**Assignment # 1**

**Due By: 16 September 2024**

**Answer the following questions**

1. Direct memory access is used for high-speed I/O devices in order to avoid increasing the CPU's execution load.
2. How does the CPU interface with the device to coordinate the transfer?
3. How does the CPU know when the memory operations are complete?
4. The CPU is allowed to execute other programs while the DMA controller is transferring data. Does this process interfere with the execution of the user programs? If so, describe what forms of interference are caused.
5. Describe the differences between symmetric and asymmetric multiprocessing. What are the advantages and disadvantages of multiprocessor systems?
6. What is the purpose of interrupts? What are the differences between a trap and an interrupt? Can traps be generated intentionally by a user program? If so, for what purpose?
7. Rank the following storage systems from slowest to fastest:
8. Hard disk drives
9. Registers
10. Optical disk
11. Main memory
12. Nonvolatile memory
13. Magnetic tapes
14. Cache
15. Differentiate between multiprogramming systems and multiprocessing systems.
16. Give two reasons why caches are useful. What problems do they solve? What problems do they cause? If a cache can be made as large as the device for which it is caching (for instance, a cache as large as a disk/memory), why not make it that large and eliminate the device?
17. Distinguish between the client-server and peer-to-peer models of distributed systems.
18. What is the purpose of system calls, and how do system calls relate to the OS and to the concept of dual-mode (kernel-mode and user-mode) operation?