جامعة عفت

EFFAT UNIVERSITY

CS2132-2

OOP - Spring2022

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Contents

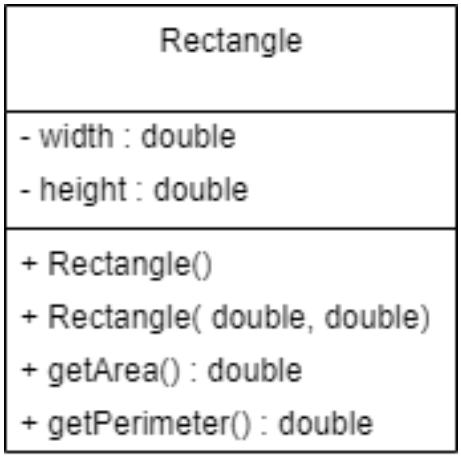
1 Objectives

- Draw the UML diagram for classes.
- Implement classes that contains attributes, constructors, and methods.
- Using classes to create objects.

2 Questions

2.1 Question 1

- UML



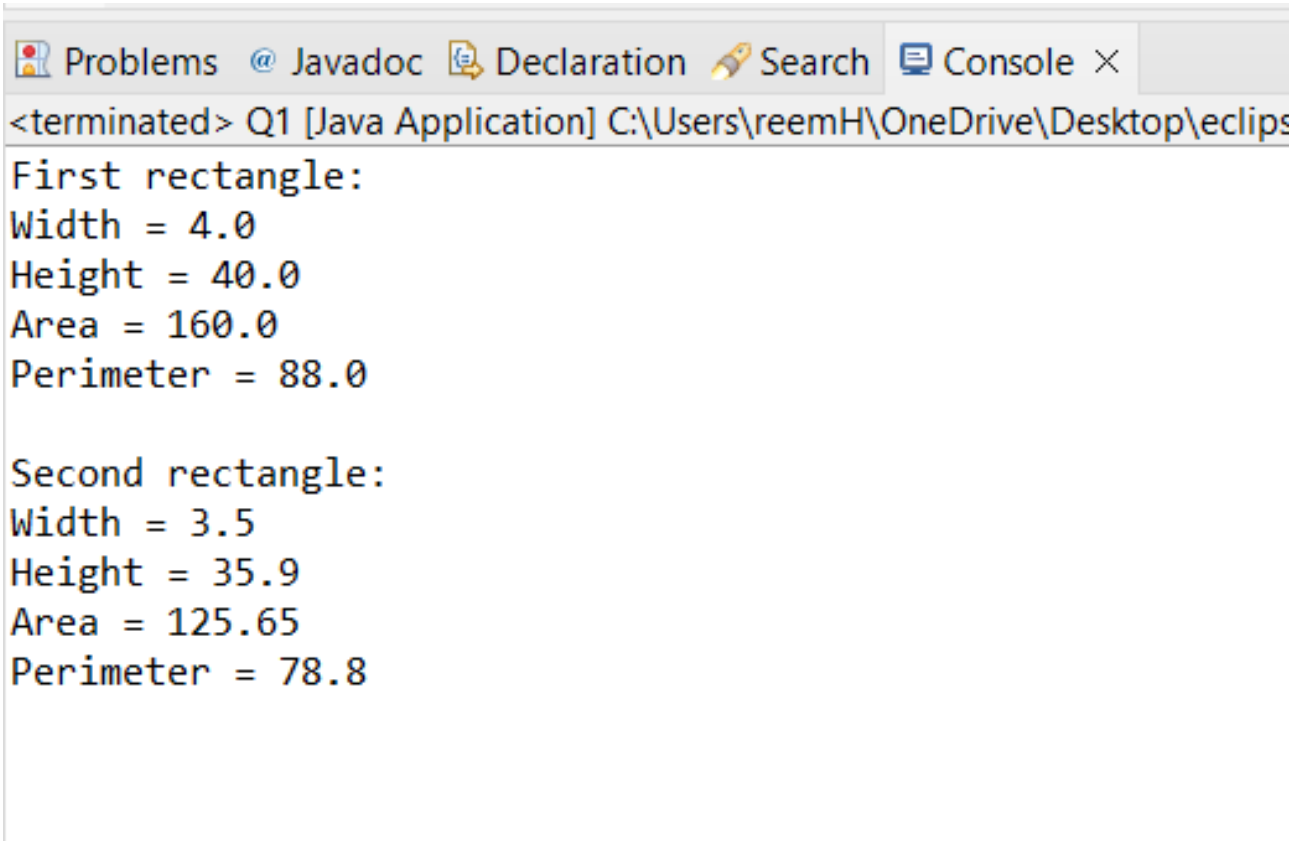
- Rectangle Class

```
public class Rectangle
{
   double width;
   double height;
   public Rectangle()
   {
      width = 1;
      height = 1;
   }
   public Rectangle(double w, double h)
   {
      width = w;
      height = h;
   }
   public double getArea()
   {
      return width * height;
   }
   public double getPerimeter()
   {
      return 2*(width + height);
   }
}
```

