

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 7308

Roll No.

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MCA
(SEMESTER-III) THEORY EXAMINATION, 2012-13
OPERATING SYSTEMS

Time : 3 Hours]

[Total Marks : 100

Part – A

1. Attempt **all** question. **2 × 10 = 20**
- (a) What is the advantage of having different time quantum sizes on different levels of a multilevel queuing system ?
 - (b) What is thread and how is it different from a process ?
 - (c) Is it possible to have no deadlock even through there is a cycle in resource allocation graph ?
 - (d) What is difference between hard real time and soft real time operating system ?
 - (e) What is advantage of layered approach of designing an operating system ?
 - (f) Write a feasible way to implement LRU page replacement algorithm.
 - (g) What do you understand by program threats ? Write two examples of program threat.
 - (h) What is role of request manager in LINUX ?
 - (i) Assuming a cluster size of 512 bytes, calculate the percentage in file space due to incomplete filling of last clusters, for the file sizes (i) 1200 bytes (ii) 20,000 bytes.
 - (j) What are monitors ?

Part – B

2. Attempt any **three** parts : **3 × 10 = 30**
- (a) (i) Discuss the two models of interprocess communication highlighting their strengths and weaknesses. **5**
 - (ii) What is difference between a trap and an interrupt ? What is the use of each of these functions ? **5**

(b) (i) Following is a snapshot of a CPU :

| Process | CPU Burst | Arrival Time |
|---------|-----------|--------------|
| P1 | 10 | 0 |
| P2 | 29 | 1 |
| P3 | 03 | 2 |
| P4 | 07 | 3 |

Draw the Gantt chart and calculate the turnaround time and waiting time of the jobs for FCFS (First Come First Served), preemptive shortest job first, and RR (Round Robin with time quantum 10) scheduling algorithms. 6

(ii) What do you understand by short term, medium term and long term scheduling ? 4

(c) (i) What are the disadvantages of semaphores and discuss the suitable technique to overcome them ? 4

(ii) What is Banker's Algorithm ? What is its use ? Explain using suitable example. 6

(d) (i) Suppose that a disk drive has 5000 cylinders, 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending request in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Calculate the total distance (in terms of cylinder), starting from its current head position, for the following disk scheduling algorithms. 5

(a) FCFS (b) SSTF (c) SCAN (d) C-SCAN (e) LOOK.

(ii) In a paged segmented system, a virtual address consist of 32 bits of which 12 bits are a displacement, 11 bits are a segment number and 9 bits are a page number. Calculate (i) page size (ii) maximum segment size (iii) maximum number of pages (iv) maximum number of segments. 5

Part – C

3. Attempt **all** question : 10 × 5 = 50

(a) What is a access matrix ? Why an operating system needs a access matrix ? What are the various techniques to implement it ?

OR

Describe the memory management and file system of LINUX.

(b) What are various disk space allocation techniques ? Write advantage and disadvantage of each.

OR

What is thrashing and how it occur ? Discuss techniques that are used to overcome the thrashing.

- (c) What is Semaphore ? Write the code for Producer-Consumer problem using Semaphore.

OR

What are various way in which deadlock can be handled and which way you will prefer to adopt and why ?

- (d) What is process scheduling ? Explain the various functions performed by the process scheduler. What are the features which a typical process scheduling policy should contain ?

OR

What are the various process states ? Depict process state diagram. What do you understand by context switching and various process involved in it ?

- (e) Differentiate between batch, multiprogramming, real time, embedded and multiprocessing operating systems with respect to process management, memory management, file management and security.

OR

What do you understand by system call and system program ? How does a new process created in UNIX OS ? Explain.
