Project: Variables and Expressions

Deliverables

Your project files should be submitted to Web-CAT by the due date and time specified. In order to avoid a late penalty for the project, you must submit your completed code files to Web-CAT by 11:59 p.m. on the due date. If you are unable to submit via Web-CAT, you should e-mail your project Java files in a zip file to your TA before the deadline.

Files to submit to Web-CAT:

- MySolver.java
- LaserMeasure.java

Specifications

Overview: You will write two programs this week. One will solve for the result of a specified formula after reading input values for x, y, and z, and the other will determine the number of miles, yards, feet, and inches for an input value of a raw distance in inches.

- **MySolver.java**

Requirements: A program is needed that inputs values of type double for x, y, and z and solves for the result of the indicated formula when z is not equal to zero. If z is equal to zero, then the result is zero.

Design: The result should be calculated as follows:

$$result = \frac{(8.5x + 6.1)\ (10y + 7.9)}{z} \qquad \text{for z} \neq\ 0$$

Special case:

$$result\ is\ undefined \qquad \text{for z} =\ 0$$

Three examples of program output for the indicated input values are shown below. Note that lines 2 through 4 for the input values begin with tab which is equivalent to three spaces in jGRASP (i.e., your output should use the **escape sequence for a tab**).

Example #1

```
Line #   Program output
1        result = (8.5x + 6.1) (10y + 7.9) / z
2           Enter x: 3.5
3           Enter y: 1.5
4           Enter z: 0.0
5        result is undefined
6
```

Example #2

Line #	Program output
1	`result = (8.5x + 6.1) (10y + 7.9) / z`
2	`   Enter x: 1`
3	`   Enter y: 1`
4	`   Enter z: 1`
5	`result = 261.34`
6	

Example #3

Line #	Program output
1	`result = (8.5x + 6.1) (10y + 7.9) / z`
2	`   Enter x: 23.5`
3	`   Enter y: 35.8`
4	`   Enter z: 10.0`
5	`result = 7532.0515`
6	

Code: Your numeric variables should be of type double. Use an if-else statement to determine if the divisor in the formula is zero. Note that in Example #1, the value of z is zero so the divisor is zero.

Test: You are responsible for testing your program, and it is important to not rely only on the examples above. Remember that the input values are doubles, so be sure to test both positive and negative values (with and without a decimal point) for x, y, and z. You should use a calculator or jGRASP interactions to check your answers.

- **LaserMeasure.java**

Requirements: A digital laser measure manufacturer would like a program that accepts a raw distance measurement in inches (of type int) and then displays the distance as a combination of miles, yards, feet, and inches for both short and long distances (e.g., from onboard and an aircraft). When a negative raw distance measurement is entered, an appropriate message is printed as shown in the first example below.

Design: The digital laser measure manufacturer would like the output to look as shown below when each of the indicated test values is entered as the raw distance for separate runs of the program.

Example #1

Line #	Program output
1	`Enter the raw distance measurement in inches: -36`
2	`Measurement must be non-negative!`
3	

Example #2

```
Line #  Program output
1       Enter the raw distance measurement in inches: 63409
2
3       Measurement by combined miles, yards, feet, inches:
4          miles: 1
5          yards: 1
6          feet: 1
7          inches: 1
8
9       63409 in = 1 mi, 1 yd, 1 ft, 1 in
10
```

Example #3

```
Line #  Program output
1       Enter the raw distance measurement in inches: 1234567890
2
3       Measurement by combined miles, yards, feet, inches:
4          miles: 19484
5          yards: 1712
6          feet: 1
7          inches: 6
8
9       1234567890 in = 19484 mi, 1712 yd, 1 ft, 6 in
10
```

Your program must follow the above format with respect to the output. Note that lines 4 through 7 in two previous examples begin with tab (i.e., your output should use the **escape sequence for a tab**).

Code: In order to receive full credit for this assignment, you must calculate the number of miles, yards, feet, and inches and store each of the values in separate variables. Create a Scanner object on System.in to read in the value for the raw distance using the nextInt() method. It is recommended as a practice that you do not modify input values once they are read in and stored.

Test: You will be responsible for testing your program, and it is important to not rely only on the example above. Assume that the amount entered can be any integer less than or equal to 2,147,483,647 (the maximum value for a 32-bit int) and greater than or equal to -2,147,483,648 (the minimum value for a 32-bit int).

Grading

Web-CAT Submission: You must submit both "completed" programs to Web-CAT at the same time. Prior to submitting, be sure that your programs are working correctly and that have passed Checkstyle. **If you do not submit both programs at once, the submission will receive zero points for correctness**. Activity 1 describes how to create a jGRASP project containing both of your files.