



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DATA SCIENCE

UNIT TEST-I

Class: SE

Semester: IV

Subject: Operating System

Date: 09/03/2023

Time: 9.00 AM to 10.30 AM

Max marks: 40

Note the following instructions

1. Attempt all questions.
2. Draw neat diagrams wherever necessary.
3. Write everything in Black ink (no pencil) only.
4. Assume data, if missing, with justification.

Q1	Attempt any two	Marks	CO	Blooms Taxonomy Level	PO																		
	A] Explain the following terms with diagram a) Kernel b) Shell	[5]	CO1	L2	-																		
	B] Define operating system and explain the functions of operating system.	[5]	CO1	L2	-																		
	C] Explain layered structure and microkernel structure of operating system with appropriate diagrams.	[5]	CO1	L2	-																		
	D] Explain evolution of operating System in detail.	[5]	CO1	L2	-																		
Q2	Attempt any two																						
	A] Apply Shortest Job First (SJF) (Non-Preemptive and Preemptive) algorithm to solve the following: <table border="1"><thead><tr><th>Process</th><th>Arrival Time</th><th>Burst Time</th></tr></thead><tbody><tr><td>P1</td><td>2</td><td>1</td></tr><tr><td>P2</td><td>1</td><td>5</td></tr><tr><td>P3</td><td>4</td><td>1</td></tr><tr><td>P4</td><td>0</td><td>6</td></tr><tr><td>P5</td><td>2</td><td>3</td></tr></tbody></table> Draw the Gantt chart for the execution of the processes, showing their start time and end time. Calculate average waiting time (AWT) and Average Turnaround Time (ATAT).	Process	Arrival Time	Burst Time	P1	2	1	P2	1	5	P3	4	1	P4	0	6	P5	2	3	[10]	CO2	L3	PO1
Process	Arrival Time	Burst Time																					
P1	2	1																					
P2	1	5																					
P3	4	1																					
P4	0	6																					
P5	2	3																					



	B] Compare Process and Threads with example.	[10]	CO2	L3	PO1																																																
	C] Sketch 7 State process model and illustrate the states in which a process can be in, and also define the flow in which a particular state can be achieved by the Process.	[10]	CO2	L3	PO1																																																
Q3	Attempt any one																																																				
	<p>A] Demonstrate Bankers Algorithm and consider the following system snapshot using data structures in the Banker’s algorithm. Resources: A=10 Instances, B=5 Instances, A=7 Instances</p> <table border="1"><thead><tr><th rowspan="2">Process</th><th colspan="3">Allocation</th><th colspan="3">Max</th></tr><tr><th>A</th><th>B</th><th>C</th><th>A</th><th>B</th><th>C</th></tr></thead><tbody><tr><td>P0</td><td>0</td><td>1</td><td>0</td><td>7</td><td>5</td><td>3</td></tr><tr><td>P1</td><td>2</td><td>0</td><td>0</td><td>3</td><td>2</td><td>2</td></tr><tr><td>P2</td><td>3</td><td>0</td><td>2</td><td>9</td><td>0</td><td>2</td></tr><tr><td>P3</td><td>2</td><td>1</td><td>1</td><td>2</td><td>2</td><td>2</td></tr><tr><td>P4</td><td>0</td><td>0</td><td>2</td><td>4</td><td>3</td><td>3</td></tr></tbody></table> <p>Apply Banker’s Algorithm and answer the following questions:</p> <ol style="list-style-type: none">1. Calculate available resources.2. What are the contents of Need matrix?3. Determine whether the system is in safe state. If yes then state the safe sequence.	Process	Allocation			Max			A	B	C	A	B	C	P0	0	1	0	7	5	3	P1	2	0	0	3	2	2	P2	3	0	2	9	0	2	P3	2	1	1	2	2	2	P4	0	0	2	4	3	3	[10]	CO3	L3	PO1
Process	Allocation			Max																																																	
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P4	0	0	2	4	3	3																																															
	B] Demonstrate Producer Consumer problem and discover the solution to it using semaphores.	[10]	CO3	L3	PO1																																																