UNIT 6
Introduction to Multimedia

Introduction

- Multimedia is the media that uses multiple forms of information content and information processing (e.g. text, audio, graphics, animation, video, interactivity) to inform or entertain the user.

- Multimedia also refers to the use of electronic media to store and experience multimedia content. Multimedia is similar to traditional mixed media in fine art, but with a broader scope. The term "rich media" is synonymous for interactive multimedia.

- Multimedia elements

- • Text

- • Graphics

- • Audio

- • Video

- • Animation

- • Interactivity

Categories of Multimedia

- Multimedia may be broadly divided into linear and non-linear categories.

- **Linear active content** progresses without any navigation control for the viewer such as a cinema presentation. **Non-linear content** offers user interactivity to control progress as used with a computer game or used in self-paced computer based training. Non-linear content is also known as hypermedia content.

- Multimedia presentations can be live or recorded. A recorded presentation may allow interactivity via a navigation system. A live multimedia presentation may allow interactivity via interaction with the presenter or performer.

Features of Multimedia

- **Multimedia presentations** may be viewed in person on stage, projected, transmitted, or played locally with a media player. A broadcast may be a live or recorded multimedia presentation. Broadcasts and recordings can be either analog or digital electronic media technology. Digital online multimedia may be downloaded or streamed. Streaming multimedia may be live or on-demand.

- **Multimedia games and simulations** may be used in a physical environment with special effects, with multiple users in an online network, or locally with an offline computer, game system, or simulator

Application of Multimedia

- Creative Industries

- Commercial

- Entertainment and Fine Arts

- Education

- Engineering

- Industry

- Mathematical & Scientific Research

- Medicine

- Multimedia in Public Places

- **Creative Industries:-**
- Creative industries use multimedia for a variety of purposes ranging from fine arts, to entertainment, to commercial art, to journalism, to media and software services provided for any of the industries listed below.

- **Commercial**
- Much of the electronic old and new media utilized by commercial artists is multimedia.
- Exciting presentations are used to grab and keep attention in advertising. Industrial, business to business, and interoffice communications are often developed by creative services firms for advanced multimedia presentations beyond simple slide shows to sell ideas.

- **Entertainment and Fine Arts**

- In addition, multimedia is heavily used in the entertainment industry, especially to develop special effects in movies and animations.

- Multimedia games are a popular pastime and are software programs available either as CD-ROMs or online.

- Some video games also use multimedia features.

- **Education**

- In Education, multimedia is used to produce computer-based training courses (popularly called CBTs) and reference books like encyclopaedia .

- A CBT lets the user go through a series of presentations, text about a particular topic.

- **Engineering**
- Software engineers may use multimedia in Computer Simulations for anything from entertainment to training such as military or industrial training.

- **Industry**
- In the Industrial sector, multimedia is used as a way to help present information to shareholders, superiors and co-workers.
- Multimedia is also helpful for providing employee training, advertising and selling products all over the world via virtually unlimited web-based technologies.

- **Mathematical & Scientific Research**
- In Mathematical and Scientific Research, multimedia is mainly used for modeling and simulation. For example, a scientist can look at a molecular model of a particular substance and manipulate it to arrive at a new substance.

- **Medicine**
- In Medicine, doctors can get trained by looking at a virtual surgery or they can simulate how the human body is affected by diseases spread by viruses and bacteria and then develop techniques to prevent it.

- **Multimedia in Public Places**
- In hotels, railway stations, shopping malls, museums, and grocery stores, multimedia will become available at stand-alone terminals or kiosks to provide information and help.

Stages of Multimedia Application Development

- **Planning and Costing :**

- This stage of multimedia application is the first stage which begins with an idea or need. This idea can be further refined by outlining its messages and objectives. Before starting to develop the multimedia project, it is necessary to plan what writing skills, graphic art, music, video and other multimedia expertise will be required.

- **Designing and Producing:**

- The next stage is to execute each of the planned tasks and create a finished product.

- **Testing :**
- Testing a project ensure the product to be free from bugs.
- Apart from bug elimination another aspect of testing is to ensure that the multimedia application meets the objectives of the project.

- **Delivering :**
- The final stage of the multimedia application development is to pack the project and deliver the completed project to the end user.

