

Object Oriented Programming

Make the class for Vector3D, and the following functionalities Should be added.

With attributes

X, Y, Z all real values possible.

With following functionalities

1. CONSTRUCTOR
 - a. Default constructor (0,0,0)
 - b. With values passed
2. Destructor
 - a. Message (i am destroyed...)
3. Vector Magnitude
4. Unit Vector(this should force them that all components of the three axis should be floating values)
5. Vector Add
6. Vector Subtract
7. Vector(cross) product
8. Scalar(dot) product
9. Projection Vector: like if you have A and B two vectors then A_b means

$$A_b = ((A \cdot \hat{B}) \hat{B})$$

10. UnitXVector/UnitYVectoe/UnitZVector... They should be static public functions
11. AREA-PARALLELOGRAM - IF you are given two position vectors of two sides you can measure that parallelogram's area. P
12. Area Triangle it is basically 1/2 of the part 9.

```

#include <stdio.h>
#include<iostream>
#include<fstream>
using namespace std;

// Header file
#pragma once

class Vector3D
{
    double x, y, z;
public:
    Vector3D(double tx = 0, double ty=0, double tz = 0);
    ~Vector3D();
    double Magnitude();           // sqrt(x*x + y*y + z*z)
    Vector3D UnitVector();        // x /mag , y/mag , z/mag
    Vector3D Add(Vector3D V);     // this->x + V->
    Vector3D Subtract(Vector3D V);
    Vector3D CrossProduct(Vector3D V);
                                // https://en.wikipedia.org/wiki/Cross_product
    double DotProduct(Vector3D V);
                                // https://en.wikipedia.org/wiki/Dot_product
    static Vector3D UnitX(); // return (1,0,0)
    static Vector3D UnitY(); // return (0,1,0)
    static Vector3D UnitZ(); // return (0,0,1)
    Vector3D ProjectionAtV(Vector3D V);

    // For area of parallelogram and triangle
                                //https://math.etsu.edu/multicalc/prealpha/chap1/chap1-3/part3.htm
    double Area_Parrallelogram(Vector3D V);
    double Area_Traingle(Vector3D V);
};

```

```
int main()
{
    Vector 3D * Vs;
    ifstream Rdr("Vs.txt");

    LoadAllVs(Vs, Rdr);
}
```

Write the main function which should act as a calculator (just like we did for the menu show for complex number/ fractions and compound fractions).

```
5
2 3 5
4 5 6
7 8 9
1 2 3
3 2 1
```