GOVERNMENT ARTS & SCIENCE COLLEGE

CLASS : III - B.Sc [CS] **I. JAYASEELAN**

SUBJECT: MULTIMEDIA

UNIT : I

What Is Multimedia?

Multimediais any combination of text, art, sound, animation, andvideo delivered to you by computer or other electronic or digitally manipulated means. It is richly presented sensation. When you weave together the sensual elements of multimedia—dazzling pictures and animations, engaging sounds, compelling video clips, and raw textual information— you can electrify the thought and action centers of people's minds. When you give them interactive control of the process, they can be enchanted.

Multimedia Definitions:

When you allow an end user also known as the viewer of a multimedia project—to control what and when the elements are delivered, it is called interactive multimedia. When you provide a structure of linked elements through which the user can navigate, interactive multi-media becomes **hypermedia**.

The software vehicle, the messages, and the content presented on a computer, television screen, PDA (personal digital assistant), or mobile phone together constitute a multimedia project. If the project is to be shipped or sold to consumers or end users, typically delivered as a down-load on the Internet but also on a CD-ROM or DVD in a box or sleeve, with or without instructions, it is a multimedia title.

Your project may also be a page or site on the World Wide Web, where you can weave the elements of multimedia into documents with HTML (Hypertext Markup Language) or DHTML (Dynamic Hypertext Markup Language) or XML (eXtensible Markup Language) and play rich media files.

The GUI is more than just the actual graphics on the screen—it also often provides the rules or structure for the user's input. The hardware and soft-ware that govern the limits of what can happen here are the multimedia platform or environment.

Use of Multimedia:

- Multimedia in Business
- Multimedia in Schools

- Multimedia at Home
- Multimedia in Public Places

Multimedia in Business:

- Business applications for multimedia include presentations, training, marketing, advertising, product demos, simulations, databases, catalogs, instant messaging, and networked communications.
- Voice mail and video conferencing are provided on many local and wide area networks (LANs and WANs) using distributed networks and Internet protocols.
- Mobile phones and personal digital assistants (PDAs) utilizing Bluetooth and Wi-Fi communications technology make communication and the pursuit of business more efficient.

Multimedia in Schools:

- . E-learning is a sensitive and highly politicized subject among educators, so educational software is often positioned as "enrich-ing" the learning process, not as a potential substitute for traditional teacher-based methods.

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- videos used for training emergency medicine specialists. Such online e-learning provides a cost-effective vehicle to learn clinical techniques outside of the hospital setting.

- An interesting use of multimedia in schools involves the students themselves. Students can put together interactive magazines and news-letters, make original art using image-manipulation software tools, and interview students, coaches, and teachers.

- ITV (Interactive TV) is widely used among campuses to join stu-dents from different locations into one class with one teacher.

Multimedia at Home:

- From gardening, cooking, home design, remodeling, and repair to software multimedia has entered the home.
- Today, home consumers of multimedia own either a computer with an attached CD-ROM or DVD drive or a set-top player that hooks up to the television, such as a Nintendo Wii, X-box, or Sony PlayStation machine.

- Nintendo alone has sold over 118 million game players worldwide along with more than 750 million games. Users with TiVo technology (www.tivo.com) can store 80 hours of television viewing and gaming on a stand-alone hard disk.

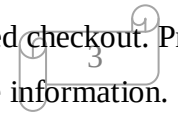
- Live Internet pay-for-play gaming with multiple players has also become popular, bringing multimedia to homes on the broadband Inter-net, often in combination with CD-ROMs or DVDs inserted into the user's machine.

Multimedia in Public Places:

- In hotels, train stations, shopping malls, museums, libraries, and grocery stores, multimedia is already available at stand-alone terminals or kiosks, providing information and help for customers.

- A supermarket kiosk that pro-vides services ranging from meal planning to coupons.

- Hotel kiosks list nearby restaurants, maps of the city, airline schedules, and provide guest services such as automated checkout. Printers are often attached so that users can walk away with a printed copy of the information.



- Museum kiosks are not only used to guide patrons through the exhibits, but when installed at each exhibit, provide great added depth, allowing visitors to browse through richly detailed information specific to that display.

Delivering Multimedia:

Multimedia requires large amounts of digital memory when stored in an end user's library, or large amounts of bandwidth when distributed over wires, glass fiber, or airwaves on a network. The greater the bandwidth, the bigger the pipeline, so more content can be delivered to end users quickly.

- CD-ROM
- DVD
- Flash Drives

- **CD-ROM:**
  - (compact disc read-only memory) discs can bemass-produced and can contain up to 80 minutes of full-screen video, images, or sound.

- The disc can also contain unique mixes of images, sounds, text, video, and animations controlled by an authoring system to provide unlimited user interaction.

- **DVD:**
  - Multilayered Digital Versatile Disc (DVD) technology increases the capacity and multimedia capability of CDs to 4.7GB on a single-sided, single-layered disc to as much as 17.08GB of storage on a double-sided, double-layered disc.

  - DVD authoring and integration software allows the creation of interactive front-end menus for both films and games.

- **Flash drives:**
  - . As high-speed connections become more and more pervasive and users become better connected, copper wire, glass fiber, and radio/cellular technologies.

- **The Broadband Internet:**

These days telecommunications networks are global, so when information providers and content owners determine the worth of their products and how to charge money for them, information elements will ultimately link up online as distributed resources on a data highway (actually more like a toll road), where you will pay to acquire and use multimedia-based information.

Text: About Fonts and Faces:

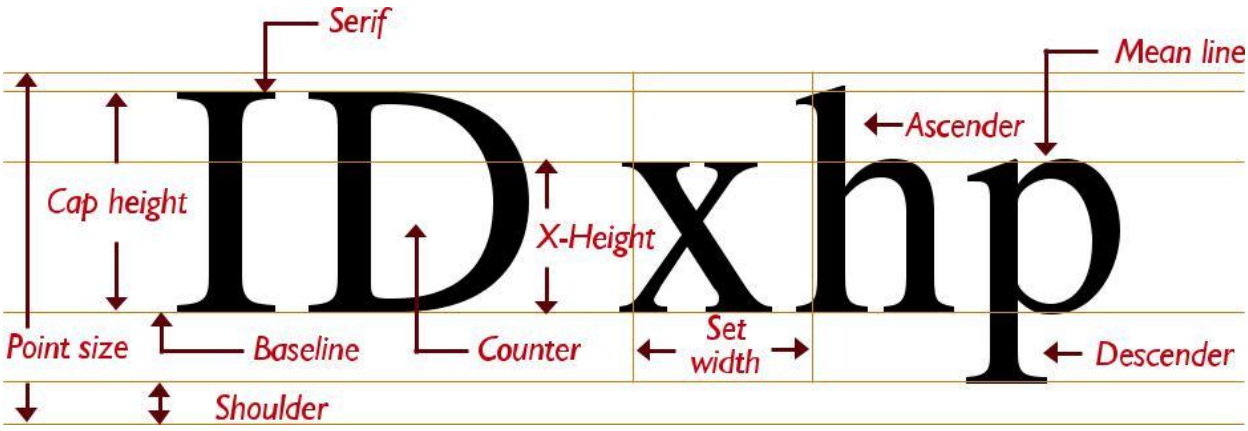
- The Internet and the World Wide Web, text has become more important than ever.

- Indeed, the native language of the Web is HTML (Hypertext Markup Language), originally designed to dis-play simple text documents on computer screens, with occasional graphic images.

Fonts and Faces:

- A **font** is a collection of characters of a single size and style belonging to a particular typeface family.

- A **typeface** is a family of graphic characters that usually includes many type sizes and styles.
- Typical font **styles** are boldface and italic.
- Your computer software may add other style **attributes**, such as underlining and outlining of characters.
- Type sizes are usually expressed in points; one **point** is 0.0138 inch, or about 1/72 of an inch.
- font's size is the distance from the top of the capital letters to the bottom of the descenders in letters such as *g* and *y*.
- Helvetica, Times, and Courier are typefaces; Times 12-point italic is a font.



(Fig: The measurement of type)

Different fonts and faces:

The type for a single font was always stored in two trays, or *cases*; the upper tray held capital letters, and the lower tray held the small letters.

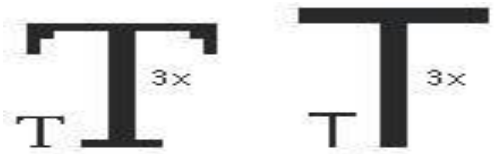
Today, a capital letter is called **upper-case**, and a small letter is called **lowercase**.

Serif vs. Sans Serif:

Typefaces can be described in many ways.

Type has been characterized as

- femi-nine,
- masculine,
- delicate,
- formal,
- capricious,
- witty,
- comic,
- happy,
- tech-nical,
- newsy



(Difference between Serif and Sans serif)

Serif:

- The **serif** is the little decoration at the end of a letter stroke.
- Serif fonts are traditionally used for body text.

Ex:

Times,

New Century Schoolbook,

Bookman

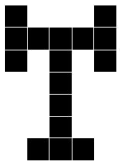
Palatino

Sans serif:

Sans serif fonts, on the other hand, are used for headlines and bold statements.

Ex:

Helvetica,



Verdana,
Arial,
Optima,
Avant Garde

Using Text in Multimedia:

A single item of menu text accompanied by a single action (a mouse click, keystroke, or finger pressed to the monitor) requires little training and is clean and immediate.

Use text for titles and headlines (what it's all about), for menus (where to go), for navigation (how to get there), and for content (what you see when you get there).

Designing with Text:

Computer screens provide a very small workspace for developing complex ideas.

Use bulleted points in large fonts and few words with lots of white space.

printing text documents provide a separate link to a complete document in either

- plain text (.txt),
- rich text format (.rtf),
- word processor format (.doc, .odt)
- Adobe PDF format (.pdf)

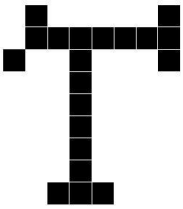
It is often more convenient to print and read a document than to scroll through many pages of text on a monitor.

Choosing Text Fonts:

Coding an initial cap for a web page is simple. Use CSS attributes:

```
p:first-letter { font-size: 200%; }
p:first-line { line-height: 100%; }
```

Uppercase 10 pt Garamond T on a Macintosh.



Uppercase 10 pt Garamond T in Windows.

Installed Fonts:

Before you can use a font, it must be recognized bythe computer's operating system.

If you want to use fonts other than those installed with your basic operating system, you will need to install them.

When you install applications, fonts are often added to your collection.
Philip Shaw at **www.codestyle.org** maintains a useful list of the most commonly installed fonts for both Mac and Windows.

The most commonly reported fonts available on Windows computers are,

- Tahoma,
- Microsoft Sans Serif,
- Verdana,
- Courier New.

On Macs expect

- Helvetica,
- Lucida Grande,
- Courier.

Use of **Cascading Style Sheets (CSS)**, preferred over the deprecated HTML <font> tag, allows you to be quite precise about font faces, sizes, and other attributes (see Table).

Property	Value	Description
color	color	Sets the color of text
direction	ltr rtl	Sets the text direction. Use with Unicode-bidi property
line-height	normal number	Sets the distance between lines

	length %	
letter-spacing	normal length	Increases or decreases space between characters
text-align	left right center justify	Aligns the text in an element
text-decoration	none underline overline line-through blink	Adds decoration to text
text-indent	length %	Indents the first line of text in an element
text-shadow	none color length	
text-transform	none capitalize uppercase lowercase	Controls the letters in an element
unicode-bidi	normal embed bidi-override inherit	Use for languages that run from left to right or both. Works with direction property
vertical-align	baseline sub super top text-top middle bottom text-bottom length %	Sets the vertical alignment of an element

(Available Text Properties Using Cascading Style Sheets (CSS))

white-space	normal pre nowrap	Sets how white space inside an element is handled
word-spacing	normal length	Increases or decreases space between words

Animating Text:

- We can animate bulleted text and have it "fly" onto the screen.
- We can "grow" a headline a character at a time.

In the above Fig, For simple presentations, PowerPoint (see the custom Animation Palette) has bells and whistles to reveal a line of text one word or one letter at a time, or to animate an entire line.

Symbols and Icons:

- Symbols are concentrated text in the form of stand-alone graphic constructs.
- Symbols convey meaningful messages.

Here are some symbols we may already know:

Fields for Reading:

web site is to display large blocks of text, try to present to the user only a few paragraphs of text per page.

Try to display whole paragraphs on the screen, and avoidbreaks where users must go back and forth between pages to read an entire paragraph.

Put the text into a scrolling field,

- Portrait
- Landscape

HTML Documents:

The standard document format used for displaying text pages on the Web is called Hypertext Markup Language (HTML).

In an HTML document you can specify typefaces, sizes, colors, and other properties by "marking up" the text in the document with **tags**.

The process of marking up documents or "styling" them is simple: Where you want text to be bold, surround it with the tags <B> and </B> or <STRONG> and </STRONG>; the text between the tags will then be displayed by your browser application in bold type.

Where you have a header, surround it with <H1> and </H1>; for an ordered list of things (1, 2, 3, … or a, b, c, …, etc.), surround your list with <OL> and </OL>.

There are many tags you can use to lay out a page. Cascading Style Sheets (CSS) work in conjunction with HTML and provide fine tuning and control of text and layout.

