OPERATING SYSTEMS

BASIS FOR COMPARISON	PRIMARY MEMORY	SECONDARY MEMORY
Basic	Primary memory is directly accessible by Processor/CPU.	Secondary memory is not directly accessible by CPU.
Altered Name	Main memory.	Auxiliary memory.
Data	Instructions or data to be currently executed are copied to main memory.	Data to be permanently stored is kept in secondary memory.
Volatility	Primary memory is usually volatile.	Secondary memory is non-volatile.
Formation	Primary memories are made of semiconductors.	Secondary memories are made of magnetic and optical material.
Access Speed	Accessing data from primary memory is faster.	Accessing data from secondary memory is slower.
Access	Primary memory is accessed by the data bus.	Secondary memory is accessed by input-output channels.

BASIS FOR COMPARISON	PRIMARY MEMORY	SECONDARY MEMORY
Size	The computer has a small primary memory.	The computer has a larger secondary memory.
Expense	Primary memory is costlier than secondary memory.	Secondary memory is cheaper than primary memory
Memory	Primary memory is an internal memory.	Secondary memory is an external memory.

External and Internal fragmentation

External 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. If too much external fragmentation occurs, the amount of usable memory is drastically reduced. Total memory space exists to satisfy a request, but it is not contiguous.

Internal Fragmentation: Internal fragmentation is the space wasted inside of allocated memory blocks because of restriction on the allowed sizes of allocated blocks. Allocated memory may be slightly larger than requested memory; this size difference is memory internal to a partition, but not being used.

1. What is an operating system?

An operating system is a program that acts as an intermediary between the user and the computer hardware.

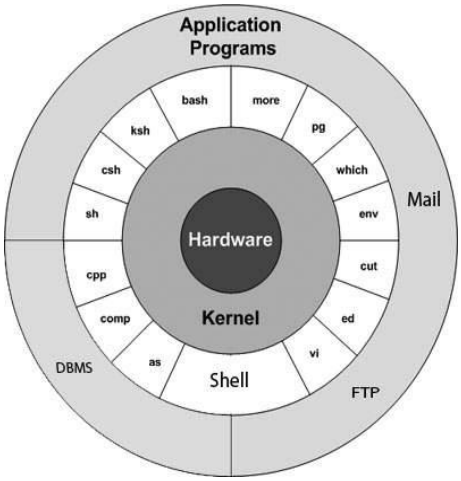
2. What are the different operating systems?

1. Batched operating systems - To speed up processing, jobs with similar needs are batched together and run as a group.
2. Multi-programmed operating systems
3. timesharing operating systems

4. Distributed operating systems
5. Real-time operating systems

functions of an operating System.

- Memory Management
- Processor Management
- Device Management
- File Management
- Security
- Control over system performance
- Job accounting
- Error detecting aids
- Coordination between other software and users



7. What is a process?

A program in execution is called a process.

8. What are the states of a process?

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

10. What is semaphore?

11. 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.

12. 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

13. 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.

14. What is virtual memory?

15. What is thrashing?

It is a phenomenon in virtual memory schemes when the processor spends most of its time swapping pages, rather than executing instructions. This is due to an inordinate number of page faults.

16. 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.

17. What are necessary conditions for dead lock?

1. Mutual exclusion (where at least one resource is non-sharable)
2. Hold and wait (where a process holds one resource and waits for other resource)
3. No preemption (where the resources can’ t be preempted)
4. Circular wait

18. What is cache memory?

Cache memory is random access memory (RAM) that a computer microprocessor can access more quickly than it can access regular RAM. As the microprocessor processes data, it looks first in the cache memory and if it finds the data there (from a previous reading of data), it does not have to do the more time-consuming reading of data from larger memory.

19. 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.

20. Differentiate 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

21. 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)

22. 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

23. 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

24. What is a trap and trapdoor?

Trapdoor is a secret undocumented entry point into a program used to grant access without normal methods of access authentication. A trap is a software interrupt, usually the result of an error condition.

25. When is a system in safe state?

processes is in a safe state if there exists at least one temporal order in which all processes can be run to completion without resulting in a deadlock.

28. 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.

29. Explain the meaning of mutex.

Mutex is the short form for ‘ Mutual Exclusion object’ . A mutex allows multiple threads for sharing the same resource. The resource can be file. A mutex with a unique name is created at the time of starting a program. A mutex must be locked from other threads, when any thread that needs the resource. When the data is no longer used / needed, the mutex is set to unlock.

30. What is cycle stealing?

We encounter cycle stealing in the context of Direct Memory Access (DMA). Either the DMA controller can use the data bus when the CPU does not need it, or it may force the CPU to temporarily suspend operation. The latter technique is called cycle stealing. Note that cycle stealing can be done only at specific break points in an instruction cycle.

39. 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.

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.