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End Semester Examination 2024

Name of the Course: BCA

Semester: II

Name of the Paper : Introduction to Operating system

Paper Code: TBC 203

Time: 3 Hours

Maximum Marks: 100

Note:

- (i) All Questions are compulsory.
- (ii) Answer any two sub questions among a,b and c in each main question.
- (iii) Total marks in each main question are twenty.
- (iv) Each question carries 10 marks.

Q1	(10*2=20 marks)													
(a)	Discuss the Simple Operating System Structure. Describe the layered approach.	CO1												
(b)	Discuss the functions of an operating system in detail.													
(c)	What is system call? Explain any five system call with their usage.													
Q2	(10*2=20 marks)													
(a)	What are the five major activities of an operating system with regard to process management? Explain in detail.	CO2												
(b)	Describe the actions taken by a kernel to context-switch between processes.													
(c)	What is IPC? Give an example of IPC system.													
Q3	(10*2=20 marks)													
(a)	What is critical section problem? Explain with an example.	CO3												
(b)	(i) A counting semaphore S is initialized to 10. Then, 6 P operations and 4 V operations are performed on S. What is the final value of S? (ii) What is semaphore? How it solves the problem of process synchronization in multi process environment?													
(c)	Explain three requirements that a solution to critical section problem must satisfy.													
Q4	(10*2=20 marks)													
(a)	Suppose that the following processes arrive for execution at the times indicated. Each process will run for the amount of time listed. In answering the questions, use non-preemptive scheduling, and base all decisions on the information you have at the time the decision must be made <table><tr><td>Process</td><td>Arrival Time</td><td>Burst Time</td></tr><tr><td>P₁</td><td>0.0</td><td>8</td></tr><tr><td>P₂</td><td>0.4</td><td>4</td></tr><tr><td>P₃</td><td>1.0</td><td>1</td></tr></table> (i) What is the average turnaround time for these processes with the FCFS scheduling algorithm? (ii) What is the average turnaround time for these processes with the SJF scheduling algorithm?	Process	Arrival Time	Burst Time	P ₁	0.0	8	P ₂	0.4	4	P ₃	1.0	1	CO4
Process	Arrival Time	Burst Time												
P ₁	0.0	8												
P ₂	0.4	4												
P ₃	1.0	1												
(b)	Explain the difference between preemptive and non-preemptive scheduling algorithm with suitable example.													

(c)	<p>Consider the following snapshot of a system:</p> <table><thead><tr><th></th><th><u>Allocation</u></th><th><u>Max</u></th><th><u>Available</u></th></tr><tr><th></th><th><i>A B C D</i></th><th><i>A B C D</i></th><th><i>A B C D</i></th></tr></thead><tbody><tr><td>P_0</td><td>0 0 1 2</td><td>0 0 1 2</td><td>1 5 2 0</td></tr><tr><td>P_1</td><td>1 0 0 0</td><td>1 7 5 0</td><td></td></tr><tr><td>P_2</td><td>1 3 5 4</td><td>2 3 5 6</td><td></td></tr><tr><td>P_3</td><td>0 6 3 2</td><td>0 6 5 2</td><td></td></tr><tr><td>P_4</td><td>0 0 1 4</td><td>0 6 5 6</td><td></td></tr></tbody></table> <p>Answer the following questions using the banker's algorithm:</p> <ul style="list-style-type: none">(i) What is the content of the matrix Need?(ii) Is the system in a safe state?(iii) If a request from process P_1 arrives for (0,4,2,0), can the request be granted immediately?		<u>Allocation</u>	<u>Max</u>	<u>Available</u>		<i>A B C D</i>	<i>A B C D</i>	<i>A B C D</i>	P_0	0 0 1 2	0 0 1 2	1 5 2 0	P_1	1 0 0 0	1 7 5 0		P_2	1 3 5 4	2 3 5 6		P_3	0 6 3 2	0 6 5 2		P_4	0 0 1 4	0 6 5 6		
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P_1	1 0 0 0	1 7 5 0																												
P_2	1 3 5 4	2 3 5 6																												
P_3	0 6 3 2	0 6 5 2																												
P_4	0 0 1 4	0 6 5 6																												
Q5	(10*2=20 marks)	CO5																												
(a)	Explain the difference between internal and external fragmentation with suitable example.																													
(b)	Given six memory partitions of 300 KB, 600 KB, 350 KB, 200 KB, 750 KB, and 125 KB (in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of size 115 KB, 500 KB, 358 KB, 200 KB, and 375 KB (in order)? Rank the algorithms in terms of how efficiently they use memory.																													
(c)	Differentiate between segmentation and paging. Why are segmentation and paging sometimes combined into one scheme.																													