Check out these web sites for more information about HTML

www.w3.org/TR/html4/www.w3.org/MarkUp/Guide/
www.w3schools.com/html/default.asp *www.w3.org/Style/CSS/*

Computers and Text:

Very early in the development of the Macintosh computer's monitor hard-ware, Apple chose to use a resolution of 72 pixels per inch.

This matches the standard measurement of the printing industry (72 points per inch) and allows desktop publishers and designers to see on the monitor what their printed output will look like (WYSIWYG).

Macintosh was invented, and the VGA video standard set for the PC (at 96 pixels per inch), pixels were typically taller than they were wide.

The aspect ratio for a pixel on older EGA monitors, for example, is 1.33:1, taller than it is wide. VGA and SVGA monitor resolutions for both Macintosh and Windows display pixels at an aspect ratio of 1:1 (square).

The Font Wars Are Over:

This special software was the **Adobe PostScript** page description and **outline font** language.

There are two kinds of **PostScript** fonts:

- Type 3
- Type 1

Type 3 font technology is *older* than Type 1 and was developed for output to printers.

It is rarely used by multimedia developers. There are currently over 6,000 different Type 1 typefaces available.

Type 1 fonts also contain **hints**, which are special instructions for grid-fitting to help improve resolution.

Hints can apply to a font in general or to specific characters at a particular resolution.

Apple and Microsoft announced font methodology called,

- True type
- Open type

True-Type would draw characters to a low-resolution (72 dpi or 96 dpi) monitor.

True type to printing smooth characters on printers

Adobe and Microsoft developed **OpenType** became a free, publicly available inter-national standard. The font wars were over.

Font Boundaries:

Today collections of fonts are available through retail channels or directly from their manufacturers.

such as CorelDraw or Adobe Illustrator, many extra fonts are included for free.

Commercial type foundries and font sites.
These gateways lead to a discussion of fonts and where to find them.

- ***www.typequarry.com/***
- ***www.oldfonts.com/***
- ***www.myfonts.com/***
- ***www.bitstream.com/***
- ***www.will-harris.com/***

Character Sets and Alphabets:

- The ASCII character set
- The extended character set
- Unicode

The ASCII character set:

- The **American Standard Code for Information Interchange (ASCII)** is the 7-bit character coding system.
- ASCII assigns a number or value to 128 characters, including both lower- and uppercase letters, punctuation marks, Arabic numbers, and math symbols.

- To a computer working with the ASCII character set, the number 65, for example, always represents an uppercase letter *A.* Later, when displayed on a monitor or printed, the number is turnedinto the letter.

- ASCII uses only 7 bits to code its 128 characters;

The extended character set:

- A byte, which consists of eight bits.

- Extended character set is most commonly filled with ANSI (American National Standards Institute) standard characters.

- This fuller set of 255 characters is also known as the ISO-Latin-1 character set; it is used when programming the text of HTML web pages.

Unicode:

- Unicode has been focused on a 16-bit architecture for multiline text and character encoding.

- The original standard accommodated up to about 65,000 characters.

- HTML allows access to the Unicode characters by numeric reference.

- Thus 水 (in hexadecimal) represents the Chinese character for water.

Special Characters in HTML:

In HTML, **character entities** based upon the ISO- Latin-1 standard make up the alphabet that is recognized by browser software on the World Wide Web.
The name for the copyright symbol is “copy” and its number is 169.
The symbol may be inserted into a document either as © or as ©—either way, the character © is generated by the browser.

www.w3.org/TR/REC-html40/sgml/entities.html

An encyclopedic discussion and reference for HTML character entity references.

Multilanguage Web Pages:

- When building a project in more than one language for the Web.
- consider translating the languages that use Roman fonts and displaying them as text in the browser in the normal way.

- If Chinese or Japanese or Arabic is desired, translate the Roman text onto a computer running an operating system using that native language.

- For the web page, the translator can then capture a screen image of the translated text, and you can embed that image into your web page.

Ex:1

```
<p>
<img src="images/chinese/story 1-1.gif">
```

這種綜合性的網路產品能為您的公司企業帶來哪些好處呢？它能降低成本，提昇服務的靈活性，以及具有更大的可靠性，因為它能支持各種話音與數據傳輸的要求，包括：

```
</p>
```

Ex:2


```
<p>
<img src="images/japanese/story 1-1.gif">
```

この統合的ネットワークソリューションは、以下を含む音声・データ要件のすべてに対応し、費用節減、フレキシビリティや信頼性の向上を実現させます。

求，包括：

```
</p>
```

Portion of a five-language web site using normal HTML code for theRoman languages and screen-captured graphic images to display the Chinese andJapanese translations.

Font Editing and Design Tools:

- Font editing tools can be used to make our own type, so we can communicate an idea or graphic exactly.

- Graphic designers, publishers, and ad agencies can design instant variations of existing typefaces.

- There are hundreds of sites for downloading free and shareware fonts drawn by others. For starters, try these two.

www.fontfoundry.com
www.larabiefonts.com

Fontlab:

Fontlab, Ltd., located at **www.fontlab.com** specializes in font editors for both Macintosh and Windows platforms.

Fontographer allows the creation of multiple font designs from two existing typefaces, and we can design lighter or heavier fonts by modifying the weight of an entire typeface.

Making Pretty Text:

- To make our text look pretty, we need a toolbox full of fonts and special graphics applications that can stretch, shade, shadow, color, and anti-alias your words into real artwork.

- Pretty text is typi-cally found in bitmapped drawings where characters have been tweaked, manipulated, and blended into a graphic image.

- Most image-editing and painting applica-tions (see Figure for a PowerPoint example) let you make text using the fonts available in our system.

- we can colorize the text, stretch, squeeze, and rotate it, and we can filter it through various plug-ins to generate wild graphic results.

- TrueType, OpenType, and PostScript outline fonts allow text to be drawn at any size on your computer screen without jaggies.

- **Jaggies** are avoided by anti-aliasing the edges of the text charac-ters, making them seem smoother to the eye.

Hypermedia and Hypertext:

- Multimedia—the combination of text, graphic, and audio elements into a single collection or presentation.

- Becomes interactive multimedia when you give the user some control over what information is viewed and when it is viewed.

- Interactive multimedia becomes hypermedia when its designer provides a structure of linked elements through which a user can navigate and interact.

- Hypertext is what the World Wide Web is all about.

- When text is stored in a computer instead of on printed pages, the computer's powerful processing capabilities can be applied to make the text more accessible and meaningful. The text can then be called **hyper-text.**

The Power of Hypertext:

- The hyper-text may be justified. It can provide a computer-supported information envi-ronment which can add to our appreciation of the text.

- It can go some way towards aping the mental ability of the human mind, can allow navigation along patterns of association.

- But the problems of constructing nonlinear documents are not few and can prove to be very complex.

Using Hypertext:

Hypertext have been designed to present electronic text, images, and other elements in a data-base fashion. Commercial systems have been used for large and compli-cated mixtures of text and images.

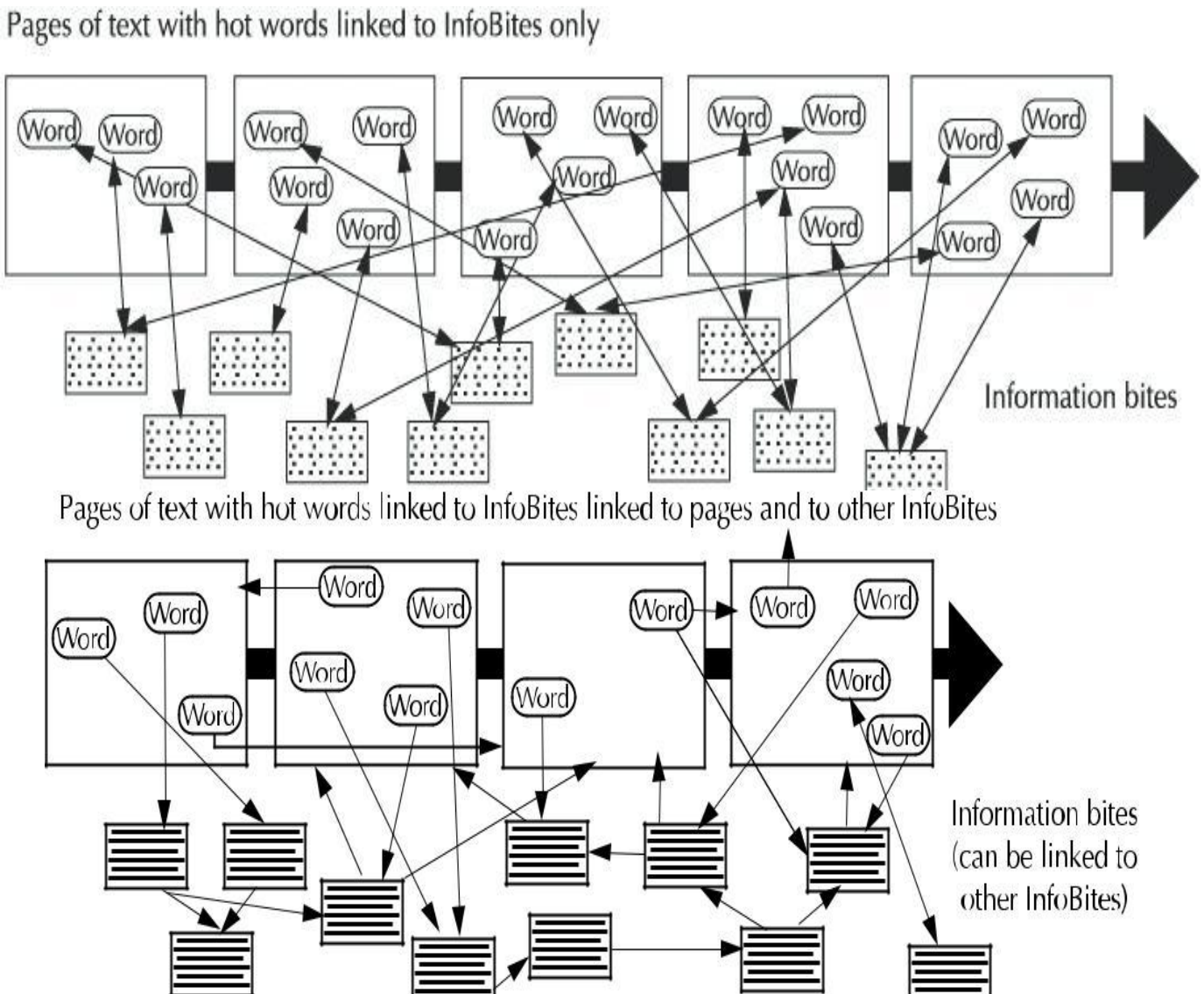
Google's search engine produces about 1,220,000,000 hits in less than a quarter of a second!

Searching for Words:

- ★ Categories
- ★ Word relationships
- ★ Adjacency
- ★ Alternates
- ★ Association
- ★ Negation
- ★ Truncation
- ★ Intermediate words
- ★ Frequency

Hypermedia Structures:

A typical navigation structure might look like the following:



Navigation becomes more complicated when you add associative links that connect elements not directly in the hierarchy or sequence.

- Hypertext systems are link and node.
- **Links** are connections between the conceptual elements.
- The **nodes**, which may consist of text, graphics, sounds, or related information in the knowledge base.
- The term **anchor** is used for the reference from one document to another document, image, sound, or file on the Web.
- A **link anchor** is where you come from; a **link end** is the destination node linked to the anchor.

Hypertext Tools:

Hypertext systems are currently used for,

- ★ electronic publishing
- ★ and reference works,
- ★ technical documentation,
- ★ educational courseware,
- ★ inter-active kiosks,
- ★ electronic catalogs,
- ★ interactive fiction,
- ★ text and image databases.

Unit – I Completed

CLASS : III - B.Sc [CS]
SUBJECT: MULTIMEDIA

UNIT : II

Images:

Multimediaon a computer screen is a composite ofelements: text, symbols, photograph-like bitmaps, vector-drawn graphics, three-dimensional renderings, distinctive buttons to click, and windows of motion videos.

Plan Approach:

- To get a handle on any multimedia project, you start with pencil, eraser, and paper.

- Outline your project and your graphic ideas first: make a flow-chart; storyboard the project using stick figures; use three-by-five index cards and shuffle them until you get it right.

Organize Tools:

- Most authoring systems provide the tools.

- We can create the graphic objects of multimedia (text, interactive buttons, vector-drawn objects, and bitmaps) directly on our screen.

- If one of these tools is not included, the authoring system usually offers a mechanism for importing the object you need from another application.

Configure Computer Workspace:

- When developing multimedia, it is helpful to have more than one monitor to provide lots of screen **real estate** (viewing area).
- In this way, we candisplay the full-screen working area of your project or presentation and still have space to put your tools and other menus.
- During development there is a lot of cutting and pasting among windows and among various applications, and with an extra monitor.

- we can open many windows at once and spread them out. Both Macintosh and Windows operating systems support this extra hardware.

Making Still Images:

- Still images may be small or large, or even full screen
- Still images may be a single tree on a wintry hillside
- still images are generated by the computer in two ways:
    - (i) **bitmaps** (or paint graphics)
    - (ii) **vector-drawn**(or just plain "drawn")

(i) Bitmaps:

- Bitmaps may also be called "raster" images.
- Likewise, bitmap editors are sometimes called "painting" programs.
- vector editors are sometimes called "drawing" programs.

