



SNS COLLEGE OF TECHNOLOGY

COIMBATORE – 35



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (UG & PG)

Second Year, 4th Semester

2 Marks Question and Answer

Subject Code & Name: 19CST201 - OPERATING SYSTEM

1. What is an operating system?

An operating system is a program that controls the execution of application programs and acts as an interface between the user of the computer and the computer hardware. It creates a user friendly environment. We can view an operating system as a resource allocator.

2. What are the two primary goals for operating system?

- Convenience for the user
- Efficient operation of the computer system.

3. Define resource allocator?

OS as a resource allocator keeps track of the status of each resources and decides how to allocate them to specific programs and users. so that it can operate the computer system efficiently and fairly.

4. What are the advantages of multi processor system (or) tightly coupled system?

- If one processor fails, then another processors should retrieve the Interrupted process state (i.e) increased reliability.
- It increases the throughput.
- More economy of scale.
- It supports efficient context switching operation.

5. Define graceful degradation and fault tolerance?

The ability to continue providing service proportional to the level of surviving hardware is called graceful degradation. Systems designed for graceful degradation are also called as fault tolerance.

6. Differentiate symmetric and asymmetric multi processing?

SYMMETRIC	ASYMMETRIC
<ul style="list-style-type: none"> ❖ In symmetric multiprocessing (SMP), each processor runs an identical copy of operating system. ❖ In SMP, no master-slave relationship exists between processors. 	<ul style="list-style-type: none"> ❖ In asymmetric, each processor is assigned to a specified task. ❖ Master-slave exists. Master processor schedules and allocates work to the slave processor.

7. Define loosely coupled system (or) distributed system?

The computer networks used in the applications consist of a collection of processors that do not share memory or a clock. Instead, each processor has its own local memory. The processors communicate with one another through various communication lines such as high speed bus or telephone lines, these systems are usually referred as loosely coupled system or distributed system

8. Define clustered system?

Clustered systems gather together multiple CPU's to accomplish computational work. They are composed of two or more individual system coupled together. Clustered computers share storage and are closely linked via LAN networking. Clustering is usually performed to provide high availability.

9. Differentiate symmetric and asymmetric clustering?

SYMMETRIC	ASYMMETRIC
<ul style="list-style-type: none"> ❖ Two or more hosts are running Applications and they are monitoring each other. ❖ This mode is more efficient. It does require more than one application be available to run. 	<ul style="list-style-type: none"> ❖ One will be in hot-stand by mode while other is in running state. ❖ If the server fails then the hot-stand by host becomes active server.

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10. What is real time system? Mention its types?

A real time system is one that must react to inputs and responds to them quickly. A real time system cannot afford to be late with a response to an event.

TYPES:

- Hard real time system.
- Soft real time system.

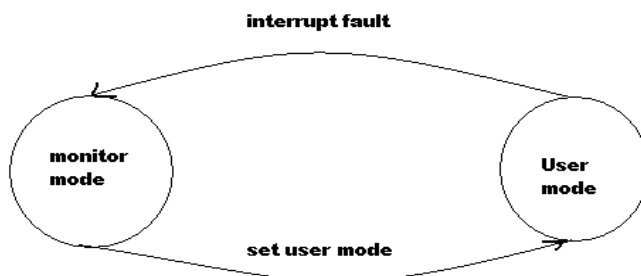
11. Define web clipping.

One approach for displaying the content in web pages is web clipping, where only a small subset of a web page is delivered and displayed on the handheld device.

12. What is dual mode operation?

Dual mode operation provides the protection to the OS from unauthorized users. In dual mode operation two separate modes are used for working of OS.

- User mode.
- Monitor mode/system mode/supervisor mode/privileged mode.



13. How do you ensure memory protection?

We can provide the memory protection by using two register usually a base register which holds the smallest legal physical memory address and a limit register which contains the size of the range.

14. Mention Operating system component activities.

- Process management.
- Main memory management.
- File management.
- Second storage management.
- I/O system management.
- Networking.
- Protection system.
- Command interpreter system.

15. What is command interpreter?

Command interpreter acts as an interface between the users and the OS. Many commands are given to the operating system by control statements. Its function is: to get the next command statement and execute it. It is also called Control-card interpreter or the command-line interpreter. Some OS include the command interpreter in the kernel. Other Os like MS-DOS and UNIX treat the command interpreter as a special program.

