TITLE PAGE

Course: CS1073

Section: FR03B

Assignment number: 3

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A)

```java
import java.util.Scanner;

/**
 This is a class for determining people's
 eligibility to apply for a Peer Mentor Position.
 @author Zohaib Khan 3740572
*/

public class Peer {
    public static void main (String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Please answer the following questions with
                            either a yes or a no.");

        System.out.println("Are you an undergrad student?");
        String input1 = sc.nextLine();

        if (input1.equals("yes")) {
            System.out.println("Will you be on a study term?");
            String input2 = sc.nextLine();

            if (input2.equals("yes")) {
                System.out.println("Is you GPA at least 2.7?");
                String input3 = sc.nextLine();

                if (input3.equals("yes")) {
                    System.out.println("You should apply!");
                }
                else if (input3.equals("no")) {
                    System.out.println("Sorry, you cannot apply");
                }
                else {
                    System.out.println("Invalid input");
                }

            }
            else if (input2.equals("no")) {
                System.out.println("Sorry, you cannot apply");
            }
            else {
                System.out.println("Invalid input");
            }

        }
        else if (input1.equals("no")) {
            System.out.println("Are you a grad student?");
            String input2 = sc.nextLine();
```

```java
        if (input2.equals("yes")) {
            System.out.println("Do you have your supervisor's
                              permission?");

            String input3 = sc.nextLine();

            if (input3.equals("yes")) {
               System.out.println("You should apply!");
            }
            else if (input3.equals("no")) {
               System.out.println("Sorry, you cannot apply");
            }
            else{
               System.out.println("Invalid input");
            }

        }
        else if (input2.equals("no")) {
           System.out.println("Sorry, you cannot apply");
        }
        else{
           System.out.println("Invalid input");
        }

    }
    else {
       System.out.println("Invalid input");
    }
  }
}
```

B)

```
[zohaib@Zohaibs-MacBook-Pro assign3 % javac Peer.java
[zohaib@Zohaibs-MacBook-Pro assign3 % java Peer
Please answer the following questions with either a yes or a no.
Are you an undergrad student?
Yes
Invalid input
[zohaib@Zohaibs-MacBook-Pro assign3 % java Peer
Please answer the following questions with either a yes or a no.
Are you an undergrad student?
yes
Will you be on a study term?
yes
Is you GPA at least 2.7?
yes
You should apply!
[zohaib@Zohaibs-MacBook-Pro assign3 % java Peer
Please answer the following questions with either a yes or a no.
Are you an undergrad student?
no
Are you a grad student?
no
Sorry, you cannot apply
[zohaib@Zohaibs-MacBook-Pro assign3 % java Peer
Please answer the following questions with either a yes or a no.
Are you an undergrad student?
no
Are you a grad student?
yes
Do you have your supervisor's permission?
yes
You should apply!
zohaib@Zohaibs-MacBook-Pro assign3 % ▌
```

C)

```java
/**
 This class represents a triangle shape using 3 points.
 @author Natalie Webber
 @author Zohaib Khan 3740572
*/
public class Triangle {

   private CartesianPoint pointA;
   private CartesianPoint pointB;
   private CartesianPoint pointC;

   public Triangle (double x1, double y1,
                    double x2, double y2,
                    double x3, double y3) {
      pointA = new CartesianPoint (x1, y1);
      pointB = new CartesianPoint (x2, y2);
      pointC = new CartesianPoint (x3, y3);
   }

   public Triangle (CartesianPoint p1,
                    CartesianPoint p2,
                    CartesianPoint p3) {
      pointA = p1;
      pointB = p2;
      pointC = p3;
   }

   public double getPerimeter () {
      return pointA.distance(pointB)
          + pointB.distance(pointC)
          + pointC.distance(pointA);
   }

   /**
    This method tells if the triangle is equilateral triangle or not.
    @return true if the triangle is an equilateral triangle, false
    otherwise.
   */
   public boolean isEquilateral () {

      double ab = pointA.distance(pointB);
      double bc = pointB.distance(pointC);
      double ac = pointA.distance(pointC);

      // Setting the tolerance to compare floating point numbers for
         equality.
      double TOLERANCE = 1E-13;
```

```java
        if ((Math.abs(ab-ac) < TOLERANCE) &&
                (Math.abs(ab-bc) < TOLERANCE)) {
            return true;
        }
        else {
            return false;
        }

    }

    /**
     This method tells if the triangle is a right-angle triangle or
     not.
     @return true if the triangle is a right-angle triangle, false
     otherwise.
     */

    public boolean isRight () {

        double ab = pointA.distance(pointB);
        double bc = pointB.distance(pointC);
        double ac = pointA.distance(pointC);

        // Setting the tolerance to compare floating point numbers for
            equality.
        double TOLERANCE = 1E-13;

        if ((Math.abs(ab*ab + ac*ac - bc*bc) < TOLERANCE) ||

            (Math.abs(ab*ab + bc*bc - ac*ac) < TOLERANCE) ||

            (Math.abs(ac*ac + bc*bc - ab*ab) < TOLERANCE)) {

            return true;
        }
        else {
            return false;
        }

    }

}
```

D)

```java
/**
 This is a driver class for the triangle class.
 @author Zohaib Khan 3740572
*/
public class TriangleTest {
    public static void main (String[] args) {

        // Creating two instances of triangle class.
        Triangle t1 = new Triangle (-0.5, 0.0, 0.5, 0.0, 0.0,
                                        Math.sqrt(3)/2);
        Triangle t2 = new Triangle (0.0, 0.0, 8.0, 0.0, 0.0, 8.0);

        // Calling both methods on t1.
        if (t1.isEquilateral() == true) {
            System.out.println("The triangle t1 is an equilateral
                                triangle.\n");
        }
        else {
            System.out.println("The triangle t1 is not an equilateral
                                triangle.\n");
        }

        if(t1.isRight() == true) {
            System.out.println("The triangle t1 is a right-angle
                                triangle.\n");
        }
        else {
            System.out.println("The triangle t1 is not a right-angle
                                triangle.\n");
        }

        // Calling both methods on t2.
        if (t2.isEquilateral() == true) {
            System.out.println("The triangle t2 is an equilateral
                                triangle.\n");
        }
        else {
            System.out.println("The triangle t2 is not an equilateral
                                triangle.\n");
        }

        if(t2.isRight() == true) {
            System.out.println("The triangle t2 is a right-angle
                                triangle.\n");
        }
        else {
            System.out.println("The triangle t2 is not a right-angle
                                triangle.\n");
        }
    }
}
```

E)

The triangle t1 is an equilateral triangle.

The triangle t1 is not a right-angle triangle.

The triangle t2 is not an equilateral triangle.

The triangle t2 is a right-angle triangle.