(ii) **vector-drawn:**

- Vector-drawn objects are used for lines, boxes, circles, polygons.
- Other graphic shapes that can be mathematically expressed in angles, coordinates, and distances.
- A drawn object can be filled with color and patterns, and you can select it as a single object.

File formats already use compression within the file itself—

for example, **GIF**, **JPEG**, and **PNG**.

Bit Depth	Number of -Colors Possible	Available Binary Combinations for Describing a Color
1-bit	2	0, 1
2-bit	4	00, 01, 10, 11
4-bit	16	0000, 0001, 0011, 0111, 1111, 0010, 0100, 1000, 0110, 1100, 1010, 0101, 1110, 1101, 1001, 1011

Bitmap Sources:

Where do bitmaps come from? How are they made? You can do the following:

- Capture a bitmap from a photo or other artwork using a scanner to digitize the image.

- Once made, a bitmap can be copied, altered, e-mailed, and otherwise used in many creative ways.

- Grab a bitmap from an active computer screen with a screen capture program, and then paste it into a paint program or your application.

Bitmap Software:

- ★ Photoshop
- ★ Adobe's Illustrator
- ★ CorelDRAW
- ★ InDesign

Morphing:

- **Morphing** is another effect that can be used to manipulatestill images or to create interesting and often bizarre animated transformations.

- Morphing allows you to smoothly blend two images so that one image seems to melt into the next, often producing some amusing result.

Vector Drawing:

- Most multimedia authoring systems provide for use of vector-drawn objects such as
  - lines,
  - rectangles,
  - ovals,
  - polygons

complex drawings created from those objects, and text.

- Computer-aided design (CAD) programs have traditionally used vector-drawn object systems for creating the highly complex and geometric renderings needed by architects and engineers.

- Programs for 3-D animation also use vector-drawn graphics.

- The higher resolution of the printer, using a page description format such as Portable Docu-ment Format (PDF).

How Vector Drawing Works:

A **vector** is a line that is described by the location of its two endpoints.

Vector drawing uses **Cartesian coordinates** where a pair of numbers describes a point in two-dimensional space as the intersection of hori-zontal and vertical lines (the x and y axes).

In three-dimensional space, a third dimension depth is described by a z axis (x,y,z).

Simply,

<line x1="0" y1="0" x2="200" y2="100">

where x1 and y1 define the starting point (in the upper-left corner of the viewing box) and x2 and y2 define the end point.

Add color like,

<rect x="0" y="0" width="200" height="100" fill="#FFFFFF" stroke="#FF0000"/>

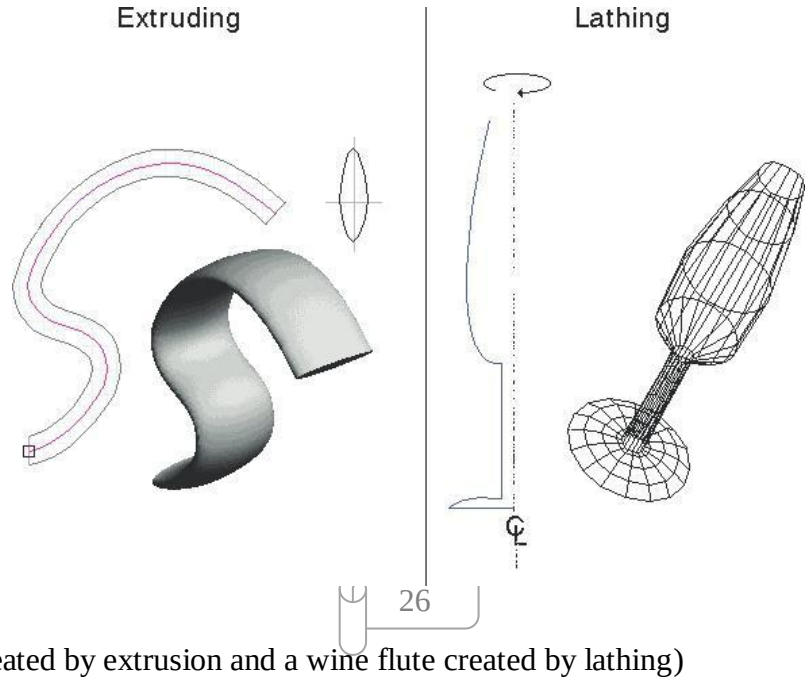
3-D Drawing and Rendering:

- A great deal of information is needed to display a 3-D scene. **Scenes** consist of **objects** that in turn contain many small elements such as blocks, cylinders, spheres, or cones.

- Objects and elements in 3-D space carry with them **properties** such as shape, color, texture, shading, and location.

➢ A scene contains many different objects. Imagine a scene with a table, chairs, and a background.

➢ To model an object that you want to place into your scene, you must start with a **shape.**



(A free-form objectcreated by extrusion and a wine flute created by lathing)

Extrude:

When we**extrude** a plane surface, its shape extends some distance, either perpendicular to the shape's outline or along a defined path.

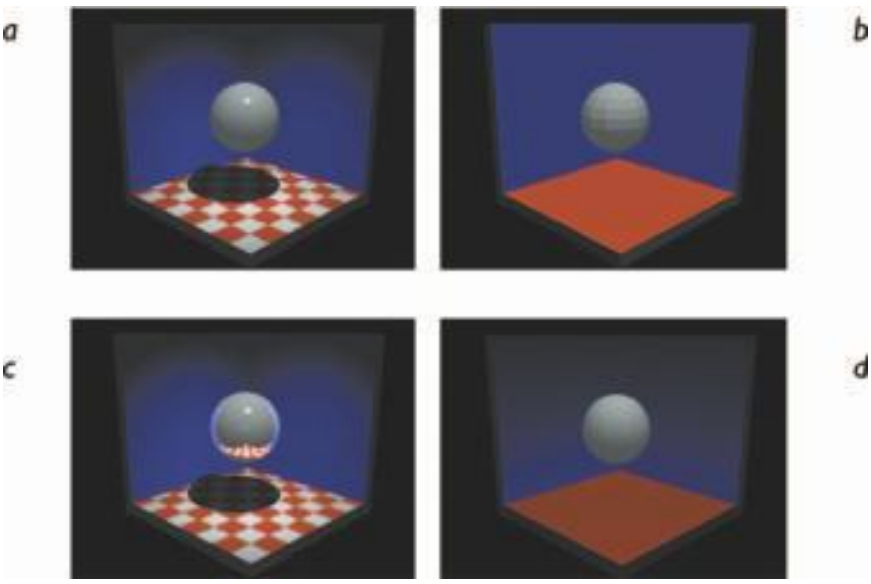
Lathe:

When we **lathe** a shape, a profile of the shape is **rotated** around a defined axis (we can set the direction) to create the 3-D object.

. **Rendering:**

Rendering is when the computer finally uses intricate algorithms to apply the effects you have specified on the objects you have created.

Rendering an image requires great computing muscle and often takes many hours for a single image, and you will feel the strength (or weakness) of your hardware.



(A scene rendered with four different methods of shading)

Shading:

Shading can usually be applied in several ways. As illustrated in above Figure, flat shading(b) is the fastest for the computer to render and is most often used in preview mode.Gouraud shading (*a*) , Phong shading (*d*), and ray tracing (*c*) take longer to render but provide photo-realistic images.

- ★ Gouraud shading (*a*)
- ★ flat shading (*b*)
- ★ ray tracing (*c*)
- ★ Phong shading (*d*)

Color:

Understanding Natural Light and Color:

- Color is a vital component of multimedia.

- Color is the frequency of a light wave within the narrow band of the electromagnetic spectrum to which the human eye responds.

- The letters of the mnemonic **ROY G. BIV**, learned by many of us to remember the colors of the rainbow, are the ascending frequencies of the visible light spectrum: red, orange, yellow, green, blue, indigo, and violet.

Computerized Color:

- Additive Color
- Subtractive Color

Additive Color:

A color is created by combining colored light sources in three primary colors: red, green, and blue (**RGB**). This is the process used for cathode ray tube (CRT), liquid crystal (LCD), and plasma displays.

Subtractive Color:

color is created by combining colored media such as paints or ink

Subtractive color is the process used to create color in printing.

The printed page is made up of tiny halftone dots of three primary colors: cyan, magenta, and yellow (designated as CMY).

Red only (255,0,0)	Red
Green only (0,255,0)	Green
Blue only (0,0,255)	Blue
Red and green (blue subtracted) (255,255,0)	Yellow
Red and blue (green subtracted) (255,0,255)	Magenta
Green and blue (red subtracted) (0,255,255)	Cyan
Red, green, and blue (255,255,255)	White
None (0,0,0)	Black

Computer Color Models:

- we specify a color by setting each amount of red, green, and blue to a value in a range of 256 choices, from 0 to 255.

- Eight bits of memory are required to define those 256 possible choices, and that has to be done for each of the three primary colors; a total of 24 bits of memory (8 + 8 +

8 = 24) are therefore needed to describe the exact color, which is one of "millions" (256 × 256 × 256 = 16,777,216).

- Two **hexadecimal** numbers, written in a scale of 16 numbers and letters in the range "0123456789ABCDEF" represent the required 8 bits (16 × 16 = 256) needed to specify the inten-sity of red, green, and blue.

- Thus, in HTML, you can specify pure green as #00FF00, where there is no red (first pair is #00), there is maximum green (second pair is #FF), and there is no blue (last pair is #00).

- The number sign (#) specifies the value as hexadecimal.

Red			
255 (#FF)	255 (#FF)	255 (#FF)	White (#FFFFFF)
255 (#FF)	255 (#FF)	0 (#00)	Yellow (#FFFF00)
255 (#FF)	0 (#00)	255 (#FF)	Magenta (#FF00FF)
0 (#00)	255 (#FF)	255 (#FF)	Cyan (#00FFFF)
255 (#FF)	0 (#00)	0 (#00)	Red (#FF0000)
0 (#00)	255 (#FF)	0 (#00)	Green (#00FF00)
0 (#00)	0 (#00)	255 (#FF)	Blue (#0000FF)
0 (#00)	0 (#00)	0 (#00)	Black (#000000)

Color Palettes:

Palettes are mathematical tables that define the color of a pixel displayedon the screen.

The most common palettes are 1, 4, 8, 16, and 24 bits deep.

Color Depth	
1-bit	Black and white (or any two colors)
4-bit	16 colors
8-bit	256 colors (good enough for color images)
16-bit	Thousands of colors (65,536; excellent for color images)
24-bit	More than 16 million colors (16,777,216; totally

GIF files using 256-color palettes are saved in a lossless format.

The PNG format also uses palettes 24-bits or 32 bits transparency and is lossless.

Dithering:

- Dithering is a process whereby the color value of each pixel is changed to the closest matching color value in the target palette, using a mathematical algorithm.
- Dithering software is usually built into image-editing programs.

Image File Formats:

Most applications on any operating system can manage.

- ★ JPEG
- ★ GIF
- ★ PNG
- ★ TIFF

- JPEG, PNG, and GIF images are the most common bitmap formats used on the Web and may be considered cross-platform, as all browsers will display them.
- **TIFF** Tagged Interchange File Format, was designed to be a universal bitmapped image format and is also used extensively in desktop publishing packages.

- **IGS** (or **IGES**, for **Initial GraphicsExchange Standard**) was developed by an industry committee as abroader standard for transferring CAD drawings.

- **PCX** files were originally developed for use in Z -Soft MS-DOS paint packages.

Sound:

- **S**oundis perhaps the most luxurious element of multimedia.

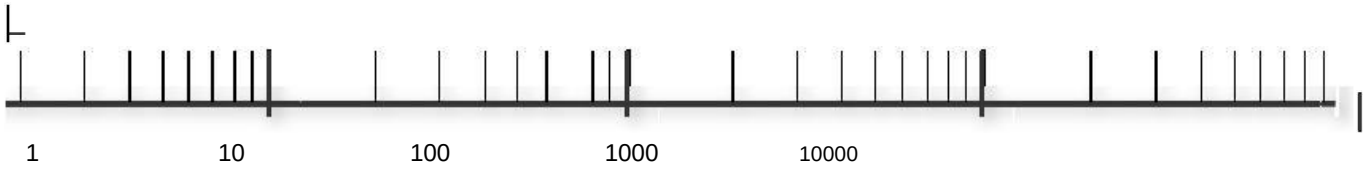
- Itis meaningful "speech" in any language, from a word to a squeal. It can provide the listening pleasure of music, the amazing pronunciation of special effects.

The Power of Sound:

- **Acoustics** is the branch of physics that studies sound.

- Sound pres-sure levels (loudness or volume) are measured in **decibels (dB).**

- A logarithmic scale is also used for measuring the power of earth-quakes



195	25–40 million	Saturn rocket
170	100,000	Jet engine with afterburner
160	10,000	Turbojet engine at 7,000-pounds thrust
150	1,000	ALSETEX splinterless stun grenade
140	100	2 JBL2226 speakers pulling 2,400 watts inside

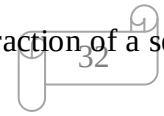
		an automobile
130	10	75-piece orchestra, at fortissimo
120	1	Large chipping hammer
110	0.1	Riveting machine
100	0.01	Automobile on highway
90	0.001	Subway train; a shouting voice
80	0.0001	Inside a 1952 Corvette at 60 mph
70	0.00001	Voice conversation; freight train 100 feet away
60	0.000001	Large department store
50	0.0000001	Average residence or small business office
40	0.00000001	Residential areas of Chicago at night
30	0.000000001	Very soft whisper
20	0.0000000001	Sound studio

(Typical Sound Levels in Decibels (dB) and Watts)

Digital Audio:

Digital audio is created when you represent the characteristics of a soundwave using numbers.