Delivering Methods of Multimedia Content

- CD-ROM
- DVD
- About Flash Drives
- About Internet

All About Text

- Introduction:-

- All multimedia content consists of texts in some form. Even a menu text is accompanied by a single action such as mouse click, keystroke or finger pressed in the monitor (in case of a touch screen). The text in the multimedia is used to communicate information to the user. Proper use of text and words in multimedia presentation will help the content developer to communicate the idea and message to the user.

Multimedia Building Blocks

- Any multimedia application consists any or all of the following components:

- **1. Text:** Text and symbols are very important for communication in any medium. With the recent explosion of the Internet and World Wide Web, text has become more the important than ever. Web is HTML (Hyper text Markup language) originally designed to display simple text documents on computer screens, with occasional graphic images thrown in as illustrations.

- **2. Audio:** Sound is perhaps the most element of multimedia. It can provide the listening pleasure of music, the startling accent of special effects or the ambience of a mood-setting background.

- **3. Images**: Images whether represented analog or digital plays a vital role in a multimedia. It is expressed in the form of still picture, painting or a photograph taken through a digital camera.

- **4. Animation:** Animation is the rapid display of a sequence of images of 2D artwork or model positions in order to create an illusion of movement. It is an optical illusion of motion due to the phenomenon of persistence of vision, and can be created and demonstrated in a number of ways.

- **5. Video:** Digital video has supplanted analog video as the method of choice for making video for multimedia use. Video in multimedia are used to portray real time moving pictures in a multimedia project.

Text in Multimedia

- ## About Fonts and Faces

- A typeface is family of graphic characters that usually includes many type sizes and styles. A font is a collection of characters of a single size and style belonging to a particular typeface family. Typical font styles are bold face and italic. Other style attributes such as underlining and outlining of characters, may be added at the users choice.

- The size of a text is usually measured in points. One point is approximately 1/72 of an inch i.e. 0.0138. The size of a font does not exactly describe the height or width of its characters. This is because the x-height (the height of lower case character x) of two fonts may differ. Typefaces of fonts can be described in many ways, but the most common characterization of a typeface is serif and sans serif. The serif is the little decoration at the end of a letter stroke.

- Times, Times New Roman, Bookman are some fonts which comes under serif category. Arial, Optima, Verdana are some examples of sans serif font. Serif fonts are generally used for body of the text for better readability and sans serif fonts are generally used for headings. The following fonts shows a few categories of serif and sans serif fonts.

- **F**   **F**

(Serif Font)   (Sans serif font)

Selecting Text fonts

- It is a very difficult process to choose the fonts to be used in a multimedia presentation. Following are a few guidelines which help to choose a font in a multimedia presentation.

- • As many number of typefaces can be used in a single presentation, this concept of using many fonts in a single page is called ransom-note topography.

- • For small type, it is advisable to use the most legible font.

- • In large size headlines, the kerning (spacing between the letters) can be adjusted.

- • In text blocks, the leading for the most pleasing line can be adjusted.

- • Drop caps and initial caps can be used to accent the words.

- • The different effects and colors of a font can be chosen in order to make the text look in a distinct manner.

- • Anti aliased can be used to make a text look gentle and blended.

- • For special attention to the text the words can be wrapped onto a sphere or bent like a wave.

- • Meaningful words and phrases can be used for links and menu items.

- **Computers and Text**
- Fonts
- Postscript fonts are a method of describing an image in terms of mathematical constructs (Bezier curves), so it is used not only to describe the individual characters of a font but also to describe illustrations and whole pages of text. Since postscript makes use of mathematical formula, it can be easily scaled bigger or smaller. Apple and Microsoft announced a joint effort to develop a better and faster quadratic curves outline font methodology, called truetype In addition to printing smooth characters on printers, TrueType would draw characters to a low resolution (72 dpi or 96 dpi) monitor.

- ## Character Set and Alphabets
- (i) ASCII Character set
- The American standard code for information interchange (SCII) is the 7 bit character coding system most commonly used by computer systems in the United states and abroad. ASCII assigns a number of value to 128 characters, including both lower and uppercase letters, punctuation marks, Arabic numbers and math symbols. 32 control characters are also included. These control characters are used for device control messages, such as carriage return, line feed, tab and form feed.

