

Roll No.

Total No. of Pages : 3

Total No. of Questions : 09

MCA (Sem.-4th)
OPERATING SYSTEMS
Subject Code : MCA-404
Paper ID : [B0118]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTIONS-A, B, C & D** contains **TWO** questions each carrying **TEN** marks each and students has to attempt any **ONE** question from each **SECTION**.
2. **SECTION-E** is **COMPULSORY** carrying **TWENTY** marks in all.
3. Use of non-programmable **scientific calculator** is allowed.

SECTION-A

1. a) Differentiate between multiprogramming, multiprocessing, timesharing and distributed systems. (4)
provided by an operating system. Explain how each provides convenience to the users. Explain in which case it would be impossible for the user-level programs to provide these services. (6)
2. Five batch jobs. A through E arrives at a computer center at essentially the same time for the first three cases. They have an estimated running time of 15, 9, 3, 6 and 12 minutes respectively. Their (externally defined) priorities are 6, 3, 7, 9 and 4, respectively, with the lower value corresponding to the higher priority. For each of the following scheduling algorithm determine the turnaround time for each process and the average turnaround time for all jobs. Ignore the process switching overhead. Explain how you arrived at your answers. In the 2nd and 3rd cases assume that only one job runs until it finishes and all the jobs are processor bound.
 - a) Round robin with the time quantum of 10 minutes.
 - b) Priority scheduling.
 - c) FCFS (run in order 15, 9, 3, 6 and 12).
 - d) SJF(Preemptive considering the arrival times in order of 0, 5, 7, 10 and 16 respectively).
 - e) Give the formula to predict next CPU Burst Time. (2+2+2+2+2)

SECTION-B

3. a) Consider the parameter Δ used to define the working-set window in the working-set model. What is the effect of setting Δ to a small value on the page fault frequency and the number of active (non-suspended) processes currently executing in the system? What is the effect when Δ is set to a very high value? (6)
- b) Describe a mechanism by which one segment could belong to the address space of two different processes. (4)
4. Consider the main memory with capacity of four page frames. Assume that the pages of a process are referenced in the order given below:
1, 3, 4, 4, 3, 2, 1, 7, 5, 6, 4, 2, 1, 2
Which of FIFO or LRU would be better? (10)

SECTION-C

- What supports the strategies of continuous, linked, and indexed allocation. What criteria should be used in deciding which strategy is best utilized for a particular file? (6)
- b) Differentiate between Acyclic and a General Graph Directory structure giving examples of both. (4)
6. What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing what can the system do to eliminate this problem? (10)

SECTION-D

7. Does deadlock prevention often result in poor resource utilization? Justify your answer with examples from various deadlock prevention strategies. (10)
8. Is it possible to have a deadlock involving only one single process? Give reasons. (10)