

# Unit-1 : Introduction to Computer

DATE

## Introduction

Multimedia means the computer information that can be represented through audio, video, and animation in addition to traditional media (i.e. text, graphics/drawings, images). It deals with generation, manipulation, storage, presentation & transmission of multimedia information.

## \* Multimedia system

It is the system that is capable of processing multimedia data and applications. It supports more than a single kind of media. Example: any system processing text & image is the multimedia system.

- A multimedia system has 4 basic characteristics
- It must be computer controlled
- Multimedia systems are integrated.
- The information they handle must be represented digitally.
- Interface is usually interactive.

## \* History of multimedia (system).

- Newspaper was the first mass communication medium, which used mostly text, graphics & images.
- Television was the new media for the 20<sup>th</sup> century. It brings video & has since changed the world of mass communication.

- Internet came into existence from early 1970's and then Email was introduced.
- In early 1990's www was introduced

Since then, multimedia systems were gradually developed & improved. Now, we have modern advanced multimedia devices with huge quality & features.

### \* Challenges of multimedia system

- Cost / financial aspect
- Data security / privacy
- Copyright / trademarking
- Technical issues / data & system incompatibility
- Quality of information
- Transmission & synchronization
- Adaptional challenges
- Synchronization, inter-media scheduling.

### \* Application of multimedia

- Metaverse  $\Rightarrow$  virtual reality
- Gaming
- Video on demand
- Video processing
- Aircraft training
- Engineering & media application
- Online education
- Simulation & modeling
- E-commerce.
- Entertainment.

### In case of sectors

- In bank
- In education
- In hospital
- World wide web

# Global Structure of Multimedia.

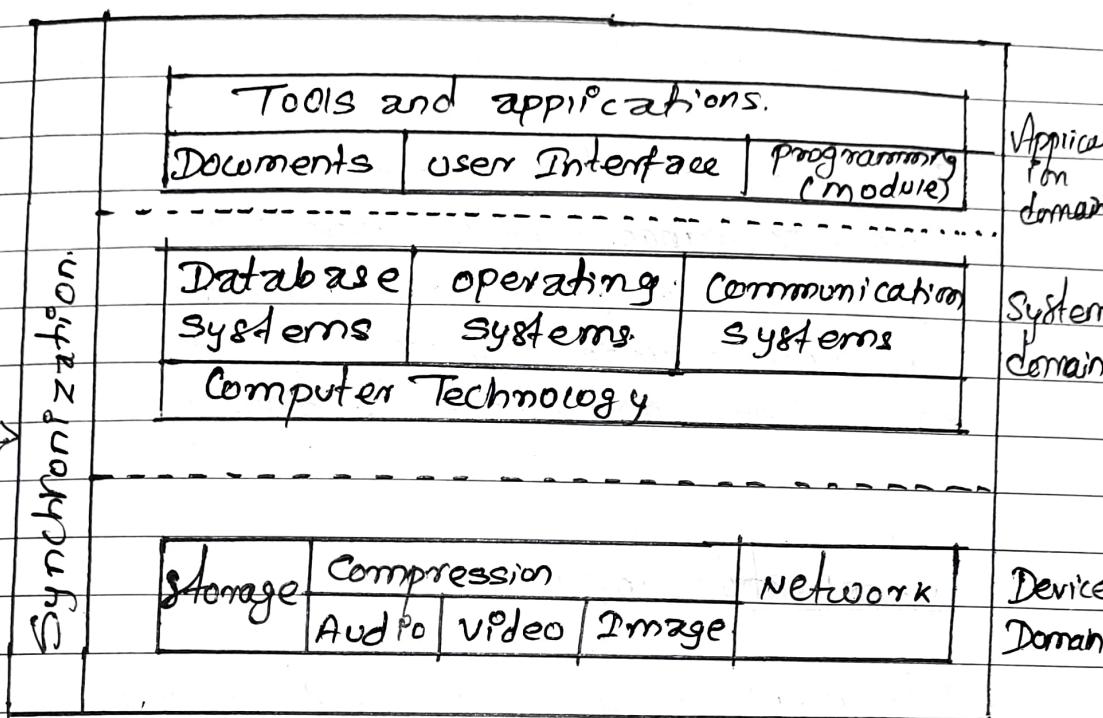


fig: Global structure of multimedia.

3 domains & one extra domain:-

\* Device domain → It deals with the interaction between multimedia application & multimedia devices. Basic concepts for the processing of digital audio and video data are based on digital signal processing. Different methods of processing the images, graphics and animation are described. The audio techniques section include music (MIDI) & speech processing.

\* System domain → The interface between the device domain & the system domain is specified by the computer technology. It includes all supports for using the functions of the device domain.