- (ii) The Extended Character set
- A byte which consists of 8 bits is the most commonly used building block for computer processing. ASCII uses only 7 bits to code is 128 characters; the 8th bit of the byte is unused. This extra bit allows another 128 characters to be encoded before the byte is used up, and computer systems today use these extra 128 values for an extended character set. The extended character set is commonly filled with ANSI (American National Standards Institute) standard characters, including frequently used symbols.
- (iii) Unicode
- Unicode makes use of 16-bit architecture for multilingual text and character encoding. Unicode uses about 65,000 characters from all known languages and alphabets in the world. Several languages share a set of symbols that have a historically related derivation, the shared symbols of each language are unified into collections of symbols (Called scripts)

- **Font Editing and Design Tools**
- There are several software that can be used to create customized font. These tools help an multimedia developer to communicate his idea or the graphic feeling. Using these software different typefaces can be created.
- In some multimedia projects it may be required to create special characters. Using the font editing tools it is possible to create a special symbols and use it in the entire text.
- Following is the list of software that can be used for editing and creating fonts:
- • Fontographer
- • Fontmonger
- • Cool 3D text
- Special font editing tools can be used to make your own type so you can communicate an idea or graphic feeling exactly. With these tools professional typographers create distinct text and display faces.

- **1. Fontographer**
- It is macromedia product; it is a specialized graphics editor for both Macintosh and Windows platforms. You can use it to create postscript, true type and bitmapped fonts for Macintosh and Windows.
- **2. Making Pretty Text**
- To make your text look pretty you need a toolbox full of fonts and special graphics applications that can stretch, shade, color and anti-alias your words into real artwork. Pretty text can be found in bitmapped drawings where characters have been tweaked, manipulated and blended into a graphic image.
- **3. Hypermedia and Hypertext**
- Multimedia is 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.
- When a hypermedia project includes large amounts of text or symbolic content, this content can be indexed and its element then linked together to

- afford rapid electronic retrieval of the associated information. 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. This text can be called as hypertext.

- **4.   Hypermedia Structures**

- Two Buzzwords used often in hypertext are link and node. Links are connections between the conceptual elements, that is, the nodes that may consists of text, graphics, sounds or related information in the knowledge base.

- **5. Searching for words**

- Following are typical methods for a word searching in hypermedia systems: Categories, Word Relationships, Adjacency, Alternates, Association, Negation, Truncation, Intermediate words, Frequency.

All About Images

- Introduction

- Still images are the important element of a multimedia project or a web site. In order to make a multimedia presentation look elegant and complete, it is necessary to spend ample amount of time to design the graphics and the layouts. Competent, computer literate skills in graphic art and design are vital to the success of a multimedia project.

Digital Image

- A digital image is represented by a matrix of numeric values each representing a quantized intensity value. When I is a two-dimensional matrix, then I(r,c) is the intensity value at the position corresponding to row r and column c of the matrix.

- The points at which an image is sampled are known as picture elements, commonly abbreviated as pixels. The pixel values of intensity images are called gray scale levels (we encode here the "color" of the image).

- The intensity at each pixel is represented by an integer and is determined from the continuous image by averaging over a small neighborhood around the pixel location. If there are just two intensity values, for example, black, and white, they are represented by the numbers 0 and 1; such images are called binary-valued images. If 8-bit integers are used to store each pixel value, the gray levels range from 0 (black) to 255 (white).

- **Digital Image Format**
- There are different kinds of image formats in the literature. We shall consider the image format that comes out of an image frame grabber, i.e., the captured image format, and the format when images are stored, i.e., the stored image format.
- **Captured Image Format**
- The image format is specified by two main parameters: spatial resolution, which is specified as pixelsxpixels (eg. 640x480)and color encoding, which is specified by bits per pixel. Both parameter values depend on hardware and software for input/output of images.
- **Stored Image Format**
- When we store an image, we are storing a two-dimensional array of values, in which each value represents the data associated with a pixel in the image. For a bitmap, this value is a binary digit.

• **Bitmaps**

- A bitmap is a simple information matrix describing the individual dots that are the smallest elements of resolution on a computer screen or other display or printing device.

- A one-dimensional matrix is required for monochrome (black and white); greater depth (more bits of information) is required to describe more than 16 million colors the picture elements may have, as illustrated in following figure.

- The state of all the pixels on a computer screen make up the image seen by the viewer, whether in combinations of black and white or colored pixels in a line of text, a photograph-like picture, or a simple background pattern.

- Where do bitmap come from? How are they made?

- Make a bitmap from scratch with paint or drawing program.

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

- Capture a bitmap from a photo, artwork, or a television image using a scanner or video capture device that digitizes the image.

