Total No. of Questions : 10] [Total No. of Printed Pages : 4

Roll No. .....

CS–502

B. E. (Fifth Semester) EXAMINATION, Dec., 2011

(Computer Science Engg. Branch)

OPERATING SYSTEM

(CS – 502)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt *one* question from each Unit. All questions carry equal marks.

Unit – I

1. (a) What are the major differences between the following types of operating systems ? 10

   (i) Batch system

   (ii) Real time system

   (iii) Time sharing system

   (b) What are the different services provided by an operating system ? Explain each in brief. 10

2. (a) Compare the following : 10

   (i) Monolithic and layered operating system

   (ii) Buffering and spooling

   (iii) Network and Distributed Operating System

   (b) What are the main functions of an operating system ? 10

P. T. O.

Unit – II

a) Discuss various file access methods. 10

b) Suppose that a disk has 500 cylinders. 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 orders is 80, 1470, 913, 1774, 948, 1509, 1022, 1750 and 130. What is the total distance that the disk arm moves for the following algorithms ? 10

(i) FCFS

(ii) SSTF

(iii) LOOK

(iv) C-SCAN

a) Explain short-term, medium-term and long-term scheduling. 10

b) Write a detailed note on interleaving and authentication parameter in file system. 10

Unit – III

a) Explain the following terms with examples : 10

(i) Critical section

(ii) Mutual exclusion

(iii) Race condition

b) What are monitors ? How are they useful in process synchronization ? Discuss the features of it. 10

a) What are various ways to avoid deadlock ? 10

with four processes and three resource types. The claim matrix is given by : 10

$$C = \begin{bmatrix} 4 & 1 & 4 \\ 3 & 1 & 4 \\ 5 & 7 & 13 \\ 1 & 1 & 6 \end{bmatrix}$$

where $C(i, j)$ denotes maximum claim of process i for resource j . The total units of each resource type are given by vector (5, 8, 16). The allocation of resources is given by the matrix :

$$A = \begin{bmatrix} 0 & 1 & 4 \\ 2 & 0 & 1 \\ 1 & 2 & 1 \\ 1 & 0 & 3 \end{bmatrix}$$

where $A(i, j)$ denotes the number of the unit of resource j that are currently allocated to process i :

(i) Find if the current state of the system is safe.

(ii) Find if granting of a request by process 1 for 1 unit of resource type 1 can safely be done.

(iii) Find if the granting of a request by process 3 for 6 units of resources 3 can safely be done.

Unit – IV

7. (a) Explain the difference between the following : 10

(i) MVT and MFT

(ii) Internal and external fragmentation

(iii) Logical and physical address

(b) Consider the following page reference string : 10

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

How many page faults will occur for LRU, FIFO and optimal page replacement algorithms, assuming 4 available frames (initially all empty) ?

8. (a) Explain the following terms : 10

(i) Locality of reference

(ii) Inverted page table

(b) Explain demand paging with example. 10

Unit – V

9. (a) What are the design issues of distributed operating systems ? 10

(b) What is the difference between a virus and a worm ? How do they each reproduce ? 10

10. (a) Compare remote procedure calls and remote evaluation on the basis of flexibility, efficiency and security. 10

(b) Discuss RRA protocol. 10