Roll Number:_____

Thapar Institute of Engineering and Technology (TIET), Patiala
Department of Computer Science & Engineering (CSED)
AUXILIARY EXAMINATION

B.Tech Auxiliary Examination (2023-24)	Course Code: UCS303
	Course Name: Operating System
August 23, 2023	Saturday, 05:3PAM-08:30 PM
Time: 3Hrs, Max. Marks: 100	Name of Faculty: Dr. Shashank Sheshar Singh

Note: All questions are compulsory. All parts of a question should be attempted in one place. Assume missing data, if any suitably.

Q. 1 **a)** Discuss and draw a labelled diagram for Process Execution Life Cycle. **[10]**

b) Consider the following distribution of resources, maximum need, and **[10]** availability to the process for applying Banker algorithm to identify the state of process execution. If the state is Safe, find out at least one Safe sequence?

Process Ids	Maximum Need			Allocated			Available		
	A	B	C	A	B	C	A	B	C
P0	6	5	4	0	3	4	4	3	1
P1	3	4	2	2	1	2			
P2	1	0	4	0	0	2			
P3	3	2	5	1	2	1			

Q. 2 **a)** Discuss the producer consumer problem. Write the pseudo code for both **[10]** the process using shared memory.

b) What is the completion time of P1, P2, and P3 using Shortest Remaining **[10]** Time First (SRTF) scheduling algorithm?

P. No.	Arrival Time	Burst Time		
		CPU	I/O	CPU
P1	0	1	2	2
P2	1	2	4	5
P3	2	3	6	8

Q. 3 **a)** Draw and explain the labelled diagram of Segmentation for allocating non- **[10]** contiguous memory to a process.

b) Explain the Fork() system call and its return values in child process creation **[10]** with an example.

Q. 4 Consider a disk storage system with 200 cylinders numbered as 0,1,....,199. Cyl- **[20]** inder number 0 starts from center and move in an incremental fashion towards circumference. The disk requests with following cylinder are received by the disk controller:

98, 183, 37, 122, 14, 124, 65, 67

Compute the Total Head Movements, when following algorithms have been deployed. Currently head is positioned at cylinder 53. Initial direction of movement

1

is towards higher cylinder for C-LOOK and C-SCAN. Show suitable diagrams and intermediate computational steps for each case.

    i.   FCFS
    ii.   SSTF
    iii. C-LOOK
    iv.   C-SCAN

Q. 5 **a)** Consider three concurrent processes P1, P2 and P3 as shown below, which ac- **[10]** cess a shared variable B that has been initialized to 200. The process are executed on a uniprocessor system running a time-shared operating system. If the minimum and maximum possible values of B after the three processes have completed execution are X and Y respectively, calculate the value of X and Y?

P1	P2	P3
....	....	....
....	....	....
B=B+40	B=B-100	B=B+70
....	....	....
....	....	....

b) Discuss the difference between Fixed Partitioning and Variable Partitioning **[5]** Scheme with examples for contiguous memory allocation.

c) Explain Thrashing with example. Show the relationship between degree of **[5]** multiprogramming and CPU utilization with a graph.

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