media

In addition to text, pictures are also started being used to communicate ideas. Pictures were sub-divided into two types.

i. A real-world picture captured by a camera is called images.

ii. A hand-drawn picture like sketches, diagrams and portraits called graphics.

Text, images and graphics are together referred to as static elements, because they do not change overtime. With further improve in technology, time varying elements like sound and movies were used. Movies are again divided into two classes. They are

- Motion pictures
- Animation

Legitimate multimedia presentation should contain at least one static media like text, images or graphics and at least one time varying media like audio, video or animation.

Non-Linearity

Non-Linearity is the capability of jumping or navigating from within a presentation with one point without appreciable delay.TV shows and motion pictures are considered linear presentation because the user or viewer has to watch the information being prescribed. The user cannot modify the content. In a multimedia presentation the user can instantly navigate to different parts of the presentation and display the frames in any way, without appreciable delay, due to which it is called a non-linear presentation.

Interactivity

In a non-linear presentation user will have to specify the desire to watch the presentation. The presentation should be capable of user inputs and capable of change the content of the presentation. Interactivity is considered to be one of salient features on which next generation e-learning tools are expected to reply for greater effectively.

Digital Representation

Magnetic tapes are called the sequential access storage devices (i.e.) data is recorded sequentially along the length of the tape. When a specific potion of the data is required to be played back, the portion before that needs to be skipped. Multimedia requires instant access to different portion of

the presentation. This is done by random access storage devices like hardware, floppy disks, and compact disks. Digital representations has other advantages, software based programs can be used to edit the digitized media in various ways to appearances and compress the file sizes to increase the performance efficiency.

Integrity

An important characteristic of a multimedia presentation is integrity. This means that although there may be several media types present and playing simultaneously, they need to be integrated or be part of a single entity which is the presentation. It should not be able to separate out the various media and control them independently; rather they should be controlled from within the frame work of the presentation. Moreover, the presentation should decide how the individual elements can be controlled

HARDWARE & SOFTWARE REQUIRMENTS:

Hardware and software requirements of a multimedia personal computer can be classified into tow classes. They are:

a. Multimedia playback

b. Multimedia production

Multimedia playback:

 Processor – At least Pentium class and minimum of 8MB RAM-to-32MB RAM.

 Hard disk drive(HDD) – Atleast 540MB having 15M/s. access time and should be able to provide 1.5MB per second sustained throughput.

 The monitor and video display adapter should confirm through SVGA standards and support 800x600 display modes with true color.

 CD-ROM drives having a speed of at least 4X but highest speed like 36X are recommended.

 PC should have a **sound card** with attached speakers standard 101 keys keyboard and mouse.

 Multimedia PC system software should be compatible with windows 95 or higher, with standard software with playback of media files in standard formats.(e.g.) Windows Media Player.

Multimedia production:

 Processor - Pentium II or higher, memory should be at least 128MB with 256MB recommended.

 Hard disk drive (HDD) – Typical requirements would be around 10GB with 40GB recommended.

 The monitor and video display adapter should confirm through SVGA standards and should be able to support 800x600 display mode with true color, RAM should be 4MB to 8MB.

 CD-ROM drive having a speed of at least 4X to 36X, PC should have a CD writer.

 PC should have a **sound card** with attached speakers standard 101 keys keyboard and mouse.

 Multimedia PC system software should be compatible with windows or higher, with standard software with playback of media files in standard formats. (e.g.)Windows Media Player.

 Editing software is used to manipulate media components to suit the developers, requirements. (e.g.) Adobe Photoshop, Flash, Cool Edit, and sound Forge.

 Authoring softwaresare used to integrate all the edited media into single presentations and build navigational pathways for accessing the media.

 To display the web content **web browsers** will be required. (e.g.) MS Internet Explorer, to create web content HTML, and java Script editors might be required (e.g.) Macromedia, dream viewer.

USES OF MULTIMEDIA

Multimedia has found extensive applications in various and varied fields. The following are some of the main areas where this technology is applied.

- Home entertainment
- Educational purposes
- Industrial training
- Information kioks
- Corporate presentations
- Business
- Tourism and Travel industry
- Electronic Commerce
- Communication and Networks
- Medicine and Healthcare
- Engineering Applications
- Content based storage and retrieval (CBSR) systems.

Home Entertainment

Application of Multimedia technology related to home entertainment includes computer based games for kids, interactive encyclopedia‘s, storytelling, cartoons etc., Computer games are one of the best application of Multimedia because of the high amount of interactivity involved.

Educational purposes

These applications include learning packages and simulation of lab experiments (especially those which cannot be easily performed). The multisensory perceptions of such study material are expected to provide a good grasp of the subject matter and interactivity elements to provide for better retention.

Industrial Training

These applications involve computer based training (CBT) for employee both technical and marketing. Successful organizations are required t maintain a high level of staff training and development. Some of the advantages of industrial training courses are:

(i) Many people can use each of these courses.

(ii) They do not need to spend time away from office.

(iii) People can learn at their own pace.

(iv) Full time instructions are not required.

(v) Because the best instructors could be used to make these CBT‘s they could be of a high quality.

Information kiosk

These are devices where information is accessed through a touch screen and viewed on a monitor. Examples can be include multi-lingual product, catalog‘s for placing orders or for dispensing important information Bio‘s can also be used to capture statistical data for an in-depth marketing research to be carried out on customer trends.

Corporate presentations

Corporate presentations are emphasizing the salient features and activities of a company, its products, business partners like suppliers and retailers can be built by incorporate multimedia elements along with textual descriptions.

Business

Items like glass utensils are difficult to stock; industrial equipment can be displayed through perspectives buyers by company sales people through multimedia presentations.

Tourism and Travel industries

Travel companies can market packaged tools by showing prospective customers, glimpses of the places they would like to visit, details on lodging, fooding, special attractions. A multimedia system implementing intelligent travel agent software will enable the user to their travel need and budget.

Electronic Commerce

Like the travel industry, customized presentations for consumer and industrial products can be created and distributed to prospective customers.

TEXT

INTRODUCTION

In multimedia presentations, text can be combined with other media in a powerful way to present information and express moods. Internally text is represented via binary codes as per the **ASCII table.** The ASCII table is however quite limited in its scope and a new standard has been developed to eventually replace the ASCII standard. This standard is called the **Unicode** standard and is capable of representing international characters from various languages throughout the world. We also generate text automatically from a scanned version of a paper document or image using Optical Character Recognition (**OCR)** software.

TYPES OF TEXT

There are three types of text that can be used to produce pages of a document:

- Unformatted text
- Formatted text
- Hypertext

Unformatted Text:

Also known as plaintext, this comprise of fixed sized characters from a limited character set. The character set is called **ASCII table** which is short for American Standard Code for Information Interchange and is one of the most widely used character sets. It basically consists of a table where each character is represented by a unique 7-bit binary code. The characters include a to z, A to Z, 0 to 9, and other punctuation characters like parenthesis, ampersand, single and double quotes, mathematical operators, etc. All the characters are of the same height. In addition, the ASCII character set also includes a number of control characters. These include BS (backspace), LF (linefeed), CR (carriage return), SP (space), DEL (delete), ESC (escape), FF (form feed) and others.

Formatted Text:

Formatted text are those where apart from the actual alphanumeric characters, other control characters are used to change the appearance of the characters, e.g. bold, underline, italics, varying shapes, sizes, and colors etc., Most text processing software use such formatting options to change text appearance. It is also extensively used in the publishing sector for the preparation of papers, books, magazines, journals, and so on.

Hypertext:

The term Hypertext is used to mean certain extra capabilities imparted to normal or standard text. Like normal text, a hypertext document can be used to reconstruct knowledge through sequential reading but additionally it can be used to link multiple documents in such a way that the user can navigate non-sequentially from one document to the other for cross-references. These links are called **hyperlinks.** Microsoft Home Page The underlined text string on which the user clicks the mouse is called an **anchor** and the document which opens as a result of clicking is called the **target document.** On the web target documents are specified by a specific nomenclature called Web site address technically known as **Uniform Resource Locators** or URL. **Node or Anchor:** The anchor is the actual visual element (text) which provides an entry point to another document. In most cases the appearance of the text is changed from the surrounding text to designate a hypertext, e.g. by default it is colored blue with an underline. Moreover the mouse pointer changes to a finger icon when placed over a hypertext. The user usually clicks over the hypertext in order to activate it and open a new document in the document viewer. In some cases instead of text an anchor can be an image, a video or some other non-textual element (**hypermedia).**

Pointer or Link These provide connection to other information units known as **target** documents. A link has to be defined at the time of creating the hyperlink, so that when the user clicks on an anchor the appropriate target document can be fetched and displayed. Usually some information about the target document should be available to the user before clicking on the anchor. If the destination is a text document, a short description of the content can be represented.

TEXT FILE FORMATS

The following text formats are usually used for textual documents.

TXT (Text)

Unformatted text document created by an editor like Notepad on Windows platform.This documents can be used to transfer textual information between different platforms like Windows, DOS, and UNIX,

DOC (Document)

Developed by Microsoft as a native format for storing documents created by the MS Word package.Contains a rich set of formatting capabilities.

RTF (Rich Text Format)

Developed by Microsoft in 1987 for cross platform document exchanges. It is the default format for Mac OS X‘s default editor TextEdit. RTF control codes are human readable, similar to HTML code. ***table 2.3 pgno:50****

PDF (Portable Document Format)

Developed by Adobe Systems for cross platform exchange of documents. In addition to text the format also supports images and graphics. PDF is an open standard and anyone may write

programs that can read and write PDFs without any associated royalty charges. *******pg no 51******table 2.4

PostScript (PS)

Postscript is a **page description language** used mainly for desktop publishing. A page description language is a high-level language that can describe the contents of a page such that it can be accurately displayed on output devices usually a printer. A PostScript interpreter inside the printer converted the vercorsbacki into the raster dots to be printed. This allows arbitrary scaling, rotating and other transformations

IMAGE PROCESSING SOFTWARE

An image-processing software like Adobe Photoshop, offers a variety of tools and graphical interfaces to perform image-processing tasks. We discuss below some of the salient features.

Object Selection Selection tools enable us to select a specific portion out image and manipulate it or copy it to another image. The selection border may be geometrical in shape like rectangular, circular, polygonal, or it may be irregular in shape. Selections may also be done based on color instead of shapes. Selected portions are frequently copied from one image to another or even to another location within the same image. When copying and pasting a selected portion, a parameter called **feathering** is used to determine whether the boundary of the selected portion has a clear and crisp border or a fuzzy border. In case of a fuzzy border, some of the background pixels from the neighbourhood of the selection is also copied along with the selection.

ColorSelectionColor-selection functions are used to select foreground and background colors from a **colorpalette** usually by clicking. They also usually allow specifying colors by their values in *RGB*, *CMYK*, *HSB* or Lab color models. A **colorswatch** is usually available as a rectangular grid of some frequently used colors. An **out-of-gamutwarning** is indicated beside a selected RGB color if the color cannot be mapped to the *CMYK* gamut, i.e., the color cannot be printed out. An **eyedropper** tool enables one to select a color from existing image.

Painting and Drawing Tools The painting and drawing tools are used to paint lines, shapes, or fill regions with specified colors. Painting strokes are usually controlled by a **paintbrush** with parameters like **diameter** and hardness. Brush diameter controls the thickness of the lines, while **hardness** determines whether the lines have clearly defined or fuzzy boundaries. A parameter

like **tolerance** controls how much of a region is filled with a color when the mouse is clicked within the region. An **airbrush** tool might be provided to simulate spray painting.

Anti-aliasing Aliasing means a false presentation of visual data. When displaying images with curves and diagonal lines on the screen one can often find that these lines look jagged instead of smooth. A sort of staircase effect replaces what should be smooth curves and diagonal lines, and hence, this effect is known as **aliasing**. Anti-aliasing is a method to counter this staircase effect and restore the smooth appearances of curves and diagonal lines. To understand how anti-aliasing works, we first need to determine the cause of aliasing. When the images are displayed on the screen, they have to be projected on a rectangular grid of pixel blocks. These blocks cannot accurately follow the smooth curves of the image, making them look jaggedThe rectangular shape of the pixels, however, cannot be changed as they form part of the display device hardware. To rectify this effect, anti-aliasing methods reassign pixel values in the neighborhood of the aliased areas, thereby creating a gradual toning effect between the curved shapes and the background. Instead of an abrupt transition from black to white which accentuates the jagged appearance, intermediate shades of gray are inserted between them to create an optical illusion of a smoothening effect. See Fig. 3.92

Fig. 3-92*Anti-aliasing techniques produce a smoother look*

DitheringDithering is a technique to improve the appearance of an image having a limited number of colors, like an indexed color image, especially when transformed from an image with higher color depth. In this case, the colors which are not available in the palette are simulated by varying the concentration of the dots of the existing colors. For example, the density of red dots on a white background can be controlled in various degrees to produce different shades of pink, although pink as a separate color may not be available in the color palette. In Fig. 3.93, when the 24-bit image is converted to the 8-bit version, color bands appear because the intermediate shades cannot be represented using small bit depths. In these cases, using dithering may produce significant improvements in the image quality by changing the distribution of the dots in the transition regions to make the clear border of the bands fuzzy and less apparent.

Fig. 3-93*(a) Original 24-bit image (b) 8-bit version showing color bands (c) 8-bit version with dithering (Refer Plate 8)*

Half-toning The essential technique of shades by varying the dot size and spacing is also referred to as half-toning, usually when used in the context Of printing. Since, a typical printing press does not support the full tonal variation of an 8-bit grayscaleimage, a stepped tonal variation is simulated by passing the light from an image through a perforated screen to obtain a subset of the total number of shades. For example, as seen in Fig. 3.94, from a continuous gradient of white to black, 5 regularly spaced perforations can be used to obtain 5 representative sub-set of shades, viz., 0%, 25%, 50%, 75%, 100%. Now the subset of gray shades is represented by the printing equipment by varying the dot size of the ink, viz., brighter shades by more whitespace and darker shades by more black dots. The spacing between the dots can also be varied to obtain more number of shades. Also note that all these shades of gray are obtained from two colors, black and white, by varying the distribution of the dots, and hence, is an illustration of dithering as well.

Gradients The gradient tool allows creation of various types of gradients like linear, circular, diamond shaped, etc. A gradient editor allows selection of various colors and their spans within the gradient. See Fig. 3.95(a).

Text The type tool is used to write text in varying sizes, fonts and orientations, along with added effects like emboss and drop-shadow. The text can be filled either with a single color or gradients or patterns. SeeFig.3.95(b).

Fig. 3-95*Variations in (a) Gradients and (b) Text*

Transformation These transformation tools are used to transform specific portions of an image in various ways like moving, rotating, scaling, skewing, distorting, etc. The entire canvas of the image can also be rotated or its dimensions can be modified.

Tonal Adjustments Tonal adjustment functions allow improving the brightness and contrast of the image using histogram equalization. A histogram is a plot of the number of pixels against the intensities ranging from 0 to 255. If an image histogram is clumped towards the center instead of being spread out over the entire range, it indicates that the image does not have pure black or pure white regions and hence, low on brightness and contrast. To improve brightness/contrast, a set of sliders are provided which work by mapping the final values to initial values. For example, if a slider at its initial default value of 255 is dragged to the left to a final value of say 200, all the values from 200 to 255 are mapped to 255, thereby increasing the brightness of the corresponding pixels. Another set of sliders work just opposite and are used to decrease contrast/brightness Of high contrast regions by mapping initial values to final values, e.g., converting 255 to 200 for the previous example.

ColorAdjustmentsColor adjustment functions allow changing the color content of images. The color balance function enables increasing and decreasing the amounts of primary and secondary colors in an image using sliders. The hue saturation function allows the independent variation of hue, saturation, and lightness Parameters. A replace color function might allow selection of specific portions of an image and change their color content.

Retouching A set of retouching tools are provided to make small changes for finishing jobs, e.g., change brightness/contrast, color hues, saturation, blurring/sharpening, and smudging in small, specific portions of an image.

Layers The concept of image layers allow the user to edit portions of an image independent of other portions, by splitting the image into separate layers. Layers can be thought to be sheets of transparent plastic Stacked on top of one another. One can draw, edit, paste, and reposition elements on one layer without disturbing the others. Layers can be made invisible, duplicated, deleted, or made transparent. Multiple layerscan also be merged into a single layer. Each layer can be individually selected and edited without disturbing the content of other layers. Contents in upper layers appear on top of contents in lower layers as one from above. The layers can be

viewed and manipulated using a Layers palette. Opacity of layers can also reduced so that content of the underlying layers can be made partially visible. See Fig, 3.96(a).

Fig. 3.96*(a) Layers (b) Channels (Refer Plate 8)*

ColorChannelsColor channels separate out the pixels of the primary colors of an image and allow the user to edit each color independently. Whatever changes are done, for example, to the blue channel affects only the blue pixels in the image. Channels can be viewed and manipulated individually using a Channels palette. Each channel contains 8-bit information and, therefore, appears as a grayscale image. Superposition of all three channels create the 24-bit color image. See Fig. 3.96(b).

Cloning Clone tools allow duplicating specific portions of an image. Clone tools can also help remove unwanted objects from images by cloning the background over those objects. See Fig. 3.97.

Fig.3.97 *Cloning*

MasksMasks allow the user to select areas of an image and protect these from editing changes applied to the rest of the image. A mask is analogous to a piece of opaque plastic placed on paper before applying paint over it so that the area beneath the plastic is protected from the paint. Masks enable us, for example, to apply filters on specific portions of an image, while protecting the remaining portions .In Fig. 3.98, the mask is visible over the image on the left as a translucent red covering, which indicates the protected area, while the circular hole in the center and the angled lines indicate the unprotected area. When an editing operation is done on the image, e.g., changing its color, the masked area remain unchanged while the change takes place within the unprotected region. A mask can be saved in the channels palette and can contain 256 levels of transparencies. Such a channel is referred to as an **alpha channel**.

Erase and Move Erase tools allow removing specific portions of an image. Erasing a portion exposes contents on lower layers. Move tools enable selecting portions of an image and moving them to different locations by dragging.

ThresholdingThresholding is a technique of converting color than or grayscale images to binary images.it requires setting up a thresholdinglevel such that and all pixels lighter than the threshold are converted to white and all pixels darker than the value are converted to black. By adjusting the threshold value, varying details of image objects can be made visible with respect to other objects which are made invisible. See Fig. 3.99.

Fig. 3-99*Thresholding using different levels (a) 70 (b) 128 (c) 180*

FiltersFilters are algorithms that accept image data and transform the data in pre-defined ways to create special effects. See Fig. 3.100.

Fig.3.100*Image filters: (a) Original (b) Radial blur (c) Mosaic (d) Glass (e) Emboss (f) Zigzag (g) Pointillize*

GRAPHICS

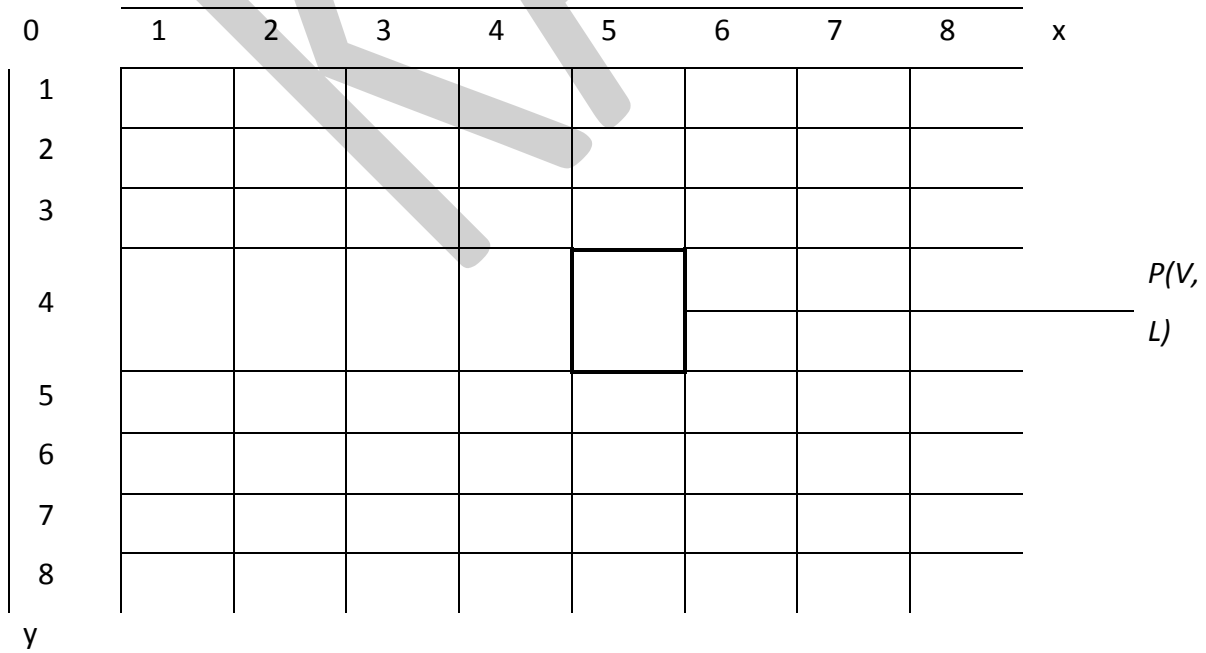
Introduction

After the text the next element that comes under the purview of multimedia is the picture. A picture being "worth a thousand words" can impart a large amount of information in a compact way. It is a fact that most people dislike going through text especially on a computer screen, and so it has been the endeavor of most multimedia developers to supplement words with pictures in presentations. The pictures that we see in our everyday life can be broadly classified into two groups: those that depict some real-world situation typically captured by a camera, and those that have been drawn or painted and can depict any fictitious scenario. The first type of picture is called an image and the second type is called graphics. Images are the subject matter of this chapter while graphics are dealt with in the next chapter. Digital images are considered to be made of a collection of structural elements called pixels arranged in the form of a grid of rows and columns. The term image is used henceforth to mean digital image unless specified Otherwise. Images are acquired into a computer system using digitizing devices like scanners and digital cameras. After acquisition, such images are processed using mathematical algorithms. For the sake of processing, images are considered to be two dimensional (2D) matrices of elements, each element having specific values. The objectives of image processing are frequently to enhance the quality of images like improving the brightness, contrast, and color composition, as

also to manipulate the image based on the requirement of the end user like rotating, scaling, and cropping a region of interest. After processing, the image is displayed on an output device like a monitor or printer. Characteristics of the output devices determine how the image is actually displayed to the end-user. For storing the images on the computer hard disk, a number of file formats along with a variety of compression schemes are available. Developers choose the specific file format and scheme depending on their requirements and constraints.

Image Data Representation.

Digital image is a 2-dimensional (2D) array of points each associated with a value. The arrangement can be represented by a functionf(x,y) where (x, y) are spatial coordinates of a point within the image and the function f denotes the value of the specified point. The point is referred to as a pixel and the value is the intensitylevelof the pixel, i.e., a measure of how bright the point is. Analog images in the real world (e.g., a painting on paper, a conventional photograph on film) are continuous entities (at least at distance scales used in our daily lives), but their digital representations are a collection of discrete points, each specified by a pair of coordinate values and an intensity value. Hence, we say that an image is made up of a finite collection of pixels, so the pixels are considered to be the structural units or building blocks of an image (similar to molecules making up of a real-world object). Typically, an image is represented as a grid of square blocks, where each blockrepresents one pixel. See Fig. 3.1. It depicts an image composed of 8 x 8 or 64 pixels, each pixel P having a specific value v and location L. The pixel value v is usually depicted by an integer or a floating-point number, and physically represents the brightness or color of the image at that point. The location L is represented as a pair of coordinates, measured with respect to an origin O -located at the top-left corner, the X-axis from left to right and the Y-axis from top to bottom.Thus, the pixel highlighted in the below Figure, has a location (5, 4), while its value can be represented in a different form depending on the type of image as explained below.



An image as a close collection of pixels

Images can broadly be divided into three types depending on the range of pixel values:

- **Binary** images, whose pixel values are either 0 or
- **Grayscale** images, whose pixel values are integer numbers within the range 0 to 255.
- **Color** images, whose pixel values are made up of three sub-units, within the range 0 to 255.

Typesofimage: (a) Binary (b) Grayscale (c) Color (Refer Plate 1)

Consider in the above Fig. 3.2 where the same image is depicted in three versions: (a) binary, (b) grayscale, and (c) color. An 8-pixel-by-8 pixel region from each image (enclosed in red square) is magnified as shown below. Theblocks in the magnified regions are the actual pixels. These pixels are represented by specific values. A **binary images**is seen to consist of either white or black blocks. The corresponding pixel values are represented as a2D matrix by inserting '1 ' for the white blocks and '0' for the black blocks, as shown below the region, enabling a binary image to be stored using I-bit information. For the **grayscale image** a region from the same part of the image is seen to contain blocks of various shades of gray. Usually, a grayscale image is represented using 8-bit information, so pixel values can range from 0 (for pure black) to 255 (for pure white), since $2^8 = 256$. Higher values indicate lighter shades while lower values indicate darker shades. The pixel values in the figure are seen to range in value from around 220 for the lighter blocks to around 50 for the darker blocks. For the **color image**, a region from the same part of the image is seen to contain blocks of various shades of color ranging from blue for the sky to brown for the rock. The pixel representation of such a color image consists of three different matrices each having values ranging from 0 to 255, i.e., each pixel is represented by three subunit values. The first matrix called R represents amount of red in the image, the second called G represents the amount of green in the image, and the third called B represents the amount of blue in the image. A combination of the three colors is required to display the actual colors in the image. Such a color image is said to be in RGB mode. The details of such representation will be explained in subsequent sections. For the time being, notice that blue portions corresponding to high values in the B matrix while brown portions correspond to high values in the R and G matrices. Also, a specific pixel is represented by three 8-bit numbers, e.g. the pixel at the top-left corner has a value (117, 171, 231). So a color image requires 24-bit

information to be stored. Programming languages like **MATLAB** can be used to manipulate image data using a variety of operations and functions. This is discussed in Section 3.4 below.

GRAPHICS

Introduction

While the term "image" refers to a real-world picture usually taken by a camera and later on digitized for computer usage, a "graphic" denotes something that is hand-drawn. A traditional graphic would be a drawing or sketch on paper by an individual, which can range from simple line drawings like charts and architectural drawings to complex color portraits that can almost resemble an image, e o., Mona Lisa. Hence, "graphics" implies a synthetic pictorial representation. When represented digitally a graphic can be broadly categorized into two types: raster graphic and vector graphic. A raster graphic has similar properties to an image, i.e., it is represented internally as a collection of pixels. An example would be a drawing on paper subsequently digitized using a scanner. The input, editing, and output stages of a raster graphic would be almost identical to that of an image.

We are going to consider the second type of graphics called vector graphics. These kinds of graphics are generated using computer software tools and hence belong to the digital domain from the start, i.e., does not need to go through a digitization phase. Moreover, instead of being a collection of pixels, these graphics are internally represented as mathematical entities or vectors, e.g., equations, arrays, matrices etc. Such a representation has a lot of advantages, for example, they have compact file sizes and can be scaled to any size without degradation in quality.

To display graphics on a monitor screen requires a graphics interpreter that can interpret the mathematical relations and generate pixels to display the objects on the screen. To locate graphical objects accurately on the screen requires a coordinate system consisting of a pair of perpendicular axes and a pair of coordinates for each point on the object. When displaying graphical objects, the system does not usually need to create everything from scratch but makes use of a set of pre-defined primitives like lines, curves, polygons etc., and expresses other objects as combinations of these. Algorithms for generating primitives include line-drawing algorithms, circle-drawing algorithms, algorithms for filling a specified shape with a specified color, or algorithms for clipping lines against a rectangle.

Once a graphical shape is drawn on the screen, transformations might be applied to them, e.g., translation, rotation, scaling, reflection and shear. To draw 3D graphics, we require a 3D coordinate system with three perpendicular axes along three directions: length, width, and height. To display the 3D objects onto a 2D viewing screen requires a set of projection techniques.

Advantages of Graphics

A vector representation of graphics provides a number of advantages:

- Because of the fact that they are not represented as pixel data but simply as a set of equations and their related parameters, means that internally they could be represented as textual data, and hence are very**compact**. The small file sizes of graphics make them an ideal choice where quick processing or limited bandwidth and storage capabilities are of primary concern, e.g., Internet and Web-based applications. For example, a graphic of a cycle wheel could be represented as a concentric circle with a number of straight lines radiating outwards from the center for the spokes.
- A graphic has the ability to **adapt** to varying magnification scales or zoom factors. An image (or raster graphic) is composed of a fixed number of pixels and when magnified, the distance between them increases. This leads to a degradation of the image quality referred to as **pixelation**. A graphic, however, does not undergo pixilation: no matter how much it is magnified it retains its crisp and smooth look throughout because when displayed on the screen, pixels are created dynamically from mathematical entities and number of pixels are adjusted to suit the magnification factor.
- Since the graphic is generated using software tools, an application has complete knowledge of equations used to create the graphic and value of the related parameters, e.g., the radius of a circle, the coordinates of the center, the points where a line intersects the circle, etc. Hence, appearance of the graphic may be changed very quickly by writing programs, e.g., multiply the radius by 3 and move the center by 5 units along the Y-axis. This makes graphics ideal for **animation**-based applications.
- A user can input mathematical relations and ask the system to create graphical objects to represent them pictorially. This is the basis for plotting charts and graphs based on user-specified data. The data may either be specified either by a relation, e.g., $y = e^x$ or

by a table of values, which the system can be asked to plot and even find out a matching relation. An existing graphic can be changed by changing its related parameters. This makes graphics suitable for **interactive** applications.

- Extensions of simple two-dimensional graphics by including the third dimension have led to the generation of **3D graphics** and animation. These graphical objects are defined using 3D geometry, which enables them to be rotated and viewed from any angle in 3D space. These have been widely used in ComputerAided Design (CAD) applications as well as in the film and game industry. File formats like 3D Studio MAX have been developed to exploit the capability.

Uses of Graphics

Due to the advantages of graphics it has been applied to a large number of uses in various applications:

User Interfaces Allows creation of point-and-click items of a graphical user interface like menus, button, windows, selection lists, etc. Complex tasks can be achieved by clicking or dragging the cursor over items in the GUI.

Office Automation With the advent of desktop publishing, the pictorial representation of data like charts, graphs, logos, histograms, tables, etc., have found increasing use in office automation applications.

Design and Drafting Tools Application software now allow users to design and create their own graphical 2D and 3D models using CAD tools. This has found extensive use in fields of architectural, mechanical, electrical, electronic, and computer science.

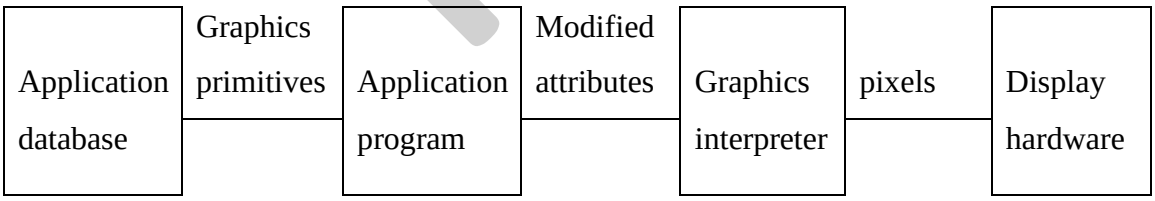
Simulation and Animation Graphical animations are used increasingly nowadays to study related to atomic structure and nuclear reactions, fluid flow, chemical molecular transformations, physical phenomena pertaining to optics, acoustics, etc., astrophysics, physiological systems and organ function Simulation packages are used for training. e.g., flight simulations for pilots, as well as for studying phenomena which is difficult to replicate physically, e.g., radioactivity, nuclear fission, process control applications, simulation of power plants, steel fabrications, missile guidance, etc.

Art and Commerce Computer graphics are nowadays extensively used to design and create artwork for interior decorations of private homes, offices, hotels, super-markets, etc., as well as for fashion design, tailoring, printing applications like calendars, diaries, etc. Film and

television commercials use graphics to design program banners, advertisements, and special effects.

Components of a Graphics System

A graphics system has a number of components to display graphic elements on the screen. See Fig. 4.1 A graphics system has a number of components to display graphic elements on the screen. See Fig. 4.1. A repository, called an **application database**, stores elementary shapes like lines, shapes, curves, polygons, circles, etc., collectively called **primitives**. The primitives are frequently used to create more complicated Objects and their presence in the application database ensures that the developer does not need to create these every time but can simply select and use them from the repository when required. An **application Program** with which the user interacts, is used to create, store, and retrieve graphical objects. Depending on user requirements, the application program uses sets of primitives from the database to create the final graphics on the screen. The program also manipulates the parameters of the primitives to produce a customized graphics object, e.g., the color, line style, position, dimensions, etc. These are collectively called **attributes** of the Primitives. A **graphics interpreter** interprets the mathematical entities and generates the required pixels for displaying the graphical object on the screen, a process called **rendering**. The graphics interpreter is also responsible for changing the view of the graphics based on user interaction with the program, e.g., zooming or panning. Finally the **display hardware**, e.g., a monitor, displays the rendered graphics on the screen, usually using structural units like **pixels**. The quality of the graphics is determined to a large extent by the **resolution** supported by the hardware.



Components of a graphics system

Possible Questions

Part - B (8 Marks)

1. Define Multimedia. Explain various components of Multimedia.
2. Discuss the uses of Multimedia.
3. What is meant by text and Explain different file formats of text.
4. Describe about Image Data Representation.
5. Discuss on Image File Format.
6. Explain Image Processing Software.
7. Define Graphics. Discuss on uses of Graphics.

KARPAGAM ACADEMY OF HIGHER EDUCATION

COIMBATORE - 21

DEPARTMENT OF COMPUTER SCIENCE,CA & IT

CLASS : III B.Sc COMPUTER TECHNOLOGY

BATCH : 2016-2019

Part -A Online Examinations **(1 mark questions)**

SUBJECT: MULTIMEDIA AND ITS APPLICATION **SUBJECT CODE: 16CTU504B**

UNIT-I

S.NO	Question	opt1	opt2	opt3	opt4	Answer
1	The people who weave multimedia into meaningful tapestries are _____	Multimedia producers	Multimedia developers	Multimedia Projectors	Multimedia Creatures	Multimedia developers
2	Forerunner of WWW is	Memex	Internet Explorer	Web browser	Intranet	Memex
3	Multimedia elements are typically seen together into a project using_____	Editing Tools	Unauthoring tools	Integrated Tools	Authoring tools	Authoring tools
4	GML Stands for _____	Generalized Markup language	Generalized Multimedia language	Generalized Makeup language	Global Markup language	Generalized Markup Language
5	Adobe illustrator is ____ tool	Editing	Video	Publishing	Audio	Publishing
6	_____is a video production tool.	Sound forge	Premiere	Flash	Photoshop	Premiere
7	_____is a Audio production tool.	Sound forge	Premiere	Flash	Photoshop	Sound forge
8	_____is a Animation tool.	Sound forge	Premiere	Flash	Photoshop	Flash
9	_____is a Graphics tool.	Sound forge	Premiere	Flash	Photoshop	Photoshop
10	3D Studio Max is a tool for____	Authoring	Timeline window	Media files	Character Animation	Character Animation
11	_____are monitors that have a textured coating across the glass surface.	Track balls	Joystick	Touch screen	MICR	Touch screen
12	Cool Edit is a popular _____ tool	Audio	Video	Editing	Movie	Audio

13	Painting software is dedicated to producing_____	vector images	animations	3-D images	bitmap images	bitmap images
14	___ is a flow control or iconic metaphor	Director	Authorware	Java 3D	Flash	Authorware
15	Nodes are ____ for links to other pages	Anchors	Viewpoint	Images	Transition effect	Anchors
16	_____is used for special effects	Filters	Frames	Layers	Styles	Filters
17	_____is a Movie making tool	Sound Forge	Quicktime	Premier	Flash	Premier
18	_____is an area of memory where data such as text and images is temporarily stored when you cut or copy them within an application	file	directory	clipboard	desktop	clipboard
19	Placing real-appearing computer graphics and vide objects into scenes	Augmented reality	Telemedicine	Audio cues	Teleconferencing	Augmented reality
20	QoS means _____	Quality of server	Quantity of Service	Quality of Service	Quantity of Server	Quality of Service
21	_____ aims to develop smart clothing	Augmented reality	Telemedicine	Audio cues	Digital Fashion	Digital Fashion
22	_____ invented the motion picture camera	Thomas Alva Edison	Alexander	Babbage	James Watt	Thomas Alva Edison
23	Online System" was demonstrated by	Thomas Alva Edison	Marconi	Douglas Engelbart	Vannevar Bush	Douglas Engelbart
24	Java is platform ____ language	Dependent	Independent	Compiled	Executed	Independent
25	Who proposed the World wide web?	Douglas Engelbart	Vannevar Bush	Tim Berner	Nicholas	Tim Berner
26	____was accepted as the international standard for digital image compression	GIF	JPEG	MPEG	BMP	JPEG

27	_____ is a text which contains links to other texts	Hyperimage	Hypermedia	Image	Hypertext	Hypertext
28	____ is now called Pro Audio	Cakewalk	Cubase	CoolEdit	Cool Edit Pro	Cakewalk
29	____ is a music sequencing and editing program	Sound forge	Cubase	CoolEdit	Cool Edit Pro	Cubase
30	____ is a component of multimedia	Video	Distributed network	Teleconferencing	Telemedicine	Video
31	Sound Forge is a digital audio editing suite created by _____	Adobe	Macromedia	Microsoft	Sony	Sony
32	____ is a powerful audio mixing, recording , and editing software	Fireworks	Protools	Cakewalk	Cubase	Protools
33	_____ is a powerful publishing tool for creating and editing vector graphics	Adobe Photoshop	Adobe Flash	Adobe Audition	Adobe Illustrator	Adobe Illustrator
34	Which of the following tool is called as Filters factory	Adobe Photoshop	Adobe Flash	Adobe Audition	Adobe Illustrator	Adobe Photoshop
35	In addition, Photoshop comes with a sub program called _____	Adobe Audition	Adobe Flash	Adobe Imageready	Adobe Illustrator	Adobe Imageready
36	All products of Adobe Systems support _____ feature	Animation	Layers	Filters	Sound editing	Layers
37	____ is a graphics editor developed by Macromedia	Photoshop	Imageready	Fireworks	Illustrator	Fireworks
38	In ____ tool video and audio are arranged in tracks like a musical score	Adobe Premiere	Imageready	Fireworks	Illustrator	Adobe Premiere
39	_____ is a rendering package created by Pixar	3D studio max	Maya	Softimage XSI	RenderMan	RenderMan
40	____ is a complete modeling package with realistic clothes and fur	3D studio max	Maya	Softimage XSI	RenderMan	Maya
41	Elements in the movie are called _____ in Flash.	Objects	Symbols	Tools	Functions	Symbols
42	_____ uses a movie metaphor to create interactive presentations	Adobe Premiere	Imageready	Fireworks	Director	Director

43	____uses a type of flowcharting metaphor	Macromedia Director	Authorware	Quest	Macromedia Flash	Quest
44	The content of ____ files are not editable	PPT	BMP	DOC	PDF	PDF
45	___ allows to create interactive shockwave movies to play over the web	Authoring	Flash	Director	Photoshop	Director
46	Motion picture camera was invented in the year ___	1990	1927	1887	1880	1887
47	Gifcon is an example for ___	GSM	Gif animation package	Authoring tool	Video file	Gif animation package
48	Silent films appeared from the year ____	1925	1810	1920	1910	1910
49	Van Dam created an early hypertext editor called ____	HTML	VBSCRIPT	FRESS	XML	FRESS
50	____ is a leading research institution investigating digital video and multimedia.	Apple Multimedia Lab	Bell Lab	MIT Media Lab	Microsoft Lab	MIT Media Lab
51	PDAs were introduced in the year ____	1990	1991	1992	1995	1991
52	Which among the following is not a digital audio tool?	Cool edit	Soundforge	Cubase	Protools	Cubase
53	Which version of cool edit pro supports MIDI files	2.1	2.0	3.1	3.0	2.0
54	Netscape is a ____	Web Browser	Design tool	Editing tool	Publishing tool	Web browser
55	Illustrator CS5 is of _____ generation	fifteenth	fifth	fourth	fourteenth	fifteenth
56	Which is not a product of Adobe?	In design	Fireworks	Photoshop	Imageready	Fireworks
57	_____is a set of different stacked elements that contains different parts of an image	Sprite	Frames	Scene	Layer	Layer
58	_____ features allows two or more separate images into one	Merging layers	merging images	merging frames	merging scenes	merging images

59	____ is a technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view.	Augmented reality	Telemedicine	augmented interaction	Teleconferencing	Augmented reality
60	Each item in a Tree View is called _____	branch	subtree	leaf	node	node

UNIT II

SYLLABUS

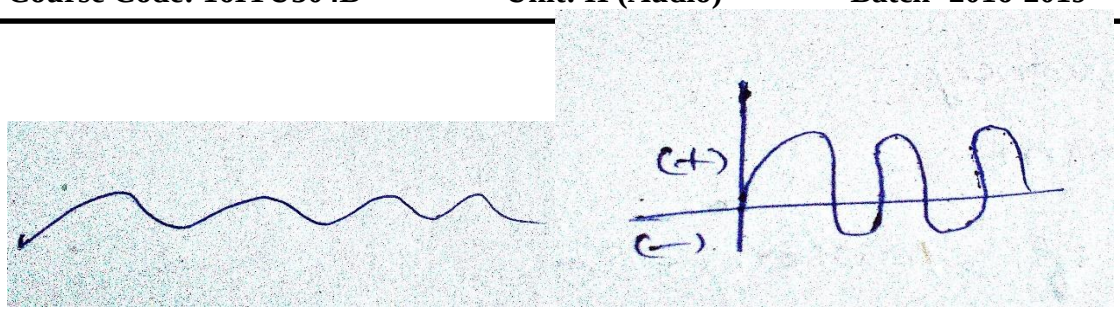
Audio: Sound waves – Types and properties of sound – Components of audio system – Digital audio - Musical Instrument Digital Interface (MIDI) – Audio file formats – Audio processing software. Video: Motion video – Television systems – Video file formats – Video processing software. Animation: Uses of animation – Computer based animation – Animation file formats – Animation software.

INTRODUCTION

After text, images and graphics the next element to be used extensively in multimedia presentations is sound. However, unlike the former, sound is not a visual medium, and cannot be played back using the monitor To process sound, the main system components required are microphones for sound input, amplifiers for boosting the loudness levels and loudspeakers for output or playback of sound. When sound needs to be processed in a computer, it should first be converted to digital format. To compress sound files, both lossy as well as lossless compression algorithms can be used. The popular MP3 audio format for distributing music on the Internet is based on a lossy compression algorithm. On a computer, an expansion card known as the sound card is required for digitizing and playback of sound. Digital audio processing techniques treat an audio signal as a mathematical vector and analyze or modify the elements of the vector as per specific requirements, e.g., temporal domain filtering or analysis of its frequency components. Speech analysis and speech coding are important tools for automated recognition and efficient transmission of speech signals. File formats are usually determined by compression schemes called CODECs. To play back the audio on a system, software audio players are required to decode the compressed file. In recent times, to improve the quality of audio playback, surround sound systems have made use of multiple speakers to simulate a 3D audio environment Use of digital audio broadcasting have utilized digital satellites and Internet to transmit audio all over the world' This chapter discusses all these concepts in detail to provide the reader an idea of how audio is utilized in various fields in computing.

SOUND WAVES

"Sound is an alteration in pressure, particle displacement, or particle velocity propagated in an elastic material" [Olson, 19571. As sound energy propagates through the material medium, it sets up alternate regions of compression and rarefaction by shifting the particles of the medium, e.g., molecules of air. This is pictorially represented as a wave, the upper part (i.e., the crest or positive peak) denoting a compression and the lower part (i.e., the trough or negative peak) denoting a rarefaction. See Fig. 5.2

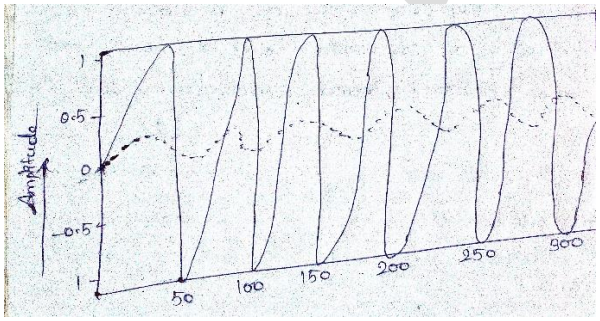


(a) (b)

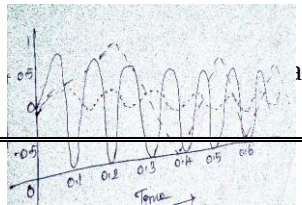
Since a sound wave actually represents a disturbance of the medium particles from their original positions (i.e., before the wave started), it cannot exist in vacuum. Sound waves have two characteristic properties. Firstly, they are said to be **longitudinal** waves, which means that the direction of propagation of sound is the same as the direction along which the medium particles oscillate. This is in contrast to transverse waves, e.g., light, where the wave moves in a direction perpendicular to the oscillation of the particles. Secondly, sound waves are also referred to as **mechanical** waves. This means that they are capable of being compressed and expanded like springs. When they are compressed, the peaks come closer together, while on expansion the peaks move further apart. On compression, the frequency of sound increases it appear more high pitched to our ears, while on expansion, the frequency decreases making it appears more dull and flat. This is known as **Doppler effect** and enables us to ascertain whether a sound source is moving towards or away from us, e.g., whistle of a moving train.

A sound wave is associated with the following physical characteristics: amplitude, frequency, waveform and speed of propagation.

AmplitudeAmplitude of a wave is the maximum displacement of a particle in the path of a wave and is the peak height of the wave. Subsequently, we will use the term "amplitude" to mean particle displacement. The physical manifestation of amplitude is the intensity of energy of the wave. For sound waves, this corresponds to the loudness of sound. Loudness is measured in a unit called, **decibel**, denoted by dB. We will discuss decibels in more detail in a later section. Larger the energy of the sound wave, more will be its amplitude and louder will it sound in our ears. The sound wave with higher amplitude in Fig. 5.3 will be louder to hear than the wave with the lower amplitude.

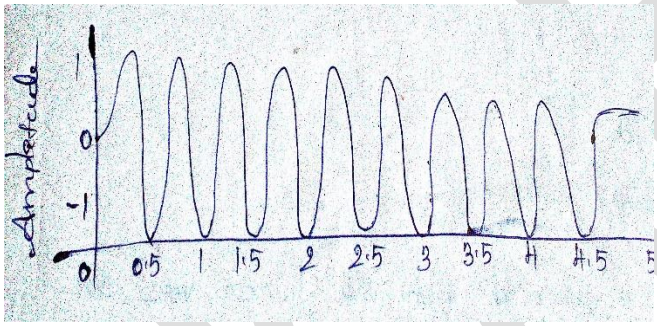


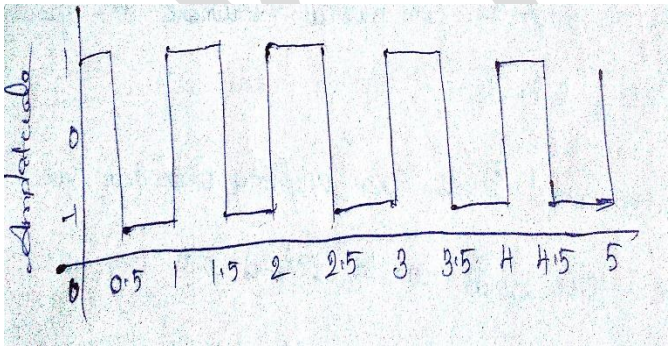
Frequency The second characteristic is frequency. This measures the number of vibrations of a particle in the path of a wave in one second. The physical manifestation of frequency of a sound wave is the pitch of sound. A high-pitched sound, like that of a

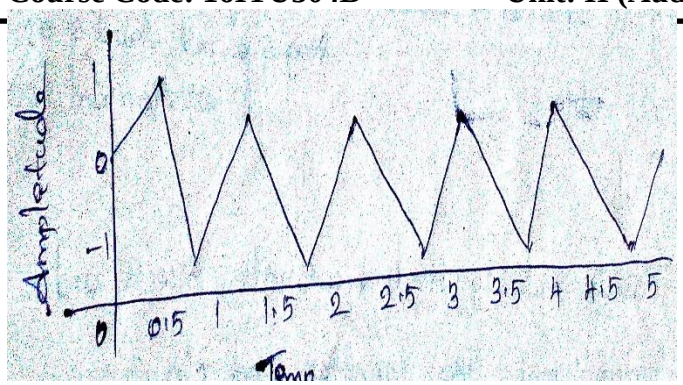


whistle, has higher frequency than a dull flat sound, like the sound of a drum. Frequency is measured in a unit called Hertz and denoted by Hz. A sound of 1 Hz is produced by an object vibrating at the rate of 1 vibration per second. The total range of human hearing lies between 20 Hz at the lower end to 20,000 Hz (or 20 kHz) at the higher end, which means that we can hear sounds produced from objects vibrating at the rate of 20 to 20000 oscillations per second. This range is the average humancapability and may vary somewhat between individuals as also with age, gender, etc. Figure 5.4 shows three sinusoidal waveforms with frequencies 2 Hz, 5 Hz, and 10 Hz as they complete 2 cycles, 5 cycles, and 10 cycles in I second.