Digitized sound is sampled sound. Every *n*th fraction of a second, a **sample** of sound is taken and stored as digital information in bits andbytes.



The quality of this digital recording depends upon how often the samples are taken (**sampling rate** or frequency, measured in kilohertz, or thousands of samples per second).

The three sampling rates most often used in multimedia are,

- 44.1 kHz
- 22.05 kHz
- 11.025 kHz

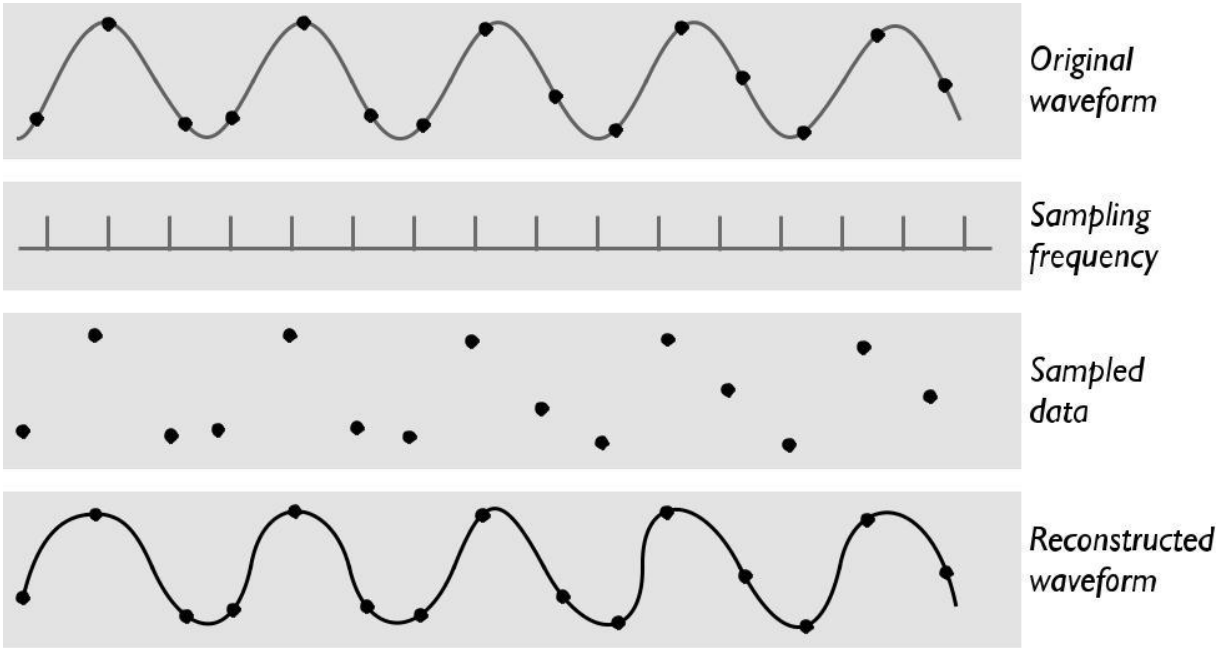
Sample sizes are either 8 bits or 16 bits.

8-bit sample:

An 8-bit sample size provides 256 equal measurement units to describe the level and frequency of the sound in that slice of time.

16-bit sample:

A 16-bit sample size, on the other hand, provides a staggering 65,536 equal units to describe the sound in that same slice of time.

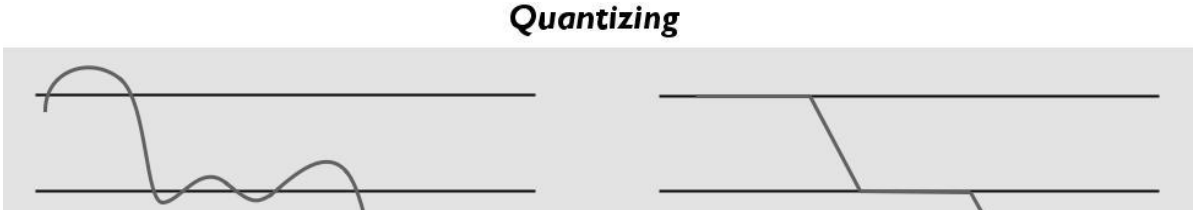


(Figure It is impossible to reconstruct the original waveform if the sampling frequency is too low.)

The value of each sample is rounded off to the nearest integer (**quantization**), and if the amplitude is greater than the intervals available, clipping of the top and bottom of the wave occurs.

Quantization:

Quantization can produce an unwanted background mocking noise, and clipping may severely distort the sound.



(Figure Examples of quantizing and clipping)

Making Digital Audio Files:

- Setting Proper Recording Levels
- Editing Digital Recordings

Setting Proper Recording Levels:

- Any good piece of digital audio recording and editing software will display digital meters to let you know how loud your sound is.

- Watch the meters closely during recording analog meters that usually have a 0 setting somewhere in the middle and extend up into ranges like +5, +8, or even higher, digital meters peak out.

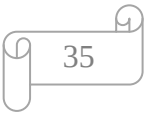
- To avoid distortion, do not cross over this limit. If this happens, lower your volume and try again. Try to keep peak levels between 3 and –10.

Editing Digital Recordings:

- Audacity is free open-source sound editing application for Windows, Macintosh, and Linux (http://audacity.sourceforge.net).

- The basic sound editing operations

★ Trimming
★ Splicing and Assembly
★ Volume Adjustments
★ Format Conversion
★ Resampling or Down sampling
★ Fade-ins and Fade-outs
★ Equalization
★ Time Stretching
★ Digital Signal Processing (DSP)
★ Reversing Sounds
★ Multiple Tracks



Trimming:

- Removing "dead air" or blank space from the recording and any unnecessary extra time off .

- Trimming is typically accomplished by dragging the mouse cursor over a graphic representation of our recording and choosing a menu command such as Cut, Clear, Erase, or Silence.

Splicing and Assembly:

- we will probably want to remove the extraneous noises that inevitably creep into a recording.

- we may need to assemble longer recordings by cutting and pasting together many shorter ones.

Volume Adjustments:

- It is best to use a sound editor to **normalize** the assembled audio file to a particular level, say 80 percent to 90 percent of maximum (without clip-ping), or about –16 dB.

Format Conversion:

- we have a Digital Rights Management (DRM) protected MP4 file downloaded from the iTunes store and burn that file to an Audio CD track, the DRM data will be lost because the Audio CD format does not provide for DRM data.

- The now-unprotected tune on the CD can then be ripped into a playable **MP3** format.

Resampling or Down sampling:

- If you have recorded and edited yoursounds at 16-bit sampling rates but are using lower rates and resolutions in your project, you must **resample** or **downsample** the file.

Fade-ins and Fade-outs:

- Fade in or fade out helps to smooth out the very beginning and the very end of a sound file.

Equalization:

- It offer **digital equalization (EQ)** capabilities that allow we to modify a recording's frequency content.

Time Stretching:

- Let we alter the length (in time)of a sound file without changing its pitch. This feature can be very useful.

Digital Signal Processing (DSP):

- It allow you to processthe signal with echo, multitap delay, chorus, flange, and other spe-cial effects using **digital signal processing (DSP)** routines**.**

Reversing Sounds:

- Another simple manipulation is to reverse all or aportion of a digital audio recording.
- Sounds, particularly spoken dialog, can produce a strangeeffect when played backward.

Multiple Tracks:

- Being able to edit and combine multiple tracks forsound effects, voice, music, etc.

MIDI Audio:

- **MIDI** (Musical Instrument Digital Interface) is a communications standard developed in the early 1980s for electronic musical instruments andcomputers.

- **MIDI** provides a protocol for passing detailed descriptions of a musical score, such as the notes, the sequences of notes, and the instrument that will play these notes.

- But MIDI data is not digitized sound; it is a shorthand representation of music stored in numeric form.

- A **MIDI keyboard** is also useful for simplifying the creation of musical scores.

0	Acoustic grand piano	16	Hammond organ
1	Bright acoustic piano	17	Percussive organ
2	Electric grand piano	18	Rock organ
3	Honky-tonk piano	19	Church organ
4	Rhodes piano	20	Reed organ
5	Chorused piano	21	Accordion
6	Harpsichord	22	Harmonica

7	Clarinet	23	Tango accordion
8	Celesta	24	Acoustic guitar (nylon)
9	Glockenspiel	25	Acoustic guitar (steel)
10	Music box	26	Electric guitar (jazz)
11	Vibraphone	27	Electric guitar (clean)
12	Marimba	28	Electric guitar (muted)
13	Xylophone	29	Overdriven guitar
14	Tubular bells	30	Distortion guitar
15	Dulcimer	31	Guitar harmonics

(General MIDI Instrument Sounds)

MIDI vs. Digital Audio:

- In contrast to MIDI data, digital audio data is the actual representation of a sound, stored in the form of thousands of individual numbers *(samples).*

- The digital data represents the instantaneous amplitude (or loudness) of a sound at discrete slices of time.

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- MIDI data is to digital audio data what vector or drawn graphics are to bitmapped graphics. That is, MIDI data is device dependent; digital data is not.

Advantages of MIDI:

i. MIDI files are much more compact than digital audio files, and the size of a MIDI file is completely independent of playback quality.

ii. MIDI files will be 200 to 1,000 times smaller than CD- quality digital audio files. Because MIDI files are small, they don't take up as much memory, disk space, or bandwidth.

Advantages of Digital Audio:

1. consistent play-back quality
2. more frequently
3. sound as good

Multimedia System Sounds:

- In Windows, system sounds are WAV files, and they be located in the Windows\Media subdirectory.

- System event sounds include

  - start.wav
  - chimes.wav
  - chord.wav
  - ding.wav
  - logoff.wav
  - notify.wav
  - recycle.wav
  - tada. wav

and the Microsoft sound.wav that typically plays when Windows starts up.

- In OS X on a Macintosh, you can only change your system alert sound.

- Put your custom sound file (in **AIF format**) into ~/System/Library/Sounds, then select it in the Sound preference pane.

Audio File Formats:

- There are many ways to store the bits and bytes that describe a sampled waveform sound.

- The method used for consumer-grade music CDs is -**Linear Pulse Code Modulation (LPCM)**, often shortened to PCM. An audio CD provides up to 80 minutes of playing time.

- LPCM tracks from an audio CD are usually converted and stored on a computer in uncompressed **AIFF** (Audio Interchange File Format) or **wave format (WAV)** files when copied from the CD.

- The MP3 format was developed by the Moving Picture Experts Group (**MPEG**) for storing consumer audio.

- It incorporates a "**lossy**" compression algorithm to save space.

- MP4 is a format based on Apple's **QuickTime movie (.mov)** "con-tainer" model and is similar to the MOV format, which stores various types of media, particularly time-based streams such as audio and video.

- The m4a extension is used when the file contains only audio data.

- M4p files contain only audio, but are encrypted for Digital Rights Management (DRM).

- M4r files are used for ringtones on Apple's iPhone.

- The AAC (Advanced Audio Coding) format, which is part of the MP4 model, was adopted by Apple's iTunes store, and many music files are commercially available in this format.

- Flash video files (FLV) contain both a video stream and an audio stream, and the FLV format has been adopted by YouTube, Google, Yahoo, Reuters.com, BBC.com, CNN.com, and other news pro-viders for Internet delivery of content.

Vaughan's Law of Multimedia Minimums:

There is an acceptable **minimum** level of adequacy that will satisfy the audience, even when that level may not be the best that technology, money, or time and effort can buy.

Adding Sound to Your Multimedia Project:

- Edit the sounds to fit your project.
- Test the sounds to be sure they are timed properly with the project's images.

Space Considerations:

The following formula will help you estimate your storage needs.

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If you are using two channels for stereo, double the result.

(sampling rate * bits per sample) / 8 = bytes per second

If you prefer to solve for kilobytes (KB), not bytes, then try:

sample rate * sample size / 8 * # seconds * 2 (if stereo) = file size in KB

For example, 60 seconds of stereo in Red Book Audio:

44.1 * 16 / 8 * 60 * 2 = 10,584KB ≅ 10.59MB

Audio Recording:

Digital audio tape (DAT) systems provide a tape-based 44.1 kHz,16-bit record and playback capability.

- USB and flash memory recorders range in quality, some suitable for voice only, some generating compressed MP3 files, and some recording in CD-quality stereo.

- Recordings can be directly downloaded as digital files using a USB cable or flash memory card reader.

Audio CDs:

The method for digitally encoding the high-quality stereo of the consumer CD music market is an international standard, called **ISO 10149**. This isalso known as the **Red Book Audio** standard

The digital audio sample size and sampling rate of Red Book Audio (16 bits at 44.1 kHz) allow accurate reproduction of all the sounds that humans can hear.

Unlike DVDs, audio CDs do not contain information about artists, titles, or tracklists of songs.
But player software such as Apple iTunes and AOL Winamp will automatically link to a database on the Internet when you insert a music CD.

