CSE 2102: Introduction to Software Engineering
Built-in Types, Command Line Arguments
Assigned: September 7, 2022, Due: September 14, 2022

Problem A (25 pts.)

Write a program `PerimeterfromArea.java` that accepts the area of a square as input, and prints its perimeter. Please note the following:

1. The program should be able to accept any positive real number as the area.
2. It should print the perimeter upto two decimal places.

Input cmd:

```
java PrintPerimeter 56
```

Output:

```
The perimeter is: 29.93
```

Submit at least 2 test cases (in a separate file) that you used to test the code.

Problem B (25 pts.)

Write a program `DispenseChange.java` that takes an amount from 1 to 99c. The program provides the user with a combination of quarters, dimes, nickles and pennies that equals that amount. While several combinations of coins can make up a particular amount, in this problem our focus is on making up the amount with as few coins as possible.

Input cmd:

```
java DispenseChange 87
```

Output:

```
87 cents in coins can be given as:
3 quarters
1 dimes
0 nickels and
2 pennies
```

Submit at least 2 test cases (in a separate file) that you used to test the code.

Problem C (25 pts.)

Consider the following two segments of code:

```
int n = 3;
int m = 4;
int result = n * (++m);
```

```
int n = 3;
int m = 4;
int result = n * (m++);
```

Is the output produced by the two segments the same? Why or why not? Justify your answer.

Problem D (40 pts.)

Write a program `ComputeInterest.java` that accepts the principal, interest rate (per year), and the duration in years. It computes the simple interest and the compound interest and the final amounts for both types of interest computations. Principal, interest rate and duration can be any real numbers.

Input cmd:

```
java ComputeInterest 100 5 10
```

Output:

```
The amount with simple interest is: 150.00
The amount with compound interest is: 162.89
The difference is: 12.89
```

Submit the following responses in a separate file:

a) For any amount and interest rate of your choice, run the program for 1, 5, 10, 15 and 20 years. Plot the difference in the amounts computed using simple and compound interest as a function of the number of years. What do you observe?

b) Now, holding the amount constant, choose two additional interest rates, one higher than what you chose in part (a), and one lower than what you chose in part (a). Once again, run the program for 1, 5, 10, 15 and 20 years for these two additional interest rates. For each interest rate, overlay the difference in the amounts on the plot produced in part (a). What do you observe?

c) Can the interest rate be encoded as “static final” in the code? Why or why not? Justify your answer.

d) You can use Excel or any other graphing tool for the plots.

Submission & other instructions

The following deliverables must be submitted on HuskyCT by midnight on September 14, 2022.
In txt or doc file:

- Problem A -- At least 2 test cases used
- Problem B -- At least 2 test cases used
- Problem C -- Written response
- Problem D -- a, b, c - written responses, d - screenshot of graph created

Additionally, submit .java, and .class files created for Problems A, B, and D.

Please make sure that your code compiles, we will test your code offline with specific test cases (common to all).

Late submissions (without any legitimate excuse) will incur a penalty of 10% per day.