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06CS53

# Fifth Semester B.E. Degree Examination, June/July 2011
# 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. Distinguish among the following terminologies associated with the operating system and explain each of them in detail.
Multi programming systems
Multitasking systems
Multiprocessor systems. **(12 Marks)**

b. With the help of an example, explain the concept of virtual machines. **(08 Marks)**

2 a. What is a process? With a state diagram, explain states of a process. Also write the structure of PCB. **(10 Marks)**

b. Consider 4 jobs with (arrival time, burst time) as (0, 5) (0.2, 2) (0.6, 8) (1.2, 4). Find the average turn around time and waiting time for the jobs using FCFS, SJF and RP(q = 1) scheduling algorithms. **(10 Marks)**

3 a. What is synchronization? Explain synchronization hardware. **(04 Marks)**

b. What are semaphores? Explain the solution to producer – consumer problem using semaphores. **(08 Marks)**

c. What are monitors? Explain it. **(08 Marks)**

4 a. What is a deadlock? Explain the necessary conditions for its occurrence. **(08 Marks)**

b. Consider a system

| Process | Allocation | Max | Available |
|---|---|---|---|
| | A B C D | A B C D | A B C D |
| $P_0$ | 0 0 1 2 | 0 0 1 2 | 1 5 2 0 |
| $P_1$ | 1 0 0 0 | 1 7 5 0 | |
| $P_2$ | 1 3 5 4 | 2 3 5 6 | |
| $P_3$ | 0 6 3 2 | 0 6 5 2 | |
| $P_4$ | 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, arrives for (0, 4, 2, 0), can the request be granted immediately? **(12 Marks)**

## PART - B

5 a. What is paging? Explain it. **(07 Marks)**

b. Explain internal and external fragmentation with a neat diagram. **(05 Marks)**

c. Consider the following page reference string.
1, 2, 3, 5, 2, 3, 5, 7, 2, 1, 2, 3, 8, 6, 4, 3, 2, 2, 3, 6.
How many page faults would occur in the case of
i) LRU
ii) FIFO
iii) Optimal algorithms assuming 3 frames.
Note that initially all frames are empty. **(08 Marks)**

6 a. Explain different file access methods. **(05 Marks)**

b. Explain various directory structures. **(07 Marks)**

c. Explain different disk space allocation methods with an example. **(08 Marks)**

7 a. Suppose a disk drive has 5000 cylinders numbered 0 to 4999. Drive is currently serving request at cylinder 143, and previous request was at cylinder 125, queue of pending requests in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending request for FCFS, SSTF, LOOK, SCAN disk scheduling algorithms. **(10 Marks)**

b. Explain access matrix with examples. **(05 Marks)**

c. Explain domain of protection. **(05 Marks)**

8 Write short notes on :

a. Components of a Linux system

b. Inter process communication

c. Thrashing

d. Monitors. **(20 Marks)**

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