CBCS SCHEME

USN | | | | | | | | | | 18CS43

Fourth Semester B.E. Degree Examination, Feb./Mar. 2022
Operating Systems

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Explain the dual mode operation of operating system. **(07 Marks)**

b. Explain layered approach structure of operating system with diagram. **(07 Marks)**

c. Differentiate client server computing and peer-to-peer computing. **(06 Marks)**

OR

2 a. Explain operating system services with respect to user and system with figure. **(07 Marks)**

b. What is Process? Explain different states of a process with state diagram. **(07 Marks)**

c. With a neat diagram, explain the concept of virtual machines. **(06 Marks)**

Module-2

3 a. Draw the Gantt chart and calculate average waiting time and turn around time for the following snapshot of processes using i) FCFS ii) SRTF iii) RR (2ms). **(07 Marks)**

Process id	Burst time	Arrival time
P_1	6	0
P_2	3	1
P_3	1	2
P_4	4	3

b. Explain different types of multithreading models. **(07 Marks)**

c. Explain Dining philosopher's problem using monitors. **(06 Marks)**

OR

4 a. Calculate the average waiting time and turn around time for the following snapshol of process using:

i) Non-preemptive SJF

ii) Non-preemptive priority

iii) Round Robin (TQ = 1ms).

P	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

(07 Marks)

b. Show how semaphores provides solution to reader writers problem. **(07 Marks)**

c. Explain critical section problem. What are the requirements that critical section problem must satisfy. **(06 Marks)**

Module-3

5 a. Describe the resource allocation graph i) With deadlock ii) With a cycle but no deadlock **(06 Marks)**

b. Using Bankers algorithm determine whether the following system is in a safe state.

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	0	2	0	0	4	1	0	2
P_1	1	0	0	2	0	1			
P_2	1	3	5	1	3	7			
P_3	6	3	2	8	4	2			
P_4	1	4	3	1	5	7			

If a request from process P_2 arrives for (0, 0, 2) can the request be granted immediately? **(07 Marks)**

c. Illustrate with example the internal and external fragmentation problem. **(06 Marks)**

OR

6 a. What are Translation Loadaside Buffer (TLB)? Explain TLB in detail with a simple paging system with a neat diagram. **(07 Marks)**

b. What is deadlock? What are necessary conditions for deadlock? **(07 Marks)**

c. With the help of a neat diagram, explain the various steps of address binding. **(06 Marks)**

Module-4

7 a. Consider the following page reference string
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
Assuming there are 3 memory frames, how many page faults would occur in case of i) LRU ii) Optimal algorithm note that initially all frames are empty. **(07 Marks)**

b. Explain the various operations performed on files. **(07 Marks)**

c. With suitable example, explain any two methods of implementation of free space list. **(06 Marks)**

OR

8 a. Illustrate how demand paging affects system performance. **(07 Marks)**

b. Explain the various access methods of files. **(07 Marks)**

c. What is thrashing? How it can be controlled? **(06Marks)**

Module-5

9 a. Describe the different Linux Kernel modules. **(07 Marks)**

b. Explain different IPC mechanisms available in Linux. **(07 Marks)**

c. Explain process scheduling in a Linux system. **(06 Marks)**

OR

10 a. With a neat diagram, explain in detail the component of a Linux operating system. **(07 Marks)**

b. Explain the various disk scheduling algorithm with example. **(07 Marks)**

c. Explain the file system implementation in Linux. **(06 Marks)**

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