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# Question Paper Code : 11425

B.E. / B.Tech DEGREE EXAMINATIONS : MAY 2015

Fourth Semester

B.Tech - Information Technology

**13IT403 - Operating Systems**

(Regulations : MepcoR-2013)

Duration: 3 Hours Maximum Marks: **:** 100

**Answer ALL Questions**

**Part – A (10 x 2 = 20 Marks)**

1. Mention two applications that use the concept of virtual machines.
2. The Internet Explorer (web browser) and the calculator are part of the later versions of the windows operating system. Do they help in the functioning of the operating system?
3. How does the construct of a monitor ensure process synchronization?
4. On what basis would you decide when to invoke a deadlock detection algorithm?
5. Consider the following segment table:

| Segment | Base | Length |
|---|---|---|
| 0 | 219 | 600 |
| 1 | 2300 | 14 |
| 2 | 90 | 100 |
| 3 | 1327 | 580 |
| 4 | 1952 | 96 |

What are the physical addresses for the following logical addresses?

a. 0,430
b. 1,10
c. 2,500
d. 3,400

6. Analyze the issues to take into consideration when setting the number of frames to be allotted to a process.
7. Mention the need for interrupt chaining.
8. What problems could occur if a system allowed a file system to be mounted simultaneously at more than one location?

9. Mention the security features provided by Linux.

10. Why are journaling file systems faster than non-journaling file systems?

**Part – B (5 x 16 = 80 Marks)**

11. (a) Write a note of the various structures of an operating system. (16 Marks)

**OR**

11. (b) Explain inter-process communication and the various ways of handling it. (16 Marks)

12. (a) Consider a hypothetical barber shop with one barber. The barber has one barber chair and a waiting room with a number of chairs in it. When the barber finishes cutting a customer's hair, he dismisses the customer and then goes to the waiting room to see if there are other customers waiting. If there are, he brings one of them back to the chair and cuts his or her hair. If there are no other customers waiting, he returns to his chair and sleeps in it.
Each customer, when he arrives, looks to see what the barber is doing. If the barber is sleeping, then he wakes him up and sits in the chair. If the barber is cutting hair, then he goes to the waiting room. If there is a free chair in the waiting room, he sits in it and waits his turn. If there is no free chair, then the customer leaves.
Coordinate these processes using semaphores. (16 Marks)

**OR**

12. (b) For the processes listed in the table

| Process | Arrival Time | Burst | Priority |
|---|---|---|---|
| A | 0 | 4 | 3 |
| B | 1 | 3 | 4 |
| C | 2 | 3 | 6 |
| D | 3 | 5 | 5 |

A) Draw a Gantt chart illustrating their execution
B) Find the waiting time for each process

when we use the following CPU scheduling algorithms

I. FCFS
II. SRTN
III. A non-preemptive priority ( a smaller priority number implies a higher priority)
IV. RR ( quantum = 1) (16 Marks)

13. (a) i. Compare and contrast contiguous and non-contiguous memory allocation with a detailed analysis of the pros and cons of the approaches. (8 Marks)

13. (a) ii. Given memory partitions of 100 KB, 500 KB, 200 KB, 300 KB and 600 KB( in order), how would each of the first-fit, best-fit, worst-fit, next-fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB( in order)? Which among these algorithms makes the most efficient use of memory? (8 Marks)

**OR**

13. (b) Given, references to the following pages by a program.
1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2.
Analyze if this reference string would result in Belady anomaly for the following page replacement policies.
A) FIFO replacement
B) LRU replacement
C) Optimal replacement
D) Second Chance replacement (16 Marks)

14. (a) On a disk with 1000 cylinders, numbered 0 to 999, compute the number of tracks the disk arm must move to satisfy all the requests in the disk queue. Assume the last request serviced was at track 305 and the head is moving towards track 0. The queue in FIFO order contains requests for the following tracks : 23, 374, 622, 435, 135, 676. Perform the computation for the following scheduling algorithms.

A) FIFO B) SSTF C) SCAN D) LOOK E) C-SCAN F) C-LOOK (16 Marks)

**OR**

14. (b) Consider a file currently consisting of 100 blocks. Assume that the file control block (and the index block, in the case of indexed allocation) is already in memory. Calculate how many disk I/O operations are required for contiguous, linked, and indexed (single-level) allocation strategies, if, for one block, the following conditions hold. In the contiguous-allocation case, assume that there is no room to grow in the beginning, but there is room to grow in the end. Assume that the block information to be added is stored in memory.
A. The block is added at the beginning.
B. The block is added in the middle.
C. The block is added at the end.
D. The block is removed from the beginning.
E. The block is removed from the middle.
F. The block is removed from the end. (16 Marks)

15. (a) Compare and contrast the design principles of linux, Windows 8 and Android. (16 Marks)

**OR**

15. (b) Explain how process management and memory management are performed in linux. (16 Marks)

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