

Homework Assignment #2

CS5004 – Object-Oriented Design
Northeastern University – Silicon Valley
Spring 2022

Due Sunday 2/6 at 11:00pm PST

Grading: Each programming problem is graded as follows

- A submission which does not compile gets 0.
 - A submission which compiles but does something completely irrelevant gets 0.
 - A submission which works (partially) correctly, gets (up to) %80 of the total credit.
 - %20 is reserved for the coding style. Follow Google's Java Style [Guide](#).
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Problem 1 [15pts]

Write a program that computes the slope of a line given two of its points on the plane. In more detail, the program reads (from keyboard) two points $p = (x_p, y_p)$ and $q = (x_q, y_q)$, and computes the slope m of the line that crosses p and q using the following formula

$$m = \frac{y_q - y_p}{x_q - x_p}$$

Your program should first check to see if $x_q = x_p$ in which case it should print “The line is vertical!” Below are two examples of how the program should behave

Example 1:

```
Enter the x-value of the first point: 3
Enter the y-value of the first point: 10
Enter the x-value of the second point: 7
Enter the y-value of the second point: 20
The slope of this line is 2.5
```

Example 2:

```
Enter the x-value of the first point: 22
Enter the y-value of the first point: 10
Enter the x-value of the second point: 22
```

Enter the y-value of the second point: 20
The line is vertical!

Note that you must compute the slope as a floating-point number.

Problem 2 [20pts]

Write a program that inputs the name, quantity, and price of three items. (Scanner class required)
The name may contain spaces. Output a bill with a tax rate of %6.25. All prices should be output to two decimal places. The bill should be formatted in columns with 30 characters for the name, 10 characters for the quantity, 10 characters for the price, and 10 characters for the total. Sample input and output are shown as follows: (Please follow the provided example numbers)

```
Input name of item 1:
lollipops
Input quantity of item 1:
10
Input price of item 1:
0.50
Input name of item 2:
diet soda
Input quantity of item 2:
3
Input price of item 2:
1.25
Input name of item 3:
chocolate bar
Input quantity of item 3:
20
Input price of item 3:
0.75
```

Your bill:

Item	Quantity	Price	Total
lollipops	10	0.50	5.00
diet soda	3	1.25	3.75
chocolate bar	20	0.75	15.00
Subtotal			23.75
6.25 percent sales tax			1.48
Total			25.23

(Note, above table just for demonstration, please format your output based on the requirement)

Problem 3 [10pts]

Define five strings as followed: "0220", "111", "6890", "6789876", "333256"

Determine whether these strings are symmetrical (the first number and the last number are equal, the second number and the penultimate number are equal, and so on) and print out your results.

For example:

0220 is symmetrical,

111 is symmetrical,

6890 is not symmetrical

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