Programming Assignment 5: Loops
Total Points (30 points) - Due Wednesday, February 15th at 11:55 PM

Assignment Overview

This programming assignment is intended to demonstrate your knowledge of the following:

- Writing a while loop
- Writing a for loop
- Writing a while loop with a sentinel value

Chocolate Coupons [30 points]

Foothill Fro-cho, LLC, gives customers a coupon every time they purchase a chocolate bar. After they earn a certain number of coupons, they qualify for a free chocolate bar, which they may use toward the purchase of a single chocolate bar.

Usually, 7 is the number of coupons that qualifies, but we will let this be a symbolic constant which we can change. But for the purposes of this section, let's say that **7 coupons** earn a free chocolate bar.

The program will be an **app** that runs at the point-of-purchase (cash register counter). The customer or cashier will process a looping series of **purchase transactions**. Normally, each transaction asks how many bars the customer wants to buy and then awards them one coupon for each chocolate bar. However, if, at the start of a new transaction, the system detects that the customer has previously earned 7 or more **credits** (= **coupons**), the system will inform the operator (customer or cashier) and give the operator the option of using **7 credits** toward a **free chocolate bar**. The customer may **accept the free chocolate bar**, in which case the number of coupons in his account is decreased by 7, and a single free y chocolate bar is dispensed, or the customer **declines**, which turns this into a **normal transaction**, allowing the customer to purchase one or more bars, adding to the credits that the customer already has.

Besides offering a **purchase transaction** each pass of the main execution loop, the only other choice is for the operator to **shut down** the system for the day.

So the main loop has two choices: **P**: process a **P**urchase, or **S**: **S**hut down.

Because we don't have arrays yet, this has to be a single-customer system.

The Program Spec

Process transactions in a main loop. Start the user's coupon balance at 0. Then enter that loop which starts by giving the user two choices at each pass:

- **P** (process a **P**urchase)
- **S** (**S**hut down.)

The user is allowed to enter a ***single character*** or **an entire word** or even **multiple words separated by spaces** and the program continues until and unless the user has entered an **"s"**, "**S**", "**S**hut down", "stratford", "**s**upport your local CC", or any word/phrase beginning with an upper or lower case **'s'**, in which case the program should end. If the user enters a word/phrase that starts with any character other than a **'P'** or **'S'** (upper or lower case), the letter is ignored, and the main menu is repeated, starting a new loop.

Specifics of the P Selection

If the operators choose 'P', then the program checks to see how many credits the customer has. (Remember, in this simplified exercise, there is only one customer.) If there are fewer than the qualifying number (set to 7), then a normal transaction is executed. If there are 7 or more credits in the customer's account, an award transaction is executed.

Normal Transaction

Ask the user/operator how many chocolate bars are being purchased, and add this number to the customer's account/wallet/ coupons. At the end of the transaction, display the total/accumulated number of coupons earned so far, including the current transaction.

Award Transaction

Tell the user/operator that the customer qualifies for a free chocolate bar.

1. If the user opts for a free chocolate bar, give them one chocolate bar, display the new, reduced total number of coupons available and end the transaction, moving on to the next pass.
2. To keep things simple, we will not allow the purchase of multiple bars when an award chocolate bar is being redeemed. We reduce the number of credits by 7 (or whatever the qualifying number is for our system).
3. We don't add any credits/ coupons for the award chocolate bar. Even if the user has, say, 24 coupons, they can only get one chocolate bar in a single transaction, and the new balance will be 24 - 7 = 17, allowing the user to get another free chocolate bar on the next transaction.
4. If the user opts to not take the award, then the sequence of events turns into a ***Normal Transaction***, in which the user can request to purchase one or more bars, and the corresponding number of coupons is credited to the customer's balance.

Input Errors

Whenever the user makes an input error, cancel the transaction and proceed to the next loop pass (i.e., don't end the program). Do not attempt to keep the user in some sort of micro user-input loop, forcing them to stay within that transaction.

Always check for invalid user input like an invalid character choice, a negative number or an out-of-range numeric value, before proceeding. If the user commits an error of any kind (a bad command letter such as '**T**' or an out-of-range amount), print an error message and return to the top of the main loop which asks the user for another command: **P** or **S**.

There is one exception to the error check just described. When it is time for the user to enter a number, you can assume he does not type some non-numeric value. You don't have to test for this kind of non-numeric error.

Test Run Requirements:

Submit at least two runs that show everything. In each run, show ***several*** cycles (passes) of the loop. Specifically, in at least one run include *at least* 6 purchase transactions and at least two free chocolate bars along with the invalid input. Beyond that, make sure you demonstrate all options.

Also demonstrate the capacity to get either single letters or entire words from the user, showing at least one user-input error (an illegal choice) and one bad numeric input (out-of-range error).

*Use **symbolic constants**, not literals, for everything you can in this (and all) assignments.*

CLASS NAME. Your program class should be called *ChocolateCoupons.java.*

Sample Run

Here is an example of a partial working run:

```
Menu:
  P (process Purchase)
  S (Shut down)

  Your Choice: d

 *** Use P or S, please. ***

Menu:
  P (process Purchase)
  S (Shut down)

  Your Choice: push

How many chocolate bars would you like to buy?
14

 You just earned 14 coupons and have a total of 14 to use.

Menu:
  P (process Purchase)
  S (Shut down)

  Your Choice: P

You qualify for a free chocolate bar. Would you like to use your credits? (Y or N)
n

How many chocolate bars would you like to buy?
21

 You just earned 21 coupons and have a total of 35 to use.

Menu:
  P (process Purchase)
  S (Shut down)

  Your Choice: p
```

```
You qualify for a free chocolate bar. Would you like to use your credits? (Y or N)
j

 *** Invalid response ***

Menu:
  P (process Purchase)
  S (Shut down)

  Your Choice: p

You qualify for a free chocolate bar. Would you like to use your credits? (Y or N)
n

How many chocolate bars would you like to buy?
2

 You just earned 2 coupons and have a total of 37 to use.

Menu:
  P (process Purchase)
  S (Shut down)

  Your Choice: proc

You qualify for a free chocolate bar. Would you like to use your credits? (Y or N)
y

You have just used 7 credits and have 30 left.
Enjoy your free chocolate bar.

Menu:
  P (process Purchase)
  S (Shut down)

  Your Choice: s

System shutting down.

Good bye
```

Submission Instructions

- Execute the program and copy/paste the output that is produced by your program into the bottom of the source code file, making it into a comment. I will run the programs myself to see the output.
- Make sure the run "matches" your source. If the run you submit could not have come from the source you submit, it will be graded as if you did not hand in a run.
- Use the Assignment Submission link to submit the source code file.
- Submit the following file:
  - ChocolateCoupons.java.
- Do not submit **.class** files.

Standard program header

Each programming assignment should have the following header, with italicized text, appropriately replaced.

```
/*
 * Class: CS1A
 * Description: (Give a brief description of Assignment 5)
 * Due date:
 * Name: (your name)
 * File name: ChocolateCoupons.java
 */
```