Software and Programming 1

Lab 3:
Construction of a Simulated Cash Register and a Student Class
Example: A simulated cash register

• Launch BlueJ

• Create a new Project and give it a suitable name, e.g. simulateCashRegister, on your disk space.

• Create a new class and give it the name CashRegister.
/**
   A simulated cash register
*/
public class CashRegister
{
   /* private data */
   private int itemCount;
   private double totalPrice;

   /* methods (public interface) */
   public void addItem(double price)
   {
      itemCount++;
      totalPrice += price;
   }
}
Structure of CashRegister class

(2)

```java
public void clear()
{
    itemCount = 0;
    totalPrice = 0;
}

public double getTotal()
{
    return totalPrice;
}

public int getCount()
{
    return itemCount;
}
```
/* constructor */
public CashRegister()
{
    itemCount = 0;
    totalPrice = 0;
}
}  // end of class CashRegister
public class CashRegisterTest
{
    public static void main(String[] args)
    {
        CashRegister reg1 = new CashRegister();
        System.out.println("Created reg1 object");
        reg1.addItem(2.95);
        System.out.println("added item 1 - 2.95 to reg1 object");
        reg1.addItem(1.99);
        System.out.println("added item 2 - 1.99 to reg1 object");
        System.out.println(reg1.getCount());
        System.out.println("System should have printed 2 - total items");
        System.out.println((reg1.getCount() == 2) ? "OK" : "FAIL");
        System.out.printf("%.2f\n", reg1.getTotal());
        System.out.println("System should have printed total of items - £4.94");
        System.out.println((reg1.getTotal() == 4.94) ? "OK": "FAIL");
    }
}
Exercise 1: testing CashRegister class

- Take the implementation of the `CashRegister` class (from the lecture notes) and implement another test class for it.

- The test class creates 3 instances of `CashRegister` and adds a number of item prices in each of them.

- Use a `Scanner` object to read item prices at the keyboard for each instance of `CashRegister`. 
import java.util.Scanner;

public class CashRegisterTest2 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        CashRegister reg1 = new CashRegister();
        System.out.print("Enter a price for 1st item: ");
        double price = input.nextDouble();
        reg1.addItem(price);
        System.out.print("Enter a price for 2nd item: ");
        price = input.nextDouble();
        reg1.addItem(price);
Exercise 1: CashRegisterTest2

class (2)

System.out.println("Total cost is " + reg1.getTotal() + ", and number of items bought is " + reg1.getCount());

/* write additional code to:
(i) create the remaining two instances of CashRegister
(ii) add a number of item prices in each of them */

} // end of class CashRegisterTest
2. Re-implement the `CashRegister` class so that it keeps track of the total price as an integer. For example, instead of storing a floating-point 17.29, store the integer 1729.

Do not change the public interface of the class. Implement a test class for it.
3. Implement a class **Student**. A student has a name and a total quiz score. Supply an appropriate constructor and methods: `getName()`, `addQuizScore(int score)`, `getTotalScore()`, and `getAverageScore()`.

Implement a test class for **Student**.
Exercise 3: Basic structure of Student Class

/** Student class **/
public class Student
{
    /* private data */
    private String name; /* example of name: Sam Wise */
    private int totalScore;
    private int scoreCount;

    /* methods (public interface) */
    public void addQuizScore(int score) { /* write code */ }
    public String getName() { /* write code */ }
    public int getTotalScore() { /* write code */ }
    public double getAverageScore() { /* write code */ }

    /* Constructor */
    public Student(String firstName, String lastName) { /* */ }
}
/**  Student class  **/  

public class Student  
{
   // … declare private data

   /* methods (public interface) */
   public void addQuizScore(int score)  
   {
      // write code to add score to totalScore  
      // increment scoreCount
   }

   public String getName()  
   {
      /* return name */
   }
public int getTotalScore() {
    /* return totalScore */
}

public double getAverageScore() {
    /* calculate average score and return the result */
}

/* Constructor */
public Student(String firstName, String lastName) {
    name = firstName + " " + lastName;
    /* next initialise the instance variables:
       total quiz score and score count */
}
} // end of class Student
Exercise 3: testing Student Class

```java
public class StudentTest {

    public static void main(String[] args) {

        Student student1 = new Student("Sam", "Wise");

        /* write more code to test the methods:
           getName(), addQuizScore(int score),
           getTotalScore() and getAverageScore() */

    }

}
```