

### Fifth Semester B.E. Degree Examination, Dec.09/Jan.10

### 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. Define an operating system. Discuss its role with user and system viewpoints. (06 Marks)  
 b. Give the features of symmetric and asymmetric multiprocessing systems. (04 Marks)  
 c. Briefly explain the common classes of services provided by the various operating systems for helping the user and for ensuring the efficient operation of the system. (10 Marks)
2. a. With a diagram, explain the different states of a process. (06 Marks)  
 b. Differentiate between long-term and short-term schedulers. (04 Marks)  
 c. Suppose the following jobs arrive for processing at the times indicated. Each job will run the listed amount of time.

Job	1	2	3
Arrival time	0.0	0.4	1.0
Burst time	8	4	1

- i) Give a Gantt chart illustrating the execution of these jobs, using the non pre-emptive FCFS and SJF scheduling algorithms.  
 ii) What is turn around time and waiting time of each job for the above algorithms?  
 iii) Compute average turn around time if CPU is left idle for the first 1 unit and then SJF is used. (Job1 and Job2 will wait during this time) (10 Marks)
3. a. Discuss various multithreading models, with a diagram. (06 Marks)  
 b. Explain the three requirements that a solution to the critical-section problem, must satisfy. (04 Marks)  
 c. State the dining philosophers problem and give a solution for the same, using semaphores. Write the structure of philosopher i. (10 Marks)
4. a. Define the hardware instructions test and set() and swap(). And also give the algorithms for implementing mutual exclusion with these instructions. (06 Marks)  
 b. Describe the necessary conditions for a deadlock situation to arise, in a system. (04 Marks)  
 c. Consider the following snapshot of a system:

	Allocation				Maximum				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P <sub>0</sub>	0	0	1	2	0	0	1	2	1	5	2	0
P <sub>1</sub>	1	0	0	0	1	7	5	0				
P <sub>2</sub>	1	3	5	4	2	3	5	6				
P <sub>3</sub>	0	6	3	2	0	6	5	2				
P <sub>4</sub>	0	0	1	4	0	6	5	6				

Answer the following questions using the Banker's algorithm:

- i) What is the content of the matrix need?  
 ii) Is the system in a safe state?  
 iii) If a request from process P<sub>1</sub> arrives for (0, 4, 2, 0), can the request be granted immediately? (10 Marks)

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