Roll No. 248

Pandit Deendayal Energy University

End Semester Examination, May - 2022

B. Tech (Computer Engineering)

Semester - IV

Course Name: 20CP207T
Course Code: Operating System

Date: 10/05/2022
Time: 2 Hours
Max. Marks:40

Instructions:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever essential and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics wherever required is an integral part of the answer.

Question No.	Description	Marks	Course Outcomes (COs)
Q1-A	Draw and explain the process state transition diagram.	5	CO1
Q1-B	Calculate the total no of context switches for the following with time quantum as 2 and 4 considering Round Robin scheduling algorithm.	5	CO3

Process No	At	BT	CT	TAT	WT
1	0	4			
2	2	5			
3	4	2			
4	6	1			
5	8	6			
6	10	3			

Q2-A — Let the processes be X, Y, Z and there are semaphores a, b, c, d, check whether Deadlock will be there or not for the following: — 5 — CO2

X: P(a) P(b) P(c)
Y: P(c) P(b) P(d)
Z: P(c) P(d) P(a)

Q2-B — There are two mutex variables a and b, with a =1 and b=1 — 5 — CO2

Process P0	**Process P1**

while(1)
{ 1. P(a);
2. P(b);
<Critical Section>
3. V(a)
4. V(b)
}
	while(1)
	{ 5. P(a);
	6. P(b);
	< Critical Section >
	7. V(a)
	8. V(b)
	}

Address the following questions:

1. Is Mutual Exclusion possible here
2. Which process will enter the < Critical Section > first and which statement is the deciding statement

Will there be any problem of deadlock, if we swap statements 5 and 6 in Process P1?

Q3-A	Discuss the fields of **Page Table Entry**, if Logical Address Space is 128MB, Physical Address Space is 1 MB, and Page size is 4 KB, what is the Page Table Size.	5	CO6
Q3-B	List all file attributes and operations possible on file, what information is stored in Local and Global file table?	5	CO6
Q4-A	List all Disk Scheduling Algorithms and calculate the total head movement (in number of cylinders) incurred while servicing the requests for FCFS algorithms. Consider a disk queue with requests to blocks on cylinders 98, 183, 41, 122, 14, 124, 65, 67. The head is initially at cylinder number 53 moving towards larger cylinder numbers on its servicing pass. The cylinders are numbered from 0 to 300.	5	CO4
Q4-B	A Paging Scheme uses TLB. A TLB access takes 10 ns and main memory access takes 50 ns. What is the effective memory access time (in ns) if the TLB hit ratio is 90 % and there is no page fault. Solve it for Page Table levels 1 and 2.	5	CO4

OR

Q4-A	For the given reference string 0 1 2 3 0 1 4 0 1 2 3 4 with allocation of Frames as 4 and 5, check whether Belady's anomaly exists or not? Discuss about the stack property? Compare it with LRU page fault.	5	CO5
Q4-B	A system uses FIFO policy for page replacement. It has 6 page frames with no pages loaded to begin with. The system accesses 200 distinct pages in some order and then accesses the same 200 pages but now in reverse order. Calculate the page faults that will occur.	5	CO5