Sound for Your Mobile:

When the mobile receives a notice that someone is calling, the unit's software takes over and, depending on the programmed options, plays the user's choice of ringtone—either generated by internal MIDI software or played from a stored sound file.

MP3 files will play on most mobiles.

Sound for the Internet:

The simplest way to embed a sound file in a web page is to call it from an inline HTML anchor:
 Click here to play MySound!

Streaming files are dependent upon connection speed.

Media players are designed to play files as soon as enough of the data is cached in your computer's **buffer.**

Testing and Evaluation:

- Putting everything together can be tough, but testing and evaluating what you've done can be even tougher—especially if your project involves a complicated live presentation, or if you're shipping a commercial multi-media application.

- In the world of professional film and video production, sound is incorporated during **post-production**, or a **post-session**, after all the film and video footage has been assembled.

Copyright Issues:

- Ownership rights are significant issues for multimedia.
- A number of software vendors have entered the multimedia mar-ketplace by selling digitized clip sounds with an unlimited-use, royalty-free license.

Unit – II Completed

CLASS : III - B.Sc [CS] **SUBJECT: MULTIMEDIA** **Mr. L. JAYASEELAN**

UNIT : III

Animation:

- **Animation**makes static presentations come alive.

- Itis visual change over time and can add great power to our multimedia projects and web pages.
- Many multimedia applications for both -Macintosh and Windows provide animation tools.

The Power of Motion:

Visual effects such as wipes, fades, zooms, and dissolves are avail-able in most multimedia authoring packages, and some of these can be used for primitive animation.

Animation is an object actually moving across or *into* or *out of* the screen.

Motion design can incorporate:

- shapes
- text
- lines
- illustrations
- photography
- 3D objects
- video etc.

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There are two kinds of motion design defined

I. Scripted/canned motion
II. Direct manipulation motion

I. Scripted/canned motion:

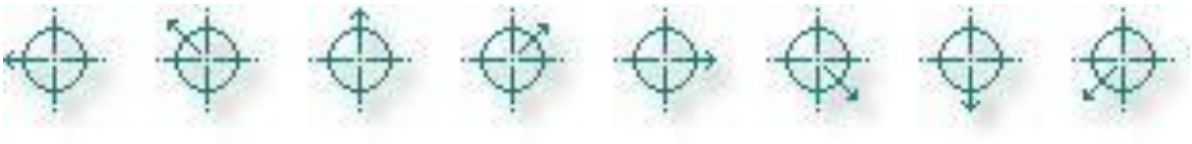
Animations that automatically occur without the control of the user.

II. Direct manipulation motion:

A motion that occurs as a result of an interactive action initiated by a user.

Principles of Animation:

Animation is possible because of a **biological phenomenon** known as persistence of vision and a **psychological phenomenon** called**phi.**



- The illustration shows a few cells, or frames, of a rotating logo.

  When the images are progressively and rapidly changed, the arrow the compass is perceived to be spinning.

- Digital television video builds 24, 30, or 60 entire frames or pictures every second, depending upon settings.

- Each frame is shown three times before the pull-down claw moves to the next frame, for a total of 72 flickers per second, which helps to eliminate the flicker effect.

Animation By Computer:

Using appropriate software and techniques, you can animate visual images in many ways

- ★ 2-D animation
- ★ 2½-D animation
- ★ 3-D animation

2-D animation:

In 2-D space, the visual changes that bring an image alive occur on the **flat Cartesian x and y axes of the screen.**

Path animation in 2-D space increases the complexity of an animation and provides motion, changing the location of an image along a predetermined path (position) during a specified amount of time (speed).

2½-D animation:

In **2½-D animation**, an illusion of depth (the z axis) is added to an image through **shadowing and highlighting**.

3-D animation:

In **3-D animation**, software creates a virtual realm in three dimensions, and changes (motion) are calculated along all three axes (x, y, and z), allowing an image or object that itself is created with a front, back, sides, top, and bottom to move toward or away from the viewer.

Animation Techniques:

- **Cel Animation**
- **Tweening**
- **Computer Animation**
- **Kinematics**
- **Morphing**

Cel Animation:

- The term **cel** derives from the clear celluloid sheets that were used for drawing each frame.
- Cel animation artwork begins with keyframes (the first and lastframe of an action).

For example, when an animated figure of a woman walks across the screen, she balances the weight of her entire body on one foot and then the other in a series of falls and recoveries, with the opposite foot and leg catching up to support the body.

Tweening:

Tweening is an action that requires calculating the number of frames between keyframes and the path the action takes, and then actually sketching with pencil the series of progressively different outlines.

Computer Animation:

In path-based 2-D and 2½-D animation, an animator simply creates an object (or imports an object as clip art) and describes a path for the object to follow.

Kinematics:

Kinematics is the study of the movement and motion ofstructures that have joints, such as a walking man.

Animating a walk-ing step is complicated,we need to calculate the position, rotation, velocity, and acceleration of all the joints and articulated parts involved—knees bend, hips flex, shoulders swing, and the head bobs.

Morphing:

Morphing is a popular (if not overused) effect in which oneimage transforms into another.

Morphing applications and other model-ing tools that offer this effect can transition not only between still images but often between moving images as well.

Animation File Formats:

Some file formats are designed specifically to contain animations.

- **Director (.dir and .dcr)**
- **AnimatorPro (.fli and .flc)**
- **3D Studio Max (.max)**
- **GIF89a (.gif)**
- **Flash (.fla and .swf).**

- A Director's native movie file (.dir), for example, must be preprocessed and compressed into a proprietary Shockwave animation file (.dcr) for the Web.

- **Flash, widely used for web-based animation**, makes extensive use of vector graphics.

- The Windows Audio Video Interleaved for-**mat (.avi),** QuickTime **(.qt, .mov**), or Motion Picture Experts Group video **(.mpeg or .mpg).** These can be played using the media players.

Making Animations That Work:

- The most widely used tool for creating multi- media animations for **Macintosh and Windows** environments and for the Web is **Adobe's Flash**.

- **Flash directly supports several 2½-D features**, including **z-axis positioning**, automatic sizing **and perspective adjustment, and kinematics.**

A Rolling Ball:

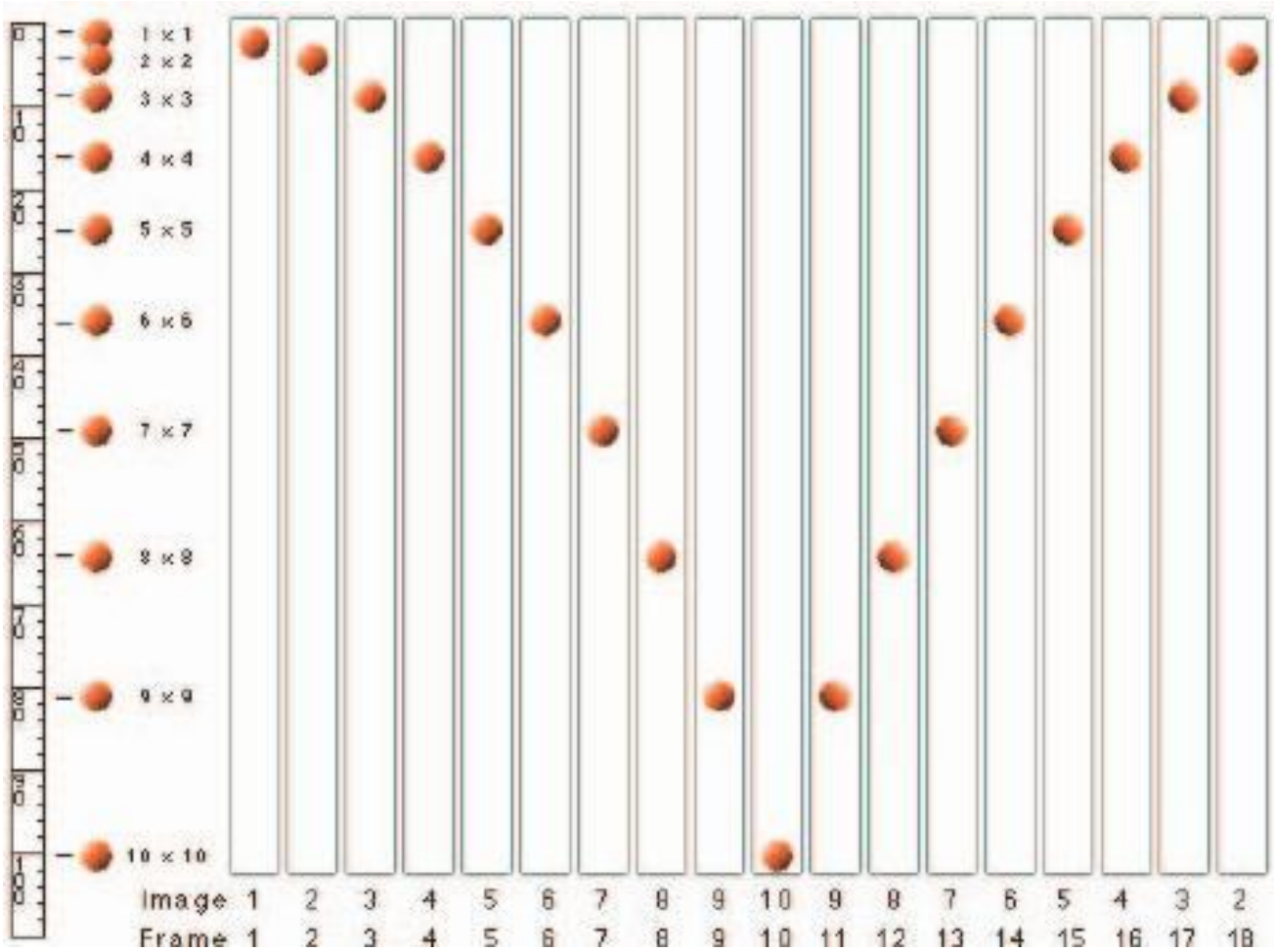
First, create a new, blank image file that is 100 × 100 pixels, and fill it with a sphere.
Create a new layer in Photoshop, and place some text on this layer at the center of the image.

Make the text spherical using -Photoshop's "Spherize" distortion filter, and save the result.

Rotate the image in 45-degree increments to create a total of eight images, rotating a full **circle of 360 degrees.**

The sphere spins is divided by 8. As each image is successively displayed, the ball is moved 40 pixels along a line.

A Bouncing Ball:



(**Figure:**To make a bouncing ball seem natural, don't forget the acceleration effects of gravity. If loop the18 images shown here, the ball will bounce forever)

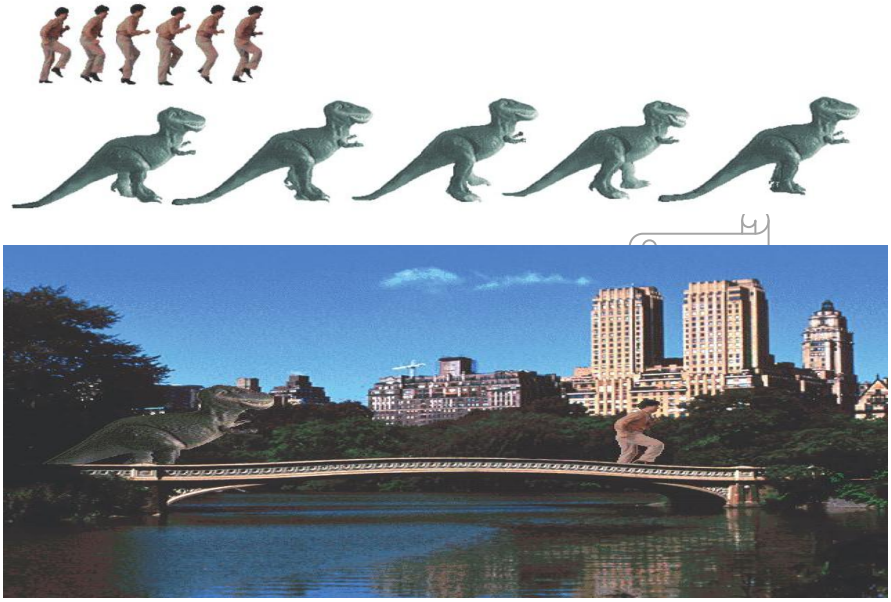
In the formula, *s* equals distance, *a* equals acceleration due to gravity, and *t* equals time:

$$s = \frac{1}{2} at^2$$

Gravity makes your bouncing ball accelerate on its downward course and decelerate on its upward course (when it moves slower and slower until it actually stops and then accelerates downward again).

Simply figure that your ball will uniformly accelerate and decelerate up and down the pixels of your screen by the squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100 are the squares of 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10.

Creating an Animated Scene:



- To produce frames of the running man, a real actor was videotaped running in place against an Ultimate**chroma-keyed blue background in a studio.**

- A few frames of this were grabbed, and the **blue background was madetransparent in each image.**

Video:

- Digital video is the most engaging of multimedia venues, and it is a powerful tool for bringing computer users closer to the real world.

- It is also an excel-lent method for delivering multimedia to an audience raised on television.

Using Video:

Compression (and decompression), using special software called a **codec**, allows a massive amount of imagery to be squeezed into a comparatively small data file.