Waveform The third characteristic is the waveform. This indicates the actual shape of the wave when represented pictorially Shapes of the waves can be sinusoidal, square, triangular, etc. see Fig. 55. Complex sounds can be of any arbitrary and irregular shape. The physical manifestation of waveform is the quality or timbre of sound. This helps us distinguish between sounds corning from different instruments . a guitar and a violin. Two sounds having the same loudness and Pitch but having different waveforms will have different hearing perceptions in our ears. We shall see later that the shape of a wave depends upon the elementary components of a wave and can be analysed mathematically.







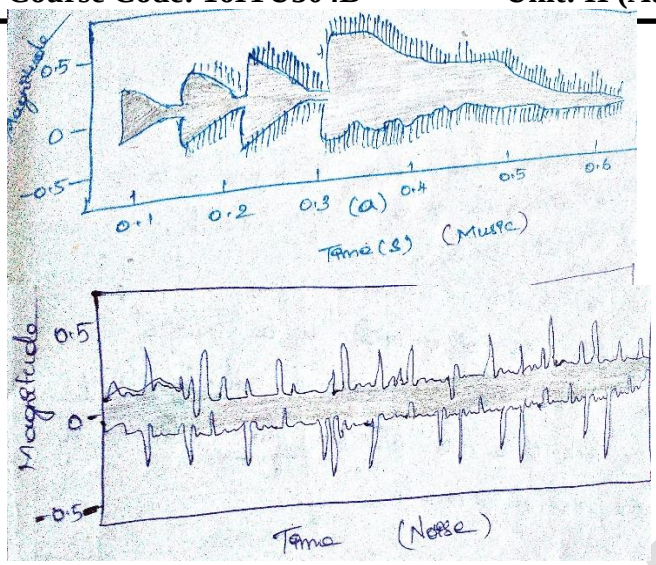
Speed A sound wave is also characterized by its speed. The speed of sound depends on the medium through which the sound travels, and the temperature of the medium but not on the pressure. The speed is about 340 m/s in air and 1500 m/s in water.

TYPES AND PROPERTIES OF SOUNDS

In general, sounds that we hear can be broadly classified into three categories: speech, music, and environmental sounds. Speech is anything uttered by a human being and generating from the human voice box. Music originates from a musical instruments like guitar, flute, violin, etc., usually being generated from vibrating strings, plates or air columns. Environmental sounds are anything other than speech and music and include sounds we normally hear in our daily lives. Such sounds can again be divided into two broad sub-types: those originating from inorganic sources and those originating from organic sources. The former include sounds like a horn of a car, ring of a bell, a door slamming, sound of an explosion and so on, while the latter includes sounds made by birds, animals, insects, and human beings (like laughter and clapping). In recent times, we can also probably think of a fourth category of synthetic sounds generated from computers and digital audio instruments like various types of clicking, alert, and beeping sounds. By analyzing the audio signals in temporal and frequency domains, these characteristics can be utilized to identify a specific class of sounds. More details on this in section 12.15.

Music vs. Noise

Subjectively, sounds may be distinguished into music and noise. Sounds pleasant to hear are called music and those unpleasant to our ears are called **noise**. This differentiation is quite subjective, as the same sound may seem pleasant to one person and unpleasant to another. However, it has been largely seen that musical sounds normally originate from periodic or regular vibrations while noise generally originates from irregular or non-periodic vibrations. See Fig. 5.6.



(a) (b)

Musical sounds most commonly originate from vibrating strings, like in guitars and violins; vibrating plates like in drums and tabla; and vibrating air columns, like in pipes and horns. In all these cases, periodic vibration is responsible for the musical sensation. The lack of periodicity in the waveform of a noise seem to account for its unpleasant sensation. The definition of music as sound having a specific set of characteristics is proposed in musicology. **Musicology** is the scientific study of music which attempts to apply methods of systematic investigation and research in understanding the principles of musical art. According to its view, there are certain observable patterns in sound due to which it can be classified as music. According to musicologist Jean —Jacques Nattjez, however, the concept of music is more culturally defined than physical. The traditional view of music often associates it with some related terms like pitch, timbre, intensity, duration, melody, harmony rhythm, note, and chord.

Musical Note

In music, a note is a unit of fixed pitch expressed in a notation system. In English, the notes are given letter names A, B, C, D, E, F, and G. Each note corresponds to a specific pitch, for example A is assigned 440 Hz. The 7 letter names can however be associated by a modifier which can change the pitch of a note by a specific amount called a **semitone**. There are two modifiers called **sharp** (indicated by #) which raise the pitch of a note, and the **flat** (indicated by b) that lowers the pitch of a note. The approximate frequencies for the notes are C (262 Hz), D (294 Hz), E (330 Hz), F (349 Hz), G (392 Hz), A (440 Hz), and B (495 Hz). When the pitch of one note is double that of another, it is said to differ by an octave. Thus, if A above middle C is 440 Hz, the A of the higher **octave** will be 880 Hz.

There are four ways to change the pitch of a vibrating string of a musical instrument:

- By changing the length of the string. A longer string will produce a lower pitch and vice versa. This is because frequency f produced is inversely proportional to the length L of the string, i.e., $f \alpha$ 1/L.

- By changing the diameter of the string. A thicker string will produce a lower pitch, as the frequency *f* isinversely proportional to the diameter D, i.e., *f*α 1/D.
- By adjusting the tension of the string. A string will higher tension will result is a greater pitch. This is because the frequency *f* is proportional to the square root of the tension T, i.e., *f*α √T.
- By changing the density of the string. A higher density results in a lower pitch, as the frequency f is inversely proportional to square root of the density ρ, i.e., $f \alpha 1/\sqrt{\rho}$
- Stringed instruments actually change pitch by varying the length, because the other methods are not considered feasible. The combined relation between all these parameters is given below in equation (5.1).

$$f = 1/2L \sqrt{T/\rho}$$

Rhythm

The duration is considered a fundamental aspect of music. As per DelLone, duration complement is the amount of different durations used, the duration scale depicts an ordering of the durations in ascending or descending order, the duration range is the difference between the shortest and longest duration, the duration hierarchy is an ordering of these durations based on the frequency of use. Durational patterns may be specified in terms of meter, tempo, and rhythm. **Rhythm** is the variation of duration over time. In Western music, rhythms are generally specified in terms of a time-signature and a meter. A **meter** is a measurement of stressed and unstressed beats in a musical line. The measurement is indicated by a symbol called the **time-signature**. A **beat** or pulse is an unbroken series of periodically occurring distinct short stimuli perceived as points in time. The **tempo** indicates how fast the beat is running.

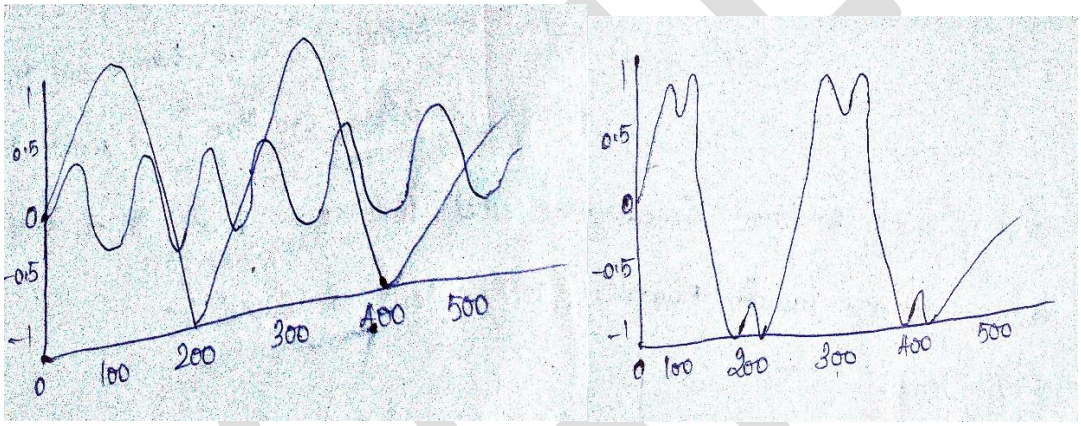
Melody and Harmony

Melody is a series of events in time that contain some kind of change to be perceived as a single entity, i.e., the events are related. Melodies often consist of one or more musical phrases and are usually repeated throughout a song in various forms. While **melody** stresses the occurring of events one at a time, **harmony** implies events occurring simultaneously. **Harmony** is related to a chord, which means three or more notes playing together over a period of time, e.g., playing three keys of a piano together. Harmony is often attributed to the presence of specific physical characteristics of the sound, e.g., inclusion of harmonics.

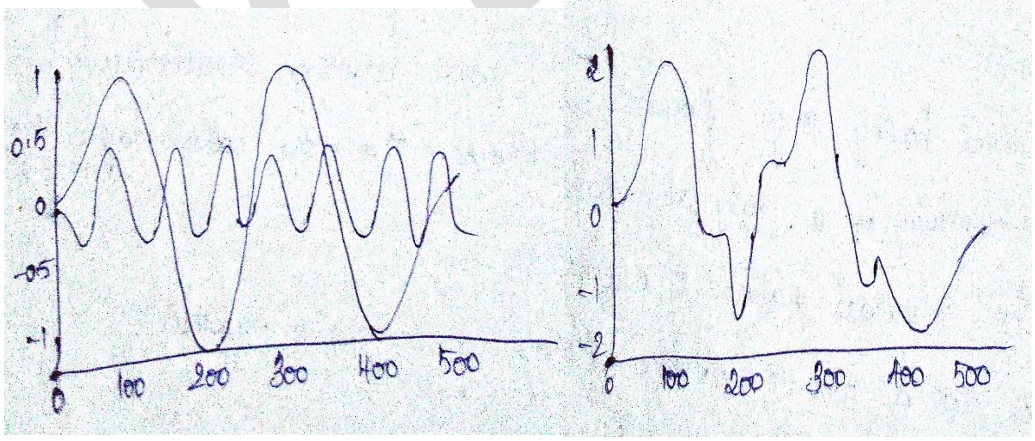
Tone and Note

A **tone** is a sound having a single frequency. A tone can be represented pictorially by a wavy curve called a sinusoidal wave. An example of a tone is the sound produced when a tuning fork is struck with a padded hammer. The sinusoidal nature of the curve is derived from the fact that a tone is produced from a kind of vibratory motion called **SimpleHarmonicMotion** (SHM), which can be described by a sine function. In daily life, we rarely hear single-frequency tones. The sounds we normally hear are a composite mixture of various tones of

varying amplitudes and frequencies. Such a composite sound is called a b. The waveform of a note can be derived from the resultant or sum of all its tonal components. The lowest frequency of a note is called the **fundamentalfrequency**. All the other frequencies are called **overtones**. Frequencies of some overtones may be integral multiples of the fundamental frequency. These overtones are called **harmonics**. For example assuming alt overtones are harmonics if the **fundamentaltone** (also called the **firstharmonic**) has a frequency *f* then the **firstovertone** (also called the **secondharmonic**) has a frequency 2*f*, the **secondovertone** (also called the third harmonic) has a frequency 31, and so on. It has been observed that presence of more harmonic content adds to the richness of sound, which is referred to as harmony. Figure 5.7(a) shows two sinusoidal tones, one the fundamental and the other the 3rd harmonic with its frequency thrice that of the fundamental. Below the tonal waveforms, the resultant note formed by the combination of the tones, is shown. The same two tones can, however, give rise to a different resultant if they are shifted in phase with respect to each other. Figure 5.7(b) shows the two waveforms with 90«iegree phase difference and the corresponding resultant.



(a) In phase

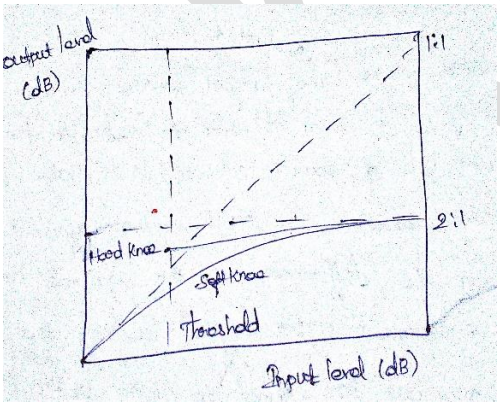


(b) With 90’ phase difference

Dynamic Range

Dynamic range is the ratio between the smallest and largest possible values of a variable quantity. In acoustics, the term dynamic range is used to mean the ratio of maximum

amplitude of undistorted sound in an audio equipment like microphone or loudspeaker to the amplitude of the quietest sound possible which is often determined by inherent noise characteristics of the device. In general terms, the term is often used to indicate the ratio of the maximum level of power, current or voltage to the minimum detectable value. In music, dynamic range is used to mean the difference between the quietest and loudest volume of an instrument. For digital audio, the dynamic range is synonymous to the Signal-to-Noise Ratio (SNR) (see Chapter 1) and is expressed in decibels (dB). It can be shown that increasing the bit depth of the digital audio by 1 bit results in its increase in dynamic range by 6 dB approximately. The human ear has a large dynamic range, i.e., the difference between the quietest (loudness of a sound just audible by the human ear) and the loudest sound is very large, of the order of 1012 in terms of the energy content. Often expressed in **decibels** (dB), the dynamic range of human hearing is considered around 120 dB. In practice, it is difficult to achieve this full dynamic range using electronic equipments. For example the dynamic range of a magnetic tape is of the order of 55 dB (reflecting the difference between the smallest voltage and the largest voltage pulses that can be recorded onto the magnetic media). Electronic equipment use certain techniques to fit the original large dynamic range to a smaller value which can be more easily recorded and stored. Such techniques are called Dynamic Range Compression (DRC). **Dynamicrangecompressors** work like an automatic volume sounds over a certain threshold are reduced (while quiet sounds remain unchanged) and quiet sounds below a certain threshold are increased (while loud Sounds remain unchanged). The amount of reduction using DRC is called the **gainreduction** and expressed as a ratio, e.g., a ratio of 2:1 means that if the input sound level is 2 dB above the threshold then the output sound level is 1 dB above the threshold and the reduction is 1 dB. See Fig. 5.8. Dynamic range compressors are often supplied with **attack** and **release** controls to slow down the response of the circuit for a smoothing effect. The **attackphase** corresponds to the situation when the input has exceeded the threshold and its value needs to be reduced. The **releasephase** corresponds to the situation when the input has fallen below the threshold and its value needs be increased back. A parameter called **hard/soft knee** controls whether the change in the response curve is sharp or gradual.



White Noise and Other Colors of Noise

Whitenoise is a signal that has the same energy or power for any frequency value, i.e., constant power density. Since a signal physically cannot have power for all frequencies (which would mean it has infinite energy content), a signal can be a white noise over a

defined frequency range. In interiors of buildings like halls, white noise is often used to submerge undesirable sounds like conversations, by generating a constant low-level noise as background sound. There are also other colors of noise as explained below. A signal whose power density decreases at the rate of 3 dB per octave with increasing frequency over a finite frequency range is called **pinknoise**. Oceanic ambient noises from distant sources are called **rednoise** because of absorption of higher frequencies. The background noise of the world is sometimes referred to as **greennoise**. A signal whose power density increases at the rate of 3 dB per octave with increasing frequency over a finite frequency range is called **bluenoise**. A signal whose power density increases at the rate of 6 dB per octave with increasing frequency over a finite frequency is called a **purplenoise**. A sound that is equally loud at all frequencies is called **graynoise**. A signal whose power density decreases at the rate of 6 dB per octave with increasing frequency over a finite frequency range is called brown noise. A noise capable to canceling other noises and producing silence is called **blacknoise**.

Crosstalk

In telecommunication, the term crosstalk (XT) is used to indicate the noise introduced in a signal transmitted on one channel or wire of a transmission system by a signal on another wire or channel. They are perceived as pieces of undesirable speech or sound within an audio transmission. Crosstalk is a result of signal interference and as such can be reduced by increased spacing, twisted cabling, or shielding of the communication wires. In music recording, the term crosstalk is used to denote the leaking of sound of one instrument into a microphone placed in front of another instrument.

Hi-fi

High fidelity, or hi-fi, is a term describing the reproduction of sound and image almost identical to the original in quality, i.e., with minimum distortion and noise. Historically, with the introduction of the vinyl record low-surface noise and quantitatively specified equalization curves brought about a major improvement in the home audio quality. In the 1950s, the term "hi-fi" began to be used by audio manufacturers as a marketing jargon to describe audio equipments providing a faithful reproduction. Technically, the term probably meant that the system conformed to the RIAA equalization specifications. Attempted improvements in audio hardware is confirmed using double-blind tests for listening comparisons. It is a series of experiments done on human subjects in such a way that the subjective bias is reduced. To reduce the influence on decisions, it is not known from beforehand who are the researchers and who are the experimental subjects, which equipment are old and which are new, etc. A single-blind test is where the experimenter knows who is the experimental subject.

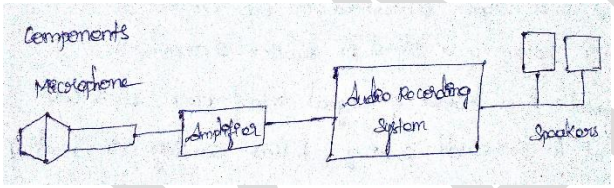
RIAA Equalization

This is a specification established by the **Recording Industry Association of America** (RIAA) for the correct Playback of vinyl records, based on applying equalization. Equalization is essentially a process of modifying the frequency envelope of a sound. There are a number of different variants of equalizers depending on which and how frequencies are changed. A peaking equalizer changes frequencies around a central point, while shelving equalizers change a wide range of frequencies by a fixed amount. One common type of equalizer is a **graphic equalizer** that consists of a series of band-pass filters with independent gain controls for each. The total range of frequencies covered is usually the entire human range of hearing, i.e., 20 Hz to 20 kHz. A simple equalizer might have bands at 20 Hz, 200 Hz, 2000 Hz, and 20000 Hz, known as 4-band equalizer. Equalizers used for professional applications may have 24 or 32 bands. When recording sound on the viny record, lower frequencies required more space because they needed wider grooves. Also there was a chance that the stylus may jump out of the groove. To rectify this, recording companies reduced the lower frequencies during recording and amplified them at playback. This led to the attenuation of high-frequency noise at playback providing a better SNR. In the 1960s, the RIAA specifications became a standard, and defines a curve, called RIAA equalization curve, which is a plot of the amplitude in dB against frequencies in Hz. It defines which frequencies are to be amplified and which to be attenuated. The curve bends down at the 50 Hz point and goes up at500 Hz and down again at 2122 Hz. At 1000 Hz, there is a 0 dB point which acts as

the reference for all other points. Relative to this, lower frequencies are amplified and higher frequencies are attenuated.

COMPONENTS OF AN AUDIO SYSTEM

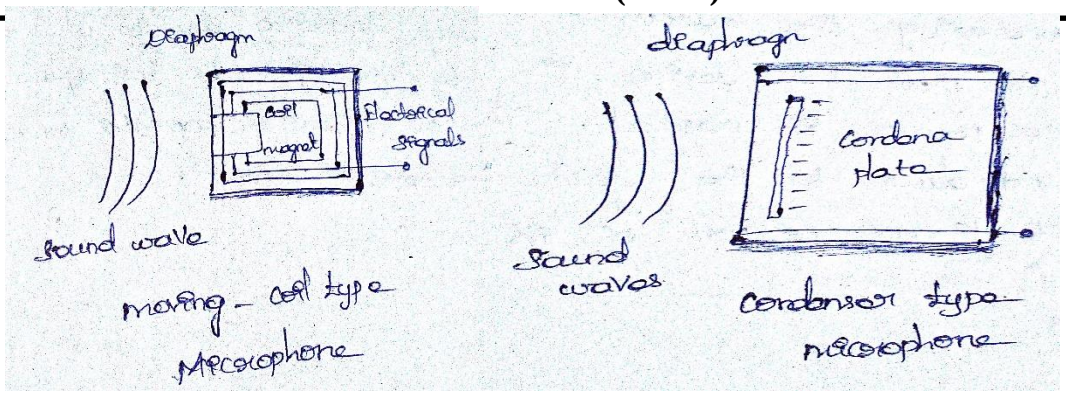
An elementary sound system is where we can record, manipulate and playback sound. It consists of a number of major components. The microphone converts the environmental sound into electrical form, that is conversion of sound energy into electrical energy. Once converted the electrical signals can then be recorded onto magnetic material like audiotape in an audio recording system. However, before that is done, we need another component called the amplifier to boost the levels of the electrical signals. Signals generated from the microphone are quiet small in their amplitudes because of the small size of the electrical equipments inside the portable microphone, and is not much of a use in its original form. Thus, they need to be increased in an amplifier before they are recorded to achieve a better quality. Sometimes the amplifier is part of the recording system. Nowadays, the audio recording system can be a personal computer that can record the sound on its hard disk instead of an audio cassette. Once recorded, the sound can be played back from the recording media by converting it back to environmental sound. This is done in a speaker. The speaker functions just opposite to that of the microphone that is it converts electrical energy back into sound energy. Sometimes, the speaker can also amplify the electrical signals before converting them, producing a louder sound. In some situations, like a pubic addressing system, the sound may not be recorded at all, but can be directly sent from the amplifier to the speaker, to produce a loud sound that can be heard over a larger distance than the original voice of the speaker. In this case, the conversion from acoustic to electrical and back to acoustic energy occurs in real time.



Microphone:

A Microphone records sound by converting the acoustic energy into electrical energy. Sound pressure exists as patterns of air pressure. The microphone changes this information into patterns of electric current. Microphones may be classified into various categories. Based on the constructional features, microphones may be of two types: (a) moving coil type, and (b) condenser type. Based on the functional features, microphones may be divided into: (a) omni-directional (b) bi-directional (c) uni-directional.

A moving coil microphone consists of a thin metallic or rubber sheet called a diaphragm. In the condenser microphone, the diaphragm is actually one plate of a capacitor.



An Omni-directional microphone is equally sensitive to sounds coming from all directions. Such microphones are used to record sound coming from multiple sources.

Bi-directional microphone is equally sensitive to sounds coming from two directions that is front and rear. It is used to record two sources of sound simultaneously.

Uni-directional microphone is designed to record sound from a single direction.

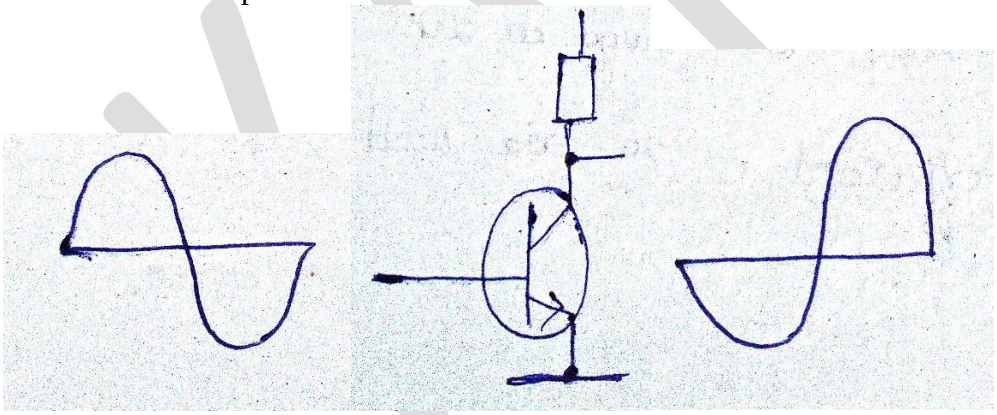
Amplifier:

The input signal of an amplifier may be a current, voltage, mechanical motion or any other signal.

The Amplifiers used in audio processing are electronic in nature. Amplifier circuits are designated as A,B and C for analogue design and D,E for digital designs.

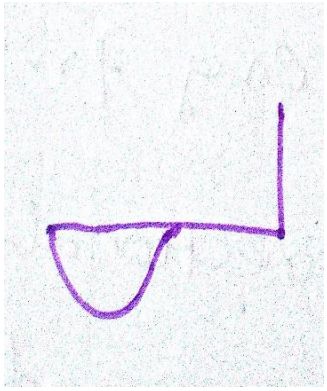
Class A Amplifier:

This amplifier use 100%of the input cycle for generating the output. The amplifying transistor is biased such that the device is always conducting due to which more power is wasted. This amplifier gives the best quality sound due to the fact that the transistor operates on the most linear portion of its characteristic curve.



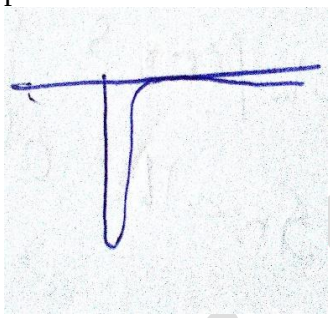
Class B Amplifier:

Amplifiers only use half of the input cycle for amplification. Though they produce a large amount of distortion, these amplifiers are more efficient than class A because the amplifying element is switched off during half of the cycle. Class B amplifiers are used in RF power amplifiers where distortion is unimportant. These amplifiers are rarely used singly in a circuit, rather they are mostly used in pairs in a push-pull configuration. The elements are biased in such a way that they operate over a linear portion of their characteristic curve during a half-cycle, but still conduct a small amount of current in the other half. This arrangement is called class-AB operation and is mostly used for audio amplifiers.



Class C Amplifier:

Amplifier use less than half of the input cycle for amplification. Though they are huge amount of distortion, they are the most efficient. These are used mostly as power amplifiers for filtering or suppressing certain unwanted harmonics from the input wave. They can also be used in situations where other auxillary equipment can be used to reduce the distortion produced.



Since the amplifying elements are essentially non-linear, distortion in the output wave is an inherent problem that needs to be dealt with. One way of reducing distortion further is to introduce a negative feedback. This is a popular mechanism of reducing noise in the input signal.

Class D :

Digital amplifiers use a series of transistors as switches. The input signal is sampled and converted to digital pulses using an ADC. The pulses arethen used to switch the transistors on and off. The current from the transistors are fed to a summing network to be produced at the output. The advantage of this arrangement is that the transistors are either on or off, and therefore, efficient. The sampling rate must be at least double that of the highest input frequency value , otherwise it tends to produce low-frequency distortions called aliasing.

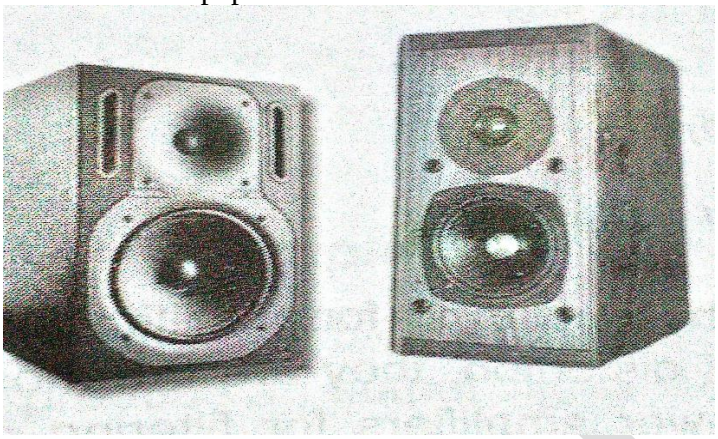
Class E:

Digital amplifiers use pulse width Modulation (PWM) to produce output waves whose widths are proportional to the desired amplitudes. This requires a single transistor for switching and is, therefore, cheaper than the others. However, it requires a fast clock to enable the switching operation. Also abrupt switching on/off can produce severe distortion of the output wave . These amplifiers are usually used for controlling small dc motors.

Loudspeakers

A loudspeaker is a device that converts electrical energy back to acoustic energy and therefore functions just opposite to that of a microphone. Electrical signals from an

amplifier or a playback system are fed to the loudspeaker based on which it generates environmental sound whose loudness is proportional to the amplitude of the source electrical signal. The dynamic loudspeakers are based on the traditional design of a wire coil and a paper cone.



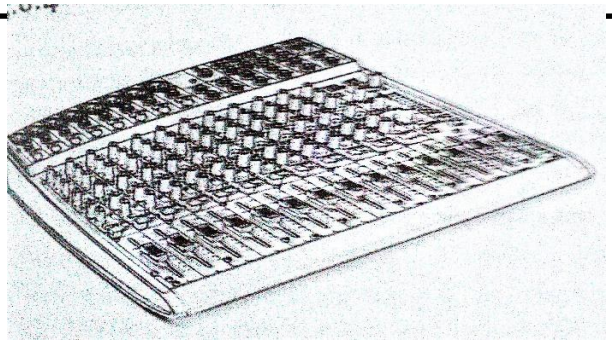
A cone made of paper or fibre, known as the diaphragm attached to a coil of wire, kept near a permanent magnet. Due to resonance characteristics, the physical properties of a vibrating element makes it suitable to reproduce sounds of a specific frequency range, instead of the entire 20HZ human audible range. A loudspeaker can be divide in to smaller units. Each of which are tuned for a small frequency range.

The units are:

1. Woofers: It handles low frequencies, ranging from 20HZ to 400HZ. Such low frequency sounds are known as bass.
2. Mid-range: Speakers are designed to handle middle frequency ranges between 400HZ and 4KHZ.
3. Tweeters: These are designed to handle high frequency ranges between 4KHZ and 20KHZ. Such high frequency sounds are known as treble. Tweeters use cones of about 1.5 inches or less in diameter since the high frequency sounds have short wavelengths, they have high directional properties and hence placement of tweeter units becomes critical for good perceived sound quality.
4. Modern speaker systems often include a subwoofer for handling the very low frequencies below 100HZ. The long wavelengths of the subwoofer sounds, make it impossible for the user to perceive the direction of a sound source.

Audio Mixer

In professional studios, multiple microphones may be used to record multiple tracks of sound at a time. Eg. Recording performance of an orchestra. A device called an audio mixer is used to record these individual tracks and edit them separately. Each of these tracks a number of controls for adjusting the volume, tempo, mute etc. Using these controls, each separate track of sound eg, guitar track, piano track, voice track etc. Finally all these tracks at combined into two channels or multiple channels. At this stage, the audio mixer can be used to determine which of the tracks would be played back from which individual speaker.



DIGITAL AUDIO

An analog quantity is converted to digital from through the processes of sampling, quantization, and code-word generation. It was seen that the digital form is a degraded version of the analog form because of quantization error; however, quality can be improved by increasing sampling rate. The upper value of sampling rate is limited by the hardware/software capabilities and economic considerations. We know that the full range of human hearing ranges from 20HZ to 20 KHZ. Minimum sampling frequencies should be around 40 KHZ. In practical systems a slightly higher frequency range of 44 to 48 KHZ is employed during sampling. However it is not necessary that we always sampleat 44 kHZ. For practical purposes, unless we require extremely fine reproductions, bit depths of 8 bits and 16 bits are sufficient for our purposes.

Let f be the frequency of analog audio signal. During Digitalization, the minimum sampling rate F should be twice the signal frequency as per Nyquist's postulate. Hence

$F=2f$

Let b be the bit depth of audio, and c be the number of channels. For mono sound, c=1; for stereo, c=2; and for multi-channel audio, c can have higher values. Then data rate D,

$D= F.b.c$

Let T be the duration of audio in seconds. Then the number of samples N in the audio is given by

$N=F.T$

Let S be the file size of the audio on bits. The file size is derived by multiplying the data rate with the total duration:

$S=D.T=F.b.c.T=2f.b.c.t$

Aliasing is a consequence of violating the sampling theorem. The highest audio frequency is a sampling system must be less than or equal to the Nyquist frequency. If the audio frequency is greater than the Nyquist frequency erroneous signals can appear within the audio bandwidth and it is impossible to distinguish them from the legitimate signals.

Streaming audio is used for downloading files on the internet. The music begins to play as soon as a buffer memory on the receiving device fills up, while the remaining portion of the audio continues to be downloaded in the background. It allows compression at bit rates ranging from 8 to 128 kbps. When the browser loads the HTML page, it encounters an EMBED tag that identifiers the shockwave file. The browser then loads the plug-in and downloads the file.

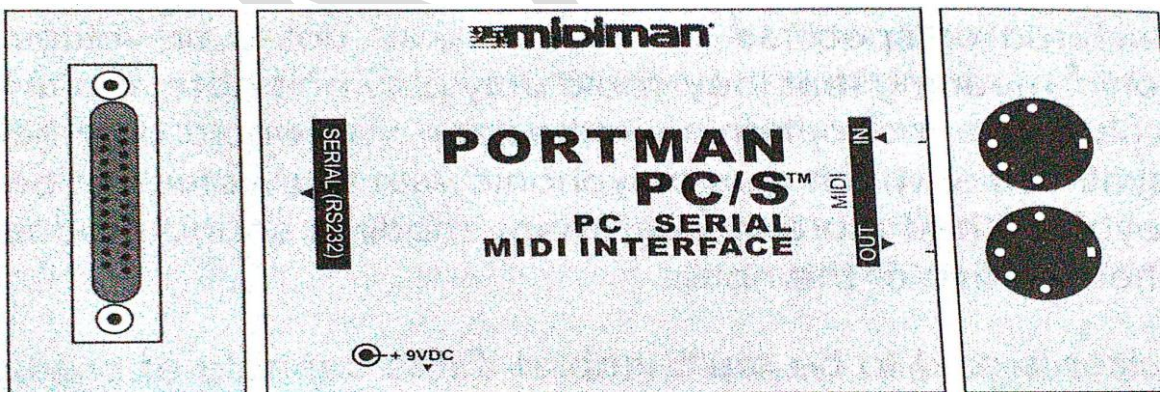
MUSICAL INSTRUMENT DIGITAL INTERFACE (MIDI)

One major factor in the increased popularity in synthesizers, and the increased push for research and design of these units, was the development of new sound generation methods. Musicians were creating new and different sounds worldwide. Eventually, the musical world

began to recognize the synthesizer as a legitimate musical instrument. A few synthesizer design technicians from different manufactures got together in 1963 and demonstrated that it was possible to generate sounds from two synthesizers connected via a cable, by physically playing only one of the synthesizers. This was first usage of MIDI. The Musical Instrument Digital Interface(MIDI) is a protocol or set of rules for connecting digital synthesizers to personal computers. Much in the same way that two computers communicate via modems, two synthesizers communicate via MIDI. Technical and administrative issues related to MIDI specifications nowadays handled by the MIDI Manufactures Association(MMA) and Japan MIDI Standards Committee(JMSC). Since 1985, the MMA has produced 11 major specification based on MIDI that have enabled new products and new markets, and adopted 38 sets of improvements to existing MIDI specifications. The following paragraph discussed the salient features of the MIDI standard.

MIDI Hardware

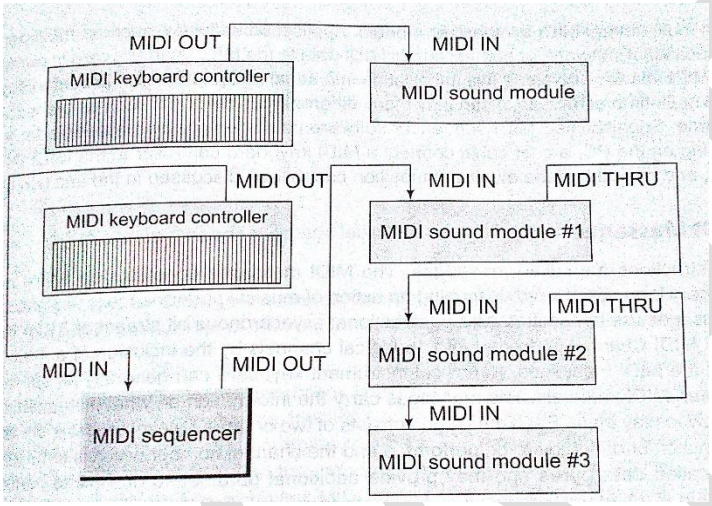
MIDI makes use of a special five-conductor table to connect to the synthesizer ports. Data is carried through the cable on pins 1 and 3, and pin 2 is sheilded and connected to common. pins 4 and 5 remain unused. MIDI cable is specially grounded and sheilded to ensure efficient data transmission. The length of the cable is critical as well, having a maximum cable length of 50 feet because of the method of data transmission through the cable. Since most PCs do not have such a connector built into their hardware, an interface adapter is generally used for this purpose. The adapter has on one side the familiar25-pin PC serial connector and on the other hand, two round 5-pin MIDI connectors. More recent computers are all equipped with USB and/or FireWire connectors, and these are now most often used for connecting MIDI devices to computers. The MMA has approved a standard for MIDI over USB, and so there are a number of different proprietary(manufacturer-specific) ways to send MIDI over USB, as well as a specification developed by the USB implementors Forum(USB-IF).



MIDI Connections:

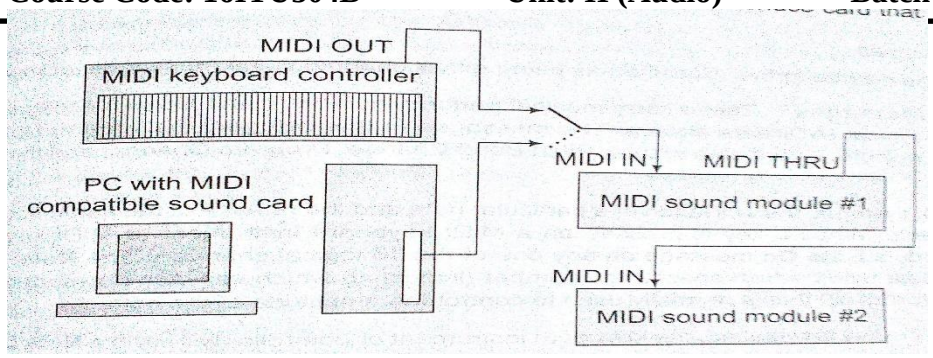
The MIDI data stream is usually originated by a MIDI controller, or a MIDI sequencer. A MIDI controller is a device that is played as an instrument, like a keyboard. However,

unlike a piano keyboard, the keys when pressed do not directly generate sound based on physical processes like vibration, but generate a set of digital instructions which define how sound is to be created. In the simplest case, these digital instructions are transmitted from the controller to a MIDI sound module, via the MIDI cable. The sound module interprets these instructions and produce sound typically from a wavetable chip inside it. The MIDI streams flows out of the controller through a MIDI-OUT port and flows into the sound module through a MIDI-IN port.



In some cases, the instructions might be temporarily stored in another device called the MIDI sequencer which allows MIDI data sequences to be captured, stored, edited, combined, and replayed. Information received on the MIDI-IN connector of a MIDI device is transmitted back out (repeated) at the device's MIDI-THRU connector. Several MIDI sound modules can be daisy-chained by connecting the THRU output of one device to the IN connector of the next device downstream in the chain. Each sound module can be configured to play a specific part of the music. eg., a specific instument sound like drums or piano.

Figure depicts a PC-based MIDI system, where the music composition is done using software instead of keyboard. In this system, the PC is equipped with an internal MIDI interface card that sends MIDI



data to an external multi-timbral MIDI synthesizer module. Application software, such as multimedia presentation packages, educational software, or games, sends MIDI data to the MIDI interface card in parallel form over the PC bus. The MIDI interface converts this information into serial MIDI data which is sent to the sound module. Since this is a multi-timbral module, it can play many different musical parts, such as piano, bass, and drums, at the same time. Sophisticated MIDI sequencer softwares packages are also available for the PC. With this software running on the PC, a user could connect a MIDI keyboard controller to the MIDI IN port of the MIDI interface card, and have the ame music composition capabilities discussed in the last two paragraphs.

MIDI Messages:

MIDI-based instructions are called messages. The MIDI messages constitute an entire music description language in binary form. Each word describing an action of musical performance is assigned a specific binary code. The messages are transmitted as a unidirectional asynchronous bit stream at 31.25 kbits/second. The single physical MIDI channel is divided into 16 logical channels by the inclusion of a 4 bit channel number within many of the MIDI messages. A musical instrument keyboard can generally be set to transmit on any one of the sixteen MIDI channels. The messages carry the information on what instruments to play in which channel and how to play them. Each message consists of two or three bytes: the first is the status byte which contains the function or operation to be performed and the channel number which is to be affected. The other two bytes are called data bytes and they provide additional parameters on how to perform the indicated operation. At the highest level, MIDI messages are classified as being either channel messages or system messages. channel messages are those that apply to a specific channel, and the channel number is included in the status byte for these messages. System messages are not channel specific, and no channel number is indicated in their status byte.

Status Byte	Status Bytes	
	Data byte 1	Data byte 2
Channel number and function	Additional parameters (optional)	Additional parameters (optional)

Channel messages:

channel messages may be further classified as being either channel voice messages, or mode messages.

Channel Voice Messages:

These carry musical performance data, and these messages comprise most of the traffic in a typical MIDI data stream. The messages in this category include the Note On ,

Note Off, polyphonic Key pressure, Channel Pressure, Pitch Bend Change, Program Change, and the Control Change messages.

Note On: In MIDI systems, the activation of a particular note and the release of the same note are considered two separate events. When a key is pressed on a MIDI keyboard instrument or MIDI keyboard controller, the keyboard sends a Note On message on any one of the 16 logical channels. The Note on status byte is followed by two databytes, which specify key number (indicating which key was pressed) and velocity (how hard the key was pressed) that is normally used to control the amplitude of the note

Note off: When the key is released, the keyboard instrument or controller will send a NoteOff message. The message also includes databytes for the key number and for the velocity with which the key was released. The NoteOff velocity information is normally ignored.

Aftertouch: Some MIDI keyboard instruments have the ability to sense the amount of pressure which is being applied to the keys while they are depressed. This Pressure information, commonly called polythonic Key Pressure(Aftertouch), may be used to control some aspects of the sound produced by the synthesizer (vibrato, for example).

Pitch Bend: The pitch Bend Change message is normally sent from a keyboard instrument in response to changes in position of the pitch-based wheel. The pitch-based information is used to modify the pitch of sounds being played on a given channel.

Program Change: The Program Change message tells the synthesizer which patch number should be used for a particular MIDI channel.

Control Change: The Control Change messages are used to control a wide variety of functions in a synthesizer.eg., to expand the number of different instrument sounds and to edit sound in specific ways.

Channel Mode Messages:

These affect the way a synthesizer responds to MIDI data. Controller number 121 is used to reset all controllers. Controller number 122 is used to enable or disable local control(In a MIDI synthesizer which has its own keyboard, the functions of the keyboard

controller and the synthesizer can be isolated by turning Local Control off), Controller numbers 124 through 127 are used to select between omni mode On or Off, and to select between the mono mode or poly mode of operation. When omni mode is On, the synthesizer will respond to incoming MIDI data on all channels. When omni mode is Off, the synthesizer will only respond to MIDI messages on one channel. When Polymode is selected, incoming Note On messages are played polyphonically. This means that when multiple Note On messages are received, each note is assigned its own voice(subject to the number of voices available in the synthesizer). The result is that multiple notes are played at the same time. when mono mode is selected, a single voice is assigned per MIDI channel. This means that only one note can be played on a given channel at a given time.see appendix B.

System messages

System messages are classified as being system common messages and system real-time messages.

System Common Messages

These include the song select message that can store and a recall a number of different songs, and the song position pointer is used to start playback of a song at some point other than at the beginning. System exclusive messages may be used to send data such as data patch parameters or sample data between MIDI devices for troubleshooting purposes. Manufacturers of MIDI equipment may define their own formats foe system exclusive data. Manufacturers are granted unique identification (ID) numbers by the MMA or the JMSC, and the manufacturer ID number is included as part of the system Exclusive message.

System Real-Time Messages

These are used to synchronize all of the MIDI clock-based the equipment within a system, such as sequencers and drum machines. Examples include Timing Clock message which sets the tempo for playback of a sequence, the start, continue,and stop messages are used to control playback of the sequence, the system Reset message, is used to reset and initialize any equipment which receives the message.

MIDI File Format

The MIDI specifications made provisions to save synthesizer audio in a separate file format called MIDI files having extension MID. MIDI files are extremely compact as compared to WAV files. for example, files containing high-quality stereo sampled audio require about 10 Mbytes of data per minute of sound, while a typical MIDI sequence might consume less than 10kbytes of data per minute of sound. This is because the MIDI file does not contain the sampled audio data; it contains only the instructions needed by a synthesizer to play the sounds.

STATUS BYTE				DATA BYTES	
1st Byte Value			Function	2nd Byte	3rd Byte
Binary	Hex	Dec			
10000000-	80-	128	Chan 1 Note off	Note Number (0-127)	Note Velocity (0-127)
10000001-	81-	129	Chan 2 "	"	"
10000010-	82-	130	Chan 3 "	"	"
10000011-	83-	131	Chan 4 "	"	"
10000100-	84-	132	Chan 5 "	"	"
10000101-	85-	133	Chan 6 "	"	"
10000110-	86-	134	Chan 7 "	"	"
10000111-	87-	135	Chan 8 "	"	"
10001000-	88-	136	Chan 9 "	"	"
10001001-	89-	137	Chan 10 "	"	"
10001010-	8A-	138	Chan 11 "	"	"
10001011-	8B-	139	Chan 12 "	"	"
10001100-	8C-	140	Chan 13 "	"	"
10001101-	8D-	141	Chan 14 "	"	"
10001110-	8E-	142	Chan 15 "	"	"
10001111-	8F-	143	Chan 16 "	"	"
10010000-	90-	144	Chan 1 Note on	"	"
10010001-	91-	145	Chan 2 "	"	"
10010010-	92-	146	Chan 3 "	"	"
10010011-	93-	147	Chan 4 "	"	"
10010100-	94-	148	Chan 5 "	"	"
10010101-	95-	149	Chan 6 "	"	"
10010110-	96-	150	Chan 7 "	"	"
10010111-	97-	151	Chan 8 "	"	"
10011000-	98-	152	Chan 9 "	"	"
10011001-	99-	153	Chan 10 "	"	"
10011010-	9A-	154	Chan 11 "	"	"
10011011-	9B-	155	Chan 12 "	"	"
10011100-	9C-	156	Chan 13 "	"	"
10011101-	9D-	157	Chan 14 "	"	"
10011110-	9E-	158	Chan 15 "	"	"
10011111-	9F-	159	Chan 16 "	"	"
...					
11110110-	F6-	246	Tune request	NONE	NONE
11110111-	F7-	247	End of SysEx (EOX)	"	"
11111000-	F8-	248	Timing clock	"	"
11111001-	F9-	249	Undefined (Reserved)	"	"
11111010-	FA-	250	Start	"	"
11111011-	FB-	251	Continue	"	"
11111100-	FC-	252	Stop	"	"
11111101-	FD-	253	Undefined (Reserved)	"	"
11111110-	FE-	254	Active Sensing	"	"
11111111-	FF-	255	System Reset	"	"

These instructions are in the form of MIDI messages, which instruct the synthesizer which sounds to use, which notes to play, and how loud to play each note. The actual sounds are then generated by the synthesizer . For computers, the smaller file size also means that less of the PCs bandwidth is utilized in spooling this data out to the peripheral that generates sound. Other advantages of utilizing MIDI to generate sounds include the ability to easily edit the music, and the ability to change the playback speed and the pitch or key of the sounds independently. This last point is particularly important in synthesis applications such as karaoke equipment, where the musical key and tempo of a song may be selected by the user. With the recent introduction of downloadable sounds(DLS) format, MIDI files can now be combined with standardized samples of musical instruments , sound effects, or even dialogue, which are used to recreate an exact copy of the sound intended by the composer,MIDI files with DLS are the ideal solution for composers of all kinds who want the predictable playback of digital audio, but also need the compactness and/or interactivity of standard MIDI Files for delivering their music.

General MIDI(GM) Specifications

prior to general MIDI, there was no standard for the relationship of patch numbers to specific sounds for synthesizers. Thus, a MIDI sequence might produce different sounds when played on different synthesizers, eventhough the synthesizers had comparable types of sounds. For example, if the composer had selected patch number 5 for channel 1, intending this to be an electric piano sound, but the synthesizer playing the MIDI data had a tuba sound mapped at patch number 5 then the notes intended for the piano would be played on the tuba when using the synthesizer (eventhough this synthesizer may have a fine electric piano sound available at some other patch number).

The general MIDI(GM) Specification defines a standard patch map that should be used by all conforming instruments. The GM1 specification established in 1993 lists a set of 128 preset instruments in a standard GM1 patch map. The GM2 specifications estblished in 1999 is a group of extensions made to general MIDI 1, which increases both the number of

available sounds and the amount of control available for sound editing and musical performance. All GM2 devices are also fully compatible with general MIDI 1.

The general MIDI Level 1 intsrument sounds are grouped by families. In each family, are 8 pecific instruments. The names of the instruments indicate what sort of sound will be heard when that instrument number(MIDI program change or"PC#") is selected on the GM1 synthesizer.

PC#	Family	PC#	Family
1–8	Piano	65–72	Reed
9–16	Chromatic Percussion	73–80	Pipe
17–24	Organ	81–88	Synth Lead
25–32	Guitar	89–96	Synth Pad
33–40	Bass	97–104	Synth Effects
41–48	Strings	105–112	Ethnic
49–56	Ensemble	113–120	Percussive
57–64	Brass	121–128	Sound Effects

AUDIO FILE FORMATS

This section discusses the major audio file formats available along with their salient features and the players they can be played in. A detailed discussion of the CODECs associated with each file format is included in chapter 8.

WAV:

WAV(Waveform) audio format, is a microsoft and IBM audio file format standard for storing audio on PCs. It is a variant of the RIFF bitstream format method for storing data in "chunks", and thus also close to the IFF and the AIFF format used on Macintosh computers. The RIFF format acts as a "wrapper" for various audio compression CODECs. It is the main format used on windows syatem for raw audio. It is an expandable format that supports multiple data formats and compression schemes. It is used for uncompressed 8-,12-and 16-bit audio files both mono and multi channels , at a variety of sampling rates including 44.1 KHZ. Though a WAV file can hold audio compressed using some lossless CODECs like DPCM and ADPCM, by far the most common format is PCM audio data. Since PCM uses an Uncompressed, lossless storage method that keeps all the samples of an audio track, professional users or audio experts may use the WAV format for maximum audio quality.

