Lab 02: Cheese Shop
CSE-021-01 **Points: 20**

Overview

We will review the following statements in this lab

- Scanner
- Variables
- System.out.print/println
- Conditional statements (if, else, elseif)

Getting Started

After starting Eclipse, create a new project called **Lab21_02**. You can write the whole program in `main()` and do not need to use methods or procedures. If you are more comfortable using them then it is fine also.

Part 1: Create `CheeseShop.java`

The machine will dispense 3 types of cheese, in **half-pound packages**. The types of cheese and prices are as follows:

- Humboldt Fog: $25.00 per pound
- Red Hawk: $40.50 per pound
- Teleme: $17.25 per pound

Your program will do the following:

- List all the cheese types available and the prices.
- Asks the user how many pounds of each type of cheese to purchase in 0.5lb increments.
  - Validate the input to be >= 0 and to be in 0.5 lb increment for positive amounts.
- Calculate discounts based on how many pounds for each type of cheese the user entered -
  - Discount for Humboldt Fog is that for each 0.5 lb package the user gets another 0.5 lb package for free.
  - Discount for Red Hawk is that for every two 0.5 lb packages, the user gets a 0.5 lb package for free.
  - **See Discount Calculation below for details.**
- Calculate Sub Total (price * amount of each cheese added together).
- Ask the user if they would like to see a list of what they purchased.
  - If the user answers yes, a list comes up showing how much of each type of cheese they bought and the cost of each cheese. Display only the cheese they actually bought.
  - If no items are purchased, then display a message stating the same (see Sample Run 6).
  - If the user answers no, then no itemized information is displayed.
- Display Sub Total, Discount(s) and Final Total. See Discount Calculation below to see how these are calculated.

Discount Calculation

The Humboldt Fog and Red Hawk cheeses are offered at the following special promotions:

- Humboldt Fog: Buy 1 package get 1 package free
- Red Hawk: Buy 2 packages get 1 package free

where, each package is 0.5 lb. Depending on how much of Humboldt Fog or Red Hawk chesses are bought, we will remove the cost of the free packages from what the user originally bought when calculating the Final Total. For instance, if the user bought 2 lb of Humboldt Fog (4 packages), then 2 of these packages will be free. And if the user bought 2 lb of Red Hawk (4 packages), then 1 of these packages will be free.

You may think of the technique of calculating these discounts as marking every 2nd package as free for Humboldt Fog, and marking every 3rd package as free for Red Hawk. In the table below, the blue cells indicate the free Humboldt Fog packages in a 4.5 lb order giving you 4 packages (or 2 lb) for free. Similarly, the orange cells indicate the free Red Hawk packages in a 4.5 lb order giving you 3 packages (or 1.5 lb) for free.

Humboldt Fog		Red Hawk	
#lb	#pkg	#lb	#pkg
0	0	0	0
0.5	1	0.5	1
1	2	1	2
1.5	3	1.5	3
2	4	2	4
2.5	5	2.5	5
3	6	3	6
3.5	7	3.5	7
4	8	4	8
4.5	9	4.5	9

Thus, the itemized list and discount calculation for a 4.5 lb order of these cheeses will appear as follows:

```
Display the itemized list? (1 for yes) 1
4.5 lb of Humboldt Fog @ $25.00 = $112.50
4.5 lb of Red Hawk @ $40.50 = $182.25

Sub Total:                          $294.75
Specials...
Humboldt Fog (Buy 1 Get 1 Free): -$50.00
Red Hawk (Buy 2 Get 1 Free):     -$60.75
Final Total:                        $184.00
```

Notice that the itemized list does not show Teleme cheese (assuming the user did not purchase any), and the discounts are applied on the free packages within the order. Here the values are as follows:

- Sub Total is the price*amount of each cheese added together
- $50 discount for Humboldt Fog corresponds to the 2 lb (or 4 pkgs) in the order that were free
- $60.75 discount for Red Hawk corresponds to the 1.5 lb (or 3 pkgs) in the order that were free
- Final Total = Sub Total – (Humboldt Fog discount + Red Hawk discount)