A specific compression standard, such as MPEG2 for **Digital-Versatile Disc (DVD)** playback or **MPEG4** for home video.

we caninstall a superfast **RAID (Redundant Array of Independent Disks)** system that will support high-speed data transfer rates.

Working with Videos and Displays:

When light reflected from an object passes through a video camera lens, that light is converted into an electronic signal by a special sensor called a **charge-coupled device (CCD).**

- Analog video
- Digital video

Analog video:

- Analog video has a resolution measured in the number of hori-zontal scan lines.

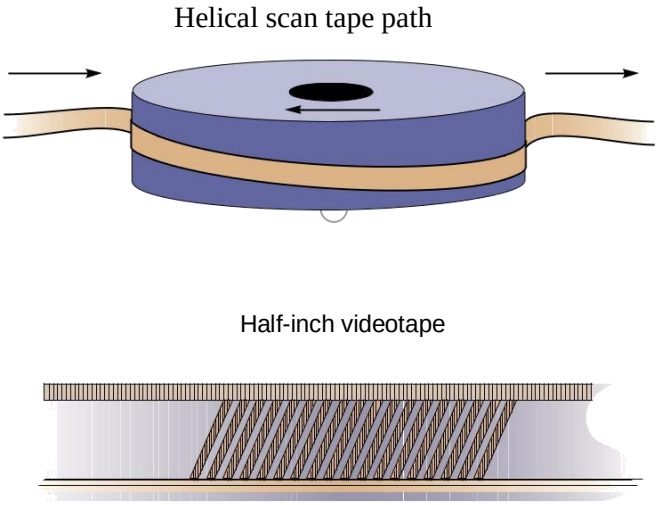
- In an analog system, the output of the CCD is processed by the camera into three channels of color information and synchronization pulses (sync) and the signals are recorded onto **magnetic tape.**

- The analog video and audio signals are written to tape by a spinning recording head that changes the local magnetic properties of the tape's surface in a series of long **diagonal stripes.**

- Because the head is canted or tilted at a slight angle compared with the path of the tape, it follows a helical (spiral) path, which is called **helical scan** recording.

- A single video frame is made up of two fields that are **interlaced.**

- **Tracking** is the fine adjustment of the tape during playback so that the tracks are properly aligned as the tape moves across the playback head.



(Diagram of tape path across the video head for analog recording)

Many television sets today also provide a composite signal connector, a S-Video connec-tor, and a **High--Definition Multimedia Interface (HDMI)** connector for purely digital input.

Video displays for computers typically provide analog component (red, green, blue) input through a 15 -pin **VGA -connector** and also a purely digital **Digital Visual Interface (DVI)** and/or an HDMI connection.

NTSC:

National Television StandardsCommittee (NTSC). These standards defined a method for **encodinginformation** into the electronic signal that ultimately created a televi-sion picture.

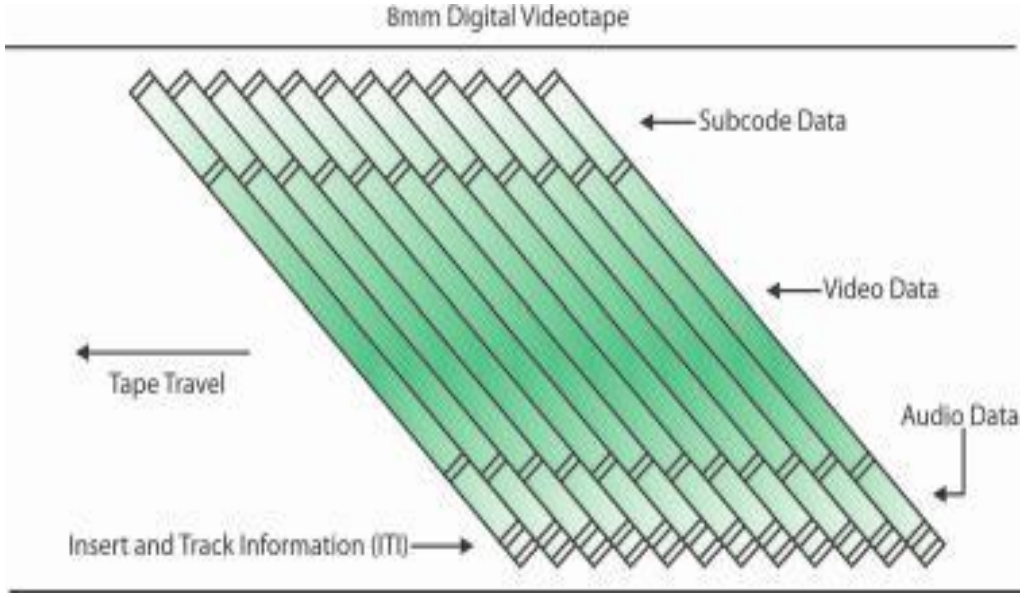
PAL:

The **Phase Alternate Line (PAL)** system increased the screen resolution to 625 horizontal lines, but slowed the scan rate to **25 frames per second.**

SECAM:

The **Sequential Color and Memory (SECAM)** was used 625-line, 50 Hz system.

Digital Video:



(Diagram of tape path across the video head for digital recording)

The video and audio data are compressedbefore being written to a tape
or digitally stored to disc or flash memory in one of several proprietary and competing formats.

HDTV:

HDTV standard by the **Advanced -TelevisionSystems Committee (ATSC)**.

HDTV provides high resolution in a **16:9** aspect ratio.

This aspect ratio allows the viewing of Cinemascope and Panavision movies.

Displays:

- Colored phosphors on a **cathode ray tube (CRT)** screen glow red, green, or blue when they are energized by an electron beam.

- Flat screen displays are all-digital, using either **liquid crystal display(LCD)** or **plasma** technologies, and have supplanted CRTs for computeruse.

- If a video clip is stored as data on a hard disk, CD-ROM, DVD, or other mass-storage device, that clip can be played back on a computer's monitor without special hardware.

Digital Video Containers:

A digital video architecture is made up of an algorithm for compressing and encoding video and audio, a container in which to put the compressed data, and a player that can recognize and play back those files.

- ★ Flash Video (.flv),
- ★ MPEG (.mp4),
- ★ QuickTime (.mov),
- ★ Windows Media Format (.wmv),
- ★ WebM (.webm),
- ★ and RealMedia (.rm).

Containers may include data compressed by a choice of codecs, and media players may recognize and play back more than one video file container format.

Codecs:

- A codec is the algorithm used to compress a video for delivery and then decode it in real time for fast playback.

- Different codecs are optimized for different methods of delivery (for example, from a hard drive, from a DVD, or over the Web).

MPEG:

The MPEG standards were developed by the **Moving Picture ExpertsGroup.**

A working group convened by the Inter-national Organization for Standardization (ISO) and the International Electro-technical Commission (IEC), which created standards for the digital representation of moving pictures as well as associated audio and other data.

- MPEG-1
- MPEG-2
- MPEG-4

MPEG-1could deliver 1.2 Mbps of video and 250 Kbps of two-channel stereo audio using CD-ROM technology.

MPEG-2 completely different systemfrom MPEG-1, required higher data rates (3 to 15 Mbps) but also deliv-ered higher image resolution, improved picture quality, interlaced video formats, multiresolution scalability, and multichannel audio features.

MPEG-2 became the video compression standard required for digital television (DTV) and for making DVDs.

MPEG-4 provides a content-based method for assimilating mul-timedia elements.
It offers indexing, hyperlinking, querying, browsing, uploading, downloading, and deleting functions, as well as "hybrid natural and synthetic data coding,"

Video Format Converters:

- DVD video uses MPEG-2 compression
- Blu-ray video uses MPEG-4 AVC compression

Obtaining Video Clips:

- Video screen capture tools for both PC and Macintosh systems will generate video files that can then be edited and integrated with audio.

- To import video in a wide variety of formats (AVI, MOV, FLV, MPEG) and edit it into your final project.

- "**Footage**" is a legacy term from the film and analog world for your video clips.

Shooting and Editing Video:

To understand at least the basics of video recording and editing, as well as the constraints of using video in a multimedia project.

- ★ Fast processor(s)
- ★ Plenty of RAM
- ★ Computer with FireWire (IEEE 1394 or i.Link) or USB connection and cables
- ★ Fast and big hard disk(s)
- ★ A second display to allow for more real estate for your editing software
- ★ External speakers
- ★ Nonlinear editing (NLE) software

The Shooting Platform:

There are two ways to convert from 16:9 to 4:3.

(i) The ***Letterbox***or **hard matte** method produces blank bars at top and bottom, but leaves the original image untouched;

(ii) ***Pan and Scan,*** on the other hand, loses both sides of the original image. When using the Pan and Scan method for conversion, editors will carefully pan across wide scenes to capture the best area to show.

Videographers and wide-screen moviemakers often consider a 4:3 "safe frame" area when setting up their wide shots, knowing that their work will be converted to 4:3 for the DVD.

Storyboarding:

- A sequential group of drawings showing camera and scene, shooting angles, lighting, action, special effects, and how objects move through from start to finish.

- A storyboard can get everyone on one page quickly.

Lighting:

- Perhaps the greatest difference between professional camcorders and consumer camcorders is their ability to perform at low light levels.

- When you are shooting blue screen, be sure that the lighting of the screen is absolutely.

Chroma Keys:

- **Chroma keys** allow you to choose a color or range of colors that becometransparent, allowing the video image to be seen "through" the computer image.

- This is the technology used by a newscast's weather person, who is shot against a blue background that is made invisible when merged with the electronically generated image of the weather map.

- The weatherman controls the computer part of the display with a small handheld controller.

Nonlinear Editing (NLE):

Simple cutting and editing of footage, with a few transitions and titles thrown in, then you may be satisfied with simpler software such as Microsoft's Windows Live Movie Maker.

Top-of-the-line **nonlinear editing (NLE)** software includes,

- ★ Adobe's Premiere,
- ★ Apple's Final Cut
- ★ Avid's Media Composer

Unit – III Completed

CLASS : III - B.Sc [CS] **SUBJECT: MULTIMEDIA**

Making Multimedia:

The Stages of a Multimedia Project:

Here are the four basic stages in a multimedia project:

- ★ Planning and costing
- ★ Designing and producing
- ★ Testing
- ★ Delivering

Planning and costing:

- ➢ A project always begins with an idea or aneed that you then refine by outlining its messages and objectives.
- ➢ Before you begin developing, plan out the writing skills, graphic art, music, video, and other multimedia exper-tise that you will require.
- ➢ Estimate the time you'll need to do all the elements, and then prepare a budget.

Designing and producing:

- ➢ During this stage, there may be many feedback cycles with a client until the client is happy.

Testing:

- ➢ Test our programs to make sure that they meet theobjectives of our project, work properly on the intended delivery platforms, and meet the needs of our client or end user.

Delivering:

Package and deliver the project to the end user. Beprepared to follow up over time with tweaks, repairs, and upgrades.

The Intangible Needs

- ★ Creativity

- ★ Organization
- ★ Communication
- ★ Hardware
- ★ Software

The Hardware Needs:

The two most significant platforms for producing and delivering multimedia projects:

- Apple Macintoshoperating system
- Microsoft Windows OS
-

Windows	Mac	Other
90.76%	4.32%	4.92%

- ➢ Microsoft is a software company.
- ➢ Apple is a hardware manufacturing company.
- ➢ Macintoshes to run natively with any x86 operating system, same as Windows.
- ➢ All recent models of Macintosh come with the latest Mac operating system, and using Boot Camp or Parallels software, Macs can also run the Windows operating system.

Networking Macintosh and Windows Computers:

- Internet service provider(ISP)
- wide area networks (WANs)
- Ethernet
- WiFi
- client/server software
- Local area networks (LANs**)**

Connections:

➢ The equipment required for developing your multimedia project will depend on the content of the project as well as its design.

- various device connection methodologies and their data transfer rates.

Connection	Transfer Rate
Serial port	115 Kbps (0.115 Mbps)
Standard parallel port	115 Kbps (0.115 Mbps)
USB (Original 1.0)	12 Mbps (1.5 Mbps)
SCSI-2 (Fast SCSI)	80 Mbps
SCSI (Wide SCSI)	160 Mbps
Ultra2 SCSI	320 Mbps
FireWire 400 (IEEE 1394)	400 Mbps
USB (Hi-Speed 2.0)	480 Mbps
SCSI (Wide Ultra2)	640 Mbps
FireWire 800 (IEEE 1394)	800 Mbps
SCSI (Wide Ultra3)	1,280 Mbps
SATA 150	1,500 Mbps
SCSI (Ultra4)	2,560 Mbps
SATA 300	3,000 Mbps
FireWire 3200 (IEEE 1394)	3,144 Mbps
USB (Super-Speed 3.0)	3,200 Mbps
SCSI (Ultra5)	5,120 Mbps
SATA 600	6,000 Mbps
Fibre Channel (Optic)	10,520 Mbps

(Table Maximum Transfer Rates for Various Connections in Megabits Per Second)

SCSI:

- The **Small Computer System Interface** (**SCSI**) connections may connect *internal* devices such as hard drives that are inside the chassis of our computer and use the computer's power supply.

- External devices,which are outside the chassis, use their own power supply, and are plugged into the computer by cable.