AIFF:

AIFF(Audio Interchange File Format) is a file format standard used for storing audio data on PCs. The format was co-developed by Apple based on Electronic Arts Interchange File Format(IFF) and is most commonly used on Apple Macintosh computer systems. The audio data in an AIFF file is uncompressed so the files tend to be much larger than files that use lossless or lossy compression formats. Types of chunks found in AIFF files include common chunk, Sound data chunk, Marker chunk, Instrument chunk, Comment chunk, Name chunk, Author chunk, and copyright chunk. The following file structures are related to the AIFF format.

1. IFF:

The IFF(Interchange File Format) is a generic file structure developed by Electronics Arts in 1985 for the 68k processor series used in Macintosh systems. In order to facilitate data transfer between software programs of different vendors. They do not, therefore, have any common extension. An IFF file is built up from chunks. Each chunk begins with a TypeID or OSType followed by a 32-bit integer specifying the size of the following data. chunks can hold different data types like text, numerical data or raw data. It was also possible

to include other IFF files as if they were chunks. Some chunks could be present in any IFF file .eg:AUTH containing author information; other chunks have a common name but hold differnt kinds of data. eg., BODY would store an image in an ILBM file and sound in an 8SVX file.

2.RIFF:

RIFF(Resource Interchange File Format) based on IFF was included by Microsoft in windows 3.1 as the default format for multimedia files. It is based on the IFF with some minor modifications to adapt it to windows and Intel's 80*86 series compared to the original IFF structure that was designed for the 68k processor series used for Apple Macintosh. Most of the Microsoft file formats like WAV and AVI use the RIFF structure as their core design. The optional INFO chunk allows RIFF files to be "Tagged" with information falling in to a number of predefined categories, such as copyright("ICOP"), comments("ICMT"), artist ("IART"), in a standardised way. Recently, however, Microsoft has adopted the new ASF (Advanced System Format) structure in preference to the RIFF structure.

3. NIFF:

NIFF(Notation Interchange File Format) is a musical notation file format based on the microsoft RIFF structure. It was designed for exchanging musical information between different musical editing and typesetting programs. It is also used with music OCR programs which scans a musical score sheet and converts the musical data for saving in a NIFF file. NIFF is now considered obsolete mainly due to the emergence of the musicXML format.

4. RMI:

RMI(RIFF based MIDI) was a file format introduced by Microsoft which consisted of the standard MIDI file enclosed in a RIFF wrapper in accordance with Microsoft's policy for standardizing the RIFF structure for its windows platform. This format was, however, not very well accepted by the industry for compatibility reasons and also due to the fact that since the original MIDI format already supported use of tags the new format did not provide any additional advantage. RMI was later embraced by MMA (MIDI Manufacturers Association) as an "extended MIDI" format which served as a container for standard MIDI files as well as DLS files. RMI has later been superseeded by the XMF Format.

MID:

MID(MIDI) files are textual files that contain instructions on how to play a piece of music on digital musical instruments, published by MMA(MIDI Manufacturers Association). The actual music is generated from a digital synthesizer chip that can recognize the instructions and retrieve (or create) corresponding audio samples using a repository of sounds. Hence, the files are very compact in size and ideal for web applications. The sound repository must conform to the instrument palette specified by the GM standard for portability between different MIDI sound generators. MIDI Karaoke that use the .KAR extension, is an unofficial extension to the MID format used to add synchronized lyrics to standard MIDI files.

DLS:

DLS(Downloadable Sounds) format provides a means for game developers and composers to add their own custom sounds to the GM sound set stored in a sound card's ROM , DLS compatible devices will automatically download these custom sounds from card, disk or CD-ROM into system RAM, allowing MIDI music to be freely augmented with new instrument sounds, dialog or special effects- thus providing a Universal interactive playback experience, along with an unlimited palette of sounds. At the same time, it enables the wavetable synthesizers in computer sound cards to deliver improved audio at no additional cost.

XMF:

XMF (Extensible Music Format) is a container format containing one or more MIDI files, DLS files, WAV , and other digital audio files to create a collection of all resources needed to be present a musical piece, an interactive webpage sound track or any other piece of media using pre-produced sound elements. The mobile XMF is an XMF format developed specifically for mobile phones. Interactive XMF is the world's first open format for interactive audio content.

RMF:

RMF (Rich Music Format) is an ausio format developed by Beatnik Inc. to take full advantage of the unique features of the Beatnik audio engine. Beatnik is a software based high-performance music and audio playback technology created by Beatnik Inc. At the core of Beatnik is the Beatnik audio engine that is a multi-platform real-time 64-voice software synthesizer fully compatible with general MIDI specifications. It also features custom downloadable samples and advnced digital audio processing effects. RMF has now been superseded by the XMF format.

MOD:

MOD (Module) file is a format to represent computer generated music files in terms of note numbers, track numbers, instrument numbers, etc. They store several patterns(pages) of musical data and also specify how the patterns should be played. The main difference with MIDI files is that MOD files include their own samples. The first module creating program was soundtracker for Amiga computers, and used the .MOD file extension. It had 15 instruments in the original version with 31 in later versions.

AU:

AU(audio) is a file format developed by sun Microsystem, for use with its java programming language . It consists of header of six 32-bit words that defines the metadata about the actual audio data following it. word 0 is an identifier defining the file type, word 1 is a data offset value, word 2 is the datasize in bytes, word 3 is the data-encoding format , word 4 is the number of samples per second, and word 5 indicates the number of channels. The type of encoding can either be PCM with A-law compression or ADCPM.

VOC:

VOC (Voice Creative) is a lossless file format used with Creative Sound Blaster sound cards to encode speech recordings. Sooundupto 16-bit stereo is supported along with compressed formats. These files can create markers for looping and synchronization markers for multimedia applications. Initially, VOC files used LPC to losslessly compress the files, however, later versions used CELP.

SHN:

SHN(shorten) is a file format used to losslessly compress CD-quality audio files(44.1 KHZ 16-bit stereo PCM). It is a compressed data file format similar to ZIP and RAR, but is optimized for compressing audio data. More mature lossless audio CODECs such as FLAC, Monkey's audio, and TTA have become popular recently.

FLAC:

FLAC(Free Lossless Audio Codec) is a popular lossless audio file format, well supported by many sofware and hardware audio products. FLAC is distinguished from general lossless algorithms such as ZIP and gzip in that it is specifically designed for the efficient packing of audio data. FLAC achieves compression rates of 30-70%.

APE:

APE(Monkey's audio) is a lossless audio format and uses the .APE extension. APE files generally achieve compression rates slightly better than FLAC and significantly better than SHN, however, both encoding and decoding are somewhat slower. Although APE is a freeware,it has a non-free software license and hence is not included in most operating systems that rely on free software, compared FLAC that comes pre-installed in most Linux distributions.

TTA:

TTA(The True Audio) is a free, simple real time lossless audio format supporting multichannel 8, 16 amd 24-bit data of uncompressed input files. It uses a real-time encoding/decoding algorithm allowing fast operation speed and minimal system requirements. It can be compiled and executed on several different platforms with free and open source code and documentation.

WV:

WV(wavpack) is a free, open-source lossless audio compression format, which allows users to compress (and restore) both 16-bit and 24-bit audio files in the .WAV format. It also supports multichannel streams and high-frequency sampling rates. Like other lossless compression schemes, the data reduction avries with the source, but is generally between 25% and 50%. Wavpack also incorporates a unique "hybrid" mode that provides all the advantages of lossless compression with an additional bonus.

OFR:

OFR (OptimFROG) is a proprietary lossless audio CODEC optimized for high compression ratios. As reported on its official site, OptimFROG obtains asymptotically the best lossless audio compression ratios. The compression ratios that can be obtained from OptimFRog generally range from 25% (salient classical music) to 70% (loud rock music) of the origibal audio file size. This file can be used in combination with the main lossy-encoded file, for lossless decoding.

MP3:

The MP3 (MPEG-1) file format is based on the MPEG-1 (Motion pictures Expert Group) Audio layer 3 standard. It is a lossy compression format using a perceptual CODEC that removes portions of an audio file not perceivable by human beings to reduce the file size. Most encoders allow encoding profiles with different levels of compression. MP3 can compress a typical song to about 5 MB with a compression ratio of 10.1 that can be easily downloaded from the internet and provides a popular way of disturbing music files. Due to which there are many MP3 encoders avilable, each producing files of different quality.

WMA:

WMA(Windows Media Audio) is a proprietary compressed audio file format used by Microsoft. It was initially a competitor to the MP3 format, but with the introduction of Apple's iTunes Music store, it has positioned itself as a competitor to the Advanced Audio Coding(AAC) format used by the Apple. It is part of the windows Media framework. An initial reason for the development of WMA might have been that MP3 technology is patended and has to be licensed from Thomson for inclusion in the Microsoft windows operating systems.

RA:

RA(Real Audio) is a proprietay audio format developed by realnetworks. It is especially designed to conform to low bandwidths, amd it can be used as a streaming audio format, that is played at the same time as it is downloaded. Many ratio stations use RealAudio to stream their programming over the internet in real time. The main palyer for RealAudio content is RealNetworksRealplayer. RealAudio files are compressed using several different audio CODECs including MPEG-4 HD-AAC and RealAudio Lossless in the latest version.

OGG:

OGG (OggVorbis) is a free and open audio compression project and is part of their Ogg effort to create free and open multimedia and signal processing standards. OggVorbis is completely free from licensing or patent issues associated with other proprietary formats like MP3. The OggVorbis format is popular among open source communities, and due to its higher fidelity and completely free nature, it is considered to be a natural replacement for the MP3 format.

AAC:

AAC (Advanced Audio Coding) is a part of the MPEG-2 audio standard and uses the file extension .AAC. It is not compatible to MPEG-1 standards like MP3 and is believed to be an improved version of MP3 providing better sound quality at same bit rates, as evidenced from results of listening tests. Its improvements over MP3 include more sampling frequencies of 8-96 KHZ compared to 16-48KHZ used in MP3, support for multi-channel sound compared to 2 channels by MP3, higher efficiency coding using MDCT compared to DCT in MP3, better handling of audio frequencies above 16KHZ. The AAC format was subsequently updated in MPEG-4(Audio) part-3, with the addition of Perceptual Noise Substitution(PNS) and a Long Term Predictor(LTP).

OMG,OMA,AA3:

.OMG, .OMA, .AA3 are file formats used to store information on Mindiscs and other Sony-branded audio players using the ATRAC (Adaptive Transform Acoustic Coding) audio compression algorithm. ARTAC uses modified discrete cosine transform to represent encoded audio. ARTAC file can be played back on IBM compactible PC using the RealAudio software or the Liquid Audio plug-in module for winamp. ATRAC 1 supports full stereo encoding with a data rate of 292 Kbps. The quality is generally transparent for most people, meaning that it is not possible to tell an ATRAC encoding from the source.

MPC:

MPC (Musepack) is an open-source version of MP2 (MPEG-1 layer2) format. Unlike MP2, it, however, uses Huffman coding (like MP3), noise substitution techniques (like MPEG-4 AAC) and variable bit rate between 3kbps and 1.3 Mbps. The psycho-acoustic model of MPC is based on that of MP2 but is enhanced due to a number of additional components like CVD(Clear Voice Detection) and ANS(Adaptive Noise Shaping). MPC uses the APEv2 metadata container, and is also a streamable format.

SPX:

SPX (Speex) is a patent free audio compression format audio compression format designed for speech coding. It was designed for VoIP applications that mean that is needed to handle lost packets. CELP was chosen as the encoding technique for supporting both low bit rates (eg., 5 kbps) and high bitrates(eg., 16kbps). Speex supports three sampling rates, 8KHZ

(narrowband),16KHZ (wideband) and 32KHZ (ultra wideband). The quality is controlled by a quality parameter ranging from 0 to 10. The encoder can operate at several complexity levels.

M4A, M4P:

M4A (MPEG-4 Audio, part-14), is a contaiber file format, part of the MPEG-4 audio standard and uses the Apple Lossless Audio Codec (ALAC) or Apple Lossless Encoder(ALE), developed by the Apple computer for lossless encoding of digital music. Apple

Lossless data is stored within an MP4(MPEG-4 layer14) container with the filename extension M4A. It does not utilize any digital rights management scheme, but by the nature of the container, it is thought that DRM(Digital Rights Management) can bee applied to ALAC much the same way it can with other files in QuickTime containers.

AMR:

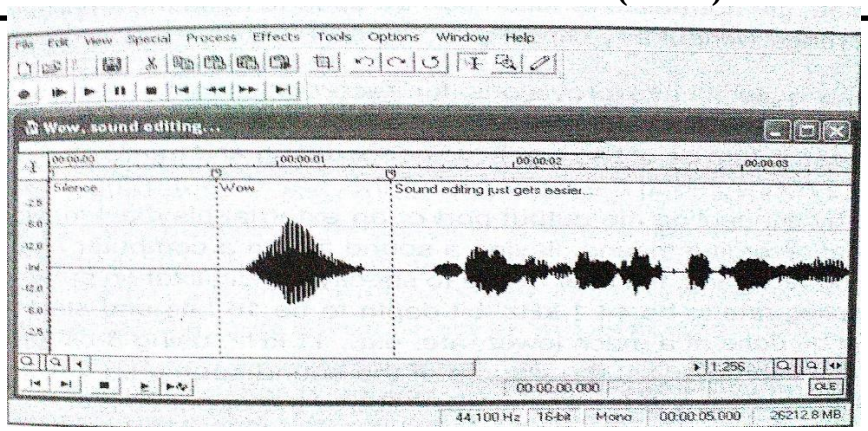
AMR(Adaptive Multi Rate) is a patented file format for speech coding and adopted by 3GPP as the standard speech for CODEC for mobile phones, in 1999. It supports a sampling frequency of 8 KHZ at 13-bit depth and is partitioned into 20 ms audio frames each containing 160 samples. It uses B different CODECs having different bitrates ranging from 4.75 kbps to 12.2 kbps. The patents are held by several companies including Nokia Corp., Voice Age, and Ericsson.

AUDIO PROCESSING SOFTWARE

An audio-processing software allows you to open, edit, manipulate, transform, and save digital audio sound files in various formats. Most commercially available software, like Sound Forge XP or CoolEdit, permit a pictorial view of the audio waveform and then allow editing to be done by selecting specific points or ranges to be selected on the waveform by the mouse and keyboard and choosing editing functions from a menu. In the following sections, we discuss some of the salient features of a typical audio-editing software.

Displaying Audio Content

An audio editor allows you to open an existing sound file and view its waveform. Most of the software will support the windows native audio file format WAV along with some additional file formats. After opening, the sound file would be visible as an audio waveform with time along the horizontal axis and amplitude, along the vertical axis. Other statistical information like sampling rate, bit, depth, duration of the file, etc. would be visible in a status bar. A number of measurement units might be available. Eg., samples and seconds for time, and decibals and percentage for amplitude.



Playing Audio Content

Playback function is initiated by pressing a play button in the toolbar. Other functions like stop, pause, Rewind, Go to start, Go to end, and Loop playing are also executed using similar buttons. As the file plays back, a playback head is seen moving across the displayed waveform while the corresponding sound is heard on the speakers. A user can also select a specific portion by using the mouse to play only that portion. Editors usually often some way

of accurately positioning the head at a specific point of the file by mentioning the time in hh:mm:ss format.

Pasting and Mixing

A portion of the audio waveform can be selected, copied and pasted either in the same file or a different file. Pasting a portion of audio changes the duration of the original file since additional audio data is inserted, and, hence, the file size change as new data is inserted. Alternatively, a mix function allows one to mix two sounds so that both of them are heard simultaneously and the total duration of the sound remains unchanged.

Changing Digitization Parameters

An audio-processing software usually provides for functions to change the audio digitization parameters sample rate, bit depth, and number of channels. There might be a limited range over which such changes can be made. Eg., 2KHZ to 96KHZ for sample rate, 8 bits to 16 bits, 1 channel(mono) to 2 channels(stereo).

Cut and Trim

The cut function enables the user to select a portion of the audio file and discard that portion. The file duration will be shortened in this case. The trim function allows one to select a portion of a file and discard the remaining portion. The duration of the file would be same as the duration of the selected portion.

Zooming

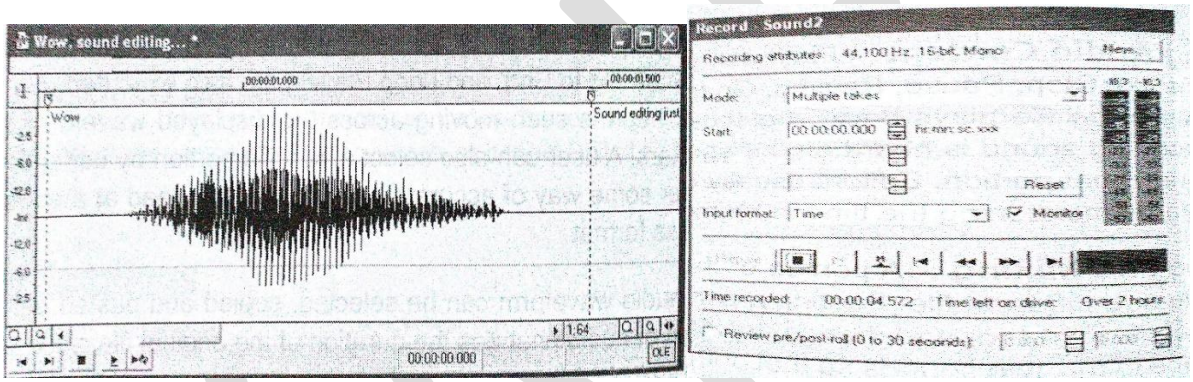
Magnifying/zooming implies displaying a magnified view of the sound waveform, without actually changing the data stored in the file. When an audio waveform is displayed pictorially, there is mapping between the number of samples and the number of pixels. This is expressed as a zoom ratio. Eg., 1:64 means that 64 samples of the sound are represented by 1 pixel in the pictorial representation.

Amplitude Normalization

If in an audio waveform the maximum amplitude level falls below the upper ceiling of the dynamic range, the normalize function can be used to raise the amplitude levels so that they just cover the entire dynamic range without any clipping.

Recording

Most sound editors have provisions for recording audio. Recording can be of two types: external and internal. External recording is done using an external device and connecting it to the computer for recording purposes. This can in turn be of two types: voice recording and music recording. For voice recording, a microphone needs to be input port of the sound card using a cable and connector, While music recording is done by connecting the output port of an external playback device. Eg., cassette player to the sound card. Internal recording means playing a sound file on a computer and recording the sound on to the same computer. During recording, the user needs to specify the digitization parameters. If the sound goes above the upper limit of the dynamic range, the top portions of the waveform would get clipped, while if the sound falls much below the dynamic range ceiling, noise levels become appreciable.



(a) (b)

Noise Removal

Audio-processing software may contain noise-removal functions that use noise gates to remove noise from salient portions of an audio signal. Parameters like attack time and release time controls how fast the noise gate closes to back noise and opens to allow desirable sound to go through.

Filters

Most audio-editing software allows application of filters for changing the nature of a sound clip in some pre-determined way, mostly for giving special effects. Examples of such filters include echo (for generating single echoes), reverb(multiple echoes), chorus, panning of sound from one speaker to another, etc. In some editors, the user may also be allowed to change the waveform manually by dragging different points of the wave.

KARPAGAM ACADEMY OF HIGHER EDUCATION

COIMBATORE - 21

DEPARTMENT OF COMPUTER SCIENCE,CA & IT

CLASS : III B.Sc COMPUTER TECHNOLOGY

BATCH : 2016-2019

Part -A Online Examinations **(1 mark questions)**

SUBJECT: MULTIMEDIA AND ITS APPLICATION **SUBJECT CODE: 16CTU504B**

UNIT-II

S.NO	**Question**	**opt1**	**opt2**	**opt3**	**opt4**	**Answer**
1	VR stands for _____	Virtual reality	visual random	Video raster	video response	Virtual reality
2	VRML stands for _____	virtual reality modeling language	visual response modeling language	video raster mode language	video raster modeling language	virtual reality modeling language
3	Which of the following is not a stage of multimedia production?	Planning and costing	designing and producing	Marketing	delivering	Marketing
4	_____ is responsible for an entire team of videographers, sound technicians, lighting designers.	Sound editor	Video specialists	Technician	Supervisor	Video specialists
5	Person who make multimedia program come alive with sound effects?	Video specialist	Audio Specialists	Technician	Supervisor	Audio Specialists

6	Diverse range of skills are called as _____	Skill	Knowledge	Strength	Multimedia skill set	Multimedia skill set
7	Person responsible for overall development and implementation of a project is ____	Executive	Music composer	Marketing Director	Project Manager	Project Manager
8	Interface designer creates a _____	Software device	Music	Video	Animation	Software device
9	Flash is the best ___ animation tool	3D	2D	Multidimensional	Aftereffects	2D
10	GIF stands for _____	Graphics Image File format	Geometric Image file format	Geographic Image File format	Graphics Internal File format	Graphics Image File format
11	___ tool allows the elements organized as objects in a structural framework or process.	Icon-or object based tool	Event-driven tools	Card or Page-based tools	Time-based tools	Icon-or object based tool
12	In which tool,the elements are organized along a timeline?	Icon-or object based tool	Event-driven tools	Card or Page-based tools	Time-based tools	Time-based tools
13	_____is useful for slide shows and presentations	Slide show metaphor	Icon based metaphor	Scripting metaphor	Card metaphor	Slide show metaphor
14	Sequence of elements of can be arranged using a Cast and a Score in ____	Director	Editor	Timer	Casting	Director
15	_____ movies are generally good for cross platform delivery	Editing	Picture	Director	Casting	Director

16	____ is an internal scripting language of Director	Lingo	Java	PHP	ASP	Lingo
17	_____ is contain resources for a movie such as still images, sound files, text, palettes.	Cast	Editing	Score	Timing	Cast
18	_____ is a sequencer for displaying, animating ad playing cast members	Score	Loss	sprite	Action script	Score
19	_____ provides elaborate and complex visual effects and transitions, adjustments of color palettes and tempo control	Action script	Loss	sprite	Score	Score
20	_____ is a object oriented scripting language	cast	score	lingo	sprite	lingo
21	_____ is used to enable interactivity and programmed control	Cast	score	lingo	sprite	lingo
22	With _____ we can control operations on the Internet such as sending mail, reading documents and images	Cast	lingo	sprite	Score	lingo
23	Using_____ scripts you can chain together separate Director documents and call other files as subroutines	lingo	cast	sprite	Score	lingo
24	Macromedia Director stores multimedia elements in its _____	stage	cast	score	sprite	cast
25	Dreamweaver is a multimedia tools used for creating _____	interactive automobile dashboards	multimedia enabled web sites	foreign language testing	database reconciliation	multimedia enabled web sites

26	____ is used to create interactive movies using score metaphore	Director	Flash	Photoshop	Illustrator	Flash
27	With _____ event driven tools, you build a flowchart by dragging appropriate icons from a library and then add content	Object based	Icon based	time based	Card based	Icon based
28	With _____ tools elements and events are organized along a timeline	Object based	Icon based	time based	Card based	time based
29	some _____ tools lets you program jumps to any location in a sequence , thereby adding navigation and interactive control	Icon based tool	Time based tool	card based tool	object based tool	Time based tool
30	_____ is a powerful, complex, and full featured authoring tool	Macromedia Director	Photoshop	Soundforge	Protool	Macromedia Director
31	Macromedia Director timeline is called the _____	cast	stage	lingo	score	score
32	A particular instance of an element in the score is a _____	cast	stage	lingo	sprite	sprite
33	A Scripting language is considered_____	a very low level language	an assembler language	a subset of HTML	a very high level language	a very high level language
34	The native language of Web is _____	HTML	C	C++	XML	HTML
35	A_____ is collection of characters of a single size and style belonging to a particular typeface family	styles	font	attributes	tools	font
36	A _____ is a family of graphics characters that usually includes many type sizes and styles	typeface	font	tools	datas	typeface

37	Still images can be generated by _____	bitmaps	text documents	linear	jpeg	bitmaps
38	_____ are used for photo realistic images	documents	bitmaps	linear	jpeg	bitmaps
39	_____ are used for lines, boxes, circles, polygons	bitmaps	vector drawn	linear	jpeg	vector drawn
40	A bit is referred to a _____	decimal	octal	hexa	binary	binary
41	A _____ is a two dimensional matrix of the bits.	map	pixels	decimal	pels	map
42	A _____ is a simple matrix of the tiny dots that form an image	vector drawn	bitmaps	linear	pixels	bitmaps
43	A _____ dimensional matrix is used to display monochrome images	two	three	one	four	one
44	The pixels are also called as _____	pels	dels	cels	pix	pels
45	A _____ contains a collection of images,graphics or photographs.	image map	bitmaps	clip art	image library	clip art
46	**TIFF means _____**	**Tagged Interchanged files form**	**Tagged Interleaved file formats**	**Tagged Inter File format**	**Tagged Interchanged File Format**	Tagged Interchanged File Format
47	**_____ is extensively used in desktop publishing packages**	**TIFF**	**PICT**	**PCX**	**IMG**	TIFF
48	**JPEG and GIF images are the most common bitmap formats used on the _____**	**documents**	**slides**	**web**	**Excelsheets**	web
49	**Multimedia presentations are also called ____**	**Movies**	**Scenes**	**Frames**	**Animation**	Movies

50	**Which metaphor uses linear presentation?**	**Card**	**Cast**	**Script**	**Slideshow**	Slideshow
51	**_____ metaphor is used in menu-driven applications.**	**Iconic**	**Hierarchical**	**Script**	**Card**	Hierarchical
52	**_____ depicts the initial idea content of a multimedia concept in a series of sketches**	**Testing**	**Designing**	**Storyboarding**	**Flowcharting**	Storyboarding
53	**_____ fonts work better for visual communication**	**Sans serif**	**Serif**	**Technic**	**TW**	Sans serif
54	**____ is the RGB code for black color**	**0 0 0**	**0 1 0**	**0 0 1**	**0 1 1**	0 0 0
55	AVI stands for	Audio visual Interval	Audio visual Interleave	Audio video Interval	Audio video Interleave	Audio video Interleave
56	Adobe premiere files are saved with _____ extension	.ppt	.ppx	.ppj	.pptx	.ppj
57	Each instance of a cast member is called	frame	Scenes	sprite	movie	sprite
58	___ is an effect produced by cycling images	Shape tweening	Palette animation	Cel animation	Motion tweening	Palette animation
59	The process of generating intermediate frames between two images to give the appearance that the first image evolves smoothly into the second image	Sprite	Score	Tweening	Script	Tweening
60	**Movie speed can be modified with ____**	**frames**	**Scenes**	**sprite**	**movie**	Frames

SYLLABUS

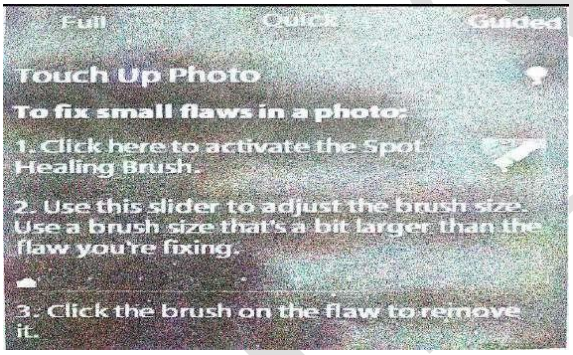
Introducing Photoshop elements: About elements – Welcome screen – Create mode – Menu bar – Toolbox – Options bar – Panels. Organizing images: Obtaining images – Tagging images - Searching for images - Opening and saving images. Selecting Areas – Layers – Text and Drawing Tools.

1.Introducing Elements

About Elements:

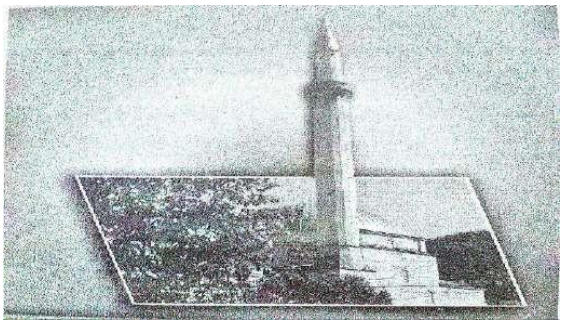
Photoshop Elements is the offspring of the professional-level image editing program, photoshop. Photoshop is somewhat unusual in the world of computer software, in that it is widely accepted as being the best program of its type on the market.If professional designers or photographers are using an image editing program, it will almost certainly be photoshop. However, two of the potential drawbacks to photoshop are the cost (approximately $600) and its complexity. This is where Elements comes into its own.Adobe (the makers of photoshop and Elements) have recognized that the majority of digital imaging users(i.e. the consumer market) want something with the basic power of photoshop, but with enough user-friendly features to make it easy to use. With the explosion in the digital camera market,a product was needed to meet the needs of a new generation of image editors-and that product is Elements.

Elements contains the same powerful editing/color management tools as the full versionofphotoshopanditalsoincludesanumberofversatilefeaturesforsharingimagesand for sharing images and for creating artistic projects, such as slide shows, cards, calendars and online photo albums. It also has valuable help features, such as the Guided Edit mode, which explains what different items can be used for and gives a step-by-step guide to various digital editingtechniques:



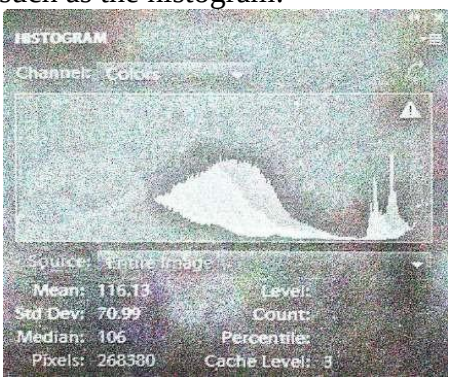
Special effects:

One of the great things about using elements with digital images is that it provides numerousfunandcreativeoptionsforturningmediocreimagesintoeye-catchingworksofart. This is achieved through a wide variety of guided activities within GuidedEdit:



Advanced Features:

In addition to User-friendly features, Elements also has more advanced functions , such as the histogram:



Welcome Screen:

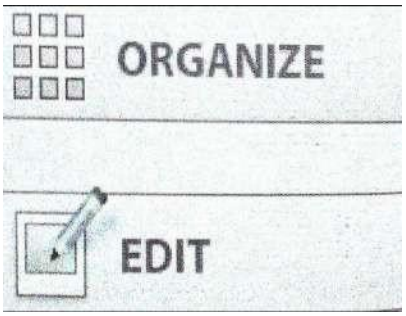
When you first open Elements, you will be presented with the Welcome Screen. This offers initial advice about Working with Elements and also provides options for creating new files, or opening existing ones. The welcome Screen appears by default but this can be altered once you become more familiar with Elements.

Welcome Screen functions:

1. Options for organizing photos, editing them and using them in a variety of

creativeways

2. Click on the Learn more buttons to find out about certain functions inElements.



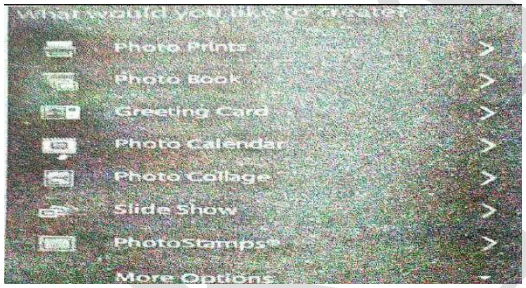
3. Click on the Organize button to go to thatarea
4. click on the Edit button to go to thatarea

Create Mode:

Createmodeiswhereyoucanreleaseyourartisticflairandstartdesigningitemssuchas photo books and photo collages. It can also be used to create slide shows, create PhotoStamps and to put your images onto disc. To use Create Mode:

1. In either the Editor or the Organizer, Click on the createbutton.

2. Select one of the create projects. Each project has a wizard that takes you through the createprocess.



3. Create mode can be used to create a variety of artistic projects, containing your own image

4. Menu Bar:

In the Editor, the Menu bar contains menus that provide all of the functionality for the workings of Elements. Some of these functions can also be achieved through the use of the othercomponentsofElements,suchastheToolbox,theShortcutsbar,theOptionsbarandthe Panels. However, the Menu bar is where all of the commands needed for the digital editing process can be accessed in oneplace.

Menu bar menus:

- File. This has standard commands for opening, saving and printing images, and also commands for creating Photomerge effects such as panoramas and combining exposures
- Edit. This contains commands for undoing previous operations, and standard copyand

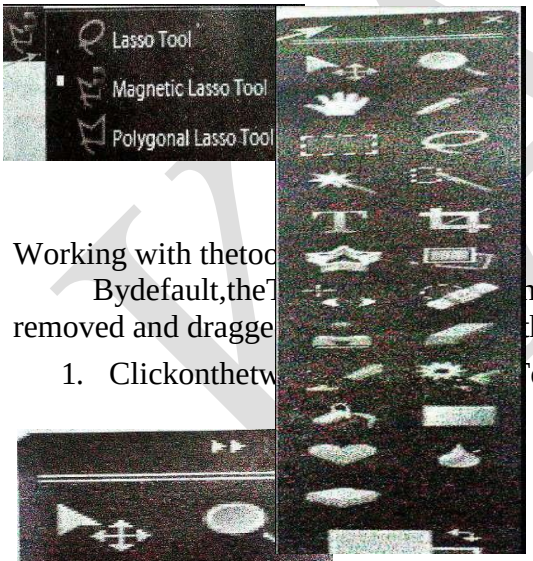
pastetechniques.

- Image.Thiscontainscommandsforalteringthesize,shapeandpositionofanimage.It also contains more advanced functions, such as changing the color mode of animage.
- Enhance. This contains commands for editing the color elements of an image. It also contains quick-fix options.
- Layer. This contains commands for working with different layers within animage.
- Select. This contains commands for working with areas that have been selected within an image, with one of the selection tools in thetoolbox.
- Filter. This contains numerous filters that can be used to apply special effects to an Image.
- View. This contains commands for changing the size at which an image is displayed, and also options for showing or hiding rulers and gridlines.
- Window.Thiscontainscommandsforchangingthewaymultipleimagesaredisplayed, and also options for displaying all of the components ofelements.
- Help. This contains the various Helpoptions.

Toolbox:

The Toolbox contains tools for adding items to an image (such as shapes and text), selecting areas of an image and also for applying editing techniques. Some of the tools have morethanoneoption,inwhichcase,theyhaveasmallblacktriangleatthebottomrightofthe default tool. To access additional tool intoToolbox:

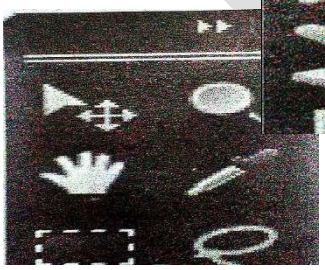
Click and hold here to access additional tools for a particular item



Working with thetoo

Bydefault,theT neleftofthemaineditorwindow.However,itcan be removed and dragge he main window. To dothis:

1. Clickonthetw oolboxinonecolumn.Clickonthecrosstoclose it.



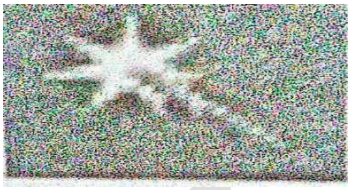
2.ClickanddragheretomovetheToolboxaroundtheEditorwindow.Dragitbacktoits original location to redock it at the left of thewindow.

Options Bar:

TheOptionsbarprovidesattributesthatcanbesetforaselectedtoolfromthetoolbox. For instances, if the Eraser tool is selected, the option bar offers choices for the type of eraser thatcanbeused,itssize,itsmodeanditsopacitylevel.Foreachtool,adifferentsetofoptions isavailable.

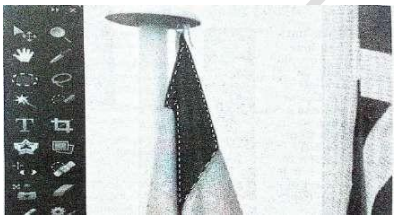
Using the options bar:

1. Click on a tool in the Toolbox (in this example it is the Magic Wandtool).



2. Select the options for the tool in the Optionsbar

3. Apply the tool to an image. The tool will maintain the settings in the Option bar until they arechanged.



Panels:

Elementsusespanelstogrouptogethersimilareditingfunctionsandprovidequickaccess to certain techniques. The available panels are:

- Adjustments. This can be used to add or make editing changes to adjustment layers in the Layers panel.
- Color Swatches. This is a panel for selecting colors that can then be applied to parts of an image or elements that have been added to it.
- Content. This contains graphical elements that can be added to images. This includes backgrounds, frame shapes and artistictext.
- Effects. This contains special effects and styles that can be applied to an entire image oraselectedpartofanimage.Thereareal sofilterswhichhavetheirowndialogboxes in which settings can be applied and adjusted. Layer styles can also be applied to elements within animage.
- Favourites. This is where favourite graphical elements from the Content panel can be store and retrievedquickly.
- Histogram.Thisdisplaysagraphofthetonalrangeofthecolorsinanimage.Itisuseful for accessing the overall exposure of an image and it changes as an image isedited.
- Info. This displays information about an image, or a selected element within it. This includes details about the color in an image or the position of a certainitem.
- Layers. This enables several layers to be included within an image. This can be useful if you want to add elements to an existing image, such as shapes or text. Layers can also be used to merge two separate imagestogether.
- Navigator. This can be used to move around an image and magnify certain areas ofit.
- Undo History. This can be used to undo to all, or some, of the editing steps that have been performed. Every action is displayed in the Undo History panel and these actions can be reversed by dragging the slider at the side of the panelupwards.

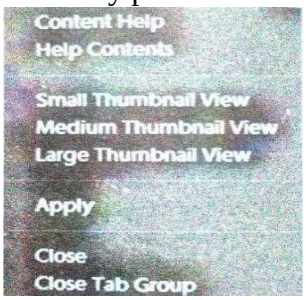
Working with panels:

By default, all panels are minimized and grouped in the panel Bin. However, it is possible to open one or more panel so that they are displayed independently from the panel Bin. To work with panels:

1. Panels are grouped together in the panel Bin at the right of the workarea.
2. Clickanddragheretomoveapanelawayfromthebin(ormoveadetachedpanelback into thebin).

3. Click here on the top bar to expand or contract apanel.

4. Every panel has its own menu; its options depend on the functions within the panel.



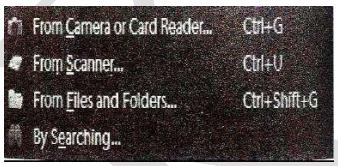
2.OrganizingImages:

Obtaining Images:

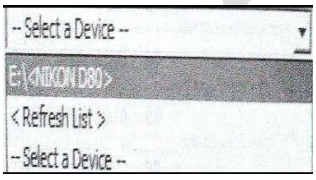
One of the first tasks in Elements is to download images so that you can start editing and sharing them. This can be done from a variety of devices, but the process is similar for all of them. To download images into Elements:

1. Access the Organizer by clicking on this button in thisEditor.

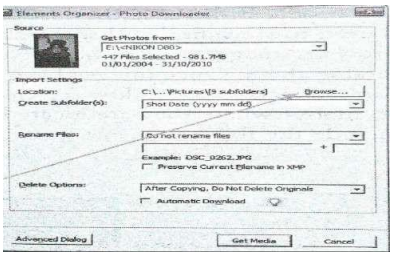
2. Select File>Get Photos and Videos from the Menu bar and select the type of device from which you want to load images intoElements.



3.If you select From Camera and Card Reader, Click under Get Photos From to select a specific Device.

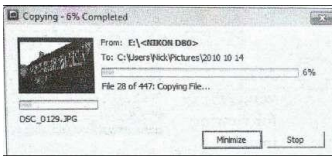


1. The images to be downloaded are displayed here, next to the device from which they will bedownloaded.

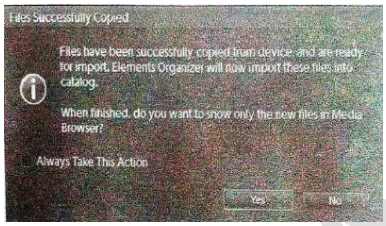


2. Clickheretoselectadestinationfortheselectedimagesandclick theGetPhotosbutton todownload.

3. As the images are being downloaded, the following window isdisplayed.



4. After the files have been copied they are then imported intoElements.



5. Click on the Yes button so that the images are imported. They can then be viewed in the Organizer and opened in theEditor.

Tagging Images:

As your digital image collection begins to grow on your computer it is increasingly important to be able to keep track of your images and find the ones you want, when you want them. One way of doing this is by assigning specific tags to images. You can then search for images according to the tags that have been added to them. The tagging function is accessed from the task pane within the Organizer. To add tags to images:

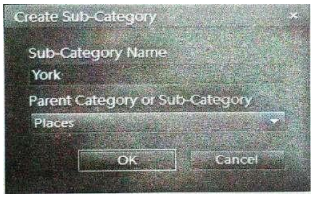
1. If the Task Pane is not visible, select Window>Show Task Pane from the menu bar, or Click here on the right border of the Media Browser to expand the TaskPane.

2. Click here to access the currently availabletags

3. Click here to access sub-categories for a particularcategory

4. Click here to add categories, or sub- categories, of your ownchoice.

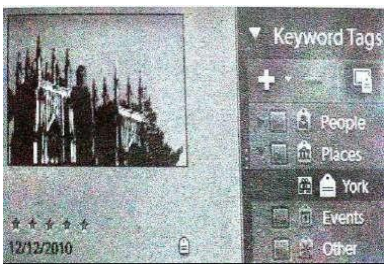
5. Enter a name for the new category, or sub-category, and click on the OKbutton



6. Select the required images in the MediaBrowser.

7. Drag a tag onto one of the selectedimages.

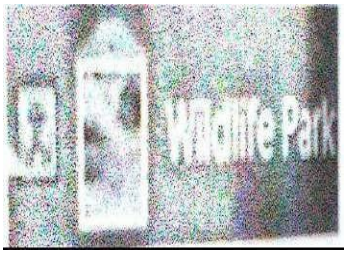
8. Theimagesaretaggedwiththeiconthatdenotesthemaincategory,ratherthanthesub-category.



Searching forImages:

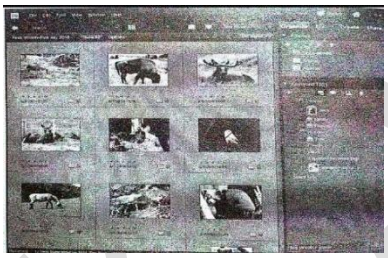
Once images have been tagged they can be searched for using both of these options. To do this:

1. For tags and collections, click on this box so that the binoculars areshowing.



2. Drag one of the icons below the timeline in the MediaBrowser.

3. All matching items for a search are shown together within the MediaBrowser.



4. Click on the show all button to return to the rest of theimages.

Opening and saving Images:

Once you have captured images with a digital camera, or a scanner, and stored them on your computer, you can open them in Elements. There are a number of options for this:

Open Command:

1. Select File>Open from the Menubar.

2. Select an image from your hard drive and clickOpen.

Open as command:

This can be used to open a file in a different file format from its original format. To do this:

1. Select File>Open As from the Menubar

2. Select an image and select the file format. ClickOpen.

Saving Images:

Whensavingdigitalimages,itisalwaysagoodideatosavetheminatleasttwodifferent file formats, particularly if layered objects, such as text and shapes, have been added. One of these formats should be proprietary Photoshop format PSD or PDD. The reason for using this is that it will retain all of the layered information within an image. So, if a text layer has been added,thiswillstillbeavailableforeditingatafuturedate,onceithasbeensavedandclosed.

The other format, that an image should be saved in, is the one most appropriate for the use to which it is going to be used on the web should be saved as JPEG, GIF or PNG files, while an image that is going to be used for printing should be saved in another format, suchas TIFF. Once images have been saved in these formats, all of the layered information within thembecomesflattenedintoasinglelayeranditwillnotbepossibletoeditthisoncetheimage hasbeensaved.Bydefault,imagesaresavedinthesameformatastheoneinwhichtheywere opened.

3. Selecting Areas:

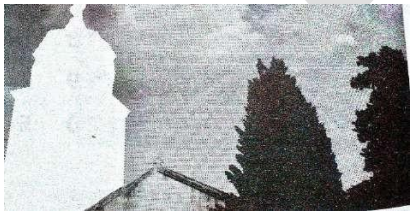
AboutSelections:

One of the most important aspects of image editing is the ability to select areas within an image. This can be used in a number of different ways:

1. Selectinganobjecttoapplyaneditingtechniquetoit(suchaschangingthebrightness or contrast) without affecting the rest of theimage.
2. Selecting a particular color in animage.
3. Selecting an area to apply a special effect toit.
4. Selecting an area to removeit.

Elements has several tools that can be used to select items, and there also a number of editing functions that can be applied to selections.
Two examples of how selections can be used are:

1. Select an area within an image and deleteit.

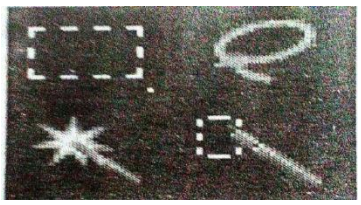


2. Select an area and add a color or specialeffect.

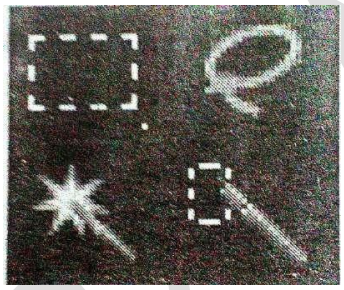
Marquee Tools:

There are two options for the Marquee tool: the Rectangular Marquee tool and the Elliptical
Marquee tool. Both of these can be used to make symmetrical selections. To use the Marquee tools:

1. Select either the Rectangular or the Elliptical Marquee tool from the Toolbox. Select the required options from the Options bar.



2. Make a symmetrical selection with one of the tools by clicking and dragging on an image.

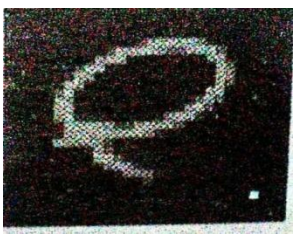


Lasso Tools:

There are three options for the Lasso Tools, which can be used to make freehand selections. To use these:

Lasso Tools:

1. Select the Lasso tool from the Toolbox and select the required options from the Optionsbar.



2. Make a freehand selection by clicking and dragging around anobject.

Polygonal Lassotool:

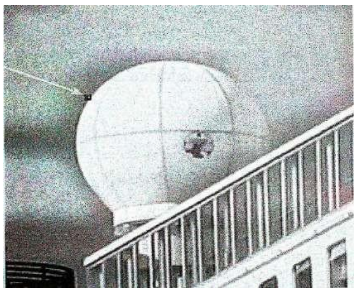
1. Select the Polygonal Lasso tool from the Toolbox and select the required options from optionsbar.

2. Makeaselectionbyclickingonspecificpointsaroundanobject,andthendragging to the nextpoint.

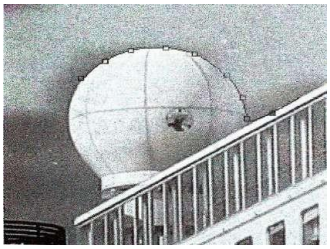
Magnetic Lassotool:

1. Select the Magnetic Lasso tool from the Toolbox and select the required options from the Optionsbar.

2. Click once on an image to create the first anchorpoint.



3. Make a selection by dragging continuously around an object. The selection line snaps to the closest strongest edge, i.e. the one with the most contrast. Fastening points are added as the selection ismade.



Magic WandTool:

The Magic Wand tool can be used to select areas of the same, or similar, color. To do this:

1. SelecttheMagicWandtoolfromtheToolboxandselecttherequiredoptionsfrom the Optionsbar

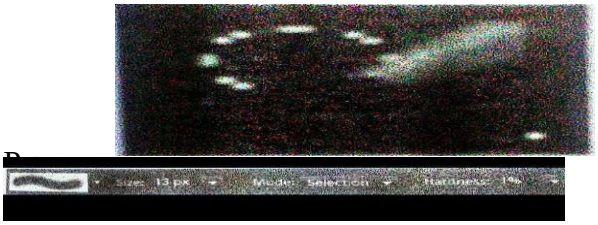
2. Click on a color to select all of the adjacent pixels that are the same, or similar, color, depending on the options selected from the Optionsbar.

