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10MCA35

Third Semester MCA Degree Examination, Dec.2013/Jan.2014
Operating Systems

Time: 3 hrs. Max. Marks:100

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

1 a. Explain operating system services. **(08 Marks)**

b. With a neat diagram, explain MS-DOS layer structure. **(06 Marks)**

c. Explain the following types of operating systems: i) Real-time; ii) Client-server; iii) Handheld systems. **(06 Marks)**

2 a. What is a process? With a neat diagram explain the different states of a process. **(08 Marks)**

b. Consider the following set of processes with the length of CPU burst time given in millisecs:

Process	Burst time	Priority
P_1	8	4
P_2	2	1
P_3	2	3
P_4	3	3
P_5	5	2

All processes arrive at time '0' in the given order. Draw Gantt charts using FCFS, SJF, priority (a smallest number implies highest priority) and RR (quantum = 1) scheduling. Also find the average waiting time in each case. **(08 Marks)**

c. Explain the need of co-operating processes. **(04 Marks)**

3 a. What is a semaphore? Define the wait and signal operations. Also explain the usage of semaphores. **(10 Marks)**

b. What is a monitor? With a neat diagram explain the working of a monitor. **(10 Marks)**

4 a. Explain the necessary conditions for a deadlock. **(04 Marks)**

b. What are the data structures used in the Banker's algorithm? Write an algorithm to know whether the system is in a safe state or not. **(10 Marks)**

c. Give the comparison between resource allocation graph and wait for graph with examples. **(06 Marks)**

5 a. Consider the following page reference string: 2 3 2 1 5 2 4 5 3 2 5 2. Assuming 3 frames, find the number of page faults when the following algorithms are used: i) LRU; ii) FIFO; iii) Optimal. Note that initially all the frames are empty. **(12 Marks)**

b. With a neat diagram, explain paging hardware with TLB. **(08 Marks)**

6 a. What is a file? List and explain the different file attributes. **(08 Marks)**

b. Explain the following with respect to the file system: i) Contiguous allocation; ii) Linked allocation; iii) Indexed allocation. **(12 Marks)**

7 a. Consider a disk queue with requests for I/O to blocks on cylinders 23, 89, 132, 42, 189 in that order. There are 200 cylinders numbered from 0 to 199. If the disk head is initially at 100, find the number of head movements using the following algorithms i) FCFS; ii) SSTF. **(10 Marks)**

b. What is access matrix? How is access matrix implemented? **(10 Marks)**

8 a. What are the important components of a LINUX system? Briefly explain with a diagram. **(10 Marks)**

b. Explain the concept of memory management with respect to LINUX. **(10 Marks)**

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