CPU & Disk Scheduling Viva Questions

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CPU Scheduling Fundamentals

1. What is CPU scheduling? Why is it needed?

- Process of determining which process runs on CPU and for how long
- Needed for multiprogramming and efficient CPU utilization

2. What is a scheduler? What are the types of schedulers?

- Long-term, Short-term, and Medium-term schedulers

3. What is context switching?

- Process of saving state of current process and loading state of next process
- Involves saving/restoring PCB (Process Control Block)

4. What is the difference between preemptive and non-preemptive scheduling?

- Preemptive: Process can be interrupted mid-execution
- Non-preemptive: Process runs until completion or I/O wait

5. What is starvation in CPU scheduling?

- When a process waits indefinitely and never gets CPU time
- Common in Priority scheduling

Algorithm-Specific Questions

FCFS (First Come First Serve)

6. Explain FCFS scheduling algorithm

- Simplest algorithm, processes executed in arrival order
- Non-preemptive

7. What are the advantages and disadvantages of FCFS?

- Advantages: Simple, fair, no starvation
- Disadvantages: Convoy effect, high average waiting time

8. What is convoy effect?

- When short processes wait behind long processes

SJF (Shortest Job First)

9. Explain SJF scheduling algorithm

- Process with shortest burst time executes first
- Can be preemptive (SRTF) or non-preemptive

10. Why is SJF optimal?

- Gives minimum average waiting time for a given set of processes

11. What is the main problem with SJF?

- Cannot know burst time in advance
- Can cause starvation for long processes

Priority Scheduling

12. Explain Priority scheduling

- Each process assigned priority, highest priority executes first
- Can be preemptive or non-preemptive

13. How to solve starvation in Priority scheduling?

- Aging: Gradually increase priority of waiting processes

14. What happens when two processes have same priority?

- Use FCFS as tie-breaker or use PID

Round Robin

15. What is Round Robin scheduling?

- Each process gets fixed time quantum
- Preemptive algorithm, circular queue implementation

16. What is time quantum/time slice?

- Fixed time interval for which process can run

17. How does time quantum affect Round Robin performance?

- Too small: High context switching overhead
- Too large: Behaves like FCFS

18. What is the typical range for time quantum?

- 10-100 milliseconds

Calculation Questions

19. What are the scheduling criteria?
- CPU utilization, Throughput, Turnaround time, Waiting time, Response time

20. Define the following:

- Arrival Time (AT): When process arrives in ready queue
- Burst Time (BT): CPU time required
- Completion Time (CT): When process finishes
- Turnaround Time (TAT): CT - AT
- Waiting Time (WT): TAT - BT

21. How to calculate average waiting time and turnaround time?

- Sum of all waiting/turnaround times divided by number of processes

Disk Scheduling Questions

General Disk Concepts

22. What is disk scheduling? Why is it important?

- Ordering of disk I/O requests
- Minimizes seek time and improves performance

23. What is seek time?

- Time taken for disk arm to move to desired track

24. What are the components of disk access time?

- Seek time + Rotational latency + Transfer time

FCFS Disk Scheduling

25. Explain FCFS disk scheduling

- Services requests in order of arrival

- Simple but not optimal

SCAN (Elevator Algorithm)

26. Explain SCAN algorithm

- Disk arm moves in one direction servicing requests
- Reverses direction at end

27. Why is SCAN called elevator algorithm?

- Works like elevator - goes up servicing requests, then down

28. What is the disadvantage of SCAN?

- Requests at extremes may wait longer

C-SCAN (Circular SCAN)

29. Explain C-SCAN algorithm

- Like SCAN but returns to beginning after reaching end
- Services requests in one direction only

30. How is C-SCAN better than SCAN?

- More uniform wait time, treats cylinders as circular list

Comparison Questions

31. Compare FCFS and SJF

- FCFS: Simple, fair, no starvation but high waiting time
- SJF: Optimal waiting time but can cause starvation

32. When to use preemptive vs non-preemptive?

- Preemptive: Interactive systems, time-sharing
- Non-preemptive: Batch systems, when context switch is expensive

33. Which algorithm is best for interactive systems?

- Round Robin - provides good response time

34. Compare SCAN and C-SCAN

- SCAN: Bidirectional, may have non-uniform wait times
- C-SCAN: Unidirectional, more uniform wait times

Practical/Implementation Questions

35. What data structures are used in Round Robin?

- Circular queue for ready queue

36. How to implement priority queue for Priority scheduling?

- Heap data structure or sorted array

37. What happens if all processes have same priority/burst time?

- Degenerates to FCFS

38. How to handle tie-breaking in your implementation?

- Use PID or arrival time

39. What modifications needed for preemptive version of SJF?

- Check at each arrival if new process has shorter remaining time

40. How to calculate total head movement in disk scheduling?

- Sum of absolute differences between consecutive positions

Advanced Questions

41. What is CPU burst and I/O burst?

- CPU burst: Time spent executing on CPU
- I/O burst: Time spent waiting for I/O

42. What is multilevel queue scheduling?

- Multiple queues with different priorities/algorithms

43. How does the OS predict burst time for SJF?

- Exponential averaging of previous bursts

44. What is response time? How is it different from turnaround time?

- Response time: First time process gets CPU
- TAT includes total execution time

45. Can Round Robin cause starvation?

- No, every process gets equal share of CPU