1) What is RAID? What are the different RAID levels?

RAID stands for Redundant Array of Independent Disks. It is used to store the same data redundantly to improve the overall performance.

Following are the different RAID levels:

RAID 0 - Stripped Disk Array without fault tolerance

RAID 1 - Mirroring and duplexing

RAID 2 - Memory-style error-correcting codes

RAID 3 - Bit-interleaved Parity

RAID 4 - Block-interleaved Parity

RAID 5 - Block-interleaved distributed Parity

RAID 6 - P+Q Redundancy

---

2) What is deadlock? Explain.

Deadlock is a specific situation or condition where two processes are waiting for each other to complete so that they can start. But this situation causes hang for both of them.

---

3) Which are the necessary conditions to achieve a deadlock?

There are 4 necessary conditions to achieve a deadlock:

- Mutual Exclusion: At least one resource must be held in a non-sharable mode. If any other process requests this resource, then that process must wait for the resource to be released.
- Hold and Wait: A process must be simultaneously holding at least one resource and waiting for at least one resource that is currently being held by some other process.

- **No preemption: Once a process is holding a resource (i.e. once its request has been granted), then that resource cannot be taken away from that process until the process voluntarily releases it.**
- **Circular Wait: A set of processes { P0, P1, P2, . . ., PN } must exist such that every P[i] is waiting for P[(i + 1) % (N + 1)].**

---

4) What is Banker's algorithm?

Banker's algorithm is used to avoid deadlock. It is the one of deadlock-avoidance method. It is named as Banker's algorithm on the banking system where bank never allocates available cash in such a manner that it can no longer satisfy the requirements of all of its customers.

---

5) What is the difference between logical address space and physical address space?

Logical address space specifies the address that is generated by CPU. On the other hand physical address space specifies the address that is seen by the memory unit.

---

6) What is fragmentation?

Fragmentation is a phenomenon of memory wastage. It reduces the capacity and performance because space is used inefficiently.

---

7) How many types of fragmentation occur in Operating System?

There are two types of fragmentation:

- **Internal fragmentation: It is occurred when we deal with the systems that have fixed size allocation units.**
- **External fragmentation: It is occurred when we deal with systems that have variable-size allocation units.**

---

8) What is spooling?

Spooling is a process in which data is temporarily gathered to be used and executed by a device, program or the system. It is associated with printing. When different applications send output to the printer at the same time, spooling keeps these all jobs into a disk file and queues them accordingly to the printer.

---

9) What is the difference between internal commands and external commands?

Internal commands are the built-in part of the operating system while external commands are the separate file programs that are stored in a separate folder or directory.

---

10) What is semaphore?

Semaphore is a protected variable or abstract data type that is used to lock the resource being used. The value of the semaphore indicates the status of a common resource.

There are two types of semaphore:

- Binary semaphores
- Counting semaphores

---

11) What is a binary Semaphore?

Binary semaphore takes only 0 and 1 as value and used to implement mutual exclusion and synchronize concurrent processes.

---

12) What is Belady's Anomaly?

Belady's Anomaly is also called FIFO anomaly. Usually, on increasing the number of frames allocated to a process virtual memory, the process execution is faster,

because fewer page faults occur. Sometimes, the reverse happens, i.e., the execution time increases even when more frames are allocated to the process. This is Belady's Anomaly. This is true for certain page reference patterns.

---

13) What is starvation in Operating System?

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

---

14) What is aging in Operating System?

Aging is a technique used to avoid the starvation in resource scheduling system.

---

15) What are the advantages of multithreaded programming?

A list of advantages of multithreaded programming:

- Enhance the responsiveness to the users.
- Resource sharing within the process.
- Economical
- Completely utilize the multiprocessing architecture.

---

16) What is the difference between logical and physical address space?

Logical address specifies the address which is generated by the CPU whereas physical address specifies to the address which is seen by the memory unit.

After fragmentation

---

17) What are overlays?

Overlays makes a process to be larger than the amount of memory allocated to it. It ensures that only important instructions and data at any given time are kept in memory.

---

18) When does trashing occur?

Thrashing specifies an instance of high paging activity. This happens when it is spending more time paging instead of executing.