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Fifth Semester B.E. Degree Examination, Jan./Feb. 2023
Operating System

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1 a. What is an operating system? Explain abstract view of component of a computer system.
                                                                              (07 Marks)
   b. List the different services that an operating system provides. Explain. (06 Marks)
   c. Explain the concept of virtual machines. Bring out its advantages.   (07 Marks)

2 a. Explain the process states with diagram.   (06 Marks)
   b. Explain the different multithreading models, with neat sketches.   (06 Marks)
   c. Consider the following set of processes. Draw Gantt charts and calculate average waiting time and average turnaround time using non-preemptive SJF and preemptive SJF scheduling algorithms.   (08 Marks)

Process	Arrival time (ms)	Burst time (ms)
P_1	0	8
P_2	1	4
P_3	2	9
P_4	3	5

3 a. Define Semaphores. Explain its usage and implementation.   (06 Marks)
   b. What are monitors? Explain its usage and implementation.   (08 Marks)
   c. Explain Dining philosophers solution using monitors.   (06 Marks)

4 a. Explain Resource-Request algorithm.   (06 Marks)
   b. What is a Deadlock? Briefly explain the methods for handling deadlocks. (06 Marks)
   c. Consider a system with five processes P_0 through P_4 and three resources A, B, C Resources A has ten instances, resources type B has five instance and resource type C has seven instances. Suppose that at time To the following snapshot of the system has been taken.

Processes	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			

   (i) Is the system in a safe state?
   (ii) If a request from P_1 arrives for (1, 0, 2) can the request be granted immediately.
                                                                              (08 Marks)

PART – B

5 a. Explain internal and external Fragmentation with examples.   **(06 Marks)**

    b. Explain with a diagram, how TLB is used to solve the problem of simple paging scheme.
                                                                   (08 Marks)

    c. What is the cause of threshing? How does the system detect thrashing?   **(06 Marks)**

6 a. Explain briefly the various operations performed on files.   **(06 Marks)**

    b. Explain the various access method of files.   **(06 Marks)**

    c. Explain various allocation methods in implementing file systems.   **(08 Marks)**

7 a. What is disk scheduling? Explain the following with diagram: i) FCFS; ii) SSTF; iii) SCAN.   **(10 Marks)**

    b. What is an access matrix? Explain the following operations in access matrix with an example for each: i) Copy; ii) Transfer; iii) Limited copy.   **(10 Marks)**

8 a. Explain the various components of a Linux system.   **(06 Marks)**

    b. Explain process scheduling in a linux system.   **(06 Marks)**

    c. Explain file systems implementation in linux.   **(08 Marks)**

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