16. What are the services provided by operating system?

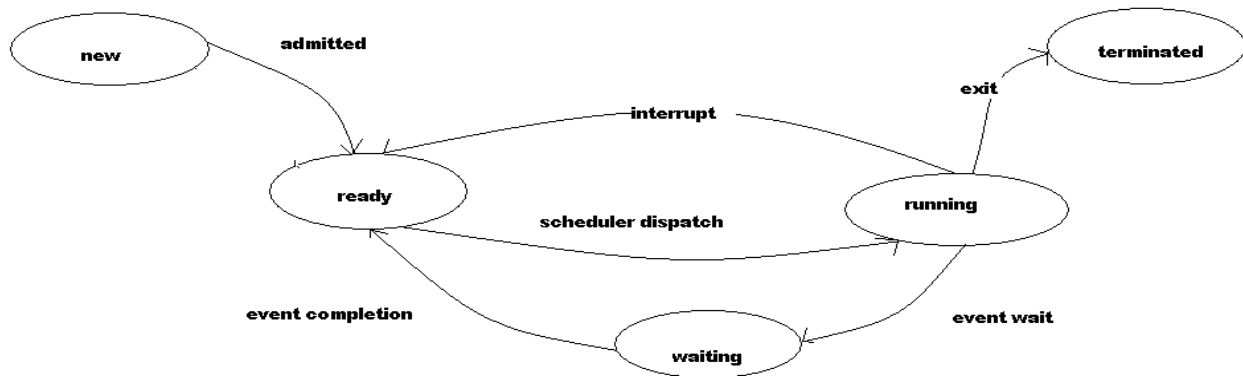
- Program execution.
- I/O operation.
- File system manipulation.
- Communications.
- Error detection.
- Resource allocation.
- Accounting.
- Protection.

17. Define system calls. Give examples.

System calls provide the interface between a process and OS. These calls are generally available as assembly language instructions. A system call instruction is an instruction that generates an interrupt that cause the OS to gain control of the processor.

Eg.fork, exec, getpid, wait.

18. Draw the process state diagram.



19. What is process control block? Give its diagram.

Each process contains the process control block. PCB is a data structure used by the OS. OS groups all information that needs about particular process.

Pointer	process state
Process number	
Program counter	
Registers	
Memory limits	
List of open files	

20. What are the multithreading models in OS?

- ❖ Many-to-One Model
- ❖ One-to-One Model
- ❖ Many-to-Many Model

21. Define long term and short term scheduler.

- Long term scheduler/Job scheduler.

It determines which programs are admitted to the system for processing. It selects from the queue and loads the processes into memory for the CPU scheduler.

When process changes the state from new to ready then there be long term scheduler.

- Short term scheduler/CPU scheduler.

It is the change of ready state to running state of the process also known as dispatcher, execute most frequently and makes the fine grained decision of which process to execute next.

22. What is context switch?

When the scheduler switches the CPU from executing one process to executing another, the context switcher saves the content of all processor registers for the process being removed from the CPU in its process descriptor.

23. What is cascading termination?

If a process terminates, then all its children must also be terminated. This phenomenon, referred to as cascading termination.

24. What are the advantages of co-operating process?

- Sharing of information.
- Increases computation speed.
- Modularity.
- Convenience.

25. Give the advantages of Layered approach.

The main advantage of the layered approach is modularity. The layers are selected such that each uses functions and services of only lower-level layers. This approach simplifies debugging and system verification.

26. Define microkernel.

The microkernel method structures the OS by removing all nonessential components from the kernel, and implementing them as system and user-level programs. The result is a smaller kernel. Microkernel provide minimal process and memory management in addition to a communication facility.

27. What is virtual machine?

The system programs are at a level higher than that of the other routines, the application programs may view everything under them in the hierarchy. This layered approach is taken to its logical conclusion in the concept of a virtual machine. The virtual machine approach, each process is provided with a copy of the underlying computer.

Eg.The VM operating system for IBM systems.

28. What are the benefits of virtual machine?

- It provides robust level of security and protecting system resources completely.
- Virtual machine supports the system development to be done without disturbing normal system operation.
- It solves system compatibility problems.

