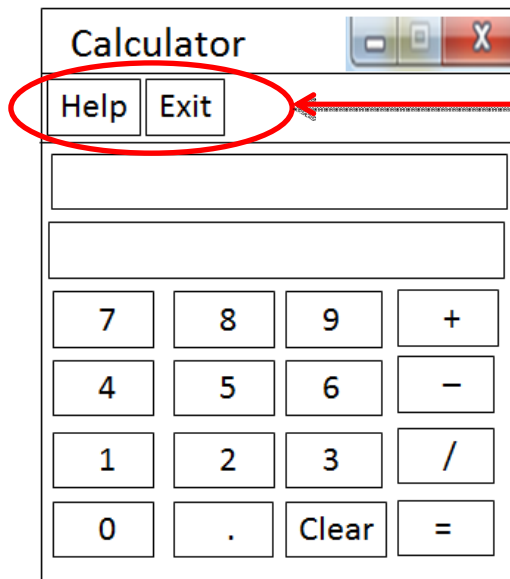


**CST 338 – Spring 2017**  
**Homework 5**  
**Due: 04/07/2017 (11:55 PM)**

1. (20 points) Create a simple Swing program called **Calculator.java** that provides “+”, “-”, and “/” operations. For the homework, you **must put every code in a single file called Calculator.java, including the main method.**

This is the main GUI for the program.



Note that **this is menus, not buttons.**

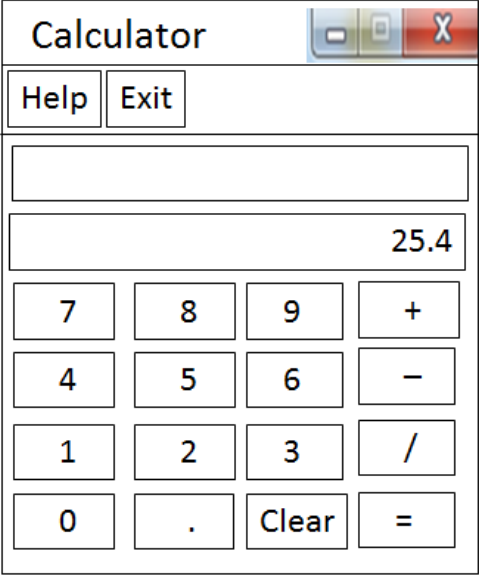
When a user clicks the “Exit” menu, the program should finish.

When a user clicks the “Help” menu, your program should create a separate window (or a dialog box) to display information about your program. It should include at least your name and version number such as version 1.0. When the user clicks “OK” button on the separate window (or dialog box), the window should disappear.

See the next pages for a few sample test cases for the homework.

(1) Binary operation example:  $25.4 + 37.5 =$

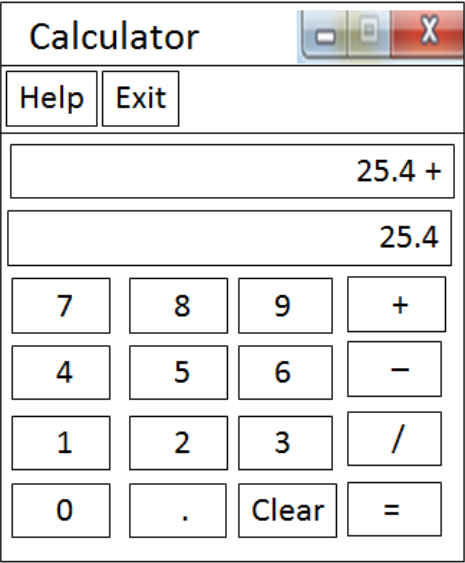
- a) When a user clicks 2, 5, . (period symbol), and 4 for the number **25.4**, the GUI should be updated like below



The image shows a window titled "Calculator" with standard window controls (minimize, maximize, close). Below the title bar are two buttons: "Help" and "Exit". There are two input fields: the top one is empty, and the bottom one contains the text "25.4". Below the input fields is a grid of buttons arranged in four rows and four columns:

7	8	9	+
4	5	6	-
1	2	3	/
0	.	Clear	=

- b) After the user clicks + sign, the GUI should be updated like below



The image shows the same "Calculator" window. The top input field now contains "25.4 +". The bottom input field still contains "25.4". The button grid remains the same as in the previous image:

7	8	9	+
4	5	6	-
1	2	3	/
0	.	Clear	=

c) After the user clicks 3, 7, ., and 5, the GUI should be updated like below

Calculator			
Help Exit			
			25.4 +
			37.5
7	8	9	+

...

d) After the user clicks = **sign**, the GUI should be updated like below

Calculator			
Help Exit			
			62.9
7	8	9	+

...

