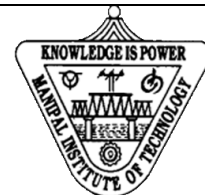




MANIPAL INSTITUTE OF TECHNOLOGY
 (Constituent Institute of Manipal University)
 MANIPAL-576104



III SEMESTER B.TECH.(COMPUTER SCIENCE AND ENGINEERING) DEGREE
END-SEMESTER EXAMINATION-DECEMBER 2014
SUBJECT: DATA STRUCTURES USING C (CSE 205)
DATE: 1-12-2014

TIME: 3 HOURS

MAX.MARKS: 50

Instructions to Candidates

- **Note:** Answer any **FIVE** full questions.

1.A. Write a recursive **function** to multiply two numbers using repeated addition. Find the space complexity of the code.

1.B. What is the difference between `int(*a)[5]` and `int *a[5]`. Show with a relevant diagram.

1.C. Compare **calloc** and **realloc** functions. Give their relevant prototype.

1D. Explain enum keyword with syntax and examples. Write a code to display day of the week (in string format) given the input information of day in integer format.
 (4+2+2+2)

2.A. Show the importance of queues in level order traversal. Write relevant **functions** associated with **queues** to implement this.

2.B. An array is divided into n stacks. Write the **functions** to check for stack full and stack empty in the case of multiple stacks. Show the initializations required to implement the stack.

2.C. Show the tabular representation of the stack contents during the conversion from infix to postfix for the given expression $a*(b+c)*d$
 (3+3+4)

3.A. Write a **recursive function** EQUALITY which takes the addresses of the header node of two circular singly linked list as its parameter. This function checks if the individual elements of the two linked list are equal and returns its status. Linked list can be of any size.

3.B. Write a **function** to reverse a singly linked list without creating a new list and returns the address of the beginning of the reversed list. Only the links are to be changed.

3.C. Generate an AVL tree when the inputs are received in the order 15,25,17,11,8,12. Specify the type of rotation if any, with each insertion.
 (3+3+4)

4.A. Draw the expression tree for the expression $9-2*6/5*4+8$.

Construct the BST diagram taking input values in the range 0 to 10. The tree should resemble the **shape** of the expression tree as constructed from the above expression but values in the node will be in the range 0 to 10.

4.B. Write a **function** which returns the number of leaf nodes in a tree. The function takes address of the root of the tree and a counter for the number of leaves as the functional parameter.

4C. Write a **function** which copies the data value of one tree to another. The parameter to the function is the address of the root of the original tree. The function returns the address of the copied tree. (4+3+3)

5.A. Write an algorithm to construct the minimum cost spanning tree using Prim's algorithm. For the Figure. Q.5A find the minimum cost spanning tree starting from vertex 4. If conflict exists in the choice of vertex use them in the increasing numerical order.

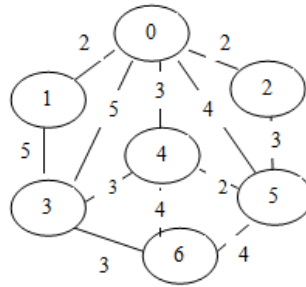


Fig. Q. 5A

5.B. For the diagram shown in the figure Q.5A, find the transitive closure. Show how this is carried out by writing a code. (5+5)

6.A. What are the two main strategies to handle collision? Explain.

6.B. Write a complete code to find an element using **recursive** binary search.

6.C. Sort the following elements using heap sort.

12, 4, 67, 23, 98, 1

(3+3+4)