

1. What is an operating system?

An operating system is a program that acts as an intermediary between the user and the computer hardware. The purpose of an OS is to provide a convenient environment in which user can execute programs in a convenient and efficient manner. It is a resource allocator responsible for allocating system resources and a control program which controls the operation of the computer hardware.

2. What are short, long and medium-term scheduling?

Long term scheduler determines which programs are admitted to the system for processing. It controls the degree of multiprogramming. Once admitted, a job becomes a process.

Medium term scheduling is part of the swapping function. This relates to processes that are in a blocked or suspended state. They are swapped out of real-memory until they are ready to execute. The swapping-in decision is based on memory-management criteria.

Short term scheduler, also known as a dispatcher executes most frequently, and makes the finest-grained decision of which process should execute next. This scheduler is invoked whenever an event occurs. It may lead to interruption of one process by preemption.

3. Explain the concept of the batched operating systems?

In batched operating system the users give their jobs to the operator who sorts the programs according to their requirements and executes them. This is time consuming but makes the CPU busy all the time.

4. What is purpose of different operating systems?

The machine purpose workstation individual usability & resources utilization mainframe optimize utilization of hardware PC support complex games, business application Hand held PCs Easy interface & min. power consumption.

5. What is virtual memory?

Virtual memory is hardware technique where the system appears to have more memory than it

actually does. This is done by time-sharing, the physical memory and storage parts of the memory one disk when they are not actively being used.

What is Throughput, Turnaround time, waiting time and Response time?

Throughput : number of processes that complete their execution per time unit.

Turnaround time : amount of time to execute a particular process.

Waiting time : amount of time a process has been waiting in the ready queue.

Response time : amount of time it takes from when a request was submitted until the first response is produced, not output (for time-sharing environment

).

7. What are the various components of a computer system?

The hardware

The operating system

The application programs

The users.

8. What is a Real-Time System?

A real time process is a process that must respond to the events within a certain time period. A real time operating system is an operating system that can run realtime processes successfully.

9. Explain the concept of the Distributed systems?

Distributed systems work in a network. They can share the network resources, communicate with each other.

10. What are the different operating systems?

Batched operating systems

Multi-programmed operating systems

Timesharing operating systems

Distributed operating systems

Real-time operating systems.

11. What is busy waiting?

The repeated execution of a loop of code while waiting for an event to occur is called busy waiting.

12. What are system calls?

System calls provide the interface between a process and the operating system. System calls for modern Microsoft windows platforms are part of the win32 API, which is available for all the compilers written for Microsoft windows.

13. What are various scheduling queues?

Job queue

Ready queue

Device queue

What are the states of a process?

New Running Waiting Ready Terminated

14. What is a job queue?

When a process enters the system it is placed in the job queue.

15. What is a ready queue?

The processes that are residing in the main memory and are ready and waiting to execute are kept on a list called the ready queue.

What are turnaround time and response time?

Turnaround time is the interval between the submission of a job and its completion.

Response time is the interval between submission of a request, and the first response to that request.

16. What are the operating system components?

Process management

Main memory management

File management

I/O system management

Secondary storage management

Networking

Protection system

Command interpreter system

17. Why thread is called as a lightweight process?

It is called light weight process to emphasize the fact that a thread is like a process but is more efficient and uses fewer resources(n hence “lighter”)and they also share the address space.

18. What are operating system services?

Program execution

I/O operations

File system manipulation

Communication

Error detection

Resource allocation

Accounting

Protection

33. What is a process?

A program in execution is called a process. Or it may also be called a unit of work. A process needs some system resources as CPU time, memory, files, and i/o devices to accomplish the task. Each process is represented in the operating system by a process control block or task control block (PCB). Processes are of two types

Operating system processes

User processes

34. What are the different job scheduling in operating systems?

Scheduling is the activity of the deciding when process will receive the resources they request.

FCFS ---> FCSFS stands for First Come First Served. In FCFS the job that has been waiting the longest is served next.

Round Robin Scheduling--->Round Robin scheduling is a scheduling method where each process gets a small quantity of time to run and then it is preempted and the next process gets to run. This is called time-sharing and gives the effect of all the processes running at the same time

Shortest Job First ---> The Shortest job First scheduling algorithm is a nonpreemptive scheduling algorithm that chooses the job that will execute the shortest amount of time.

Priority Scheduling--->Priority scheduling is a scheduling method where at all times the highest priority process is assigned the resource.

35. What is dual-mode operation?

In order to protect the operating systems and the system programs from the malfunctioning programs the two mode operations were evolved

System mode

User mode.

What is a device queue?

A list of processes waiting for a particular I/O device is called device queue.

19. What are the different types of Real-Time Scheduling?

Hard real-time systems required to complete a critical task within a guaranteed amount of time.

Soft real-time computing requires that critical processes receive priority over less fortunate ones.

20. What is starvation ?

Starvation is a resource management problem where a process does not get the resources it needs for a long time because the resources are being allocated to other processes.

21. What is a long term scheduler & short term schedulers?

Long term schedulers are the job schedulers that select processes from the job queue and load them into memory for execution.

The **Short term schedulers** are the CPU schedulers that select a process from the ready queue and allocate the CPU to one of them.

22. What is fragmentation?

Fragmentation occurs in a dynamic memory allocation system when many of the free blocks are too small to satisfy any request.