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

Making Still Images

- Still images may be small or large, or even full screen.

- Whatever their form, still images are generated by the computer in two ways: as bitmap (or paint graphics) and as vector-drawn (or just plain drawn) graphics.

- Bitmaps are used for photo-realistic images and for complex drawing requiring fine detail.

- Vector-drawn objects are used for lines, boxes, circles, polygons, and 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.

- Typically, image files are compressed to save memory and disk space; many image formats already use compression within the file itself – for example, GIF, JPEG, and PNG.

- images may be the most important element of your multimedia project. If you are designing multimedia by yourself, put yourself in the role of graphic artist and layout designer.

- ## **Bitmap Software**

- The abilities and feature of image-editing programs for both the Macintosh and Windows range from simple to complex. The Macintosh does not ship with a painting tool, and Windows provides only the rudimentary Paint (see following figure), so you will need to acquire this very important software separately – often bitmap editing or painting programs come as part of a bundle when you purchase your computer, monitor, or scanner.

- **Capturing and Editing Images**

- The image that is seen on a computer monitor is digital bitmap stored in video memory, updated about every 1/60 second or faster, depending upon monitor's scan rate. When the images are assembled for multimedia project, it may often be needed to capture and store an image directly from screen. It is possible to use the Prt Scr key available in the keyboard to capture a image.

- **Scanning Images**

- After scanning through countless clip art collections, if it is not possible to find the unusual background you want for a screen about gardening. Sometimes when you search for something too hard, you don't realize that it's right in front of your face. Open the scan in an image-editing program and experiment with different filters, the contrast, and various special effects. Be creative, and don't be afraid to try strange combinations – sometimes mistakes yield the most intriguing results.

- **Vector Drawing**
- Most multimedia authoring systems provide for use of vector-drawn objects such as lines, rectangles, ovals, polygons, and text.
- Computer-aided design (CAD) programs have traditionally used vectordrawn object systems for creating the highly complex and geometric rendering needed by architects and engineers.
- Graphic artists designing for print media use vector-drawn objects because the same mathematics that put a rectangle on your screen can also place that rectangle on paper without jaggies. This requires the higher resolution of the printer, using a page description language such as PostScript.
- Programs for 3-D animation also use vector-drawn graphics. For example, the various changes of position, rotation, and shading of light required to spin the extruded.

Color

- Color is a vital component of multimedia. Management of color is both a subjective and a technical exercise. Picking the right colors and combinations of colors for your project can involve many tries until you feel the result is right.

- **Understanding Natural Light and Color**

- 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. Ultraviolet light, on the other hand, is beyond the higher end of the visible spectrum and can be damaging to humans.

- The color white is a noisy mixture of all the color frequencies in the visible spectrum. The cornea of the eye acts as a lens to focus light rays onto the retina. The light rays stimulate many thousands of specialized nerves called rods and cones that cover the surface of the retina. The eye can differentiate among millions of colors, or hues, consisting of combination of red, green, and blue

- **Additive Color**

- In additive color model, a color is created by combining colored light sources in three primary colors: red, green and blue (RGB). This is the process used for a TV or computer monitor.

- **Subtractive Color**

- In subtractive color method, a new color is created by combining colored media such as paints or ink that absorb (or subtract) some parts of the color spectrum of light and reflect the others back to the eye. 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 (CMY).

All About Sounds

- Introduction

- Sound is perhaps the most important element of multimedia. It is meaningful "speech" in any language, from a whisper to a scream. It can provide the listening pleasure of music, the startling accent of special effects or the ambience of a moodsetting background. Sound is the terminology used in the analog form, and the digitized form of sound is called as audio.

Power of Sound

- When something vibrates in the air is moving back and forth it creates wave of pressure. These waves spread like ripples from pebble tossed into a still pool and when it reaches the eardrums, the change of pressure or vibration is experienced as sound. Acoustics is the branch of physics that studies sound. Sound pressure levels are measured in decibels (db); a decibel measurement is actually the ratio between a chosen reference point on a logarithmic scale and the level that is actually experienced.

- **Multimedia Sound Systems**

- The multimedia application user can use sound right off the bat on both the Macintosh and on a multimedia PC running Windows because beeps and warning sounds are available as soon as the operating system is installed.

- On the Macintosh you can choose one of the several sounds for the system alert.

