

Digital system → works with discrete values  
analog system → works with continuous values

classmate

Date \_\_\_\_\_

Page \_\_\_\_\_

## Chapter-7 (1 or 2 Q) Computer Technology and Multimedia Operating System

Q) Explain the need of Communication Architecture.

Ans: Local multimedia systems (i.e. multimedia workstations) has a network interface through which they can communicate with each other.

- The transmission of audio and video cannot be carried out with only either analog system or only digital system.
- Both of them are required for a communication.
- Until now, continuous and discrete <sup>media</sup> were used in different environments, independently of each other.
- So, communication architecture focuses on ~~integrating~~ integration and interaction between analog and digital environments. This integration approach is called the hybrid approach.

112) Explain the hybrid approach.

Explain the hybrid system for communication architecture.

Ans: Analog system works with continuous values.

→ Professional radio and television studios transmit audio and video stream in the form of analog signals.

→ Digital system works with discrete values.

→ In digital system, audio-video devices can be connected directly to the computer (workstation) and digitized audio-video data are transmitted over shared data network.

→ By using existing technologies, integration and interaction between analog and digital environments can be implemented. This integration approach is called the hybrid approach.

→ A hybrid system is a combination of digital and analog system and it combines the best features of both types of systems.

→ It uses speed of analog system, and memory & accuracy of digital system.

→ It can process both continuous & discrete data.

→ It can be used in real time system.



- With the help of hybrid approach, we can control analog input/output audio-video components in the digital environment.
- Example: The connection between the sources (camera/microphone) and destinations (video recorder) can be controlled digitally. {Used in video chat}

### III 3) Multimedia Workstation

<sup>or</sup>  
<sup>components</sup>  
Explain various multimedia workstation.

Ans: Workstation is a high-performance computer system that is basically designed for a single user and has advanced graphics capabilities, large storage capacity and a powerful central processing unit.

- A multimedia workstation is a combination of hardware, software and firmware for quick exchange of data and simultaneous manipulation of discrete and continuous media information.
- ~~The~~ It can be used to create various multimedia files and export them in various formats.

→ The components of Multimedia workstation are:-

- i) System Processor → for processing discrete media information.
- ii) Real-time Processor → for processing of data in real time.
- iii) Main memory and Secondary memory  
↳ large amount of both types of memory are required for storage.
- iv) Graphics Card → for rendering graphics
- v) C/D / DVD drives etc

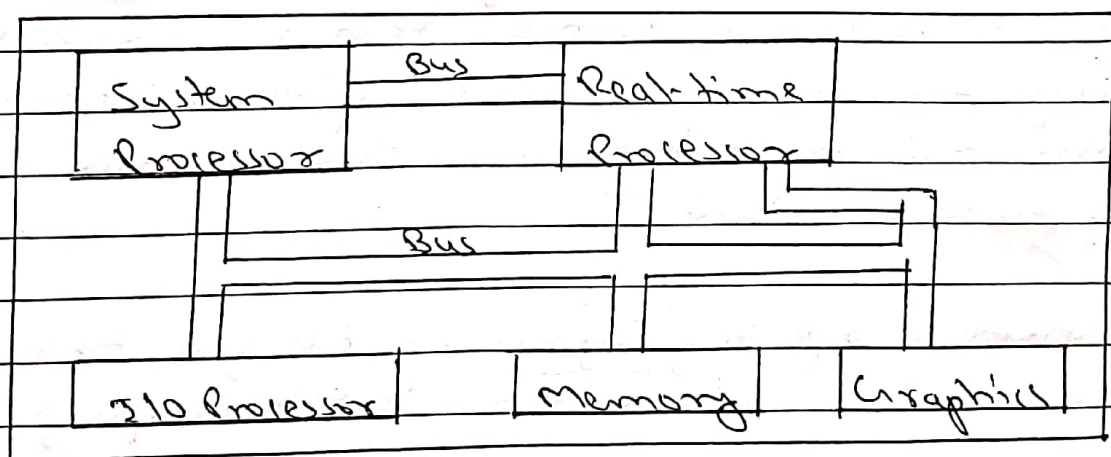


Fig:- Multimedia Workstation



11.4) Explain Multimedia operating System.  
Explain the characteristics of Multimedia Operating System.

