

**Sardar Vallabhbhai Patel Institute of Technology, Vasad**  
**I.T. and C.E. Department**

**Question Bank**

**Subject : Operating System**  
**sub. code: 2141702**

**Date: 03/03/2018**

(Note:- Data / values in example may change. MCQ's may be out of question bank.)

**Unit – 1 Introduction to O.S.**

1. Explain basic service provided by Operating system on bare hardware machine.
2. What is virtual machine?
3. What is Kernel? Differentiate between Monolithic Kernel and Micro Kernel .
4. Explain the objectives and functions of operating systems.
5. What is Operating System? Give functions of Operating System.
6. Give the features of Real Time Operating System and Time Sharing Operating System.
7. List the types of operating systems and explain any one in detail.
8. Differentiate Multi-Programming, Multi-tasking, and Multiprocessing & Distributed Operating System.
9. Explain Client/Server & Virtual Machine Architecture of Operating System.
10. Explain different types of OS and also Explain different types of tasks done by OS.
11. Give the difference between a Process and a Program.
12. Give the features of Batch Operating System.
13. Write short note on Real Time Operating System.
14. Explain briefly different types of operating systems.
15. Write different operating system services.
16. Explain multiprocessor operating system types in brief.
17. What is operating system? Explain the abstract view of the components of a computer system.
18. Define operating system. Explain the different views of operating system. Also explain types of operating system.
19. Explain evolution of operating system in detail with suitable diagrams.
20. Why the Operating System viewed as a resource allocator & control program?
21. What are Batch systems?
22. What is the advantage of Multiprogramming?
23. What is an Interactive computer system?
24. What do you mean by Time-sharing systems?
25. What are multiprocessor systems & give their advantages?
26. What is graceful degradation?
27. What is dual mode operation?
28. What are privileged instructions?
29. How can a user program disrupt the normal operations of a system?
30. How is the protection for memory provided?
31. What are the various OS components?
32. Define RTOS.
33. What are the different types of multiprocessing?
34. Give examples of at least two applications which in your opinion are real-time applications.
35. What is Operating System? What are the various OS components? Give functions of operating System.

## Unit – 2 Process Management

1. What is average waiting time & average turnaround time of all processes for FCFS, SJF, non preemptive priority and round robin(quantum=1) scheduling:

Process	Burst Time	Priority
P1	8	5
P2	1	1
P3	3	2
P4	2	4
P5	5	3

(Assume small number implies higher priority & all 5 process arrive in order P1,P2,P3,P4,P5 all at time=0)

2. What is process?
3. Explain process state transition diagram in detail.
4. Define a process. Explain the process state transition with a neat diagram.
5. What is thread and what are the differences between user-level threads and kernel supported threads? Under what circumstances is one type “better” than the other?
6. Explain “5 State” Process State Transition Diagram with illustration.
7. Consider the following set of processes with length of CPU burst time given in milliseconds:

Process	Burst time	Priority
P1	10	5
P2	1	1
P3	2	3
P4	1	4
P5	5	2

Assume arrival order is: P1, P2, P3, P4, P5 at time 0,1,2,3,4 respectively and a smaller priority number implies a higher priority. Draw the Gantt charts for preemptive and non-preemptive priority scheduling. Calculate Average Turnaround Time and Average Waiting Time.

8. What is Process Control Block? Explain various entries of it.
9. Define Process. List the major events for creation of a process and explain them.
10. What is PCB? Discuss its major fields.
11. Draw process state diagram for THREE states and explain all states.
12. Explain the classical thread model with its implementation strategies.
13. Explain scheduling of process with shortest process next policy.
14. Consider the Following set of Processes , with the length of the CPU-burst time given in milliseconds:

Process	Burst time	Priority
P1	10	5
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order P1, P2, P3,P4, P5 all at time=0.

- a. Draw Four Gantt charts illustrating the execution of these processes using FCFS, SJF, non-preemptive Priority ( a small priority number implies a higher priority) , and Round Robin (

quantum =1 ) scheduling.

- b. What is the average waiting time of all processes for each of the scheduling algorithms in part a ?
  - c. What is the average Turn around time of all processes for each of the scheduling algorithms in part a ?
15. Find average waiting time for Shortest job first scheduling, and Round robin scheduling algorithm.

Process	CPU burst time
P1	6
P2	8
P3	5
P4	2

CPU burst time is given in millisecond and time quantum is 4.

16. Consider the following set of processes with the length of CPU burst time given in the milliseconds.

Process	Arrival Time	Burst time	Priority
P1	0	8	3
P2	1	1	1
P3	2	3	2
P4	3	2	3
P5	4	6	4

Calculate average turnaround time and average waiting time for First-come first served Scheduling, Shortest job first scheduling and Priority scheduling algorithm.

17. What is process? What are the different types of states Of any process? Explain different data structures to handle process management.
18. Explain Context Switching. Discuss performance evaluation of FCFS(First Come First Serve) & RR ( Round Robin) scheduling
19. Define: Waiting Time, Response Time.
20. Five jobs A through E arrive at a computer center with following details

Job	Arrival Time	CPU Time
A	0	9
B	1	5
C	2	2
D	3	6
E	4	8

Calculate the Turnaround Time and Waiting Time for all processes applying (i) First Come First Serve (ii) Shortest Job First and (iii) Round Robin (with Time Quanta=3) algorithms

21. Explain PCB.
22. Explain thread in brief.
23. Five batch jobs A to E arrive at same time. They have estimated running times 10,6,2,4 and 8 minutes. Their priorities are 3,5,2,1 and 4 respectively with 5 being highest priority. For each of the following algorithm determine mean process turnaround time. Ignore process swapping overhead Round Robin, Priority Scheduling, FCFS, SJF.
24. What is scheduler? Explain queuing diagram representation of process scheduler with figure.
25. What is thread? Explain thread structure.
26. Suppose that the following processes arrive for the execution at the times indicated. Each process will run the listed amount of time. Assume preemptive scheduling

Process	Arrival time	Burst time
---------	--------------	------------

P1	0.0	8
P2	0.4	4
P3	1.0	1

What is the turnaround time for these processes with Shortest Job First scheduling algorithm?