- In Windows system sounds are WAV files and they reside in the windows\Media subdirectory.

- There are still more choices of audio if Microsoft Office is installed. Windows makes use of WAV files as the default file format for audio and Macintosh systems use SND as default file format for audio.

- **Digital Audio**

- Digital audio is created when a sound wave is converted into numbers – a process referred to as digitizing.

- It is possible to digitize sound from a microphone, a synthesizer, existing tape recordings, live radio and television broadcasts, and popular CDs.

- You can digitize sounds from a natural source or prerecorded. Digitized sound is sampled sound. Ever nth fraction of a second, a sample of sound is taken and stored as digital information in bits and bytes.

- The quality of this digital recording depends upon how often the samples are taken.

Preparing Digital Audio Files

- Preparing digital audio files is fairly straight forward. If you have analog source materials – music or sound effects that you have recorded on analog media such as cassette tapes.

- • The first step is to digitize the analog material and recording it onto a computer readable digital media.

- • It is necessary to focus on two crucial aspects of preparing digital audio files:

- • Balancing the need for sound quality against your available RAM and Hard disk resources.

- • Setting proper recording levels to get a good, clean recording.

- Remember that the sampling rate determines the frequency at which samples will be drawn for the recording. Sampling at higher rates more accurately captures the high frequency content of your sound. Audio resolution determines the accuracy with which a sound can be digitized.

Editing Digital Recordings

- Once a recording has been made, it will almost certainly need to be edited. The basic sound editing operations that most multimedia procedures needed are described in the paragraphs that follow

- 1. **Multiple Tasks:** Able to edit and combine multiple tracks and then merge the tracks and export them in a final mix to a single audio file.

- 2. **Trimming:** Removing dead air or blank space from the front of a recording and an unnecessary extra time off the end is your first sound editing task.

- 3. **Splicing and Assembly:** Using the same tools mentioned for trimming, you will probably want to remove the extraneous noises that inevitably creep into recording.

- **4. Volume Adjustments:** If you are trying to assemble ten different recordings into a single track there is a little chance that all the segments have the same volume.

- **5. Format Conversion:** In some cases your digital audio editing software might read a format different from that read by your presentation or authoring program.

- **6. Resampling or downsampling:** If you have recorded and edited your sounds at 16 bit sampling rates but are using lower rates you must resample or downsample the file.

- **7. Equalization:** Some programs offer digital equalization capabilities that allow you to modify a recording frequency content so that it sounds brighter or darker.

- **8. Digital Signal Processing:** Some programs allow you to process the signal with reverberation, multitap delay, and other special effects using DSP routines.

- **9. Reversing Sounds:** Another simple manipulation is to reverse all or a portion of a digital audio recording. Sounds can produce a surreal, other wordly effect when played backward.

- **10. Time Stretching:** Advanced programs let you alter the length of a sound file without changing its pitch. This feature can be very useful but watch out: most time stretching algorithms will severely degrade the audio quality.

Making MIDI Audio

- MIDI (Musical Instrument Digital Interface) is a communication standard developed for electronic musical instruments and computers. MIDI files allow music and sound synthesizers from different manufacturers to communicate with each other by sending messages along cables connected to the devices. Creating your own original score can be one of the most creative and rewarding aspects of building a multimedia project, and MIDI (Musical Instrument Digital Interface) is the quickest, easiest and most flexible tool for this task.

- The process of creating MIDI music is quite different from digitizing existing audio. To make MIDI scores, however you will need sequencer software and a sound synthesizer.
- The MIDI keyboard is also useful to simply the creation of musical scores. An advantage of structured data such as MIDI is the ease with which the music director can edit the data.
- A MIDI file format is used in the following circumstances :
- Digital audio will not work due to memory constraints and more processing power requirements
- When there is high quality of MIDI source
- When there is no requirement for dialogue.
- A digital audio file format is preferred in the following circumstances:
- When there is no control over the playback hardware
- When the computing resources and the bandwidth requirements are high.
- When dialogue is required.

Audio File Formats

- A file format determines the application that is to be used for opening a file.

- Following is the list of different file formats and the software that can be used for opening a specific file.