IDE, EIDE, Ultra IDE, ATA, and Ultra- ATA:

- **Integrated Drive Electronics (IDE)** connections, also known as **Advanced Technology Attachment (ATA)** connections, are typicallyonly internal, and they connect hard disks, CD-ROM drives, and other peripherals mounted inside the PC.

USB:

- To promote a **Universal Serial Bus (USB)** standard for connecting devices to a computer ("**plug-and-play**").

- USB connections are now common on video game consoles, cameras, GPS locators, cell phones, televisions, MP3 players, PDAs, and portable memory devices.

FireWire and i.LINK (IEEE 1394):

- **FireWire** was introduced by Apple.
- (IEEE 1394) supporting high-bandwidth serial data transfer, particularly for digital video and mass storage.

Memory and Storage Devices:

- Random Access Memory (RAM)
- Read-Only Memory (ROM)
- Hard Disks
- Flash Memory or Thumb Drives
- CD-ROM Discs
- Digital Versatile Discs (DVD)
- Blu-ray Discs

Input Devices:

- Optical character recognition (OCR) software - Scanner
- Barcode readers - Universal Product Code (UPC)
- Voice recognitionsystems –Noise canceling microphone

Output Devices:

- Cathode-ray tube (CRT) projectors

- Liquid crystal display (LCD) panels
- Digital Light Processing (DLP) projectors
- Liquid crystal on silicon (LCOS) projectors
- Grating-Light-Valve (GLV) technology (for larger projects)

The Software Needs:

The basic tool set for building multimedia projects contains one or more authoring systems and various editing applications for text, images,sounds, and motion video.

Text Editing and Word Processing Tools:

- A **word processor** is usually the first software tool computer users for multimedia.
- The better your **keyboarding** or typing skills, the easier and more efficient your multimedia.
- That wordprocessor comes bundled in an **office suite** that might include spread-sheet, database, e-mail, web browser, and presentation applications.

OCR Software:

- OCR software turns bitmapped characters into electronically rec-ognizable ASCII text.
- A scanner is typically used to create the bitmap.
- Most OCR applications claim about 99 percent accuracy when reading 8- to 36-point printed characters at 300 dpi and can reach process-ing speeds of about 150 characters per second.
- The text areas of the image are then converted to ASCII characters using probability and expert system algo-rithms.

Painting and Drawing Tools:

- Painting software
- Drawing software

Painting software isdedicated to producing crafted bitmap images.

Ex:

- **P**hotoshop
- Fireworks
- Painter

Drawing softwareis dedicated to producing vector-based line art easily printed to paper at high resolution.

Ex:

- CorelDraw
- FreeHand
- Illustrator
- Designer
- Canvas

3-D Modeling and Animation Tools:

Powerful modeling packages such as

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- ★ AutoDesk's Maya
- ★ Strata 3D
- ★ Avid's SoftImage

Blender is a powerful (and free) cross-platform 3-D modeling program.

Google SketchUp is a free 3-D modeling program with limited capabili-ties, but with a large online library of components.

Features of 3-D modeling tool:

A good 3-D modeling tool should include the following features

- ➢ Multiple windows that allow you to view your model in each dimen-sion, from the camera's perspective, and in a rendered preview
- ➢ The ability to drag and drop primitive shapes into a scene.
- ➢ The ability to create and sculpt organic objects from scratch.

- Lathe and extrude features.
- Color and texture mapping.
- The ability to add realistic effects such as transparency, shadowing, and fog.
- The ability to add spot, local, and global lights, to place them any-where, and manipulate them for special lighting effects.
- Unlimited cameras with focal length control.
- The ability to draw spline-based paths for animation.

Image-Editing Tools:

Image-editing applications are specialized and powerful tools forcreating, enhancing, and retouching existing bitmapped images.

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Features:

- Multiple windows that provide views of more than one image at a time
- Direct inputs of images from scanner and video sources
- Good masking features
- Multiple undo and restore features
- The ability to resample and resize an image.
- 24-bit color, 8- or 4-bit indexed color, 8-bit gray-scale, black-and-white, and customizable color palettes.
- **Filters** for special effects, such as crystallize, dry brush, emboss, facet,fresco, graphic pen, mosaic, pixelize, poster, ripple, smooth, splatter, stucco, twirl, watercolor, wave, and wind.

Sound-Editing Tools:

- Sound-editing tools for both digitized and MIDI sound.

➢ By drawing a representation of a sound in fine incre-ments, whether a score or a waveform, you can cut, copy, paste, and other-wise.

Animation, Video, and Digital Movie Tools:

Moviemaking tools such as,

- Premiere
- Final Cut Pro
- VideoShop
- MediaStudio Pro

An Authoring System Needs:

➢ Multimedia authoring tools provide the important framework we need for organizing and editing the elements of our multimedia project, including graphics, sounds, animations, and video clips.

➢ Authoring tools are used for designing interactivity and the user interface, for presenting your project on screen.

➢ With multi-media authoring software, you can make

★ Video productions
★ Animations
★ Games
★ Interactive web sites
★ Demo disks and guided tours
★ Presentations
★ Kiosk applications
★ Interactive training
★ Simulations, prototypes, and technical visualizations.

Types of Authoring Tools:

▪ Card- and Page-Based Authoring Tools

- Icon- and Object-Based Authoring Tools
- Time-Based Authoring Tools

Card- and Page-Based Authoring Tools:

- Page-based authoring systems such as LiveCode
- contain media objects: buttons, text fields, graphic objects, backgrounds, pages or cards, and even the project itself.
- Card- and page-based systems typically provide **Two** separate layers on each card:
  I. **Background layer** that can be shared among many cards.
  II. **Foreground layer** that is specific to a single card.

Icon- and Object-Based Authoring Tools:

- Icon-based, event-driven tools provide a visual programming approach to organizing and presenting multimedia.

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- Icon- or object-based, event-driven tools simplify the project and typically display flow diagrams of activities along branching paths.

Time-Based Authoring Tools:

- **Time-based tools** are authoring systems, wherein elements and eventsare organized along a timeline, with resolutions as high as or higher than 1/30 second.
- Flash is a time-based development environment.
- Adobe's Director is a powerful and complex multimediaauthoring tool with a broad set of features to create multimedia presenta-tions, animations, and interactive multimedia applications.

Multimedia Production Team:

- ★ Project Manager
- ★ Multimedia Designer
- ★ Interface Designer
- ★ Writer
- ★ Video Specialist
- ★ Audio Specialist
- ★ Multimedia Programmer
- ★ Producer of Multimedia for the Web
- ★ The Sum of Parts

Project Manager:

- ➢ A project manager's role is at the center of the action.
- ➢ The **project manager** is the glue that holds it together.
  - ★ Budgets
  - ★ Schedules
  - ★ Creative sessions
  - ★ Time sheets
  - ★ Illness
  - ★ Invoices
  - ★ Team dynamics

Multimedia Designer:

- ➢ Graphic designers, illustrators, animators, and image processing spe-cialists deal with the visuals.
  - ★ Instructional designers
  - ★ Interface designers
  - ★ Information designers

Interface Designer:

- ➢ An interface provides control to the people who use it.

- It also provides access to the "media" part of multimedia, meaning the text, graphics, animation, audio, and video without calling attention to itself.

Writer:

- Multimedia writers do everything writers of linear media do, and more.
- They create character, action, and point of view
- A traditional **scriptwriter**'s tools of the trade and they also create interactivity.

Video Specialist:

- For high-quality productions, it may still be necessary for a **videospecialist** to be responsible for an entire team of videographers, soundtechnicians, lighting designers, set designers, script supervisors, gaffers, grips, production assistants, and actors.

Audio Specialist:

- The quality of audio elements can make or break a multimedia project.
- **Audio specialists** are the wizards who make a multimedia program comealive, by designing and producing music, voice-over narrations, and sound effects.

Multimedia Programmer:

- A **multimedia programmer** or software engineer integrates all the multimedia elements of a project into a seamless whole using an authoring system or programming language.
- Without programming talent, there can be no multimedia.
- Code, whether written in JavaScript, OpenScript, Lingo, RevTalk, PHP, Java, or C++, is the sheet music played by a well multimedia project.

Producer of Multimedia for the Web:

- Web site **producer** is a new occupation, but putting together a coordinated set of pages for the World Wide Web requires the same creative process, skill sets, and (often) teamwork as any kind of multimedia does.

Role of Producer:

- ★ Designing
- ★ Implementing
- ★ Maintaining

The Sum of Parts:

- ★ Artists and related workers
- ★ Multi-Media Artists
- ★ Animators
- ★ Designers

★ Television, video, and motion picture camera operators and editors.

★ Writers and editors

Unit – IV Completed

CLASS : III - B.Sc [CS] **SUBJECT: MULTIMEDIA**

UNIT : V

Planning and Costing:

We begin a multimedia project, we must develop an organized outline and a plan that is rational in terms of the skills, time, budget, tools, and resources we have at hand.

The Process of Making Multimedia:

- ★ Idea Analysis
- ★ Pretesting
- ★ Task Planning
- ★ Prototype Development

- ★ Alpha Development
- ★ Beta Development
- ★ Delivery

Idea Analysis:

- ➢ Who is your intended audience? Who will be your end users?
- ➢ How can you organize your project?
- ➢ What multimedia elements (text, sounds, and visuals) will deliver your message?
- ➢ What are your capabilities and skills with both the software and the hardware?
- ➢ Can you do it alone? Who can help you?
- ➢ How much time do you have?
- ➢ How much money do you have?
- ➢ How will you distribute the final project?
- ➢ Will you need to update and/or support the final product?

Idea Management Software:

Software such as,

- ★ dotProject
- ★ kForge
- ★ OpenProj
- ★ GanttProject

- ➢ Project management software typically provides **Critical PathMethod (CPM)** scheduling functions to calculate the total durationof a project.
- ➢ **Program Evaluation Review Technique (PERT) charts** provide graphic representations of task.
- ➢ **Gantt charts** depict all the tasks along a timeline.

Pretesting:

- ➢ Work up a prototype of the project on paper, with an explanation of how it will work.
- ➢ All of these steps help us organize our idea and test it against the real world.

Task Planning:

- ➢ There may be many tasks in our multimedia project.

- ★ Assemble Team

- ★ Revise Design
- ★ Create Graphics
- ★ Create Animations
- ★ Produce Audio
- ★ Produce Video
- ★ Digitize Audio and Video
- ★ Fix Bugs
- ★ Test Functionality

Prototype Development:

- For the prototype, sometimes called a **proof-of-concept** or **feasibility study**, we might select only a smallportion of a large project and get that part working as it would in the final product.

Alpha Development:

- With an **alpha** stage prototype in hand and a commitment to proceed, the investment of effort will increase and, at the same time, become more focused.

- More people may become involved as you begin to flesh out the project as a whole.

Beta Development:

- By the time your idea reaches the **beta** stage of development, you will have committed serious time, energy, and money, and it is likely too late to bail out.

Delivery:

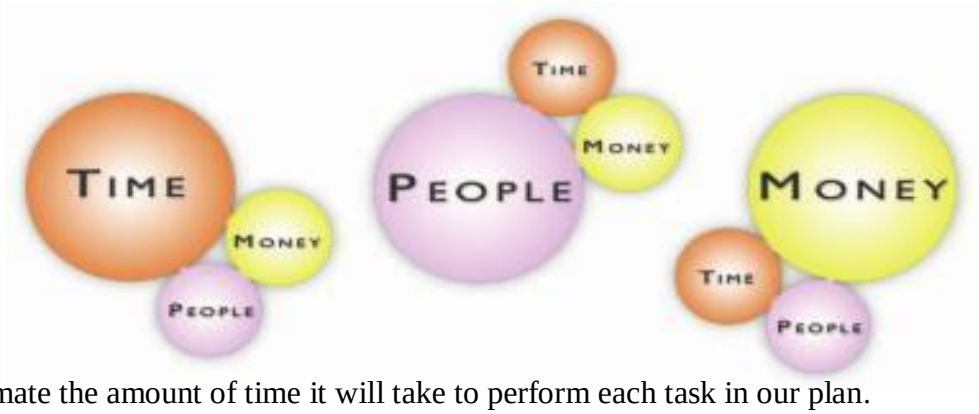
- By the time we reach the delivery stage, we are **going gold**—producing the final product.
- The alpha, beta, and final gold stages of project delivery for CD-ROM, DVD, and the Web.

Scheduling:

- To create this schedule, you must estimate the total time required for each task and then allocate this time among the number of persons who will be asynchronously working on the project.
- Scheduling can be difficult for multimedia projects because so much of the making of multimedia is artistic trial and error.

- A recorded sound will need to be edited and perhaps altered many times.
- Animations need to be run again and again and adjusted so that they are smooth and properly placed.
- A QuickTime or MPEG movie may require many hours of editing and tweaking before it works in sync with other screen activities.
- Scheduling multimedia projects is also difficult because the technol-ogy of computer hardware and software is in constant flux, and upgrades.

Estimating:



- To estimate the amount of time it will take to perform each task in our plan.
- Multiply this estimate by your hourly billing rate.
- Sum the total costs for each task, and you now have an estimate of the project's total time and cost.

Billing Rates:

- Typical billing rates for multimedia production companies and web designers range from **$60** to **$150** an hour, depending upon the work being done and the person doing it.
- Our billing rate should be set according to your cost of doing business plus a reasonable profit margin.