Selection Brush Tool:

TheSelectionBrushtoolcanbeusedtoselectareasbyusingabrush-likestroke.Unlike withtheMarqueeorLassotools,theareaselectedbytheSelectionBrushtoolistheonedirectly below where the tool moves. To make a selection with the Selection Brushtool:

1. Select the Selection Brush tool from the Toolbox and select the required options from the Optionsbar

2. Click and drag to make aselection



3. The Selection area is underneath the borders of the Selection Brushtool.

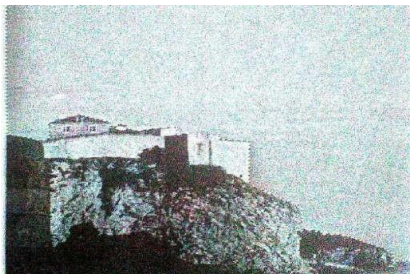
Quick Selection Tool:

TheQuickSelectiontoolcanbeusedtoselectareasofsimilarcolorbydrawingover the general area, without having to make a specific selection. To dothis:

1. Select the Quick Selection tool from theToolbox.

2. Select the required options from the Optionsbar.

3. Draw over an area, or part of an area, to select all of the similarly coloredpixels.

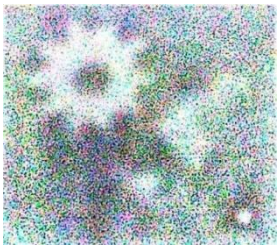


Smart BrushTool:

TheSmartBrushtoolcanbeusedtoquicklyselectlargeareasinanimage(inasimilar way to the quick Selection tool) and then have effects applied automatically to the selected area. To do this:

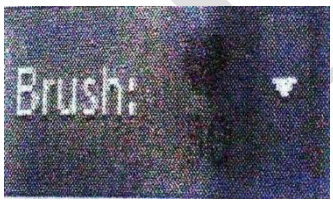
1. Open the image to which you want to apply changes with the Smart Brushtool

2. Select the Smart Brush tool from theToolbox.



3. Select the editing effect you want to apply to the area selected by the Smart Brush tool, from the optionsbar.

4. Select Brush size for the Smart Brush tool, from the Optionsbar.



5. DragthesmartBrushtooloveranareaoftheimage.Intheleft-handimage,below, the building has been selected and brightened, in the right-hand image the sky has been selected and enhanced.

Inverting a Selection:

This can be a useful option if you have edited a selection and then want to edit the rest of the image without affecting the area you have just selected. To do this:

1. M

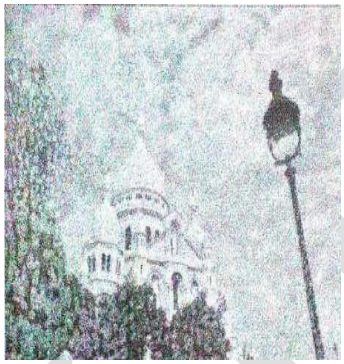
2. Choose select>Inverse from the Menubar

3. The selection becomes inverted, i.e. if a background object was selected the foreground is nowselected.

Feathering:

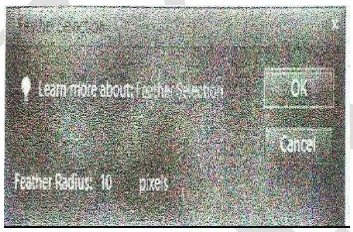
Featheringisatechniquethatcanbeusedtosoftentheedgesofaselectionbymaking them slightly blurry. This can be used if you are pasting a selection into another image, or if you want to soften the edges around a portrait of an individual. To dothis:

1. Make aselection.



2. Choose select>Feather from the menubar.

3. Enterafeathervalue(thenumberofpixelsaroundtheradiusoftheselectionthatwill be blurred). Click on the OKbutton.



4. Invert the selection, as shown on the previous page, and delete the background by pressing Delete. This will leave the selection around the subject with softenededges

Editingselections:

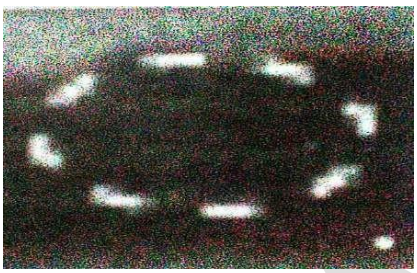
When you have made a selection, you can edit it in a number of ways.

Moving a Selection:

Make a selection and select the Move tool from the Toolbox. Drag the selection to move it to a new location.

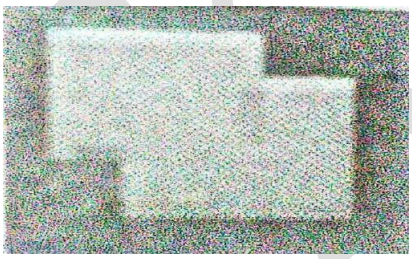
Changing the Selectionarea:

Make a selection with a selection tool. With the same tool selected, click and drag within the selection area to move it over another part of image.



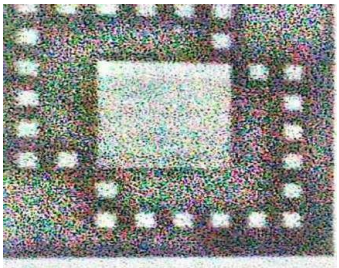
Adding to a selection:

Make a selection and click on this button in the Options bar. Make another selection to create a single larger selection. The two selections do not have to intersect.



Intersecting with a selection:

To create a selection by interesting two existing selections: make a selection and click onthisbuttonintheOptionsbar.Makeanotherselectionthatintersectsthefirst.Theintersected area will become theselection.



Expanding a selection:

To expand a selection by a specific number of pixels: make a selection and choose select>Modify>Expand from the Menu bar. In the Expand Selection dialog box, enter the amount by which you want the selection expanded.

Growing a Selection:

The Grow command can be used on a selection when it has been made with the Magic Wand tool, and some of the pixels within the selection have been omitted. To do this:

Make a selection with the Magic Wand tool and make the required choices from the Optionsbar.ChooseSelect>GrowfromtheMenubar.DependingonthechoicesintheOptions bar, the omitted pixels will be included in theselection.

KARPAGAM ACADEMY OF HIGHER EDUCATION

COIMBATORE - 21

DEPARTMENT OF COMPUTER SCIENCE,CA & IT

CLASS : III B.Sc COMPUTER TECHNOLOGY

BATCH : 2016-2019

Part -A Online Examinations **(1 mark questions)**

SUBJECT: MULTIMEDIA AND ITS APPLICATION **SUBJECT CODE: 16CTU504B**

UNIT-III

S.NO	Question	opt1	opt2	opt3	opt4	Answer
1	_____is used to convert analog signal into Digital Signal	Printer	Scanner	Modem	Monitors	Modem
2	MIDI stands for_____	Multimedia Instrument Digital Interface	Musical Instrument Digital Interface	Media Instrument Digital	Movie Instrument Digital	Musical Instrument Digital
3	The size of the original image divided by the size of the compressed image is called	Image Quality	Lossy schemes	Compression ratio	Lossless	Compression ratio
4	MPEG stands for_____	Moving picture Expert Group	Movie Picture Expert Group	Music Pic Expert Group	Media Picture Expert Group	Moving picture Expert Group
5	_____schemes preserve the original data precisely.	Lossy	Lossless	decompression	Transferring	Lossless
6	In Windows, system sounds are _____files	DOC	WAV	DBS	PPT	WAV
7	_____ is created when you convert a sound wave into numbers	digital video	recording	digital audio	digital visual	digital audio
8	Sampling rate is measured in _____	kilohertz	hertz	watts	ohms	kilohertz
9	Sample sizes are either 8bits or ____ bits	32	64	16	12	16
10	_____ determines the accuracy with which a sound can be digitized	Audio files	Audio frequency	Audio resolution	Audio equalization	Audio resolution

11	_____ allows to modify a recording's frequency content so that it sounds brighter or darker	digital waves	digital resolution	digital finalization	digital equalization	digital equalization
12	A _____ keyboard is also useful to simplify the creation of musical scores	MACE	MIDI	MIDS	AIFF	MIDI
13	MIDI means_____	Multiple Insturment Digital Interface	Musical Interface Digital Instrument	Musical Instrument Digital	Multiple Instrument Digital	Musical Instrument Digital
14	_____ is a device dependent	MACE	MIDS	MIDI	AIFF	MIDI
15	MIDI files will be _____ times smaller than CD-quality digital audio files	1000-10000	1000-7000	200-1000	500-1000	200-1000
16	Removing blank space or dead air at the beginning or end of a recording is sometimes called	quieting	quantizing	trimming	pre rolling	trimming
17	_____ software allows you to record, edit and save music generated from a MIDI keyboard or instrument	Sound	Sequence	synthesizer	Samples	Sequence
18	An 8-bit sample size provides ____equal units to describe the dynamic range or amplitude	16	12	256	324	256
19	General MIDI numbering system ranges from_____	0 to 127	0 to 125	0 to 126	0 to 124	0 to 127
20	MIDI sounds are typically stored in files with the _____ extension	.sou	.midi	.mid	.mdi	.mid
21	Digital audio data is the actual representation of a sound, stored in the form of thousands of individual numbers called	orders	datas	codes	samples	samples
22	A music compression scheme to reduce file size was enveloped by the _____	MPEG	MPES	MPPS	MPDS	MPEG
23	The 3-D scenes consists of _____	objects	vectors	linear	Shapes	objects
24	In a 3-D, we can import a premade shape from a library of geometric shapes called	primitives	data	tools	texts	primitives
25	When you _____ a plane surface, its shape extends some distance,either perpendicular to the shape's outline or along	lathe	extrude	intrude	textures	extrude

26	_____provides high resolution in a 16:9 aspect ratio	SECAM	PAL	ATSC DTV	HDTV	HDTV
27	Using MPEG-1 we can deliver _____ of video	1.5Mbps	2 Kbps	1.2 Mbps	3 Mbps	1.2 Mbps
28	_____ video combines the luminance and chrome information from the video signal	decomposition	composite	component	compound	composite
29	_____ video separates the luminance and chrome information	decomposition	composite	component	compound	component
30	In _____ color and luminance information are kept on two separate tracks	decomposition	composite	S-Video	A-Video	S-Video
31	_____ is a continuous time varying signal	Analog video	Digital video	Image	Audio	Analog video
32	_____ is represented as a sequence of digital images	Analog video	Digital video	Image	Audio	Digital video
33	There is no “crosstalk” between different channels in _____ video	composite	component	compound	Simple	component
34	_____ improves the quality of the video and decrease generation loss	decomposition	composite	component	compound	composite
35	S-Video is _____	Super video	Simple video	Smart video	Sample video	Super video
36	_____ traces through a complete picture row-wise	Interlaced	Non interlaced	Raster	Digitized	Non interlaced
37	_____ uses 525 scan lines per frame	SECAM	PAL	NTSC	CCIR	NTSC
38	PAL uses _____ channel to improve quality	8 MHz	16 MHz	32 MHz	64 MHz	8 MHz
39	PAL means _____	Phase Alternate Line	Phase Altering Line	Phase Alternate Link	Phase Altering Link	Phase Altering Line
40	____ supports repeated recording without degradation of image quality	Analog video	Image	Digital video	Audio	Digital video

41	_____ indicates that no chroma sub sampling is used	4:1:1	4:1:2	4:1:3	4:4:4	4:4:4
42	CIF stands for	Common Interleave Format	Common Intermediate Format	Common Internet Format	Common Internal Format	Common Intermediate Format
43	_____ uses non-interlaced scan	CCIR 601	CCIR	CIF	PAL	CIF
44	Scheme _____ is commonly used in JPEG and MPEG	4:2:0	4:2:1	4:2:2	4:2:3	4:2:0
45	____ uses 720 active lines or higher	TV	SDTV	EDTV	HDTV	HDTV
46	Which among the following is not a property of sound?	reflection	diffraction	refraction	Transformation	Transformation
47	____ means measuring the quantity interested in, usually at evenly spaced intervals	Digitization	Compression	Sampling	Quantization	Sampling
48	____ is sampling the analog signal in the amplitude dimension	Digitization	Compression	Sampling	Quantization	Quantization
49	SNR stands for _____	Signal to Neutral Ratio	Signal to Noise Ratio	Sample to Noise Ratio	Sample to Neutral Ratio	Signal to Noise Ratio
50	____ is the process of removing unwanted frequencies in audio	Digitization	Compression	Sampling	Filtering	Filtering
51	MIDI channels are numbered from	0 to 16	1 to 16	0 to 15	1 to 15	0 to 15
52	If the first four bits are all ones in MIDI, the message is interpreted as a ____	System message	Channel message	Voice message	Mode message	System message
53	____ is the connector through which the device echoes the data received	MIDI OUT	MIDI IN	MIDI THRU	MIDI OFF	MIDI THRU
54	____ messages are used to specify effects such as sustain, vibrato and pitch	System message	Channel message	Mode message	Voice message	Voice message
55	____ message is included for manufacturers who can extend the MIDI standard	Mode message	Voice message	System Exclusive Message	System Common Message	System Exclusive Message

56	Extra character information such as karaoke lyrics is included in ____	MIDI	MIDI Leve 2	MPEG - 1	MPEG -2	MIDI Leve 2
57	_____ specifies the design of tests for verifying whether the bitstream or decoder complies with the standard	systems	Audio	Conformance	Software	Conformance
58	If prediction is from a previous frame it is called ____	Forward Prediction	Backward Prediction	Previous Prediction	Next Prediction	Forward Prediction
59	There are ____ hierarchical layers in MPEG video bitstream	5	6	7	8	6
60	Which of the following combination does not form hybrid scalability	SNR and Spatial	Spatial and Temporal	SNR and Temporal	SNR and Data partitioning	SNR and Data partitioning

UNIT IV

SYLLABUS

Understanding Flash: Understanding Flash basic elements – Creating a simple animation. Learning Flash Toolbox: Learning the toolbox – Using tools. Learning Flash Panels: Understanding the panels. Using timeline and layers: Understanding how timeline works – Understanding layers. Drawing objects: Drawing lines and fills – Using colors – Rotating, skewing and scaling – Grouping objects. Creating animation – How animation works – Creating motion tweens – Creating shape tweens. Understanding masks – Creating masks.

UNDERSTANDING FLASH

Macromedia Flash is a very popular tool for creating very interesting and dynamic Web sites. With Flash, you can add animation and interactivity to your Web site, and make people want to return. Of course, you need to learn how to use Flash to create all of that neat and interesting content so that you can put it on your Web site. In this module, you will learn what you can do with Macromedia Flash so that you will have a better understanding of how adding Flash movies can lives up your Web site. In addition, you will learn about all of the basic elements of the Flash interface so that you will be ready to begin creating Flash movies very quickly.

Flash, of course, is just one of the many tools that you may use in creating and maintaining your Web site. In addition to Flash, you will probably use a page layout program such as Macromedia Dreamweaver or Microsoft FrontPage. You may even use graphics-editing software or sound-editing software to create Web page content. Even so, you will find that Flash has some pretty amazing capabilities all on its own.

WHAT CAN YOU DO WITH FLASH?

Flash is everywhere. As you browse various Web sites, you probably aren't even aware just how often you are viewing a Flash movie. You may be surprised to learn that the vast majority of Web sites that contain animation generally use Flash. If you visit a Web site and you see objects slide into place, you're probably viewing a Flash movie. If you visit a Web site where menus appear when the mouse pointer rolls over a particular point on the screen, that's probably a Flash movie, too. Just why is Flash so popular? It's because Flash can enable you to do so much with so little work.

Let's take a look at some of the things you can do with Flash.

Create Web Images

The World Wide Web-or just Web- is a part of the Internet that truly cries out for visual creativity. When you surf the Web, you see literally thousands of different ideas about what makes an interesting Web sites. Even with all of these divergent opinions, there is

one almost universally accepted notion-images and color are pretty much a requirement when you are creating a Web site.

Flash has the tools you need to create colourful Web images with very little effort. For example, here is a company logo I created for a Web site using Flash in just a few minutes.

UNDERDAHL GROUP

Web Design with style!

Although this may come as a bit of a surprise, you cannot simply add Flash images to your Web site. Although many different programs can easily display various assorted types of bitmap images, vector graphics typically must be viewed using a special program. For Flash images, this special program is the Flash Player, which almost everyone already has installed in their Web browser. Flash images are saved as part of a Flash movie, and that Flash movie is what is placed on your web page. When your Web browser encounters a Flash movie on a Web page, the browser automatically loads the Flash Player so that the Flash movie (and the images it contains) can be viewed.

You do need to add a bit of HTML to the Web page, but Flash automatically creates the necessary HTML code when you publish a Flash movie. You'll learn more about publishing Flash movies in Module 11.

Animate Your Web Site

Let's face it, plain old Web sites that simply sit there are boring. A little bit of animation can make quite a difference. Some nicely done animation-even if it is simply moving menu elements into place-makes your Web site stand out from the rest.

Flash makes animation easy to create using a process known as *tweening.* Essentially, in this process you tell Flash where you want the animation to begin, and you tell it were you want the animation to end. Once you have done this, Flash automatically generates all the in-between frames. So, if it takes 24 frames to complete your animation, you may end up creating tow of the frames, while Flash creates the other 22 frames. Obviously, this greatly reduces you workload.

For example, take a look at this animated sequence. Here, I'm moving the truck across the stage. I needed to create only one instance of the truck. I told Flash where I wanted the truck to begin, and then I told it where the truck should end. Once I did this, Flash too care of all the rest and generated all of the frames necessary to make it appear as though the truck were smoothly driving across the screen from one side to the other.

Picture- pg.no:5

Flash actually offers several different ways to move and reshape objects. As you will learn in Module 7, you can create a motion guide when you want to move an object along a

path that isn't straight. In addition to motion tweens, which are used to moves objects, you can also create shape tweens. These enable you to change the shapes of objects. You will learn about both types of tweens in Module 6.

Build Interactive Movies

In addition to simple animation, you can use Flash to build interactive Web sites. You could, for example, create a Flash movie that enables the visitor to choose between several different movie clips or even between different soundtracks. Because Flash is object oriented, your movies already know how to interact with users. All you need to do is to tell your movies what you want them to do when the user does something, like click a button.

It does take a small amount of ActionScript programming in order to add most interactivity to Flash movies. Don't let this worry you. Flash makes adding some ActionScript commands very easy because you can essentially just click and then make selections from list boxes.

Here are some of the things you can do with interactivity in Flash movies:

- Enable Web site visitors to select the movie they want to view.
- Create games that allow users to drag and drop objects.
- Add rewind buttons and other controls to allow users to control the playback.
- Load different movies depending on when a visitor comes to your Web site.
- Allow visitors to mute the soundtrack of a movie.
- Send information requests from visitors to an e-mail address.

Of course, interactivity can take many other forms, too. If you can dream up an idea about how you would like your Flash movies to interact with a visitor, there is probably a fairly simple way to make it happen.

Display Buttons

Buttons, of course, are an interface element that virtually everyone understands. You probably don't have to explain to visitors that pressing (or clicking) a button will cause something to happen.

You can easily add buttons to your Flash movies either by creating your own buttons or by using some of the buttons that come along with Flash, as shown here. When you add buttons to a Flash movie, those buttons already know how to act as buttons. That is, they know that when a user clicks the button, something should happen.

Diagram-7

Of course, when you add a button to a Flash movie, the button doesn't really know what you want to happen, only that it should respond to a mouse click. You have to tell the button what you want it to do. For example, if you want to create a button that rewinds the movie and starts it playing again at the beginning of the movie, you might add a line of ActionScript code that looks like this:

gotoAndPlay(1);

Believe it or not, that is all of the ActionScript programming you need to add to create your rewind button! Flash automatically handles all of the other details for you.

Transform shapes

One of the animation techniques in Flash allows you to change an object from one shape into a totally different shape. This process is known as a shape tween. Here I am transforming a rectangle into a circle.

Diagram-8

Display Rolling Banner Text

You have no doubt seen rolling text banners on a number of different Web sites. These are often used to create a tickertape-style effect in which text scrolls into a text box from one side and scrolls out of the box on the other. This effect is used to display stock market results and news headlines, among other things.

In Flash, creating a rolling text banner is quite easy. Basically, the effect requires you to combine a couple of Flash movie techniques to produce the desired result. You start with a motion tween that moves a text block across the stage. Then you add a mask that controls how much of the text is visible at any one time. When you do this, users cannot tell that the whole text block is moving-all they see is the portion of the text block that is currently visible through the mask.

It is quite easy to display predefined text in a rolling text block, but displaying something like a stock ticker or a scrolling headline ticker is quite a bit more involved. You will need to learn some advanced ActionScript techniques, as well as some server-side programming, to be able to supply the constantly updated text to your Flash movie. From a practical standpoint, you will probably find this project to be a lot harder than you might expect.

Okay, so now that you have an idea about some of the things that you can do with Flash, let's take a look at the various things you will see when you use Flash.

UNDERSTANDING FLASH's BASIC ELEMENTS

As with any other program you might use on your computer, Flash has a number of basic elements that enable you to accomplish the tasks for which the program was designed. Here is an overview of some of the most important elements-we'll look at each of these in more detail shortly.

Diagram- 10

The Flash Stage

The stage is the area where you create your Flash movies. This is the white area that takes up most of the middle of the Flash window. When your movie plays, anything that is on the stage will be visible in the movie.

The stage is surrounded by a gray area known as the workspace. It is perfectly acceptable for you to place objects in the workspace off the edge of the stage. Objects that are in the workspace but not on the stage won't appear in the movie unless they are moved onto the stage-just as actors in a play cannot be seen until they move out onto the stage.

You can use the zoom control in the status bar below the stage to zoom in or out. You can also use the View menu to zoom in or out, or to select a specific magnification level.

The Timeline

The timeline is the Flash element that controls when things happen during the movie playback. Here, I've labelled the important items you see on the timeline.

Diagram-13

Here is a brief description of these important timeline elements:

- **Playhead** You can drag the playhead to different frames to view the contents of those frames. You can also click a frame in the timeline to select that frame-this automatically moves the playhead to that frame.
- **Frame numbers** These are your guides to working with the timeline; they enable you to place objects in the correct frame.
- **Timeline menu** This provides access to a number of options where you can choose timeline view settings.

- **Center frame** This moves the current view of the timeline so that the current frame is centered in the visible area of the timeline.
- **Onion skin view** This displays several frames before and after the current frame using lightly shaded versions of the objects on the stage so that you can get a feel for the animation sequence.
- **Onion skin outline view** This also displays an onion skin view of several frames, but it uses wire frame outlines rather than filled objects.
- **Edit multiple frames** This enables you to edit the animation in several frames.
- **Modify onion markers** This displays a menu that allows you to choose how many frames to display in onion skin view.
- **Current frame** This shows the frame number of the currently selected frames.
- **Frame rate** This shows the number of frames per second that are displayed in the current movie.
- **Playback time** This shows how many seconds will have elapsed when the current frame is played.
- **Scroll bars** These enable you to see frames or layers that are not currently displayed.

Layers

Layers are like transparent overlays on the stage. They enable objects to act independently of objects on other layers, and they also control whether objects are visible-objects onlayers that are in front of other layers hide the objects on those other layers when they cross in front of them.

Here is a closer look at the layers area (this is actually an integral part of the timeline and cannot be separated from the timeline).

Diagram-16

Let's take a look at each of these items:

- **Layer names** These are the names of the layers. You can change the names by double-clicking the layer name. Most Flash developers name the layers to indicate their contents or purpose.
- **Add a layer** Click this button to add a new layer. Because all objects on a single layer must have the same animation effects, this enables you to create objects that function independently of each other.

- **Add a motion guide layer** This enables you to create a guide layer so that you can move objects in a path that is not necessarily a straight line. Objects on guide layers do not appear in you movie once it has been published.

- **Add a layer folder** This enables you to add folders to help organize the layers.

- **Delete a layer** This removes the currently selected layer and any objects it contains. Use this with caution so that you don't accidentally delete objects you need.

- **Show or hide layer** Clicking in this column toggles the visibility of the layers. Hiding layers may make it easier to create objects by reducing the visual confusion. Clicking the icon toggles all layers. To toggle a single layer, click in this column within the later itself.

- **Lock or unlock layer** Click in this column to lock the layers to prevent anychanges. Locking a specificlayer is a good way to avoid accidentally making changes to that layer-especially if you inadvertently select the wrong layer to work in.

- **Show layer as outlines** Click this column to show the objects as wire frame outlines rather than as filled objects. This may be useful when you want to see how objects on different layers relate to each other.

Extra layers do not affect the size of the published movie because Flash flattens published movies into a single layer. That is one reason you need to save your Flash movie project in addition to publishing the movie-your movie project file (the .FLA file) contains all of the layers so that you can make whatever modifications you want. If you import a published movie file (the .SWF file), everything will be in one layer.

The Toolbox

The Flash toolbox contains all of the tools you need for drawing or selecting objects. Next is a closer look at the toolbox.

Diagram-18

The flash toolbox has a lot of tools. Let's take a look at the purpose of each of them:

- **Arrow tool** Use this tool to select objects. You can click an object to select it, double-click to select the object and all of its components, or drag the Arrow tool to create a selection box to select everything within the box.

- **Line tool** Use this tool to draw lines. Hold down SHIFT as you draw to create lines that are perfectly horizontal, vertical, or at 45 degrees.

- **Pen tool** Use this tool to draw curved lines. The pen tool draws Bezier curves-which are curved lines with selection handles that you can use to control the curve.
- **Oval tool** Use this tool to draw oval objects. Hold down SHIFT to draw perfect circles.
- **Pencil tool** Use this line to draw individual points or lines that follow an irregular path.
- **Free Transform tool** Use this tool to modify the color of a line.
- **Ink Bottle tool** Use this tool to add or modify the color of a line.
- **Eyedropper tool** Use this tool to select a color from an object so that you can match the same color in your drawings.
- **Hand tool** Use this tool to drag the stage (and all objects) around. This will be most useful if you have zoomed in so much that you cannot see the entire stage and you want to work in a different area of the stage.
- **Stroke Color** Click this icon to open the stroke color selector pane so that you can choose a color for drawing strokes (lines).
- **Fill Color** Click this icon to open the fill color selector pane. This enables you to select a fill color or gradient fill for the insides of drawn objects.
- **Default Colors** Click this icon to set the stroke color to black and the fill color to white.
- **No Color** Click here to change the current stroke or fill color-depending on which of he two is currently selected-to none. You may not be able to select this in some instances where it makes no sense-such as settings the stroke color to none when you are drawing a line rather than a filled object.
- **Option pane** Many of the tools have optional settings that appear in the Options pane of the toolbox. To see what a option does, hold your mouse pointer over the option icon briefly until a tool tip appears next to the mouse pointer.
- **Subselect tool** Use this too to modify lines that you drew with the Pen tool.
- **Lasso tool** Use this tool to drag an irregular selection area. This selects any object that are within the area.
- **Text tool** Use this tool to add a text box. Click once to create a text box that can expand horizontally, or drag to create a text box that has a fixed width.

- **Rectangle tool** Use this tool to draw rectangles. Hold down SHIFT to draw perfect squares. Depending on the options you choose, the rectangle may have either square or rounded corners.
- **Brush tool** Use this tool to draw freehand brush stokes. This tool has a number of options that control the effect that is created by using it.
- **Fill transform tool** Use this tool to add or modify the fill color or gradient fill inside an object.
- **Eraser tool** Use this tool to erase areas of a drawing.
- **Zoom tool** Use this tool to zoom in or out on a drawing.
- **Swap colors** Click this icon to swap the fill and stroke colors.

If you find that you have made a mistake, select Edit | Undo or press CTRL-Z immediately to undo the error. Some actions cannot be undone, but most things that you might do with the tools in the Flash toolbox can be undone.

In most cases, a tool remains selected after you have used it once so that you can reuse the same tool, but this is not always the case. Get in the habit of taking a quick glance at the toolbox to see what is selected, and you will find yourself needing to rely upon the Edit | Undo command a whole lot less often!

The Flash drawing tools create vector images rather than bitmap ones. This is important to you for a number of reasons. Vector drawings generally take far less file space, so your movies load faster and run a bit more smoothly. In addition, objects that are drawn as vector images can be scaled up or down freely without losing quality.

Because the Flash drawing tools create vector images, you may notice that Flash sometimes "cleans up" the lines that you draw. When it does this, it is attempting to simplify the lines so that they have fewer curves because this takes less memory.

The Panels

Flash makes extensive use of panels. These are very similar to the dialog boxes that you have no doubt used in many other programs, but there are some differences. For example, panels do not have OK or Close buttons. That's because a panel does not need to be closed in order to apply any selections that you may have made in it.

It's not really important that you study the purpose of each panel in detail at this point. As you progress through the modules, you will become familiar with the panels as you need to use them.

Project 1: Creating a simple Animation

One of the best ways to get a feel for how Flash helps you create animations is to go ahead and give it a try yourself. It really isn't necessary to get real fancy with this first project, but at least you will get a chance to get your feet wet.

In this case, you will create a simple Flash movie that has a box that moves from one corner of the stage to another corner. Although this is a very simple animation, it does provide you with the basics that you will use later as you create more complex movies.

Step-by-Step

1. Make certain that you have Flash open and that there is nothing on the stage. If necessary, select File | New from the Flash menu to open a new, blank movie.
2. Click the Rectangle tool in the toolbox so that this tool is selected.
3. Near the lower-left corner of the stage, draw a small rectangle.
4. Click the Arrow tool to select it.
5. Double-click the rectangle you just drew so that both the fill and the stroke are selected. You may find it easier to simply draw a selection box that surrounds the entire rectangle.
6. Select the Modify | Group command (or press CTRL-G). The object needs to be grouped in order to have a motion tween applied.
7. Click frame 24 in the timeline to select the frame. You can tell when the frame is selected because the frame will then change to dark blue. The choice of frame 24 is arbitrary. In this case, we want the animation to last for 2 seconds, and at the default frame rate of 12 frames per second, frame 24 will produce the desired result.
8. With frame 24 still selected, choose Insert | keyframe from the Flash menu to add a keyframe to frame 24.
9. Drag the rectangle from the lower-left corner to the upper-right corner of the stage. This will be where the rectangle finishes its movement.
10. Click the timeline between frames 1 and 24 to select all of the frames in that range. When the frames are selected, the frames will turn back.
11. Select insert | Create Motion Tween from the menu. This will add a solid arrow that points from frame 1 to frame 24 in the timeline.
12. Select Control | Test Movie to try out your animations. Your rectangle will move from the lower left to the upper right of the stage and then jump back and start again.

13. Click the lower close button to close the Flash Player and return to the Flash development environment.

Project Summary

Believe it or not, you have just created your first Flash movie! For reference, your movie should look something like this. A file of the finished project can be downloaded from the McGraw-Hill/Osborne Web site at www.osborne.com (along with oter files throughout the rest of this book).

Diagram-23

LEARNING THE FLASH TOOLBOX

When you create a movie using Flash, most of the objects in your movie are likely to be ones that you have drawn using the various tools in the Flash toolbox. Most of these tools are relatively easy to understand and use; but, if you want to get the best results from your efforts, it is important to know exactly what to expect from each of the tools. In this module, you will learn how to get the results you want from those tools so that you can concentrate on producing the best possible movie.

Learning the Toolbox

The Flash toolbox holds all of the tools that you use to draw objects within Flash. As this shows, the toolbox is divided into four different areas.

Diagram-26

For most purposes, of course, you will make extensive use of the drawing tools area of the toolbox. This does not mean, however, that the rest of the toolbox is just taking up space. Each of the toolbox areas serves a very useful purpose.

Selecting the Tools

The Flash toolbox is really intended to be used with the mouse. That is, you simply click the tool that you want to use in the toolbox, and this selects the tool. The currently selected tool has a depressed appearance as though it were pushed in. When you move the mouse over a tool, the tool's button looks as though it were above the surface of the toolbox. In addition, a tool tip appears briefly as you move the mouse over a tool.

Diagram-27

Even though the toolbox is primarily designed for use with the mouse, you can use keyboard commands to select the tools. Table 2-1 lists the keyboard shortcuts that you can use to select each of the tools.

Selecting Tool Options

When you select certain tools from the toolbox, various items may appear in the options pane. In fact, half of the tools have options that you can use to modify how the tool functions. For those tools that have options, you simply select the option that you want to use with the tool.

In some cases, the options are toggles. That is, you can click the option icon to turn the option on or off. If an option icon is depressed, that means that the option is selected. Some tools have multiple options that you can select in combination with each other.

Tool	Keyboard Shortcut
Arrow tool	V
Line tool	N
Pen tool	P
Oval tool	O
Pencil tool	Y
Free Transform tool	Q
Ink Bottle tool	S
Eyedropper tool	I
Hand tool	H
Subselect tool	A
Lasso tool	L
Text tool	T
Rectangle tool	R
Brush tool	B
Fill Transform tool	F
Paint Bucket tool	K
Eraser tool	E

Zoom tool M or Z

You will see several different types of options in the options pane. For example, the options for the brush tools shown here are of three different types. Clicking the icon at the top displays a list of choices. Clicking the arrow to the right of one of the boxes in the middle displays different sizes and shapes that you can choose. The bottom icon is a simple toogle that can be either on or off.

Diagram-29

We will look at the individual tool options as we examine each tool in detail in the next section.

Using the Tools

To create a drawing, you begin by selecting the appropriate tool from the toolbox. Next, you choose the options from the options pane. Let's take a look at each of the drawing tools to see how each of them works.

Drawing with the Line Tool

The Line tool draws straight lines as you hold down the mouse buttons and drag the mouse from the starting point to the ending point of the line. When you draw with the Line tool, Flash draws the line using the currently selected stroke color.

If you want the line to be perfectly horizontal, vertical, or at a 45-degree angle, holds down the SHIFT key as you draw the line. As you hold down SHIFT, the line will snap to the 45-degree angle that is closest to the mouse pointer. That is, the lien can be ar 0 degrees, 45 degrees, 90 degrees, 135 degrees, and so on. If you do not hold down SHIFT, the line will simply extend from the starting point of the drag to the current mouse pointer position.

Drawing with the Rectangle Tool

You use the Rectangle tool to draw rectangular-objects that have two vertical and two horizontal sides. The rectangles can have square or rounded corners, depending on the settings you choose.

When you select the Rectangle tool, the options pane displays the Round Rectangle Radius icon. This option enables you to create rectangles with rounded corners rather than square ones. When you click this icon, Flash displays the Rectangle Settings dialog box shown next. You can enter a value in the text box, to specify the amount of rounding you want. Specify 0 for square corners, or a number up to 999 for round ones. You can also use the up and down arrows while you are drawing with the Rectangle too to change the roundness of the corners.

Diagram-33

To draw a rectangle with equal-length horizontal and vertical slides, hold down SHIFT as you draw the rectangle. If you have set the corner rounding to 0, this will produce a perfect square.

When you draw a rectangle, the lines around the rectangle are separate from the fill. Depending on the corner rounding setting, there may be four, six, or eight separate line segments around a rectangle:

- There will be four line segments if the corners of the rectangle are square.
- There will be six line segments if the rounding value is very high and the opposite sides of the rectangle are too close to allow for a straight line between two corners.
- There will be eight line segments for most rectangles with rounded corners because each corner will have a curved line segment and each side will normally have a straight line segment.

The reason the number of line segments around a rectangle is significant relates directly to how those segments act when you select the rectangle objects. If you click once inside the rectangle, you will select the fill without selecting any of the lines. If you double-click inside the rectangle, you will select the entire rectangle, including any lines that surround it. But if you click one of the line segments, you will select only that one segment. For example, here I have selected three of the eight line segments around this rectangle and dragged them away from the edges of the rectangle.

Diagram-34

Drawing with the Oval Tool

The Oval tool draws objects that are either ellipses or circles, depending on how you use the tool. As with the other drawing tools, you draw with the Oval tool by dragging the mouse pointer from the starting point to the ending point. As you drag, Flash displays an outline view that shows where the object will appear.

Drawing an ellipse or a circle can be little confusing at first. The reason for this is that the points where you begin and end the drag are not actually on the resulting ellipse or circle. Rather, the starting and ending drag points are at the corners of the bounding box. This is a normally invisible box that extends to the bounds- the outer edges- of a drawn objects. All objects you draw in Flash have a bounding box, but you normally aren't aware of the bounding box because it doesn't appear on the screen unless you make a special effort to display it.

To get a better feel for how the bounding box relates to an ellipse or a circle, try this exercise:

1. Select the Oval tool and draw a fairly large ellipse on the stage. You will want this ellipse to extend almost to the edges of the stage with just a small white space around each side.
2. Select the Arrow tool and draw a selection box around the entire ellipse so that both the fill and the stroke are selected.
3. Use the modify | Group command (or CTRL-G) to group the fill and the stroke. Doing so will display the bounding box as shown here (whenever a grouped objects is selected, the bounding box appears).

Diagram-35

4. Select the Oval tool again (you may also want to select a different fill color to make the end result stand out a bit more clearly).
5. Carefully place the mouse pointer over one of the corners of the bounding box, and then drag the mouse pointer to the bounding box corner that is diagonal from the corner where you started. Notice how the new ellipse outline exactly matches the existing ellipse. This clearly demonstrates how the bounding box is related to the ellipse.

Adding Text with the Text Tool

Text is often an important part of any Web site. Flash provides the Text tool that you can use to add text to your movies. Text can be stand-alone, or it may be soothing that you add to another object.

There are two different ways to use the Text tool:

- If you select the Text tool and then simply click where you want the text to begin, Flash creates a text box that initially is one character wide. As you type, the text box expands horizontally to fit whatever text you add. Unless you press ENTER, all of the text will appear on a single line that may extend well past the right edge of the stage. This type of text box is easy to identify by the small circle in the upper-right corner of the text box.
- If you drag out a text box rather than simply clicking, Flash creates a text box with a fixed width. When you add text to this type of text box, words wrap to the next line if they cannot fit on the current line. This type of e\text box expands downward

to accommodate additional lines of text as necessary. You can indentify this type of text box by the small square in the upper-right corner of the text box.

When you are creating text for use in your Flash movies, it is important to remember that Flash does not check the spelling of your text. If you misspell a word, Flash won't provide you with any clues to let you know that something is incorrect. One effective way to avoid this type of often very visible error is to create your text in your word processor and check the spelling there. Once you are certain that you haven't made any errors, you can use the Edit| Copy command in your word processor and Edit | Paste in Flash to transfer the text into your movie.

Flash uses the current text option settings whenever you add a new text box to the current movie. That is, if you used the properties panel to select a different type size or font, Flash will use that same font and type size for subsequent text boxes until you make another change in these settings. You will learn more about the panels in Module 3.

Drawing with the Pencil Tool

The Pencil tool draws any shape of line that you want. Unlike the Line tool or the Pen tool, the Pencil tool follows whatever path you want- no matter how crooked it might be. This is the tool that you will want to use to add small details to objects when the other drawing tools seem just a little too confining.

When you select the Pencil tool, you will have three optional settings for how the tool functions, as shown here.

Diagram-38

These three options are

- **Straighten** When you select this mode, Flash converts the lines you draw into connected straight line segments.
- **Smooth** When you select this mode, Flash converts your lines into smooth curves.
- **Ink** In this mode, Flash applies the least amount of smoothing to the line so that it remains fairly close to what you actually drew.

The next illustration shows an example of each pencil tool mode option. In each case, I drew approximately the same line, and Flash applied the smoothing as soon as I finished drawing the line.

Drawing-39

It is very important that you understand that Flash applies the current settings from the Stroke panel to all lines that you draw, no matter which tool you are using. If you have selected settings in the Stroke panel for use with the Line tool or the Pen tool, those same settings will also apply to the Pencil tool.

Drawing with the Brush Tool

The Brush tool acts like a paintbrush. With this tool, you can draw any type of objects that you want. The Brush tool uses the fill color selection, and this means that you can paint with gradient fills if you want.

You can choose any of five different paintings modes when you use the Brush tool. These include the following:

- **Paint Normal** Choose this mode to simply paint wherever you drag the Brush tool.
- **Paint Fills** In this mode, the Brush tool paints only when it is over the fill of an object. The lines are untouched.
- **Paint Behind** Use this mode when you want to paint the background while leaving any objects untouched.
- **Paint Selection** When you choose this mode, the Brush tool paints only objects that are selected.
- **Paint Inside** This mode paints inside the first object that you click with the Brush tool but leaves other areas untouched.

In addition to choosing the painting mode for the Brush tool, you can select the brush size and brush shape form the drop-down boxes. Both of these boxes offer a wide variety of choice that should suit all of your needs.

The fourth Brush tool option deserves some special attention. The Lock Fill option is a toggle, so the only choices are on or off. This option serves a useful purpose only if you are using a gradient fill.

When the Lock Fill option is on, the first place that you begin painting with the Brush tool becomes the anchor for all subsequent areas that you paint with the Brush tool. That is, as you paint additional areas, the fill continues as if the two areas were connected, rather than restarting the fill in the new area. You may, however, find the Lock Fill option a bit hard to use because it begins the fill at the last place you painted when you turned on the

option. This may not be what you want in all cases. I strongly recommend that you practice with this option until you become comfortable with the way it is working.

First, draw some rectangles or circles, and then select the Brush tool. Use the fill color selector to choose one of the gradient fills. Finally, try painting with the Lock Fill option on and with it off.

Drawing with the Pen Tool

The pen tool enables you to draw smooth curved lines. The name for this type of line is a Bezier curve. When you draw with the Pen tool, as shown here, each point on the curve has both an anchor position (the place where you click) and a handle that you drag to produce the curve.

Diagram-41

Creating a smooth curve in the exact shape you want can be a tricky proposition. Each time you click and drag, you are creating both a direction and a force vector for the curve. The further away from the initial click point that you drag the handle, the stronger the force vector that is produced at the initial click point. Stronger force vectors make the line (on the opposite side of the click point) stay closer to the departure angle for a longer distance. By moving the handle around and away from the click point, you can shape the curve just the way you want.

When you are drawing with the Pen tool, you can create a closed shape by clicking the initial point on the line. When you do, Flash creates a smooth curve to that point from the last point on the curve. If you have selected a fill color or gradient, Flash also fills the shape with that color or gradient.

It can be difficult to get exactly the effect you want with the Pen tool, but Flash offers another tool that is designed specifically for modifying curves. The Subselect tool works along with the Pen tool to enable you to modify curves that you have drawn with the Pen tool. When you click the Subselect tool, you can click any of the points on the curve (these are the places where you clicked the Pen tool and are identifiable by a small box that appears on the curve at each point) and then drag the point or handles to modify the curve.

Adding Fills

A fill is the color or gradient that fills the inside of closed objects. When you use the Pen, Oval, or Rectangle tool to create an object that is completely surrounded by lines, Flash automatically fills the objects with whatever fill is currently selected.

To choose a fill, you click the fill selector to display the selector pane shown next. When you do, the mouse pointer becomes an eyedropper that you can use to select a color or gradient from the selector pane or from almost anywhere on the screen.

Diagram-43

You can also change the current fill in an object or add a fill to an unfilled object by clicking the paint Bucket tool. When you do, Flash fills any objects you click with the new fill. You can also use the Ink Bottle tool to change the color of any lines you click to the current stroke color.

Another way to change the fill or the stroke is to click the Dropper tool. This tool picks up the color of the next object that you click, and then opens the paint Bucket tool or the Ink Bottle tool-depending on whether you clicked a fill or a stroke with the Dropper tool.

In addition to using a solid color or gradient fill, you can also use a bitmap fill. This is a fill that you create by importing a bitmap image and then using the Modify| Break Apart command before you click the bitmap image with the Dropper tool. You will learn more about using imported bitmap images in Module 9.

When you click the Arrow tool, you will notice that this tool has several different mouse pointers associated with it. This shows you how those pointers change for different purposes.

Diagram-46

Drag to create selection box

Reshape a line or curve

Move selection

Move a corner

You can use any of three methods to select objects with the Arrow tool:

- Drag a selection box around the objects that you want to select. Everything within the selection box will be selected.
- Click an object to select the item you clicked. If you click a line, the current line segment will be selected. If you click a fill, the fill will be selected.
- Double-click an object to select both the fill and any lines that outline the object.

When the Arrow tool pointer shows a curved line, you can use the Arrow tool to reshape the line or curve. To do so, point to the line or curve, hold down the mouse button,

and drag the line or curve. Flash will automatically adjust the fill if you are dragging one of the outlines of a filled object.

If the Arrow tool pointer displays a four-headed arrow, you can drag the currently selected objects. Simply hold down the mouse button and drag the objects to their new locations. Remember, though, that if multiple objects are selected, all of them will move-not just the object you are pointing to.

Finally, if the Arrow tool pointer shows a line with a 90-degree corner, you can use the tool to drag a corner point to a new location. This will also reshape the lines that are attached to the corner.

Selecting with the Lasso Tool

As useful as the Arrow tool may be, it is not always the most convenient tool if you want to make a selection of several objects out of a group, or if you wants to select an irregular area of an object. For example, if you have a bottle on the stage and want to create with the Arrow tool. For this more freeform approach to making selections, the Lasso tool may be a better option.

The Lasso tool functions by allowing you to draw an irregular selection area around or through objects. When you complete the selection drag, everything that is inside the area you dragged is selected. As the following illustration shows, the selection does not necessarily have to include the whole object (the selected area is the area with the crosshatch effect).

Diagram-48

Another use for the Lasso tool is to select a number of objects when you want only some of the objects in an area and it would be impossible to select them by dragging a selection box using the Arrow tool. Of course, you might be able to use the double-click method to select tightly spaced objects, but the Lasso tool offers another option.

Learning the Flash Panels

Virtually all of the objects you create for use in your Flash movies have a number of different optional settings. This wide variety of options wouldn't be very useful without a means of selecting and controlling the options. In this module, you will learn about the means that you use for this purpose in Flash-the panels.

Understanding the Panels

Virtually all computer programs have some means for the user to interact with the program. Typically, these include such things as menus, toolbars, and dialog boxes. Depending on the program and the function it serves, these options are often sufficient to

fulfill the user's needs. Sometimes, however, these tools simply are inadequate for the task at hand and something else is needed. In Flash, that something else is the panel, the subject of this module.

What Are Panels?

You're probably wondering just what the panel is, anyway. In effect, a panel is effectively what is known as a nonmodal dialog box. That is, a panel can be thought of as a dialog box that does not need to be closed. When you make changes in one for the Flash panels, those changes are applied immediately without closing the panel.

Because the panel will often remain open while you were working, Flash makes it very easy for you to access the panels. You can open any of the panels by selecting the Window menu and then choosing the panel that you want from the menu as shown next.

Diagram-57

As the illustration shows, panels that are already open are shown with a check mark in the panel menu. In this case, Tool and Timeline are open.

Locating the Correct Panel

The Flash panels are extremely useful, but only if you know which panel you need to use to accomplish your goal. In order to help you know which panel to choose, I will present a brief introduction to each of the panels.

Properties Panel

The properties panel, shown next, enables you to select the properties for whatever happens to be selected. Here, the Text tool is selected, so the Properties panel enables you to select the properties for any text that you add to your movies. Many of the options that you see here are also available in the Text menu.

Diagram-58

You can make selections in the Properties panel before you add text, or you can use this panel to modify existing text. If you want to modify the properties of existing text, you must select the text before making changes in the properties panel.

When you first add a text box to your movie using the Text tool, Flash creates the text box as a static text box-one that holds unchanging text. If you want to be able to display the contents of a variable, such as a game score, you must change the text box to a dynamic text box. If on the other hand, you want to obtain user input, you must change the text box into an input text box.

The properties panel enables you to choose whether a text box displays static text, whether the text can change as your movie plays, and whether the box can be used to accept user input. In addition, this panel enables you to assign variables to text boxes, as well as control the visual settings for text boxes.

Let's take a quick look at some of the other ways you can use the properties panel by selecting different objects or tools.

Modifying instances You can also use the properties panel, shown here, to modify symbol instances. Symbols include objects such as buttons, movie clips, and imported graphics. Symbols are discussed in Module 8.

Diagram-59

Symbols are an important feature in Flash movies. Symbols can be reused many times in a movie without saving individual copies of the symbol. This results in tremendous savings in the size of your published movie files.

Modifying Strokes and Fills The properties panel, as shown here, can enable you to select the style, width, and color for lines (strokes), as well as the fill color for objects. Changes you make affect new lines that you draw or lines that are selected when you make changes in the panel.

Diagram-59

By default, the stroke settings in the properties panel are used for lines you draw with the Line tool and the pen tool, as well as for the outlines of objects you create using the Oval tool and the Rectangle tool. Keep in mind, however, that the outlines for ovals and rectangles can be turned off by clicking the No color buttons in the colors area of the Flash toolbox.

Modifying Frame Properties You can also use the properties panel, shown next, to apply and modify tweens-animations-to frames in the timeline. This panel also enables you to add frame labels, which can be used along with ActionScript programming to control the flow in your movies.

Diagram-60

The properties panel, although very important, is not the only Flash panel that you will use. Let's take a look at some other panels you will find useful.

Align Panel

The Align panel, shown here, is used to control the size, distribution, alignment, and spacing of objects on the stage. This panel, like most Flash panels, affects only those objects that are selected when you click one of the buttons in the panel.

Diagram-61

Each of the buttons in the Align panel has an associated tool tip. This means that you can easily determine the purpose of each button by simply allowing the mouse pointer to hover briefly over the button.

Color Mixer Panel

You can use the Color Mixer panel, shown here, to create your own colors for use both in strokes and in dills. When you create a color in the Color Mixer panel, that color becomes the current selection in either the stroke color or fill color selector, so it will be used in new objects that you create.

Diagram-62

Color Swatches Panel

The Color Swatches panel, shown here, enables you to select colors, as well as choose the color palette that will be used in your Flash movies. This panel is a near duplicate of the color selectors, but it also offers a number of menu selections that you can access by opening its menu.

Diagram-63

Using color on Web sites can be somewhat problematic. Your carefully selected colors may not always render precisely on a visitor's monitor, so you may find that subtle color variations are not always very effective. There are many reasons for this, but ultimately they boil down to one thing- you should not depend on visitors being able to see colors accurately. For this reason, many Flash developers use fairly broad color changes between different objects in their movies. Highly contrasting colors offer a better chance of being easily seen on the broad range of devices that are used to browse the Internet.

Info Panel

The Info panel, shown next, provides you with information about a selected object. You can also use this panel to set an object's width, height, or position to precise values by entering those values directly into the text boxes in the info panel.

