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Instructor :-

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Subject :-

Operating Systems.

Paper :-

Mid Terms.

Note:- Please attempt all questions. All questions carry equal marks.

Q1) Explain the main purpose of an operating system?

Ans: An operating system has three main functions.

(a) Manage the computer's resources, such as the central processing unit, memory, disk, drives and printers

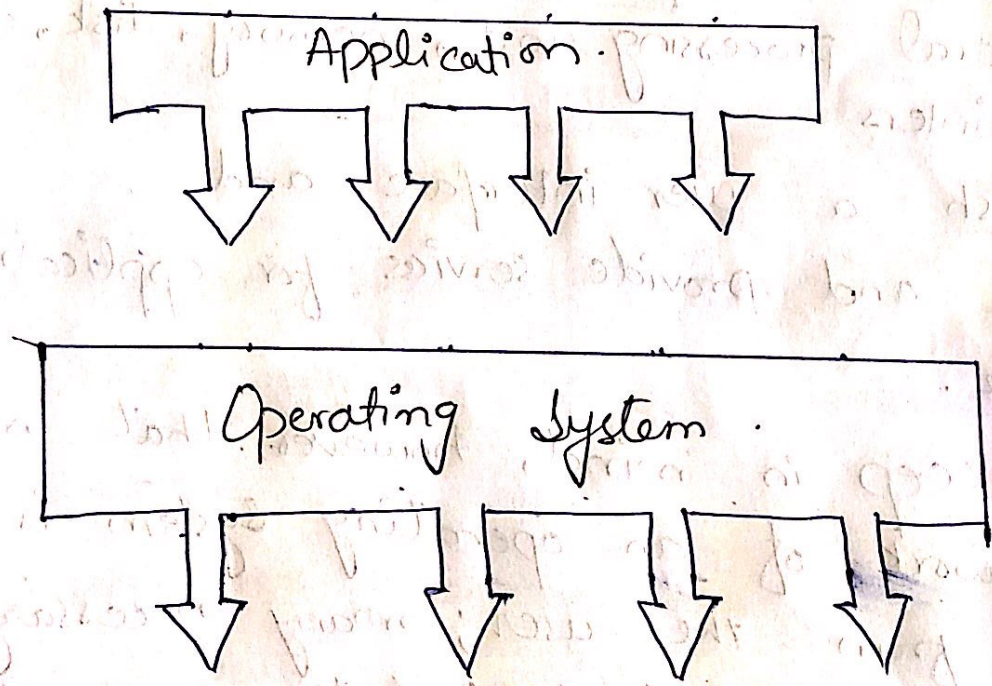
(b) Establish a user interface and

(c) Execute and provide services for applications software.

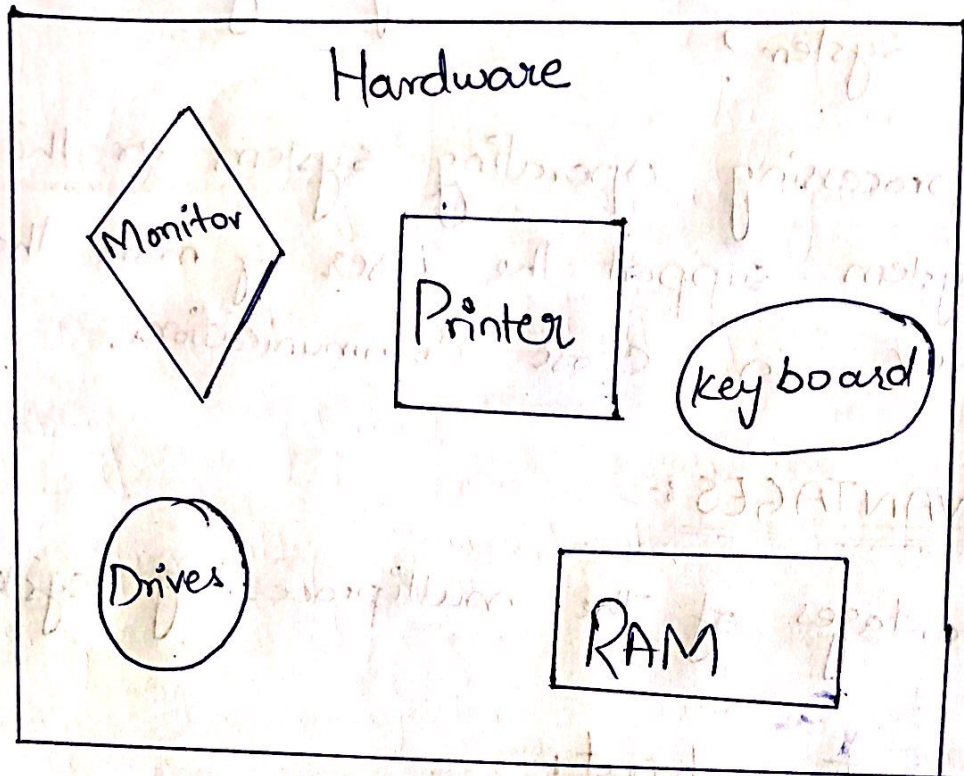
Keep in mind, however, that much of the work of an operating system is hidden from the user; many necessary tasks are performed behind the scenes. In particular, the first listed function, managing the computer's resources, is taken care of without the user being aware of the details. Furthermore, all input and