27. Define process. Differentiate between a process and a program.
28. Explain different states of a process with a suitable diagram.
29. Explain threads in brief with its types. What is multithreading? Explain.
30. Explain Context Switching. Discuss performance evaluation of FCFS (First Come First Serve) & RR (Round Robin) scheduling.
31. Compare user thread and kernel thread.
32. Define CPU scheduling
33. What is preemptive and non-preemptive scheduling?
34. What is a Dispatcher?
35. What is Dispatch latency?
36. What is turnaround time?
37. What are the use of job queues, ready queues & device queues?
38. Diff. b/w Long Term Short Term Medium Scheduler.
39. What are co-operating processes? Give example.
40. What are the scheduling Criteria?
41. What is a zombie process and how it may manifest itself?
42. Show the changes in the process control Block(PCB) when
  - a. Running process is suspended
  - b. New process is created
43. What happens when process context is switched? Is it an over-head?
44. Explain the function of the system calls along with the process state diagrams.
45. Explain why real-time systems require a pre-emptive scheduling policy.
46. Explain the procedure to kill a process.
47. What is pop-up thread?
48. what is Upcall?
49. what is Scheduler Activation?
50. Find Average waiting time and Average Turn around time for preemptive SJF:

Process	Arrival time	Burst time
P1	0.0	7
P2	2.0	4
P3	4.0	1
P4	5.0	4

51. Find Average waiting time and Average Turn around time for preemptive SRTF:

Process	Arrival time	Burst time
P1	0.0	8
P2	1.0	4
P3	2.0	9
P4	3.0	5

52. Find Average waiting time and Average Turn around time for priority scheduling:

Process	Burst time	Priority ( small no= high priority)
P1	10	3
P2	1	1
P3	2	4
P4	1	5

P5	5	2
----	---	---

53. Find Avg. Waiting time for Round robin ( $q = 20$ ).

Process	Burst time
P1	53
P2	17
P3	68
P4	24

54. On a system using multilevel feedback queues, a totally CPU-bound process requires 40 seconds to execute. If the first queue uses a time quantum of 2 and at each level the time quantum increases by 5 time units, how many times will the job be interrupted and on what queue will it be when it terminates?

### Unit -3 Inter process Communication

1. What is IPC?
2. Explain the use of Semaphore to solve Producer-Consumer problem.
3. What is monitor in IPC? Solve bounded buffer problem using monitor.
4. Explain the Problem of Critical Section (CSP) through Producer Consumer Problem. Explain any one Solution in detail.
5. Write short note: 1) Semaphores 2) Monitors
6. Define: Race Condition, Mutual Exclusion and Throughput.
7. What is Semaphore? Give the implementation of Readers-Writers Problem using Semaphore.
8. What is monitor? Give the implementation of Bounded Buffer Producer Consumer Problem using monitor.
9. Discuss the Peterson's solution for the race condition with algorithm.
10. What is Semaphore? How can we achieve the synchronization using semaphore for producer – consumer problem?
11. Explain IPC Problem –Dining Philosopher Problem.
12. Explain IPC Problem – Readers & Writers Problem.
13. What is critical section? What is Mutual exclusion? Explain Peterson's solution for mutual exclusion problem.
14. Explain: Race conditions , Semaphore and Monitor.
15. Define: Critical Section, Race Condition.
16. What is priority inversion problem in interprocess communication? How to solve it with semaphore?
17. Define mutual exclusion. How mutual exclusion can be achieved? Explain.
18. What is critical section problem?
19. What is the requirement that a solution to critical section problem must satisfy.
20. Define entry section and exit section.
21. Define busy waiting.
22. Explain what semaphores are, their usage, implementation given to avoid busy waiting and binary semaphores.
23. Explain the classic problems of synchronization.
24. Explain the difference between busy waiting and blocking.

### Unit 4 Deadlock

1. What is Deadlock? Describe the conditions that lead to deadlock. How to recover from deadlock.
2. Explain banker's algorithm to avoid deadlock with multiple resources.
3. What do you mean by Deadlock Avoidance? Explain the use of Banker's Algorithm for Deadlock Avoidance with illustration.
4. What is Deadlock? List the conditions that lead to deadlock. How Deadlock can be prevented?
5. Explain the use of Banker's Algorithm for multiple resources for Deadlock Avoidance with illustration.
6. How Resource Trajectories can be helpful in avoiding the deadlock?
7. What is Deadlock? When it occurs? How to recover from it.
8. What is Deadlock? Explain Deadlock prevention & Avoidance.
9. Explain Deadlock Prevention in detail.

### **Unit -5 Memory Management**

1. What are the methods to store free memory blocks?
2. Which are the techniques to search into free memory list?
3. What is Fragmentation?
4. What is External and internal Fragmentation?
5. What if memory Compaction?
6. What is Swapping?
7. Given memory partition of 100K, 500K, 200K, 300K, and 600K in order, How would each of the First-fit, Best-fit and Worst-fit algorithms place the processes of 212K, 417K, 112K and 426K in order? Which algorithm makes the most efficient use of memory? Show the diagram of memory status in each cases.
8. What is Hit ratio?
9. How to calculate Effective access time in Demand Paging?
10. Consider a logical address space of eight pages of 1024 words each mapped onto a physical memory of 32 frames
  - a. How many bits are in the logical address?
  - b. How many bits are in the physical address?