Diagram-64

The size and position measurements that are used in the Info panel are in pixels. Position measurements are relative to the upper-left corner of the stage.

Scene Panel

The Scene panel, shown here, helps you work with multiple scenes in a movie. Using this panel, you can select the scene you want as active, add new scenes, or delete scenes you no longer need.

Diagram-64

There are many different ways to organize Flash movies. Some Flash developers prefer to work with a single timeline(or scene), whereas others prefer to break the action down into multiple scenes. The method you choose is primarily a matter of personal preference. Once you publish your movie, Flash flattens the movie into a one-layer, single-scene production.

Transform panel

The transform panel, shown here, enables you to precisely scale, rotate, or skew an object. The object must be selected before you can enter any settings in this panel.

Diagram-65

It is possible to both scale and rotate objects without using the Transform panel. You can right-click an object and select either Scale or Rotate and Skew from the pop-up menu or you can use the Modify| Transform menu options. In either case, Flash displays a series of handles around the object that you can drag with the mouse. There is, however, an advantage to using the Transform panel. When you use the Transform panel, you can specify precise values that you want to use. It is much harder to make these transformations with very good precision when you are dragging the handles with the mouse.

Actions Panel

The Actions panel, shown here, is used for adding Action Script code to frames in the timeline or to objects. ActionScript is the programming language that you use to automate actions within Flash. You will learn more about ActionScript programming beginning in Module 12.

Diagram-66

The Actions panel has two different modes. If a key frame in the timeline is selected, the Actions panel title is Actions- Frame. If an object that can have ActionScript code attached is selected, the Actions panel title is Actions- Object. When you are using the Actions panel, it is often important to make note of which Actions panel mode is active. This can prevent you from accidentally attempting to add your Action Script code to the wrong place.

Movie Explorer Panel

The Movie Explorer panel, shown here, enables you to view the properties and relationships between the different elements in your movie. Using this panel, you can see

which objects are contained within other objects, and you can see any ActionScript code that is attached to any of the objects or frames.

Diagram-67

You are most likely to use the Movie Explorer panel once you have created a large and complex movie. It can be difficult to remember how everything in a large project fits together, and the Movie Explorer panel provides you with a method for examining all of the relationships visually.

Reference Panel

The Reference panel, shown here, provides information about ActionScript language elements. When you begin adding ActionScript code to your Flash movies, you will likely find the reference panel to be an invaluable tool.

Diagram-68

Output Window

The output window is not a panel. Rather, it is a window you can choose to display when you are testing a Flash movie to determine how various elements of an ActionScript program are functioning.

Accessibility Panel

The Accessibility panel, shown next, enables you to make your Flash movies accessible to people who depend on screen reader software to navigate Web sites. The accessibility options make it possible for the screen reader software to read aloud a description of many of the elements of your movies.

Diagram-69

Components Panel

The Components panel, shown next, includes a number of user interface elements that you can add to your movies and control with a small amount of ActionScript programming. The components each have a number of very sophisticated capabilities built in so that it is far easier to create highly interactive Flash movies simply.

Diagram-69

Closely related to the components panel is the component parameters panel. This panel enables you to set various properties of components you have added to your movies. Note, however, that the properties panel actually provides more options for working with components.

Using the Panels

Now that you have a good idea about which of the Flash panels you need to use in any situation, you need to understand a little more about how the panels actually work.

The Flash panels are typically quite easy to use. Actually, they do work much like the dialog boxes that you are used to using. That is, when you open a panel, you will see familiar objects such as text boxes, list boxes, and option buttons. All of these function nearly identically to the way they function in a standard dialog box.

One of the important differences between the Flash panels and the dialog boxes is that you can leave the panels open while you continue to work on your movie. This makes it easy for you to use the same panel again. You don't constantly have to return to the Flash menu in order to reopen a panel. Rather, you use the panel to make some changes, and then let it sit in an out-of-the-way place on the screen.

Selecting in Panels

Because the panels can remain open on your desktop, you need to be aware of what is selected before you make any changes in the panels. Remember, objects that are selected can be affected by those changes.

The Flash panels are intended for use with your mouse. Some of the standard keyboard actions that you use with dialog boxes simply won't work in the panels. For example, if you attempt to use the TAB key to move between options in a panel, you will find that pressing the TAB key hides the panels. Pressing the TAB key a second time redisplays the panel.

Therefore, to make a selection in a panel, you click that selection with your mouse. Some options have a down arrow at the right edge of the option. If the option is a list box, clicking this down arrow displays a list of items from which you can choose. If the option is a text box, clicking the down arrow displays a slider that you can drag up or down to enter values in the text box.

Of course, sometimes when you select one option, this affects which options are available in the panel. For example, in the Text Options panel, choosing the type of text box determines which other options appear in the panel. For this reason, the panels may not always appear identical to the illustrations that you have seen in this module.

Applying Panel Selections

When you want to use one of the Flash panels to make changes to an object, it is important that you understand how those selections are applied. Consider these rules:

- If no objects are selected, and you are able to make changes within a panel, you new selections will apply to future objects that you create. For example, if you change the

stroke height in the properties panel and then draw a box using the Rectangle tool, the new line width will be used for the offline of that box.

- If an object is selected, any changes you make within the panel typically will be applied to that object. Sometimes, however, the changes are applied only after you press the ENTER key.
- If no objects are selected, and you are unable to make changes within the panel, this means that you must select an object before you will be allowed to make any changes.

Customizing the Panels

The Flash panels are intended to make your development work much easier, but not everyone works quite the same way. Therefore, Macromedia decided to accommodate different work styles by allowing you to customize the panels. Customizing the panels means creating sets of panels that are laid out the way you want.

Creating Panel Sets

As you develop Flash movies, you will no doubt find yourself using certain panels an awful lot. For example, you might use the properties panel, the Align panel, and the Actions panel all the time. You could keep all three panels open, but this might eat up too much valuable space on your desktop. As an alternative, you might memorize the keyboard shortcuts to display certain panels.

A better choice may be to create your own panel set that includes the panels you use most often. Once you have done this, you will have just the panels you want.

Saving Panel Sets

You probably don't want to go to the work of re-creating your customized panel sets each time you use Flash. You can avoid this prospect by saving you panel sets for future use.

To save a custom panel set, you use the Window| Save Panel Layout command to display the Save Panel Layout dialog box shown here. After you enter a name for your panel set and click OK, Flash saves your custom panels for later use.

Diagram-73

Displaying the Standard Panels

If you discover that you want to return to the standard Flash panel sets, you will find that it is very easy to do so. This can be especially handy if you share a PC with another Flash user,

because your custom panel set may be a little confusing for someone who was not involved in creating it.

To return to the standard Flash panel layout, select the Window| Panel Sets command to display the menu shown here, where you can choose from several different options. When you do, you will also see that the Window| Panel sets menu enables you to open any of the custom panel sets you have saved.

Diagram-73

Module 4

Using the Timeline and Layers

One of the primary purposes of Flash is to create animated movies. Any animation- no matter how it is produced- results from displaying a series of images that change with time. In Flash, you use the timeline to control when the images are displayed so that you can achieve the animation effects you want. In this module, you will learn how to make use of the timeline and the closely related timeline layers, which you use to help control the layout of objects and to allow different objects to act independently of each other.

Understanding How the Timeline Works

As humans, we are used to thinking about where objects are in three dimensions. These geometric measurements are very useful for most purposes, but they fall short when you need an additional dimension-time. The time dimension becomes very important when you are creating animated movies in Flash because you need the ability to place objects in different locations over time.

The Flash timeline gives you the ability to control objects in time. By using the timeline, you have the ability to use time the same way you use height, width, or depth. That is, you have an additional dimension that enables you to exercise precise control over the positioning of objects according to how much time has passed.

Although you were introduced to the timeline in Module 1, I'd like to take a moment to refresh your memory about the various parts of the timeline before we continue with the rest of this module.

Diagram-79

Understanding Frames

Each frame in a Flash movie represents a view of the movie at a particular instant in time during the movie's playback. If you are using the default setting of 12 frames per second, then each frame would normally appear for one twelfth of a second before the movie moves on to the next frame.

Even though each frame represents the view of your movie at one particular instant, this does not mean that you must create the content for each frame individually. Although it would be possible for you to do this, Flash offers some far more efficient alternatives:

- For static content- objects that remain in one position without any changes- Flash can simply display the object in a series of frames without any additional increase in the file size. You only need to add the object to the first frame where you want it to appear and then tell Flash how long you want it to appear, and the rest is automatic. You do so simply by adding the correct number of frames for the length of time the object should appear.
- For objects that move from one place to another, you draw the object in the first frame where it appears in the movie. Then you specify the final frame for the objects movement and the object's position in that frame. Once you have done this, Flash takes over and displays the objects in the intermediate frames without requiring you to draw the object in those frames. This is called a motion tweens.
- For objects that change shape, you again draw the first shape in the first frame where the object appears. Then, in the final frame of the shape change, you draw the new shape. When this is complete, you instruct Flash to create a shape tween to automatically generate all of the intermediate shapes without any additional work on your part.

In reality, allowing Flash to do as much of the work in creating your movies as possible not only makes life easier for you, it also greatly increases efficiency and allows for smaller file sizes.

Learning the Frame Types

Because frames are so important in Flash movies, you might expect that Flash would have many different types of frames for different uses. Fortunately, this is simply not true. Indeed, Flash has only two types of frames- ordinary frames and key frames. The differences and similarities between the two types of frames are pretty easy to understand:

- During playback, all frames play for the same length of time (unless you have used some Action Scripts code to modify the playback flow).
- You can add items to key frames only. It doesn't matter what you want to add, you can do so only in a key frame.
- Only Flash can add items to ordinary frames. You cannot do anything directly to a frame if it is not a keyframe.

So, what this all boils down to is that you do all of your work in keyframes, and Flash handles all of the other frames. As long as you remember this, working with the frames will be pretty straightforward.

This does not mean, however, that you have no control over frames that are not keyframe. Indeed, as you will learn in the next few section, you can exercise considerable control over those frames- you just cannot work directly in them.

Selecting Frames

There are many different reasons why you select frames. Here are some of them:

- You select frames when you want to add a key frame to the timeline.
- You select a keyframe to add or modify the content of the keyframe.
- You select the frames between keyframes when you want to add or modify a tween.
- You select frames when you want to add, delete, or move frames.

It is important to make certain that you are selecting the correct frame. This is especially true when you start adding layers to the timeline because frames are specific to their layer. For example, the next illustration shows a timeline that contains two layers. As the illustration shows, you can have keyframes in different places on different layers, and selecting frames on one layer has no effect on the other layers.

Diagram-82

In this case, frames 11-17 are selected in the topmost layer. The keyframes that contain content all have a dot, while the black keyframes do not.

The frame selector in the illustration appears with an outline of a box because it is over a series of frames that are selected. Otherwise, the frame selector appears as just an arrow.

When the frame selector has a box, it can move the selected frames by dragging. When the frame selector is an arrow, it selects individual frames.

When you select a frame in the timeline, you are actually selecting both the frame and the layer that contains the frame. For example, here I have selected frame 4 in layer 2. When you select a frame, any changes you make are made only in the selected layer. So, if I have selected frame 4 in layer 2, any object 1 draw will reside on layer 2 (and nowhere else).

If you select a frame that is not a keyframe, it may seem as thought you are being allowed to add content to an ordinary frame that is not a keyframe. In reality, though, when you do this Flash will automatically place the objects in the previous keyframe. So in the case of the illustration where I have selected frame 4 (which is not a keyframe), Flash adds any objects I draw to frame 1.

Adding, Deleting, and Moving Frames

As you work on your Flash movies, you will probably find a need to add, delete, and move frames in the timeline. You might, for example, decide that one animation should finish before another animation begins. To accomplish this, you must make sure that the two animation sequences do not share the same time space on the timeline. If the first animation runs for three seconds -36 frames at the standard frame rate- you would have to start the second animation at some point after frame 36 to prevent overlap.

The insert menu offers several commands that you can use to modify the frames in the timeline. Table 4-1 describes these commands.

When you use any of the Insert menu frame commands, be sure to select the appropriate frames before you issue the command. In particular, make certain that you have selected the

Command	Shortcut	Description
Frame	F5	Adds one or more ordinary frames at the Insertion point
Remove Frames	SHIFT-F5	Removes the selected frames from the timeline
Keyframe	F6	Adds a keyframes that duplicates the contents of the previous keyframe
Blank Keyframe	F7	Adds a keyframe that does not inherit the contents of the previous keyframe

Clear Keyframe	SHIFT	Converts a keyframe into an ordinary frame

Correct layer. Remember, Flash will do what you tell it to do, even if that is not what you wanted it to do.

If you want to move frames in the timeline, you drag the frames with the mouse. You can drag the beginning or the ending key frames to change the length of an animation sequence. To move the entire sequence to a different point of the timeline, click the frames in between the key frames and then drag the sequence.

One very common reason for adding or deleting frames from the timeline is to adjust the length of an animation. You might discover that an animation needs to run for more frames because it appears jerky. This can easily happen if you try to move an object too far in a given number of frames. By lengthening the time that an animation runs, you allow for smaller changes between the individual frames. Smaller changes between frames result in a smoother animation.

Commenting Your Work

Even if you never add any ActionScript programming to your Flash movies, they are effectively still computer programs. As with all computer programs, it can be difficult to understand what is happening in a Flash movie unless you get a bit of extra help. That is where comments come into play. Comments are notes that explain what is going on.

In a Flash movie, you add comments to frames in the timeline. When you have done so, the comments appear in the timeline. Your comments can be fairly simple, but they are still an important way to help make your movies easier to understand.

To add comments to the timeline, follow these steps:

1. Select the keyframe where you want to add a comment.
2. Open the Properties panel using the Window | Properties command or by pressing CTRL-F3.
3. Type your comment in the Label text box (just below where you see “Frame” near the left side of the Properties panel), as shown here. Be sure to place two forward slashes (//) at the beginning of the line to indicate that this is a comment.

Diagram-86

4. Press ENTER to apply the comment

Comments can, of course, be added only to keyframes. In the timeline, comments will display in full unless another keyframe is encountered before the end of the comment. This is one of the reasons why a separate comment layer can be so useful-keyframes do not have to appear in the same frames on different layers, so you can adjust the keyframe placements in comment layers as needed.

Flash ignores the contents of comments. This means that you can use any characters or punctuation you want in your comments.

Adding Labels for Better Control

In addition to adding comments, you can also add labels to keyframes. Like comments, labels help to make your timelines easier to understand. However, labels also serve another, more important purpose when you start adding ActionScripts programming to your movies.

One of the most common ActionScript commands is the gotoAndPlay command. This command is used to control the flow of a movie by moving the playhead to a specific frame, and then playing the movie from that point onward. In its most simple form, the gotoAndPlay command accepts a frame number as an argument as shown here:

gotoAndPlay(20);

In this case, the command moves the playhead to frame 20 and begins playing the movie from that frame forward. Consider what might happen, however, if you were to decide to lengthen an animation that appeared earlier in the timeline. If you added 10 extra frames, the correct starting point for the gotoAndPlay command might be frame 30 rather than frame 20. Unfortunately, Flash would have no way to know this, so it might well try to move the playhead to the wrong frame.

The solution to this problem is to use frame labels rather than frame numbers. If you added the label “AnimationStart” to frame 20, your ActionScript command could look like this:

GotoAndPlay(“AnimationStart”);

The difference between these two options is an impotant one. If you add frames to the timeline, Flash will move the frame label along with the rest of the frames. Therefore, the AnimationStart label will continue to refer to the correct frame even after the timeline has

been adjusted. Note that when you use a label in an ActionScript statement, you must enclosed the label in quotation marks.

You add a frame label in much the same way as you do a comment. The only real difference is that you do not add the two slashes in the Label text box of the Properties panel when you are adding a frame label. You should avoid using spaces and punctuation in frame labels.

Viewing Your Work with Onion Skins

When you are creating an animation in Flash, it can be difficult to visualize how objects will move between frames. You normally see only a single frame at a time, so you may find it hard to get a good picture of just where an object may go.

The solution to this problem is to use the onion skin vies. This term comes from the traditional hand-drawn animation techniques where objects were drawn on transparent- or onion skin- paper and it was possible to see different frames through the paper. Flash enables you to view the frames of your movie in a similar fashion, as shown here.

Diagram-88

There actually are two onion skin modes. In addition to the standard onion skin view that shows progressively lighter images the further away you get from the current frame, you can also click the Onion Skin Outlines button to view objects as outlines only. You may find that you prefer one or the other of these two modes, but there is no real functional difference between them.

You will likely find it helpful to click the Modify Onion Markers button to display the menus shown here. You can use the options on this menu to control how the onion skin view functions. I suggest experimenting with these options to determine which settings work best for you.

Diagram-89

In addition to using the onion shin view, you may want to use the outline view for specific layers at times. The rightmost column in the layers area of the timeline has a box you can click to toggle between solid and outline view. Unlike when using the onion skin view, you can toggle outline view for specific layer. As this shows, you can then display one layer using the solid onion skin view and another layer using the onion skin outline view.

Diagram-89

Understanding Layers

Depending on the other drawing programs that you may have used, you may or may not be familiar with the concept of layers. Layers are an important part of the Flash development environment. In the following sections, we will look at why layers are important and how you can make use of them as you create your Flash movies.

As you work with layers in Flash, is important to remember one very significant fact. When you publish a Flash movie, any layers that you have created are flattened into a single layer. As a result, adding extra layers does not increase the size of your published Flash movie file. Therefore, you should feel free to use as many layers as necessary when you are creating a Flash movie.

The Purpose of Layers

One way to think of layers would be to think of clear plastic sheets where you can draw the objects that you will use in your movies. Each plastic sheet-layer-can act independently of all of the others. If you have drawn objects on one layer and want to move them, you are free to do so without affecting the objects on other layers. Layers actually have a number of important uses:

- When you create a tween, all of the objects on the layer containing the tween must move together. If you want to have stationary objects in your movies, they must be placed on layers that do not contain tweens. In addition, if you have different tweens in the movie, these require separate layers.
- If you want to create a movie where objects are visible only on part of the stage, you need to use a special layer known as a mask layer. You might use this type of layer to create the effect of the character walking behind a window, for example.
- When you create a motion tween, the objects you were animating typically move in a straight line. If you want them to follow some other path, you use a special layer known as a guide layer.
- For organizational purposes, most Flash developers add separate layers for comments, for labels, and for any ActionScript code. Doing so makes it much easier to find specific items on the timeline.
- Sometimes, you may want it to appear as though one object were passing in front of another object. By using layers, you can easily achieve this effect.

Adding Layers

You can add layers to the timeline at any time. There's no need for you to add every possible layer when you first begin creating your movie because you can add them as the need arises.

You can use the Flash menu to add layers. The Insert | Layer command adds a new layer immediately above the currently selected layer. You will probably find, however, that it is far easier to simply click the Insert Layer button at the lower-left edge of the timeline.

Naming Layers

When you add layers to the timeline, Flash automatically names them using the not-very-descriptive names of Layer 1, Layer 2, so on. Although there's no requirement for you to rename the layers, the default names certainly give no indication of the purpose of each layer. When you rename the layers, you can use descriptive names that clearly state the purpose of each layer. For example, you might name one layer Background to indicate that it is the background layer. Where you will draw objects that just sit there as the movie plays back. Then, you might name another layer Ball to indicate that this is the layer where an animated ball will appear.

As I noted earlier, it is a good idea to also add layers for things like labels and ActionScript programming. When you do, you will probably want to name these layers with simple names like Labels and Actions. The names are there for your benefit, so you might as well make them something you will easily remember.

Layer Order Significance

As you start adding new layers to your movie, you need to understand how the layer order affects the visibility of objects. In this illustration, I have created a Flash movie that has two layers. The layer in the front is named Car, while the layer in the back is named Background.

Diagram-92

In the timeline, the layers look like this. The Car layer is higher in the list than the Background layer.

Diagram-92

If I move the Background layer higher in the timeline than the Car layer, the objects that are in the Background layer appear to be in front of the objects in the Car layer.

Diagram-93

Objects that are in layers higher in the timeline always appear to be in front of objects that are in layers lower in the timeline. You may need to rearrange the layers in order to make the objects appear in the correct order. You can do this by simply dragging a layer up or down in the timeline list.

Adding Objects to Layers

Flash has three types of layers. Of these, the Mask and Guide layers have special purposes, but you can use normal layers for any other type of use. That is, you can draw objects on any normal layer, you can add ActionScript programming to any normal layer, and you can add labels or comments.

Earlier in this module, you learned some of the reasons that you would want to use separate layers for different types of objects. You saw, for example, that you can use layers to separate stationery objects from those that movie in an animation. You also learned that the order of the layer can be used to control the visibility of objects.

Using Drawing Layers

Drawings layers are simply normal layers. As you create your Flash movies, it makes sense to use separate layers for all objects that you might want to act independently of each other. That is, you may want to use even more separate drawing layers than you first imagine.

One reason for this is the way that Flash combines objects automatically. Consider this following illustration. In this case, I first drew a rectangle on the stage. Next, I have selected a different fill color and drawn the circle that overlaps the rectangle.

Diagram-94

At this point, I decided that I didn't want the circle. I selected the circle and deleted it. As the following illustration shows, this also removed part of my rectangle. Clearly, I didn't intend for the two objects to interact in that way.

Diagram-94

If I had placed the two objects on different layers, deleting or moving the circle would not have affected the rectangle.

Using Action Layers

I have briefly mentioned ActionScript programming several times. ActionScript is the programming language that you use when you need to add a little extra control to your Flash movies. For example, this shows a small ActionScript program that displays a message in a pop-up window when the movie is test-run.

Diagram-95

When you add ActionScript statements to the timeline, You can add them only to keyframes. By adding a separate layer for your ActionScript actions, you not only gain the flexibility of being able to place those keyframes anywhere in the timeline, but you also make it far easier to quickly locate the frames where you have added some code.

You can, of course, use whatever name you prefer for the layer that contains your ActionScript statements. A convention that many Flash developers follow is to call this layer Actions to make it clear that the layer holds the ActionScript actions.

Mask Layers

Mask layers are one of the two special types of layers you can create in Flash. A mask layer acts as a window onto another layer. When your movie plays, the mask layer controls how much of the masked layer is visible.

To understand how a mask layer works, take a look at this illustration. Here I've added a number of colored balls to the stage.

Diagram-96

Now I have added a mask layer, where I have drawn a rectangle over part of the stage. This rectangle will be the mask that controls what can be seen when the movie is played.

Diagrma-96

Finally, this shows how the stage will look during playback. The only portion of the masked layer that is visible is the area that was under the mask.

Diagrma-97

When you create a mask layer, the mask layer is associated with the layer immediately below it in the timeline. This is the masked layer- the one that is affected by the mask. The mask layer itself never appears when the movie is played.

Guide Layers

Guide layers are the second of the two special layer types you will find in Flash. Guide layers are used to direct the path of a motion tween when you don't want the animation to follow a straight path. If you don't use a motion guide, the animation will always follow a direct, straight line from the objects position in the initial keyframe to the object's position in the final keyframe.

The next illustration shows an example of a guide layer. In this case, you can see that the ball starts moving at one of the upper corners of the stage and then follows a rather twisted path to the other upper corner of the stage. This sort of path is possible only when you use a motion guide.

Diagram-98

Like mask layers, guide layers do not appear in the published movie. You can use any sort of line as a motion guide.

To create a motion guide, you begin by creating a normal motion tween animation sequence. Then you add a motion guide layer and draw the motion guide path. Finally, you attach the tweened object to the motion guide, and the object will follow the path as it moves. Motion guides are covered in detail in Module 7.

Drawing Objects

Virtually all Flash movies include objects that are down. Learning how to use the drawing tools and create object for your Flash movies is a fundamental part of creating movies. In this module, you will learn to use those tools and create objects. As you will see, creating objects that you can animate is not an overly difficult task, but you do have to understand certain concepts in order to be successful. For example, you will see that grouping objects is an important step both in making objects act independently of each other, and in being able to animate them.

Drawing Lines and Fills

On the surface, drawing objects in Flash is not a whole lot different than drawing objects in many other graphics programs. That is, you select the appropriate drawing tool and then draw objects on the stage. Still, Flash does have some important differences from most other

drawing programs. For one thing, the objects that you draw in Flash are vector- based rather than being bitmap images (this is also true of certain other programs, of course).

Unlike bitmap images, vector graphics are really made up of mathematical description of an object. In contrast, bitmap images are made up of thousands of data points. As a result, vector graphics can be easily be scaled to different sizes without affecting the image quality. This is not true of bitmap images because changing the image size requires interpolating missing or overlapping data points.

One of the consequences of the fact that Flash uses vector graphics is that you end up dealing with lines and fills as complete entities. This is very different from the way that you work in a bitmap graphic editing programs. There, it is typically very difficult to modify an entire line or fill because these are not considered to be individual objects. Don't worry if thisseems a little confusing at this point; you will quickly become quite comfortable with the way you work with objects in Flash.

Selecting Different Strokes

Flash uses the term for what you almost certainly call a line. We will use the two terms interchangeably. Whenever you use the Line tool, the Pen tool, or the Pencil tool, you always create a line. In most cases, you also create a line to outline the object that you are drawing when you use the Oval tool or the Rectangle tool.

No matter which of the drawing tools that you use to draw a line, Flash uses the current selections in the properties panel to draw that line. Therefore, the Properties panel is the place to begin when you want to draw different types of lines. To make these selections, follow these steps:

1. Open the properties panel as shown here using the Window | Properties command or by pressing CTRL-F3.

Diagram-105

2. Select one of the tools (such as the Line tool) that draw lines so that the Properties panel will display the stroke options.
3. Click the down arrow at the right side of the Stroke Style list box to display all of the available stroke styles, as shown here.

Diagram-105

4. Click the Style that you want to use. Any selections you make will appear in the Stroke preview window at the bottom of the Stroke panel. If you want to create a line that is as thin as possible and never scale up, choose hairline.
5. To change the line width, drag the Stroke Height Slider up or down, as shown here. You can also enter a value directly into the Stroke Height text box. The value for the line width must be between 0.1 and 10 points.

Diagram-105

6. If you want to change the color, you can click the stroke color selector.

Once you have made your selections, any new lines that you draw will reflect those changes. It is not necessary for you to close the properties panel unless you find that you need more room on your screen.

You can also modify the style, width, and color of an existing line by selecting the line and then making changes in the properties panel. The new settings that you choose will also apply to any new lines that you draw until you select a different set of options in the properties panel.

Choosing Different Fills

Ovals, rectangles, and other closed objects can be filled with a solid color, a gradient, or even a bitmap fill. Typically, you use the fill color selector to choose the fill for closed objects. However, you can also use the Color Mixer panel, as shown here. To open the Color Mixer panel, use the Window | Color Mixer command or press SHIFT-F9.

Diagram-106

Generally speaking, you should choose the fill that you want to use before you begin drawing an objects. If you want to change the fill in an existing objects, you have a couple of choices. You can select the object and then use the Color Mixer panel to select a new fill. You also can use the Paint Bucket tool to add a different fill to objects.

We will discuss gradient fills shortly. Bitmap fills are discussed in Module'9.

Adding Complex Curves

In Module 2, you learned how to use the Pen tool to draw Bezier curves. These are curved lines that are defined by a series of click points and handles. The Pen tool is supplemented by

the Subselect tool, which enables you to modify the curved lines after you have finished using the pen tool.

The Pen tool and the Subselect tool are certainly powerful, but they can be somewhat tricky to use, and it can take a fair amount of time to achieve the results you want with them. Fortunately, these two tools are not the only options that you can use to create complex curved lines in your Flash drawings.

You can also use the Arrow tool to modify objects. With the Arrow tool, you can move corners, as well as bend lines into quite complex curved shapes. As you will soon learn, the Arrow tool makes it very easy to make major modifications to the Shape of drawn objects.

In addition to using the Subselect and Arrow tools to modify the shape of objects, you also have the option of using the free Transform tool. Although quite similar to the Arrow tool, the Free Transform tool enables you to make a number of modifications with a single tool. You can, for example, scale, rotate, skew, and wrap and objects with the Free Transform tool. It is probably best, however, to learn the basics by using the Arrow tool first and then move on to the Free Transform tool once you are comfortable with those actions.

To use this Arrow tool to add complex curves to a drawn object, follow these steps:

1. Draw the objects that you want to use as the basis for your new object. You will be able to make extensive modification to the shape of the objects, so the initial shape is not very critical.
2. Click the Arrow tool to select it.
3. To modify a corner, move the mouse pointer close to a corner so that the Arrow tool pointer shows a right-angle corner, as shown here.

Diagram-108

4. Drag the corner to a new position, as shown next. If you drag an existing corner onto another corner, Flash will eliminate the corner you were dragging and connect the remaining corners.

Diagram-109

5. To change a line into a curved line, move the mouse pointer close to the line so that the Arrow tool as a curved line, as shown here.

Diagram-109

6. Drag the line into the curved shape you want, as shown next. Notice that you can modify the curve not only by dragging the line, but also by moving the mouse pointer toward or away from a corner.

Diagram-109

As you drag lines with the Arrow tool to reshape them, keep in mind that the corner pints always remain anchored when you are dragging the middle of the line. However, if you drag a corner point, you will reshape both of the lines that are attached to the corner.

Using Colors

One of the most noticeable things that people generally see first when they visit a Web site is the use of colors. Oh, they may not think too much about the colors they are seeing, but a colourful Web site certainly does make an impression.

Actually, the use of color in animations is a very old concept. The Saturday morning cartoons that many of us grew up on certainly used a lot of bright colors to help make things interesting. That makes a lot of sense, really. No one would look at an animated cartoon (any more than they would look at a Flash movie) and mistake it for real life. Because of this, color can be used in an animation in ways it might not be used otherwise. Bright, bold colors can provide a lot of excitement and add to the overall experience.

You can choose colors for each line and fill that you add to a drawing. Flash has two color selectors – one for the stroke color and one for the fill color. In certain circumstances, you can also choose to not use a color:

- When you use the Oval tool or the Rectangle tool, you can click the No Color button when either the stroke color or the fill color selector is active. Doing so places a red slash across the selected color selector to indicate that no color will be used.
- When you use the Pen tool, you can click the No color button only if the fill color selector is active. This prevents Flash from filling the objects when you close the shape.
- You cannot use the No Color button with the Line tool, the Pencil tool, or the Brush tool. These tools draw with only one color, and it cannot be turned off.

Choosing Colors

To choose a stroke or fill color, you begin by clicking the color selector you want in the Colors area of the Flash toolbox. This displays the color selector pane, as shown here. In this case, I have opened the fill color selector, but the stroke color selector is nearly identical-except that you cannot choose a gradient fill for the stroke color.

Diagram-111

When you open a color selector, the mouse pointer changes into an eyedropper. As you move the mouse around, the color that is under the tip of the eyedropper appears in the current color selection box. In addition, the hexadecimal value of the current color selection appears in the box just to the right of the current color selection box. Although this value has little meaning to you right now, it will be important later when you want to control colors of objects using Action Scripts programming.

You are not limited to selecting colors from the color selector pane. If you move the mouse pointer out of the color selector pane, you can select almost any color from any objects on the screen. In fact, this is a good way to make sure that you match an existing color.

You also can use custom colors by clicking the custom color button in the upper-right corner of the color selector pane. This will display the color dialog box, as shown here.

Diagram-112

One advantage to using the Color dialog box is that you have the option of specifying an exact color using precise values. This might be very handy if you need to match a color such as the color of a corporate logo. After you select the custom color, click the Add to Custom Colors button to make that color the current color selections. When you close the color dialog box, you can then use the custom color in your drawings.

Adding Gradients

Gradients are a special type of color fill that you can use. A gradient is a fill that blends two or more colors. A gradient always starts at one color and makes a smooth transition to another color.

There are two types of gradients:

- A *linear* gradient changes colors in a straight line form one side of the fill to the other side.
- A *radial* gradient changes colors as the distance changes from the center point of the fill.

You're free to use whichever type of gradient you prefer. That is, you do not have to use linear gradients in rectangular objects, nor do you have to use radial gradients in round objects.

Adding a gradient fill works just like adding a solid color fill. You simply choose the gradient fill you want to use, and Flash fills any new, closed objects with that gradient fill. This shows an example of using a gradient fill.

Diagram-113

Creating Your Own Gradients

Using gradient fills is even more fun when you create your own gradients. You can create both linear and radial gradients to suit your needs. To create a custom gradient, follow these steps:

1. Use the Window |Color Mixer command (SFIHT-F9) to open the color mixer panel, as shown here.

   Diagram-114

2. Select either Linear Gradient or Radial Gradient from the Fill Style list box.
3. Click one of the pointers below the Edit Gradient Range box to select it. The selected pointer has a solid black triangle on top. While the other pointers show a gray triangle.
4. Click the Gradient color selector to choose the color for the selected pointer.
5. To add a new pointer, click below the Edit Gradient Range box.
6. To move a color selection, drag it right or left as necessary.
7. To remove a pointer, drag it off the Color Mixer panel.
8. Click the Save button in the lower-right corner of the Color Mixer panel to save the custom gradient. This will place the new gradient as one of the selections in the fill color selector pane.

Warping and Bending Gradients

By default, gradient fills are centered in the objects being filled, and the gradient is placed so that is sits at a normal horizontal orientation. There is no reason, however, why you cannot warp and bend the gradients to suite your needs. Often a gradient will produce a far better effect once it has been modified somewhat.

Both linear and radial gradients can be modifies. Radial gradients have one additional adjustment that is lacking with linear gradients, but otherwise the procedure is identical. To modify a gradient fill that you have applied to an object, follow these steps:

1. Select the Fill Transform tool from the Flash toolbox.
2. Click the filled objects that you want to modify to display the transform fill handles, as shown here.

Diagram-116

3. To move the center of the fill, drag the handle in the center of the circle.
4. To wrap the fill in a horizontal direction, drag the square handle.
5. To change the overall diameter of the gradient fill, drag the middle handle (this handle is missing when you are modifying a linear gradient).
6. To rotate the fill, drag the rotation handle.

The next illustration shows an example of how the gradient fill might appear after you have made a number of modifications using the carious handles to warp and bend the fill.

Diagram-116

Controlling Alpha Settings

The alpha setting isn't strictly a color setting, but it is somewhat related. Alpha is the transparency property for an object. An object that has an alpha setting of 100 is completely opaque, whereas an alpha setting of 0 makes the object totally transparent (and therefore invisible). Settings between 0 and 100 results in partial transparency, as shown in this example, where the four boxes are set at 100%, 75%, 50% and 25% respectively. The text that shows the alpha setting is on a separate layer behind the boxes. Notice that you cannot even see the text behind the box with a 100% alpha setting.

Diagram-117

To set an object's alpha value, follow these steps:

1. Click the Arrow tool in the Flash toolbox to select it.
2. Click the object whose alpha setting you want to adjust so that the object is selected.
3. Open the Color Mixer panel, as shown here, using the Window | Color Mixer command.

Diagram-118

4. Enter a value in the Alpha box or drag the slider to the correct value.
5. To adjust the alpha setting for additional objects, repeat steps 2-4 as necessary.

You can also adjust an object's alpha property using ActionScript statements or as a part of a tween. You could, for example, make an object fade into the background or make an object slowly come into view. This later option can be used to create a very interesting effect when you want a set of buttons to appear on the stage.

Rotating, Skewing, and Scaling

So far, you have learned several ways to modify objects. Now we will have a look at some ways to modify objects while retaining their basic shape. Objects that you rotate, skew, or scale may not look as though they still have the same basic shape, but to Flash they do. This is an important point because you can apply these effects as a part of a motion tween. If the basic shape were changed, you would not be able to use a motion tween to animate the objects.

You can rotate, skew, or scale pretty much any type of object that you create in Flash. Of course, some types of objects are better candidates for these actions. For example, it would be very easy to tell when a rectangle was rotated, and almost impossible to tell if a circle had been rotated. Therefore, I will use rectangles in these examples simply so that it will be easier for you to see the effects of each action.

Rotating Objects

Rotating an object is the act of turning the object around its center point- in much the same way that the hands on a clock rotate around the center of the clock. When you rotate an object, the object maintains the same dimensions and angles that it had before it was rotated.

You can rotate an object using your mouse. To do so, follow these steps:

1. Click the Arrow tool in the toolbox to select it.
2. Double-click the object that you want to rotate so that you select both the stroke and the fill. You can also draw a selection box using the Arrow tool if you prefer that method of selecting.
3. Select the Modify | Transform | Rotate and Skew command to add the rotation handles to the object, as show here. Alternatively, you can right-click the selected object and choose Rotate and Skew from the pop-up menu.

Diagram-120

4. Use one of the corner handles to rotate the object by dragging, as shown here.

Diagram-120

Skewing Objects

Skewing an object is a process that moves the sides of the objects so that the sides remain parallel, but the angles of the corners are modifies. You can skew an object by up to 45 in either direction.

To skew an object, follow these steps:

1. First, make certain that you have selected the entire object, including the stroke and the fill.
2. Select the Modify | Transform | Rotate and Skew command or right-click the selected object and choose Rotate and skew from the pop-up menu.
3. Drag one of the side handles, as shown here. As you drag a side, that side will remain parallel to the opposite side of the object.

Diagram-121

Scaling Objects

Scaling an object modifies the height or width of the object. You use scaling to make an object shrink or grow.

To scale an object by dragging, follow these steps:

1. Begin by selecting the entire object that you want to scale.
2. Select the Modify | Transform | Scale command or right-click the selected object and choose scale form the pop-up menu.
3. Drag one of the handles, as shown here. If you drag one of the side handles, you will scale the object in just one direction. If you drag one of the corner handles, you will scale the object in two dimensions at the same time.

Diagram-122

Rotating and Scaling Using the Scale and Rotate Dialog Box

One of the problems with rotating and scaling objects by dragging them is that this method is not very precise. It is difficult, for example, to rotate an object to a specific angle by dragging. Fortunately, Flash offers a couple of different methods that are more precise.

The first of these methods uses the Scale and Rotate dialog box. To use this method, follow these steps:

1. Select the object that you wish to modify.
2. Select Modify | Transform | Scale and Rotate from the Flash menu, or press CTRL-ALT-S to display the Scale and Rotate dialog box, shown here.

Diagram-122

3. Enter the scale percentage in the Scale text box. Note that the same scaling will apply in both the vertical and the horizontal dimensions.
4. Enter the number of degrees that you wish to rotate the objects in the Rotate text box. Enter the value as a positive number to rotate the object in a clockwise direction, or as a negative number to rotate the object in a counter-clockwise direction.
5. Click OK to apply the changes and close the dialog box.

Rotating, Skewing, and Scaling Using
The Transform Panel

For the most precise control over all aspects of rotating, skewing, and scaling objects, you should use the Transform panel. This panel enables you to enter exact values, so that you can get exactly the results you want.

To modify an object using the Transform panel, follow these steps:

1. Select the objects that you want to modify.
2. Open the Transform panel using the Window | Transform command (or CTRL-T), as shown here.

Diagram-123

3. Enter the values that you wish to apply to the objects.
4. If you want the object to scale equally in the vertical and horizontal dimensions, make certain that you select the Constrain check box.
5. If you decide that you should not have modified the object, click the Reset button in the lower-right corner of the Transform panel.

Grouping Objects

If you have tried drawing and animating objects in Flash, you may have experienced a certain amount of frustration. Although the process is fairly simple, there are some basic requirements that can trip you up if you are unaware of them. In the following sections, we will discuss a very important topic that can have a profound effect on your ability to successfully draw and animate objects: grouping.

Understanding Ungrouped Objects

Objects that you draw in Flash typically consist of more than one part. Unless you draw a simple, straight line, almost all drawn objects have a number of different pieces that make up the object. At a minimum, filled objects consist of at least two pieces- the outline stroke and the internal fill.

Of course, many objects have more than two pieces. A square- cornered rectangle has five different elements when you count each of the lines and the fill. Rectangles with rounded corners have even more individual pieces. To see an example of this, draw a rectangle object with rounded corners. Then click different parts of the outline (hold down SHIFT if you want to add additional pieces to the selection). Once you have selected several elements, drag several of them away from the rectangle, as shown here.

Diagram-125

This example clearly demonstrates that Flash treats each elements of a drawn objects as a separate objects. This has several important implications:

- You cannot apply a motion tween to drawn objects without first grouping them.
- You can apply shape tweens only to ungrouped objects.
- Ungrouped objects that are on the same layer will automatically combine if they are overlaying each other. If you attempt to move an object that is on top of another objects, the part of the lower objects that was under the top objects will disappear.

- It is very easy to accidentally modify part of an ungrouped object without modifying the entire objects. For example, if you click once inside a rectangle and then rotate the rectangle, you will leave the outline where it was and only move the fill.

Understanding Grouped Objects

Grouped objects are objects where all of the parts of the objects have been joined together so that they function as a single entity. If you move or modify a grouped object, you affect all parts of the object.

Here are some important facts you need to know about grouped objects:

- You can apply a motion tween to a grouped objects.
- You cannot apply a shape tween to a grouped objects.
- Grouped objects do not affect other objects, even if they are on the same layer. If you drop a grouped object onto another object, you can move the grouped objects without removing any of the lower object.
- Grouped objects always act as if they were a single objects, so modifications you make to a grouped object are applied to the complete object.

Simple Grouping Examples

By now, it should be fairly clear why you will often need to group the objects that you draw in Flash. Not only does this enable you to apply motion tweens to the objects, but grouping them also allows them to act independently so that you don't inadvertently wipe out part of an object by placing another object over it.

Okay, so now that you have a basic understanding of why you might need to group objects, it's time to see how you do so. Follow these steps:

1. Use the drawing tools to create an object on the stage.
2. Click the Arrow tool to select it.
3. Draw a selection box around the object to select it completely. If no other objects exist on the current layer, you can also use the Edit | Select All command or CTRL-A to select everything on the layer.
4. Select the Modify | Group command (or CTRL-G) to group the selected objects. As this shows, Flash then places a bounding box around the grouped objects.

Diagram-127

5. Click outside the object to remove the bounding box selection.
6. With the objects unselected, drag it to a different location on the stage. Notice that even though it is not selected, the object moves together as a single unit.

Although this example showed a fairly complex object, you can also group very simple objects. Try the example again using a circle that you have drawn with the Oval tool (remember to hold down SHIFT to create a perfect circle). This time, use the double-click method to select the objects for grouping. That is, rather than drawing a selection box, simple double-click the drawn object.

Now that you have created a grouped objects, try modifying that objects to see how the various elements are affected. For example, here is our sports car after it has been scaled to make it longer and lower. Notice that every part of the grouped object was modified- even the wheels. Clearly this is not quite the effect we want in this case. Next we'll look at how you can avoid this type of problem.

Diagram-128

Ungrouping as Needed

As the last illustration showed, grouped objects act as a single entity, and this can cause problems in some cases. Indeed, you may find that you need to ungroup objects to make certain types of modifications.

To ungroup an objects, you use the Modify | Ungroup command (or CTRL-SHIFT-G). This separates the object back into its individual components so that you can modify them individually.

Ungrouping objects brings back all of the shortcomings of ungrouped objects that were mentioned earlier. For example, any individual elements that overlap will once again interact. If you were to try to scale the automobile without changing the wheels, you would likely find that the effect would not be very satisfactory.

The Modify menu contains another command- the Break Apart command. This command is intended primarily for use with bitmap images, but it also functions as a super ungroup command. That is, the Modify | Break Apart command destroys all grouping-even nested grouping- in the selected objects. This command can make some very profound changes and deserves to be treated with extreme caution!

Possible Questions

1. What is Flash Panel? Explain it with example.
2. Write about Rotating, skewing and scaling in Flash
3. Explain Drawing lines and fills in flash with example
4. Illustrate how to create motion tweens in flash with example
5. Explain with example controlling frame movements using different timelines.
6. Explain how to create motion tweens.
7. Explain in detail about the panels in flash
8. Illustrate how animation can be performed in flash using shape tween with example.
9. Illustrate the Layers in flash
10. Elaborate on various selecting tool options in flash.

KARPAGAM ACADEMY OF HIGHER EDUCATION

COIMBATORE - 21

DEPARTMENT OF COMPUTER SCIENCE,CA & IT

CLASS : III B.Sc COMPUTER TECHNOLOGY

BATCH : 2016-2019

Part -A Online Examinations **(1 mark questions)**

SUBJECT: MULTIMEDIA AND ITS APPLICATION **SUBJECT CODE: 16CTU504B**

UNIT-III

S.NO	Question	opt1	opt2	opt3	opt4	Answer
1	_____is used to convert analog signal into Digital Signal	Printer	Scanner	Modem	Monitors	Modem
2	MIDI stands for_____	Multimedia Instrument Digital Interface	Musical Instrument Digital Interface	Media Instrument Digital	Movie Instrument Digital	Musical Instrument Digital
3	The size of the original image divided by the size of the compressed image is called	Image Quality	Lossy schemes	Compression ratio	Lossless	Compression ratio
4	MPEG stands for_____	Moving picture Expert Group	Movie Picture Expert Group	Music Pic Expert Group	Media Picture Expert Group	Moving picture Expert Group
5	_____schemes preserve the original data precisely.	Lossy	Lossless	decompression	Transferring	Lossless
6	In Windows, system sounds are _____files	DOC	WAV	DBS	PPT	WAV
7	_____ is created when you convert a sound wave into numbers	digital video	recording	digital audio	digital visual	digital audio
8	Sampling rate is measured in _____	kilohertz	hertz	watts	ohms	kilohertz
9	Sample sizes are either 8bits or ____ bits	32	64	16	12	16
10	_____ determines the accuracy with which a sound can be digitized	Audio files	Audio frequency	Audio resolution	Audio equalization	Audio resolution

11	_____ allows to modify a recording's frequency content so that it sounds brighter or darker	digital waves	digital resolution	digital finalization	digital equalization	digital equalization
12	A _____ keyboard is also useful to simplify the creation of musical scores	MACE	MIDI	MIDS	AIFF	MIDI
13	MIDI means_____	Multiple Insturment Digital Interface	Musical Interface Digital Instrument	Musical Instrument Digital	Multiple Instrument Digital	Musical Instrument Digital
14	_____ is a device dependent	MACE	MIDS	MIDI	AIFF	MIDI
15	MIDI files will be _____ times smaller than CD-quality digital audio files	1000-10000	1000-7000	200-1000	500-1000	200-1000
16	Removing blank space or dead air at the beginning or end of a recording is sometimes called	quieting	quantizing	trimming	pre rolling	trimming
17	_____ software allows you to record, edit and save music generated from a MIDI keyboard or instrument	Sound	Sequence	synthesizer	Samples	Sequence
18	An 8-bit sample size provides ____equal units to describe the dynamic range or amplitude	16	12	256	324	256
19	General MIDI numbering system ranges from_____	0 to 127	0 to 125	0 to 126	0 to 124	0 to 127
20	MIDI sounds are typically stored in files with the _____ extension	.sou	.midi	.mid	.mdi	.mid
21	Digital audio data is the actual representation of a sound, stored in the form of thousands of individual numbers called	orders	datas	codes	samples	samples
22	A music compression scheme to reduce file size was enveloped by the _____	MPEG	MPES	MPPS	MPDS	MPEG
23	The 3-D scenes consists of _____	objects	vectors	linear	Shapes	objects
24	In a 3-D, we can import a premade shape from a library of geometric shapes called	primitives	data	tools	texts	primitives
25	When you _____ a plane surface, its shape extends some distance,either perpendicular to the shape's outline or along	lathe	extrude	intrude	textures	extrude

26	_____provides high resolution in a 16:9 aspect ratio	SECAM	PAL	ATSC DTV	HDTV	HDTV
27	Using MPEG-1 we can deliver _____ of video	1.5Mbps	2 Kbps	1.2 Mbps	3 Mbps	1.2 Mbps
28	_____ video combines the luminance and chrome information from the video signal	decomposition	composite	component	compound	composite
29	_____ video separates the luminance and chrome information	decomposition	composite	component	compound	component
30	In _____ color and luminance information are kept on two separate tracks	decomposition	composite	S-Video	A-Video	S-Video
31	_____ is a continuous time varying signal	Analog video	Digital video	Image	Audio	Analog video
32	_____ is represented as a sequence of digital images	Analog video	Digital video	Image	Audio	Digital video
33	There is no “crosstalk” between different channels in _____ video	composite	component	compound	Simple	component
34	_____ improves the quality of the video and decrease generation loss	decomposition	composite	component	compound	composite
35	S-Video is _____	Super video	Simple video	Smart video	Sample video	Super video
36	_____ traces through a complete picture row-wise	Interlaced	Non interlaced	Raster	Digitized	Non interlaced
37	_____ uses 525 scan lines per frame	SECAM	PAL	NTSC	CCIR	NTSC
38	PAL uses _____ channel to improve quality	8 MHz	16 MHz	32 MHz	64 MHz	8 MHz
39	PAL means _____	Phase Alternate Line	Phase Altering Line	Phase Alternate Link	Phase Altering Link	Phase Altering Line
40	____ supports repeated recording without degradation of image quality	Analog video	Image	Digital video	Audio	Digital video

41	_____ indicates that no chroma sub sampling is used	4:1:1	4:1:2	4:1:3	4:4:4	4:4:4
42	CIF stands for	Common Interleave Format	Common Intermediate Format	Common Internet Format	Common Internal Format	Common Intermediate Format
43	_____ uses non-interlaced scan	CCIR 601	CCIR	CIF	PAL	CIF
44	Scheme _____ is commonly used in JPEG and MPEG	4:2:0	4:2:1	4:2:2	4:2:3	4:2:0
45	____ uses 720 active lines or higher	TV	SDTV	EDTV	HDTV	HDTV
46	Which among the following is not a property of sound?	reflection	diffraction	refraction	Transformation	Transformation
47	____ means measuring the quantity interested in, usually at evenly spaced intervals	Digitization	Compression	Sampling	Quantization	Sampling
48	____ is sampling the analog signal in the amplitude dimension	Digitization	Compression	Sampling	Quantization	Quantization
49	SNR stands for _____	Signal to Neutral Ratio	Signal to Noise Ratio	Sample to Noise Ratio	Sample to Neutral Ratio	Signal to Noise Ratio
50	____ is the process of removing unwanted frequencies in audio	Digitization	Compression	Sampling	Filtering	Filtering
51	MIDI channels are numbered from	0 to 16	1 to 16	0 to 15	1 to 15	0 to 15
52	If the first four bits are all ones in MIDI, the message is interpreted as a ____	System message	Channel message	Voice message	Mode message	System message
53	____ is the connector through which the device echoes the data received	MIDI OUT	MIDI IN	MIDI THRU	MIDI OFF	MIDI THRU
54	____ messages are used to specify effects such as sustain, vibrato and pitch	System message	Channel message	Mode message	Voice message	Voice message
55	____ message is included for manufacturers who can extend the MIDI standard	Mode message	Voice message	System Exclusive Message	System Common Message	System Exclusive Message

56	Extra character information such as karaoke lyrics is included in ____	MIDI	MIDI Leve 2	MPEG - 1	MPEG -2	MIDI Leve 2
57	_____ specifies the design of tests for verifying whether the bitstream or decoder complies with the standard	systems	Audio	Conformance	Software	Conformance
58	If prediction is from a previous frame it is called ____	Forward Prediction	Backward Prediction	Previous Prediction	Next Prediction	Forward Prediction
59	There are ____ hierarchical layers in MPEG video bitstream	5	6	7	8	6
60	Which of the following combination does not form hybrid scalability	SNR and Spatial	Spatial and Temporal	SNR and Temporal	SNR and Data partitioning	SNR and Data partitioning

SYLLABUS

Creating symbols and using the library: Learning about symbols – Creating symbols – Using libraries. Learning Basic Action Script concepts: Action Script basics – Data type basics. Learning basic Action Script Programming: Applying Action Script – Using Action Script to Control actions – Using Action script to control properties – Understanding Actions and Event Handlers.

