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18CS43

Fourth Semester B.E. Degree Examination, June/July 2025
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. Define Operating system. Explain the Dual model operations of an Operating system.
   (08 Marks)
   b. Discuss various Operating system services. **(06 Marks)**
   c. Explain layered approach structure of Operating system. **(06 Marks)**

OR

2 a. Define a Process. With a diagram, explain different states of a process. **(06 Marks)**
   b. Explain the Queuing diagram representation of a process. **(06 Marks)**
   c. Describe Direct and Indirect communication with respect to message passing systems.
   (08 Marks)

Module-2

3 a. Briefly explain the different multithreading models. **(06 Marks)**
   b. Discuss the issues to be considered with multithreaded programming. **(08 Marks)**
   c. Explain the CPU scheduling criteria. **(06 Marks)**

OR

4 a. Consider the following set of processes with length of CPU burst and arrival time given in milliseconds.

Process	Arrival Time	Burst Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

   Draw the Gantt chart and compute Average Waiting Time and Average Turnaround Time using Shortest Remaining Time First (SRTF) algorithm. **(06 Marks)**
   b. What is Critical section? What are the requirements for critical section to satisfy in its solution? **(06 Marks)**
   c. Illustrate Peterson's solution for critical section problem. **(08 Marks)**

Module-3

5 a. Describe the necessary conditions for a deadlock to arise in a system.   **(06 Marks)**

    b. What are the different ways of recovery from a deadlock? Explain.   **(06 Marks)**

    c. 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	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

       If a request from process P1 arrives for (1, 0, 2), can the request be granted immediately.

                                                          (08 Marks)

OR

6 a. Explain Swapping of two processes using a disk as a backing store.   **(06 Marks)**

    b. Illustrate with example, the internal and external fragmentation problem encountered in contiguous memory allocation.   **(06 Marks)**

    c. Explain segmentation with the help of a diagram and a suitable example.   **(08 Marks)**

Module-4

7 a. Describe the steps involved in handling page fault.   **(06 Marks)**

    b. Explain copy on write process in virtual machines.   **(06 Marks)**

    c. Explain FIFO and optimal page replacement algorithms.   **(08 Marks)**

OR

8 a. Explain various file operations.   **(10 Marks)**

    b. Explain different allocation methods.   **(10 Marks)**

Module-5

9 a. Discuss FCFS , SSTF and SCAN disk scheduling algorithms.   **(10 Marks)**

    b. Explain access matrix method of system protecting with domain as objects and its implementation.   **(10 Marks)**

OR

10 a. With a diagram , explain the components of a Linux system.   **(08 Marks)**

     b. Discuss the different IPC mechanisms available in Linux.   **(06 Marks)**

     c. Write a note on Security concerns in a Linux system.   **(06 Marks)**

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