

Q1. Briefly explain the importance of quality of service and admission control.

A: Quality of service manages network capabilities and is the overall performance. OS makes best effort with no QoS guarantees. Allows different traffic streams to be prioritised.

It also affects the computer in terms of CPU, scheduling, file systems.

• Admission control → In real-time scheduling, a practice whereby the scheduler may not allow a process to start if it cannot guarantee task completion.

This reserves resources and assigns resource manager for each type of resources.

Manager rejects the service if it cannot allocate resources to meet QoS.

Requests arrive with associated QoS.

Q2. Identify whether the following statements are TRUE or FALSE. If statement is FALSE, correct.

A: The statement is FALSE. Passwords of users in UNIX are encrypted by hashes and cannot be accessed by any other user including root user. This safeguards the control of access and security, allowing authorization of user properly, preventing attacks.

Q3. Briefly explain the following consistency semantics with positive and negative points.

A: UNIX semantics:

- The file which user is going to write will be visible to all users sharing that file.
- File can be shared via pointer of current location but this affects all other sharing users.
- A file shared is associated with single image accessed as exclusive resource. This causes delays in user processes.

Session semantics:

- The file to be written will not be visible to other users sharing that file.
- After closing the file, changes done are visible in later sessions only.
- A file is associated with multiple images and allows concurrent read and write.

Q.4. How RAID 4 is better than RAID 3? Also compare RAID 4 and RAID 5.

A: RAID 3 consists of Byte level striping and the parity bit generated ~~is~~ is stored on a different drive to overcome disk failure. The additional drive for parity causes storage overhead and in case of small size file, performance is low.

RAID 4 consists of block level striping. Due to this, it facilitates ~~run~~ simultaneous I/O requests. Also the storage overhead is low as it allows disk to be added seamlessly. Transfer rates for large read are high <sup>due to parallelism</sup> and RAID 4 also allows for error correction. If one disk fails the parity block, other blocks can be used to recover the failed disk.

RAID 5 generally has better performance than RAID 4.

It has parity distributed among all  $N+1$  disks. For each block one disk stores parity and other stores data. Although there is overhead in parity, the I/O is spread evenly across all drives. There is better protection against data loss.

• Since there is no single parity disk, it will not have ~~both~~ bottleneck and better performance.

• It is more suitable for large volumes of data than RAID 4.

Q.5. Define the word quality of service. Discuss what techniques could be used.

A: QoS is the requirements that OS must guarantee the specific data rate and timing of continuous media.

a) Process scheduler:

Most hard realtime scheduling algo assign realtime processes static priorities which do not change. to ensure critical tasks will be serviced within timing deadlines.

b) Disk scheduler:

Algos must be optimized to meet the timing deadlines and rate requirements of continuous media.

• EDF scheduling order ~~serve~~ request according to time of completion.

c) Memory manager:

The manager allocates resources appropriately only if it can be completion within time deadline. Proper ~~se~~ memory is managed by associated QoS.