MODULE 6: I/O MANAGEMENT

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 is ordered as 86,1470,913,1774,948,1509,1022,1750, 130.

What is the total distance that the disk arm moves for following by applying following algorithms?

1. FCFS   2. SSTF   3. LOOK   4. SCAN   (IMP)

1. Discuss various disk scheduling methods with an Example (VV IMP)

2. Give detail of IO buffering technique.

3. Explain Interrupt driven IO and discuss the advantages of Interrupt driven IO over programmed IO.

Extra :
Explain the disk cache.

MODULE 5: FILE MANAGEMENT

1. Discuss various File Allocation Mechanism and their advantages

   (VV IMP)

2. Explain File Organization and Give details of file organization types.

MODULE 4. MEMORY MANAGEMENT

1. Explain the effect of page frame size on performance of page replacement algorithms. **(V IMP)**

2. Give memory partition of 100K, 500K, 200K, 300K and 600K (in order). How would each of the first fit, best fit and worst fit algorithm place process of 212 K, 417 K, 112K, and 426 K (in order)? Which algorithm makes the most efficient use of memory? **(VIMP)**

3. Calculate number of page faults and page hits for the page replacement policies FIFO, Optimal and LRU for given reference string 6, 0, 5, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 5, 2, 0, 5, 6, 0, 5 (assuming three frame size.) **(V IMP)**

4. Explain different types of memory fragmentation.

Extra :

Explain Thrashing in detail.

Explain virtual memory concept with respect to paging, segmentation and TLB

4. Explain banker's algorithms in detail including relevant examples and applications. **(V IMP)**

5. What is deadlock? Explain the necessary and sufficient condition for deadlock. What is the difference between deadlock avoidance and prevention? **(VVIMP)**

6. Explain Semaphores and its types

    a. Producer consumer problem

    b. Readers and Writers Problem

    c. Dining philosopher Problem

1. Consider a system that contains five processes P1, P2, P3, P4, P5 and the three resource types A, B and C. Following are the resources types: A has 10, B has 5 and the resource type C has 7 instances. (IMP)

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P1	0	1	0	7	5	3	3	3	2
P2	2	0	0	3	2	2			
P3	3	0	2	9	0	2			
P4	2	1	1	2	2	2			
P5	0	0	2	4	3	3			

Answer the following questions using the banker's algorithm:

1. What is the reference of the need matrix?

2. Determine if the system is safe or not.

3. What will happen if the resource request (1, 0, 0) for process P1 can the system accept this request immediately?

MODULE 2: PROCESS AND PROCESS SCHEDULING

2. Draw and Explain 5 State Process Model or Process State Diagram (VIMP)

3. Discuss **various scheduling criteria.** (IMP)

4. Differentiate between short term, medium term and long term scheduler with a diagram. (IMP)

5. Define Thread & Discuss the importance of "Multithreading". Differentiate between kernel and user thread.

6. Explain Process Control Block

1. Consider the following set of processes.

Process	Burst Time	Arrival Time	Priority
P1	0	4	2 (L)
P2	1	2	4
P3	2	3	6
P4	3	5	10
P5	4	1	8
P6	5	4	12 (H)
P7	6	6	9

Note: Higher number is having Higher priority.

1. Draw Gantt chart for SJF-Preemptive Scheduling and Preemptive priority scheduling.

2. Calculate average waiting time, average turnaround time and average response time for this scheduling algorithms. **(IMP)**

MODULE 1 – OPERATING SYSTEM OVERVIEW

Q. Write short note on System Calls and Its Types (V.IMP)

Q. Explain monolithic or microkernel Structure of OS or Differentiate between monolithic, layered and microkernel structure of OS. (V. IMP)

Q. Define Operating System. Brief the Functions of OS?