- 1. *.AIF, *.SDII in Macintosh Systems

- 2. *.SND for Macintosh Systems

- 3. *.WAV for Windows Systems

- 4. MIDI files – used by north Macintosh and Windows

- 5. *.WMA –windows media player

- 6. *.MP3 – MP3 audio

- 7. *.RA – Real Player

- 8. *.VOC – VOC Sound

All About Animations

- Introduction

- Animation makes static presentations come alive. It is visual change over time and can add great power to our multimedia projects. Carefully planned, well-executed video clips can make a dramatic difference in a multimedia project. Animation is created from drawn pictures and video is created using real time visuals.

Principles of Animation

- Animation is the rapid display of a sequence of images of 2-D artwork or model positions in order to create an illusion of movement. It is an optical illusion of motion due to the phenomenon of persistence of vision, and can be created and demonstrated in a number of ways. The most common method of presenting animation is as a motion picture or video program, although several other forms of presenting animation also exist

- Animation is possible because of a biological phenomenon known as persistence of vision and a psychological phenomenon called phi. An object seen by the human eye remains chemically mapped on the eye's retina for a brief time after viewing. Combined with the human mind's need to conceptually complete a perceived action, this makes it possible for a series of images that are changed very slightly and very rapidly, one after the other, to seemingly blend together into a visual illusion of movement. The following shows a few cells or frames of a rotating logo. When the images are progressively and rapidly changed, the arrow of the compass is perceived to be spinning.

- Television video builds entire frames or pictures every second; the speed with which each frame is replaced by the next one makes the images appear to blend smoothly into movement. To make an object travel across the screen while it changes its shape, just change the shape and also move or translate it a few pixels for each frame.

Animation Techniques

- When you create an animation, organize its execution into a series of logical steps. First, gather up in your mind all the activities you wish to provide in the animation; if it is complicated, you may wish to create a written script with a list of activities and required objects. Choose the animation tool best suited for the job. Then build and tweak your sequences; experiment with lighting effects. Allow plenty of time for this phase when you are experimenting and testing. Finally, post-process your animation, doing any special rendering and adding sound effects

- **Cel Animation**
- The term cel derives from the clear celluloid sheets that were used for drawing each frame, which have been replaced today by acetate or plastic. Cels of famous animated cartoons have become sought-after, suitable-for-framing collector's items.
- Cel animation artwork begins with keyframes (the first and last frame of an action). For example, when an animated figure of a man walks across the screen, he balances the weight of his 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.
- • The animation techniques made famous by Disney use a series of progressively different on each frame of movie film which plays at 24 frames per second.
- • A minute of animation may thus require as many as 1,440 separate frames.
- • The term cel derives from the clear celluloid sheets that were used for drawing each frame, which is been replaced today by acetate or plastic.
- • Cel animation artwork begins with keyframes.

- **Computer Animation**
- Computer animation programs typically employ the same logic and procedural concepts as cel animation, using layer, keyframe, and tweening techniques, and even borrowing from the vocabulary of classic animators. On the computer, paint is most often filled or drawn with tools using features such as gradients and antialiasing. The word links, in computer animation terminology, usually means special methods for computing RGB pixel values, providing edge detection, and layering so that images can blend or otherwise mix their colors to produce special transparencies, inversions, and effects.
- • Computer Animation is same as that of the logic and procedural concepts as cel animation and use the vocabulary of classic cel animation – terms such as layer, Keyframe, and tweening.
- • The primary difference between the animation software program is in how much must be drawn by the animator and how much is automatically generated by the software

- **Kinematics**
- It is the study of the movement and motion of structures that have joints, such as a walking man.
- • Inverse Kinematics is in high-end 3D programs, it is the process by which you link objects such as hands to arms and define their relationships and limits.
- • Once those relationships are set you can drag these parts around and let the computer calculate the result.

- **Morphing**
- • Morphing is popular effect in which one image transforms into another. Morphing application and other modeling tools that offer this effect can perform transition not only between still mages but often between moving images as well.
- • The morphed images were built at a rate of 8 frames per second, with each transition taking a total of 4 seconds.
- • Some product that uses the morphing features are as follows
- Black Belt's EasyMorph and WinImages,
- Human Software's Squizz
- Valis Group's Flo , MetaFlo, and MovieFlo.

