CS 46A Fall 2022

Homework 04

Requirements

1. You must name your classes exactly as specified. Otherwise Codecheck will not be able to process your submission and you will get no credit.
2. When you are finished with your code, submit it to Codecheck one final time then download the .signed.zip file.
3. You must upload all three signed.zip files together to Canvas and you should double check the files in Canvas to make sure all three zip files are uploaded.
4. Do not open the downloaded zip files. The files are digitally signed, and the grader program will check that they have not been opened.
5. Due time: 10 pm, Saturday, Sep 24. Submissions before the due time are not late.

   You will lose five points if your submission is marked Late in Canvas.

6. Grace time: 10 am, Sunday, Sep 25. Submissions before the grace time will not be rejected.

   You will receive no points if your submission is rejected by Canvas.

Remember to follow our Programming Style Requirements!

Problem 4A

The Student Painters company paints dorm rooms. The rooms have one window and one door. The room is rectangular. The walls are always 8 feet tall. The doorway is 80 inches tall by 32 inches wide and the window is 4 feet by 5 feet. Student Painters charges $100 for labor plus the cost of the paint to paint a room. A gallon of paint costs $31.95 and will cover 300 square feet. All four walls (minus the window and door) and the ceiling are painted.

Write a `PaintJob` class to model a paint job for Student Painters.

The class has a constructor that takes the length and width of the room given as doubles in that order. Both length and width are in feet.

- `public PaintJob(double theLength, double theWidth)` Do not do any calculations in the constructor. Just initialize the instance variables.

Provide these methods:

- `public double getLength()` Gets the length of the room in feet.

- `public double getWidth()` Gets the width of the room in feet.
- `public void setDimensions(double newLength, double newWidth)` Sets a new length and width of the room in feet.
- `public double surfaceArea()` Gets the surface area of the room in square feet, excluding the area of the door and the window.
- `public double costOfPaint()` Gets the cost of the paint for this job. Do not calculate surface area in this method. Call `surfaceArea()`. Charge for the fractional gallons used. The leftover paint can be used for another job.
- `public double totalJobCost()` Gets the cost of this job. Do not calculate surface area or the cost of the paint in this method. Call methods to get the values.

You will need to convert the square inches for the door to square feet. There are 144 square inches in a square foot.

Here are some constants you must use

```
public static final int SQ_INCHES_PER_SQ_FOOT = 144;
public static final double WALL_HEIGHT_IN_FEET = 8;
public static final double DOOR_HEIGHT_IN_INCHES = 80;
public static final double DOOR_WIDTH_IN_INCHES = 32;
public static final double WINDOW_HEIGHT_IN_FEET = 5;
public static final double WINDOW_WIDTH_IN_FEET = 4;
```

You need to define and use constants for the cost of labor, the cost of a gallon of paint, and the number of square feet a gallon will cover. Make these constants accessible to any class. Do not use any magic numbers in the code, except number 2.

Create a class `PaintJobTester` in your BlueJ project and copy the code from Codecheck to test your class before submitting class `PaintJob` to Codecheck.

Codecheck link for 4A

Problem 4B

Create a Java application `IntegerAndDouble` that uses a `Scanner` object to do the following:

1. Ask the user to enter an integer using prompt "Enter an integer: "
2. Get the integer and store it in an integer variable
3. Print the integer on a new line
4. Ask the user to enter a double number using prompt "Enter a double number: "
5. Get the double number and store it in a double variable
6. Print the double number on a new line
7. Calculate and display the square root of the double number

8. Get the integer part of the double number and store it in an integer variable
9. Display the integer part of the double number on a new line
10. Calculate and display the quotient of the integer number divided by the double number
11. Calculate and display the double quotient of the integer number divided by the integer part of the double number
12. Calculate and display the integer quotient of the integer number divided by the integer part of the double number
13. Calculate and display the remainder of the integer number divided by the integer part of the double number

You should create just one Scanner object, and there is no starter code.

Do not use the try-catch statement or any parse statement.

Sample output

```
Enter an integer: 3
The integer number is 3.
Enter a double number: 5.9
The double number is 5.9.
The square root of the double number is 2.4289915602982237.
The integer part of the double number is 5.
The quotient of the integer number divided by the double number
is 0.5084745762711864.
The double quotient of the integer number divided by the integer
part of the double number is 0.6.
The integer quotient of the integer number divided by the
integer part of the double number is 0.
The remainder of the integer number divided by the integer part
of the double number is 3.
```

Codecheck link for 4B

Problem 4C

Write a Java program **`StringApplication`** which creates a **`Scanner`** object then does the following:

1. Create a Scanner object, declare a String variable and two int variables
2. Ask the user to enter a book title
3. Read in one line of input for book title
4. Print the first character of the book title within single quotes
5. Print the first word of the book title within double quotes.
6. Print the rest of the book title without the space after the first word within double quotes

7. Ask the user to enter the starting position for a substring
8. Read in the starting position and store it in the first int variable
9. Ask the user to enter the length for the substring
10. Read in the length and store it in the second variable
11. Print the substring of the book title specified by the starting position and the length within double quotes

There is no starter code. You can have local variables as needed but should create just one Scanner object.

You can assume that the book title has multiple words separated by single spaces, but no spaces at either end of the book title.

You should create just one Scanner object, and there is no starter code.

Do not use the try-catch statement or any parse statement.

Sample output

```
Enter a book title: Big Java Early Objects
The first character is 'B'.
The first word is "Big".
The rest of title is "Java Early Objects".
Enter the starting position for a substring: 0
Enter the length for the substring: 5
The 5-char substring starting at index 0 is "Big J".
```

Codecheck link for 4C