

Unit - 17

Multimedia \Rightarrow Multi means "many" and Media means "showing information".

Multimedia is commonly defined as the combination of text, graphics, audio, video and animation on a computer.

There are 15 basic elements of multimedia :-

- | | | | | |
|----------|-------------|-------------|------------|---------------|
| (i) Text | (ii) Images | (iii) Audio | (iv) Video | (v) Animation |
|----------|-------------|-------------|------------|---------------|

Ex Text in box.

Photographic images.

Voice commands.

Audio messages.

Music Graphics, Moving graphics
animation

Multimedia Types:-

- (i) Linear Multimedia \Rightarrow In this the end user cannot control the content of the appl?

It has no interactivity of any kind.

Ex It works very well for providing info' to a large group of people such as that seminars, training session, workplace meeting etc.

2. Non-linear multimedia \Rightarrow In this

user is allowed the navigational control to move () through multimedia content at his own desire.

Ex Computer games, websites.

Appl' of multimedia \Rightarrow

- (i) Education
- (ii) Entertainment
- (iii) Business
- (iv) Technology and Science
- (v) Engineering

Multimedia Architecture \Rightarrow Multimedia

encompasses a large variety of technologies and integration of multiple architectures interacting in real time.

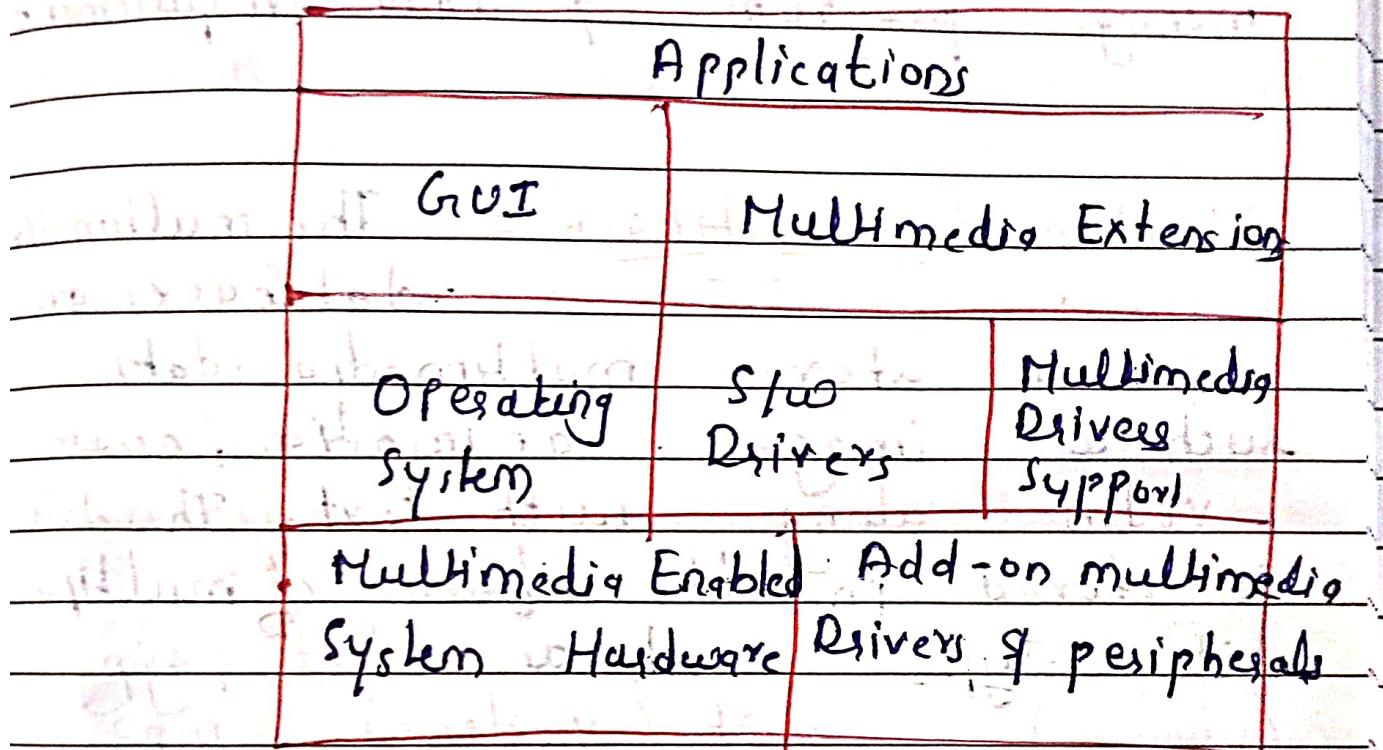


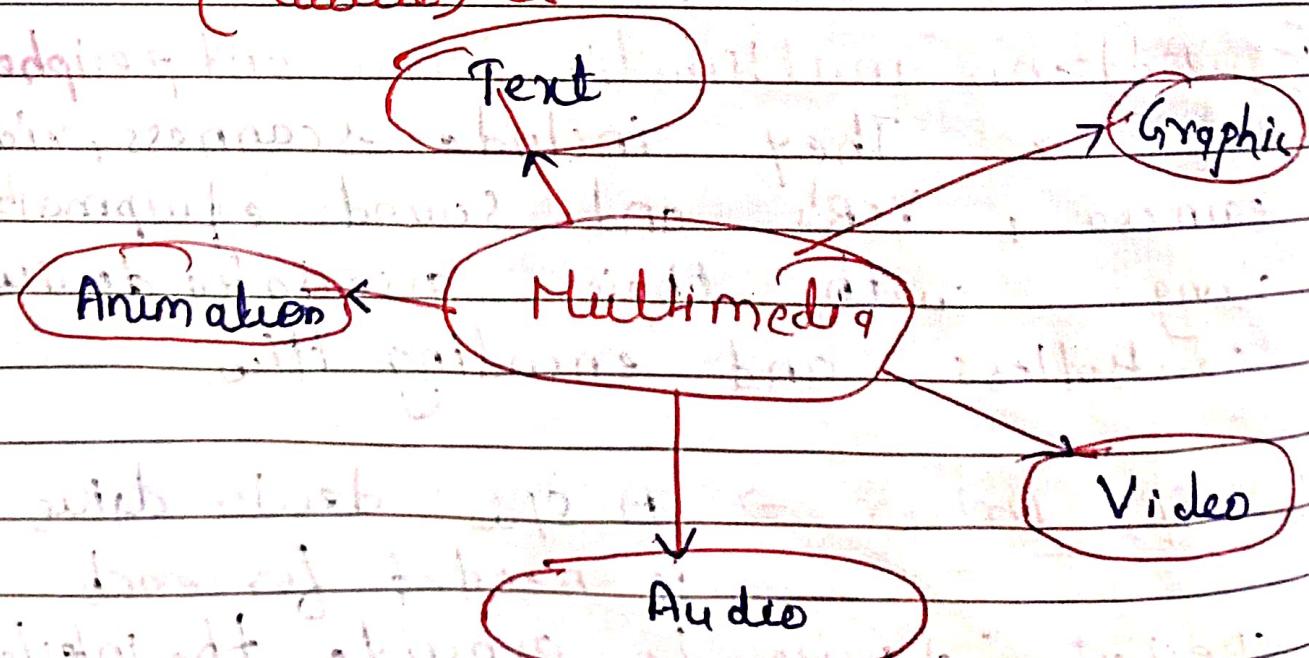
Fig.: Architecture

(i) Add-on multimedia devices and peripherals \Rightarrow They include scanners, video cameras, VCR's and sound equipment along with their associated drivers controllers and encoding H/w.

(ii) S/w Drivers \Rightarrow A s/w device driver is needed for each special device to provide the interface from an appl' to the device.

(iii) System H/w \Rightarrow Multimedia operating places tremendous demands of computing performance and storage on the system H/w. It requires additional resources to manage program & data requirements.

Multimedia database \Rightarrow The multimedia database is used to store multimedia data such as images, animations, audio, video along with text. This data is stored in the form of multiple file types such as .txt, .jpg (images), .swf (videos), .mp3 (audio) etc.





Text file formats ⇒ TXT file format

is a format that is developed for storing plain text with no formatting such as graphics, bolding, font style, alignment & so on. It is one of the most basic file types and most widely used file format on computer.