CREATING SYMBOLS AND USING THE LIBRARY:

Flash movies are popular for a number of different reasons, but one of the very important reasons is that you can pack so much into a very small file. This means that you can add quite a bit of interest to a website without creating a download nightmare. Symbol and libraries are two pieces of the flash development environment that are very important both to cutting the size of Flash movies and reducing your workload by enabling you to reuse objects that you have created.

LEARNING ABOUT SYMBOLS:

Symblos are objects that you create for use in your Flash movies. They differ from the objects you have created so far in some very important ways:

- Sytmbols are reusable. This means that you can use instances of the symbols as many times as necessary in a movie.
- Only one copy of a symbol is stored in the published movie file. Any instances of that symbol refer to the stored copy of the symbol- greatly reducing the size of the published movie file.
- Changes you make to the stored copy of a symbol affect all instances of that symbol.
- Symbols can be saved in a library that can then be shared with other Flash movies you create.

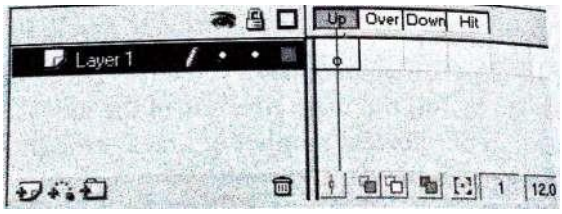
There are three types of Flash symbols. Each serves a very useful purpose in your Flash movie development .

GRAPHIC SYMBOLS:

Graphics symbols are objects that are images you have created, imported bitmaps, or animations that are tied to the main timeline of the movie. These are objects that you might want to duplicate a number of times throughout a movie, such as the trees on a background layer.

BUTTON SYMBOLS:

Button symbols are a special type of symbols that has built-in interactive capabilities. You use button symbol instances to create buttons that the user can click to interact with your movie.



The four frames of a button symbol timeline are:

1. UP: This represents the condition of the button when it is uo-that is, not interacting with the mouse.
2. OVER: This represents the condition of the button when the mouse pointer is over the button, but the mouse button has not been clicked.
3. DOWN: This represents the condition of the button when the user is holding down the mouse button while the mouse pointer is over the button.
4. HIT: This defines the area that is sensitive to a mouse click. Normally this will be the same size as the other button states, but if you get fancy with the shapes in the other three button frames.

MOVIE CLIPS:

Movie clip symbols are essentially movies within a movie. Movie clip symbols are typically small pieces of animation that can be placed within another movie to provide an independent piece of animation. For example, you might create a movie clip symbol that shows a rolling wheel. You could then use a couple of instances of this movie clip symbol to provide wheels for any vehicles in your main movie. That way the wheels of the vehicle would turn as the vehicle moved, providing a much more realistic animation.

UNDERSTANDING THE RIPPLE EFFECT:

Earlier I mentioned that one of the advantages of using symbol instances in your movies is that if you modify the master copy of the symbol, the changes will apply to all of the instances you have added to the movie. This has some very important implications. For example. Consider these points:

- If you create a symbol that re-creates your company logo, you can update that logo wherever it might appear in your movie by simply modifying the copy that is contained within the library.
- If you were to create a rolling wheel movie clip, you could share that rolling wheel with different movies. Then, to create a different type of wheel- a wagon wheel.
- If you create a button symbol for use in your movie and then decided you wanted to use a different color scheme, simply modifying the master button symbol in the library would change the color of all instances of the button throughout your movie.

CREATING SYMBOLS:

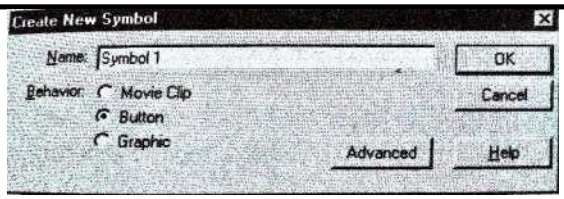
Creating new symbols is very easy. Each type of symbol has its own requirements, of course, but you will primarily use techniques you have already learned in creating symbols.

CREATING GRAPHIC SYMBOLS:

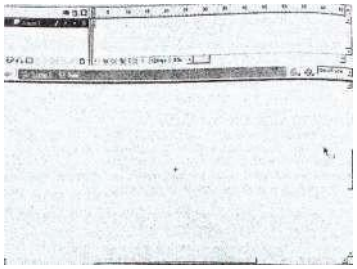
Graphic symbols are the simplest of all of the symbol types. Creating a graphic symbol is also a very easy task. Typically, graphic symbols are simply objects that you draw so that they can be used conveniently within your movie.

To create a new graphic symbol, follow the steps:

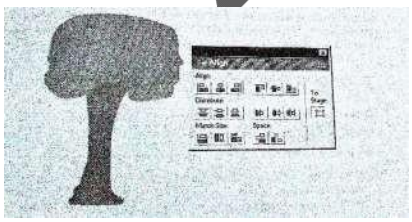
1. Select the Insert| New symbol command (or press CTRL-F8) to display the create new symbol dialog box, as shown here.



2. Select the Graphic option button.
3. Optionally, enter a name for the symbol in the name text box.
4. Click OK to enter the symbol editing mode. In this mode, Flash displays the name of the symbol above the stage, as shown



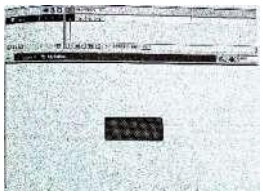
5. Use the drawing tools to draw the object that you want to use as a graphic symbol. As you draw the object, notice a couple of important points about the stage:
    - First, the plus sign in the center of the stage is the registration point for the object- the point that Flash will use as the center of the object.
    - Second, there is no workspace beyond the edge of the stage. Everything you draw will be a part of the symbol.
6. When you have finished drawing the object, click the Arrow tool to select it.
7. Draw a selection box around the entire object so that it is completely selected.
8. Select window| Align (or press CTRL-K) to open the Align panel.
9. Click the To Stage button so that the alignment options you choose will control the object's alignment relative to the stage.
10. Click the Align Horizontal Center button. This is the second from the left in the top row of buttons.
11. Click the Align Vertical Center button. This is the second from the right in the top row of buttons.



12. Close the Align panel by clicking its Close button.
13. Close the symbol editing mode by clicking scene 1 above the stage.

Button symbols are some of the most useful symbols you can create. If you want users to be able to interact with your movies, you will need to create botton symbols.
To create a button symbol, follow the steps:

1. Select the Insert| New symbol command(or press CTRL-F8) to open the create New symbol dialog box.
2. Select the button option button.
3. Enter a name for the button symbol in the Name text box.
4. Click OK to close the dialog box and enter symbol editing mode.
5. Use the drawing tools to create the image for the Up frame.
6. Once you have drawn the button image for the Up frame, use the arrow tool to select the entire button image.
7. Open the Align panel using the Window|panels|Align command (or press CTRL-K).
8. Use the To Stage, Align Horizontal Center, and Align Vertical Center buttons to make certain that the button is centered on the stage.
9. Click the Over frame in the timeline so that you can create the image that will appear when the mouse pointer is over the button.
10. Select Insert| keyframe (or-press F6) to add a keyframe to the over frame.
11. Use the fill color selector to choose a different color for the fill. This will make the button change color when the user moves the mouse pointer over the button.
12. Click the Down frame in the timeline.
13. Select Insert|Keyframe to add a keyframe to the Down frame, or if you want to create a button that has a totally different appearance when it is depressed, use the Insert| Blank Keyframe command to add a blank keyframe.
14. Select a new fill color or draw the image you want to use for the Down frame. This will be the image the user sees when they click the button.
15. Finally, add a keyframe to the Hit frame.
16. If you used the same image in all of the previous frames, you don't need to do anything else.



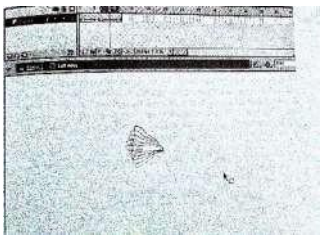
17. Click the scene 1 name above the stage to close the symbol editing mode and return to the main stage.

CREATING MOVIE CLIP SYMBOLS:

Movie clip symbols are some of the most fun symbols you can create. When you create a movie clip symbol, you are creating an independent piece of animation that you can use in your main movie to do things that would be very hard to accomplish in other ways.
To create a movie clip symbol.

1. Select the Insert| New symbol command (or CTRL-F8) to open the create New symbol dialog box.
2. Select the Movie Clip option button.
3. Enter a name for the button symbol in the Name textbox.
4. Click Ok to close the dialog box and enter symbol editing mode.
5. Use the drawing tools to create the object you want to animate.

6. Create the animation using the techniques you have learned in previous modules.



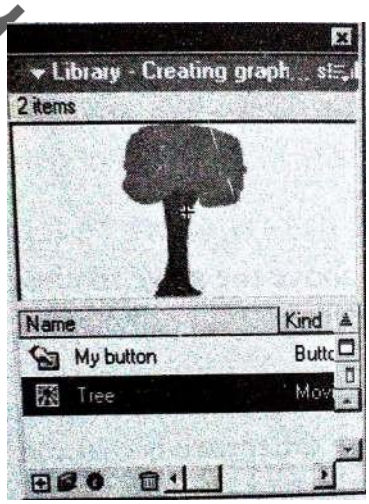
7. Click the scene 1 name above the stage to close symbol editing mode and return to the main stage.

OPENING SYMBOLS FOR EDITING;

When you finish creating any type of symbol, you return to the Flash stage, where there is no indication that the symbol even exists. This can make it somewhat difficult for you to edit the symbols until you learn where to find them.

To open symbols for editing,

1. Select window | Library to open the library window, as shown here



2. Click on of the symbols to view in the upper pane of the library window.
3. To edit a symbol, double-click it in the list, or right-click it and choose Edit from the pop-up menu. This will open the same symbol editing mode window you used to create symbol in the first place.
4. Make any necessary modifications to the symbol.
5. Click the scene name above the timeline to close the symbol editing mode window.

USING SYMBOL INSTANCES:

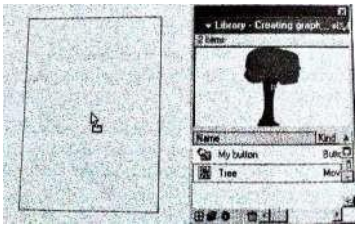
The whole point of going to the trouble of creating symbols is so that you can use instances of them in your movies. As you have already learned, using symbol instances offers many advantages, including considerable savings in the size of you published files.

ADDING SYMBOL INSTANCES TO YOUR MOVIE:

All of the symbols that you create in a movie are automatically stored in the movie's library. To add an instance of a symbol to the stage so that it si a visible part of your movie, you must copy that instance from the library.

To add a symbol instance to the stage, follow the steps.

1. Use the Window| Library command to open the library window.
2. In the lower [pane of the library window, select the symbol you want to add to the stage.
3. Drag a copy of the symbol ontothe stage, as shown here.



4. Continue dragging symbol instances onto the stage is needed.
5. If desired, close the library window to free up space for working.

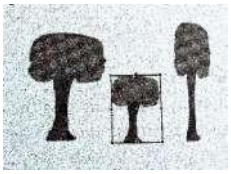
COMBINING SYMBOLS:

Just as you can use symbol instances by dragging them onto the main stage, you can also use symbol instances as a part of another symbol.

1. You can place a movie clip symbol instance onto face of a button symbol to create an animated button.
2. You can embed a button symbol instance in a movie clip symbol to create custom mouse pointers and to produce interactive games that allow the user to drag objects as your movie plays.
3. You can use a graphic symbol instance to add a fancy appearance to buttons.
4. You can create complex animations that combine several movie clip instances so that the motions of the various pieces of an object appear to be more realistic.

MODIFYING SYMBOL INSTANCES:

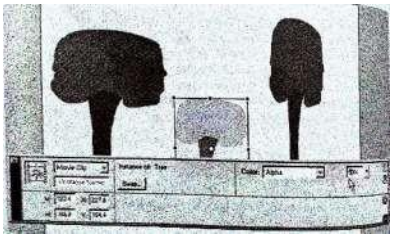
Just because you are using a symbol instance does not mean that you need to live with boring repetition. You can make quite a few different modifications to those symbol instances with very little increase in the overall size of your published movie file.



In addition to such simple changes as scaling or rotating a symbol instance, you can make far more extensive changes, too. You can, for example, make changes such as these:

- Add text to individual button symbol instances. This can be used to let the user know the purpose of different buttons.
- Add ActionScript code to the button symbol instances so that each button performs a specific action when it is clicked.

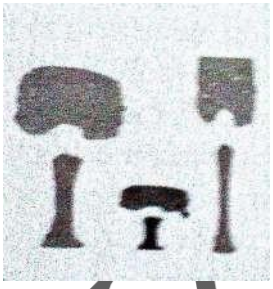
- Change the alpha property of a symbol instance using the properties panel, as shown here.



- Change the tint or brightness of a symbol instance by using other options in the properties panel.

- Change an instance into a different type of symbol using the properties panel. This would enable you to play an animation in a graphic symbol independently of the main timeline.

In addition to these instance-specific modifications, you may find that you want to modify the characteristics of the master symbol after you have added instances to the stage. Flash offers an easier way to edit the master symbol without ever leaving the main stage.

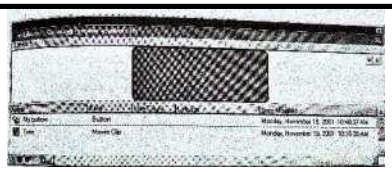


USING LIBRARIES:

Earlier in this module, you have learned that flash automatically places any symbols that you create into a library. Libraries are an important item in helping you organize symbols that you create and in enabling you to reuse object in more than one movie. In the following sections, you will learn what you need to know inorder to make the most effective use of the Flash libraries.

UNDERSTNADING LIBRARIES:

Each Flash movie has its own library. This library is a part of the movie project file- the file that is saved with a FLA extension whenever you choose file| save or file | save as from the flash menu. Libraries hold all of the symbols, imported bitmap images, and imported sound files that you use in a movie. When you open the library window, you will normally see a rather small window with just enough with to display the name of the object that are contained in the library. As this shows, however, you can drag the edges of the library window to reveal fair more information about the objects in the library.



The library window has several columns:

- NAME: this is the name that you assign to the object.
- KIND: This is the type of the object. You can also tell the objects type by looking at its icon to the left of the name column.
- USE COUNT: This tells you how many times the object has been used in the movie.
- LINKAGE: This provides linkage information for objects that are used in shared libraries. This libraries are discussed a little later in this module.
- DATE MODIFIED: This is the date and time information for when the object was last modified.

The library menu provides a number of comments that are handy for creating objects and for organizing the library.

ADDING YOUR OBJECTS TO LIBRARIES:

Whenever you create a new symbol, that symbol is automatically added to the current movie's library. In addition, you can add objects to the library by importing bitmap graphic image files or by importing sound files. In both cases, Flash paces the object into the library as soon as they are imported. You cannot arbitrarily add objects to the library. Except for imported bitmap graphic images and imported sound files, the only object you can store in the library are symbols that you create.

ORGANIZING YOUR LIBRARIES:

As you add more symbols and imported objects to the libraries, you may that it became a little difficult to locate specific objects. One way around this is to add a little bit of organization. Add folders to the library by selecting the new folder command from the library menu. Once you have created folders, you can move items into those folders. You can do this using a drag- and- drop method or by selecting the item you want to move and using the move to new folder command on the options menu.

USING STANDARD LIBRARY OBJECTS:

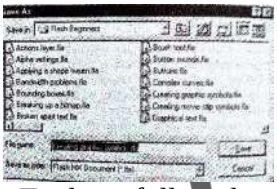
One secret that the new flash developers are always pleased to learn is that flash comes with the number of readymade objects that you are free to use in your movies. This objects are stored in what are called common libraries. When you install flash, this common libraries are also installed, giving you access to all of the objects that they contain. Each of this contains a number of objects that you can add to a flash movie just the you would add an intense from the movies own library-by dragging and dropping.

As an example, here is the common library that contains a large number of buttons that you can use by simple dragging them into your movie.

When you add an object from one of the common libraries to a flash movie, that object is automatically added to the movies library as well.

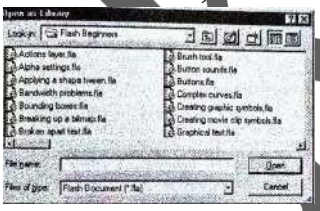
CREATING REUSABLE LIBRARIES:

The common libraries are really just flash movie project files that are stored in a special location. The libraries folder is located under the flash program folder On a windows-based PC, this folder is typically named C:\program Files\macromedia\Flash MX\First run\libraries.

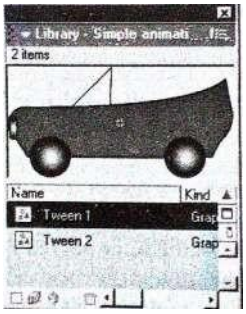


To do so follow the steps:

- Select the file | open As library command to display the open as library dialog box, as shown here



- Select the movie project that you want to open and then click the open button.



- Drag the object you want to use onto the stage. As with the common libraries, this also places a copy of borrowed objects into the current movies library.
- Click the closed button for the foreign library file to close it.

USING SHARED LIBRARIES:

As I have tried to emphasize many time in the earlier modules, one of the real benefits of using flash to create website animation is the high level of efficiency of the flash movie file format. Flash offers another method of gaining efficiency that I will touch on briefly, shared library files are flash movie files that you place on your webserver. The primary advantage occurs when you have multiple movies that all use the same shared resource. The best advice I can offer you above shared libraries files is to avoid them for now. If you become involved in developing a very large project, you any want to revisit the subject at a later date.

LEARNING BASIC ACTIONSCRIPTS CONCEPTS:

In this module you will learn some of the basics of ActionScript and you will see how even some very simple ActionScript code can really enhance your movies. ActionScript is a fairly simple programming language that is amazingly easy to use even if you spend almost no time learning about it. Often you will be able to rather sophisticated behaviour to your movies with just a few mouse clicks. In fact, you will soon learn that your ActionScript programming will largely consist of simply clicking some choices with your mouse. It would be hard to find another programming language that enables you to do so much with so little effort.

UNDERSTANDING ACTIONSCRIPT:

Actionscript is the programming language that you use to control various aspects of a Flash movie. Actionscript is a fairly simple programming language, and yet it is capable of some fairly sophisticated actions. ActionScript is a scripting language, the program statements tend to be quiet easy to understand. Even if you have little or no experience with computer programming , you will likely find that Actionscript programs seem to make sense because the statements generally look a lot like ordinary English.

ACTIONSCRIPTS ORIGIN IN JAVASCRIPT:

Beginning with Flash 5, ActionScript underwent a major change from the previous versions of ActionScript. To make the language more powerful and easier to use, and to base it on an open standard, Macromedia based the newer version of ActionScript on an international specification known as ECMA-262. This specification was created by a group called the European Computer Manufacturers Association(ECMA). ECMA-262 was an attempt to create a new definition of javascript- a programming language that is widely used on web pages. This new definition of javascript was aimed at marking Javascript an open specification that was not under control of one company, and therefore making it a language that everyone would be able to use without fear that someone's arbitrary decision would render your work incompatible. Actionscript is not 100 percent the same as Javascript. Actionscript is intented as a language for controlling Flash movies, and Javascript Is intended as a language for controlling actions on a web page.

UNDERSTANDING OBJECT-ORIENTED PROGRAMMING:

In addition, to being a script-based language, ActionScript is also an object-oriented language. This means that when you are working in ActionScript, you are dealing with different objects that each possess a number of characteristics that can be easily examined or

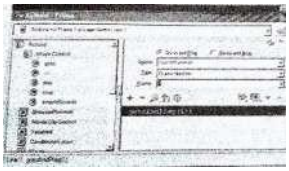
defined. In addition, those objects have the built-in-ability to perform certain actions or respond to specific events.

ACTIONSCRIPT BASICS:

In order to understand how ActionScript works, you should start by learning a little about the basic elements of the ActionScript language. In the following sections, we will take a brief look at some important elements of ActionScript that you will encounter often.

ACTIONS:

Actions are the built-in commands in the ActionScript language. These are the statements that you will use to make something happen in your movie. The selected action, go to, tells flash to move the playhead to a specific frame.



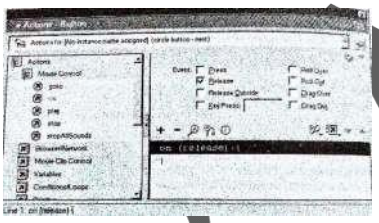
The Actions panel has two different modes that determine how you work in the panel. Normal mode displays an area in the right-hand side of the panel called the parameters area. This prompts you for all of the necessary information to successfully enter ActionScript statements.

- BREAK: Stops the execution of a loop and moves on to the next ActionScript statement following the loop.
- CALL: Executes the ActionScript statements that exist at a specific frame and returns to the current frame at the completion of those statements.
- CASE: This action is always used in combination with the switch action; it executes a statements if a specific condition is matched.
- COMMENT: Creates a comment- a non executing statement that exists for documentation purposes.
- CONTINUE: Causes the current execution of a loop to end but does not stop additional passes through the loop.
- DEFAULT: This action is always used in combination with the switch action, and it specifies a statement to execute if none of the case statements are executed.
- DELETE: Removes a named object from memory to free up that memory.
- DO WHILE: Executes a series of statements as long as a specified condition remains true.
- DuplicateMovieClip: Creates a new instance of a movie clip and is useful for adding objects to the stage as the movie is playing.
- ELSE: Executes a series of ActionScript statements if the original If statement was false.
- ELSEIF: Similar to the Else action, but performs an additional test before executing the statements that follow.
- EVALUATE: Enables you to enter ActionScript statements manually while working in the Action panels normal mode.
- FOR: Creates a loop that executes a series of ActionScript statements as long as the test condition remains true.
- FOR….IN: Also creates a loop, but one that executes once for each item in a set of properties or elements in an array.

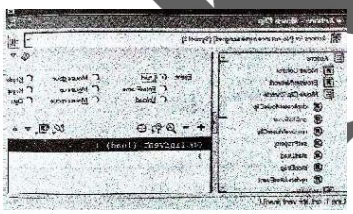
- FSCommand: Enables you to send commands from your Flash movie to the Javscript functions on a webpage.
- FUNCTION: Creates a user-defined function using a set of statements that you define.
- GetURL: Loads a document from a specified URL and optionally passes the values of the movie's variables to that URL.
- Goto: sends the playhead to a specific frame.
- IF: performs a conditional test and executes a series of statements if the test proves to be true.
- IFFRAMELOADED: Executes a statement if a specific frame from the movie has been completely loaded.
- #include: Enables you to add some ActionScript staements that you have saved in a textfile into your script without retyping them.
- WHILE: Executes a block of statements as long as a condition remains true.
- WITH: Provides a shorthand method of executing a series of statements that will apply to a specifies object.

EVENTS:

Events are occurrence that can cause objects to respond. For example, when you create a button symbol and then place an instance of that symbol onto the Flash stage, the button instance responds when the user clicks the button with their mouse. There are a number of different types of events that you can use to trigger actions.



Movie clips can also respond to a number of different events. You can use the onClipEvent action as shown next to assign events that you want a movie clip instance to respond to.



Events are a very information and then return portent concept in any object- oriented programming language. Those objects then control how the program works by responding to events. The beauty of this approach is that you don't have to write a program that keeps checking every possibility to see what is happening .

FUNCTIONS:

Functions are independent pieces of code that process specific types of information and then return a value or perform some action based on that data. If you have ever used a spreadsheet program, you are almost certainly quite familiar with the concept of functions.

Flash has a number of built-in functions that you can access using the Actions panel. This capability is especially useful if you are creating a Flash movie where you need to repeat the same calculation several times. This method is not only more efficient, but also far easier to update because you need to make changes only in one place, and the new calculations will apply in all instances that call the function.

METHODS:

Methods are things that an object knows how to do. In most ways, methods are quite similar to actions, except that methods are specifically defined by the objects they are a part of. In most cases, the methods even have the same name as the actions. Consider the following ActionScript statement that uses an action to move the playhead in the current timeline to frame 100 and begins playing the movie from that point:

```
gotoAndPlay(100);
```

This action is pretty straightforward and easy to understand. Suppose, though, that you want to tell a movie clip instance to perform the same action. You want to control the timeline in the movie clip object to perform this same task:

```
MyMovieClip.gotoAndPlay(100)
```

PROPERTIES:

Properties are the various characteristics that define an object. These include a number of things you already know about, such as alpha setting, which controls the transparency of an object, and the height property, which defines the height of the object in pixels. Most object properties can be both read and modified. ActionScript statements to determine the current value of a property and to change the value of the property to a different value.

VARIABLES:

Variables are names that you create so that Flash can use them to store information while your movie is playing. In Flash, variables can hold any type of information you want them to hold. In addition to using variables to hold information for use in your movies, you can also send the values of the variables to a URL using one of several ActionScript statements. ActionScript includes a set of variable action, it is generally not necessary to use this action to set the value of a variable.

EXPRESSIONS:

Expressions are ActionScript statements that are used to assign a value to a variable. You are no doubt quite familiar with mathematical expressions- expressions in ActionScript programs work just the same way.

PARAMETERS:

Parameters are the arguments that tell various ActionScript actions, functions, and so on, exactly what you want them to do. Parametrs provide considerable flexibility by allowing the same action or function to do different things, depending upon variable information that you have provided. You can specify the parameters by using specific values or the name of a variable that was defined earlier in the program execution.

OPERATORS:

Operators are the controlling element in an expression. Operators tell Flash just what you want it to do in order to manipulate the objects on either side of the expression. Actionscript operators come in many different flavors. The Actions panel toolbox lists some of them immediately under the operators category, and a bunch more in subcategories under operators.

LOOPING:

Looping is the process of repeating a block of ActionScript statements a number of times based on the results of a conditional test. You can use looping to automate many different tasks in your Flash movies. Several different ActionScripts actions can be used to create a loop. These include the for, for…in, do while, and while actions. Each of these actions creates a slightly different type of loop. Some other type of loops perform the test after the first pass through the loop, thus assuring that the statements in the loop will always be executed atleast once.

WORKING WITH OBJECTS:

Objects are key to programming in ActionScript. Virtually everything that you do in your Actionscript programming involves objects. You move objects, change their properties, hide or display them, and so on. In order to work with objects using ActionScript, you need to know how to reference them properly. That is, you need to be able to tell the program exactly which object it is that you want to address with an action or a property setting. ActionScript uses a very simple and easy-to-understand method for referencing objects. ActionScript uses a number of rather strange-looking names of actions and other elements of the language. Because actionscript uses such a mixed bag of strange names, it needs a convention that will enable it to recognize where one name ends and the next begins. This convention is known as dot notation. In dot notation, the following rules apply:

- All names are separated by dots.
- Dots cannot be used within names.
- A name to the left side of a dot is the parent of the name to the right of the dot.
- Object methods appear to the right of the object name, also separated by a dot.

It will be easier for you to understand dot notation by taking a look at an example. MyClip is attached to a frame in the maintimeline, so I can use_root to specify the location because_root is ActionScript shorthand for the lowest level in the movie.

```
Root.MyClip.gotAndstop(20);
```

DATA TYPE BASICS:

Actionscript is fairly lax about data types. It is a good idea for you to understand the different types of data that you can use. That way, you can avoid any unpleasant surprises.

STRINGS:

Strings are the most flexible of all data types. You can store letters, numbers, and punctuation in a string. You enter strings by enclosing them in quotes. You can concatenate strings by using a plus sign(+). If you attempt to concatenate a string and a number, flash simply produces a string result that treats the number as if it were a string.

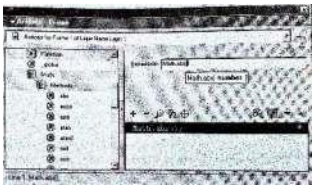
This can be quite handy for building strings using incrementing numbers as a part of the string.

Here are some of the characters that you must enter using a special notation:

- BackSlash
- Backspace
- Carriage return
- Double quote
- Form feed
- Line feed
- Single quote
- Tab.

NUMBERS:

Flash treats all numbers as double- precision, floating point numbers. As a result, all mathematical calculations are done with a high level of accuracy. Double- precision, floating point numbers require more memory than other types of numerical values, and they also can be a little slower to use in calculations; but because few flash movies rely on heavy mathematical calculations, you aren't likely to notice the negative impact.

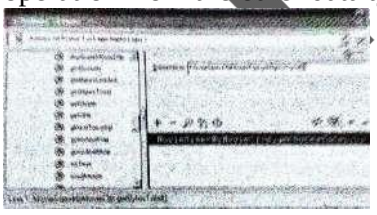


BOOLEAN:

The Boolean data type is a quite simple one. Boolean values can be either true or false, and they are generally the result of a conditional test. There is also a Boolean object that you can use; but, generally speaking, you are free to use the Boolean datatype without resorting to any complicated.

MOVIE CLIPS:

The movie clip data type is actually there for your convenience. This data type enables you to use the methods of the movie clip object to control instances of movie clip symbols in your movies. Both the movie clip data type and the object data type are a little different in operation from the other data types.



OBJECTS:

The object data type is a rather complex data type because it is essentially freeform. That is, object data type is a custom data type that you define when you want to create an object that does not really fit into any other category. Every property and method that you want the object to possess must be defined.

ARRAYS:

Arrays are not actually one of the actionscript data types, but they do provide you with a very handy way to store and access data. You might want to think of arrays as a way to organize information in a very flexible structure in which each piece of information is stored using an index number. The array object has a number of methods that you can use for various purposes. You can even create a string from all of the array elements.

LEARNING BASIC ACTIONSCRIPT PROGARMMING:

You can do a lot with just a little actionscript programming, but you need to understand how to apply Actionscript to your problem if you want to be effective.

APPLYING ACTIONSCRIPT:

It simply makes good sense to have a plan of action so that you aren't simply wasting your time playing around to see what happens. ActionScript programming becomes an integral part of planning your whole movie. You cannot really isolate the two areas effectively because they really are a part of the same process.

PLANNING YOUR PROGRAM:

Once you get beyond very simple Flash movies with just one or two tweens to add a little animation, it really helps to sit down and plan things out before you begin. There simply are too many possible areas of conflict not to do so.

- How many layers do I need to use in order to avoid unwanted interaction between different elements of the movie?
- What timing- related issues do I need to consider? If I am using several different tweens, where should each of them begin and how many frames should each of them cover to achieve the effect I want?
- Do I want to use a preloader to ensure that playback will be smooth, even over a slow dial-up connection?
- What types of interaction do I want to include, and which movie elements should provide that interaction?
- How can I create reusable objects and keep my published movie file size as small and efficient as possible?

You will almost certainly want to give additional thought to these areas when you are thinking about using ActionScript in your movies:

- What do I want to accomplish with Actionscript programming that I could not do otherwise?
- How will my ActionScript affect the flow of the movie, and will it be necessary to organize things differently because of this?

Logical tests can produce only one of two possible results, it is very easy to structure a program so that the results you obtain from performing the test are quite different than what you expect.

ADDING ACTIONSCRIPT TO OBJECTS AND FRAMES:

One of the areas that Flash developers often find confusing when they start using Actionscript, is deciding just where to place the Actionscript statements. They are several questions:

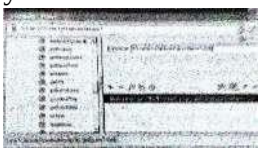
- If an Actionscript statement should be executed automatically when the play head reaches a specific point in the timeline, you will want to add the ActionScript code to a frme in the timeline.
- ActionScript code that is attached to a button is always attached to the instance rather than to the main symbol's timeline.

You can also open the actions panel in some other ways, depending on what you are doing:

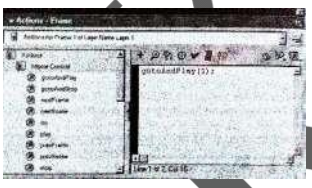
- You can right click a key frame or an object and select actions from the pop-up menu.
- You can double- click a key frame in the timeline.

THE ACTIONS PANEL MODES:

As you learned in module 12, the actions panel has two modes of operation that you can choose from the Actions panel menu. If a selected statement in the script window accepts parameters, the right-hand section of the actions panel displays each of the parameters so that you can select or fill in the required information.



If you switch to the actions panel to expert mode, Flash provides you with far less assistance.



AVOIDING DEPRECATED ACTIONSCRIPT STATEMENTS:

These statements remain available primarily to make it possible to support older versions of the Flash Player, but also so that older flash movies do not need to be rewritten immediately. The deprecated statements are shown in the deprecated category in the actions panel toolbox to make them easy to identify and avoid.

USING ACTIONSCRIPT TO CONTROL ACTIONS:

In this section, we will look at some of the more basic actions that you are likely to use. In this way, you can get a feel for actually using some Actionscript to program your Flash movies.

Goto:

The goto action is used to move the playhead to a different frame in the timeline.

- GotoAndPlay: This form of the action moves the playhead to a specific frame number or frame label and begins playing the movie from that point.
- gotoAndStop: This form of the action moves the playhead to a specific frame number or frame label and stops the playback.

PLAY:

The play action resumes playback of the movie at the current frame. In that way, you could provide the user with buttons that they could use to control playback of the movie.

STOP:

The stop action stops the playback of the movie. This is the another of the actions that you might typically attach to a button so that the user could control the playback.

STOPALLSOUNDS:

The stopallsounds action immediately stops any sounds that are currently playing. This provides the user with a way to mute the soundtrack if you attach this action to action to a button that the user can click.

GETURL:

You use the getURL action to load a new document from a specific web address. You can use this action for a number of different purposes, including loading another Flash movie. This argument can take any of the following values:

- Windowname: The is the name of a specific window in which to display the document.
- Self: This places the document in the current frames.
- Blank: This places the document in the new window.

FSCOMMAND:

The fscommand action is used to send commands to the Flash player or the web browser that contains the Flash player. Most of the commands that you are likely to send would be javascripts commands.

LOADMOVIE:

The loadmovie action is used to load additional Flash movies. These can be replacements for an existing loaded movie, or they can be additional movies. The action can be very handy if you want to provide the user the option to select particular movies. The loadMovie action has two different formats:

- Loadmovie: you use this format when you want to specify a target movie clip that will be replaced by the new movie clip.
- loadMovieNum: you use this format when you want to specify a level on which to load the new movie clip.

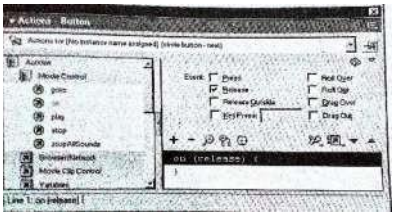
This might be handy if you wanted to send certain information such as the name of the user so that the new movie would also know who has viewing the movie.

UNLOAD MOVIE:

The unload movie action unloads the movie that you specify from memory. You can specify the movie to unload by name or by level number. Once you unload the movie, it can no longer be played.

ON(MOUSE EVENT):

The final action we will look at is labelled "ön". In reality, this is not an action; It is a convenient way for you to access the mouse event handler that you can wrap around a block of the ActionScript statements.



The reason for this Flash automatically adds this event handler whenever you add actions to a button symbol instance. That is because the button symbol instance must always respond to mouse events, so it needs this event handler in every case.

USING ACTIONSCRIPT TO CONTROL PROPERTIES:

In addition to using Actionscript actions, you will almost certainly find a need to use ActionScript to control object properties.

UNDERSTANDING WHICH PROPERTIES YOU CAN SET:

It is important to remember that some properties are read-only, so any attempt to set the property will fail. That is , when you set the value of the property such as the quality property, the new setting applies to all movies rather than to a single, named movie clip instance.

- Alpha: This is the transparency value. The effective range is 0 to 100.
- Currentframe: This is read-only current frame number of the movie clip's playhead.
- Droptarget: This is the read-only name of the movie clip instance where the specified movie clip instance was dropped.
- Focusrect: This is a global property that determines if the button that has the focus is surrounded by a yellow rectangle to make it easier for the user to see the active button.
- Height: This is the height of the movie clip in pixels. You can both read and set this property.
- Quality: This is a global property that is similar to the highquality property. You can set this property to LOW, MEDIUM,HIGH, OR BEST.
- Rotation: This property is used to rotate the movie clip instance a specific number of degrees.
- Target: this is a read-only property that specifies the complete target path to the movie clip instance.

SETTING MOVIE CLIP INSTANCE PROPERTIES;

You can set the properties of movie clip instances using dot notation and an expression, or you can use the setProperty action to accomplish the task. Either method accomplishes the task equally well, so it is primarily a matter of personal preference on your part. Setting a movie clip instance property using dot notation and an expression is very similar to setting the value of a variable.

UNDERSTANDING ACTIONS AND EVENT HANDLERS:

Actions and Event handlers are parts of ActionScripts that you will use in almost every case in which you add ActionScript code to a flash movie, so it is vital that you have a clear understanding of how these language elements work.

ACTIONS:

Actionscript actions are what might be called commands in some other programming languages. Actions cause something to happen immediately when they are executed. Actions can be attached to keyframes in a timeline, or they can be attached to an object.

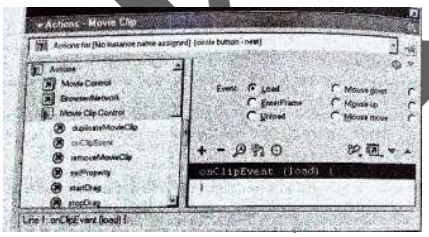
- If an action is attached to a keyframe, the action is executed when the playhead reaches the keyframe- unless you are using a conditional test that may modify the program flow depending on the results of the test.
- If an action Is attached to an object, the action is executed only when the proper event occurs. This is determined by the event handler options you have selected.

EVENT HANDLERS:

Event handlers function something like traffic signals. An action that is controlled by an event handler can be executed only when the event handler gives the action a go signal. There are two types of event handlers in Actionscript:

- Buttons use the on mouse event handler so that they can respond to mouse events.
- Movie clips use the onClipEvent handler.

Both types of event handlers can respond to some of the same types of events, but the onClipEvent handler has some additional options.



Possible Questions

Part – B (8 Marks)

1. Explain how to create symbols in flash with example
2. Discuss Data type basics in flash with example
3. Explain data types and expressions used in flash ActionScript.
4. Explain how to use ActionScript to control properties in flash
5. Explain the steps to perform actions of play or stop with buttons in flash
6. Explain how to create masks in flash with example.
7. Explain how to use ActionScript to control actions in flash
8. Explain the steps to perform actions of play or stop with buttons in flash.
9. Explain various mouse events used in flash.
10. Explain how to use libraries in flash with example.

KARPAGAM ACADEMY OF HIGHER EDUCATION

COIMBATORE - 21

DEPARTMENT OF COMPUTER SCIENCE,CA & IT

CLASS : III B.Sc COMPUTER TECHNOLOGY

BATCH : 2016-2019

Part -A Online Examinations **(1 mark questions)**

SUBJECT: MULTIMEDIA AND ITS **SUBJECT CODE: 16CTU504B**

UNIT-V

S.NO	Question	opt1	opt2	opt3	opt4	Answer
1	Text options panel can be selected using _____ shortcut in Mac systems	Ctrl+T	Cmd+T	Ctrl+O	Cmd+O	Cmd+T
2	_____offers the ability to go to another section of the multimedia production	Conditional branching	Simple branching	loop	decision making statements	Simple branching
3	_____supports a go-to based on the results of IF-THEN decision events	Conditional branching	Simple branching	loop	decision making statements	Conditional branching
4	When a word, sections are linked to any other text then it is called as	hypertext	hyper data	hyper tool	internet	hypertext
5	_____ is a container for data that can hold more than one piece of data	Constant	Variable	Keyword	Array	Array
6	_____ has a Trace Bitmap menu option that converts a bitmap ad image into a vector image	frontpage	HTML	flash	morph	flash
7	Process of drawing series of frames in between the key frames is called	ordering	linking	tweening	twisting	tweening
8	_____ is a popular effect in which one image transforms into another	twisting	linking	morphing	linear	morphing
9	_____ is the file format used in flash	.dir	.max	.flc	.fla	.fla
10	Rotation is the name of a property that can have a positive or negative value between	0 to 180	0 to 360	0 to 90	0 to 45	0 to 360

11	The process of building a single frame from two fields is called	interleaving	interference	interlacing	interval	interlacing
12	____ Adds interactivity and/or playback efficiency to a movie via coding	Action script	Javascript	VBScript	XML	Action script
13	ActionScript is a	Object oriented programming language	Structured Programming language	Procedural Language	Low level language	Object oriented programming language
14	____ is a thing whose content may vary over time	Constant	Variable	Keyword	Token	Variable
15	Each element of an array is referred to by _____	Index	Script	Constant	Variable	Index
16	_____ is a collection of frames	Variable	Action script	Movie	Constant	Movie
17	_____ is the area on the screen where the user works with layers and frames to alter the movie's content and	Tools window	Timeline window	Library window	Swatches window	Timeline window
18	_____ is made up of any combination of alphanumeric characters	Array	Constant	Variable	String	String
19	____ is the raw data that goes into a variable	Array	Literal	Variable	String	Literal
20	When two or more strings are joined together, the process is known as	Joining	Merging	Concatenation	Comparison	Concatenation
21	Frame rate is defined as _____	Frames/minute	Frames/second	Frames/hour	Frames/bit	Frames/second
22	In ActionScript _____ operator joins strings	add	-	join	||	add
23	Boolean true can also be interpreted as _____	1	0	2	3	0
24	____ function converts Boolean literal to string “true” or “false”	Boolean()	valueOf()	toString()	toBoolean()	toString()
25	An integer is declared in actionscript by using _____ function	int ()	integer()	number()	num()	int ()

26	Anything that is a collection of properties in action script is considered as an	Array	Literal	Variable	Object	Object
27	Actions panel window can be opened by selecting	Ctrl+Alt+A	Ctrl+Alt+S	Ctrl+Alt+T	Ctrl+Alt+P	Ctrl+Alt+A
28	____ layer sets up the movie clip for displaying the outcome of a particular action script	Output Window layer	Movie clip layer	Action layer	Action script layer	Output Window layer
29	_____ is used to see the output of flash script	Ctrl+T	Ctrl+O	Ctrl+Enter	Cmd+O	Ctrl+Enter
30	_____ indicates the frame number whose contents are directly visible on the stage	Current Frame	Previous Frame	Next Frame	Last Frame	Current Frame
31	____ is actually the elapsed time between the first frame of the movie and the current frame	Playhead	Frames per second	Length of Movie	Timelines	Length of Movie
32	_____ allows the user to select the frame to be altered	Playhead	Frames per second	Length of Movie	Timelines	Playhead
33	Layers are organized in a column to the____ of the Timeline	Right	Left	Top	Bottom	Left
34	____ frames per second is good rate for web-based animation	14	16	12	15	12
35	____ indicates the final positions or changes to the symbol or graphic	Blank frame	Object Frame	Final Frame	Key Frame	Key Frame
36	Which among the following is not a method of movie clip?	getBounds	duplicateMovieClip	getAscii	unloadMovie	getAscii
37	If the actionscript is stored in an external file it has the extension	.as	.ac	.at	.ar	.as
38	_____ is used to open an external script file into flash	#include	#define	#script	#open	#include
39	Loop within another loop is called _____	Simple loop	Structured loop	Frame loop	Nested Loop	Nested Loop
40	____ loops are contained in a single frame, button or movie clip.	Simple loop	Structured loop	Frame loop	Nested Loop	Structured loop

41	____ loop runs the code to be repeated before checking for the condition	Simple loop	Structured loop	Frame loop	Do-while loop	Do-while loop
42	____ loop repeats a set of code after checking the condition	While loop	Structured loop	Frame loop	Do-while loop	While loop
43	____ are tools used to execute a segment of code repeatedly for a number of times	Branching statements	Looping statements	Arrays	Objects	Branching statements
44	____ loops deals with more than a single dimension in a script	Simple loop	Structured loop	Frame loop	Nested Loop	Nested Loop
45	___ key is used to enter the symbol editor	Ctrl +T	Ctrl +A	Ctrl +E	Ctrl +S	Ctrl +E
46	____ key is used to insert a new key frame	F8	F5	F6	F2	F6
47	_____ menu has the option to break apart an image	File	Insert	Edit	Modify	Modify
48	____ key is used to convert an object into symbol	F8	F5	F1	F2	F8
49	In event handling the ____ is the object that performs the action or is affected by the event	Event	Target	action	handler	Target
50	_____ event reacts when the mouse button is pressed	press	keypress	release	roll over	keypress
51	____ event reacts when the mouse button is pressed on the button and then dragged off the button hot spot	dragOver	rollOver	dragOut	rollOut	dragOut
52	_____ is called as the association operator in Key methods	dot	comma	semicolon	colon	dot
53	_____ method returns the virtual key code of the last key pressed	Key.getAscii	Key.isDown	Key.isToggled	Key.getCode	Key.getCode
54	____ are read only functions that return the position of the mouse on the screen	_xmouse	_ymouse	_xmouse and _ymouse	x_mouse and y_mouse	_xmouse and _ymouse
55	In movie clip _____event is triggered if the clip is removed from stage	load	unload	enterFrame	data	unload

56	_____ shortcut is used to open the Library panel	Ctrl + P	Ctrl + L	Ctrl + I	Ctrl + N	Ctrl + L
57	_____ method returns true if the Num Lock or Caps Lock key is activated	Key.getAscii	Key.isDown	Key.isToggled	Key.getCode	Key.isToggled
58	_____ is the constant associated with the key code value for the Enter key if Key.ENTER is pressed	13	27	36	45	13
59	_____ shortcut is used to open the Frame panel	Ctrl + F	Ctrl + T	Ctrl + I	Ctrl + N	Ctrl + F
60	_____ shortcut is used to open the Instance panel	Ctrl + P	Ctrl + T	Ctrl + I	Ctrl + N	Ctrl + I

KARPAGAM ACADEMY OF HIGHER EDUCATION
(Deemed to be University)
COIMBATORE-641021
B.Sc. DEGREE EXAMINATION
DEPARTMENT OF CS, CA & IT
Fifth Semester

First Internal Examination – July 2018
Answer Key
Multimedia and Its Applications

Subject Code: 16ITU504B
Date/Session:14 .07.2018 **Duration : 2:00 Hrs**
Class: III B.Sc. IT **Maximum : 50 Marks**

PART-A **[20 * 1 = 20 Marks]**
Answer all the Questions

1. The people who weave multimedia into meaningful tapestries are _____
   a)Multimedia producers **b)Multimedia developers**
   c)Multimedia Projectors d)Multimedia Creatures
2. Forerunner of WWW is
   a)Memex b)Internet Explorer c)Web browser d)Intranet
3. Multimedia elements are typically seen together into a project using_____
   a)Editing Tools b)Unauthoring tools c)Integrated Tools **d)Authoring tools**
4. GML Stands for _____
   a)Generalized Markup language b)Generalized Multimedia language
   c)Generalized Makeup language d)Global Markup language
5. Adobe illustrator is ____ tool
   a)Editing b)Video **c)Publishing** d)Audio
6. _____is a video production tool.
   a)Sound forge **b)Premiere** c)Flash d)Photoshop
7. _____is a Animation tool.
   a)Sound forge b)Premiere **c)Flash** d)Photoshop
8. _____is a Graphics tool.
   a)Sound forge b)Premiere c)Flash **d)Photoshop**
9. QoS means _____
   a)Quality of server b)Quantity of Service
   c)Quality of Service d)Quantity of Server
10. _____ aims to develop smart clothing
    a)Augmented reality b)Telemedicine c)Audio cues **d)Digital Fashion**
11. _____ invented the motion picture camera

a)Thomas Alva Edison b)Alexander
c)Babbage d)James Watt

12. Online System" was demonstrated by
a)Thomas Alva Edison b)Marconi
c)Douglas Engelbart d)Vannevar Bush

13. VR stands for _____
a)Virtual reality b)visual random c)Video raster d)video response

14. VRML stands for _____
a)virtual reality modeling language b)visual response modeling language
c)video raster mode language d)video raster modeling language

15. Which of the following is not a stage of multimedia production?
a)Planning and costing b)designing and producing
c)Marketing d)delivering

16. _____ is responsible for an entire team of videographers, sound technicians, lighting designers.
a)Sound editor **b)Video specialists** c)Technician d)Supervisor

17. Person who make multimedia program come alive with sound effects?
a)Video specialist **b)Audio Specialists** c)Technician d)Supervisor

18. Diverse range of skills are called as _____
a) Skill b) Knowledge c) Strength **d) Multimedia skill set**

19. ____ is a component of multimedia
a) Video b) Distributed network
c) Teleconferencing d) Telemedicine

20. Sound Forge is a digital audio editing suite created by _____
a)Adobe b)Macromedia c)Microsoft **d)Sony**

PART-B **[3 * 2 = 6 Marks]**
Answer all the questions

21. Define Graphics
While the term "image" refers to a real-world picture usually taken by a camera and later on digitized for computer usage, a "graphic" denotes something that is hand-drawn. A traditional graphic would be a drawing or sketch on paper by an individual, which can range from simple line drawings like charts and architectural drawings to complex color portraits that can almost resemble an image, e o., Mona Lisa. Hence, "graphics" implies a synthetic pictorial representation.

