Roll No. | | | | | | | | |

B.E / B.Tech (Full Time) DEGREE ARREAR END SEMESTER EXAMINATIONS, APR / MAY 2014

INFORMATION TECHNOLOGY
III Semester

IT8303 Programming & Data Structures II
(Regulation 2012)

Time : 3 Hours | Answer ALL Questions | Max. Marks 100

PART- A (10 x 2 = 20 Marks)

1. How *new* operator differs from *malloc*?
2. What is the significance of Scope resolution operator?
3. List out the operators that could not be overloaded as a friend.
4. What is the output of this program?

```
#include <iostream>
#include <string>
using namespace std;
int main ()
{
   string str ("I like to code in C");
   unsigned sz = str.size();
   str.resize (sz + 2, '+');
   str.resize (14);
   cout << str << '\n';
   return 0;
}
```

5. What is terminate() function in exceptions? Why do we need it?
6. How can we extend a namespace which is already defined?
7. What is a Disjoint Set?
8. Construct a Binomial Heap for the following numbers:

10 50 23 14 57 26 34 28 12 17

9. Write a recursive procedure for Depth First Search.
10. How do you represent a graph using Adjacency list?

Part – B (5x16=80 marks)

11. i) Write a C++ program to represent a Vector using classes. Include member functions to perform the following tasks:

    a. To create a Vector b. To multiply it by a Scalar c. Display of Vector.

(8)

ii) Create a Class named 'MATRIX' of size m*n. Define a friend function to find the transpose of MATRIX. (8)

12. a) i) What is RTTI? Where do we require? Explain the significance of it with few cases. (6)

ii) Write a C++ program to develop a polynomial class consisting of a coefficient and an exponent part. Overload an assignment operator to assign one polynomial to another using friend function. (10)

(OR)

b) i) Create a class named **employee** with data members **first name**, **last name** and member functions: **earnings** (Pure Virtual function) and **Print**(Virtual function). Derive a class called boss from employee and its data member is **weekly salary** and member function: **set_weekly_salary**. Calculate and print the earnings appropriately. (10)

ii) How is protected access specifier different from other access specifiers while inheriting a class? Explain with an example. (6)

13. a) i) Write a C++ program that uses a Stack object to determine whether a String is palindrome or not using Class Templates. (8)

ii) Write a C++ program to read a text file and count & display the total number of alphabets and numbers present in it. (8)

(OR)

b) i) Create a **List1** consisting of even numbers and a **List2** with odd numbers. Sort both of the lists appropriately and Merge two sequences of numbers to produce **List3** and display the values of List3. (Make use of the LIST header file from STL). (8)

ii) Write a C++ program to calculate the current age of a person by accepting his date of birth. Raise an exception if the age is negative. (8)

14. a) i) Show the result of inserting the following keys into an initially empty Red-Black Tree: 85, 15, 70, 60, 30, 50, 110, 40. Further delete the keys 60, 30, 15 from the above. (6+4)

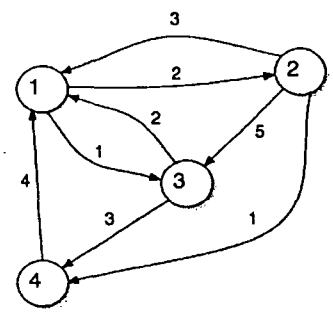
ii) Explain the various types of Amortized analysis in detail. (6)

(OR)

b) i) Simulate the result of inserting the following keys into an initially empty B-Tree: I,J,K,C,V,G,M,R,N,A,B,X,Y,P,D,Z,L,H,Q,S,F,E with minimum order 5. Further delete the keys F, M, G, R from it. (8)

ii) Write a suitable routine to insert nodes into an AVL tree with appropriate rotations. (8)

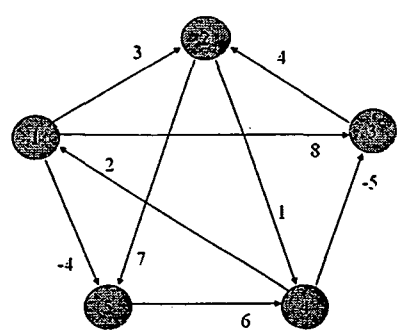
15. a) i) Compute All-Pair shortest path for the following graph using Floyd-Warshall algorithm (10)



ii) How do you construct a minimum spanning tree using Kruskal's algorithm. Explain with an example. (6)

(OR)

b) i) Write Bellman Ford algorithm and compute shortest path for the following graph using it. (Assume Vertex 1 as the source node) (10)



ii) Write a suitable algorithm to sort the edges of a graph using Topological Sort. Also show the simulation of the above algorithm with an example. (6)

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