Example Cost Sheets:

- ★ Project development costs
- ★ Production costs

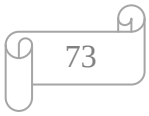
- ★ Testing costs
- ★ Distribution costs

Project development costs:

- Salaries
- Client meetings
- Communication
- Travel
- Research

Production costs:

- Management
- Content Creation
- Graphics Production
- clips Audio Production
- Video Production
- Authoring



Testing costs:

- Salaries
- Printing costs
- Food and incentives

Distribution costs:

- Documentation
- Packaging
- Manufacturing
- Marketing
- Advertising
- Shipping

RFPs and Bid Proposals:

- **Request forProposal (RFP)** typically detailed documents from large corporations that are "outsourcing" their multimedia development work.

Electronic Communications RFP:

- ★ Multimedia Presentation Capabilities
- ★ External Web Site
- ★ Internal Web Site

Production Elements for all Electronic Communications:

- ★ Icons
- ★ Interface Design
- ★ Visual Image
- ★ Photography

Bid proposal:

- A multimedia bid proposal will be passed through several levels of a company so that managers and directors can evaluate the project's quality and its price.
- In the body of the proposal, include a section dealing with creative issues, and describe our method for conveying the client's message ormeeting the graphic and interactive goals of the project.
- If necessary, identify the members of our staff who will work on the project, and list their roles and qualifications.
- The backbone of the proposal is the estimate and project plan that we have created up to this point.
- It describes the scope of the work.
- If the project is complicated, prepare a brief synopsis of both the plan and the timetable.

The Cover and Package:

- Develop your own special style for a proposal cover and package, including custom fonts, cover art and graphics, illustrations and figures, unique section and paragraph styles, and a clean binding.

- Do your proposal first class.
- Make the entire package plain and simple.

Table of Contents:

- A table of contents or index is a straightforward way to present the elements of your proposal in condensed overview.
- In some situations, you may also wish to include an **executive summary**
- The summary should be on the cover page or immediately following.

Target Audience:

- All multimedia proposals should include a section that describes the target audience and target platform.
- When the end user's multimedia capabilities have a broad and uncertain range, it is crucial to describe the hardware and software delivery platform you intend to provide.

Creative Strategy:

- A **creative strategy** section—a description of the look and feel of the project itself.

Project Implementation:

- A proposal must describe the way a project will be organized and scheduled.
- Our estimate of costs and expenses will be based upon this description.
- The Project Implementation section of your proposal may contain a detailed calendar, PERT and Gantt project planning charts, and lists of specific tasks with associated completion dates, deliverables, and work hours.

Budget:

- The budget relates directly to the scope of work, we have laid out in the project implementation section.

Designing and Producing:

Designing:

- The design part of your project is where your knowledge and skill with computers.

- Our talent in graphic arts, video, and music; and your ability to conceptualize logical pathways through information are all focused to create the real thing.

- Design is thinking, choosing, making, and doing.

- It is shaping, smoothing, reworking, polishing, testing, and editing.

- When you design your project, your ideas and concepts are moved one step closer to reality.

Designing the Structure:

- A multimedia project is no more than an arrangement of text, graphic, sound, and video elements (or *objects*).
- The way you compose these elements into interactive experiences is shaped by our purpose and messages.

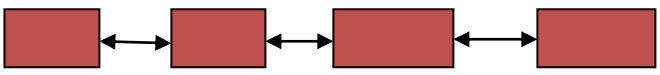
Navigation:

- Navigation maps outline the connections or links among various areas of our content and help us organize our content and messages.

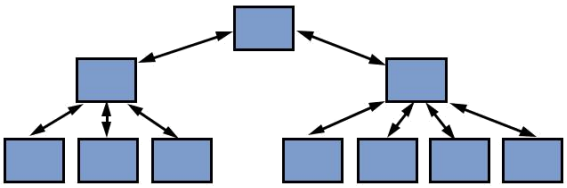
- A **navigation map** (or **site map**) provides a table of contents as well as a chart of the logical flow of the interactive interface.

- A few basic structures for multimedia projects will cover most cases:

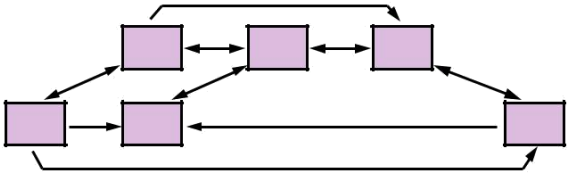
    - Linear navigation
    - Hierarchical navigation
    - Nonlinear navigation
    - Composite navigation.

Linear 

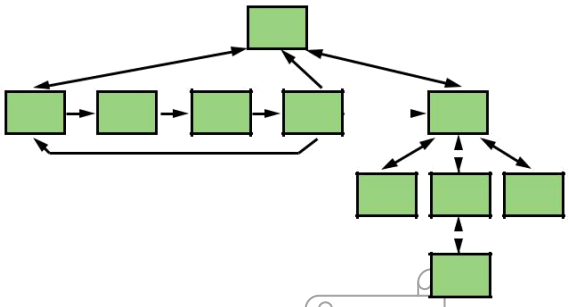
Hierarchical



Nonlinear



Composite



(The four primary navigational structures used in multimedia)

- **Linear**:Users navigate sequentially, from one frame or bite of information to another.
- **Hierarchical:** Also called "linear with branching," since users navigate along the branches of a tree structure that is shaped by the natural logic of the content.
- **Nonlinear:**Users navigate freely through the content of the project,unbound by predetermined routes.
- **Composite:** Users may navigate freely(nonlinearly) but are occasionally con-strained to linear presentations of movies or critical information and/or to data that is most logically organized in a hierarchy.

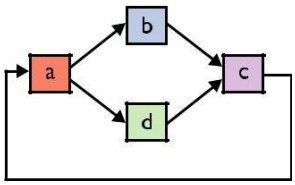
Structural Depth:

Two types of structure,

I. Depth structure

II. Surface structure

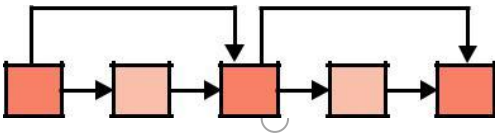
I. Depth structure:



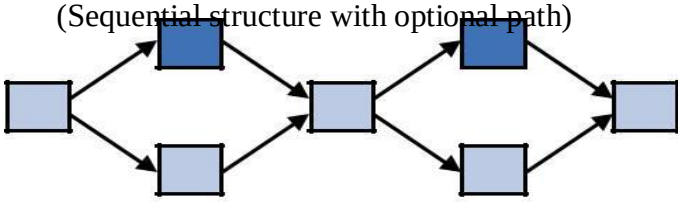
- **Depth structure** represents the complete navigation map and describes all the links between all the components of our project.

II. Surface structure:

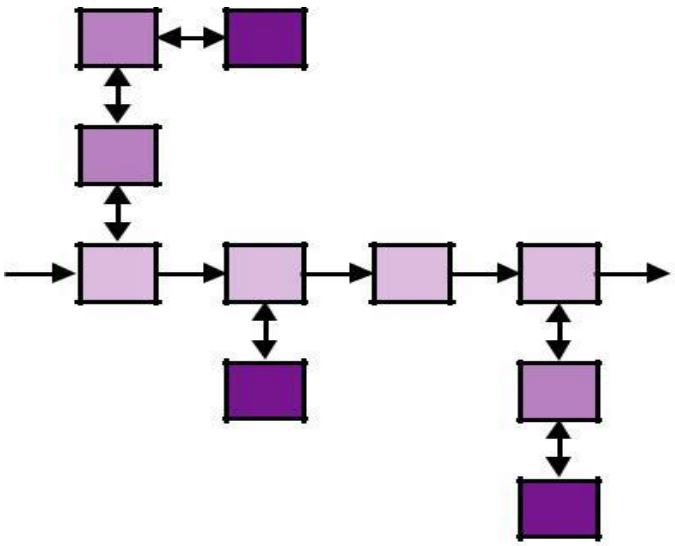
- **Surface structure**, on the other hand, represents the structures actually realized by a user while navigating the depth structure.
- Some surface structures generated by users might look like this:



(Sequential structure with optional path)



Sequential structure with alternative paths



- Surface structures are of particular interest to marketing firms in tracking users' routes through a web site to determine the effectiveness of the site's design and to profile a user's preferences.

- When a user's preferences are known, a custom web site experience can be dynamically tailored and delivered to that user.

- Most multimedia authoring systems allows to make,

  - ★ Hot spot
  - ★ Hyperlink
  - ★ Button
  - ★ Icons

Designing the User Interface:

- The **user interface** of your multimedia product is a combine of its graphic elements and its navigation system.
  - ★ Novice/Expert Modes
  - ★ GUIs
  - ★ Graphical Approaches
  - ★ Audio Interfaces

Producing:

- **Production** is the phase when your multimedia project is actually rendered.

- During this phase you will contend with important and continuous organizing tasks.

Starting Up:

- Best computers you can give?

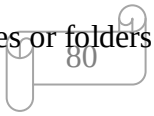
- Biggest (or most) monitors you can give?
- Sufficient disk storage space for all work files?
- System for regular backup of critical files?
- Latest version of your primary authoring software?
- Latest versions of software tools and accessories?
- Communication pathways open with client?
- Financial arrangements secure (retainer in the bank)?
- Expertise lined up for all stages of the project?

Working with Clients:

- Client Approval Cycles
- Data Storage Media and Transportation

Tracking:

- Organize a method for tracking the receipt of material that you will incorporate into your multimedia project.
- Store the files in directories or folders with logical names.



Copyrights:

- Commonly used authoring platforms may allow access to the software programming code or script that drives a particular project.
- The source code of HTML pages on the Web may also be easily viewed.

Content and Talent:

- Every multimedia project includes content.
- It is also the information and material that forms the heart of your project, and it is that which defines what our project is about.
- Content can be any and all of the elements of multimedia.
- Content can have low and high **production value.**

Acquiring Content:

- **Content acquisition** can be one of the most expensive and time-consumingtasks in organizing a multimedia project.
- We must plan ahead, allocating sufficient time (and money) for this task.

Using Content Created by Others:

- When a work is created, certain rights, such as for the work's public display or performance, its use in a broadcast, or its reproduction, are granted to its creator.

- Among the rights most relevant to a multimedia producer are **electronic rights**—the rights to publish a work in a computer-basedstorage and delivery medium such as a CD-ROM or on the Web.

Locating Preexisting Content:

- Preexisting content can come from a variety of sources.
- We may be able to use material from collections of **clip art**.
- Such collections of photographs, graphics, sounds, music, animation, and video are becoming widely available from many sources, for anywhere from fifty to several hundred dollars.

Copyrights:

- **Copyright protection** applies to "original works of authorship fixed in anytangible medium of expression."
- The Copyright Act of 1976, as amendedprotects the legal rights of the creator of an original work.
- **copyright ownership** (for example, "Copyright © 2010 by Tay Vaughan").

Obtaining Rights:

- We may still be able to **license** the rights to use that material.
- That different rights for the same copyrighted work (for example, rights for public performance, broadcast use, or publication) may be assigned to different parties.

- We may be given a standard **rate card**listing licensing fees for different uses, formats, and markets.

- Some **licensing agreements** may be as simple as a signed permission letter or release form describing how you may use the material.

Copyleft:

- Copyleft represents a serious and growing worldwide effort to"grant the right to freely copy, distribute, and transform creative works without infringing the author's rights.

- Effectively, copyleft uses the copyright laws them-selves to remove traditional copyright protections from a work and offer that work with legal and unlimited permission clearly granted to freely copy, modify, transform, or distribute the work.

Ownership of Content Created for Project:

- The ownership of a project created by employees in the course of their employment belongs solely to the employer if the work fits the requirements of a"**work made for hire**."
- If the individual contributing to a project is not an employee, the commissioned work must fall within one of the following agreement in writing from every individual contributing to the work that it is being created as a "**work for hire**".

- The copyright ownership of works created in whole or in part by persons who fall under the definition of **independent contractor** may belong to that contractor unless the work is specially ordered or commissioned for use and qualifies as a work made for hire, in which case the copyright belongs to the entity commissioning the work.

Acquiring Talent:

- **AFTRA (American Federation ofTelevision and Radio Artists)** or **SAG (Screen Actors Guild)**. They areusually represented by a talent agent or agency.

Locating the Professionals You Need:

- Begin by calling a **talent agency** and explain what we need. The agency will probably suggest several clients who might fit your needs and send you to their web site for video or audio samples of the actors' work.

- After reviewing the samples, you can arrange **auditions** of the best candidates, at our office or at a studio.

- We can also get in touch with several agencies and put out a **casting call** for screen or audio auditions.

Working with Union Contracts:

The two unions are,

1. AFTRA (American Federation ofTelevision and Radio Artists)
2. SAG (Screen Actors Guild)

- AFTRA and SAG, have similar contracts and terms for minimum pay and benefits.
- AFTRA has approved an Interactive Media Agreement to cover on- and off-camera performers on all interactive media platforms.

Acquiring Releases:

- A union talent contract explicitly states what rights you have to the still and motion images and voices you make and use.

- If, however, your talent is nonunion be sure to require the person to sign a **release form**.

- This form grants to you certain permissions and specifies the terms under which you can use the material you make during a recording session.

- For more about video and music releases and sample forms, check out www.current.tv/make/resources.

Unit – V Completed

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