- The OS acts as an interface between computer hardware & software components & provides user the suitable environment for performing tasks.
- The database system allows a structured access to data & management of large databases
- The Communication system is responsible for data transmission according to the timing & reliability requirement.

### \* Application domain:

It allows user to develop & present multimedia projects. It includes software tools, & multimedia projects development methodology. The services of the system domain are offered to the application domain through proper programming abstractions.

### \* Cross domain

It allows communication to other domain or other system.

## Medium

A medium is a third-party or element through which a message is communicated. A computer system medium can be text, image, sound, video.

### Types of medium / classification of media:

- Perception medium (media)

It helps human to sense their environment. The question is how human can get information in a computer environment. And the answer is through seeing and hearing. Seeing includes text, image & video. Hearing includes media like music, noise & speech.

- Representation medium (media)

They are defined by internal computer representation of information. The question is how the computer information is coded? The answer is that, various formats are used to represent media information in computer.

- Text, character is coded in ASCII format
- Image can be coded in JPEG format

- Presentation medium (media)

It refers to tools & devices for the input & output of the information.

Input media - Keyboard, mouse, Camera, microphone

Output media - paper, screen & speaker

- Storage medium (media)

It refers to the data carrier which enables the storage of information. It includes hard disk, CD-ROM etc.

- Transmission medium (media)

They are the different information carrier that enables continuous data transmission. The information is transmitted through LAN cable, co-axial cable, fiber optics as well as wirelessly.

- Information exchange medium

It includes all storage & transmission media. The question is which information carrier is used for information exchange between different places?

The answer is combine uses of storage & transmission. Eg: Email system.

## Representation dimension of media:

Media are divided into two types in respect to time in their representation space.

- Time independent (discrete) : Information is expressed only in its individual value. ex: Text, Image, etc.

- Time dependent (continuous) : Information is expressed not only in its individual value, but also by the time of its occurrences. Ex: Sound & video

# Properties of multimedia system

A multimedia system has following properties

- Combination of media:- One should talk about multimedia only when both continuous and discrete media are utilized. A simple text processing program with incorporated images is often called a multimedia application because two media are processed through one program.
- Independence : Different types of media are independent from each other. Some media types like audio/video may be dependent, but others may not.
- Computer supported Integration

The different independent media are combined to work together as a system with the support of computers. It means, a multimedia is always controlled through the computer in multimedia systems.

## Note:

- Non-linear multimedia :-

- Interactive.
- Users have control over the content that is being showed to them. ex: games

## Linear:

- NOT interactive.

classmate , " " " NO control " " " ex: movie, lecture slides PAGE

# Components of a multimedia system

The Components include various hardwares & softwares required for a multimedia system

- Capture devices → They take input from the environment using camera, sensors & other devic video camera, video recorder, audio microphone, graphics tablets, VR devices, etc. are some examples
- Storage devices → They store multimedia data for future requirements. Ex: Hard disks, CD-ROMs, DVD-Roms. These are mostly secondary storage device
- Communication networks → They help to communicate or transfer data between two or more devices. Ex: local networks, intranets, internet, or others.
- Computer systems → Multimedia desktop machines, workstations, MPEG /VIDEO/ DSP Hardware are some examples of computer systems
- Display devices → They are used for presenting multi media projects. Ex: HDTV, SVGA, Hi-Res monitors, color printers, etc.

Note: Hyper media: not constrained to be text-based, can include other media ex: graphics, images & especially continuous media - sound & video  
Ex: WWW

classmate media: the computer information that can be represented through " . . . "

~~Extra~~

Q. What are the challenges of multimedia?

2) Some of the challenges are:

- Continuous media types such as video need a lot of space to store & very high bandwidth to transmit.
- They also have tight timing constraints.
- Automatically analyzing, indexing & organizing information in audio, image & video is much harder than from text.
- Multimedia involves many different research areas & needs more complex & more efficient algorithms & hardware platforms.

# Multimedia Pn:-

Business →

- Sales/Marketing presentation
- Staff training.
- Trade show production

Education →

- Learning through simulation
- E-learning.
- Information searching.

Entertainment →

- Games, movies, video on demand

Home → Television, SMS services.

## Questions asked from two Chapter

- Q. Explain the global structure of multimedia with block diagram and explain each block in detail (2076 - 10 marks)
- Q. Explain about components used to build the multimedia computing with example. (2078 - 10 marks)
- Q. What is multimedia system? Explain its properties. (imp)
- Q. What is multimedia? What are the challenges of multimedia? (imp)
- Q. What is medium? Explain the types of medium/media. (imp for 10 marks)