22. What is meant by Multimedia?
The word 'multimedia' comes from the Latin words multus which means 'numerous' and media which means 'middle' or center. Multimedia therefore means 'multiple intermediaries' Multimedia is a combination of following elements. They are

- Text (e.g. books,letters,newspapers)
- Images and graphics (e.g. photographs,charts,maps,logos,sketches)
- Sound (e.g. radio, gramophone records and audio cassettes)
- Video and animation (e.g. TV, video cassettes and motion pictures)

23. Describe Image Processing Software.

PART-C **[3 * 8 = 24 Marks]**

Answer all the questions

24. a)Enlighten Multimedia presentation and production.

MULTIMEDIA PRESENTATION AND PRODUCTION

The multimedia presentation is basically a digital show in which the contents are expressed through various media types like text, images, audio, video etc., The end users who execute and watch the presentation are called viewers or target audience.

The multimedia presentation is basically playback on a personal computer either from hard disk or the CD-ROM. Sometimes when the audience consists of the large number of people, the presentation may be projected on a big screen using a projection system. Before a presentation can be viewed, however it has to be created. This process is known as multimedia production.

The production work is carried out by a team of professionals equipped with the required skills and knowledge. These professionals are called the developers or the authors and the development work is called the authoring.

CHARACTERISTICS OF MULTIMEDIA PRESENTATION

Multimedia is any combination of text, graphics, art, sound and video elements. The following are the important characteristics of Multimedia presentation. They are

- Multiple media
- Non-linearity
- Interactivity
- Digital representation
- Integrity

Multiple Media

In addition to text, pictures are also started being used to communicate ideas. Pictures were sub-divided into two types.

i. A real-world picture captured by a camera is called images.
ii. A hand-drawn picture like sketches, diagrams and portraits called graphics.

Text, images and graphics are together referred to as static elements, because they do not change overtime. With further improve in technology, time varying elements like sound and movies were used. Movies are again divided into two classes. They are

- Motion pictures
- Animation

Legitimate multimedia presentation should contain at least one static media like text, images or graphics and at least one time varying media like audio, video or animation.

Non-Linearity

Non-Linearity is the capability of jumping or navigating from within a presentation with one point without appreciable delay.TV shows and motion pictures are considered linear presentation because the user or viewer has to watch the information being prescribed. The user cannot modify the content. In a multimedia presentation the user can instantly navigate to different parts of the presentation and display the frames in any way, without appreciable delay, due to which it is called a non-linear presentation.

Interactivity

In a non-linear presentation user will have to specify the desire to watch the presentation. The presentation should be capable of user inputs and capable of change the content of the presentation. Interactivity is considered to be one of salient features on which next generation e-learning tools are expected to reply for greater effectively.

Digital Representation

Magnetic tapes are called the sequential access storage devices (i.e.) data is recorded sequentially along the length of the tape. When a specific potion of the data is required to be played back, the portion before that needs to be skipped. Multimedia requires instant access to different portion of the presentation. This is done by random access storage devices like hardware, floppy disks, and compact disks. Digital representations has other advantages, software based programs can be used to edit the digitized media in various ways to appearances and compress the file sizes to increase the performance efficiency.

Integrity

An important characteristic of a multimedia presentation is integrity. This means that although there may be several media types present and playing simultaneously, they need to be integrated or be part of a single entity which is the presentation. It should not be able to separate out the various media and control them independently; rather they should be controlled from within the frame work of the presentation. Moreover, the presentation should decide how the individual elements can be controlled

(OR)

b)Classify the Hardware and software requirements for multimedia.

HARDWARE & SOFTWARE REQUIRMENTS:

Hardware and software requirements of a multimedia personal computer can be classified into tow classes. They are:

a. Multimedia playback

b. Multimedia production

Multimedia playback:

 Processor – At least Pentium class and minimum of 8MB RAM-to-32MB RAM.

 Hard disk drive(HDD) – Atleast 540MB having 15M/s. access time and should be able to provide 1.5MB per second sustained throughput.

 The monitor and video display adapter should confirm through SVGA standards and support 800x600 display modes with true color.

 CD-ROM drives having a speed of at least 4X but highest speed like 36X are recommended.

 PC should have a **sound card** with attached speakers standard 101 keys keyboard and mouse.

 Multimedia PC system software should be compatible with windows 95 or higher, with standard software with playback of media files in standard formats.(e.g.) Windows Media Player.

Multimedia production:

 Processor - Pentium II or higher, memory should be at least 128MB with 256MB recommended.

 Hard disk drive (HDD) – Typical requirements would be around 10GB with 40GB recommended.

 The monitor and video display adapter should confirm through SVGA standards and should be able to support 800x600 display mode with true color, RAM should be 4MB to 8MB.

 CD-ROM drive having a speed of at least 4X to 36X, PC should have a CD writer.

 PC should have a **sound card** with attached speakers standard 101 keys keyboard and mouse.

 Multimedia PC system software should be compatible with windows or higher, with standard software with playback of media files in standard formats. (e.g.)Windows Media Player.

 Editing software is used to manipulate media components to suit the developers, requirements. (e.g.) Adobe Photoshop, Flash, Cool Edit, and sound Forge.

 Authoring softwaresare used to integrate all the edited media into single presentations and build navigational pathways for accessing the media.

 To display the web content **web browsers** will be required. (e.g.) MS Internet Explorer, to create web content HTML, and java Script editors might be required (e.g.) Macromedia, dream viewer.

25. a)What do you meant by Text? And make clear the types of test in multimedia.

INTRODUCTION

In multimedia presentations, text can be combined with other media in a powerful way to present information and express moods. Internally text is represented via binary codes as per the **ASCII table.** The ASCII table is however quite limited in its scope and a new standard has been developed to eventually replace the ASCII standard. This standard is called the **Unicode** standard and is capable of representing international characters from various languages throughout the world. We also generate text automatically from a scanned version of a paper document or image using Optical Character Recognition (**OCR)** software.

TYPES OF TEXT

There are three types of text that can be used to produce pages of a document:

- Unformatted text
- Formatted text
- Hypertext

Unformatted Text:

Also known as plaintext, this comprise of fixed sized characters from a limited character set. The character set is called **ASCII table** which is short for American Standard Code for Information Interchange and is one of the most widely used character sets. It basically consists of a table where each character is represented by a unique 7-bit binary code. The characters include a to z, A to Z, 0 to 9, and other punctuation characters like parenthesis, ampersand, single and double quotes, mathematical operators, etc. All the characters are of the same height. In addition, the ASCII character set also includes a number of control characters. These include BS (backspace), LF (linefeed), CR (carriage return), SP (space), DEL (delete), ESC (escape), FF (form feed) and others.

Formatted Text:

Formatted text are those where apart from the actual alphanumeric characters, other control characters are used to change the appearance of the characters, e.g. bold, underline, italics, varying shapes, sizes, and colors etc., Most text processing software use such formatting options to change text appearance. It is also extensively used in the publishing sector for the preparation of papers, books, magazines, journals, and so on.

Hypertext:

The term Hypertext is used to mean certain extra capabilities imparted to normal or standard text. Like normal text, a hypertext document can be used to reconstruct knowledge through sequential reading but additionally it can be used to link multiple documents in such a way that the user can navigate non-sequentially from one document to the other for cross-references. These links are called **hyperlinks.** Microsoft Home Page The underlined text string on which the user clicks the mouse is called an **anchor** and the document which opens as a result of clicking is called the **target document.** On the web target documents are specified by a specific nomenclature called Web site address technically known as **Uniform Resource Locators** or URL. **Node or Anchor:** The anchor is the actual visual element (text) which provides an entry point to another document. In most cases the appearance of the text is changed from the surrounding text to designate a hypertext, e.g. by default it is colored blue with an underline. Moreover the mouse pointer changes to a finger icon when placed over a hypertext. The user usually clicks over the hypertext in order to activate it and open a new document in the document viewer. In some cases instead of text an anchor can be an image, a video or some other non-textual element (**hypermedia).**
Pointer or Link These provide connection to other information units known as **target** documents. A link has to be defined at the time of creating the hyperlink, so that when the user clicks on an anchor the appropriate target document can be fetched and displayed. Usually some information about the target document should be available to the user before clicking on the anchor. If the destination is a text document, a short description of the content can be represented.

TEXT FILE FORMATS

The following text formats are usually used for textual documents.

TXT (Text)

Unformatted text document created by an editor like Notepad on Windows platform.This documents can be used to transfer textual information between different platforms like Windows, DOS, and UNIX,

DOC (Document)

Developed by Microsoft as a native format for storing documents created by the MS Word package.Contains a rich set of formatting capabilities.

RTF (Rich Text Format)

Developed by Microsoft in 1987 for cross platform document exchanges. It is the default format for Mac OS X's default editor TextEdit. RTF control codes are human readable, similar to HTML code. ***table 2.3 pgno:50****

PDF (Portable Document Format)

Developed by Adobe Systems for cross platform exchange of documents. In addition to text the format also supports images and graphics. PDF is an open standard and anyone may write programs that can read and write PDFs without any associated royalty charges.

PostScript (PS)

Postscript is a **page description language** used mainly for desktop publishing. A page description language is a high-level language that can describe the contents of a page such that it can be accurately displayed on output devices usually a printer. A PostScript interpreter inside the printer converted the vercorsbacki into the raster dots to be printed. This allows arbitrary scaling, rotating and other transformations

(OR)

b)Elucidate advantages and uses of graphics.

Advantages of Graphics

A vector representation of graphics provides a number of advantages:

- Because of the fact that they are not represented as pixel data but simply as a set of equations and their related parameters, means that internally they could be represented as textual data, and hence are very**compact**. The small file sizes of graphics make them an ideal choice where quick processing or limited bandwidth and storage capabilities are of primary concern, e.g., Internet and Web-based applications. For example, a graphic of a cycle wheel could be represented as a concentric circle with a number of straight lines radiating outwards from the center for the spokes.
- A graphic has the ability to **adapt** to varying magnification scales or zoom factors. An image (or raster graphic) is composed of a fixed number of pixels and when

magnified, the distance between them increases. This leads to a degradation of the image quality referred to as **pixelation**. A graphic, however, does not undergo pixilation: no matter how much it is magnified it retains its crisp and smooth look throughout because when displayed on the screen, pixels are created dynamically from mathematical entities and number of pixels are adjusted to suit the magnification factor.

- Since the graphic is generated using software tools, an application has complete knowledge of equations used to create the graphic and value of the related parameters, e.g., the radius of a circle, the coordinates of the center, the points where a line intersects the circle, etc. Hence, appearance of the graphic may be changed very quickly by writing programs, e.g., multiply the radius by 3 and move the center by 5 units along the Y-axis. This makes graphics ideal for **animation**-based applications.
- A user can input mathematical relations and ask the system to create graphical objects to represent them pictorially. This is the basis for plotting charts and graphs based on user-specified data. The data may either be specified either by a relation, e.g., $y = e^x$ or by a table of values, which the system can be asked to plot and even find out a matching relation. An existing graphic can be changed by changing its related parameters. This makes graphics suitable for **interactive** applications.
- Extensions of simple two-dimensional graphics by including the third dimension have led to the generation of **3D graphics** and animation. These graphical objects are defined using 3D geometry, which enables them to be rotated and viewed from any angle in 3D space. These have been widely used in ComputerAided Design (CAD) applications as well as in the film and game industry. File formats like 3D Studio MAX have been developed to exploit the capability.

Uses of Graphics

Due to the advantages of graphics it has been applied to a large number of uses in various applications:

User Interfaces Allows creation of point-and-click items of a graphical user interface like menus, button, windows, selection lists, etc. Complex tasks can be achieved by clicking or dragging the cursor over items in the GUI.

Office Automation With the advent of desktop publishing, the pictorial representation of data like charts, graphs, logos, histograms, tables, etc., have found increasing use in office automation applications.

Design and Drafting Tools Application software now allow users to design and create their own graphical 2D and 3D models using CAD tools. This has found extensive use in fields of architectural, mechanical, electrical, electronic, and computer science.

Simulation and Animation Graphical animations are used increasingly nowadays to study related to atomic structure and nuclear reactions, fluid flow, chemical molecular transformations, physical phenomena pertaining to optics, acoustics, etc., astrophysics, physiological systems and organ function Simulation packages are used for training. e.g., flight simulations for pilots, as well as for studying phenomena which is difficult to replicate physically, e.g., radioactivity, nuclear fission, process control applications, simulation of power plants, steel fabrications, missile guidance, etc.

Art and Commerce Computer graphics are nowadays extensively used to design and create artwork for interior decorations of private homes, offices, hotels, super-markets, etc., as well as for fashion design, tailoring, printing applications like calendars, diaries, etc. Film and television commercials use graphics to design program banners, advertisements, and special effects.

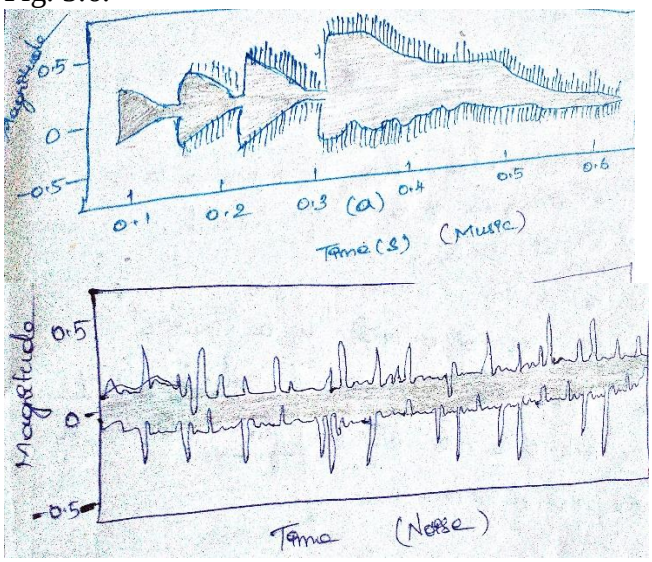
26. a)Give explanation of types and properties of sound system.

TYPES AND PROPERTIES OF SOUNDS

In general, sounds that we hear can be broadly classified into three categories: speech, music, and environmental sounds. Speech is anything uttered by a human being and generating from the human voice box. Music originates from a musical instruments like guitar, flute, violin, etc., usually being generated from vibrating strings, plates or air columns. Environmental sounds are anything other than speech and music and include sounds we normally hear in our daily lives. Such sounds can again be divided into two broad sub-types: those originating from inorganic sources and those originating from organic sources. The former include sounds like a horn of a car, ring of a bell, a door slamming, sound of an explosion and so on, while the latter includes sounds made by birds, animals, insects, and human beings (like laughter and clapping). In recent times, we can also probably think of a fourth category of synthetic sounds generated from computers and digital audio instruments like various types of clicking, alert, and beeping sounds. By analyzing the audio signals in temporal and frequency domains, these characteristics can be utilized to identify a specific class of sounds. More details on this in section 12.15.

Music vs. Noise

Subjectively, sounds may be distinguished into music and noise. Sounds pleasant to hear are called music and those unpleasant to our ears are called **noise**. This differentiation is quite subjective, as the same sound may seem pleasant to one person and unpleasant to another. However, it has been largely seen that musical sounds normally originate from periodic or regular vibrations while noise generally originates from irregular or non-periodic vibrations. See Fig. 5.6.



(a) (b)

Musical sounds most commonly originate from vibrating strings, like in guitars and violins; vibrating plates like in drums and tabla; and vibrating air columns, like in pipes and horns. In all these cases, periodic vibration is responsible for the musical sensation. The lack of periodicity in the waveform of a noise seem to account for its unpleasant sensation. The definition of music as sound having a specific set of characteristics is proposed in musicology. **Musicology** is the scientific study of music which attempts to apply methods of systematic investigation and research in understanding the principles of musical art. According to its view, there are certain observable patterns in sound due to which it can be classified as music. According to musicologist Jean —Jacques Nattjez, however, the concept of music is more culturally defined than physical. The traditional view of music often associates it with some related terms like pitch, timbre, intensity, duration, melody, harmony rhythm, note, and chord.

Musical Note

In music, a note is a unit of fixed pitch expressed in a notation system. In English, the notes are given letter names A, B, C, D, E, F, and G. Each note corresponds to a specific pitch, for example A is assigned 440 Hz. The 7 letter names can however be associated by a modifier which can change the pitch of a note by a specific amount called a **semitone**. There are two modifiers called **sharp** (indicated by #) which raise the pitch of a note, and the **flat** (indicated by b) that lowers the pitch of a note. The approximate frequencies for the notes are C (262 Hz), D (294 Hz), E (330 Hz), F (349 Hz), G (392 Hz), A (440 Hz), and B (495 Hz). When the pitch of one note is double that of another, it is said to differ by an octave. Thus, if A above middle C is 440 Hz, the A of the higher **octave** will be 880 Hz.

There are four ways to change the pitch of a vibrating string of a musical instrument:

- By changing the length of the string. A longer string will produce a lower pitch and vice versa. This is because frequency f produced is inversely proportional to the length L of the string, i.e., $f\alpha$ 1/L.
- By changing the diameter of the string. A thicker string will produce a lower pitch, as the frequency *f* isinversely proportional to the diameter D, i.e., $f\alpha$ 1/D.
- By adjusting the tension of the string. A string will higher tension will result is a greater pitch. This is because the frequency *f* is proportional to the square root of the tension T, i.e., $f\alpha \sqrt{T}$.
- By changing the density of the string. A higher density results in a lower pitch, as the frequency f is inversely proportional to square root of the density ρ, i.e., $f \alpha 1/\sqrt{\rho}$
- Stringed instruments actually change pitch by varying the length, because the other methods are not considered feasible. The combined relation between all these parameters is given below in equation (5.1).

$$f = 1/2L \sqrt{T/\rho}$$

Rhythm

The duration is considered a fundamental aspect of music. As per DelLone, duration complement is the amount of different durations used, the duration scale depicts an ordering of the durations in ascending or descending order, the duration range is the difference between the shortest and longest duration, the duration hierarchy is an ordering of these durations based on the frequency of use. Durational patterns may be specified in terms of meter, tempo, and rhythm. **Rhythm** is the variation of duration over time. In Western music, rhythms are generally specified in terms of a time-signature and a meter. A **meter** is a measurement of stressed and unstressed beats in a musical line. The measurement is indicated by a symbol called the **time-signature**. A **beat** or pulse is an unbroken series of periodically occurring distinct short stimuli perceived as points in time. The **tempo** indicates how fast the beat is running.

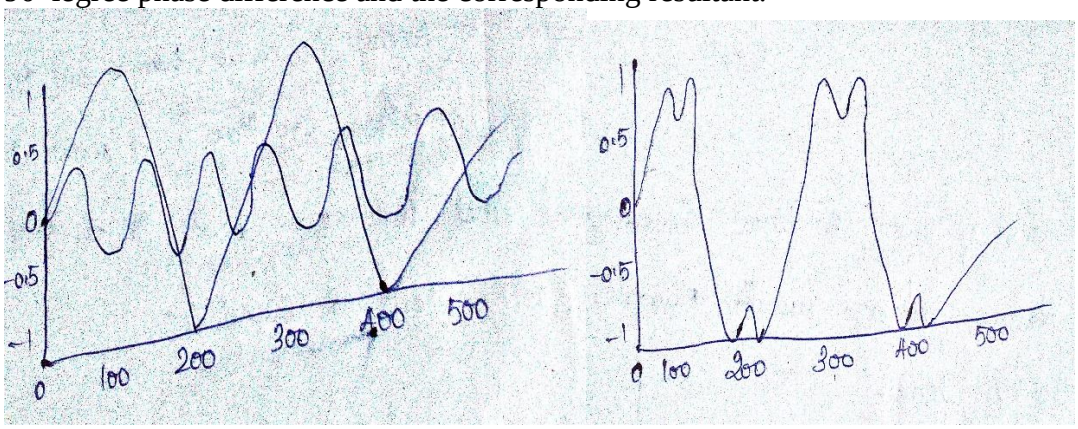
Melody and Harmony

Melody is a series of events in time that contain some kind of change to be perceived as a single entity, i.e., the events are related. Melodies often consist of one or more musical phrases and are usually repeated throughout a song in various forms. While **melody** stresses the occurring of events one at a time, **harmony** implies events occurring simultaneously. **Harmony** is related to a chord, which means three or more notes playing together over a period of time, e.g., playing three keys of a piano together. Harmony is often attributed to the presence of specific physical characteristics of the sound, e.g., inclusion of harmonics.

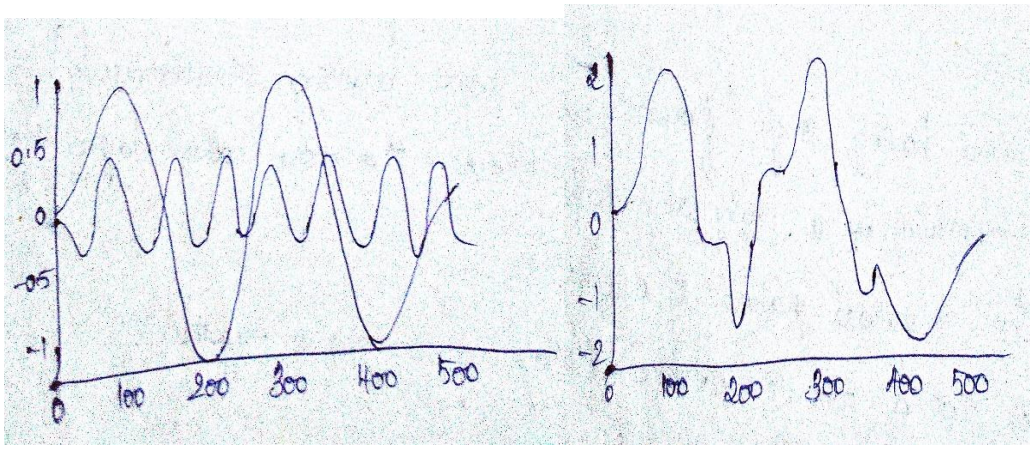
Tone and Note

A **tone** is a sound having a single frequency. A tone can be represented pictorially by a wavy curve called a sinusoidal wave. An example of a tone is the sound produced when a tuning fork is struck with a padded hammer. The sinusoidal nature of the curve is derived from the fact that a tone is produced from a kind of vibratory motion called **SimpleHarmonicMotion** (SHM), which

can be described by a sine function. In daily life, we rarely hear single-frequency tones. The sounds we normally hear are a composite mixture of various tones of varying amplitudes and frequencies. Such a composite sound is called a b. The waveform of a note can be derived from the resultant or sum of all its tonal components. The lowest frequency of a note is called the **fundamentalfrequency**. All the other frequencies are called **overtones**. Frequencies of some overtones may be integral multiples of the fundamental frequency. These overtones are called **harmonics**. For example assuming alt overtones are harmonics if the **fundamentaltone** (also called the **firstharmonic**) has a frequency *f* then the **firstovertone** (also called the **secondharmonic**) has a frequency 2*f*, the **secondovertone** (also called the third harmonic) has a frequency 31, and so on. It has been observed that presence of more harmonic content adds to the richness of sound, which is referred to as harmony. Figure 5.7(a) shows two sinusoidal tones, one the fundamental and the other the 3rd harmonic with its frequency thrice that of the fundamental. Below the tonal waveforms, the resultant note formed by the combination of the tones, is shown. The same two tones can, however, give rise to a different resultant if they are shifted in phase with respect to each other. Figure 5.7(b) shows the two waveforms with 90«iegree phase difference and the corresponding resultant.



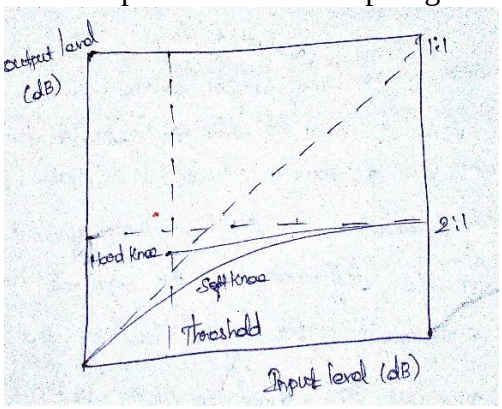
(a) In phase



(b) With 90’ phase difference

Dynamic Range

Dynamic range is the ratio between the smallest and largest possible values of a variable quantity. In acoustics, the term dynamic range is used to mean the ratio of maximum amplitude of undistorted sound in an audio equipment like microphone or loudspeaker to the amplitude of the quietest sound possible which is often determined by inherent noise characteristics of the device. In general terms, the term is often used to indicate the ratio of the maximum level of power, current or voltage to the minimum detectable value. In music, dynamic range is used to mean the difference between the quietest and loudest volume of an instrument. For digital audio, the dynamic range is synonymous to the Signal-to-Noise Ratio (SNR) (see Chapter 1) and is expressed in decibels (dB). It can be shown that increasing the bit depth of the digital audio by 1 bit results in its increase in dynamic range by 6 dB approximately. The human ear has a large dynamic range, i.e., the difference between the quietest (loudness of a sound just audible by the human ear) and the loudest sound is very large, of the order of 1012 in terms of the energy content. Often expressed in **decibels** (dB), the dynamic range of human hearing is considered around 120 dB. In practice, it is difficult to achieve this full dynamic range using electronic equipments. For example the dynamic range of a magnetic tape is of the order of 55 dB (reflecting the difference between the smallest voltage and the largest voltage pulses that can be recorded onto the magnetic media). Electronic equipment use certain techniques to fit the original large dynamic range to a smaller value which can be more easily recorded and stored. Such techniques are called Dynamic Range Compression (DRC). **Dynamicrangecompressors** work like an automatic volume sounds over a certain threshold are reduced (while quiet sounds remain unchanged) and quiet sounds below a certain threshold are increased (while loud Sounds remain unchanged). The amount of reduction using DRC is called the **gainreduction** and expressed as a ratio, e.g., a ratio of 2:1 means that if the input sound level is 2 dB above the threshold then the output sound level is 1 dB above the threshold and the reduction is 1 dB. See Fig. 5.8. Dynamic range compressors are often supplied with **attack** and **release** controls to slow down the response of the circuit for a smoothing effect. The **attackphase** corresponds to the situation when the input has exceeded the threshold and its value needs to be reduced. The **releasephase** corresponds to the situation when the input has fallen below the threshold and its value needs be increased back. A parameter called **hard/soft knee** controls whether the change in the response curve is sharp or gradual.



White Noise and Other Colors of Noise

Whitenoise is a signal that has the same energy or power for any frequency value, i.e., constant power density. Since a signal physically cannot have power for all frequencies (which would mean it has infinite energy content), a signal can be a white noise over a defined frequency

range. In interiors of buildings like halls, white noise is often used to submerge undesirable sounds like conversations, by generating a constant low-level noise as background sound. There are also other colors of noise as explained below. A signal whose power density decreases at the rate of 3 dB per octave with increasing frequency over a finite frequency range is called **pinknoise**. Oceanic ambient noises from distant sources are called **rednoise** because of absorption of higher frequencies. The background noise of the world is sometimes referred to as **greennoise**. A signal whose power density increases at the rate of 3 dB per octave with increasing frequency over a finite frequency range is called **bluenoise**. A signal whose power density increases at the rate of 6 dB per octave with increasing frequency over a finite frequency is called a **purplenoise**. A sound that is equally loud at all frequencies is called **graynoise**. A signal whose power density decreases at the rate of 6 dB per octave with increasing frequency over a finite frequency range is called brown noise. A noise capable to canceling other noises and producing silence is called **blacknoise**.

(OR)

b)Explicate Musical instrument Digital Interface(MIDI).

MUSICAL INSTRUMENT DIGITAL INTERFACE (MIDI)

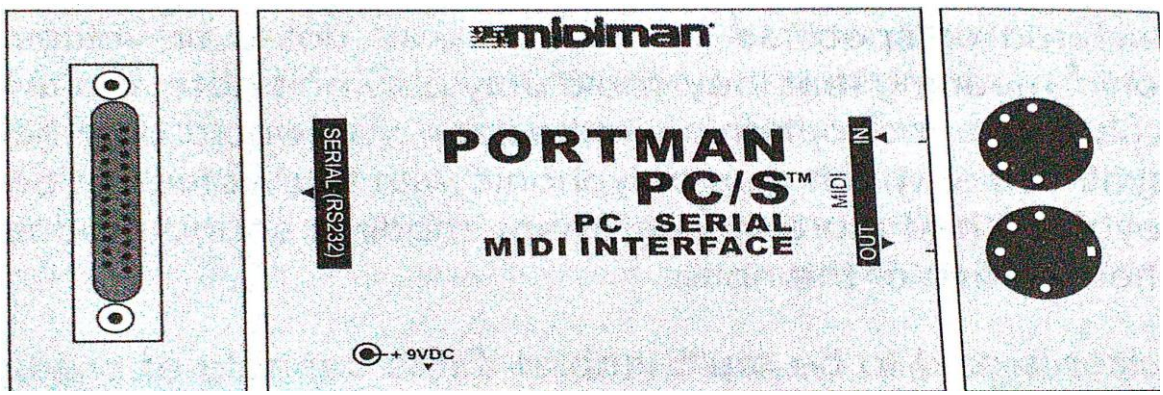
One major factor in the increased popularity in synthesizers, and the increased push for research and design of these units, was the development of new sound generation methods. Musicians were creating new and different sounds worldwide. Eventually, the musical world

began to recognize the synthesizer as a legitimate musical instrument. A few synthesizer design technicians from different manufactures got together in 1963 and demonstrated that it was possible to generate sounds from two synthesizers connected via a cable, by physically playing only one of the synthesizers. This was first usage of MIDI. The Musical Instrument Digital Interface(MIDI) is a protocol or set of rules for connecting digital synthesizers to personal computers. Much in the same way that two computers communicate via modems, two synthesizers communicate via MIDI. Technical and administrative issues related to MIDI specifications nowadays handled by the MIDI Manufactures Association(MMA) and Japan MIDI Standards Committee(JMSC). Since 1985, the MMA has produced 11 major specification based on MIDI that have enabled new products and new markets, and adopted 38 sets of improvements to existing MIDI specifications. The following paragraph discussed the salient features of the MIDI standard.

MIDI Hardware

MIDI makes use of a special five-conductor table to connect to the synthesizer ports. Data is carried through the cable on pins 1 and 3, and pin 2 is sheilded and connected to common. pins 4 and 5 remain unused. MIDI cable is specially grounded and sheilded to ensure efficient data transmission. The length of the cable is critical as well, having a maximum cable length of 50 feet because of the method of data transmission through the cable. Since most PCs do not have such a connector built into their hardware, an interface adapter is generally used for this purpose. The adapter has on one side the familiar25-pin PC serial connector and on the other hand, two

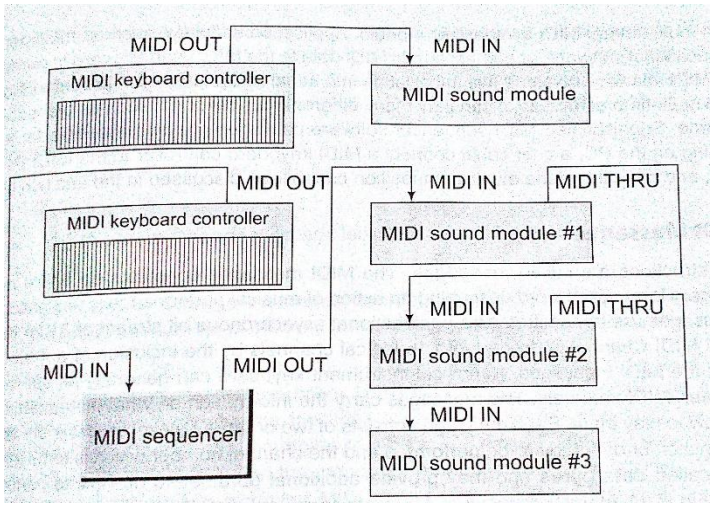
round 5-pin MIDI connectors. More recent computers are all equipped with USB and/or FireWire connectors, and these are now most often used for connecting MIDI devices to computers. The MMA has approved a standard for MIDI over USB, and so there are a number of different proprietary(manufacturer-specific) ways to send MIDI over USB, as well as a specification developed by the USB implementors Forum(USB-IF).



MIDI Connections:

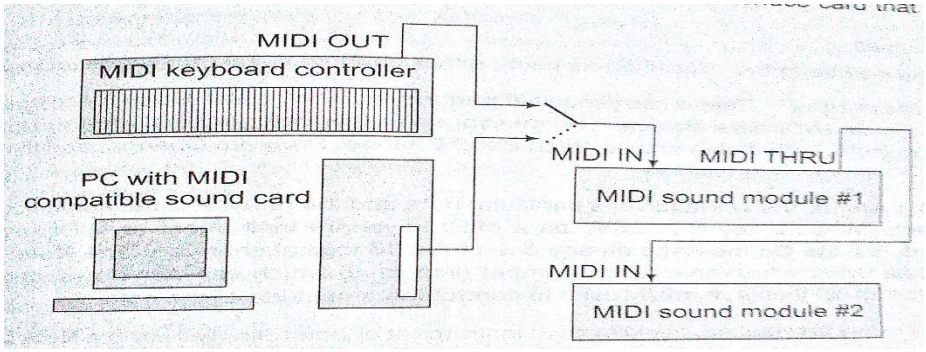
The MIDI data stream is usually originated by a MIDI controller, or a MIDI sequencer. A MIDI controller is a device that is played as an instrument, like a keyboard. However,

unlike a piano keyboard, the keys when pressed do not directly generate sound based on physical processes like vibration, but generate a set of digital instructions which define how sound is to be created. In the simplest case, these digital instructions are transmitted from the controller to a MIDI sound module, via the MIDI cable. The sound module interprets these instructions and produce sound typically from a wavetable chip inside it. The MIDI streams flows out of the controller through a MIDI-OUT port and flows into the sound module through a MIDI-IN port.



In some cases, the instructions might be temporarily stored in another device called the MIDI sequencer which allows MIDI data sequences to be captured, stored, edited, combined, and replayed. Information received on the MIDI-IN connector of a MIDI device is transmitted back out (repeated) at the device's MIDI-THRU connector. Several MIDI sound modules can be daisy-chained by connecting the THRU output of one device to the IN connector of the next device downstream in the chain. Each sound module can be configured to play a specific part of the music. eg., a specific instument sound like drums or piano.

Figure depicts a PC-based MIDI system, where the music composition is done using software instead of keyboard. In this system, the PC is equipped with an internal MIDI interface card that sends MIDI



data to an external multi-timbral MIDI synthesizer module. Application software, such as multimedia presentation packages, educational software, or games, sends MIDI data to the MIDI interface card in parallel form over the PC bus. The MIDI interface converts this information into serial MIDI data which is sent to the sound module. Since this is a multi-timbral module, it can play many different musical parts, such as piano, bass, and drums, at the same time. Sophisticated MIDI sequencer softwares packages are also available for the PC. With this software running on the PC, a user could connect a MIDI keyboard controller to the MIDI IN port of the MIDI interface card, and have the ame music composition capabilities discussed in the last two paragraphs.

MIDI Messages:

MIDI-based instructions are called messages. The MIDI messages constitute an entire music description language in binary form. Each word describing an action of musical performance is assigned a specific binary code. The messages are transmitted as a unidirectional asynchronous bit stream at 31.25 kbits/second. The single physical MIDI channel is divided into 16 logical channels by the inclusion of a 4 bit channel number within many of the MIDI messages. A musical instrument keyboard can generally be set to transmit on any one of the sixteen MIDI channels. The messages carry the information on what instruments to play in which channel and how to play them. Each message consists of two or three bytes: the first is the status byte which contains the function or operation to be performed and the channel number which is to be

affected. The other two bytes are called data bytes and they provide additional parameters on how to perform the indicated operation. At the highest level, MIDI messages are classified as being either channel messages or system messages. channel messages are those that apply to a specific channel, and the channel number is included in the status byte for these messages. System messages are not channel specific, and no channel number is indicated in their status byte.

Status Byte	Status Bytes	
	Data byte 1	Data byte 2
Channel number and function	Additional parameters (optional)	Additional parameters (optional)

Channel messages:

channel messages may be further classified as being either channel voice messages, or mode messages.

Channel Voice Messages:

These carry musical performance data, and these messages comprise most of the traffic in a typical MIDI data stream. The messages in this category include the Note On ,

Note Off, polyphonic Key pressure, Channel Pressure, Pitch Bend Change, Program Change, and the Control Change messages.

Note On: In MIDI systems, the activation of a particular note and the release of the same note are considered two separate events. When a key is pressed on a MIDI keyboard instrument or MIDI keyboard controller, the keyboard sends a Note On message on any one of the 16 logical channels. The Note on status byte is followed by two databytes, which specify key number (indicating which key was pressed) and velocity (how hard the key was pressed) that is normally used to control the amplitude of the note

Note off: When the key is released, the keyboard instrument or controller will send a NoteOff message. The message also includes databytes for the key number and for the velocity with which the key was released. The NoteOff velocity information is normally ignored.

Aftertouch: Some MIDI keyboard instruments have the ability to sense the amount of pressure which is being applied to the keys while they are depressed. This Pressure information, commonly called polythonic Key Pressure(Aftertouch), may be used to control some aspects of the sound produced by the synthesizer (vibrato, for example).

Pitch Bend: The pitch Bend Change message is normally sent from a keyboard instrument in response to changes in position of the pitch-based wheel. The pitch-based information is used to modify the pitch of sounds being played on a given channel.

Program Change: The Program Change message tells the synthesizer which patch number should be used for a particular MIDI channel.

Control Change: The Control Change messages are used to control a wide variety of functions in a synthesizer.eg., to expand the number of different instrument sounds and to edit sound in specific ways.

Channel Mode Messages:

These affect the way a synthesizer responds to MIDI data. Controller number 121 is used to reset all controllers. Controller number 122 is used to enable or disable local control(In a MIDI synthesizer which has its own keyboard, the functions of the keyboard controller and the synthesizer can be isolated by turning Local Control off), Controller numbers 124 through 127 are used to select between omni mode On or Off, and to select between the mono mode or poly mode of operation. When omni mode is On, the synthesizer will respond to incoming MIDI data on all channels. When omni mode is Off, the synthesizer will only respond to MIDI messages on one channel. When Polymode is selected, incoming Note On messages are played polyphonically. This means that when multiple Note On messages are received, each note is assigned its own voice(subject to the number of voices available in the synthesizer). The result is that multiple notes are played at the same time. when mono mode is selected, a single voice is assigned per MIDI channel. This means that only one note can be played on a given channel at a given time.see appendix B.

System messages

System messages are classified as being system common messages and system real-time messages.

System Common Messages

These include the song select message that can store and a recall a number of different songs, and the song position pointer is used to start playback of a song at some point other than at the beginning. System exclusive messages may be used to send data such as data patch parameters or sample data between MIDI devices for troubleshooting purposes. Manufacturers of MIDI equipment may define their own formats foe system exclusive data. Manufacturers are granted unique identification (ID) numbers by the MMA or the JMSC, and the manufacturer ID number is included as part of the system Exclusive message.

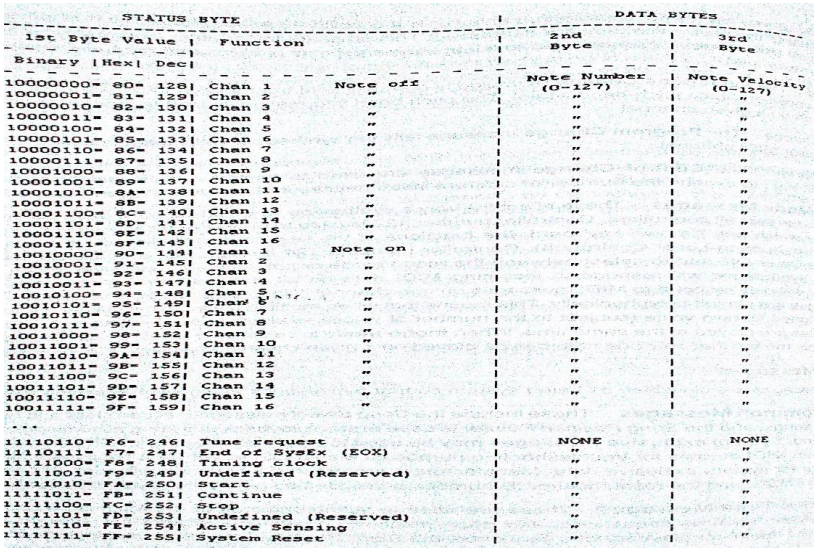
System Real-Time Messages

These are used to synchronize all of the MIDI clock-based the equipment within a system, such as sequencers and drum machines. Examples include Timing Clock message which sets the tempo for playback of a sequence, the start, continue,and stop messages are used to control playback of the sequence, the system Reset message, is used to reset and initialize any equipment which receives the message.

MIDI File Format

The MIDI specifications made provisions to save synthesizer audio in a separate file format called MIDI files having extension MID. MIDI files are extremely compact as compared to WAV files. for example, files containing high-quality stereo sampled audio require about 10 Mbytes of data per minute of sound, while a typical MIDI sequence might consume less than

10kbytes of data per minute of sound. This is because the MIDI file does not contain the sampled audio data; it contains only the instructions needed by a synthesizer to play the sounds.



STATUS BYTE				DATA BYTES	
1st Byte Value			Function	2nd Byte	3rd Byte
Binary	Hex	Dec			
10000000=	80=	128	Chan 1 Note off	Note Number (0-127)	Note Velocity (0-127)
10000001=	81=	129	Chan 2 "	"	"
10000010=	82=	130	Chan 3 "	"	"
10000011=	83=	131	Chan 4 "	"	"
10000100=	84=	132	Chan 5 "	"	"
10000101=	85=	133	Chan 6 "	"	"
10000110=	86=	134	Chan 7 "	"	"
10000111=	87=	135	Chan 8 "	"	"
10001000=	88=	136	Chan 9 "	"	"
10001001=	89=	137	Chan 10 "	"	"
10001010=	8A=	138	Chan 11 "	"	"
10001011=	8B=	139	Chan 12 "	"	"
10001100=	8C=	140	Chan 13 "	"	"
10001101=	8D=	141	Chan 14 "	"	"
10001110=	8E=	142	Chan 15 "	"	"
10001111=	8F=	143	Chan 16 "	"	"
10010000=	90=	144	Chan 1 Note on	"	"
10010001=	91=	145	Chan 2 "	"	"
10010010=	92=	146	Chan 3 "	"	"
10010011=	93=	147	Chan 4 "	"	"
10010100=	94=	148	Chan 5 "	"	"
10010101=	95=	149	Chan 6 "	"	"
10010110=	96=	150	Chan 7 "	"	"
10010111=	97=	151	Chan 8 "	"	"
10011000=	98=	152	Chan 9 "	"	"
10011001=	99=	153	Chan 10 "	"	"
10011010=	9A=	154	Chan 11 "	"	"
10011011=	9B=	155	Chan 12 "	"	"
10011100=	9C=	156	Chan 13 "	"	"
10011101=	9D=	157	Chan 14 "	"	"
10011110=	9E=	158	Chan 15 "	"	"
10011111=	9F=	159	Chan 16 "	"	"
...					
11110110=	F6=	246	Tune request	NONE	NONE
11110111=	F7=	247	End of SysEx (EOX)	"	"
11111000=	F8=	248	Timing clock	"	"
11111001=	F9=	249	Undefined (Reserved)	"	"
11111010=	FA=	250	Start	"	"
11111011=	FB=	251	Continue	"	"
11111100=	FC=	252	Stop	"	"
11111101=	FD=	253	Undefined (Reserved)	"	"
11111110=	FE=	254	Active Sensing	"	"
11111111=	FF=	255	System Reset	"	"

These instructions are in the form of MIDI messages, which instruct the synthesizer which sounds to use, which notes to play, and how loud to play each note. The actual sounds are then generated by the synthesizer . For computers, the smaller file size also means that less of the PCs bandwidth is utilized in spooling this data out to the peripheral that generates sound. Other advantages of utilizing MIDI to generate sounds include the ability to easily edit the music, and the ability to change the playback speed and the pitch or key of the sounds independently. This last point is particularly important in synthesis applications such as karaoke equipment, where the musical key and tempo of a song may be selected by the user. With the recent introduction of downloadable sounds(DLS) format, MIDI files can now be combined with standardized samples of musical instruments , sound effects, or even dialogue, which are used to recreate an exact copy of the sound intended by the composer,MIDI files with DLS are the ideal solution for composers of all kinds who want the predictable playback of digital audio, but also need the compactness and/or interactivity of standard MIDI Files for delivering their music.

General MIDI(GM) Specifications

prior to general MIDI, there was no standard for the relationship of patch numbers to specific sounds for synthesizers. Thus, a MIDI sequence might produce different sounds when played on different synthesizers, eventhough the synthesizers had comparable types of sounds. For example, if the composer had selected patch number 5 for channel 1, intending this to be an electric piano sound, but the synthesizer playing the MIDI data had a tuba sound mapped at patch number 5 then the notes intended for the piano would be played on the tuba when using the synthesizer (eventhough this synthesizer may have a fine electric piano sound available at some other patch number).

The general MIDI(GM) Specification defines a standard patch map that should be used by all conforming instruments. The GM1 specification established in 1993 lists a set of 128

preset instruments in a standard GM1 patch map. The GM2 specifications estblished in 1999 is a group of extensions made to general MIDI 1, which increases both the number of available sounds and the amount of control available for sound editing and musical performance. All GM2 devices are also fully compatible with general MIDI 1.

The general MIDI Level 1 intsrument sounds are grouped by families. In each family, are 8 pecific instruments. The names of the instruments indicate what sort of sound will be heard when that instrument number(MIDI program change or"PC#") is selected on the GM1 synthesizer.

PC#	Family
1–8	Piano
9–16	Chromatic Percussion
17–24	Organ
25–32	Guitar
33–40	Bass
41–48	Strings
49–56	Ensemble
57–64	Brass

PC#	Family
65–72	Reed
73–80	Pipe
81–88	Synth Lead
89–96	Synth Pad
97–104	Synth Effects
105–112	Ethnic
113–120	Percussive
121–128	Sound Effects

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DEPARTMENT OF CS, CA & IT
Fifth Semester
FIRST INTERNAL EXAMINATION – July 2018
Multimedia and Its Applications
Question Paper

Subject Code: 16ITU504B
Date/Session: 14.07.2018 **Duration : 2 hours**
Class: III B.Sc. IT **Maximum : 50 Marks**

PART-A(20 * 1 = 20 Marks)
Answer all the Questions

1. The people who weave multimedia into meaningful tapestries are _____
   a)Multimedia producers b)Multimedia developers
   c)Multimedia Projectors d)Multimedia Creatures
2. Forerunner of WWW is
   a)Memex b)Internet Explorer c)Web browser d)Intranet
3. Multimedia elements are typically seen together into a project using_____
   a)Editing Tools b)Unauthoring tools c)Integrated Tools d)Authoring tools
4. GML Stands for _____
   a)Generalized Markup language b)Generalized Multimedia language
   c)Generalized Makeup language d)Global Markup language
5. Adobe illustrator is ____ tool
   a)Editing b)Video c)Publishing d)Audio
6. _____is a video production tool.
   a)Sound forge b)Premiere c)Flash d)Photoshop
7. _____is a Animation tool.
   a)Sound forge b)Premiere c)Flash d)Photoshop
8. _____is a Graphics tool.
   a)Sound forge b)Premiere c)Flash d)Photoshop
9. QoS means _____
   a)Quality of server b)Quantity of Service
   c)Quality of Service d)Quantity of Server
10. _____ aims to develop smart clothing
    a)Augmented reality b)Telemedicine c)Audio cues d)Digital Fashion
11. _____ invented the motion picture camera
    a)Thomas Alva Edison b)Alexander
    c)Babbage d)James Watt

Prepared by K.Gomathi Assistant Professor, Dept. of Cs,CA & IT, KAHE

12. Online System" was demonstrated by
    a)Thomas Alva Edison b)Marconi
    c)Douglas Engelbart d)Vannevar Bush
13. VR stands for _____
    a)Virtual reality b)visual random c)Video raster d)video response
14. VRML stands for _____
    a)virtual reality modeling language b)visual response modeling language
    c)video raster mode language d)video raster modeling language
15. Which of the following is not a stage of multimedia production?
    a)Planning and costing b)designing and producing
    c)Marketing d)delivering
16. _____ is responsible for an entire team of videographers, sound technicians, lighting designers.
    a)Sound editor b)Video specialists c)Technician d)Supervisor
17. Person who make multimedia program come alive with sound effects?
    a)Video specialist b)Audio Specialists c)Technician d)Supervisor
18. Diverse range of skills are called as _____
    a) Skill b) Knowledge c) Strength d) Multimedia skill set
19. ____ is a component of multimedia
    a) Video b) Distributed network
    c) Teleconferencing d) Telemedicine
20. Sound Forge is a digital audio editing suite created by _____
    a)Adobe b)Macromedia c)Microsoft d)Sony

PART-B (3 * 2 = 6 Marks)
Answer all the questions

21. Define Graphics
22. What is meant by Multimedia?
23. List the Types and properties of Sound.

PART-C (3 * 8 = 24 Marks)
Answer all the questions

24. a) Enlighten Multimedia presentation and production.
    (OR)
    b) Classify the Hardware and software requirements for multimedia.
25. a) What do you meant by Text? And make clear the types of test in multimedia.
    (OR)
    b) Elucidate advantages and uses of graphics.
26. a) Give explanation of types and properties of sound system.
    (OR)
    b) Explicate Musical instrument Digital Interface (MIDI).