29. Define JVM.

JVM is a specification for abstract computer.

Java Virtual Machine (JVM) is a combination of class loader, a class verifier, and java interpreter.

The JVM makes it possible to develop programs that are architecture neutral and portable. The implementation is specific for each system and it abstracts the system in a standard way to a java program, providing the architecture neutral interface.

30. What is Socket? What are the three different types of sockets provided by Java?

Socket is an end point of communication. It is a combination of IP and port number.

TYPES:

- Connection-oriented sockets (TCP). Socket class
- Connectionless (UDP) sockets. DatagramSocket Class
- MulticastSocket class

31. Define RPC and RMI.

Remote Procedure Call (RPC) allows IPC by providing a communication mechanism similar to ordinary function or procedure calls. RPC servers are multithreaded. RPC system using a separate Stub for each remote procedure.

Remote Method Invocation (RMI) is one of the special features of java. RMI using a stub at client side and a skeleton at server side. RMI allows a thread to invoke a method on a remote object.

32. What is Thread? Mention the benefits of Multithreaded Programming.

A thread is a flow of execution through the process code, with its own program counter, system register and stack. It is a light weight process.

BENEFITS:

- Responsiveness.
- Resource Sharing.
- Economy.
- Utilization of multiprocessor architecture.

33. Define user and kernel thread.

User threads are supported above the kernel and are implemented library at the user level. The library provides support for thread creation, scheduling, and management with no support from the kernel.

Kernel threads are supported directly by the operating system: the kernel performs thread creation, scheduling, and management in kernel space

34. Define Target thread and Thread Cancellation.

- A Thread that is to be cancelled is called as a target thread.
- Thread cancellation is the task of terminating a thread before it has completed
- . For eg. In multithread environment, thread concurrently searching through a database. If any one thread returns the result, the remaining might be cancelled.

35. What are the two different scenarios for thread cancellation?

- Asynchronous cancellation.
- Deferred cancellation.

36. Explain signal handling.

Signals are used in UNIX systems to notify a process that a particular event has occurred. A signal may be received either synchronously or asynchronously, depending upon the source and the reason for the event being signaled. Whether a signal is synchronous or asynchronous, all signals follow the same pattern:

- A signal is generated by a particular event.
- A generated signal is delivered to a process.
- Once delivered, the signal must be handled.

37. What is APC?

Asynchronous procedure calls (APC) facility allows a user thread to specify a function that is to be called when the user thread receives notification of a particular event.

38. Define Thread pools.

The general idea is to create a number of threads at process startup and place them into a pool. When a server receives a request, it awakens a thread from this pool if one is available passing it the request to service. Once the thread completes its service, it returns to the pool awaiting more work. If the pool contains no available thread, the server waits until one becomes free.

39. Write any four issues to consider with multithreaded programs.

- The fork and exec system calls.
- Cancellation.
- Signal handling
- Thread Pools

40. Differentiate the loosely coupled system and tightly coupled system.

Loosely coupled system	Tightly coupled system
<ul style="list-style-type: none"> ➤ A distributed operating system is one that looks to its users like an ordinary operating system but runs on multiple, independent CPU. ➤ Shorter responses times and higher throughput. 	<ul style="list-style-type: none"> ➤ Multiprocessor system has more than one processor in close communication. It is possible for parallel execution. ➤ If one processor fails, then another processor should retrieve the interrupted process.

41. Define cache coherency.

In multiprocessor environment, a copy of data may exist simultaneously in several caches. Since the various CPUs can all execute concurrently, we must make sure that an update to the data in one cache is immediately reflected in all other caches. This situation is called cache coherency.

42. Compare the process and threads.

Process	Threads
<ul style="list-style-type: none"> ➤ Process is called heavy weight Process. ➤ Process switching needs interface With OS. ➤ It does not cause an interrupt to Kernel. 	<ul style="list-style-type: none"> ➤ Thread is called light weight Process. ➤ Thread switching does not need to Call an OS. ➤ It causes an interrupt to the kernel.

43. Mention the benefits of thread pools.

- It is usually faster to service a request with an existing thread than waiting to create a thread.
- A thread pool limits the number of threads that exist at any one point. This is particularly important on systems that cannot support a large number of concurrent threads.