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07MCA35

Third Semester MCA Degree Examination, June/July 2011
Operating Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. What is an operating system? What are the functionalities of an OS? **(08 Marks)**
b. Explain various components of an OS. **(08 Marks)**
c. What is a virtual machine? **(04 Marks)**

2 a. What is a process? With the help of a diagram, explain the different states of a process. **(08 Marks)**
b. What is a thread? Mention the benefits of multithreaded programming. **(06 Marks)**
c. Explain the process control block, in detail. **(06 Marks)**

3 a. Consider the following processes, which have arrived at the ready queue with the burst time and the arrival time given in milliseconds as shown below:

Process	Burst time in milliseconds	Arrival time in milliseconds
P_1	8	0
P_2	4	1
P_3	9	2
P_4	5	3

Draw the Gantt chart and calculate the average waiting time using the following algorithms:
i) FCFS ii) SJF (pre emptive) **(08 Marks)**
b. What do you mean by semaphore? How do you access a semaphore? **(06 Marks)**
c. What is a deadlock? What are the necessary conditions for a deadlock to occur? **(06 Marks)**

4 a. Define critical section problem and explain the requirements to be met by a solution to the critical section problem. **(06 Marks)**
b. Explain the Readers-Writers problem, in detail. **(08 Marks)**
c. Explain the following terms:
i) Mutex ii) Race condition. **(06 Marks)**

5 a. What is page fault? What action does the operating system take when a page fault occurs? **(10 Marks)**
b. Consider the following page reference string:
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
How many page faults would occur in the case i) FIFO ii) LRU iii) Optimal algorithms assuming three frames? Note that initially all frames are empty. **(10 Marks)**

6 a. Explain the various disk scheduling algorithms, with an example. **(10 Marks)**
b. Explain the following terms briefly:
i) File attributes ii) File operations iii) Access methods. **(10 Marks)**

7 a. What is access matrix? How is access matrix implemented? **(10 Marks)**
b. With a diagram explain the components of the Linux system. **(10 Marks)**

8 Write short notes on:
a. Thrashing b. Fragmentation c. Monitor d. Context switch. **(20 Marks)**

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.