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Fourth Semester B.E. Degree Examination, June/July 2023 Operating System

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define operating system. Explain the services of operating system with neat diagram. (08 Marks)
- b. What do you mean by system call? Explain the types of system call. (07 Marks)
- c. Define system program? Explain multiprogramming and time sharing system. (05 Marks)

OR

- 2 a. Explain the concept of virtual machine with neat diagram. (06 Marks)
- b. Define process. Explain Queuing diagram representation of the process. (07 Marks)
- c. What is Inter process communication? Explain message passing and shared memory concept of IPC. (07 Marks)

Module-2

- 3 a. Explain multithreading model with diagram. (04 Marks)
- b. What is dispatcher and dispatch latency? Explain the criteria used to select the scheduling algorithm. (07 Marks)
- c. Calculate the average waiting time by drawing Gantt chart using FCFS (First Come First Serve), SRTF (Shortest Remaining Time First), RR(Round Robin) ($q = 2$ ms) algorithms.

Process	Arrival Time	Burst Time
P ₁	0	8
P ₂	1	4
P ₃	2	9
P ₄	3	5

(09 Marks)

OR

- 4 a. What is Critical Section? What are the requirements for critical section to satisfy? (04 Marks)
- b. Illustrate Petersons solution for critical section problem. (06 Marks)
- c. What is Semaphore? State a dining philosopher problem give a solution using semaphore. (10 Marks)

Module-3

- 5 a. What is deadlock? Explain the necessary condition for a deadlock to occur. (05 Marks)
- b. Explain in detail how deadlock can be prevented. (05 Marks)
- c. Determine whether the following system is safe state by using Banker's algorithm for the SnapShot given below.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Continued

Allocation			
	A	B	C
P ₀	0	1	0
P ₁	2	0	0
P ₂	3	0	2
P ₃	2	1	1
P ₄	0	0	2

Maximum		
A	B	C
7	5	3
3	2	2
9	0	2
2	2	2
4	3	3

Available		
A	B	C
3	3	2

If a request from P₁ arrives for (1, 0, 2) can the requested be granted immediately? (10 Marks)

OR

- 6 a. What is paging? Illustrate with example internal and external fragmentation problem encountered in contiguous memory allocation. (07 Marks)
- b. Explain the three methods of memory allocation. With a neat diagram explain the hardware support for relocation and limit register. (07 Marks)
- c. What is segmentation? Explain with a neat diagram. (06 Marks)

Module-4

- 7 a. What is demand paging? Discuss with a neat diagram steps to handle the page fault. (08 Marks)
- b. What is copy-on-write? Consider the reference stream 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. Find the number of page faults using LRV and FCFS (Frames = 3) (12 Marks)

OR

- 8 a. What is a file? Distinguish between contiguous and linked allocation methods with the neat diagram. (10 Marks)
- b. Distinguish between single level directory structure and two level directory structures. What are its advantages and disadvantages? (10 Marks)

Module-5

- 9 a. Explain various disk scheduling algorithms in detail. (10 Marks)
- b. Explain access matrix method of system protection with domain as objects and its implementation. (10 Marks)

OR

- 10 a. Explain different IPC mechanism available in Linux. (06 Marks)
- b. With the neat diagram, explain the different components of Linux system. (08 Marks)
- c. What are the design principles of Linux operating system? Explain. (06 Marks)
