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Daffodil International University
Faculty of Science & Information Technology
Department of Computer Science & Engineering
Mid Semester Examination, Fall 2024
Course Code: CSE 323, Course Title: Operating Systems
Level: 3 Term: 2 Batch: 61

Time: 01:30 Hrs | Marks: 25

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	a)	You are a data scientist working with a modern computer system to perform a complex data analysis task. The analysis involves processing a large dataset, running several computational algorithms, and generating visualizations for a research project. The computer system is equipped with a multi-core CPU, ample RAM, a high-speed SSD for storage, and a dedicated GPU for accelerated computations. **Explain** the properties of a Multitasking Operating System and multi core processor in order to enhance performance, responsiveness, and the ability to handle such an environment.	[3]	CO1
2.	a)	**Demonstrate** the necessity of Standard APIs instead of System calls in LINUX Operating System.	[4]	CO2
	b)	**Illustrate** the Microkernel System Structure.	[3]	
3.	a)	Consider the following table of Arrival Time (**AT**) and Burst Time (**BT**) in milliseconds for the processes. **Apply** Round Robin Scheduling in order to schedule those processes where **TQ = 4 ms**.	[8]	CO3

Id.	AT	BT
P0	21	11
P1	10	21
P2	29	8
P3	1	7
P4	5	3
P5	4	4
P6	7	13
P7	9	5
P8	23	9

i. **Construct** the Gantt chart.
ii. **Identify** the average Waiting Time and the average Turn Around time.
iii. **Analyze** the performance of Round Robin Scheduling Algorithm in terms of context switching time and time quantum (TQ).

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b) You have a set of processes with arrival times, burst times, and priorities. **Apply** preemptive Priority Scheduling algorithm and FCFS tie breaking. Higher value in priority column represents higher priority. [7]

Id.	Arrival Time	Burst Time	Priority
P0	0	5	3
P1	1	3	1
P2	2	8	2
P3	3	4	2
P4	4	2	1
P5	5	1	3
P6	6	4	4

i. **Construct** the Gantt chart.
ii. **Identify** the average Waiting Time and the average Turn Around time.
iii. **Identify** the average Response Time and Throughput.
iv. **Analyze** the performance of Priority Scheduling Algorithm in terms of scheduling criteria.