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10CS53

Fifth Semester B.E. Degree Examination, December 2012
Operating Systems

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What is a distributed operating system? What are the advantages of the distributed operating system? **(06 Marks)**

b. What are system calls? With examples explain different categories of system calls. **(07 Marks)**

c. With a neat diagram, explain the concept of virtual machine. **(07 Marks)**

2 a. Explain the process state transition diagram. **(06 Marks)**

b. Explain multithreading models. **(09 Marks)**

c. For the processes listed below, draw Gantt charts using preemptive and non preemptive priority scheduling algorithm. A larger priority number has a higher priority.

Jobs	Arrival time	Burst time	Priority
J_1	0	6	4
J_2	3	5	2
J_3	3	3	6
J_4	5	5	3

(05 Marks)

3 a. What is busy waiting in a critical section concept? How semaphore is used to solve critical section problem? What are the advantages of semaphore? **(10 Marks)**

b. What is a monitor? Explain the solution to the classical dining philosopher's problem, using monitor. **(10 Marks)**

4 a. What is a resource allocation graph(RAG)? Explain how RAG is very useful in describing deadly embrace by considering your own example. **(08 Marks)**

b. System consists of five jobs (J_1, J_2, J_3, J_4, J_5) and three resources (R_1, R_2 R_3). Resource type R_1 has 10 instances, resource type R_2 has 5 instances and R_3 has 7 instances. The following snapshot of the system has been taken :

Jobs	Allocation			Maximum			Available		
	R_1	R_2	R_3	R1	R2	R3	R_1	R_2	R_3
J_1	0	1	0	7	5	3	3	3	2
J_2	2	0	0	3	2	2			
J_3	3	0	1	9	0	2			
J_4	2	1	1	2	2	2			
J_5	0	0	2	4	3	3			

Find need matrix and calculate the safe sequence by using Banker's algorithm. Mention the above system is safe or not safe. **(08 Marks)**

c. Briefly explain the methods for handling deadlocks. **(04 Marks)**

PART – B

5 a. Distinguish between :
   i) Logical versus physical address space
   ii) Paging versus segmentation
   iii) First fit and best fit algorithms. **(07 Marks)**

b. Mention the problem with simple paging scheme. How TLB is used to solve this problem? Explain with supporting hardware diagram and with an example. **(08 Marks)**

c. On a system using simple segmentation, compute the physical address for each of the logical address, logical address is given in the following segment table. If the address generates a segment fault, indicate it as "segment fault".

Segment	Base	Length
0	330	124
1	876	211
2	111	99
3	498	302

i) 0, 9, 9 ii) 2, 78 iii) 1, 265 iv) 3, 222 c) 0, 111. **(05 Marks)**

6 a. Explain briefly different file types. **(04 Marks)**

b. Explain the different types of directory structures, with examples and mention their advantages and disadvantages. **(08 Marks)**

c. With supporting diagrams, explain linked and indexed method of allocating disk space. **(08 Marks)**

7 a. Explain the following disk scheduling algorithms in brief
   i) SSTF ii) SCAN iii) LOOK. **(09 Marks)**

b. Explain in brief, the selection of a disk scheduling algorithm. **(04 Marks)**

c. What is protection? Distinguish between mechanisms and policies. Explain briefly the access matrix with domains as objects. **(07 Marks)**

8 Write short notes on (any four):
   a. Linux history
   b. Linux design principles
   c. Components of a Linux system
   d. Optimal page replacement algorithm
   e. Steps in handling page fault. **(20 Marks)**

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