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

(An Autonomous Institution affiliated to VTU, Belagavi)

Fourth Semester, B.E. - Information Science and Engineering

Semester End Examination; May/June - 2018

Operating System

Time: 3 hrs *Max. Marks: 100*

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

UNIT - I

1 a. Explain the major activities of an operating system in regard to process management and file management. 10

b. Write a brief note on protection and security. 5

c. Write a note on various computing environments. 5

2 a. Why is system calls used? List the system calls under each category. 10

b. What is a process? With a neat illustration, explain the process state diagram. 6

c. Discuss the following multithreading models : 4

i) Many-to-One Model ii) One-to-One Model

UNIT - II

3 a. Calculate the average turnaround time and average waiting time on the basis of round robin scheduling and FCFS algorithm. Assume time quantum is set to 3 units. Times are mentioned in milliseconds. 10

Process	Arrival time	Burst Time
P_1	5	5
P_2	4	6
P_3	3	7
P_4	1	9
P_5	2	2
P_6	6	3

b. Explain the different scheduling criteria used for comparing CPU scheduling algorithms. 10

4 a. What is dinning philosopher's problem? Write and explain the monitor solution for the above. 10

b. What is critical section problem? Write and explain two process solutions. 10

UNIT - III

5 a. Explain the deadlock recovery methods. 8

b. Following is the snapshot of a system with five processes P_0 through P_4. 12

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

Contd…2

i) How many instances of each type of the resources initially exist in the system

ii) Check wherther the system is in safe state or not using the safety algorithm (Banker's algorithm)

iii) Specify the safe sequence that you discover (if any)

iv) Is it possible to practice Banker's algorithm? If Yes, Give reason and if No, Give reason

6 a. With a neat diagram, explain the inverted paging hardware. How is it different from paging hardware? 10

b. Explain the technique to translate logical address to physical address using segmentation. List the advantages of segmentation. 10

UNIT - IV

7 a. Define page fault. Discuss the steps in handling a page fault with the aid of a neat illustration. 8

b. Consider a paging system with TLB and page table stored in memory. If HIT ratio of TLB is 80% and it takes 20 nano seconds to search TLB and 100 nano seconds to access main memory. Find the effective memory access time. 5

c. Consider the following page reference string :

1 2 3 4 2 1 5 6 2 1 2 3 7 6 3 2 1 2 3 6 7

Find the number of page faults using the LRU page replacement algorithm with 4 frames.

8 a. Discuss the following methods to access files :

i) Sequential Access 6

ii) Direct Access

b. Explain the different directory structures in file handling. 14

UNIT - V

9 a. Explain boot block and bad block in disk management. 8

b. Given the following queue 95, 180, 34, 119, 11, 123, 62, 64 with head initially at track 50 and ending at track 199. Calculate the number of moves using FCFS, SCAN and SSTF. 12

10 a. Write short notes on Revocation of access rights. 8

b. Discuss the goals of protection, principles and domain of protection. 12

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