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21CS43

Fourth Semester B.E. Degree Examination,2023

Model Question Paper
Operating System

Time: 3 hrs.

Max. Marks: 60

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Q. No.	Questions		Marks	BL/CO
Module I				
1	a.	Illustrate the Process states with a diagram. Demonstrate how many processes are created by the below program? #include <stdio.h> #include <unistd.h> int main () { int i; for(i=0; i<4;i++) fork (); return 0; }	10	CL3/CO1
	b.	Explain Operating system services with respect to User & System with a neat block diagram.	07	CL2/CO1
	c.	Compare traditional versus clustered system.	03	CL2/CO1
OR				
2	a.	Demonstrate the Process creation and Termination using System calls –fork (), vfork(), exit(), return 0.	10	CL3/CO1
	b.	Summarize Inter process Communication.	07	CL2/CO1
	c.	Explain Process control block.	03	CL2/CO1
Module II				
3	a.	Illustrate the different multithreading models with suitable examples.	10	CL2/CO2
	b.	Calculate average turnaround time and average waiting time for the below process snapshot by using FCFS, SJF, Priority (Preemptive).	07	CL3/CO2

		<table><tr><th>Process ID</th><th>Arrival Time</th><th>Burst Time</th><th>Priority</th></tr><tr><td>P1</td><td>0</td><td>4</td><td>2</td></tr><tr><td>P2</td><td>1</td><td>3</td><td>3</td></tr><tr><td>P3</td><td>2</td><td>1</td><td>4</td></tr><tr><td>P4</td><td>3</td><td>5</td><td>5</td></tr><tr><td>P5</td><td>4</td><td>2</td><td>5</td></tr></table>	Process ID	Arrival Time	Burst Time	Priority	P1	0	4	2	P2	1	3	3	P3	2	1	4	P4	3	5	5	P5	4	2	5																																																																			
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	c.	Differentiate CPU scheduler and Job scheduler	03	CL2/CO2																																																																																									
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4	a.	Illustrate the issues that comes with multithreaded programming	10	CL2/CO2																																																																																									
	b.	Calculate average turnaround time and average waiting time for the below process snapshot by using SRTF, Round robin (Quantum time=2ms) Priority (Non-Preemptive)	07	CL3/CO2																																																																																									
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c.	Explain Scheduling criteria of process scheduling.	03	CL2/CO2																																																																																										
Module III																																																																																													
5	a.	Illustrate software-based solution for critical section problem and justify the following criteria's i. Mutual exclusion ii. Progress iii. Bounded waiting.	10	CL3/CO3																																																																																									
	b.	Using Banker's algorithm determine whether the following system is in a safe state.	10	CL3/CO3																																																																																									
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Module IV				
7	a.	With a diagram, illustrate the steps in handling a page fault in Demand Paging.	10	CL3/CO4
	b.	Explain contiguous memory allocation.	10	CL2/CO4
OR				
8	a.	Consider the page reference string 1,0,7,1,0,21,2,3,0,3,2,4,0,3,6,2,1 for a memory with three frames. Calculate the number of page faults using FIFO, Optimal page replacement algorithms.	10	CL3/CO4
	b.	Explain the different allocation methods.	10	CL2/CO4
Module V				
9	a.	A drive has 5000 cylinders numbered 0-4999 the drive is currently serving a request at 143 and previously served a request at 125. The queue of pending requests in FIFO order is 86,1470,913,1774,948,1509,1022,1750,130 starting from the current head position calculate what is the distance travelled (in cylinders) by disk arm to satisfy the requests using FCFS, SSTF, SCAN, LOOK and C-LOOK algorithms.	12	CL3/CO5
	b.	Explain access matrix method of system protection with domain as objects and its implementation.	8	CL2/CO5
OR				
10	a.	A disk drive has 8000 cylinders numbered 0-7999. The drive is currently serving a request at cylinder 500 and previously served a request at cylinder 600. The queue of pending requests in FIFO order is 200, 1200, 4000, 3500, 6000. Calculate the distance traveled (in cylinders) by the disk arm to satisfy the requests using FCFS, SSTF, SCAN, LOOK, and C-LOOK algorithms.	12	CL2/CO5
	b.	Explain mass storage structure with a diagram.	8	CL3/CO5

Cognitive Levels of Bloom's Taxonomy

No.	CL1	CL2	CL3	CL4	CL5	CL6
Level	Remember	Understand	Apply	Analyze	Evaluate	Create

Course Outcomes

CO1	Illustrate the operating system, its components, and the ideas behind system calls and inter-process communication.	CL3
CO2	Apply the concepts of multithreading and demonstrate various algorithms by considering different scheduling criteria.	CL3
CO3	Illustrate the process synchronization, its classical approaches and discuss the concepts of deadlock.	CL3
CO4	Apply the concept of memory management, demand paging, and demonstrate the working of various page replacement algorithms and file system operations.	CL3
CO5	Analyze the structure of mass storage devices, various disk scheduling techniques and concepts of operating system protection.	CL4