

B.E/TECH DEGREE END SEMESTER EXAMINATIONS, May/June 2012
SECOND SEMESTER – (REGULATIONS 2008)
Computer Science and Engineering/ Information Technology
CS9151 Programming and Data Structures I

8

Time: Three hours

Maximum: 100 marks

Answer ALL Questions.

Part – A (10*2 = 20)

1. Why is function declaration statement placed prior to function definition?
2. What is a Macro definition? Write a C code to print the cube of a given number using Macro definition.
3. What is the difference between structure and a union?
4. What is a NULL pointer? Is it same as an uninitialized pointer?
5. What is an ADT?
6. What is the data structure used to perform recursion?
7. Clearly distinguish between linked lists and arrays. Mention their relative advantages and disadvantages.
8. Define depth and height of a tree.
9. How are collisions handled while hashing?
10. Discuss the efficiency in terms of the number of comparisons in Quick sort.

Part B – (16*5 =80)

- 11 a) i) Explain the various control structures and the different control statements used in 'C' with an example code for each. (10)
- 11 a) ii) Differentiate between call by value and call by reference using suitable example. (6)
- 12 a) i) Write a C program that reads several different names and addresses into the computer, rearranges the names into alphabetical order, and then writes out the alphabetized list. Make use of structure variables within the program. (10)
- 12 a) ii) Differentiate Array of Pointers and Pointer to an Array with suitable example and syntax. (6)

(OR)

- 12 b) i) Write a C program to copy the contents of one file into another. (10)
- 12 b) ii) How can the *getchar()* function be used to read multicharacter strings? (6)

13 a) i) Formulate an algorithm to perform an insertion in a singly linked list in an increasing order of their INFO field. (10)

13 a) ii) A circular queue has a size of 5 and has 3 elements 10, 20 and 40 where $F=2$ and $R=4$. After inserting 50 and 60, what is the value of F and R. Trying to insert 30 at this stage what happens. Delete 2 elements from the queue and insert 70, 80 & 90. Show the sequence of steps with necessary diagrams with the value of F & R. (6)

(OR)

13 b) i) Formulate an ADT to implement cursor with the following routines
InitializeCursor(), CursorAlloc(), CursorFree(), InsertMid(), Delete(). (10)

13 b) ii) Simulate using Stack to convert the infix expression to postfix expression
 $A * (B + D) / E - F * (G + H / K)$ (6)

14 a) i) Formulate an algorithm for performing insertion and deletion in a binary search tree. (10)

14 a) ii) Make a BST for the following sequence of numbers.
45, 36, 76, 23, 89, 115, 98, 39, 41, 56, 69, 48
Traverse the tree in Preorder, Inorder and Postorder. (6)

(OR)

14 b) i) Formulate an algorithm to implement open addressing hash table with operations,
InitializeTable(), Insert(), Delete() and Find(). (10)

14 b) ii) Consider inserting the keys 10, 22, 31, 4, 15, 28, 17, 88, 59 into a hash table of length $m = 11$ using open addressing with the primary hash function $h'(k) = k \bmod m$. Illustrate the result of inserting these keys using linear probing, using quadratic and using double hashing with $h_2(k) = 1 + (k \bmod (m - 1))$. (6)

15 a) i) Write the algorithm to sort using Mergesort. (10)

15 a) ii) Show how Heap sort processes the input 15, 75, 10, 80, 21, 35, 23, 8, 12, 7. (6)

(OR)

15 b) i) Sort the data 81, 94, 11, 96, 12, 35, 17, 99, 28, 58, 41, 75, 15 using external sorting algorithms. Show the steps to generate extended initial runs using Replacement Selection strategy. (10)

15 b) ii) Write the algorithm for Shell sort. (6)