Some of the common Text file formats

- 1) .ascii,
- 2) .doc
- 3) .dock
- 4) .rtf
- 5) .pdf
- 6) .msg
- 7) .txt
- 8) .wpd , .wps

Audio file formats ⇒ An audio file format is a file format for storing digital audio data on a computer system.

Sound file format \Rightarrow

- (i) .Wav
- (ii) .MP3
- (iii) .MIDI
- (iv) .M4A
- (v) .M3U

App's that use sound file format

(i) Media player \Rightarrow Ex MP3, WMA, WAV, VCO

App's like Windows Media player, VLC media, Winamp, iTunes

(ii) Music streaming \Rightarrow Online service like Spotify, Pandora

(iii) Podcasting \Rightarrow The podcast introducts S/W program uses MP3, AAC and lots of others

Video file format \Rightarrow It is most widely used file format for entertainment and educational purposes.

Video file formats are:-

1. AVI (Audio video Interlace)
2. MP4
3. MPG
4. 3GP
5. WMV

App's that use Video file format

- 1) Netflix
- 2) YouTube
- 3) VLC media player
- 4) Adobe Premiere Pro
- 5) Da Vinci Resolve

Audio \Rightarrow Audio refers to the sound we hear. Sound is a form of energy capable of flowing from one place to another through medium. It is generated from vibrating objects when part of the energy of vibration is converted

to sound energy.

Sound of frequen-

-cies b/w 20 Hz to 20 kHz can be
heard by human ear so called
audible frequency range

Components -

- (1) Tape
- (2) Recorders
- (3) Amplifiers
- (4) microphones
- (5) speakers

Digital Audio \Rightarrow Digital audio

e.g., the method of
representing audio in digital form

A Digital audio signal can be
stored on a CD, a digital audio
player, a hard drive, a USB flash
drive or any other digital data
storage device.

Two types of Sounds -

1) Analog sound

2) Digital sound

Two characteristics of sound wave:

1) Amplitude \Rightarrow It is the power or intensity of the sound.

2) Frequency \Rightarrow It is the rate at which sound is measured (Hz)

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Digital Audio Processing \Rightarrow The digital

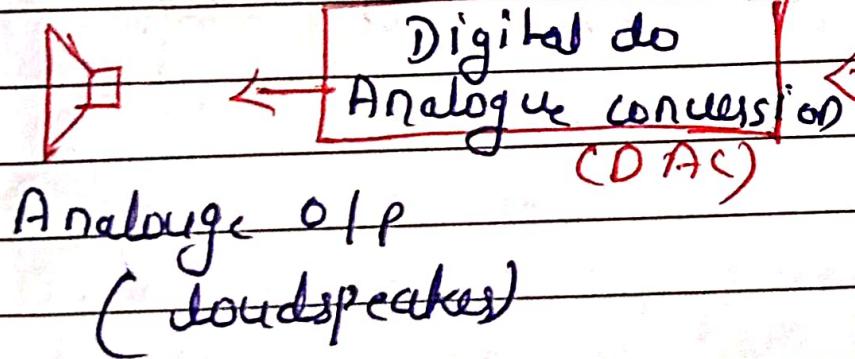
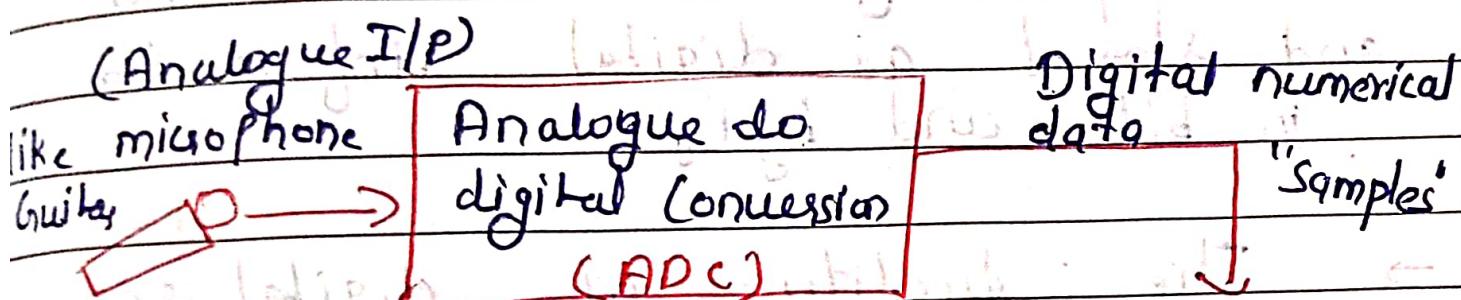


fig. Digital to Analog conversion processing

Digitizing \Rightarrow Digital audio created when the characteristic of sound wave is represented using numbers — a process called as Digitizer,

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→ Digitized sound is sampled sound.

