

Fifth Semester B.E. Degree Examination, December 2012

Operating Systems

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least 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 (J₁, J₂, J₃, J₄, J₅) and three resources (R₁, R₂, R₃). Resource type R₁ has 10 instances, resource type R₂ has 5 instances and R₃ has 7 instances. The following snapshot of the system has been taken :

Jobs	Allocation			Maximum			Available		
	R ₁	R ₂	R ₃	R ₁	R ₂	R ₃	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 :
- Logical versus physical address space
 - Paging versus segmentation
 - 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):
- Linux history
 - Linux design principles
 - Components of a Linux system
 - Optimal page replacement algorithm
 - Steps in handling page fault. (20 Marks)

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