Sixth/Eighth Semester Examination -2010

OPERATING SYSTEMS

Full Marks - 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any five from the rest'

The figures in the right-hand margin indicate marks.

1. Answer the following questions : [2x10

   (a) What is prefetching ? How it helps in improving performance of multiprogramming.

   (b) What is the major drawback of multi-level scheduling ? Suggest a solution for it.

   (c) What is a lazy swapper ? Mention its working principle.

   (d) Garbage collection and compaction degrades system performance. Justify.

   (e) How pag'ing and segmentation are not free from

internal and external fragmentation respectively ?

(f) Whether a single user process can create deadlock to the system ?(Yes/No). Justify your answer with a suitable example.

(g) Multithreading is not necessarily faster than multiprocessing.(Yes/No).Justify your answer.

(h) Why DOS OS is less secure than UNIX OS? Explain briefly

(i) What is Belady's Anomaly ? Name the algorithms which suffer this problem.

(j) Briefly explain how priorisdty-inheritance protocl helps multi-processing activity inside a asystem.

2. (a) Define a PCB . What is its role during process execution ? Draw a neat block diagram representing diferent states of a process and its transition among various states. (5

(b) Define context switching. With a suitable example explain context switsching meschanism among several processes. (5

3. (a) Consider the following set of processes with their CPU burst time, arrival time given in milliseconds and priority.

Proscess	CPU burst Time	ArrivalTime	Priority
P1	3	0	1
P2	2	1	0
P3	4	3	2
P4	5	4	0
P5	3	5	1

Draw three Gantt charts for execution of the processes using SRTF, RR (Time quantum = 2), and Preemptive Priority scheduling. Separately scompute the average resopnse time, average waiting time and average turn around time of the processes on execution of the three algorithms. (5

(b) What is IPC ? Explain the mechanisms of IPC for cooperating among the processes in an OS. (5

4. (a) Differentiate among safe state, unsafe state, and deadlock in a system. With suitable example explain how the conditions of deadlock are satisfied. (5

(b) Explain the different techniwues for structuring page table. Mention their pros and cons if any. (5

5. (a) Consider the following snapshot of a system :

Process	Allocation	Max	Available
P0	0012	0012	1520
P1	1000	1750	
P2	1354	2356	
P3	0632	0652	
P4	0014	0656	

Applying Banker's algorithm compute

(i) The Need matrix

(ii) Is the system in a safe state ?

(iii) If a request from process P2 arrives for (1,2, 0, 1), can the request be granted

immediately ? (5

(b) Define external fragmentation and internal fragmentation. Analyze the merits and limitations of the existing solutions for elimination of these problems. (5

6. (a) What is dedmand paging ? With a suitable block diagram, explain the procedure to handle page fault. (5

(b) Consider the following reference string. Determine the number of page faults for FIFO , LRU and optimal algokrithms separately if memory size is 4 frames.

2, 6, 7, 2, 4, 7, 1, 4, 3, 4, 0, 7, 4, 5, 2, 3, 2, 6, 3, 8, 5. (5

7. (a) A disk drived has 2000 cylinders, numbered from 1 to 1999. the drive is currently serving a request at cylinder 111, and the previous request was at cylinder 90. The queue of pending requests, in FIFO order, is 34, 190, 21, 1543, 237, 987, 328, 675, 1129, 65. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the spending requests for FCFS, SSTF,SCAN, LOOK, andC-LOOK disk-scheduling algorithms ? (5

(b) Explain the different directory structures and access mechanisms to retrieve various files. (5

8. (a) Discuss the different types of file systems in LINUX operating system. (5

(b) Describe three circumstances under which non-blocking I/O should be used. Why not non-blocking I/O is implemented and have processes busy-wait until their device is ready? (5