BTS–VI(R)–04–22–0307 Reg. No. | | | | | | | | |

B

B.Tech. Degree VI Semester Regular Examination April 2022

CS 19-202-0605 OPERATING SYSTEM

(2019 *Scheme*)

Time: 3 Hours Maximum Marks: 60

Course Outcome

On successful completion of the course, the students will be able to:

CO1: Familiarise with the basic concepts of operating system.
CO2: Implement various process scheduling algorithms.
CO3: Design programs to avoid synchronization problems.
CO4: Gain knowledge about memory management and virtual memory.
CO5: Analyse various security and protection mechanism in file system and implementation.
CO6: Illustrate the problems related with deadlocks and deadlock handling.
CO7: Compare different types of OS.

Bloom's Taxonomy Levels (BL): L1 – Remember, L2 – Understand, L3 – Apply, L4 –Analyze, L5 – Evaluate, L6 – Create

PO – Programme Outcome

PART A

(Answer *ALL* questions)

			Marks	BL	CO	PO
I.		(8 × 3 = 24)				
	(a)	What are system calls? Give examples for system calls related to process management.	3	L2	1	2
	(b)	Explain race conditions in the context of interprocess communication	3	L1	1	1
	(c)	What is inverted page map table? Give its advantages and disadvantages.	3	L2	4	4
	(d)	With suitable example explain memory management with bitmaps.	3	L3	4	1
	(e)	Give a brief description on interrupt handlers.	3	L1	5	1
	(f)	Explain I/O buffering.	3	L1	5	1
	(g)	What do you understand by cycle formation within resource allocation graph? Explain with the help of resource allocation graph with single resource category and multiple resource categories.	3	L3	6	2
	(h)	Compare and contrast starvation and deadlock.	3	L2	6	1

PART B

(4 × 12 = 48)

II. (a) Consider the following set of processes, with the length of the CPU-burst time given in milliseconds — 6 — L4 — 2 — 2

Process	Burst time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0. Calculate the turnaround time of each of the processes using FCFS, SJF, nonpreemptive priority (a smaller priority number implies higher priority) and RR(quantum = 1) scheduling.

(b) Using suitable semaphores illustrate the implementation of Mutual exclusion producer-consumer problems. — 6 — L3 — 3 — 3

OR

(P.T.O)

III.	(a)	With suitable data show that with large time quantum, RR scheduling reduces to FCFS scheduling algorithm.	6	L4	2	4
	(b)	Illustrate how monitors solve process synchronisation problems.	6	L3	3	3
IV.		Give different methods for page map table implementation. Give advantages and disadvantages of each method.	12	L2	4	1
		OR				
V.		Consider the following page reference string 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults will occur for: (i) LRU page replacement (ii) FIFO page replacement (ii) Optimal page replacement? Assume four page frames.	12	L3	4	2
VI.		Suppose that the disk drive has 5000 cylinders, numbered 0 to 4999.The drive is currently serving a request at cylinder 143 and the previous request was at cylinder 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 ,what is the total distance(in cylinders)that the disk arm moves to satisfy all pending requests for each of the following disk scheduling algorithms? (1) FCFS (2) SSTF (3) SCAN (4) LOOK (5) C-SCAN (6)C-LOOK	12	L3	5	2
		OR				
VII.		Explain in detail the methods for file implementations.	12	L2	5	1
VIII.		Consider the following snapshot of a system:	12	L3	6	2

	Allocation				Maximum				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

(i) What is the Need matrix?
(ii) Is the system in a safe state?
(iii) If a request from process p1 arrives for (0, 4, 2, 0) can the request be granted immediately?

OR

IX.	(a)	Give different deadlock detection methods.	9	L2	6	1
	(b)	Explain two-phase locking.	3	L1	6	1

Bloom's Taxonomy Levels
L1 = 18%, L2= 29%, L3 = 41%, L4 = 12%

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