



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

Marks: 25

Time: 01:30 Hrs

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. <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Id.</th> <th>AT</th> <th>BT</th> </tr> </thead> <tbody> <tr><td>P0</td><td>21</td><td>11</td></tr> <tr><td>P1</td><td>10</td><td>21</td></tr> <tr><td>P2</td><td>29</td><td>8</td></tr> <tr><td>P3</td><td>1</td><td>7</td></tr> <tr><td>P4</td><td>5</td><td>3</td></tr> <tr><td>P5</td><td>4</td><td>4</td></tr> <tr><td>P6</td><td>7</td><td>13</td></tr> <tr><td>P7</td><td>9</td><td>5</td></tr> <tr><td>P8</td><td>23</td><td>9</td></tr> </tbody> </table> 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).	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	[8]	CO3
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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 - P6

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