Sample Runs (user input shown in green, with each run separated by a dashed line):

```
We sell 3 kinds of Cheese (in 0.5 lb packages):
Humboldt Fog: $25.0 per pound
Red Hawk: $40.5 per pound
Teleme: $17.25 per pound

Enter the amount of Humboldt Fog in lbs: 1
Enter the amount of Red Hawk in lbs: 1
Enter the amount of Teleme in lbs: 1

Display the itemized list? (1 for yes) 1
1.0 lb of Humboldt Fog @ $25.0 = $25.0
1.0 lb of Red Hawk @ $40.5 = $40.5
1.0 lb of Teleme @ $17.25 = $17.25

Sub total:                          $82.75
Discounts...
```

```
Humboldt Fog (Buy 1 Get 1 Free): -$12.5
Final Total:                      $70.25
--------------------------------------------------------------------------------SAMPLE RUN 2
 We sell 3 kinds of Cheese (in 0.5 lb packages):
 Humboldt Fog: $25.0 per pound
 Red Hawk: $40.5 per pound
 Teleme: $17.25 per pound

 Enter the amount of Humboldt Fog in lbs: 1.4
 Invalid input. Enter a value that's multiple of 0.5: 1
 Enter the amount of Red Hawk in lbs: -5
 Invalid Input. Enter a value >= 0: 2
 Enter the amount of Teleme in lbs: 3

 Display the itemized list? (1 for yes) 1
 1.0 lb of Humboldt Fog @ $25.0 = $25.0
 2.0 lb of Red Hawk @ $40.5 = $81.0
 3.0 lb of Teleme @ $17.25 = $51.75

Sub total:                        $157.75
Discounts...
Humboldt Fog (Buy 1 Get 1 Free): -$12.5
Red Hawk (Buy 2 Get 1 Free):     -$20.25
Final Total:                      $125.0
--------------------------------------------------------------------------------SAMPLE RUN 3
 We sell 3 kinds of Cheese (in 0.5 lb packages):
 Humboldt Fog: $25.0 per pound
 Red Hawk: $40.5 per pound
 Teleme: $17.25 per pound

 Enter the amount of Humboldt Fog in lbs: 1.4
 Invalid input. Enter a value that's multiple of 0.5: -2
 Invalid Input. Enter a value >= 0: 3.3
 Invalid input. Enter a value that's multiple of 0.5: -5
 Invalid Input. Enter a value >= 0: 0
 Enter the amount of Red Hawk in lbs: 0
 Enter the amount of Teleme in lbs: 2

 Display the itemized list? (1 for yes) 1
 2.0 lb of Teleme @ $17.25 = $34.5

Sub total:                        $34.5
Discounts...
None                             -$0.0
Final Total:                      $34.5
--------------------------------------------------------------------------------SAMPLE RUN 4
 We sell 3 kinds of Cheese (in 0.5 lb packages):
 Humboldt Fog: $25.0 per pound
 Red Hawk: $40.5 per pound
 Teleme: $17.25 per pound

 Enter the amount of Humboldt Fog in lbs: 0.5
 Enter the amount of Red Hawk in lbs: 0.5
 Enter the amount of Teleme in lbs: 0

 Display the itemized list? (1 for yes) 1
 0.5 lb of Humboldt Fog @ $25.0 = $12.5
 0.5 lb of Red Hawk @ $40.5 = $20.25

Sub total:                        32.75
Discounts...
```

```
None                            -$0.0
Final Total:                     $32.75
-------------------------------------------------------------------------------SAMPLE RUN 5
  We sell 3 kinds of Cheese (in 0.5 lb packages):
  Humboldt Fog: $25.0 per pound
  Red Hawk: $40.5 per pound
  Teleme: $17.25 per pound

  Enter the amount of Humboldt Fog in lbs: 1
  Enter the amount of Red Hawk in lbs: 1
  Enter the amount of Teleme in lbs: 1

  Display the itemized list? (1 for yes) 0

  Sub total:                     $82.75
  Discounts...
  Humboldt Fog (Buy 1 Get 1 Free): -$12.5
  Final Total:                   $70.25
-------------------------------------------------------------------------------SAMPLE RUN 6
  We sell 3 kinds of Cheese (in 0.5 lb packages):
  Humboldt Fog: $25.0 per pound
  Red Hawk: $40.5 per pound
  Teleme: $17.25 per pound

  Enter the amount of Humboldt Fog in lbs: 0
  Enter the amount of Red Hawk in lbs: 0
  Enter the amount of Teleme in lbs: 0

  Display the itemized list? (1 for yes) 1
  No items were purchased.

  Sub total:                     $0.0
  Discounts...
  None                          -$0.0
  Final Total:                   $0.0
```

Part 2: (Assessment) Logic Check

Create a Word document or text file named `Part2` that contains answers to the following:

1. How many variables did you use?
2. How many variable types did you use?
3. How did you decide what types each variable should be?
4. What is the difference between `print` and `println`?
5. Did you use both `print` and `println` in your program? For what purpose did you use each type of print statement.
6. What does the line `System.out.println();` do?

Specification Compliance

The following are some additional instructions to make sure your project complies with specifications:

1. Your program must produce an output that **exactly resembles the Sample Output shown below, including identical wording of prompts, spacing, input locations, etc**.
2. Your program must ensure the following:
   a. Your program should not display items that are not bought (amount is 0) when listing them out [cf. Sample Run 4, Lines 11-12]. If no items are purchased, then a special message is displayed [cf. Sample Run 6, Line 11].
   b. If no discounts are applied, a special message is displayed [cf. Sample Run 3, Line 19].
3. Your program must check for invalid inputs when entering the amounts [cf. Sample Run 3, Lines 7-10].

4. Before you submit, in Eclipse, type CTRL-A (to select everything) followed by a CTRL-I (to fix indentation) on each of your java programs. In MacOS the corresponding keystrokes are Cmd-A followed by Cmd-I.

What to hand in

When you are done with this lab assignment, submit all your work through CatCourses.

Before you submit, make sure you have done the following:

- Attached the file named `Part2` containing answers to Assessment questions (1 – 6).
- Attached the created `CheeseShop.java` file.
- Filled in your collaborator's name (if any) in the "Comments…" text-box at the submission page.

Also, remember to demonstrate your code to the TA or instructor before the end of the grace period.