All About Video

- Introduction
- Carefully planned, well-executed video clips can make a dramatic difference in a multimedia project. Video is nothing but sequences of images captured by camcorder or any other video recording device of live actions

Video

- **Analog versus Digital**

- Digital video has supplanted analog video as the method of choice for making video for multimedia use. While broadcast stations and professional production and postproduction houses remain greatly invested in analog video hardware (according to Sony, there are more than 350,000 Beta cam SP devices in use today), digital video gear produces excellent finished products at a fraction of the cost of analog. A digital camcorder directly connected to a computer workstation eliminates the image-degrading analog-to-digital conversion step typically performed by expensive video capture cards, and brings the power of nonlinear video editing and production to everyday users.

- **Broadcast Video Standards**

- Four broadcast and video standards and recording formats are commonly in use around the world: NTSC, PAL, SECAM, and HDTV. Because these standards and formats are not easily interchangeable, it is important to know where your multimedia project will be used.

- **NTSC**
- The United States, Japan, and many other countries use a system for broadcasting and displaying video that is based upon the specifications set forth by the 1952 National Television Standards Committee. These standards define a method for encoding information into the electronic signal that ultimately creates a television picture. As specified by the NTSC standard, a single frame of video is made up of 525 horizontal scan lines drawn onto the inside face of a phosphorcoated picture tube every 1/30th of a second by a fast-moving electron beam.
- **PAL**
- The Phase Alternate Line (PAL) system is used in the United Kingdom, Europe, Australia, and South Africa. PAL is an integrated method of adding color to a black-and-white television signal that paints 625 lines at a frame rate 25 frames per second.

- **SECAM**
- The Sequential Color and Memory (SECAM) system is used in France, Russia, and few other countries. Although SECAM is a 625-line, 50 Hz system, it differs greatly from both the NTSC and the PAL color systems in its basic technology and broadcast method.
- **HDTV**
- High Definition Television (HDTV) provides high resolution in a 16:9 aspect ratio (see following Figure). This aspect ratio allows the viewing of Cinemascope and Panavision movies. There is contention between the broadcast and computer industries about whether to use interlacing or progressive-scan technologies

Recording Formats

- **S-VHS Video**

- In S-VHS video, color and luminance information are kept on two separate tracks. The result is a definite improvement in picture quality. This standard is also used in Hi-8. still, if your ultimate goal is to have your project accepted by broadcast stations, this would not be the best choice.

- **Component (YUV)**

- In the early 1980s, Sony began to experiment with a new portable professional video format based on Betamax. Panasonic has developed their own standard based on a similar technology, called "MII," Betacam SP has become the industry standard for professional video field recording. This format may soon be eclipsed by a new digital version called "Digital Betacam

- **Digital Video**

- Full integration of motion video on computers eliminates the analog television form of video from the multimedia delivery platform. If a video clip is stored as data on a hard disk, CD-ROM, or other mass-storage device, that clip can be played back on the computer's monitor without overlay boards, videodisk players, or second monitors. This playback of digital video is accomplished using software architecture such as QuickTime or AVI, a multimedia producer or developer; you may need to convert video source material from its still common analog form (videotape) to a digital form manageable by the end user's computer system. So an nderstanding of analog video and some special hardware must remain in your multimedia toolbox. Analog to digital conversion of video can be accomplished using the video overlay hardware described above, or it can be delivered direct to disk using FireWire cables. To repetitively digitize a fullscreen color video image every 1/30 second and store it to disk or RAM severely taxes both Macintosh and PC processing capabilities–special hardware, compression firmware, and massive amounts of digital storage space are required.

- **MPEG**

- The MPEG standard has been developed by the Moving Picture Experts Group, a working group convened by the International Standards Organization (ISO) and the International Electro-technical Commission (IEC) to create standards for digital representation of moving pictures and associated audio and other data. MPEG1 and MPEG2 are the current standards. Using MPEG1, you can deliver 1.2 Mbps of video and 250 Kbps of two-channel stereo audio using CD-ROM technology. MPEG2, a completely different system from MPEG1, requires higher data rates (3 to 15 Mbps) but delivers higher image resolution, picture quality, interlaced video formats, multi resolution scalability, and multichannel audio features.

- **DVI/INDEO**
- DVI is a property, programmable compression/decompression technology based on the Intel i750 chip set. This hardware consists of two VLSI (Very Large Scale Integrated) chips to separate the image processing and display functions. Two levels of compression and decompression are provided by DVI: Production Level Video (PLV) and Real Time Video (RTV). PLV and RTV both use variable compressionrates. DVI's algorithms can compress video images at ratios between 80:1 and 160:1. DVI will play back video in full-frame size and in full color at 30 frames per second.