→ Every n^{th} fraction of a second, a sample of a sound is taken and stored as digital information in bits and bytes.

→ The quality of digital recording depends on how often the samples are taken.

i.e. Higher sampling rate better is the quality of sound.

Campbell -

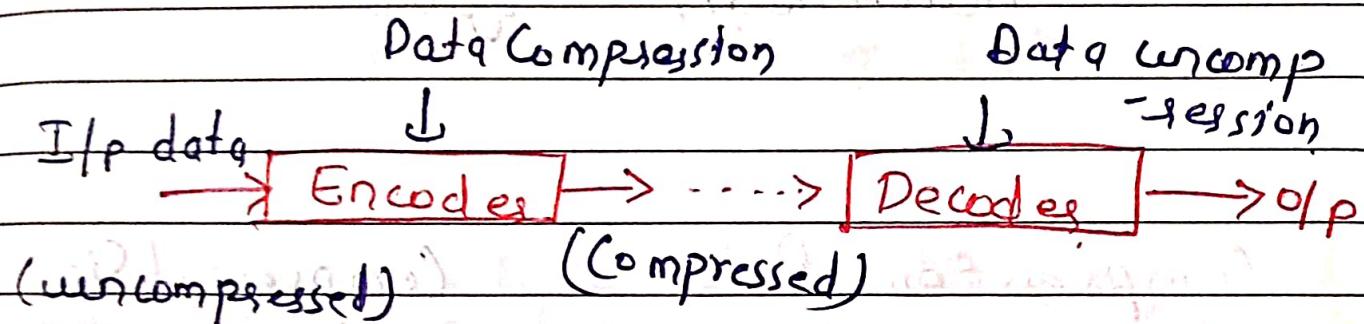


Digital Video → ~~Digital~~ video is an electronic representation of moving visual images. It is created and manipulated using computers technology & can be viewed on a variety of digital device such as computer, TV etc.

Digital video is a type of video that is created and stored in a digital format. It consists of a series of digital images that are captured and processed by a device such as camera or a smartphone. These images are then compressed and stored as a digital file, which can be viewed on a variety of digital devices.

~~TMF~~

Compression \Rightarrow ^{eg} Compression is a way of making files to take up less space. In a multimedia system in order to manage large multi-media data objects efficiently, these data objects need to be compressed to reduce the file size for storage of these objects.



Compression Types:-

- (i) Lossless compression
- (ii) Lossy compression

(i) Lossless D.C. \Rightarrow No data is lost
 \Rightarrow Exact Replica

Lossless D.C. guarantees that the decompressed data is identical to the original data.

\Rightarrow Text Encryption

(i) Lossy compression \Rightarrow Some information is lost. Less info from the media is removed.

\rightarrow Not an Exact Replica

Ex \rightarrow Image, Audio & video (multimedia files)

Compression Ratio \Rightarrow $\frac{\text{Compressed Size}}{\text{Original size}}$

Compression factor \Rightarrow $\frac{1}{\text{Compression ratio}}$

Compression time \Rightarrow Time to compress using hard disk (ms)

Decompression time \Rightarrow Time to decompress



Image compression \Rightarrow Image compression is minimum sizing of the size in bytes of a graphics file without degrading the quality of the image to an unacceptable level.

The reduction of file size allows more images to be stored in a given amount of disk or memory space.

Also reduces the time required for images to be sent over the internet or downloaded from web pages.

Two most common compressed graphic image formats are

JPEG format \rightarrow for photographs

1) GIF \rightarrow for ~~text and~~

Two types of compression of Image:-

- 1) Lossless Image Compression
- 2) Lossy Image Compression

Audio and Video compression \Rightarrow

• Audio compression is a form of data compression designed to reduce the size of audio data files.

It is of 2 types:-

- (i) Lossless Audio compression
- (ii) Lossy Audio compression.

