CSC120 2022 Spring Lab #2: Receiving Input for Computation

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The goal of this lab is to learn how to use `Scanner` to write programs that receive input from the user. This assignment consists of two parts.

Part 1: Solving a System of Linear Equations with Two Unknowns

The goal of this is to write a program, `LinEq`, to solve a system of linear equations with two unknowns. Suppose we have two linear equations with two unknowns, `x` and `y`, as follows:

```
a x + by = p
c x + dy = q
```

Let *det* denote the determinant $ad - bc$. The solutions for these equations can be obtained using Cramer's Rule as follows:

```
x = ( d * p - b * q ) / det
y = ( a * q - c * p ) / det
```

Write a program `LinEq.java` that receives from the user coefficients (`a`), (`b`), and (`p`), followed by (`d`), (`e`), and (`q`), and then solves the equations using the formulas.

Here is a sample execution of the code:

```
This program solves systems of linear equations
ax + by = p, cx + dy = q
Enter a, b, and p: 1 3 2
Enter c, d, and q: 2 2 0
The solution is x = -1.0, y = 1.0
```

Part 2: Shopping at a Bakery

The goal of this part is to write a class, `Bakery`, that mimics shopping at a bakery, Chad's Bakery, in a simplified manner.

Chad's Bakery sells four kinds of items, pastries, coffees, sandwiches, and loaves of bread. The prices are \$3.5, \$2.5, \$5.0, and \$4.0. The program receives the number of items the user purchases for each kind, computes the subtotal, computes the tax (the tax rate is 10%), computes the total, and greets off the customer. The problem will report the subtotal after receiving the number of purchase for each kind. We show next an example of running the program.

```
Welcome to Chad's Bakery!

Pastries are each 3.5 dollars.
Coffees are each 2.5 dollars.
Sandwiches are each 5 dollars.
Loaves of breads are each 4 dollars.

How many pastries? 1
Subtotal is 3.5 dollars.

How many coffees? 1
Subtotal is 6.0 dollars.

How many sandwiches ? 1
Subtotal is 11.0 dollars.

How many loaves? 1
Subtotal is 15.0 dollars.

Tax is 1.5 dollars.

Total is 16.5 dollars.

Thank you for coming. See you soon!
```

We will use the following variables in the program: `int` variables `pastries`, `coffees`, `sandwiches`, and `loaves` for storing the numbers of orders for pastries, coffees, sandwiches, and loaves, respectively, and `double` variables `subtotal`, `tax`, and `total` for the subtotal, the tax, and the total of the purchase.