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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, Master of Computer Applications (MCA)

Semester End Examination; May / June - 2019

Operating Systems

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a. List and explain the operating system services. 10

b. What are special purpose systems? Classify their types. 6

c. Highlight the importance of caching. 4

2 a. Explain the dual mode operation in operating system with a neat diagram. 6

b. In what ways is the modular kernel approach similar to the layered approach? In what ways does it different from the layered approach? 6

c. Discuss different computing environments. 8

UNIT - II

3 a. Define the process. With neat diagram, explain its states. 8

b. Draw Gantt chart for SJF algorithm. Calculate average waiting time, average turnaround time and average response time.

Process	Arrival Time (ms)	CPU Time (ms)
P_1	0	3
P_2	0	7
P_3	2	6
P_4	5	4
P_5	3	5

6

c. Explain different multithreading models. 6

4 a. With a neat diagram, explain the contents of PCB and explain the need for PCB. 6

b. With the help of a Gantt chart compare Priority (Non-Preemptive) scheduling with priority (Preemptive) scheduling.

Process	Execution Time (ms)	Priority	Arrival Time (ms)
P_1	10	2	0
P_2	4	1	2
P_3	6	3	0

6

c. Explain;

i) Processor Affinity 8

ii) Load balancing with respect to multiprocessor scheduling

Contd…2

UNIT - III

5 a. Explain the Dining Philosopher's problem. 8

b. Deadlock exists if a cycle exists yes or no. Justify your answer with a suitable example. 6

c. Consider the following snapshot of a system : 6

Processes	Allocation			Maximum			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			

Answer the following questions using Bankers algorithm :

i) Is the system in a safe state?

ii) Can request for (0, 2, 0) by P_0 be generated immediately? Give reason.

6 a. What is a Semaphore? With a code segment, give the functioning of wait( ) and signal( ). 6

b. Discuss Readers Writers problem with code segment for both reader and writer process. 8

c. What are the different ways a deadlock can be handled? Explain in detail deadlock prevention. 6

UNIT - IV

7 a. Explain with the help of a neat diagram how TLB can be used to improve Effective Access Time? 8

b. A small computer has four page frames. A process makes the following list of page references : 1, 2, 3, 4, 0, 3, 2, 1, 5, 2, 3, 1, 2, 5, 0. How many page faults occur, using FIFO, LRU and Optimal page replacement algorithms? 12

8 a. Write a note on trashing. 4

b. With a neat diagram, explain segmentation. Show an example diagrammatically. 8

c. With a neat figure, explain the steps in handling page fault. 8

UNIT - V

9 a. List and explain different file attributes and file operations. 10

b. Some systems automatically open a file when it is referenced for the first time and close the file when the job terminates? Discuss the advantages and disadvantages of this scheme as compared to the more traditional one, where the user has to open and close the file explicity. 4

c. Discuss briefly different methods to allocate file space on the disk. 6

10 a. Explain the process of file system mounting. 6

b. Given a hard disk of 200 tracks (track 0 - 199) with track 0 being the innermost track. Write down the track numbers the disk head will travel for the following five disk scheduling algorithms with the following sequence of disk track request 103, 110, 95, 130, 143, 55, 50, 147, 40. The disk head has just finished a request at track 105 and is currently at track 100. For this exercise, which disk-scheduling algorithm (FIFO, SSTF, C-SCAN) is most effective? 6

c. Discuss free space management. 8

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