

QUESTION BANK

Module 1

1. How are network computers different from traditional personal computers? Describe some usage scenarios in which it is advantageous to use network computers.
2. What network configuration would best suit the following environments?
 - a. A dormitory floor
 - b. A university campus
 - c. A state
 - d. A nation
3. 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), why not make it that large and eliminate the device?
4. Under what circumstances would a user be better off using a timesharing system rather than a PC or a single-user workstation?
5. List the four steps that are necessary to run a program on a completely dedicated machine—a computer that is running only that program.
6. How does the distinction between kernel mode and user mode function as a rudimentary form of protection (security) system?
7. In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation can result in various security problems.
 - a. What are two such problems?
 - b. Can we ensure the same degree of security in a time-shared machine as in a dedicated machine? Explain your answer.
8. Describe a mechanism for enforcing memory protection in order to prevent a program from modifying the memory associated with other programs.
9. What are the tradeoffs inherent in handheld computers?
10. Distinguish between the client-server and peer-to-peer models of distributed systems.
11. Some computer systems do not provide a privileged mode of operation in hardware. Is it possible to construct a secure operating system for these computer systems? Give arguments both that it is and that it is not possible.
12. What are the main differences between operating systems for mainframe computers and personal computers?
13. Which of the following instructions should be privileged?
 - a. Set value of timer
 - b. Read the clock
 - c. Clear memory
 - d. Issue a trap instruction.
 - e. Turn off interrupts
 - f. Modify entries in device-status table
 - g. Switch from user to kernel mode
 - h. Access I/O device
14. Discuss, with examples, how the problem of maintaining coherence of cached data manifests itself in the following processing environments:
 - a. Single-processor systems
 - b. Multiprocessor systems
 - c. Distributed systems

15. Identify several advantages and several disadvantages of open-source operating systems. Include the types of people who would find each aspect to be an advantage or a disadvantage.
16. How do clustered systems differ from multiprocessor systems? What is required for two machines belonging to a cluster to cooperate to provide a highly available service?
17. What is the main difficulty that a programmer must overcome in writing an operating system for a real-time environment?
18. Direct memory access is used for high-speed I/O devices in order to avoid increasing the CPU's execution load.
 - a. How does the CPU interface with the device to coordinate the transfer?
 - b. How does the CPU know when the memory operations are complete?
 - c. 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.
19. Identify which of the functionalities listed below need to be supported by the operating system for (a) handheld devices and (b) real-time systems.
 - a. Batch programming
 - b. Virtual memory
 - c. Time sharing
20. Some CPUs provide for more than two modes of operation. What are two possible uses of these multiple modes?
21. Define the essential properties of the following types of operating systems:
 - a. Batch
 - b. Interactive
 - c. Time sharing
 - d. Real time
 - e. Network
 - f. Parallel
 - g. Distributed
 - h. Clustered
 - i. Handheld
22. Describe the differences between symmetric and asymmetric multiprocessing. What are three advantages and one disadvantage of multiprocessor systems?
23. The issue of resource utilization shows up in different forms in different types of operating systems. List what resources must be managed carefully in the following settings:
 - a. Mainframe or minicomputer systems
 - b. Workstations connected to servers
 - c. Handheld computers
24. 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?
25. Consider a computing cluster consisting of two nodes running a database. Describe two ways in which the cluster software can manage access

Module 2

1. What is a process? What is PCB? What are the different states of a process? Explain using diagrams?
2. Draw queuing diagram/representation of process scheduling & explain various queues & schedules.
3. What are two main operations on processes?
4. Write a note on IPC. Explain two methods.
5. Differentiate between shared memory & message passing.
6. Explain in detail direct & indirect communication.
7. What is a thread? What is TCB?
8. Write a note on multithreading models.
9. What is thread cancellation?
10. What is signal handling?
11. What do you mean by
 - a. Thread pool
 - b. Thread specific data
 - c. Scheduler activation
12. What is preemptive scheduling and non-preemptive scheduling?
13. Define the following:
 - a. CPU utilization
 - b. Throughput
 - c. Turnaround time
 - d. Waiting time
 - e. Response time
14. Explain scheduling algorithms with examples.
15. Explain multilevel and multilevel feedback queue.
16. For the following set of process find the avg. waiting time and avg. turn around using Gantt chart for a) FCFS b) SJF (primitive and non-primitive) c) RR (quantum= 4)

Process	Arrival Time	Burst Time
P1	0	4
P2	1	2
P3	2	5
P4	3	4