(i) Lossless Audio compression \Rightarrow

- (i) Removes redundant data
- (ii) Resulting signal is same as original.

(ii) Lossy Audio Encoding

- (i) Removes irrelevant data
- (ii) Resulting signal is similar to original.

Advantages:-

- (i) faster transmission time
- (ii) smaller size
- (iii) Reduced bandwidth due to smaller size



Video compression \Rightarrow Video take up so ~~so~~ much space.

Video must be compressed before it is put on the web. "~~compression~~^{ed.}" just means that the info is packed into a smaller space.

There are 2 kinds of compression-

- (i) Lossy Video compression.
- (ii) Lossless Video compression.

Advantage -

- (i) Occupies less disk space
- (ii) Reading & writing is faster.
- (iii) File transferring is faster.

Animation \Rightarrow It is defined as the act of making something come alive.

In animation, a series of images rapidly change do create an illusion of movement.

Types of animation:

(i) Cel Animation \Rightarrow A traditional form of animation used in the production of cartoon, and animated movies where each frame of the scene is drawn by hand.

(ii) Computer Animation \Rightarrow Subfield of both computer graphics & animation technologies. It is the creation of moving images using computer technology.

(iii) Kinematics \Rightarrow It is the study of the movement & motion of structures that

base points such as walking man
such type of animation are usually
used in the areas like mechanics
etc.

iv) Morphing \Rightarrow It is popular effect in which one image transforms into another.

Animation file formats \Rightarrow

- i) Director * .dir
- ii) Animation Pro * .flr
- iii) 3D studio Max * .max
- iv) Super card & Director * .pics
- v) CompuServe * .gif
- vi) flash * .fla, * .swf

Animation Slides used -
 (i) D studio max
 (ii) Flash
 (iii) Animation Pro

Uses of Animation \Rightarrow

- 1) Gaming
- 2) Marketing
- 3) Architecture
- 4) Entertainment

Himp

Principles of Animation \Rightarrow

- (1) Squash and stretch \Rightarrow Squash and stretch gives the flexibility to the object.
- (2) Staging \Rightarrow It defines the proper projection of any scene
 (हम कैसे किसी scene का present करते हैं ताकि उसके proper elements & even synchronize होते ही हों)
- (3) Anticipation \Rightarrow It defines the proper preparation of any action.

[means किसी action को होने वाले के प्रयोग से action force की need होती है तो उसे हम anticipation कहते हैं]

4) Secondary action \Rightarrow It provide the realism in our main action. & support primary ^{animation}
 Ex Primary motion \Rightarrow walk forward
 Secondary action \Rightarrow watching around

5) Straight Ahead & pose to pose \Rightarrow

(First process of follow up exit
 action of proper sequence at end]

6) Arc \Rightarrow It provide the realistic in motion (curve)

7) Set slow in slow out \Rightarrow It provide the organic feel in our animation.

8) Timing \Rightarrow The speed of an action through the no. of frames used.

9) Exaggeration \Rightarrow Making animations more expensive,

entertaining and engaging.

10) follow through & overlapping action → When a part of an object moves after the whole object has stopped

11) Appeal ⇒ It is an important principle of animation that ensures viewer connect with the character & their story.

12) Solid Drawing ⇒ It prevent characters from looking too stiff, flat or rubbery.

Effects in animation \Rightarrow Animation effects

can include audio, visual and special effects. They can be used to enhance the look & feel of an animation.

(i) Audio effects \Rightarrow It can be used to manipulate sound.

(ii) Visual effects \Rightarrow The process of creating or manipulating imagery outside of a true animation shot.

(iii) Special effects \Rightarrow Can include explosions.

magical sparks, weather effects or creatures that don't exist in real life.

\Rightarrow Can make cartoons look more interesting.

(iv) Transition effects \Rightarrow Morphing animation effects. Can be used to create smooth transition b/w scenes.

