**UNIT-III**

**MULTIMEDIA BUILDING BLOCKS**

* Multimedia is a combination of various elements, such as text, images, video, sound and animation.
* Interactive multimedia has become increasingly popular in education, business, entertainment and public places.
* The more elements of multimedia building books inserted in; it will be more attractive.

BASIC ELEMENTS IN MULTIMEDIA BUILDING BLOCK

**Text:** the on-screen display of words, that is, text. Using the different styles, fonts, and colors to highlight a specific point.

**Audio:** this includes speech, audio effects, surrounding sound( for example, the background sound of the sea, bird chirping, and winds blowing) and music.

**Images/graphic:** any picture of an object. Graphic includes conventional artwork, computer-generated artwork, and photo graphs or captured video frames. Help the audience to more understand about the content than just read the text.

**Animation:** animation is the times sequence of a series of graphic images or frames together to give the appearance of continuous movement.

**Video:** anything that can see visually on the screen(digital movie)

**SOUND:**

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 mood- setting 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:

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

o 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 down sampling:** If you have recorded and edited your sounds at

16 bit sampling rates but are using lower rates you must resample or down sample

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 worldly 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.

**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

**9. AIFF** sound format for Macintosh sound files

**10. \*.OGG** – Ogg Vorbis

**IMAGES**

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.

**Image File Formats**

There are many file formats used to store bitmaps and vectored drawing. Following is a list of few image

file formats.

**Format Extension**

* Microsoft Windows DIB **.bmp .dib .rle**
* Microsoft Palette **.pal**
* Autocad format 2D **.dxf**
* JPEG **.jpg**
* Windows Meta file **.wmf**
* Portable network graphic **.png**
* Compuserve gif **.gif**
* Apple Macintosh **.pict .pic .pct**

**Animation and Video**

**Animation**

Animation is a medium where images or objects are manipulated to be displayed as moving ones.

**Key benefits of animation**

* Animation helps deepen visual understanding better than traditional diagrams.
* Animation omits unnecessary verbiage and visuals.
* It allows you to communicate ideas quickly and sharply.
* Animation is a cost-saving communication strategy.
* It educates & engages the audience through entertainment.
* It also provides real to life scenarios faced in daily life during learning, and so many other activities.

**Types of Animation:**

**2D animation**

This is a vector animation. An animation is often created using Flash or similar. This type is popular due to the availability of technology. Here too, the animator may create frame-by-frame series. In addition, we may create rigs for characters. In addition, there are tools for dragging and applying special effects and so much more.

**3D animation**

Another type of animation is 3D animation. It is also called computer animation. This is the most common type of animation today. It requires an understanding of movement and composition. The animator can simply move the character using special controls. It also provides a complete overview of the visual object. Therefore, the animator must concentrate on the entire object all the time. Usually, 3D animation has a high frame rate.

**Motion graphics**

That’s another type of animation. This is for moving graphic elements or text creatively. Commercials, logos, movie titles, television commercials use these types of animation. This requires an understanding of composition and camera movements.

**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.

**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 anti- aliasing. 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.

**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 images but often

between moving images as well.

**Video**

A video is used to generate a steady source of still pictures as it is a series of electronic signals, which simulate movement. Videos can be used for education, entertainment, or other purposes, which use pictures, graphics, or text.

**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 post- production houses remain greatly

invested in analog video hardware (according to Sony, there are more than 350,000 Betacam 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.

**Shooting and Editing Video**

To add full-screen, full-motion video to your multimedia project, you will need to invest in specialized

hardware and software or purchase the services of a professional video production studio. In many cases, a professional studio will also provide editing tools and post-production capabilities that you cannot duplicate with your Macintosh or PC.

**Video Tips**

A useful tool easily implemented in most digital video editing applications is “blue screen,” “Ultimate,” or “chromo key” editing. Blue screen is a popular technique for making multimedia titles because

expensive sets are not required. Incredible backgrounds can be generated using 3-D modeling and

graphic software, and one or more actors, vehicles, or other objects can be neatly layered onto that

background. Applications such as VideoShop, Premiere, Final Cut Pro, and iMovie provide this

capability.

**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 understanding 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 full-screen 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.