U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E.   Semester: III
Branch: INFORMATION SCIENCE AND ENGINEERING   Duration: 3 hrs.
Course Code: 19IS3ESOPS   Max Marks: 100
Course: OPERATING SYSTEM   Date: 16.09.2023

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may suitably assumed.

UNIT - I

1 a) Illustrate the different roles of operating system in user mode and kernal mode. **06**

   b) Describe the three methods of passing parameters to the operating system with examples. **06**

   c) With neat diagram explain about the different services provided by operating systems. **08**

UNIT - II

2 a) With Queueing-diagram explain the different types of schedulers and events which migrates process from one queue to another queue. **07**

   b) List the benefits of multithreaded programming? Under what circumstances user threads are better than the kernel threads and vice versa? **06**

   c) Illustrate how the Readers –Writers Problem can be solved using semaphores **07**

UNIT - III

3 a) Differentiate between scheduler and dispatcher. Discuss the effects of dispatch latency on performance of system **06**

   b) Suppose that the following processes arrive for execution at the times indicated. Using non-preemptive scheduling, Compute the following and draw the Gantt chart for each **09**

Process	Arrival Time	Burst Time
P1	0.0	8
P2	0.4	4
P3	1.0	1
P4	5	2

   i. Find the average turnaround time for these processes with the FCFS scheduling algorithm?

  ii. Find the average turnaround time for these processes with the SJF scheduling algorithm?

  iii. What is the average turnaround time will be if the CPU is left idle for the first 1 unit and then SJF scheduling is used.

c) Consider a system containing 4 resource types R1, R2, R3, R4 with single instance and 5 processes P1, P2, P3, P4, P5 with following snapshot at time t_0 **05**
R1 is held by P2, R3 is held by P3,R2 is held by P4,
P4 requests R1 and R4, P5 requests R1, P1 requests R1, P4 requests R3, P5 requests R2.
Explain the following by constructing the
  i. Resource allocation graph
  ii. Wait for graph and also
  iii. Check if system is in safe or unsafe state

<div align="center">OR</div>

4 a) Considering a system with 5 processes P0,P1,P2,P3,P4 and 3 resources of type A, B, C with 10, 5and 7 instances of each type respectively. Suppose at time t0 following snapshot of the system has been taken: **08**

Process	Allocation	Max	Available
	A B C	A B C	A B C
P0	0 1 0	7 5 3	3 3 2
P1	2 0 0	3 2 2	
P2	3 0 2	9 0 2	
P3	2 1 1	2 2 2	
P4	0 0 2	4 3 3	

  i) What will be the content of the Need matrix?
  ii) Is the system in a safe state?
  iii) If Yes, then what is the safe sequence?

b) Consider 5 processes with 10, 1, 2, 1, 5 burst times and priorities as 3, 1, 4, 5, and 2 respectively. Prepare a Gantt chart for the above processes using non-preemptive Priority scheduling and Calculate the average waiting time. **04**

c) Briefly explain the different methods to handle deadlocks and different methods to recover deadlocks. **08**

<div align="center">UNIT - IV</div>

5 a) Given five memory partitions of 125Kb, 500Kb, 250Kb, 300Kb, 600Kb in order, how would the first-fit, best-fit, and worst-fit algorithms place processes of 200 Kb,100 Kb, 410 Kb, 132 Kb, and 426 Kb in order? Which algorithm makes the most efficient use of memory? **09**

b) Consider a system with the logical address is 22 bit and physical address is 36 bit and the page size is 2KB. The memory is byte-addressable and the page table is 4 bytes. Calculate the conventional page table size and inverted page table size **05**

c) Explain segmentation and usage of segment table in memory with the help of diagram. **06**

<div align="center">OR</div>

6	a)	With neat diagram describe the actions taken by the operating system when a page fault occurs. Justify how TLB improves the performance	**07**
	b)	Compute the page faults using FIFO, LRU, Optimal page replacement algorithm using 3 frames for the given reference string 1,2,3,2,3,4,5,3,4,1,2,4,3,5,2,4,5,1, 2 with brief explanation of each	**09**
	c)	Write a note on Copy-on-Write	**04**

UNIT - V

7	a)	Given the following sequence 95,180,34,119,11,123,62,64 with the head initially at track 50 and track ends at 199.what is the total no. of disk travelled by disk arm using FCFS, SSTF, SCAN, C-SCAN, C-LOOK	**10**
	b)	Discuss any two techniques used for free space management in disk.	**05**
	c)	Define file management system and explain the access methods for files.	**05**

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