

1. What is the primary responsibility of a scheduler in an operating system?
 - A) Memory management
 - B) Process synchronization
 - C) **Process scheduling**
 - D) File system management
2. Which scheduling algorithm assigns the CPU to the process that arrives first and is ready to execute?
 - A) Round Robin
 - B) **First-Come-First-Serve (FCFS)**
 - C) Shortest Job Next (SJN)
 - D) Priority Scheduling
3. In preemptive scheduling, a currently running process can be interrupted and moved to the ready queue by the scheduler.
 - A) True
 - B) False
4. Which scheduling algorithm is designed to reduce the turnaround time and waiting time of processes?
 - A) Priority Scheduling
 - B) Round Robin
 - C) **Shortest Job Next (SJN)**
 - D) Multilevel Queue Scheduling
5. The aging technique is commonly used in which scheduling algorithm?
 - A) Round Robin
 - B) **Priority Scheduling**
 - C) Multilevel Queue Scheduling
 - D) Shortest Job Next (SJN)

Semaphore and Mutex:

6. What is the purpose of a semaphore in operating systems?
 - A) **To synchronize processes**
 - B) To allocate memory
 - C) To manage files
 - D) To manage CPU scheduling
7. A binary semaphore can take values:
 - A) **0 and 1**
 - B) 1 and 2
 - C) True and False
 - D) -1 and 1
8. Mutex stands for:
 - A) **Mutual Exclusion**
 - B) Multi-threading User eXperience
 - C) Multiple Execution
 - D) Memory Utilization and Exception Handling

9. Which of the following is a fundamental difference between a mutex and a semaphore?
- A) A mutex allows multiple processes to access a critical section simultaneously.
 - B) A semaphore is used for mutual exclusion, while a mutex is used for process synchronization.
 - C) A semaphore can only be binary, while a mutex can have multiple states.
 - D) A mutex is more lightweight than a semaphore.
10. What operation is typically used to release a semaphore or mutex?
- A) Wait
 - B) Signal
 - C) Lock
 - D) Release

Fork, IPC, and Threads:

11. In the context of operating systems, what does "fork" refer to?
- A) Creating a new process
 - B) Terminating a process
 - C) Suspending a process
 - D) Resuming a process
12. Which IPC mechanism allows processes to communicate by writing and reading to a common data area?
- A) Message Passing
 - B) Semaphores
 - C) Shared Memory
 - D) Pipes
13. What is the purpose of a thread in an operating system?
- A) To manage files
 - B) To execute a program
 - C) To manage memory
 - D) To execute code independently within a process
14. In a multithreaded process, each thread has its own:
- A) Memory space
 - B) File descriptors
 - C) Register values
 - D) Process ID
15. Which of the following is an advantage of using threads over processes?
- A) Better security
 - B) Lower resource consumption
 - C) Easier process management
 - D) Improved process isolation

Scheduler and Scheduling Algorithms:

16. Which scheduling algorithm uses time quantum to allocate CPU time to processes?
- A) First-Come-First-Serve (FCFS)
 - B) Round Robin
 - C) Priority Scheduling
 - D) Shortest Job Next (SJN)
17. The concept of "starvation" is most associated with which scheduling algorithm?
- A) Round Robin
 - B) Priority Scheduling
 - C) First-Come-First-Serve (FCFS)
 - D) Multilevel Queue Scheduling
18. What is the purpose of a ready queue in the context of process scheduling?
- A) To store processes that are waiting for I/O
 - B) To store processes that are ready to execute
 - C) To store processes that are currently running
 - D) To store terminated processes
19. In priority scheduling, a lower numerical priority value indicates:
- A) Higher priority
 - B) Lower priority
 - C) Equal priority
 - D) Round-robin scheduling
20. Which scheduling algorithm may suffer from the "convoy effect"?
- A) First-Come-First-Serve (FCFS)
 - B) Round Robin
 - C) Priority Scheduling
 - D) Shortest Job Next (SJN)

Semaphore and Mutex:

21. What is a deadlock in the context of semaphore and mutex usage?
- A) A situation where a process holds a resource indefinitely
 - B) A situation where two or more processes are waiting for each other to release resources
 - C) A situation where a process loses access to a critical section
 - D) A situation where a process is terminated abruptly
22. Which of the following statements about semaphores is true?
- A) Semaphores can only be used for mutual exclusion.
 - B) Semaphores can be used for both process synchronization and mutual exclusion.
 - C) Semaphores are only used in single-threaded systems.
 - D) Semaphores are a type of memory allocation mechanism.
23. Mutexes are typically used to protect:
- A) Disk drives
 - B) Critical sections
 - C) CPU registers

- D) Network sockets
- 24. In a counting semaphore, the value can range from:
 - A) -1 to 1
 - B) 0 to 1
 - C) 0 to infinity
 - D) 1 to infinity
- 25. Which operation is used to acquire a mutex or semaphore?
 - A) Wait
 - B) Signal
 - C) Lock
 - D) Release

More Questions on Fork, IPC, and Threads:

- 26. What is the primary advantage of using Inter-Process Communication (IPC)?
 - A) Improved process isolation
 - B) Enhanced security
 - C) Communication between processes
 - D) Reduced resource consumption
- 27. The `fork` system call in Unix-like operating systems creates:
 - A) A child process
 - B) A parent process
 - C) A thread
 - D) A semaphore
- 28. Which IPC mechanism is best suited for communication between processes on different computers?
 - A) Shared Memory
 - B) Message Passing
 - C) Pipes
 - D) Semaphores
- 29. What is a thread pool?
 - A) A group of threads sharing the same memory space
 - B) A pool of resources used by threads
 - C) A group of processes sharing the same CPU
 - D) A collection of threads that can be reused for multiple tasks
- 30. Which of the following is a disadvantage of using threads?
 - A) Improved parallelism
 - B) Increased resource consumption
 - C) Better responsiveness
 - D) Enhanced modularity