B.Tech III Year I Semester (R13) Regular Examinations December 2015

OPERATING SYSTEMS

(Common to CSE and IT)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)

(a)   In general one process is not allowed to access the memory of another process, then how shared memory is working?

(b)   void main()
{
fork(); fork(); fork();
}
How many child processes are created by the above C code? Explain.

(c)   Heap memory is shared across threads in multi threaded process but not stack memory. Why?

(d)   Does Peterson's solution to the mutual exclusion works when process scheduling is preemptive? How about when it is non preemptive?

(e)   A computer program has enough room to hold four programs in its main memory. These programs are idle waiting for I/O half time. What fraction of CPU time is wasted?

(f)   A system has p processes and r resources, each process needs maximum of m resources. What condition must hold to make system deadlock free?

(g)   It has been suggested that the first part of each UNIX file kept in the same disk block as its I-node. What good would this do?

(h)   If 011011011110000 is bit map of a disk, then calculate the free space of the disk if disk employing each block of size 1 MB.

(i)   List the forms of accidental and malicious security violations.

(j)   Define Trojan Horse.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

$\boxed{\textbf{UNIT – I}}$

2   (a)   Write the advantages of peer-to-peer systems over client-server systems? Give an example to peer-to-peer model.

(b)   What are the set of operating system services that provides functions that are helpful to the user?

OR

3   (a)   Define debugging. What are different failure analysis approaches in operating systems?

(b)   Draw and explain process state diagram with two suspend states.

$\boxed{\textbf{UNIT – II}}$

4   Consider 3 processes P_1, P_2 and P_3, which require 5, 7 and 4 time units and arrive at time 0, 1 and 3. Draw the Gant chart, process completion sequence and average waiting time for.
(i) Round robin scheduling with CPU quantum of 2 time units.
(ii) FCFS.

OR

5   Assume that the pool consists of n buffers, each capable of holding one item. The mutex semaphore provides mutual exclusion for accesses to the buffer pool and is initialized to the value 1. The empty and full semaphores count the number of empty and full buffers. The semaphore empty is initialized to the value n; the semaphore full is initialized to the value 0.
Write a C like code for producer and consumer processes.

UNIT – III

6   Consider a swapping system in which memory consists of the following hole sizes in memory order: 10 KB, 4 KB, 20 KB, 18 KB, 7 KB. 9 KB, 12 KB, and 15 KB. Which hole is taken for successive segment requests of 12 KB, 10 KB and 9 KB for:

(a) First fit.
(b) Best fit.
(c) Next fit.

OR

7   Suppose there are 2 copies of resource A, 3 copies of resource B, and 3 copies of resource C. Suppose further that process 1 holds one unit of resources B and C and is waiting for a unit of A; that process 2 is holding a unit of A and waiting on a unit of B; and that process 3 is holding one unit of A, two units of B, and one unit of C.

(a) Draw the resource allocation graph.
(b) Is the system in a deadlocked state? Why or why not?

UNIT – IV

8   (a) Explain C-LOOK disk scheduling algorithms with example.
     (b) Discuss about swap-space management.

OR

9   Explain file allocation methods in detail.

UNIT – V

10   How do we implement access matrix? Explain in detail.

OR

11   Give a brief note on I/O mode data transfers.

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