OPERATING SYSTEMS

PROCESS MANAGEMENT – MEDIUM LEVEL

1. Which scheduling algorithm may suffer from the convoy effect?
   A) Round Robin
   B) Priority Scheduling
   C) FCFS
   D) Multilevel Queue
   Answer: C

2. The turnaround time of a process is:
   A) Waiting time + Response time
   B) Completion time – Arrival time
   C) Burst time – Waiting time
   D) Context switch time
   Answer: B

3. Which of the following is not a CPU scheduling algorithm?
   A) SJF
   B) Round Robin
   C) First Come First Serve
   D) Belady's Algorithm
   Answer: D

4. In multiprogramming, the degree of multiprogramming is:
   A) The number of CPUs
   B) The number of processes in memory
   C) The number of I/O devices
   D) The number of system calls
   Answer: B

5. Which of the following prevents starvation in priority scheduling?
   A) Context switching
   B) Aging
   C) Preemption
   D) Deadlock avoidance
   Answer: B

6. Which statement about context switching is correct?
   A) It is executed by the user program
   B) It saves and restores process state
   C) It increases throughput directly
   D) It decreases CPU utilization always
   Answer: B

7. Which data structure is used to implement Round Robin scheduling?
   A) Stack
   B) Queue
   C) Circular Queue
   D) Linked List
   Answer: C

8. Which of the following best defines CPU utilization?
   A) (CPU busy time / total time) × 100
   B) (Waiting time / burst time) × 100
   C) (Throughput / turnaround time) × 100
   D) (Ready queue time / burst time) × 100
   Answer: A

9. Which of the following is not a process synchronization mechanism?
   A) Semaphore
   B) Mutex
   C) Test-and-Set
   D) Virtual memory
   Answer: D

10. Which condition is necessary for deadlock?
    A) Mutual exclusion
    B) Hold and wait
    C) Circular wait
    D) All of the above
    Answer: D

11. Which of the following is a preemptive scheduling algorithm?
    A) SJF (non-preemptive)
    B) Round Robin
    C) FCFS
    D) Multilevel Queue (non-preemptive)
    Answer: B

12. What is the main purpose of the medium-term scheduler?
    A) Select a process for execution
    B) Remove processes temporarily to control degree of multiprogramming
    C) Create a new process
    D) Handle I/O interrupts
    Answer: B

13. Which statement about semaphores is false?
    A) A semaphore can be binary or counting
    B) Semaphores can prevent race conditions
    C) Semaphores are always faster than spinlocks
    D) Semaphores can block processes
    Answer: C

14. In Banker's Algorithm, safe state means:
    A) Deadlock is certain

B) Deadlock will never occur
C) Deadlock is possible but avoidable
D) Deadlock is ignored
Answer: C

15. Which of the following is used to detect deadlock?
A) Resource allocation graph
B) Banker's Algorithm
C) Peterson's Algorithm
D) Round Robin
Answer: A

16. Which system call in UNIX replaces the current process image with a new one?
A) fork()
B) exec()
C) wait()
D) exit()
Answer: B

17. Which is true about orphan processes?
A) Parent finishes before child
B) Child finishes before parent
C) Child process with no parent process
D) Process without PCB
Answer: A

18. Which of these is an inter-process communication (IPC) mechanism?
A) Pipes
B) Message queues
C) Shared memory
D) All of the above
Answer: D

19. A process holding some resources and waiting for others is an example of:
A) Deadlock possibility
B) Starvation
C) Context switching
D) Turnaround
Answer: A

20. Which of the following is a hardware solution to critical section problem?
A) Test-and-set instruction
B) Semaphores
C) Mutex locks
D) Monitors
Answer: A

21. A process that has terminated but whose parent has not waited is called:
A) Zombie process
B) Orphan process
C) Child process

D) Deadlock process
Answer: A

22. Which of the following statements about multithreading is correct?
A) Threads do not share code
B) Threads share data and resources of a process
C) Each thread has its own PCB
D) Threads cannot run concurrently
Answer: B

23. Which of the following is used in priority scheduling to prevent indefinite blocking?
A) Preemption
B) Aging
C) Deadlock detection
D) Spinlocks
Answer: B

24. In UNIX, which system call is used by the parent to wait for the child to finish?
A) fork()
B) exec()
C) wait()
D) kill()
Answer: C

25. Which of the following is not an attribute stored in the Process Control Block (PCB)?
A) Process state
B) Program counter
C) Stack pointer
D) Source code
Answer: D

