B. Tech

BCSE 3305

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 :   2×10

   (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.

P.T.O.

(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 completion 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 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 resulting value of semaphore ?

(j) void main ()
{
    fork (); How many processes will be created ?
    fork (); How many processes will be created ?
}

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 access time. What will 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 the necessary 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	
P_0	010	753	743
P_1	200	322	122
P_2	302	902	600
P_3	211	222	011
P_4	002	433	431

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, 6 ms, 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.   6
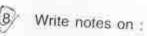
BCSE 3305   5   P.T.O.

(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

(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 : 2.5×4

(a) Process State transition diagram

(b) Lamport's Backery Algorithm

(c) RAID

(d) Thrashing.

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