output operations, although invoked by an applications program, are actually carried out by the operating system functions are hidden from view, you will know when you are using an applications software package, and this requires that you invoke-call into action-the operating system. Thus you both establish a user interface and execute software.

→ Operating System in a Hierarchy:-



P-T-O



→ Important Functions of an Operating System:-

The most important functions of an operating system are as under:-

- (a) Security.
- (b) Control over system performance.
- (c) Job accounting.
- (d) Coordination between other software and users.
- (e) Processor Management.
- (f) Device Management.
- (g) File Management.

Q2: What are the advantages of a multi-processor system?

Ans: Multi-processing operating system or the parallel system support the user of more than one processor in close communication.

⇒ ADVANTAGES:-

The advantages of the multiprocessing system are :-

(a) Increase Throughput:-

By increasing the number of processors, more work can be completed in a unit time.

(b) Cost Savings:-

Parallel system shares the memory, buses, peripherals etc. Multiprocessor system thus saves money as compared to multiple single systems. Also, if a number of programs are to operate on the same data, it is cheaper to store that data on one single disk and shared by all processors instead.

of using many copies of the same data.

(c) Increased Reliability:

In this system, as the workload is distributed among several processors which results in increased reliability. If one processor fails then its failure may slightly slow down the speed of the system but system will work smoothly.

Q3- Describe the objectives of multi-programming?
 → Multi-programming:-

- In a computer system, there are multiple processes waiting to be executed i.e they are waiting when the CPU will be allocated to them and they begin their execution.
- These processes are initially kept in an area called job pool.
- This job pool consists of all these processes awaiting allocation of main memory and CPU.
- The processor is shared amongst different processes.

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• The main idea of multiprogramming is to maximize the CPU time.

→ Objectives of Multiple programming:-

The objectives of multiple programming is:

- (a) to minimize unused CPU time.
- (b) to reduce incidences of peripheral bound operation.
- (c) to minimize total elapsed time.
- (d) to prevent single programs from dominating the CPU.

Q4. Give some benefits of multi-threaded programming.

→ Multithreading:-

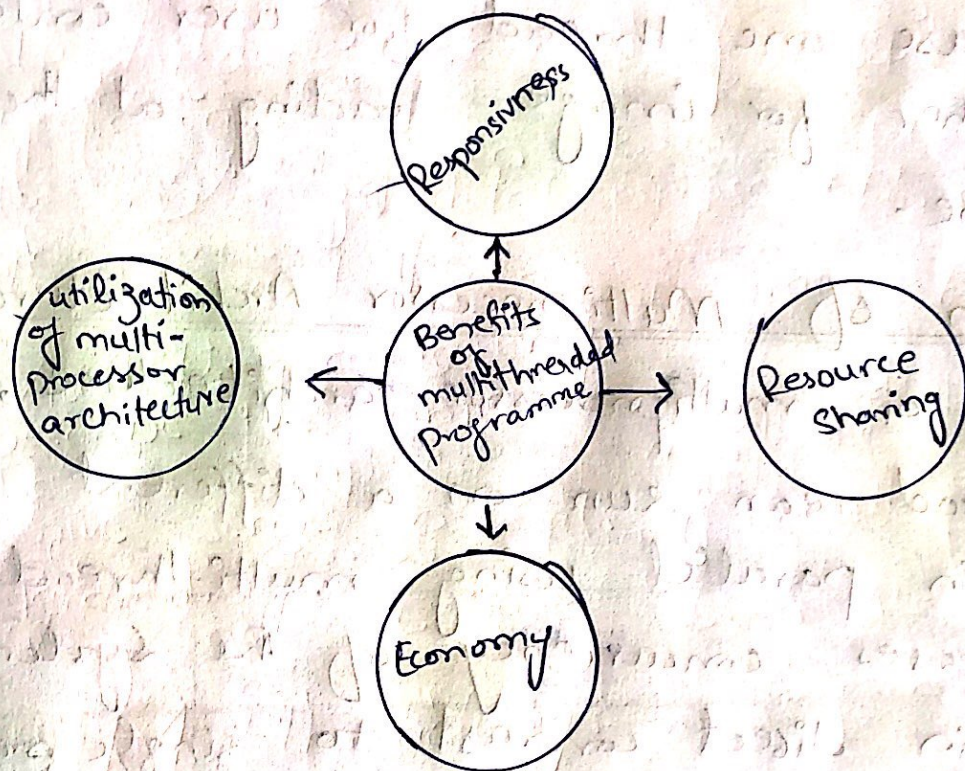
Multithreading is an execution model that allows a single process to have multiple code segments (i.e. threads) running concurrently with in the "context" of the process.

