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Fifth Semester B.E. Degree Examination, June 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 an operating system? Bring out the requirements of,
 - i) Real time operating systems. (10 Marks)
 - ii) Distributed operating systems. (10 Marks)
- b. What are system calls? Explain the different categories of the system calls. (10 Marks)
- 2 a. Explain the process states with a diagram. What is the need for a context switch? (07 Marks)
- b. What are the differences between user level threads and kernel supported threads? (05 Marks)
- c. For the following example calculate average waiting time and average turn around time by using FCFS, preemptive SJF and RR (1 time unit) CPU scheduling algorithms. (08 Marks)

Jobs	Arrival time	Burst time
P ₁	0	8
P ₂	1	4
P ₃	2	9
P ₄	3	5

- 3 a. What is critical section problem? How does a semaphore solve the critical section problem? Discuss whether semaphores satisfy the three requirements for a solution to the critical section problem. (08 Marks)
- b. What are monitors? Explain with an example program request. (04 Marks)
- c. Describe the monitor solution to the classical dining philosopher's problem. (08 Marks)
- 4 a. What is deadlock? Explain the necessary conditions for its occurrence. (06 Marks)
- b. Explain with an example how resource allocation graph is used to describe the deadlock. (06 Marks)
- c. System consists of five processes (P₀, P₁, P₂, P₃, P₄) and three sources (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			Max			Available		
	R ₁	R ₂	R ₃	R ₁	R ₂	R ₃	R ₁	R ₂	R ₃
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			

Calculate the content of matrix need and find out safe sequence by using Banker's algorithm. (08 Marks)

PART – B

- 5** a. Distinguish between :
- i) Logical address space and physical address space.
 - ii) Internal fragmentation and external fragmentation.
 - iii) Paging and segmentation. **(06 Marks)**
- b. Explain with the help of supporting hardware diagram how the TLB improves the performance of a demand paging system. **(10 Marks)**
- c. Given memory partitions of 100 K, 500 K, 200 K, 300 K and 600 K (in order) how would each of the first fit, best fit and worst fit algorithms work place processes of 212 K, 417 Km 112 K and 426 K (in order)? Which algorithm makes the most efficient use of memory? **(04 Marks)**
- 6** a. Explain the different types of files. **(05 Marks)**
- b. Name the different file allocation methods. Explain the linked allocation of file implementation with merits and demerits. **(08 Marks)**
- c. Define file system. Explain the different directory structure. **(07 Marks)**
- 7** a. What is disk scheduling? Explain any 3 disk scheduling methods with examples. **(10 Marks)**
- b. What is swap space management? Explain. **(05 Marks)**
- c. What is access matrix? Explain access matrix with domains as objects. **(05 Marks)**
- 8** Write short notes on the following:
- a. Process management in Linux. **(06 Marks)**
 - b. Page replacement algorithms. **(08 Marks)**
 - c. Steps in handling a page fault. **(06 Marks)**

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