- The main function

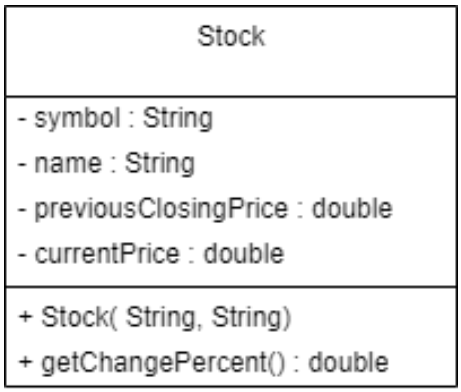
```
public class Q1
{
   public static void main(String args[])
   {
      Rectangle r1 = new Rectangle(4, 40);
      Rectangle r2 = new Rectangle(3.5, 35.9);
      System.out.println("First rectangle:" + "\nWidth = " + r1.width + "\nHeight = " + r1.height
            + "\nArea = " + r1.getArea() + "\nPerimeter = " + r1.getPerimeter()
            + "\n\nSecond rectangle:" + "\nWidth = " + r2.width + "\nHeight = " + r2.height);
      System.out.printf("Area = %.2f" , r2.getArea());
      System.out.println("\nPerimeter = " + r2.getPerimeter());

   }
}
```

- Output



2.2 Question 2

- UML



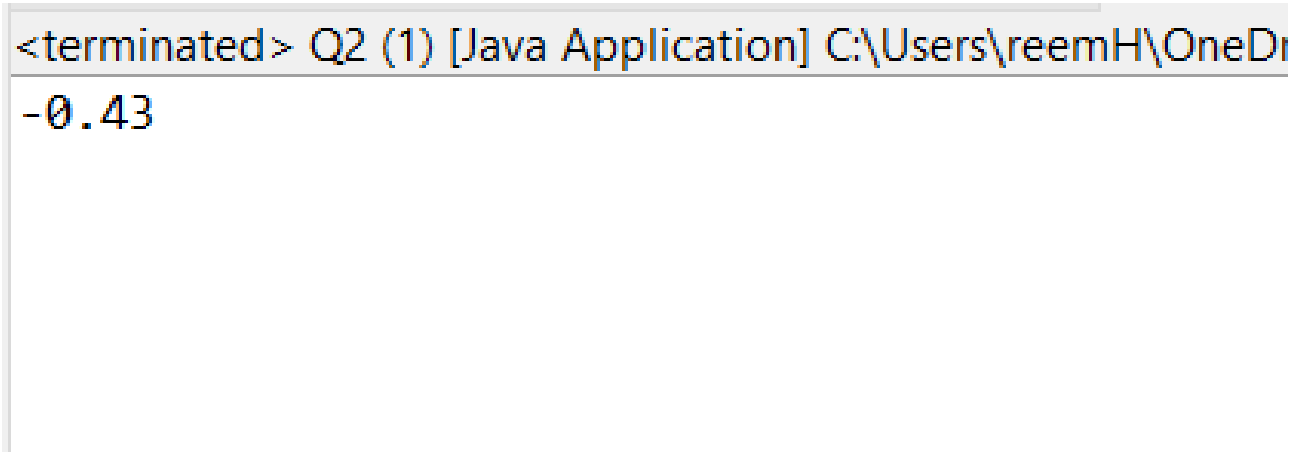
- Stock Class

```
public class Stock
{
   String symbol;
   String name;
   double previousClosingPrice;
   double currentPrice;
   public Stock(String s, String n)
   {
      symbol = s;
      name = n;
   }
   public double getChangePercent()
   {
      // rate of change = (x2-x1)/x1
      return ((currentPrice - previousClosingPrice)/previousClosingPrice)*100;
   }
}
```

