Summer-20 Mid Term Assignment

Subject: Operating System Concepts

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1.Explain the main purpose of an operating system?

ANSWER

Definition

An operating system is a program that acts as an interface between the user and the computer hardware and controls the execution of all kinds of programs.

An Operating System (OS) is an interface between a computer user and computer hardware. An operating system is a software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.

An operating system has three main purpose:

 (1) manage the computer's resources, such as the central processing unit, memory, disk drives, and printers.

 (2) establish a user interface.

(3) 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. Although much of 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.

Some popular Operating Systems include Linux Operating System, Windows Operating System, VMS, OS/400, AIX, z/OS, etc.

2.What are the advantages of a multiprocessor system?

ANSWER

A multiprocessor system is defined as "a system with more than one processor", and, more precisely, "a number of central processing units linked together to enable parallel processing to take place". The key objective of a multiprocessor is to boost a system's execution speed.

Multiprocessor systems can save money, by sharing power supplies, housings, and peripherals. Can execute programs more quickly and can have increased reliability.

By increasing the number of processors, more work can be completed in a unit time. Cost Saving – Parallel system shares the memory, buses, peripherals etc. Multiprocessor system thus saves money as compared to multiple single systems.

3.Describe the objective of multiprogramming.

ANSWER

The main objective of multiprogramming is to have process running at all times. With this design, CPU utilization is said to be maximized. Answer: Multiprogramming is a feature of the Operating system with the help of it can run multiple programs at the same time.

Multiprogramming. Sharing the processor, when two or more programs reside in memory at the same time, is referred as multiprogramming. Multiprogramming assumes a single shared processor. Multiprogramming increases CPU utilization by organizing jobs so that the CPU always has one to execute. Multiprogramming. Sharing the processor, when two or more programs reside in memory at the same time, is referred as multiprogramming. Multiprogramming assumes a single shared processor. Multiprogramming increases CPU utilization by organizing jobs so that the CPU always has one to execute

4.Give some benefits of multithreaded programming.

ANSWER

Multithreading specifically refers to the concurrent execution of more than one sequential set (thread) of instructions. Multithreaded programming is programming multiple, concurrent execution threads. These threads could run on a single processor. Or there could be multiple threads running on multiple processor cores.

This concurrent activity speeds applications up - one of the main benefits of multithreading.

MULTITHREADING allows both the full exploitation of parallel hardware and the effective use of multiple processor subsystems. While MULTITHREADING is essential for taking advantage of the performance of symmetric multiprocessors, it also provides performance benefits on uniprocessor systems by improving the overlap of operations such as computation and I/O.

Some of the most important benefits of MULTITHREADING are:

- Improved throughput. Many concurrent compute operations and I/O requests within a single process.
- Simultaneous and fully symmetric use of multiple processors for computation and I/O
- Superior application responsiveness. If a request can be launched on its own thread, applications do not freeze or show the "hourglass". An entire

application will not block, or otherwise wait, pending the completion of another request.

- Improved server responsiveness. Large or complex requests or slow clients don't block other requests for service. The overall throughput of the server is much greater.
- Minimized system resource usage. Threads impose minimal impact on system resources. Threads require less overhead to create, maintain, and manage than a traditional process.
- Program structure simplification. Threads can be used to simplify the structure of complex applications, such as server-class and multimedia applications. Simple routines can be written for each activity, making complex programs easier to design and code, and more adaptive to a wide variation in user demands.
- Better communication. Thread synchronization functions can be used to provide enhanced process-to-process communication. In addition, sharing large amounts of data through separate threads of execution within the same address space provides extremely high-bandwidth, low-latency communication between separate tasks within an application.

5.**What is RR scheduling algorithm?**

ANSWER

CPU **Scheduling** is a process of determining which process **will** own CPU for

execution while another process is on hold. ... The selection process **will** be

carried out by the CPU **scheduler**. It selects one of the processes in memory

that **are** ready for execution.

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.

Quantum = 3

PO	P1	P2	P3	PO	P2	P3	P2

0   3   6   9   12 14   17   20 22
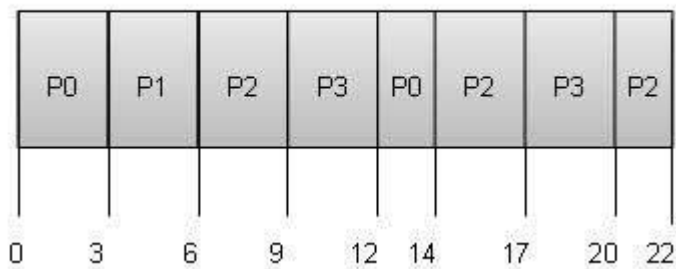
Wait time of each process is as follows −

Process	Wait Time : Service Time - Arrival Time
P0	$(0 - 0) + (12 - 3) = 9$
P1	$(3 - 1) = 2$
P2	$(6 - 2) + (14 - 9) + (20 - 17) = 12$
P3	$(9 - 3) + (17 - 12) = 11$
	Average Wait Time: $(9+2+12+11) / 4 = 8.5$

6.**What are the primary differences between Network Operating System and Distributed Operating System?**

ANSWER

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 distribute 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:

S.NO	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.	In Network Operating System, Communication takes place on the basis of files.	In Distributed Operating System, Communication takes place on the basis of messages and shared memory.
3.	Network Operating System is more scalable than Distributed Operating System.	Distributed Operating System is less scalable than Network Operating System.
4.	In Network Operating System, fault tolerance is less.	While in Distributed Operating System, fault tolerance is high.
5.	Rate of autonomy in Network Operating System is high.	While The rate of autonomy in Distributed Operating System is less.
6.	Ease of implementation in Network Operating System is also high.	While in Distributed Operating System Ease of implementation is less.
7.	In Network Operating System, All nodes can have different operating system.	While in Distributed Operating System, All nodes have same operating system.

7.What inconveniences that a user can face while interacting with a computer system, which is without an operating system.

ANSWER

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.