Computer Based Animation \Rightarrow Computer animation

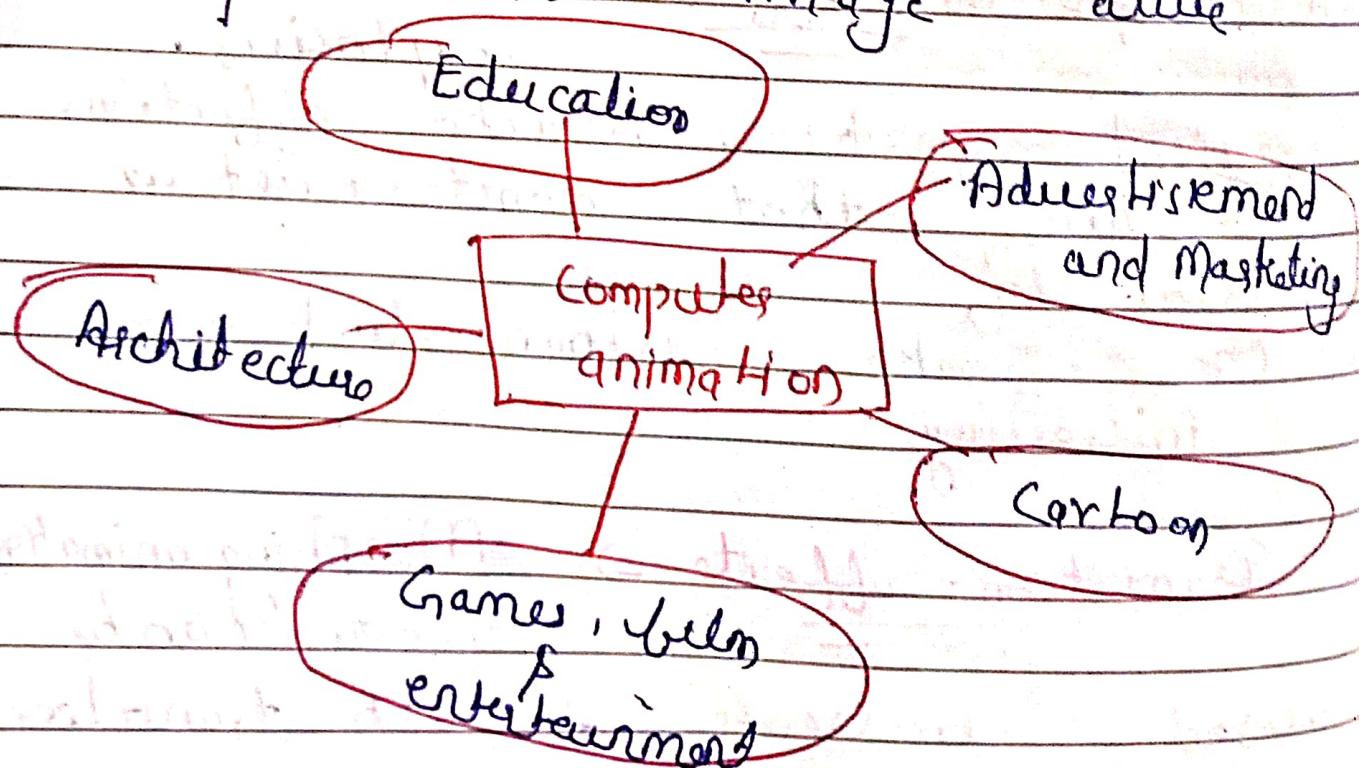
is a visual digital display technology that processes the moving images on screen.

OR

"It is defined as the art of power of giving life, energy and emotion etc to any non-living or inanimate object via computer."

→ It can be presented in form of any movie or video

→ It has the ability to make any dead image alive



3D Animation → 3D animation is the process of taking a 3D object & getting it to move. In 3D animation objects have height, width & depth. In 3D animation everything is going to be done by computer.

③ It is much expensive as compared to 2D animation.

④ Widely used in gaming, movie, medical, engineering etc.

Storyboarding for Animation →

Storyboarding is a powerful & essential tool in the design process, especially in UX/UI design.

→ It allows creators to visualize the flow of a project.

→ With the help of this each image or scene is arranged chronologically.

- It's helping viewers understand or process step by step.
- It clarifies the vision.
- Helps plan a production.
- Acts like a checklist \Rightarrow A good storyboard can act like a checklist for what actions, props & cameras angles are needed for each scene.
- Help identify production challenges \Rightarrow When a director views the storyboard, they may note inconsistencies in the narrative or VFX challenges that must be addressed before filming or animation begins.