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