Code No: RR410110 **Set No. 1**

IV B.Tech I Semester Regular Examinations, November 2005
DATA STRUCTURES THROUGH C
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Write a C program to print the upper triangular of a given square matrix. [16]
2. Write an algorithm to perform each of the following operations to a linked list.
   (a) Form a list containing union of the elements of two lists.
   (b) Form a list containing the intersection of the elements of two lists. [8+8]
3. (a) Write a C Program to convert a postfix expression into infix expression.
   (b) Transform the following postfix expression to infix A B C + D E F - + using the above approach [8+8]
4. Explain how shall a queue be represented in C with different queue operations. [16]
5. (a) Write about different traversal methods of trees.
   (b) Write C function for creating empty tree and for insertion and deletion operations. [6+10]
6. (a) Write C program to create an empty graph, to enter graph information and to have output from the graph.
   (b) Write a C program to breadth first search of a graph. [8+8]
7. Write an algorithm for linear search and explain with a suitable example [16]
8. (a) Write an algorithm for selection sort
   (b) Sort the following numbers using selection sort and give the required steps. 96,31,27,42,34,76,61,10,4 [8+8]

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Code No: RR410110 **Set No. 2**

IV B.Tech I Semester Regular Examinations, November 2005
DATA STRUCTURES THROUGH C
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Write a C program to display the first two characters from each word of a given line , if exists. Ex: input: rama is a good boy output ra is go bo. [16]

2. (a) What is a linked list? What are the basic operations that are performed on a linked list. Explain with the help of an example.
   (b) What are the applications of linked lists? [10+4]

3. (a) Write a 'C' Program to convert a prefix string to infix string .
   (b) Consider the following arithmetic expression in prefix notation:
   $++A-^{*}\$BCD/+EF^{*}GHI$
   Find the equivalent infix form of the above. [8+8]

4. (a) Write and explain algorithms to insert and delete an element to and from a circular queue respectively.
   (b) Given the circular queue with front (F)=6 and Rear(R)=2, give the values of R and F after each operation in the sequence: insert, delete delete insert. [10+6]

5. (a) Write about different traversal methods of trees.
   (b) Write C function for creating empty tree and for insertion and deletion operations. [6+10]

6. What are different graph traversal methods. Explain them with neat sketches.[16]

7. Write an iterative function for binary search method and trace it. Give a suitable example. [16]

8. Write a C program to implement quicksort [16]

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Code No: RR410110 **Set No. 3**

IV B.Tech I Semester Regular Examinations, November 2005
DATA STRUCTURES THROUGH C
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Write a C program to find the saddle point of a given matrix (element which is maximum in a row and minimum in a column) [16]

2. Write an algorithm to perform each of the following operations to a linked list.
   (a) Return the sum of the integers in a list.
   (b) Return the number of elements in a list. [8+8]

3. (a) Derive a method to convert a postfix expression into its prefix form
   (b) Consider the following arithmetic expression in postfix notation: 7 5 2 + * 4 1 5 - / -
      i. Find the equivalent prefix form of the above .
      ii. Obtain the computed value of the expression from its postfix notation [8+4+4]

4. (a) Define queue. Explain how to represent queues in terms of arrays and linked lists
   (b) A queue is maintained in an array, and F and R are the front location and rear location of the queue respectively. Obtain a formula for N, the number of elements in the queue in terms of F and R.
   (c) Explain the difference between general queue and circular queue. [6+5+5]

5. Write a C program to show basic operations on a tree. [16]

6. (a) Write relative merits and demerits of different graph representations.
   (b) What is spanning tree? When is it called a minimum spanning tree? [8+8]

7. Write an algorithm for binary search and explain with a suitable example [16]

8. Write an algorithm for bubble sort and sort the following using bubble sort 85,12,108,27,91,4,72 [16]

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Code No: RR410110 **Set No. 4**

IV B.Tech I Semester Regular Examinations, November 2005
DATA STRUCTURES THROUGH C
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Write a program to find the sum of all digits in a given number. Repeat this operation successively until the result is a single digit. [16]

2. (a) Formulate an algorithm that will change the INFO field of the K th node of a linked list value given by Y.
   (b) Formulate an algorithm which will perform a deletion operation in a single linked list. [8+8]

3. (a) Define recursion. What are the properties of recursive definition .
   (b) Write a recursive definition of a + b , where a and b are nonnegative integers, in terms of the successor function succ , defined as

```
succ(x)
int x;
{

return (x++);
}
```

   (c) Write a recursive algorithm to compute the product of two non negative integers [3+7+6]

4. Write algorithms for various operations performed on queues and explain with a suitable example. [16]

5. Write a C program to show basic operations on a tree. [16]

6. (a) Write relative merits and demerits of different graph representations.
   (b) What is spanning tree? When is it called a minimum spanning tree? [8+8]

7. Write an iterative function for binary search method and trace it. Give a suitable example. [16]

8. (a) Compare and contrast the advantages of various sorting mechanisms
   (b) Explain the selection sort method for the elements 25,35,84,46,13,57,18,29. [8+8]

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