What is the state of the processor, when a process is waiting for some event to occur?

Waiting state

23. What is the difference between Primary storage and secondary storage?

Main memory - only large storage media that the CPU can access directly.

Secondary storage - extension of main memory that provides large nonvolatile storage capacity.

24. What is the difference between Compiler and Interpreter?

An interpreter reads one instruction at a time and carries out the actions implied by that instruction. It does not perform any translation.

But a compiler translates the entire instructions

25.What are the different functions of Scheduler

Scheduler deals with the problem of deciding which of the process in the ready queue is to be allocated the CPU. Short Term Schedulers, Long Term Schedulers

26.. What are local and global page replacements?

Local replacement means that an incoming page is brought in only to the relevant process' address space. Global replacement policy allows any page frame from any process to be replaced. The latter is applicable to variable partitions model only.

27. What are the different operating systems?

1. Batched operating systems
2. Multi-programmed operating systems
3. timesharing operating systems
4. Distributed operating systems
5. Real-time operating systems

28. What are the basic functions of an operating system?

Operating system controls and coordinates the use of the hardware among the various applications programs for various uses. Operating system acts as resource allocator and manager. Also operating system is control program which controls the user programs to prevent errors and improper use of the computer. It is especially concerned with the operation and control of I/O devices.

29. What is kernel?

Kernel is the core and essential part of computer operating system that provides basic services for all parts of OS.

30.What is a process?

A program in execution is called a process.

Processes are of two types:

1. Operating system processes
2. User processes

31. What are the states of a process?

1. New
2. Running
3. Waiting
4. Ready
5. Terminated

32. What is starvation and aging?

Starvation is Resource management problem where a process does not get the resources it needs for a long time because the resources are being allocated to other processes.

Aging is a technique to avoid starvation in a scheduling system.

33. What is context switching?

Transferring the control from one process to other process requires saving the state of the old process and loading the saved state for new process. This task is known as context switching.

34. What is a thread?

A thread is a program line under execution. Thread sometimes called a light-weight process, is a basic unit of CPU utilization; it comprises a thread id, a program counter, a register set, and a stack

35. What is process synchronization?

A situation, where several processes access and manipulate the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place, is called race condition. To guard against the race condition we need to ensure that only one process at a time can be manipulating the same data. The technique we use for this is called process synchronization.

36. What is virtual memory?

Virtual memory is hardware technique where the system appears to have more memory than it actually does. This is done by time-sharing, the physical memory and storage parts of the memory on disk when they are not actively being used.

37. What is fragmentation? Tell about different types of fragmentation?

When many of free blocks are too small to satisfy any request then fragmentation occurs. External fragmentation and internal fragmentation are two types of fragmentation. External Fragmentation happens when a dynamic memory allocation algorithm allocates some memory and a small piece is left over that cannot be effectively used. Internal fragmentation is the space wasted inside of allocated memory blocks because of restriction on the allowed sizes of allocated blocks.

38. What is logical and physical addresses space?

Logical address space is generated from CPU; it bound to a separate physical address space is central to proper memory management. Physical address space is seen by the memory unit. Logical address space is virtual address space. Both these address space will be same at compile time but differ at execution time.

39. What is Memory-Management Unit (MMU)?

Hardware device that maps virtual to physical address. In MMU scheme, the value in the relocation register is added to every address generated by a user process at the time it is sent to memory.

->The user program deals with logical addresses; it never sees the real physical addresses

40. What is a Real-Time System?

A real time process is a process that must respond to the events within a certain time period. A real time operating system is an operating system that can run real time processes successfully

41. What is process migration?

It is the transfer of sufficient amount of the state of process from one machine to the target machine.

42. Difference between Primary storage and secondary storage?

Primary memory is the main memory (Hard disk, RAM) where the operating system resides.

Secondary memory can be external devices like CD, floppy magnetic discs etc. secondary storage cannot be directly accessed by the CPU and is also external memory storage.

43. Define compactions.

Compaction is a process in which the free space is collected in a large memory chunk to make some space available for processes.

44. What are the disadvantages of context switching?

Time taken for switching from one process to other is pure over head. Because the system does no useful work while switching. So one of the solutions is to go for threading when ever possible.

55.What is Dispatcher?

Dispatcher module gives control of the CPU to the process selected by the short-term scheduler; this involves: Switching context, Switching to user mode, Jumping to the proper location in the user program to restart that program, dispatch latency – time it takes for the dispatcher to stop one process and start another running.

46. What is the Translation Lookaside Buffer (TLB)?

In a cached system, the base addresses of the last few referenced pages is maintained in registers called the TLB that aids in faster lookup. TLB contains those page-table entries that have been most recently used. Normally, each virtual memory reference causes 2 physical memory accesses- one to fetch appropriate page-table entry, and one to fetch the desired data. Using TLB in-between, this is reduced to just one physical memory access in cases of TLB-hit.

Explain FCFS Process Management algorithm with Example
 Explain SJF Process Management algorithm with Example
 Explain Priority Process Management algorithm with Example
 Explain RR Process Management algorithm with Example

Explain FIFO Memory Management algorithm with Example
 Explain Optimal Memory Management algorithm with Example
 Explain LRU Memory Management algorithm with Example
 Explain LFU Memory Management algorithm with Example.