1623

M. Tech 1st Semester Examination

Operating System & Case Study

CSE1-515/MT-105

Time : 3 Hours   **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, select one question from each section A, B, C and D. Section E is compulsory.

SECTION - A

1. (a) Define the role of operating system. Discuss about the real time operating system and its types.   (10)

    (b) Here are the arrival and burst times for a number of processes:

Process	Arrival Time	Burst Time
P1	0	4
P2	2	2
P3	3	5
P4	4	3
P5	7	1

Draw a Gantt chart showing a Shortest Job First schedule with preemption and calculate the average waiting time.
(10)

2. (a) Explain process management. Suppose that a process scheduling algorithm favours those processes that have used the least processor time in the recent past. Why will this algorithm favour IO-bound processes, but not starve CPU-bound processes? (10)

(b) Provide two kind of programming examples in which multithreading does not provide better performance than a single-threaded solution. (10)

SECTION - B

3. (a) What are the relative advantages and disadvantages of using semaphores and monitors for implementing process synchronization? (10)

(b) Can a system be in a state which is neither deadlocked nor safe? If so give an example. If not, prove that all states are either, deadlocked or safe. (10)

4. (a) Explain Banker's algorithm for avoiding deadlocks. What are its limitations? (10)

(b) Given memory partitions of 100K. 500K, 200K. 300K and 600K (in order), how would each of the first-fit and best-fit algorithms place processes of 212K, 417K, 112K and 426K (in order)? Which algorithm makes the most efficient use of memory? (10)

SECTION - C

5. (a) What is file system? Explain the three factors that contribute to the time required to access a file: seek time, search time and transfer time. (10)

(b) Discuss the different techniques with which a file can be shared among different users. (10)

6. (a) Consider the situation in which the disk read/write head is currently located at track 60 (of tracks 0-255) and moving in the positive direction. Assume that the following track requests have been made in this order: 90, 37, 11, 238, 67. What is the order in which FCFS would service these requests and what is the total seek distance? (10)

(b) Explain various techniques adopted by operating system to manage free space on a disk. (10)

SECTION - D

7. (a) Unix device drivers are packaged together with the kernel, while Windows device drivers are often provided with the hardware in binary form, separate from the operating system. List four advantages of the Windows method, and four advantages of the Unix method of proving device drivers. (10)

(b) How can a Unix process arrange to share some of its open files with a child process it is creating? What happens if both processes read from the open file?(10)

8. (a) Differentiate between protection and security. Explain the techniques used for protection of user files in Windows NT. (10)

(b) Unix runs on variety of hardware platforms. What steps must the Unix developers take to ensure that the system is portable to different processors and memory management architectures and to minimize the amount of architecture specific kernel code? (10)

SECTION - E

9. (a) Describe the booting process for a Windows NT system.

(b) Differentiate between Distributed Operating System and Mobile Operating System.

(c) Why are memory page sizes always powers of 2?

(d) Describe the virtual memory scheme in Windows NT.

(e) What is a resource allocation graph? (4×5=20)