- The main function

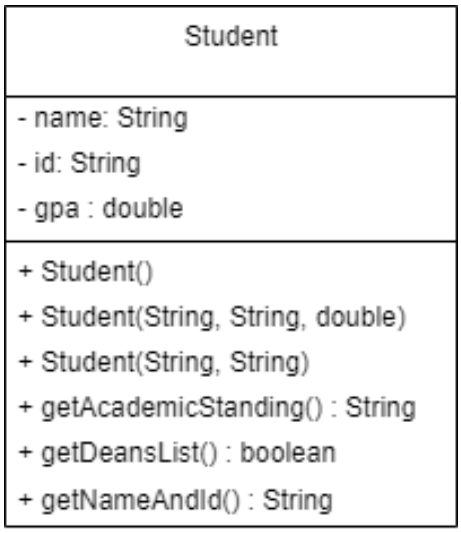
```
public class Q2
{
   public static void main(String args[])
   {
      Stock s = new Stock("ORCL", "Oracle Corporation");
      s.previousClosingPrice = 34.5;
      s.currentPrice = 34.35;
      System.out.printf("%.2f",s.getChangePercent());
   }
}
```

- Output



2.3 Question 3

- UML



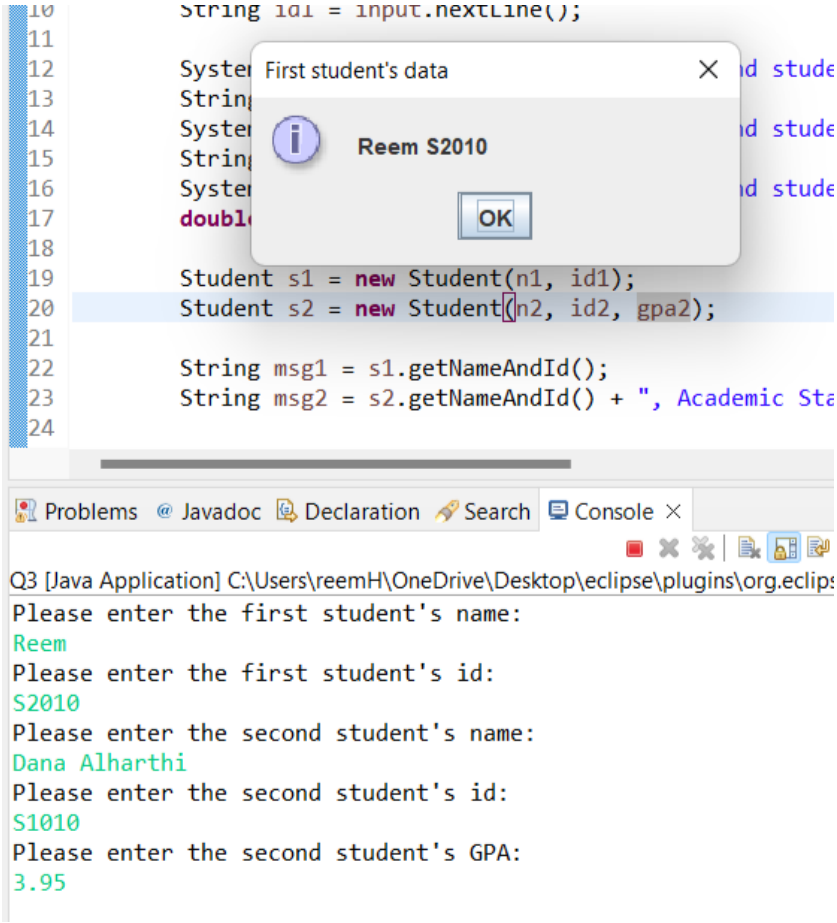
- Student Class

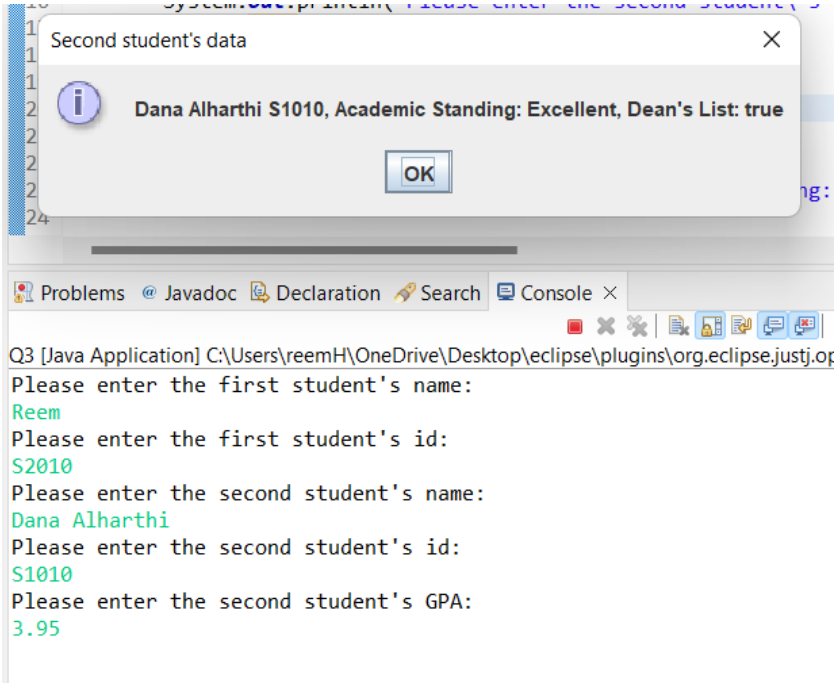
```
public class Student
{
   // three attributes
   String name;
   String id;
   double gpa;
   // constructor 1: default
   public Student()
   {
      name = null;
      id = null;
      gpa = 0;
   }
   // constructor 2: overloaded with 3 parameters (all attributes)
   public Student(String n, String i, double g)
   {
      name = n;
      id = i;
      gpa = g;
   }
   // constructor 3: overloaded with only 2 parameters
   public Student(String n, String i)
   {
      name = n;
      id = i;
   }
   // 3 methods
   public String getAcademicStanding()
   {
      String standing = null;
      if (gpa >= 3)
         standing = "Excellent";
      else if (gpa < 3 && gpa >= 2)
         standing = "Good";
      else if (gpa < 2 && gpa >= 0.99)
         standing = "Risky";
      else if (gpa < 0.99 && gpa >= 0)
         standing = "Fail";
      return standing;
   }
   public boolean getDeansList()
   {
      boolean deansList = false;
      if (gpa >= 3)
         deansList = true;
      return deansList;
   }
   public String getNameAndId()
   {
      return name+" "+id;
   }
}
```

- The main function

```
import javax.swing.JOptionPane;
public class Q3 {
   public static void main(String args[])
   {
      java.util.Scanner input = new java.util.Scanner(System.in);

      System.out.println("Please enter the first student\'s name: ");
       String n1 = input.nextLine();
      System.out.println("Please enter the first student\'s id: ");
       String id1 = input.nextLine();

      System.out.println("Please enter the second student\'s name: ");
