

1. Explain the Storage-Device Hierarchy in detail.
2. Write a note on different Computing Environments.
3. Explain the services of operating system.
4. What is system call? Explain the type of system call in detail.
5. Explain Operating System Structure.
6. What is process? Explain the process state with diagram.
7. Explain PCB in detail.
8. Explain Single and Multithreaded Processes in detail.
9. What is CPU Scheduler and Dispatcher?
10. Which are Optimization Criteria for Scheduling Algorithms? Explain all CPU scheduling algorithm with one example.
11. Explain Multiple-Processor Scheduling.
12. Process and its corresponding burst time and arrival time is given. Mention the Gantt Chart and Find the average turnaround time and average waiting time for FCFS, SJF(Non-preemptive and Preemptive) and RR(q=2).
Justify which algorithm is best overall.

Process	Arrival Time	Burst Time
P1	0 ms	4 ms
P2	3 ms	2 ms
P3	6 ms	6 ms
P4	5 ms	3 ms

13. Process and its corresponding burst time are given. All Process arrive at 0 ms. Mention the Gantt Chart and Find the average turnaround time and average waiting time for FCFS, SJF and RR(q=4).
Justify which algorithm is best overall.

Process	Burst Time
P1	21 ms
P2	3 ms
P3	6 ms
P4	2 ms

14. Process and its corresponding burst time and arrival time is given. Mention the Gantt Chart and Find the average turnaround time and average waiting time for FCFS, SJF and RR(q=3).
Implement preemptive and non-preemptive both.

Process	Arrival Time	Burst Time
P1	0	7
P2	2	4
P3	4	1
P4	5	4

15. Process and its corresponding burst time and arrival time is given. Mention the Gantt Chart and Find the average turnaround time and average waiting time for FCFS, SJF and RR(q=2). Implement preemptive and non-preemptive both.

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

16. What is the Critical-Section Problem? Which are the requirements for solution to critical-section problem?
17. Define following terms:
- Race Condition
 - Monitor
 - Liveness
 - Starvation
18. Explain Semaphore in detail.
19. Explain Peterson's Solution for critical section problem.
20. Explain forms of hardware support synchronization.
21. What is Deadlock? Which are the conditions in which deadlock can arise?
22. How Deadlock can be prevented?
23. Write baker's algorithm and explain using an example.
24. Observe the following resource allocation graph. determine which process request or allocated which resource, also determine deadlock is possible or not? why?
25. What is Fragmentation? Explain Internal and External Fragmentation.
26. Explain Non-contiguous Memory Allocation.
27. What is Swapping? Explain Swapping with Paging.
28. What is Demand Paging? Define the terms : Lazy swapper and pager.
29. What is Thrashing? Why thrashing occurs?
30. What is Belady's Anomaly?
31. Estimate the Number of page faults for the following page reference string for frame size 3:
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2
Use FIFO, Optimal and LRU Algorithms.

32. Estimate the Number of page faults for the following page reference string for frame size 3:
5, 7, 6, 0, 7, 1, 7, 2, 0, 1, 7, 1, 0
Use FIFO, Optimal and LRU Algorithms.
33. A disk system has 100 cylinders, numbered 0 to 99. Assume that the read/write head is at cylinder 50 and determine the order of head movement for FCFS, SSTF, SCAN and C-SCAN to satisfy the following stream of request. Also calculate total head travel distance and conclude which is better algorithm.
stream of request : 30, 12, 22, 64, 67, 32, 81, 75, 85, 65, 18
34. A disk system has 200 cylinders, numbered 0 to 199. Assume that the read/write head is at cylinder 65 and determine the order of head movement for FCFS, SSTF, SCAN and C-SCAN to satisfy the following stream of request. Also calculate total head travel distance and conclude which is better algorithm.
stream of request : 82, 170, 43, 140, 24, 16, 190
35. What is difference between SCAN and C-SCAN algorithms.
36. Explain Storage Device Management.
37. Explain RAID in detail with its structure.
38. Explain Six Step Process to Perform DMA Transfer.
39. Explain Life Cycle of An I/O Request.
40. Explain different type, attributes and operations of file in brief.
41. Explain file Access Methods.
42. Explain Tree-Structured Directories and Acyclic-Graph Directories.
43. Explain File Control Block (FCB).
44. Explain File Allocation Method.
45. Explain Free-Space Management in files.
46. Explain Virtual File Systems.
47. Explain Schematic View of NFS Architecture.