Code No: RR10203 **Set No. 1**

I B.Tech Supplementary Examinations, November/December 2005
C & DATA STRUCTURES
(Common to Electrical & Electronic Engineering, Electronics & Communication Engineering, Computer Science & Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Information Technology, Electronics & Control Engineering, Computer Science & Systems Engineering, Electronics & Telematics, Electronics & Computer Engineering, Instrumentation & Control Engineering and Bio-Technology)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Write a program to read the values of x, y and z and print the results of the following expressions in one line.
   a = $\frac{x+y+z}{x-y-z}$ b = $\frac{x+y+z}{3}$ c = (x+y)(x-y)(y-z)
   (b) Explain the following with general form and flowchart
      i. Simple IF statement.
      ii. IF. . . ELSE statement.
      iii. Nested IF. . . ELSE statement.
      iv. Switch statement. [8+8]

2. (a) In what way array is different from an ordinary variable?
   (b) What conditions must be satisfied by the entire elements of any given array?
   (c) What are subscripts? How are they written? What restrictions apply to the values that can be assigned to subscripts?
   (d) What advantage is there in defining an array size in terms of a symbolic constant rather than a fixed integer quantity?
   (e) Write a program to find the largest element in an array. [3+2+3+3+5]

3. (a) What is the use of struct keyword? Explain the use of dot operator? Give an example for each.
   (b) Write a C program to accept records of the different states using array of structures. The structure should contain char state, population, literary rate, and income. Display the state whose literary rate is highest and whose income is highest. [6+10]

4. Write a 'C' program to find number of words, blank spaces, special characters, digits and vowels of a given text using pointers. [16]

5. What is a data structure? Explain the various types of data structures with suitable example. [4+12]

6. Write routines to

(a) Insert element at n^{th} position

(b) Delete element at n^{th} position in a doubly linked list. [8+8]

7. (a) Prove that the total number of edges in a complete binary tree with n terminal nodes is 2(n-1).

(b) Give a brief note about different representations of binary tree. [8+8]

8. Write in detail about the following:

(a) Selection sort

(b) Heap sort [8+8]

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are different types of integer constants? What are long integer constants? How do these constants differ from ordinary integer constants? How can they be written and identified?
   (b) Describe two different ways that floating-point constants can be written in C. What special rules apply in each case?
   (c) What is a character constant? How do character constants differ from numeric-type constants? Do character constants represent numerical values? [6+4+6]

2. (a) Write a program to sort the set of strings in an alphabetical order?
   (b) How are multidimensional arrays defined? Compare with the manner in which one-dimensional arrays are defined. [10+6]

3. (a) When are array of structures are used? Declare a variable as array of structure and initialize it?
   (b) Write a C program to calculate student-wise total for three students using array of structure. [8+8]

4. (a) Distinguish between the following functions.
      i. Printf and fprintf.
      ii. eof and ferror.
   (b) Write a program to copy the contents of one file into another. [8+8]

5. What is a Queue? Explain the various operations performed on Queues with suitable algorithms. [4+12]

6. (a) What is the difference between linked list and an array?
   (b) Write a 'C' program to reverse the elements in a singly linked list. [8+8]

7. Explain the following graph traversal methods with suitable examples:
   (a) Depth first search
   (b) Breadth first search [8+8]

8. (a) Write and explain non-recursive algorithm for **binary search** with suitable example and discuss the various time complexities of binary search.

   (b) Suppose that the list contains the integers 1,2,8 in this order. Trace through the steps of **binary search** to determine what comparisons of keys are done in searching.

      i. To locate 3

      ii. To locate 4.5 [8+8]

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Code No: RR10203 **Set No. 3**

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What is the purpose of switch statement? How does this statement differ from the other statements?

   (b) An electric power distribution company charges its domestic consumers as follows:

Consumption Units		Rate of Charge
0-200		Rs. 0.50 per unit
201-400	Rs.100 plus Rs.0.65	per unit excess 200
401-600	Rs.230 plus Rs.0.80	per unit excess of 400.

   Write a C program that reads the customer number and power consumed and prints the amount to be paid by the customer. [8+8]

2. The annual examination is conducted for 50 students for three subjects. Write a program to read the data and determine the following:

   (a) Total marks obtained by each student.

   (b) The highest marks in each subject and the Roll No. of the student who secured it.

   (c) The student who obtained the highest total marks. [5+6+5]

3. (a) Write a C program to illustrate the comparison of structure variables.

   (b) What is the use of a structure? Given an example for a structure with initialized values. [8+8]

4. (a) How to use pointer variables in expressions? Explain through examples.

   (b) Write a 'C' Program to illustrate the use of pointers in arithmetic operations. [8+8]

5. Let a be an array of integers. Present recursive algorithms to compute

   (a) Maximum element of the array

   (b) The sum of elements of the array [8+8]

6. How can a polynomial in three variables (x,y and z) be represented by a singly linked list? Each node should represent a term and should contain the powers of x, y, and z as well as coefficient of that term. Write a C program to add two such polynomials. [16]

7. (a) Define graph. Explain the properties of a graph.
   (b) What is the difference between strongly connected graph and weakly connected graph? [8+8]

8. (a) Write and explain **linear search** procedure with a suitable example.
   (b) Formulate recursive algorithm for **binary search** with its timing analysis. [4+12]

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What is an expression? What kind of information is represented by an expression?
   (b) What is an operator? Describe several different types of operators that are included with in the C language with an example each. [8+8]

2. (a) In what way array is different from an ordinary variable?
   (b) What conditions must be satisfied by the entire elements of any given array?
   (c) What are subscripts? How are they written? What restrictions apply to the values that can be assigned to subscripts?
   (d) What advantage is there in defining an array size in terms of a symbolic constant rather than a fixed integer quantity?
   (e) Write a program to find the largest element in an array. [3+2+3+3+5]

3. (a) What is a structure? How is it declared? How it is initialized?
   (b) Define a structure to represent a data. Use your structures that accept two different dates in the format mmdd of the same year. And do the following: Write a C program to display the month names of both dates. [6+10]

4. (a) What is a pointer? List out the reasons for using pointers.
   (b) Write a C Program to illustrate the use of indirection operator "*" to access the value pointed by a pointer. [8+8]

5. Declare a queue of integers. Write functions
   (a) To insert an element in to queue
   (b) To delete an element from queue [8+8]

6. What is Circular doubly linked list? Explain the various operations on Circular doubly linked lists with suitable algorithms. [4+12]

7. Give the **storage representation** of following list using adjacency matrix and list structure.

(a) (a,(b,(c,d)),e,f)

(b) ((x),y,A,z) where A= (a,b,(c,d)) [8+8]

8. (a) Explain **Quick sort** with algorithm.

(b) Analyse the worst case performance of **Quick sort** and compare with **Selection sort**. [8+8]

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