Prepared by K.Gomathi Assistant Professor, Dept. of Cs,CA & IT, KAHE

Reg. No ----------
[16ITU504B/16CTU504B**]**

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(Deemed to be University)
(Established Under Section 3 of UGC Act 1956)
COIMBATORE – 641 021
(For the candidates admitted in 2016 onwards)
SECOND INTERNAL EXAMINATION, AUGUEST 2018
Fifth Semester
INFORMATION TECHNOLOGY / COMPUTER TECHNOLOGY
Multimedia and Its Applications

Class : III B.Sc. [IT/CT] Maximum: 50
Date & Session:16.08.2018 (AN) Time: 2 Hrs.

PART-A **[20*1= 20 Marks]**
Answer all the questions

1. _____ metaphor is used in menu-driven applications.
   a) Iconic **b) Hierarchical** c) Script d) Card
2. _____ depicts the initial idea content of a multimedia concept in a series of sketches
   a) Testing b) Designing **c) Storyboarding** d) Flowcharting
3. _____ fonts work better for visual communication
   a) Sans serif b) Serif c) Technic d) TW
4. ____ is the RGB code for black color
   a) 0 0 0 b) 0 1 0 c) 0 0 1 d) 0 1 1
5. AVI stands for
   a) Audio visual Interval b) Audio visual Interleave
   c) Audio video Interval **d) Audio video Interleave**
6. Adobe premiere files are saved with _____ extension
   a) .ppt b) .ppx **c) .ppj** d) .pptx
7. Each instance of a cast member is called
   a) frame b) Scenes **c) sprite** d) movie
8. Sample sizes are either 8bits or ____ bits
   a) 32 b) 64 **c) 16** d) 12
9. _____ determines the accuracy with which a sound can be digitized
   a) Audio files b) Audio frequency **c) Audio resolution** d) Audio equalization
10. _____ allows to modify a recording's frequency content so that it sounds brighter or darker
    a) digital waves b) digital resolution c) digital finalization **d) digital equalization**
11. A _____ keyboard is also useful to simplify the creation of musical scores
    a) MACE **b) MIDI** c) MIDS d) AIFF
12. MIDI means_____
    a) Multiple Instruments Digital Interface b) Musical Interface Digital Instrument
    c) Musical Instrument Digital Interface d) Multi Instrument Digital Interface

13. _____ is a device dependent
    a) MACE b) MIDS **c) MIDI** d) AIFF
14. MIDI files will be _____ times smaller than CD-quality digital audio files
    a) 1000-10000 b) 1000-7000 **c) 200-1000** d) 500-1000
15. Removing blank space or dead air at the beginning or end of a recording is sometimes called _____
    a) quieting b) quantizing **c) trimming** d) pre rolling
16. _____ software allows you to record, edit and save music generated from a MIDI keyboard or instrument
    a) Sound **b) Sequence** c) synthesizer d) Samples
17. An 8 bit sample size provides ____equal units to describe the dynamic range or amplitude
    a)16 b) 12 **c) 256** d) 324
18. General MIDI numbering system ranges from_____
    a) 0 to 127 b) 0 to 125 c) 0 to 126 d) 0 to 124
19. MIDI sounds are typically stored in files with the _____ extension
    a) .sou b) .midi **c) .mid** d) .mdi
20. Digital audio data is the actual representation of a sound, stored in the form of thousands of individual numbers called _____
    a) orders b) datas c) codes **d) samples**

PART – B **(3*2 = 6 Marks)**

Answer all the questions

21. Name the any four tools in flash

Arrow tool
Pen tool
Oval tool
Line tool

22. Define layer in flash

Layers are like transparent overlays on the stage. They enable objects to act independently of objects on other layers, and they also control whether objects are visible-objects onlayers that are in front of other layers hide the objects on those other layers when they cross in front of them.

23. What do you mean by shape tweening?

Shape tweening: Shape Tweening is used to gradually change size and shapes of graphic objects over a number of frames. It is implemented by selecting the initial and final shapes in two different key-frames and tweening in between frames.

PART – C **(3*8 =24 Marks)**

Answer all the questions

24. a) Write about Animation file formats with example.

All the file formats applicable for graphics namely
FLIC,

FLA,
SWA,
MAX
There also applicable for animation since the packages from which these are created are capable of both graphics and animation. An additional format namely Animated GIF is discussed below.

ANIMATED GIF:

Animated GIF is a variant of the GIF file format, an 8-bit image file format introduced by CompuServe in 1987, and later enhanced in 1989. GIF files are capable of storing multiple 8-bit images in a single file and then later playing them back at a specific speed, which leads to the generation of animation. The GIF format is a block oriented file format. It consists of a stream of functional blocks. The Header block contains the information necessary for a program to detect that the file is in GIF format. A Logical Screen Descriptor has information that describes the overall dimensions of the file, along with an optional Global Color Table. Optional Extension Blocks are for vendor specific information, like Browser extension for looping. The Graphic Rendering Block has all the necessary data for rendering each individual image in the stream, and the required Trailer Block is there for a program to easily identify the end of the stream. Software like GIF animators and Flash can be used to combine multiple individual static GIF files into a single animated GIF.

(Or)

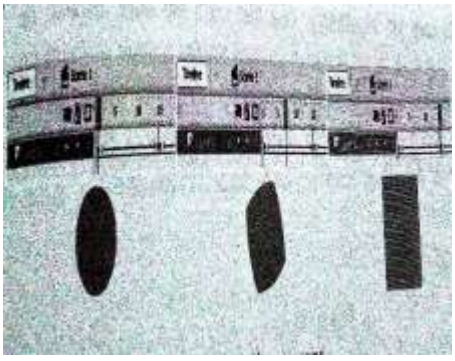
b) Discuss on animation and the software used for animation

ANIMATION SOFTWARE:

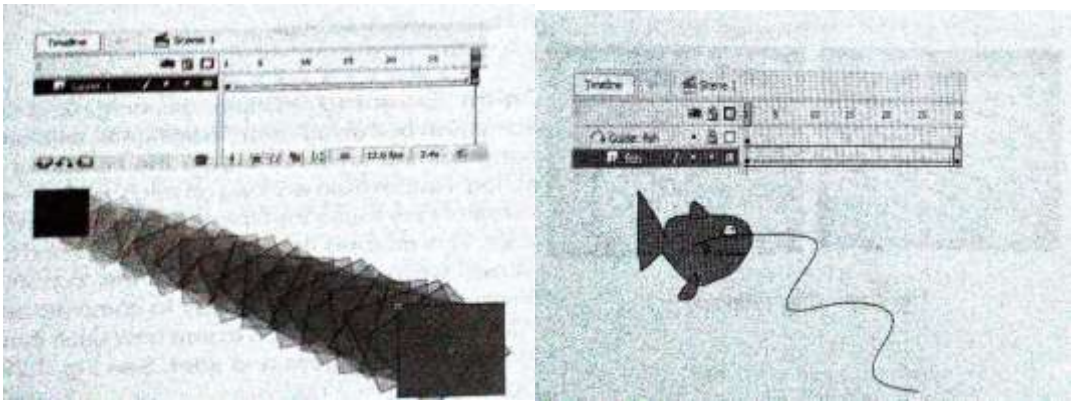
An animation software is used to create and animate graphical objects and scenes usually in a vector format. Here, we deal with aspects of animating the objects both in 2D and 3D environments. Typical examples of 2D and 3D animation software are Adobe Flash and Autodesk 3D Studio Max.

2D Animation:

Shape tweening: Shape Tweening is used to gradually change size and shapes of graphic objects over a number of frames. It is implemented by selecting the initial and final shapes in two different key-frames and tweening in between frames.

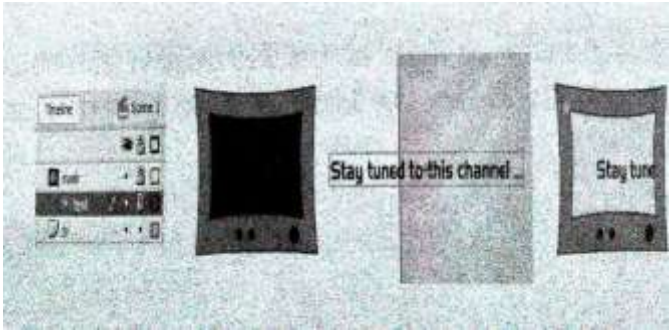


Motion Tweening: Motion tweening is implemented to move objects over the stage by selecting the initial and final locations and tweening over the in-between frames. While the object moves, its dimension and orientation can also be changed.



Path Animation: In addition to tweening properties over key-frames, an object can be made to move over a specific path at a specific speed. A guide path is associated with the object that needs to be moved.

Masking: masking allows moving objects to be seen only in specific areas of the stage and invisible or hidden over other areas., eg, a scrolling text is visible only within the boundaries of the TV screen. Such arrangements often makes use of a mask layer which defines under what conditions the moving object is visible or hidden.

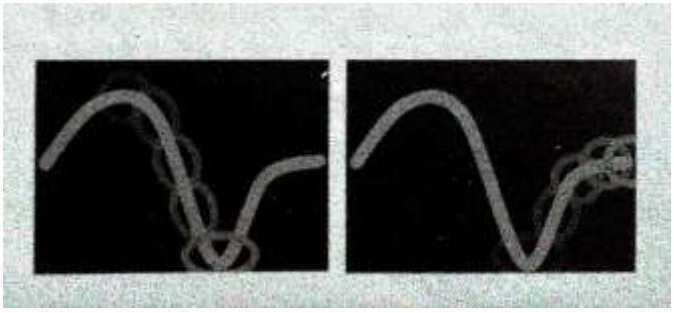


Changing color and Transparency:

Other than motion and shape, properties like color and transparency of objects can also be tweened. Colors are specified at certain Key-frames and tweeningis applied between them to smoothly transit from each color to the next. Transparency can be changed by a parameter called an Alpha setting.

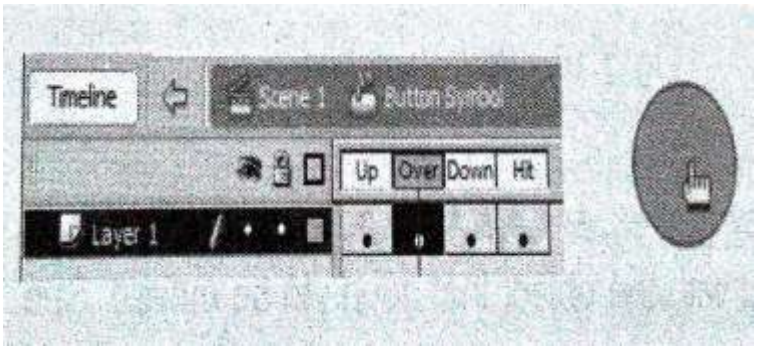
Onion skinning:

Onion skinning is a drawing technique borrowed from traditional cell animation that helps the animator create the illusion of smooth motion. Rather than working on each frame in isolation, animators lay these transparent cells one on top of the other.



Buttons:

A button is an interactive object over which the user clicks the mouse in order to initiate some action. Eg., take the playback head to a specific frame, play a sound, etc. A button has separate timeline with 3 states. Up , Over, Down



Programming language:

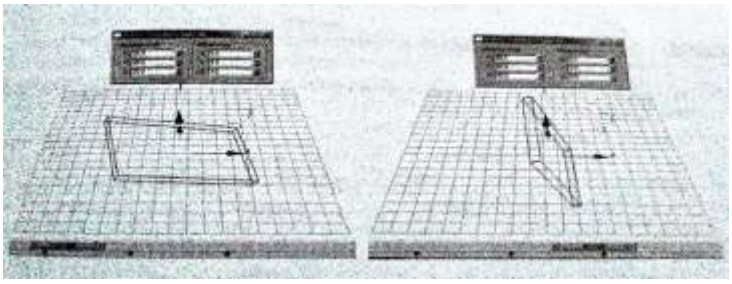
In an interactive animation clip, an event will be triggered by the mouse clicking on or dragged over something on the screen typically a button. The event handler will be a set of instructions

Attached to the button specifying what needs to be dione when the user triggers the event. These instructions are written in an internal programming language associated with the animation software. Eg., ActionScript in Flash.

3D ANIMATION:

Key-frame Based Animation:

Just as in a 2D animation case, in 3D animation environment too, movement is produced by defining key-frames over a timeline and specifying movement and rotation values at each keypoint.

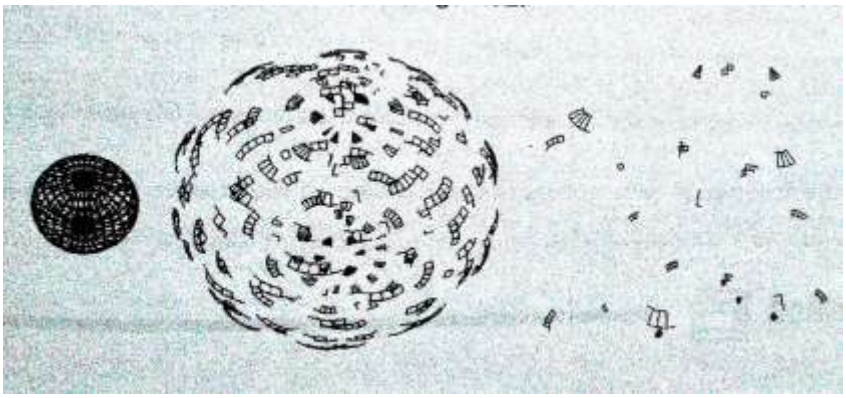


Path Animation:

Path animation is implemented by using a position controller to attach an object to a path. Optionally, the characteristics of the object can be changed as it moves along the path.

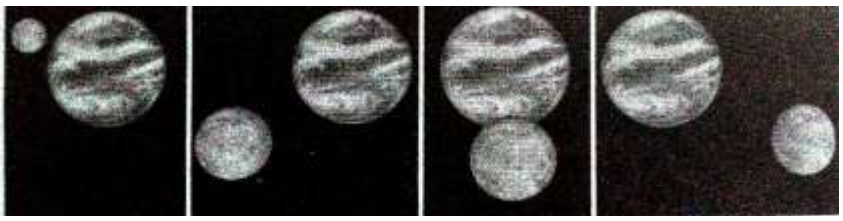
Particle systems and Space warps:

Particle systems like rain, snow, spray, wind etc., can be implemented by specifying parameters like type of system, direction, speed, size etc. Explosions like bombs can be simulated by binding space warps to 3D objects and specifying parameters related to the explosion like strength, particle size, spin factor, gravity, etc



Surface Texture and Rendering:

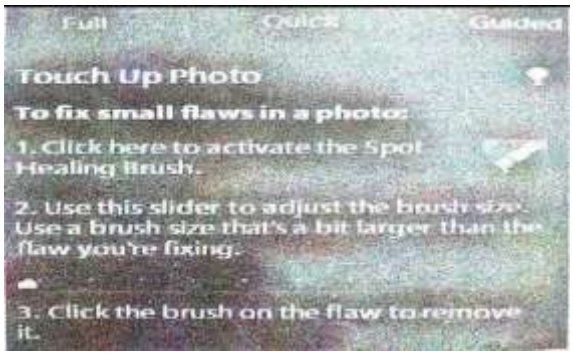
Appropriate surface texture can be applied to moving objects imparting a realistic appearance to them and rendering over a set of key-frames generates a movie clip by converting the vector information into pixel data.



25. a) Explain the basic elements in Photoshop

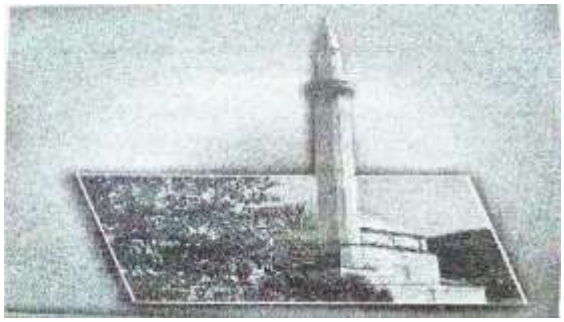
Photoshop Elements is the offspring of the professional-level image editing program, photoshop. Photoshop is somewhat unusual in the world of computer software, in that it is widely accepted as being the best program of its type on the market.If professional designers or photographers are using an image editing program, it will almost certainly be photoshop. However, two of the potential drawbacks to photoshop are the cost (approximately $600) and its complexity. This is where Elements comes into its own.Adobe (the makers of photoshop and Elements) have recognized that the majority of digital imaging users(i.e. the consumer market) want something with the basic power of photoshop, but with enough user-friendly features to make it easy to use. With the explosion in the digital camera market,a product was needed to meet the needs of a new generation of image editors-and that product is Elements.

Elements contains the same powerful editing/color management tools as the full versionofphotoshopanditalsoincludesanumberofversatilefeaturesforsharingimagesand for sharing images and for creating artistic projects, such as slide shows, cards, calendars and online photo albums. It also has valuable help features, such as the Guided Edit mode, which explains what different items can be used for and gives a step-by-step guide to various digital editingtechniques:



Special effects:

One of the great things about using elements with digital images is that it provides numerousfunandcreativeoptionsforturningmediocreimagesintoeye-catchingworksofart. This is achieved through a wide variety of guided activities within GuidedEdit:



Advanced Features:

In addition to User-friendly features, Elements also has more advanced functions , such as the histogram:

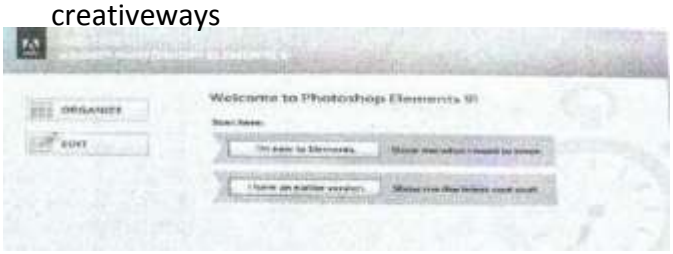
Welcome Screen:

When you first open Elements, you will be presented with the Welcome Screen. This offers initial advice about Working with Elements and also provides options for creating new files, or opening existing ones. The welcome Screen appears by default but this can be altered once you become more familiar with Elements.

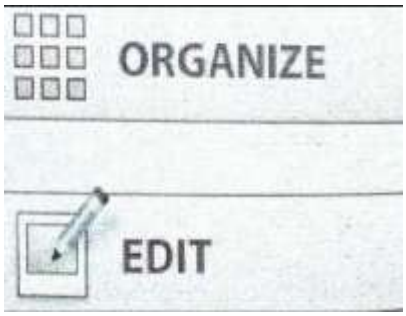
Welcome Screen functions:

1. Options for organizing photos, editing them and using them in a variety of

creativeways



2. Click on the Learn more buttons to find out about certain functions inElements.

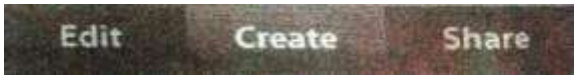


3. Click on the Organize button to go to thatarea
4. click on the Edit button to go to thatarea

Create Mode:

Create mode is where you can release your artistic flair and start designing items such as photo books and photo collages. It can also be used to create slide shows, create PhotoStamps and to put your images onto disc. To use Create Mode:

1. In either the Editor or the Organizer, Click on the createbutton.



2. Select one of the create projects. Each project has a wizard that takes you through the createprocess.

3. Create mode can be used to create a variety of artistic projects, containing your own image

4. Menu Bar:

In the Editor, the Menu bar contains menus that provide all of the functionality for the workings of Elements. Some of these functions can also be achieved through the use of the othercomponentsofElements,suchastheToolbox,theShortcutsbar,theOptionsbarandthe Panels. However, the Menu bar is where all of the commands needed for the digital editing process can be accessed in oneplace.

Menu bar menus:

- File. This has standard commands for opening, saving and printing images, and also commands for creating Photomerge effects such as panoramas and combining exposures
- Edit. This contains commands for undoing previous operations, and standard copyand pastetechniques.
- Image.Thiscontainscommandsforalteringthesize,shapeandpositionofanimage.It also contains more advanced functions, such as changing the color mode of animage.
- Enhance. This contains commands for editing the color elements of an image. It also contains quick-fix options.
- Layer. This contains commands for working with different layers within animage.
- Select. This contains commands for working with areas that have been selected within an image, with one of the selection tools in thetoolbox.
- Filter. This contains numerous filters that can be used to apply special effects to an Image.
- View. This contains commands for changing the size at which an image is displayed,

and also options for showing or hiding rulers and gridlines.

- Window.Thiscontainscommandsforchangingthewaymultipleimagesaredisplayed, and also options for displaying all of the components ofelements.
- Help. This contains the various Helpoptions.

Toolbox:

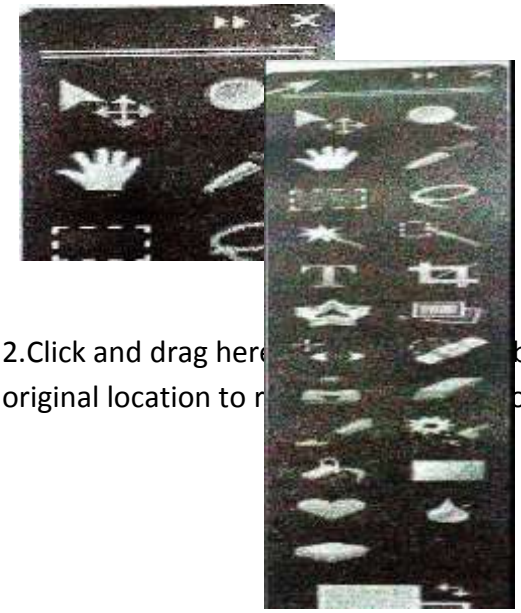
The Toolbox contains tools for adding items to an image (such as shapes and text), selecting areas of an image and also for applying editing techniques. Some of the tools have morethanoneoption,inwhichcase,theyhaveasmallblacktriangleatthebottomrightofthe default tool. To access additional tool intoToolbox:

Click and hold here to access additional tools for a particular item

Working with thetoolbox:

Bydefault,theToolboxisdockedattheleftofthemaineditorwindow.However,itcan be removed and dragged anywhere within the main window. To dothis:

1. ClickonthetwoarrowstoviewtheToolboxinonecolumn.Clickonthecrosstoclose it.



2.Click and drag here box around the Editor window.Drag it back to its original location to r of the window.

Options Bar:

The Options bar provides attributes that can be set for a selected tool from the tool box. For instances, if the Eraser tool is selected, the option bar offers choices for the type of eraser that can be used, its size, its mode and its opacity level. For each tool, a different set of options is available.

Using the options bar:

1. Click on a tool in the Toolbox (in this example it is the Magic Wandtool).

2. Select the options for the tool in the Optionsbar

3. Apply the tool to an image. The tool will maintain the settings in the Option bar until they arechanged.

Panels:

Elements uses panels to group together similar editing functions and provide quick access to certain techniques. The available panels are:

- Adjustments. This can be used to add or make editing changes to adjustment layers in the Layers panel.
- Color Swatches. This is a panel for selecting colors that can then be applied to parts of an image or elements that have been added to it.
- Content. This contains graphical elements that can be added to images. This includes backgrounds, frame shapes and artistic text.
- Effects. This contains special effects and styles that can be applied to an entire image oraselectedpartofanimage.Thereareralsofilterswhichhavetheirowndialogboxes in which settings can be applied and adjusted. Layer styles can also be applied to elements within an image.
- Favorites. This is where favorite graphical elements from the Content panel can be store and retrieved quickly.
- Histogram.Thisdisplaysagraphofthetonalrangeofthecolorsinanimage.Itisuseful for accessing the overall exposure of an image and it changes as an image is edited.
- Info. This displays information about an image, or a selected element within it. This includes details about the color in an image or the position of a certain item.
- Layers. This enables several layers to be included within an image. This can be useful if you want to add elements to an existing image, such as shapes or text. Layers can also be used to merge two separate images together.
- Navigator. This can be used to move around an image and magnify certain areas of it.
- Undo History. This can be used to undo to all, or some, of the editing steps that have been performed. Every action is displayed in the Undo History panel and these actions can be reversed by dragging the slider at the side of the panel upwards.

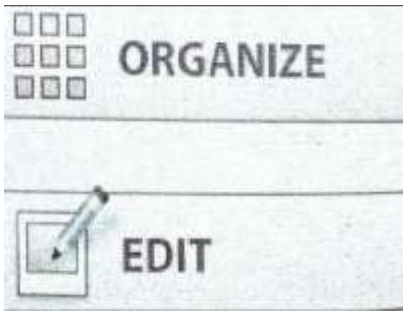
(Or)

b) Create a simple animation using photoshop

Welcome Screen functions:

4. Options for organizing photos, editing them and using them in a variety of creativeways

5. Click on the Learn more buttons to find out about certain functions inElements.



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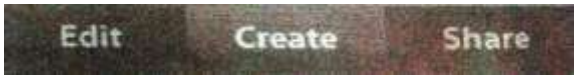

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- Layer. This contains commands for working with different layers within an image.
- Select. This contains commands for working with areas that have been selected within an image, with one of the selection tools in the tool box.
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- View. This contains commands for changing the size at which an image is displayed, and also options for showing or hiding rulers and gridlines.
- Window.Thiscontainscommandsforchangingthewaymultipleimagesaredisplayed, and also options for displaying all of the components of elements.
- Help. This contains the various Help options.

26. a) Write note on the following

(i) Opening and saving images

Once you have captured images with a digital camera, or a scanner, and stored them on your computer, you can open them in Elements. There are a number of options for this:

Open Command:

1. Select File>Open from the Menu bar.

2. Select an image from your hard drive and click Open.

Open as command:

This can be used to open a file in a different file format from its original format. To do this:

1. Select File>Open As from the Menu bar

2. Select an image and select the file format. Click Open.

When saving digital images, it is always a good idea to save them in at least two different file formats, particularly if layered objects, such as text and shapes, have been added. One of these formats should be proprietary Photoshop format PSD or PDD. The reason for using this is that it will retain all of the layered information within an image. So, if a text layer has been added, this will still be available for editing at a future date, once it has been saved and closed.

The other format, that an image should be saved in, is the one most appropriate for the use to which it is going to be used on the web should be saved as JPEG, GIF or PNG files, while an image that is going to be used for printing should be saved in another format, such as TIFF. Once images have been saved in these formats, all of the layered information within them becomes flattened into a single layer and it will not be possible to edit this once the image has been saved. By default, images are saved in the same format as the one in which they were opened.

3. Selecting Areas: About Selections:

One of the most important aspects of image editing is the ability to select areas within an image. This can be used in a number of different ways:

1. Selecting an object to apply an editing technique to it (such as changing the brightness or contrast) without affecting the rest of the image.
2. Selecting a particular color in an image.
3. Selecting an area to apply a special effect to it.
4. Selecting an area to remove it.

Elements has several tools that can be used to select items, and there also a number of editing functions that can be applied to selections.
Two examples of how selections can be used are:

1. Select an area within an image and delete it.

2. Select an area and add a color or specialeffect.

(ii) Searching images

Once images have been tagged they can be searched for using both of these options. To do this:

1. For tags and collections, click on this box so that the binoculars areshowing.

2. Drag one of the icons below the timeline in the MediaBrowser.

3. All matching items for a search are shown together within the MediaBrowser.

4. Click on the show all button to return to the rest of theimages.

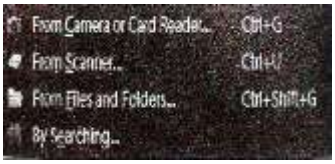
(iii) Organizing images

Obtaining Images:

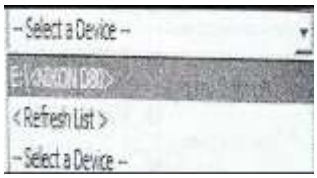
One of the first tasks in Elements is to download images so that you can start editing and sharing them. This can be done from a variety of devices, but the process is similar for all of them. To download images into Elements:

1. Access the Organizer by clicking on this button in thisEditor.

2. Select File>Get Photos and Videos from the Menu bar and select the type of device from which you want to load images intoElements.



3. If you select From Camera and Card Reader, Click under Get Photos From to select a specific Device.

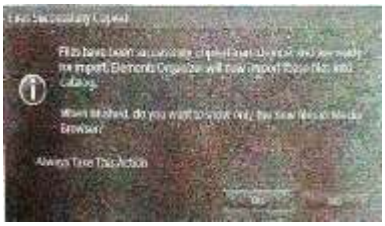


1. The images to be downloaded are displayed here, next to the device from which they will bedownloaded.

2. ClickheretoselectadestinationfortheselectedimagesandclicktheGetPhotosbutto n todownload.

3. As the images are being downloaded, the following window isdisplayed.

4. After the files have been copied they are then imported intoElements.



5. Click on the Yes button so that the images are imported. They can then be viewed in the Organizer and opened in theEditor.

(iv) Tagging Images

As your digital image collection begins to grow on your computer it is increasingly important to be able to keep track of your images and find the ones you want, when you want them. One way of doing this is by assigning specific tags to images. You can then search for images according to the tags that have been added to them. The tagging function is accessed from the task pane within the Organizer. To add tags to images:

1. If the Task Pane is not visible, select Window>Show Task Pane from the menu bar, or Click here on the right border of the Media Browser to expand the TaskPane.

2. Click here to access the currently availabletags

3. Click here to access sub-categories for a particularcategory

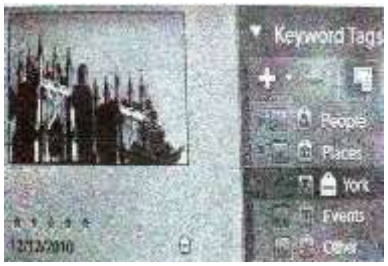
4. Click here to add categories, or sub- categories, of your ownchoice.

5. Enter a name for the new category, or sub-category, and click on the OKbutton

6. Select the required images in the MediaBrowser.

7. Drag a tag onto one of the selectedimages.

8. Theimagesaretaggedwiththeiconthatdenotesthemaincategory,ratherthanthesub- category.



(Or)

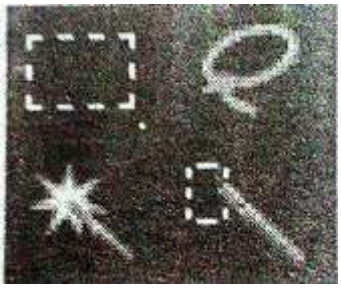
b) Explain the following tools with examples

(i) Marquee

There are two options for the Marquee tool: the Rectangular Marquee tool and the Elliptical Marquee tool. Both of these can be used to make symmetrical selections. To use the Marquee tools:

1. Select either the Rectangular or the Elliptical Marquee tool from the Toolbox. Select the required options from the Options bar.

2. Make a symmetrical selection with one of the tools by clicking and dragging on an image.



(ii) Lasso

There are three options for the Lasso Tools, which can be used to make freehand selections. To use these:

1. Select the Lasso tool from the Toolbox and select the required options from the Optionsbar.

2. Make a freehand selection by clicking and dragging around anobject.

(iii) Magic Wand

The Magic Wand tool can be used to select areas of the same, or similar, color. To do this

1. SelecttheMagicWandtoolfromtheToolboxandselecttherequiredoptionsfrom the Optionsbar

2. Click on a color to select all of the adjacent pixels that are the same, or similar, color, depending on the options selected from the Optionsbar.

(iv) Brush

The Selection Brush tool can be used to select areas by using a brush-like stroke. Unlike with the Marquee or Lasso tools, the area selected by the Selection Brush tool is the one

directly below where the tool moves. To make a selection with the Selection Brush tool:

1. Select the Selection Brush tool from the Toolbox and select the required options from the Options bar

2. Click and drag to make a selection

3. The Selection area is underneath the borders of the Selection Brush tool.

Quick Selection Tool:

The Quick Selection tool can be used to select areas of similar color by drawing over the general area, without having to make a specific selection. To do this:

1. Select the Quick Selection tool from the Tool box.

2. Select the required options from the Options bar.

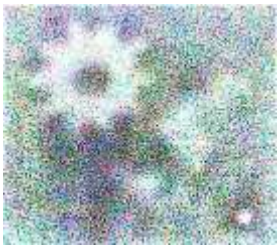
3. Draw over an area, or part of an area, to select all of the similarly colored pixels.

Smart Brush Tool:

The Smart Brush tool can be used to quickly select large areas in an image (in a similar way to the quick Selection tool) and then have effects applied automatically to the selected area. To do this:

1. Open the image to which you want to apply changes with the Smart Brush tool

2. Select the Smart Brush tool from theToolbox.



3. Select the editing effect you want to apply to the area selected by the Smart Brush tool, from the optionsbar.

4. Select Brush size for the Smart Brush tool, from the Optionsbar.

5. DragthesmartBrushtooloveranareaoftheimage.Intheleft-handimage,below, the building has been selected and brightened, in the right-hand image the sky has been selected and enhanced.

KARPAGAM ACADEMY OF HIGHER EDUCATION
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(Established Under Section 3 of UGC Act 1956)
COIMBATORE – 641 021

Department of CS, CA & IT

Fifth Semester
THIRD INTERNAL EXAMINATION - October 2018

MULTIMEDIA AND ITS APPLICATION

Class & Section: III B.Sc (IT) & (CT) **Duration: 2 hours**
Date & Session : 09.10.2018 AN **Maximum: 50 marks**
Subj.Code: 16ITU504B& 16CTU504B

PART-A **[20 * 1 = 20Marks]**

Answer ALL the questions

1. The people who weave multimedia into meaningful tapestriesare_____
   a. Multimediaproducers c. MultimediaProjectors
   b. Multimediadevelopers d. MultimediaCreatures
2. Forerunner of WWW is
   a. Memex c. Webbrowser
   b. InternetExplorer d. Intranet
3. Multimedia elements are typically seen together into a projectusing_____
   a. EditingTools c. IntegratedTools
   b. Unauthoringtools d. Authoringtools
4. GML Standsfor _____
   a. Generalized Markuplanguage c. Generalized Makeuplanguage
   b. Generalized Multimedialanguage d. Global Markuplanguage
5. Person who make multimedia program come alive with soundeffects?
   a. Videospecialist c. Technician
   b. AudioSpecialists d. Supervisor
6. Diverse range of skills are calledas _____
   a. Skill c. Strength
   b. Knowledge d. Multimedia skillset
7. Person responsible for overall development and implementation of a projectis _____
   a. Executive c. MarketingDirector
   b. Musiccomposer d. ProjectManager
8. Interface designer createsa_____
   a. Softwaredevice c. Video
   b. Music d. Animation
9. MIDI channels are numberedfrom
   a. 0to 16 b. 1 to 16 c. 0to 15 d. 1 to 15
10. If the first four bits are all ones in MIDI, the message is interpreted asa _____
    a. Systemmessage c. Voicemessage
    b. Channelmessage d. Modemessage
11. is the connector through which the device echoes the datareceived
    a. MIDIOUT b. MIDIIN c. MIDITHRU d. MIDIOFF
12. messages are used to specify effects such as sustain, vibrato andpitch

a. Systemmessage
b. Channelmessage
c. Modemessage
d. Voicemessage

13. tool draws free-formselections
a. Lasso
b. PolygonalLasso
c. Magnetic Lasso
d. MagicWand

14. is used to choose a foreground or background color for animage
a. Colorpicker
b. Colorpalette
c. Coloring
d. Brushes

15. is the shortcut to select the entire content of animage
a. Ctrl+T
b. Ctrl +A
c. Ctrl +S
d. Ctrl +V

16. is the shortcut to deselect the selected portion of theimage
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b. Ctrl +A
c. Ctrl +S
d. Ctrl +I

17. is the spacing between characterpoints
a. kerning b. inches c. points d. line

18. is a container for data that can hold more than one piece ofdata
a. Constant b. Variable c. Keyword d. Array

19. has a Trace Bitmap menu option that converts a bitmapped image into a vectorimage
a. frontpage b. HTML c. flash d. morph

20. Process of drawing series of frames in between the key frames iscalled _____
a. ordering b. linking c. tweening d. twisting

PART- B (3 * 2= 6 Marks)
Answer ALL the Questions

21. Define Flash.
22. Explain about Drawing Objects?
23. How animation works?

PART C (3 * 8 = 24 Marks)
Answer ALL the Questions

24. a. Explain in detail about the panels inflash

(OR)

b**.** Illustrate how animation can be performed in flash using shape tween with example.

25. a. Explain various mouse events used inflash.

(OR)

b. Explain how to use libraries in flash with example.

26. a. How to create mouse events and How it works?

(OR)

b.How to apply action script and How to use Actionscript to control actions ?

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d. Ctrl +I

17. is the spacing between characterpoints
a. kerning **b. inches** c. points d. line

18. is a container for data that can hold more than one piece ofdata
a. Constant b. Variable c. Keyword d**. Array**

19. has a Trace Bitmap menu option that converts a bitmapped image into a vectorimage
a. frontpage b. HTML c**. flash** d. morph

20. Process of drawing series of frames in between the key frames iscalled _____
a. ordering b. linking c**. tweening** d. twisting

PART- B (3 * 2= 6 Marks)
Answer ALL the Questions

21. Define Flash.

ANS:Macromedia Flash is a very popular tool for creating very interesting and dynamic Web sites. In this module, you will learn what you can do with Macromedia Flash so that you will have a better understanding of how adding Flash movies can lives up your Web site..

22. Explain about Drawing Objects?

ANS:

The Pencil tool draws any shape of line that you want. Unlike the Line tool or the Pen tool, the Pencil tool follows whatever path you want- no matter how crooked it might be. This is the tool that you will want to use to add small details to objects when the other drawing tools seem just a little too confining.

23. How animation works?

ANS:

Flash makes animation easy to create using a process known as tweening. Once you have done this, Flash automatically generates all the in-between frames. So, if it takes 24 frames to complete your animation, you may end up creating tow of the frames, while Flash creates the other 22 frames.

PART C (3 * 8 = 24 Marks)
Answer ALL the Questions

24. a. Explain in detail about the panels inflash

ANS:

The Panels

Flash makes extensive use of panels. These are very similar to the dialog boxes that you have no doubt used in many other programs, but there are some differences. For example, panels do not have OK or Close buttons. That's because a panel does not need to be closed in order to apply any selections that you may have made in it. It's not really important that you study the purpose of each panel in detail at this point.

Project 1: Creating a simple Animation

One of the best ways to get a feel for how Flash helps you create animations is to go ahead and give it a try yourself. It really isn't necessary to get real fancy with this first project, but at least you will get a chance to get your feet wet.

Step-by-Step

1. Make certain that you have Flash open and that there is nothing on the stage. If necessary, select File | New from the Flash menu to open a new, blank movie.
2. Click the Rectangle tool in the toolbox so that this tool is selected.
3. Near the lower-left corner of the stage, draw a small rectangle.
4. Click the Arrow tool to select it. KARPAGAM ACADEMY OF HIGHER EDUCATION

5. Double-click the rectangle you just drew so that both the fill and the stroke are selected. You may find it easier to simply draw a selection box that surrounds the entire rectangle.
6. Select the Modify | Group command (or press CTRL-G). The object needs to be grouped in order to have a motion tween applied.
7. Click frame 24 in the timeline to select the frame. You can tell when the frame is selected because the frame will then change to dark blue. The choice of frame 24 is arbitrary. In this case, we want the animation to last for 2 seconds, and at the default frame rate of 12 frames per second, frame 24 will produce the desired result.
8. With frame 24 still selected, choose Insert | keyframe from the Flash menu to add a keyframe to frame 24.
9. Drag the rectangle from the lower-left corner to the upper-right corner of the stage.

This will be where the rectangle finishes its movement.

10. Click the timeline between frames 1 and 24 to select all of the frames in that range. When the frames are selected, the frames will turn back.

11. Select insert | Create Motion Tween from the menu. This will add a solid arrow that points from frame 1 to frame 24 in the timeline.

12. Select Control | Test Movie to try out your animations. Your rectangle will move from the lower left to the upper right of the stage and then jump back and start again.

13. Click the lower close button to close the Flash Player and return to the Flash development environment.

Project Summary

Believe it or not, you have just created your first Flash movie! For reference, y

(OR)

b**.** Illustrate how animation can be performed in flash using shape tween with example.

ANS:

UNDERSTANDING FLASH

Macromedia Flash is a very popular tool for creating very interesting and dynamic Web sites. In this module, you will learn what you can do with Macromedia Flash so that you will have a better understanding of how adding Flash movies can lives up your Web site..

In addition to Flash, you will probably use a page layout program such as Macromedia Dreamweaver or Microsoft FrontPage. You may even use graphics-editing software or sound-editing software to create Web page content.

Flash is everywhere. You may be surprised to learn that the vast majority of Web sites that contain animation generally use Flash.

Create Web Images

The World Wide Web-or just Web- is a part of the Internet that truly cries out for visual creativity. When you surf the Web, you see literally thousands of different ideas about what makes an interesting Web sites. Even with all of these divergent opinions, there is one almost universally accepted notion-images and color are pretty much a requirement

when you are creating a Web site.

Eg:

Although many different programs can easily display various assorted types of bitmap

images, vector graphics typically must be viewed using a special program. For Flash

images, this special program is the Flash Player, which almost everyone already has

installed in their Web browser. Flash images are saved as part of a Flash movie, and that

Flash movie is what is placed on your web page. KARPAGAM ACADEMY OF HIGHER EDUCATION

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You do need to add a bit of HTML to the Web page, but Flash automatically creates the

necessary HTML code when you publish a Flash movie.

Animate Your Web Site:

Flash makes animation easy to create using a process known as tweening. Once you

have done this, Flash automatically generates all the in-between frames. So, if it takes 24

frames to complete your animation, you may end up creating tow of the frames, while

Flash creates the other 22 frames.

For example, take a look at this animated sequence. Here, I'm moving the truck across

the stage. I needed to create only one instance of the truck. I told Flash where I wanted the

truck to begin, and then I told it where the truck should end. Once I did this, Flash too care

of all the rest and generated all of the frames necessary to make it appear as though the

truck were smoothly driving across the screen from one side to the other.

Flash actually offers several different ways to move and reshape objects. As you will

learn in Module 7, you can create a motion guide when you want to move an object along a

path that isn't straight. In addition to motion tweens, which are used to moves objects, you

can also create shape tweens. These enable you to change the shapes of objects. You will

learn about both types of tweens in Module 6.

Build Interactive Movies

In addition to simple animation, you can use Flash to build interactive Web sites. You

could, for example, create a Flash movie that enables the visitor to choose between several

different movie clips or even between different soundtracks. Because Flash is object

oriented, your movies already know how to interact with users. All you need to do is to tell

your movies what you want them to do when the user does something, like click a button.

It does take a small amount of ActionScript programming in order to add most

interactivity to Flash movies.

25. a. Explain various mouse events used inflash.

ANS:

UNDERSTANDING ACTIONS AND EVENT HANDLERS:

Actions and Event handlers are parts of ActionScripts that you will use in almost

every case in which you add ActionScript code to a flash movie, so it is vital that you have a clear understanding of how these language elements work.

ACTIONS:

Actionscriptactions are what might be called commands in some other programming languages. Actions cause something to happen immediately when they are executed. Actions

can be attached to keyframes in a timeline, or they can be attached to an object.

- If an action is attached to a keyframe, the action is executed when the playhead reaches thekeyframe- unless you are using a conditional test that may modify the program flow depending on the results of the test.
- If an action Is attached to an object, the action is executed only when the proper

event occurs. This is determined by the event handler options you have selected.

EVENT HANDLERS:

Event handlers function something like traffic signals. An action that is controlled by an event handler can be executed only when the event handler gives the action a go signal. There are two types of event handlers in Actionscript:

- Buttons use the on mouse event handler so that they can respond to mouse events.
- Movie clips use the onClipEvent handler.

Both types of event handlers can respond to some of the same types of events, but the onClipEvent handler has some additional options.

(OR)

b. Explain how to use libraries in flash with example.

ANS:

UNDERSTANDING FLASH's BASIC ELEMENTS

As with any other program you might use on your computer, Flash has a number of basic elements that enable you to accomplish the tasks for which the program Was designed.

The Flash Stage:

The stage is the area where you create your Flash movies. This is the white area that takes up most of the middle of the Flash window.

The stage is surrounded by a gray area known as the workspace. It is perfectly acceptable for you to place objects in the workspace off the edge of the stage. Objects that are in the workspace but not on the stage won't appear in the movie.

The Timeline

The timeline is the Flash element that controls when things happen during the movie playback. Here, I've labelled the important items you see on the timeline.

Here is a brief description of these important timeline elements:

- Playhead You can drag the playhead to different frames to view the contents of those frames.
- Frame numbers These are your guides to working with the timeline; they enable you to place objects in the correct frame.
- Timeline menu This provides access to a number of options where you can choose timeline view settings.
- Center frame This moves the current view of the timeline so that the current frame

is centered in the visible area of the timeline.
 Onion skin view This displays several frames before and after the current frame using lightly shaded versions of the objects on the stage so that you can get a feel for the animation sequence.
 Onion skin outline view This also displays an onion skin view of several frames, but it uses wire frame outlines rather than filled objects.
 Edit multiple frames This enables you to edit the animation in several frames.

 Modify onion markers This displays a menu that allows you to choose how many frames to display in onion skin view.
 Current frame This shows the frame number of the currently selected frames.
 Frame rate This shows the number of frames per second that are displayed in the current movie.
 Playback time This shows how many seconds will have elapsed when the current frame is played.
 Scroll bars These enable you to see frames or layers that are not currently displayed.

26. a. How to create mouse events and How it works?

ANS:

(OR)

b.How to apply action script and How to use Actionscript to control actions ?

ANS:

USING ACTIONSCRIPT TO CONTROL ACTIONS:

In this section, we will look at some of the more basic actions that you are likely to use. In this way, you can get a feel for actually using some Actionscript to program your
Flash movies.

Goto:

The goto action is used to move the playhead to a different frame in the timeline.

 GotoAndPlay: This form of the action moves the playhead to a specific frame number or frame label and begins playing the movie from that point.
 gotoAndStop: This form of the action moves the playhead to a specific frame number or frame label and stops the playback.

PLAY:

The play action resumes playback of the movie at the current frame. In that way, you

could provide the user with buttons that they could use to control playback of the movie.

STOP:

The stop action stops the playback of the movie. This is the another of the actions that you might typically attach to a button so that the user could control the playback.

STOPALLSOUNDS:

The stopallsoundsaction immediately stops any sounds that are currently playing. This provides the user with a way to mute the soundtrack if you attach this action to action to a button that the user can click.

GETURL:

You use thegetURL action to load a new document from a specific web address. You can use this action for a number of different purposes, including loading another Flash movie.

This argument can take any of the following values:

- Windowname: The is the name of a specific window in which to display the document.
- Self: This places the document in the current frames.
- Blank: This places the document in the new window.

FSCOMMAND:

The fscommand action is used to send commands to the Flash player or the web browser that contains the Flash player. Most of the commands that you are likely to send would be javascripts commands.

LOADMOVIE:

The loadmovie action is used to load additional Flash movies. These can be replacements for an existing loaded movie, or they can be additional movies. The action can be very handy if you want to provide the user the option to select particular movies. The loadMovie action has two different formats:

- Loadmovie: you use this format when you want to specify a target movie clip that will be replaced by the new movie clip.
- loadMovieNum: you use this format when you want to specify a level on which to load the new movie clip.

This might be handy if you wanted to send certain information such as the name of the user so that the new movie would also know who has viewing the movie.

UNLOAD MOVIE:

The unload movie action unloads the movie that you specify from memory. You

can
specify the movie to unload by name or by level number. Once you unload the movie, it can no longer be played.

ON(MOUSE EVENT):

The final action we will look at is labelled “ön”. In reality, this is not an action; It is a convenient way for you to access the mouse event handler that you can wrap around a block of the ActionScript statements.

The reason for this Flash automatically adds this event handler whenever you add actions
to a button symbol instance. That is because the button symbol instance must always respond
to mouse events, so it needs this event handler in every case