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13MCA23

Second Semester MCA Degree Examination, June/July 2015
Operating Systems

Time: 3 hrs. Max. Marks:100

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

1 a. Define operating system, explaining different types with their features. **(08 Marks)**
b. What is the need for "Interrupt"? Explain with an instruction cycle diagram. **(06 Marks)**
c. Discuss the memory hierarchy concept, explaining the characteristics while distinguishes various elements. **(06 Marks)**

2 a. Explain various services provided by an operating system. **(08 Marks)**
b. What is layered approach? Explain with neat diagram and its advantages. **(06 Marks)**
c. Differentiate between process and threads. **(06 Marks)**

3 a. Explain the five state process model with queuing diagram, showing how to change process model for a suspend process. **(10 Marks)**
b. Calculate the average waiting time, turn around time for SJF (non-pre emptive) and priority scheduling, with following set of processes:

Process	A.T	B.T	Priority
P_0	0	8	2
P_1	4	15	5
P_2	7	9	3
P_3	13	5	1
P_4	9	13	4
P_5	0	6	1

(10 Marks)

4 a. Discuss the critical section problem, with an example. **(04 Marks)**
b. Discuss the bounded-buffer produce-consumer problem using semaphores. **(06 Marks)**
c. What is reader's-writer's problem? Explain with a solution using message passing. **(10 Marks)**

5 a. Mention the deadlock conditions. **(05 Marks)**
b. Design a solution to the dining philosopher's problem using a monitor. **(10 Marks)**
c. What is dynamic paging, and its advantages? **(05 Marks)**

6 a. Mention the different page table structures, explaining in brief. **(10 Marks)**
b. Considering the page reference string below:
1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6
using 3 frames, find out the page fault using LRU, FIFO and optimal page replacement methods. **(10 Marks)**

7 a. List and explain different file allocation methods. **(10 Marks)**

b. A disk with 5,000 cylinders, numbered 0 – 4999, with current request at cylinder 143, and previous request at 125, and the queue of pending requests in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 starting from the current head position. Calculate the total distance (in cylinder) which the disk arm moves in order to satisfy all the pending requests using i) FCFS ii) SSTF iii) SCAN iv) C-SCAN v) LOOK disk scheduling algorithms. **(10 Marks)**

8 Briefly explain the below concepts,

a. Resource allocation graph

b. Directory structure

c. System threats

d. Linux file system. **(20 Marks)**

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