# OPERATING SYSTEM

## IMPORTANT QUESTIONS:

## CHAPTER 1: INTRODUCTION

1. What is Operating System? Give the view of OS as Resource Manager.
2. Explain different types of OS.
3. Give the view of OS as User Interface.
4. What is system call? Explain the types of system call.
5. Write different operating system services.
6. What is spooling?
7. Explain the structure of operating system.
8. What is kernel? Explain types of kernel.

## CHAPTER 2: PROCESS AND THREADS MANAGEMENT

1. What is Process? Give the difference between a process and a program.
2. Explain the Process State transition diagram.
3. Explain **Process Control Block (PCB)?**
4. Difference between process and thread.
5. What is scheduler? Explain queuing diagram representation of process scheduler with figure.
6. What is thread? Explain thread structure.
7. Explain process creation and process termination.
8. Explain types of thread.
9. Five batch jobs A to E arrive at same time. They have estimated running times 10,2,6,8,4 minutes. Their priorities are 3,2,5,4,1 respectively **with 5 being highest priority**. For each of the following algorithm determine mean process turnaround time. Ignore process swapping overhead. Round Robin (q=3), Priority Scheduling, FCFS, SJF.
10. Draw Four Gantt charts illustrating the execution of these processes using FCFS, SJF, priority **(a small priority number implies a higher priority**), and Round Robin (**quantum=1**) scheduling.
11. 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.

12. 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.

## CHAPTER 3: CONCURRENCY

1. Define: Mutual Exclusion,
2. What is Semaphore? Give the implementation of Bounded Buffer Producer Consumer Problem using Semaphore.
3. What is advantage of using Monitor? Give the implementation of Bounded Buffer Producer Consumer Problem using "Monitor".
4. Explain: Race conditions, Semaphore and Monitor.

## CHAPTER 4: INTER PROCESS COMMUNICATION

1. Explain IPC Problem –Dining Philosopher Problem.
2. Explain IPC Problem – Readers & Writers Problem.
3. What is critical section? What is Mutual exclusion? Explain Peterson‟s solution for mutual exclusion problem.
4. Define: Critical Section, Race Condition.
5. What is monitor? Give the implementation of Bounded Buffer Producer-Consumer Problem using monitor.
6. What is Semaphore? Give the implementation of Readers-Writers Problem using Semaphore.
7. Write short note: Mutual Exclusion
8. Discuss the Peterson‟s solution for the race condition with algorithm

## CHAPTER 5: DEADLOCK

1. What do you mean by Deadlock Avoidance? Explain the use of **Banker's Algorithm** for Deadlock Avoidance with illustration.
2. What is Deadlock? List the conditions that lead to deadlock. How Deadlock can be prevented?
3. What is Deadlock? Explain Deadlock prevention & Avoidance.
4. How Resource Trajectories can be helpful in avoiding the deadlock?
5. What is Deadlock? List the conditions that lead to deadlock. How Deadlock can

be prevented?

## CHAPTER 6: MEMORY MANAGEMENT

1. What is Virtual Memory? Explain.
2. Compare Multiprogramming with Fixed Partition and multiprogramming with Variable Partitions with diagram.
3. What is paging? What is Page Table? Explain the conversion of Virtual Address to Physical Address in Paging with example.
4. Explain the concept of Segmentation for Memory Management. Explain why combined Paged Segmentation is used with illustration.
5. For the Page Reference String:
   **7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0. 1. 7, 0, 1**
   Calculate the Page Faults applying **(i)Optimal(ii)LRU and(iii)FIFO** Page Replacement Algorithms for a Memory with **three frames.**
6. Explain the various page replacement strategies.
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 case.
8. What is segmentation? Explain it with example.
9. Consider the following page reference string:
   **1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.**
   How many page faults would occur for the following replacement algorithms, assuming four frames? Remember all frames are initially empty, so your firstunique pages will all cost one fault each.**LRU replacement, FIFO replacement**
10. Explain the various page replacement strategies.
11. 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.
12. Explain swapping in memory management.
13. What is Semaphore? How can we achieve the synchronization using semaphore for producer – consumer problem?
14. Explain the following allocation algorithms: 1) First-fit 2) Best-fit 3) Worst-fit.

# CHAPTER 7: I/O MANAGEMENT & DISK SCHEDULING

1. Explain Goals of I/O Software.
2. Explain I/O buffering.
3. Explain various **Disk Scheduling Algorithms** with illustration.
4. Direct Memory Access (DMA).
5. Explain RAID level system.
6. What are the use of device driver & controller in OS? Explain.
7. Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is - 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling – **FCFS , SCAN ( elevator).**
8. Disk requests come in to the disk for cylinders 10, 22, 20, 2, 40, 6 and 38. A seek takes 6 msec per cylinder move. How much seek time is for Closest cylinder next algorithm? Initially arm is at cylinder 20.Starting track at 100.The queue of pending request is, 55,58,39,18,90,160,150,38,184 – **FCFS**, **SCAN ( elevator)**, **SSTF**,**C SCAN**
9. Suppose that a disk drive has 1000 cylinders, numbered 0 to 999. Assume last request received was at track 345 and the head is moving towards track 0. The queue of pending requests, in FIFO order, is 123,874,692,475,105,367. Perform following scheduling algorithm.
   **FIFO , SSTF,SCAN,LOOK,C-SCAN,C-LOOK**
10. Disk request come in to the driver for cylinder 10,22,20,2,40,6 and 38.A seek takes 6 msec per cylinder moved . How much seek time needed for **FCFS ,Closet cylinder** next diagram. Initially arm is at cylinder 20.Starting track at 100. The queue of pending request is, 27,129,110,186,147,41,10,63,120 – **SSTF , C-SCAN,C-LOOK.**
11. Disk head is start at 53.. The queue of pending request is, 98,183, 37,122,14,124,65,67. - **FCFS , SSTF,SCAN,C-SCAN, LOOK**
12. Suppose that a disk drive has 5000 cylinders, numbered 0 through 4999.The drive is serving a request at cylinder 143. FIFO order is, 86, 1470, 913, 1774,948,1509,1022,1750,130 starting from head position. What is total distance? **FCFS, SSTF, SCAN, LOOK, C SCAN, C-LOOK.**