NATIONAL UNIVERSITY
of Computer & Emerging Sciences, Lahore

Assignment 02-B

Operator Overloading

Deadline: Monday, 29 Oct, 2018

Submit your work on :

\\sandata\Xeon\Fall 2018\Bismillah Jan\Computer Programming\Assignment_02B_Submissions

Objectives: In this assignment you will learn operator overloading

Deliverables: You will only submit **one .CPP**, only recent updated file will be accepted.

Total Marks: 20 **Weightage: 02**

Question:

You need to implement the following class in your assignment

```
Class VectorType
{
private:
//necessary variables of type pointers and dynamic arrays if needed
     double * x;
     double * y;
     double * z;

public:
//Consider U and V are two objects/Vectors of type VectorType. Now implement the following operations
```

1. **[1]** Default and parameterized constructor
2. **[1]** Copy Constructor
3. **[1]** Destructor to de-allocate dynamic memories
4. **[1]** Overloaded assignment operator
5. **[2]** Function to find the dot product of two vectors
   a. For this you will need to overload * operator
      Dot product between U and V can be determine by the following mathematical formula

$$U*V=(U.x*V.x)+(U.y*V.y)+(U.z*U.y)$$

6. **[1]** Function to find length of a vector
   a. Length V can be determine by the following mathematical formula

$$Len\,V=\sqrt{x^2+y^2+z^2}$$

7. **[3]** Function to find angle between two vectors V and U

a. Angle can be determine by using the following formula

$$Theta = \cos^{-1}\left(\frac{U * V}{Len\,U^{Len}\,V}\right)$$

Where ^ operator is the overloaded multiplication operator that takes two vectors of type **VectorType** and return the multiplication of their lengths. Do not use "Len V" function here, you are required to overload the operator ^ so that it returns the product of the length of two vectors U and V.

8. **[2]** Addition, subtraction overloaded operators for vectors
9. **[4]** Overload pre and post increment and decrement operators (++ and --)
10. **[4]** Overloaded ==, !=, >> and << operator as non-member function(friend).

};

Best of luck ☺