

**Fifth Semester B.E. Degree Examination, June/July 2014**  
**Operating System**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

1.
  - a. Explain multiprogramming and time sharing operating systems. (08 Marks)
  - b. List out the different services that an OS provides? Explain any two. (06 Marks)
  - c. What are the different categories of system program? Explain. (06 Marks)
2.
  - a. With neat diagram, explain components of PCB. (05 Marks)
  - b. Explain direct and indirect communication with respect to message passing systems. (05 Marks)
  - c. Consider the following set of processes with CPU burst time (in m secs)

Process	Arrival time	Burst time
P <sub>0</sub>	0	6
P <sub>1</sub>	1	3
P <sub>2</sub>	2	1
P <sub>3</sub>	3	4

- i) Draw Gantt chart illustrating the execution of above processes using SRTF and non preemptive SJF
  - ii) Find the turn around time for each processes for SRTF and SJF. Hence show that SRTF is faster than SJF. (10 Marks)
3.
  - a. What do you mean by a binary semaphore and counting semaphore? Explain the implementation of wait( ) and signal( ) semaphore operation. (10 Marks)
  - b. What is race condition? List the requirements that a solution to critical section must satisfy. (05 Marks)
  - c. Explain any one synchronization problem for testing newly proposed synchronization scheme. (05 Marks)
4. a. Consider the following snapshot of resource allocation at time t<sub>1</sub>

	Allocation			Request			Available		
	A	B	C	A	B	C	A	B	C
P <sub>0</sub>	0	1	0	0	0	0	0	0	0
P <sub>1</sub>	2	0	0	2	0	2			
P <sub>2</sub>	3	0	3	0	0	0			
P <sub>3</sub>	2	1	1	1	0	0			
P <sub>4</sub>	0	0	2	0	0	2			

- i) Show that the system is not deadlocked by generating one safe sequence
  - ii) At instance t<sub>2</sub>, P<sub>2</sub> makes one additional request for instance of type C. Show that the system is deadlocked if the request is granted. Write down the deadlocked processes. (08 Marks)
- b. Describe resource allocation graph
  - i) With deadlock ii) With a cycle but no deadlock. (06 Marks)
- c. What is wait for graph? Explain how it is useful for detection of deadlock. (06 Marks)

## PART – B

- 5 a. Explain internal and external fragmentation, with examples. (06 Marks)
- b. Consider the following page reference string 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults would occur for the following page replacement algorithms assuming 3 and 5 frames. i) LRU ii) optimal. (10 Marks)
- c. What is the cause of Thrashing? How does the system detect thrashing? (04 Marks)
- 6 a. What do you mean by free space list? With suitable example, explain any two methods of implementation of free space list. (08 Marks)
- b. What are the three methods for allocating disk space? Explain with suitable example. (12 Marks)
- 7 a. Suppose that a disk has 50 cylinders named 0 to 49. The R/W head is currently serving at cylinder 15. The queue of pending requests are in order : 4 40 11 35 7 14 starting from the current head position, what is the total distance traveled (in cylinders) by the disk arm to satisfy the requests using algorithms FCFS, SSTF and LOOK. Illustrate with figure in each case. (12 Marks)
- b. Write a note on :  
i) Domain of protection  
ii) Access matrix. (08 Marks)
- 8 a. With diagram, explain components of Linux system. (08 Marks)
- b. Explain in detail, the components that the kernel module support under Linux. (12 Marks)

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