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10CS53

Fifth Semester B.E. Degree Examination, June/July 2019

Operating Systems

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Discuss the types of multiprocessor systems and the advantages of multiprocessor systems. **(06 Marks)**

b. Which calls provide an interface to the service made available by an operating system? Explain the same with suitable examples. **(06 Marks)**

c. Explain the method of operating system design which involves using object oriented programming technique with a neat diagram. **(08 Marks)**

2 a. List the operating system primitives that are used in direct and indirect communication between cooperating process. **(04 Marks)**

b. Name and explain the formula that is used to predict the value of the next CPU burst required for shortest job first scheduling method. **(06 Marks)**

c. Four processes P1, P2, P3 and P4 arrive in the order given below with the following CPU burst and priority values. Compute the average waiting time using:

i) Round Robin with time quantum = 3
ii) Preemptive priority scheduling (low values has high priority)
iii) Preemptive shortest job first scheduling.

Process	CPU burst	Arrival time	Priority
P1	8	0	5
P2	4	2	2
P3	6	1	3
P4	1	3	1

(10 Marks)

3 a. Consider two concurrently running processes P1 with statement S1 and S3 along with P2 with statements S2 and S4. The required order of execution of the statements must be S2, S4, S1 and S3. Solve this problem using semaphores. **(08 Marks)**

b. Define and explain the semaphore structure, wait operation and signal operation of a semaphore which avoids busy waiting. **(06 Marks)**

c. Discuss the importance of processor affinity and the types of processor affinity. **(06 Marks)**

4 a. Explain the steps involved in a resource allocation graph algorithm which is used to avoid deadlocks. **(06 Marks)**

b. Explain how the circular wait condition can be used to prevent deadlocks. **(04 Marks)**

c. Assume there are 3 processes P0 through P2 and 3 resource types each having 4 instances. The allocation and max matrix is given below:

	Allocation			Max		
	A	B	C	A	B	C
P0	2	1	2	4	1	3
P1	1	1	1	2	1	2
P2	0	1	1	1	1	1

Answer the following questions using Banker's algorithm:

i) Is the system in safe state? If so find safe sequence.

ii) At time t1, if a request from process P1 arrives for (0, 1, 0) can the request be granted? If so find the safe sequence.

iii) At time t2, if a request from process P1 arrives for (1, 0, 0) can the request be granted? If so find the safe sequence. **(10 Marks)**

PART – B

5 a. Illustrate and explain Belady's anomaly using a suitable example. **(06 Marks)**

b. Explain the strategy used to prevent thrashing. **(06 Marks)**

c. Explain segmentation and how the physical address is generated using a neat diagram. **(08 Marks)**

6 a. List and explain the most common schemes used for defining the logical structure of a directory. **(10 Marks)**

b. Discuss the four techniques used to keep track of free disk space. **(10 Marks)**

7 a. List and explain any four methods used for implementing access matrix. **(10 Marks)**

b. Suppose that a disk drive has 200 cylinders numbered 0 to 199. The drive is currently serving a request at cylinder 53 and the previous request was at 43. The queue of pending requests in FIFO order is 98, 183, 37, 122, 14, 124, 65, 67. Starting from current position calculate total cylinders crossed using SCAN, CSCAN and FCFS disk scheduling algorithms. **(10 Marks)**

8 Write short notes on:

a. Driver registration in LINUX **(07 Marks)**

b. Kernel synchronization in LINUX **(07 Marks)**

c. Implementation of virtual machines **(06 Marks)**

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