

# Assignment Operating Systems

By Mr Ayush Tripathi

Assistant Professor

Department of Computer Science and Engineering

JIMS Engineering Technical Management Campus

## Assignment 01

### Shortest Job First (SJF) Non-Preemptive Numerical

**Question 1.** Using the Shortest Job First (SJF) non-preemptive scheduling algorithm, calculate the Turnaround Time (TAT), Waiting Time (WT), Average TAT, and Average TAT.

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

### Shortest Job First (SJF) Preemptive or Shortest Remaining Time First (SRTF) Numerical

**Question 2.** Using the Shortest Job First (SJF) preemptive scheduling algorithm, calculate the Turn Around Time (TAT) and Waiting Time (WT) of **Process C**, and also calculate the Average WT.

Process ID	Arrival Time	Burst Time
A	0	6
B	3	2
C	5	4
D	7	6
E	10	3

**Question 3.** Using the Shortest Remaining Time First (SRTF) scheduling algorithm, find the value of Z if the average waiting time is equal to 1.

[Hint: Burst Time of P4 is less than Burst Time of P3;  $BT(P4) < BT(P3)$ ]

Process ID	Arrival Time	Burst Time
P1	0	3
P2	1	1
P3	3	3
P4	4	Z

## Assignment 02

### Page Replacement Numerical

**Question 1.** A system uses 3-page frames for storing process pages in main memory. It uses the **First in First out (FIFO)** page replacement policy. Assume that all the page frames are initially empty. What is the total number of page faults that will occur while processing the page reference string given below-

**4,7,6,1,7,6,1,2,7,2**

Also Calculate the hit and miss ratio.

**Question 2.** A system uses 3-page frames for storing process pages in main memory. It uses the **Least Recently Used (LRU)** page replacement policy. Assume that all the page frames are initially empty. What is the total number of page faults that will occur while processing the page reference string given below-

**4,7,6,1,7,6,1,2,7,2**

Also Calculate the hit and miss ratio.

**Question 3.** A system uses 3-page frames for storing process pages in main memory. It uses the **Optimal** page replacement policy. Assume that all the page frames are initially empty. What is the total number of page faults that will occur while processing the page reference string given below-

**4,7,6,1,7,6,1,2,7,2**

Also Calculate the hit and miss ratio.

**Question 4.** Explain hardware solution to Mutual Exclusion Problem.

## Assignment 03

### Disk Scheduling Numerical

**Question 1.** Consider an imaginary disk with 51 cylinders. A request comes in to read a block on cylinder 11. While the seek to cylinder 11 is in progress, new requests come in for cylinders 1, 36, 16, 34, 9, and 12, in that order. 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 algorithms? 1. FCFS (First come first serve) 2. SSTF (Shorted seek time first) 3. SCAN 4. C-SCAN 5. LOOK (Elevator) 6. C-LOOK.

### Banker's Algorithm Numerical

**Question 2.** Consider the following snapshot of a system:

	Allocation				MAX				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions using the banker's algorithm:

- What is the content of the matrix Need?
- Is the system in a safe state?
- If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately?

**Question 3.** Explain Caching and Buffering.

# **Assignment 04**

## **File System Questions**

**Question 1.** Explain Free Space Management.

**Question 2.** Case Study on FAT32 File System.

**Question 3.** Explain Concept of Data Integrity Protection in terms of File Systems.