Example:-

VLC media player, where one thread is used for opening the VLC

media player, one thread for playing a particular song and another thread for adding new songs to the playlist.

Some of the benefits of multithreaded programming are given as under:-



Resource Sharing:-

All the threads of a process shares its resources such as memory, data files etc. A single application can have different threads with in the same address space using resource sharing.

Responsiveness:-

Programme responsiveness allows a programme to run even if part of it is blocked using multithreading. This can also be done if the process is performing a lengthy operation. For example - A web browser with multithreading can use one thread for user contact and another for image loading at the same time.

Utilization of Multiprocessor Architecture:-

In a multiprocessor architecture, each thread can run on a different processor in parallel using multi-threading. This increases concurrency of the system. This is in direct contrast to single processor or thread can run on a processor at a time.

Economy:-

It is more economical to use threads as they share the process resources. The overhead for process creation and management is much higher than thread creation and management.

Q5. What is RR scheduling algorithm?

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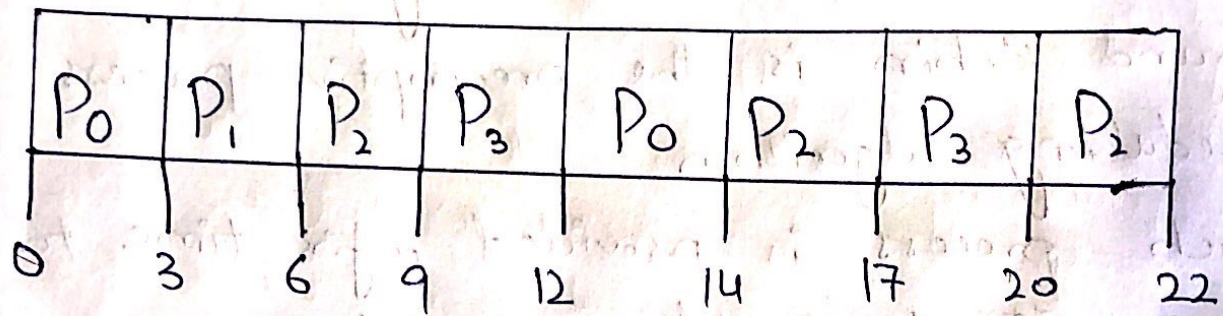
Ans. Round Robin Scheduling:-

- Round Robin is the preemptive process scheduling algorithm.
- Each process is provided a fix time to execute, it is called a quantum.
- Once a process is executed for a given time period, it is preempted and other process executes for a given time period.
- Context switching is used to save states of preempted processes.

Process	Arrival time	Execute Time
P ₀	0	5
P ₁	1	3
P ₂	2	8
P ₃	3	6

P.T.O.

Quantum = 3



- Wait time of each process is as follows:

Process	Wait time : Service time - Arrival time
P ₀	$(0-0) + (12-3) = 9$
P ₁	$(3-1) = 2$
P ₂	$(6-2) + (14-9) + (20-17) = 2$
P ₃	$(9-3) + (17-12) = 11$

- Average ^{wait} time : $(9+2+12+11)/4 = 8.5$

Q6 What are the primary difference between Network Operating system and distributed operating system?

Ans: The main difference between these two operating systems (Network operating system and distributed operating system) is that in network operating system each node or system can have its own operating system on the other hand in distributed operating system each node or system have same operating system which is opposite to the network operating system.

The difference between Network operating system and distributed operating system are given below:

P-T-O.

Network Operating System

Distributed Operating System

1- Network operating system's main objective is to provide the local services to remote client.

Distributed operating system's main objective is to manage the hardware resources.

2- Network operating system is more scalable than distributed operating system.

Distributed operating system is less Scalable than network operating system.

3- In network operating system, fault tolerance is less.

While in distributed operating system, fault tolerance is high.

4- Rate of autonomy in network operating system is high.

While in distributed operating system the rate of autonomy is less.

5. Ease of implementation in network operating system is also high.

While in distributed operating system Ease of implementation is less.

Q7. What inconveniences that a user can face while interacting with a computer system which is without an operating system. Reg no: 16550 (13)

Ans. Operating system is a required component of the computer system.

Without an operating system computer hardware is only an inactive electronic machine, which is inconvenient to user for execution of programs.

As the computer hardware or machine understands only the machine language. It is difficult to develop each and every program in machine language in order to execute it.

Thus without operating system execution of user program or to solve user problems is extremely difficult.