THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME: LEVEL 04/05
NO BOOK TEST 1 (NBT-1) – 2024 /2025
CSU4300 / CSU5315 – OPERATING SYSTEMS
DURATION: One hour

Date: 06/09/2024 | **Time: 4.00pm – 5.00pm**

Answer All Questions

QUESTION 1

1.1)   List different methods of process termination.

1.2)   What are the three (3) types of CPU schedulers? Explain their operations briefly.

1.3)   Draw the process state transitions diagram. Briefly explain each state transition.

1.4)   Consider the following set of processes, arrival times and CPU burst times in answering section 1.4. State your assumptions and show all the calculations.

Process	Arrival Time (ms)	Burst Time (ms)
P1	0	7
P2	3	2
P3	5	1
P4	7	5

(i)   Assuming that the Shortest Job First (SJF) scheduling algorithm with preemption is used, draw the Gantt chart of process execution. Calculate average turnaround time, average waiting time, and average response time.

(ii)   Assuming that the round robin scheduling algorithm with a time quantum of 3 ms is used, draw the Gantt chart of process execution and calculate the average turnaround time and average waiting time.

QUESTION 2

2.1)   What is RACE condition? Explain using an example.

2.2)   State four (4) techniques of recovering from a detected deadlock.

2.3)   What are the differences between Kernel Threads and User threads?

2.4)   Given the following sets and resource allocation details, answer the questions below:

Processes (P) : {P1, P2, P3, P4, P5}
Resources (R): {R1, R2, R3, R4, R5}
Edges(E)   : {(P1, R1), (P1, R2), (R2, P1), (R3, P2), (P2, R4), (R4, P3), (R5, P3),
(P3, R4), (R1, P4), (P4, R2), (R2, P5), (P5, R3), (R4, P1)}

Number of resource instances:
- R1: 2 instances
- R2: 2 instances
- R3: 1 instance
- R4: 2 instances
- R5: 1 instance

Draw the resource allocation graph based on the information provided.

2.5   Identify deadlock sequences (if any) using the resource graph you have drawn for the Question 2.4. Justify your answer.

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