26. In SJF scheduling, which process is chosen next?
A) Process with highest priority
B) Process with shortest burst time
C) Process with earliest arrival time
D) Process with lowest priority
Answer: B

27. Which process scheduling algorithm is considered fair in time-sharing systems?
A) SJF
B) Round Robin
C) FCFS
D) Priority Scheduling
Answer: B

28. Which condition ensures no deadlock in a system?
A) Allowing circular wait
B) Resource preemption
C) Resource ordering
D) Both B and C
Answer: D

29. In Peterson's algorithm, which concept ensures mutual exclusion?
    A) Busy waiting
    B) Critical section
    C) Turn variable and flag array
    D) Deadlock prevention
    Answer: C

30. Which type of semaphore allows multiple processes to access a resource up to a limit?
    A) Binary semaphore
    B) Counting semaphore
    C) Mutex
    D) Monitor
    Answer: B

31. The waiting time for a process is:
    A) Completion time – arrival time
    B) Turnaround time – burst time
    C) Response time + turnaround time
    D) Burst time + I/O time
    Answer: B

32. Which of these statements about Round Robin is correct?
    A) Each process gets equal CPU share
    B) It may cause starvation
    C) It is non-preemptive
    D) It does not use a ready queue
    Answer: A

33. Which of the following is not a requirement for a critical section solution?
    A) Mutual exclusion
    B) Progress
    C) Bounded waiting
    D) High throughput
    Answer: D

34. In a system with n processes, how many semaphores are required for the Dining Philosophers problem?
    A) n
    B) n – 1
    C) 2n
    D) 1
    Answer: A

35. Which statement is false about deadlock?
    A) Deadlock is permanent if no action is taken
    B) Deadlock can be prevented, avoided, or detected
    C) Deadlock only occurs in single-CPU systems
    D) Deadlock needs four necessary conditions
    Answer: C

36. What is the primary disadvantage of busy waiting?
    A) High CPU utilization
    B) Low CPU utilization
    C) Wasted CPU cycles
    D) Faster execution
    Answer: C

37. The ready queue is implemented using:
    A) FIFO queue
    B) Stack
    C) Tree
    D) Hash table
    Answer: A

38. Which of the following ensures deadlock cannot occur?
    A) Hold and wait
    B) Preemption of resources
    C) Circular wait
    D) Non-sharable resources
    Answer: B

39. Which field in PCB stores the address of the next instruction to be executed?
    A) Stack pointer
    B) Program counter
    C) Base register
    D) Process state
    Answer: B

40. In multiprocessor scheduling, which approach assigns a process to a fixed CPU?
    A) Load sharing
    B) Processor affinity
    C) Gang scheduling
    D) Dynamic balancing
    Answer: B

41. Which is true about I/O-bound processes?
    A) Spend most of their time using CPU
    B) Spend most of their time waiting for I/O
    C) Never block for I/O
    D) Always have high burst time
    Answer: B

42. Which scheduling algorithm is most suitable for real-time systems?
    A) Round Robin
    B) Priority (preemptive)
    C) SJF
    D) FCFS
    Answer: B

43. What is the primary purpose of the dispatcher?
    A) To allocate CPU to a process

B) To manage I/O devices
C) To create new processes
D) To terminate a process
Answer: A

44. Which of the following is not a long-term scheduling objective?
A) To control degree of multiprogramming
B) To select mix of I/O-bound and CPU-bound jobs
C) To increase throughput
D) To reduce context switching
Answer: D

45. A deadlock situation can be resolved by:
A) Ignoring it
B) Killing one or more processes
C) Resource preemption
D) All of the above
Answer: D

46. Which scheduling criterion is important in interactive systems?
A) CPU utilization
B) Response time
C) Throughput
D) Turnaround time
Answer: B

47. In the Dining Philosophers problem, deadlock occurs when:
A) All philosophers eat simultaneously
B) All philosophers hold one fork and wait for another
C) Only one philosopher eats continuously
D) Forks are unlimited
Answer: B

48. Which synchronization primitive allows conditional waiting?
A) Semaphore
B) Mutex
C) Monitor
D) Spinlock
Answer: C

49. Which of the following is a disadvantage of preemptive scheduling?
A) Higher throughput
B) Increased response time
C) Increased context switching overhead
D) Low CPU utilization
Answer: C

50. In a multiprogrammed system, CPU-bound and I/O-bound processes are mixed to:
A) Reduce turnaround time
B) Maximize CPU and I/O device utilization
C) Reduce throughput

D) Minimize aging
Answer: B