- Ans: An operating system acts as an interface between the user of a computer and the computer hardware.
- The purpose of an operating system is to provide an environment in which user can execute programs in a convenient & efficient manner.
  - OS ensures effective utilization of computer hardware.
  - Important function of OS are
    - i) Memory Management      ii) Resource Management
    - iii) Processor Management      iv) I/O Management
    - v) File Management      vi) Security
  - Multimedia is the integration of ~~media~~ two or more medias such as text, audio, video, etc.
  - Operating System that are capable to handle the multimedia files are called multimedia operating system.
  - Multimedia operating system are designed to handle conventional data such as text files, programs, word processing, audio, video, etc.
  - In multimedia application, a lot of data manipulation is required and this involves a lot of data transfer, which consumes many resources.

- These resources are under the control of OS.
- Multimedia application demand that human's perceive media like (audio/video) in natural and error free way.
- A multimedia Operating System should be able to take care of many resources simultaneously and effectively.

### Required Characteristics in Multimedia Operating System

- 1) Multimedia files are large. So OS has to provide proper file handling mechanism.
- 2) A multimedia Operating System should be able to take care of many resources simultaneously and effectively.
- 3) A MOS ~~has~~ should be able to integrate discrete and continuous media data.
- 4) MOS should ~~have~~ have an effective database management system.
- 5) Operating System should have appropriate scheduling algorithms.
- 6) The continuous media data should be processed in Real time. Since, Multimedia System are quite sensitive to time delays.



//////  
//////  
5) V.V.Img

5) What is Multimedia Real time Operating System? Explain the characteristics of Real time Operating System.

~~Ans:~~ A real time operating system

Ans: A real time system is a system which delivers the results of the processing in given time span.

- It is a data processing system in which the time interval required to process and respond to inputs is small.
- The response time is very less.
- In real time system, each job carries a certain deadline within which the job is supposed to be completed, otherwise, huge loss will be there, or even if the result is produced, it will be completely useless.
- Eg: Scientific Experiments, weapon System, Air Traffic Control System, Medical Image processing use Real time operating System.
- In Multimedia, continuous media data should be processed in real time as Multimedia System is quite sensitive to time delays.
- Multimedia application requires real time system to deliver the results of the processing in a given time-span.

- To fulfill the timing requirements the operating system must use the real time scheduling algorithms.

### Characteristics of Real time Operating System

- 1) Correctness of Computation
  - The main characteristics of real time system is the correctness of the computation.
- 2) Fast response time
  - The time taken by a system to respond to an input and display result is response time. Response time should be very less.
- 3) High degree of schedulability
  - Schedulability refers to the degree of resource utilization.
- 4) Stability under System Overload
  - Under the system overload, the processing of critical tasks must be ensured.
- 5) Fault tolerance
  - Mechanism to handle system failures.
- 6) Concurrency
  - Responds to several number of process at a time.



6) Define deadline in terms of multimedia Operating System.

Ans. Deadlines represents the time at which specific tasks has to be completed.

→ There are two types of deadlines. They are:-

1) Soft deadline

→ It is used when a deadline cannot be exactly determined and failing to meet it does not produce an unacceptable result.

2) Hard deadline

→ They are strict and never to be violated. If they are violated, leads to system failure.

17) What is resource in terms of multimedia?

Ans. A resource is a system entity required by a tasks for processing and manipulating data.

→ Resources have following characteristics

1) A resource can be active or passive.

↳ CPU is an active resource, main memory is a passive resource

2) A resource can be either exclusively used by one process at a time or shared between various processes.

3) Each resource has a capacity denoting ~~the~~ maximum ability to perform a task using the resource. Eg: Memory Size, CPU capacity, etc.

19) What are the phases of the resource reservation and management process? Explain different ways of reserving the resources.

Ans: Multimedia OS is a real time system which have to manage the resources among various process.

Phases for Resource Reservation and Management Process.

- 1) Schedulability Test  
→ Resource Manager ~~with~~ checks with given QoS parameters (throughput, reliability) to determine if there is enough remaining resource capacity available to handle this additional request.
- 2) Quality of Service Calculation  
→ After Schedulability test, the resource manager calculates the best possible performance the resource can guarantee for new request.



### 3) Resource Reservation

→ Resource manager allocates the required capacity to meet the Quality of Service guarantee.

### 4) Resource Scheduling

→ Incoming messages from connections are scheduled according to the given QoS guarantees.

### Allocation Schemes

→ The reservation of resources can be made in these ways:-

#### 1) Optimistic Approach

→ Resources are reserved according to average workload only.

#### 2) Pessimistic Approach

→ Avoids resource conflicts by making reservations for worst case.