42 Lecture - CS501

Important Subjective

1. **What is the role of the I/O subsystem in a computer system?**
   Answer: The I/O subsystem facilitates the transfer of data between the computer's memory and peripheral devices such as disks and network interfaces.

   How does the speed of the devices in an I/O subsystem affect its performance?
   Answer: The speed of the devices affects the rate at which data can be transferred, which impacts the overall performance of the I/O subsystem.

   What is RAID, and how does it improve I/O performance?
   Answer: RAID (redundant array of independent disks) is a technique for combining multiple disk drives into a single logical unit. RAID can improve I/O performance by distributing data across multiple drives, which can reduce I/O bottlenecks and improve fault tolerance.

   What is latency, and how does it affect I/O performance?
   Answer: Latency is the time delay between the initiation of an I/O operation and its completion. High latency can result in slower I/O performance, as it can cause delays in accessing data and transferring it to and from peripheral devices.

   What is caching, and how does it improve I/O performance?
   Answer: Caching is the process of storing frequently accessed data in a fast-access storage location, such as a cache. Caching can improve I/O performance by reducing the need to retrieve data from slower storage devices, such as hard disk drives.

   What is DMA, and how does it improve I/O performance?
   Answer: DMA (direct memory access) is a technique for transferring data between peripheral devices and memory without involving the CPU. DMA can improve I/O performance by reducing the overhead associated with I/O operations, as the CPU is not involved in the transfer of data.

   How does the workload characteristics of an application affect I/O performance?
   Answer: The workload characteristics of an application, such as the read/write ratio and the size of data transfers, can impact I/O performance by affecting the rate at which data is transferred and the frequency of I/O operations.

   What is bandwidth, and how is it used to measure I/O performance?
   Answer: Bandwidth is the amount of data that can be transferred per unit of time. It is used to measure I/O performance by indicating the rate at which data can be transferred between memory and peripheral devices.

   What is an interrupt, and how is it used in I/O handling mechanisms?
   Answer: An interrupt is a signal that is sent to the CPU to indicate that an I/O operation has been completed or that an error has occurred. Interrupts are used in I/O handling mechanisms to alert the CPU that an I/O operation requires attention.

   How does the efficiency of an operating system's I/O handling mechanisms affect I/O

performance?
Answer: The efficiency of an operating system's I/O handling mechanisms can impact I/O performance by affecting the speed and effectiveness of I/O operations, as well as the amount of CPU overhead required to perform I/O operations.