Sixth/Eighth Semester Examination -2009

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 the hit ratio of a cache if a system performs memory access at 30 ns with cache and 150ns without it ? Assume cache access time is 20 ns.

   (b) Define cache hit ratio.

   (c) Specify two advantages of multiprogramming ?

   (d) What is filter in UNIX ? Give a suitable example.

   (e) Four jobs A, B, C, D arrive at a single processor system at the same time. The CPU burst time represents are 4, 1, 8, 1 time units respectively. Find compleltion time of A in Round Robin scheduling with one unit of time slice.

   (f) A computer has 6 tape drives among n programs. Each needs two tape drives. For a system to be deadlock free what is maximum value of n ?

   (g) With segmentation, if there are 64 segments and maximum segment size is 512 words. What will be the length of logical address?

   (h) Consider the reference string 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2. Find

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the number of page fault in LRU scheme.

   (i) A counting semaphore has initialized to 10. Then six P and four V operations were completed on this semaphore, what is the relulting value of semaphore ?

   (j) void.main ()

   {

   fork(); How many processes will be created ?

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   }

2. (a) Consider a memory system with following parameters,

   Cache access time = 100 ns

   Memory access time = 1200 ns

   If we would like to have average memory access time to be no more than 20% higher than cache accesstime. What wil be the lie ratio ? (5

   (b) What is virtual memory? Describe a scheme with block diagram that supports virtual memory. (5

3. (a) What is deadlock ? What are thenecessary and sufficient conditions to occur deadlock in a system ? (3

   (b) Differentiate between deadlock avoidance and prevention. Why it is not possible to prevent deadlock? (3

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(c) For the following data

	Allocation	Max
P0	010	753
P1	200	322
P2	302	902
P3	211	222
P4	002	433

Check whether the system is safe ? If so find a safely sequence. (4

4. State Dining Philosopher's problem. Suggest a deadlock free algorithm to solve this problem. (10

5. (a) For the three processes P_1 P_2 P_3 with CPU burst time of 30 ms, 6ms, and 8 ms respectively, find the average TAT, average waiting time and average response time with time quantum 5 ms. Assume all the jobs are available at the same time.

(b) Discuss the Multilevel feedback scheduling. State its advantages. (4

6. (a) What is a critical section problem ? Illustrate with a real time example. (4

(b) Why P and V operations of a semaphore need to be atomic? (2

(c) Define semaphore. Write the P and V operations on semaphore. (4

7. (a) Distinguish between protection and security in a computer system. (2.5

(b) How does OS support protection and security .(2.5

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(c) Differentiate between capability list and access control list ? (2.5

(d) What is an I-Node ? State the I-node mapping in Unix. (2.5

8. Write notes on : (2.5 x 4

(a) Process State transition diagram

(b) Lamport's Backery Algorithm

(c) RAID

(d) Thrashing.

(c) Differentiate between capability list and access control list ? (2.5

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