CS151 Spring 2020

HW 6

3d vectors

Three dimensional vector can be represented as a triple (x, y, z), where x, y, z are real numbers.

The operations to add, subtract and multiply two vectors are defined as follows:

Addition: (x1, y1, z1) + (x2, y2, z2) = (x1 + x2, y1 + y2, z1 + z2)

Subtraction: (x1, y1, z1) - (x2, y2, z2) = (x1 - x2, y1 - y2, z1 - z2)

Design an application with two classes.

Class Vector3d has three member double variables x, y, and z.

It has two constructors.

The first one accepts three double parameters which are used to initialize x, y, and z.

The second one does not take any parameter and initializes x, y, and z to 0.

The following two methods can add, subtract, or multiply the vector with the vector other that is in the parameter list.

public Vector3d add(Vector3d other)

public Vector3d subtract(Vector3d other)

Class Vector3d has also toString method that returns string representation of 3dvector

x = …, y = …, z = …

Class Vector3dTester has main method. Instantiate four 3d vectors v1=(1,2,3), and v2=(3,-1,2), v3, and v4 (v3 and v4 initial values will be your choice). Apply all two operations on v1 and v2 and display result using toString method.

Do the same for v3 and v4.

**(Look at RationalNumbers class form the textbook chapter 7)**

public class Vector3d

{

private double x, y, z;

public Vector3d()

{

// set x, y, z to 0.

}

public Vector3d(double x, double y, double z)

{

// assign x, y, z values

}

public Vector3d subtract(Vector3d other)

{

// return new Vector3d( … );

}

public Vector3d add(Vector3d other)

{

// return new Vector3d( … )

}

public String toString()

{

// return “x = “ + …

}

}

public class Vector3dTester

{

public static void main(String[] args)

{

Vector3d v1 = new Vector3d(1, 2, 3);

Vector3d v2 = new Vector3d(3, -1, 2);

// Vector3d v3 = new Vector3d ...

// Vector3d v4 = new Vector3d ...

System.out.println(v1.add(v2));

// three more lines

}

}