ITU Computer Engineering Department
BLG252E Object Oriented Programming
3rd Homework

Due Date: May 19, 2013 23:00

In this homework, you will implement **an Arithmetic Vector class inherited from the vector class** in the standart template library. On this inherited class, some arithmetic operations can be applied. Some rules must be taken into consideration and if the given rules are not met, error messages must be thrown.

- To sum two vector objects, their sizes must be equal.
- To divide two vector objects, their sizes must be equal and the divisor vector should not include any elements which is 0.
- You can simply apply divide operator as (Assume two vectors with the size of 3);

  $a_1 a_2 a_3$ $b_1 b_2 b_3$ a_1/b_1 a_2/b_2 a_3/b_3
- A vector object cannot be compared or assigned to another object if their sizes are different.
- "Index out of bounds" message should be printed if one tries to access vector with the non-existing index values.

A test program is given below. It illustrates the usage of all the methods and operators you will implement. Your implementation must be compatible with this test program.

```
#include <iostream>
#include <cstdlib>
#include <ctime>
#include "ArithmeticVector.h"
using namespace std;
int main() {
    srand(time(NULL));
    ArithmeticVector<int> v1(3); // creating some objects
    ArithmeticVector<int> v2(3); // vector elements are assigned randomly
from 0 to 10
    ArithmeticVector<double> v3(5);
    ArithmeticVector<double> v4(5);
    try {
        // trying to get the element at(4)
        // should give an error
        cout << v1[4] << endl;
    } catch (const string & err_msg) {
        cout << err_msg << endl;
    }
    cout << "Printing v4" << endl;
    v4.print();
    try {
        // trying to divide two vectors
        ArithmeticVector<double> v6 = v4 / v3;
        cout << "Printing v6" << endl;
        v6.print();
    }
```

```
    catch (const string & err_msg) {
        cout << err_msg << endl;
    }
    if (v1.contains(4))
        // checking if the Vector has an element with value 4
        cout << "Vector contains the element" << endl;
    else
        cout << "Vector does not contain the element" << endl;
    ArithmeticVector<int> v5 = v2;
    cout << "Printing v5" << endl;
    v5.print();
    try {
        v1 = v2 + v5; // sum v2 and v5 vectors and assign result to v1
        --v1; // decrement v1's vector elements by 1
        v5 = v2 / v1; // divide v2 and v1 vectors and assign result to v5
        ++v5; // increment v5's vector elements by 1
        if (v5 == v1) // comparing two vectors
            cout << "Objects are equal" << endl;
        else
            cout << "Objects are not equal" << endl;
    } catch (const string & err_msg) {
        cout << err_msg << endl;
    }
    cout << "Printing v1" << endl;
    v1.print();
    cout << "Printing v5" << endl;
    v5.print();
}
```

Note: If you face with an anomaly with the assignment or given test program, contact me (responsible research assistant from this assignment) as soon as possible via e-mail (kocca@itu.edu.tr) or in person (Res. Lab. 3).

Submission Procedure:

1. Your source code should be named as “ArithmeticVector.cpp” and “ArithmeticVector.h”
2. Make sure you write your name and number to all the header files of your project with the following format.

```
/*
* @Author
* Student Name: !! enter here !!
* Student ID : !! enter here !!
* Date:
*/
```

3. Make sure that GNU C++ Compiler (g++) compiles your project and the application runs in Unix smoothly. This is important because we will evaluate your homework in Unix using g++.
4. Use comments wherever necessary in your code to explain what you did.
5. After you make sure that everything is compiled smoothly, archive all files into a zip file. Submit this file through www.ninova.itu.edu.tr. Ninova enables you to change your submission before the submission deadline.

Academic dishonesty including but not limited to cheating, plagiarism, collaboration is unacceptable and subject to disciplinary actions. Any student found guilty will get grade F.