

**BACHELOR IN COMPUTER  
APPLICATIONS**

**Term-End Examination**

**December, 2007**

**CS-62 : 'C' PROGRAMMING AND DATA  
STRUCTURE**

*Time : 2 hours*

*Maximum Marks : 60*

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**Note :** Question no. 1 is **compulsory**. Answer any **three** questions from the rest. All algorithms should be written nearer to 'C' language.

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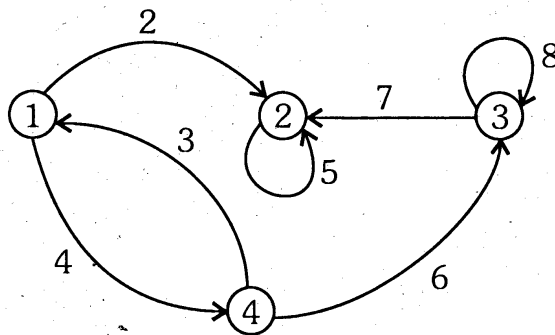
1. (a) Define an AVL tree. Construct a height balanced tree for the following list of elements :  
4, 6, 12, 8, 4, 2, 15, 7, 3 8
- (b) Write an algorithm to implement linked list using pointers and perform the following tasks : 10
- (i) Delete a node in the list, given a pointer to that node.
- (ii) Write a function to reverse the linked list.
- (c) Write an algorithm that reads  $m \times n$  matrix "A" and  $p \times q$  matrix "B", checks whether these matrices are multipliable in either order or not. (e.g. whether  $A \times B$  or  $B \times A$  is defined). Further, if  $A \times B$  or  $B \times A$  is defined then calculate the product.
- Note :** Show proper error handling also. 7

- (d) Calculate the time complexity of the following code by using Big 'O' notation : 5
1. Scanf ("%d", &n);
  2. Scanf ("%d", &m);
  3. for (i=0; i<=m+n; i+=2)
  4. Printf ("%d \n", i-1);
  5. for (j=m\*n/100; j<=m\*n; j++)
  6. Printf ("%d \n", j);
2. (a) Write an algorithm, that accepts 12 words of different string-size. Arrange the words in descending order based on the sum of ASCII values of the characters in the string.
- e.g. : If string is "ABFD", its ASCII mapping is 65, 66, 70, 68 respectively and sum is  
 $65 + 66 + 70 + 68 = 269$
- Hint :** ASCII value of 'A' starts with 65, and 'a' starts with 97. 6
- (b) Write an algorithm to implement bubble sort technique. Also, show the steps of bubble sort on the following given number : 4
- "5, 12, 38, 7, 3, 18, 68, 115"
3. (a) Construct the binary tree using the following preorder and inorder sequences : 5
- Preorder : A B C E I F J D G H K L  
Inorder : E I C F J B G D K H L A
- Also, write the postorder sequence of it.

(b) Write algorithms to perform the following operations in circular queue : 5

- (i) Create a circular queue
- (ii) Check whether a queue is empty
- (iii) Insert an element in a queue

4. (a) Consider the following graph :



Make the adjacency matrix for the given graph. Also, write an algorithm to compute the transpose of the matrix. 5

(b) What is a sparse matrix ? Which method is used to represent its non-zero elements ? Also, write the algorithm corresponding to this method, explaining its steps. 5

5. Explain the following with an example of each : 10

- (a) Direct file organisation
- (b) Depth first search
- (c) B-tree
- (d) Column major order