       String n2 = input.nextLine();
      System.out.println("Please enter the second student\'s id: ");
       String id2 = input.nextLine();
      System.out.println("Please enter the second student\'s GPA: ");
       double gpa2 = input.nextDouble();

      Student s1 = new Student(n1, id1);
      Student s2 = new Student(n2, id2, gpa2);

      String msg1 = s1.getNameAndId();
      String msg2 = s2.getNameAndId() + ", Academic Standing: " + s2.getAcademicStanding() + ",
          Dean\'s List: " + s2.getDeansList();

      JOptionPane.showMessageDialog( null, msg1, "First student\'s
          data",JOptionPane.INFORMATION_MESSAGE );
      JOptionPane.showMessageDialog(null, msg2 , "Second student\'s data",
          JOptionPane.INFORMATION_MESSAGE);
   }
}
```

- Output


String id1 = input.nextLine();
First student's data
Reem S2010
OK
Student s1 = new Student(n1, id1);
Student s2 = new Student(n2, id2, gpa2);
String msg1 = s1.getNameAndId();
String msg2 = s2.getNameAndId() + ", Academic Sta
Problems Javadoc Declaration Search Console
Q3 [Java Application] C:\Users\reemH\OneDrive\Desktop\eclipse\plugins\org.eclips
Please enter the first student's name:
Reem
Please enter the first student's id:
S2010
Please enter the second student's name:
Dana Alharthi
Please enter the second student's id:
S1010
Please enter the second student's GPA:
3.95


Second student's data
Dana Alharthi S1010, Academic Standing: Excellent, Dean's List: true
OK
Problems Javadoc Declaration Search Console
Q3 [Java Application] C:\Users\reemH\OneDrive\Desktop\eclipse\plugins\org.eclipse.justj.op
Please enter the first student's name:
Reem
Please enter the first student's id:
S2010
Please enter the second student's name:
Dana Alharthi
Please enter the second student's id:
S1010
Please enter the second student's GPA:
3.95

3 Conclusion

This lab was very clear and helpful. I got better with Java syntax, OOP concepts, function overloading appropriately, I/O, and UML diagrams.