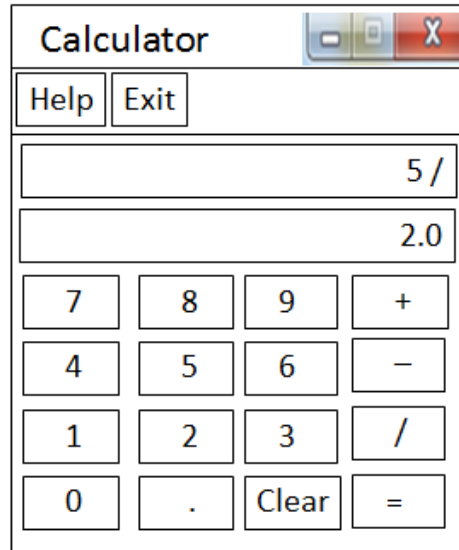
e) After the user clicks **Clear** button, the GUI should be updated like below

Calculator			
Help Exit			
			0
7	8	9	+

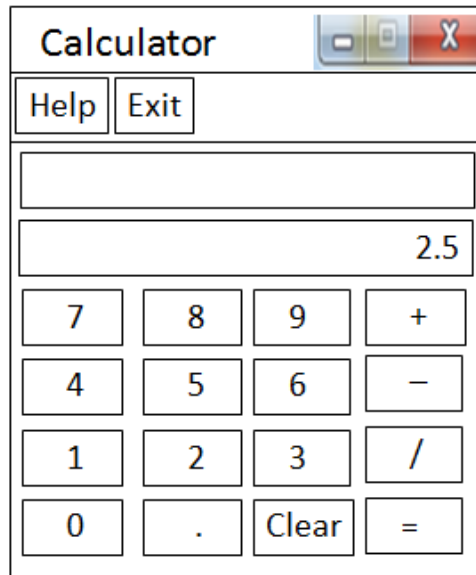
...

(2) Binary operation example:  $5 / 2.0 =$

a) When a user types 5, /, 2, ., and 0, the GUI should be updated like below



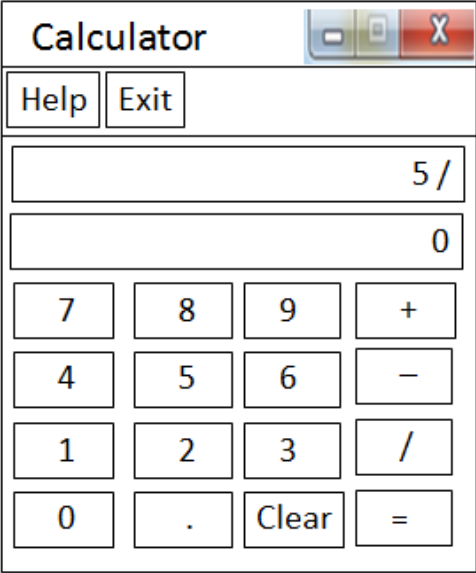
b) After the user types = sign, the GUI should be updated like below



c) After the user clicks Clear button, the program should display 0 as the above example.

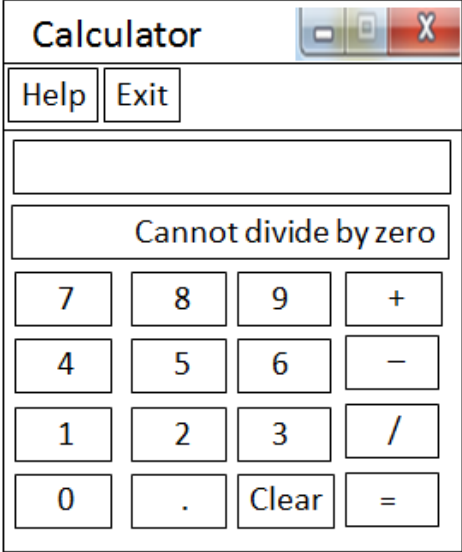
(3) Divide by zero example:  $5 / 0 =$

a) When a user types 5, /, and 0, the GUI should be updated like below



The image shows a window titled "Calculator" with standard Windows window controls (minimize, maximize, close). Below the title bar are two buttons: "Help" and "Exit". The main area contains two input fields. The first field displays "5 /" and the second field displays "0". Below these fields is a grid of buttons: a 4x4 grid of digits (7, 8, 9, +; 4, 5, 6, -; 1, 2, 3, /; 0, ., Clear, =).

b) After the user types = sign, the GUI should display an error message like below

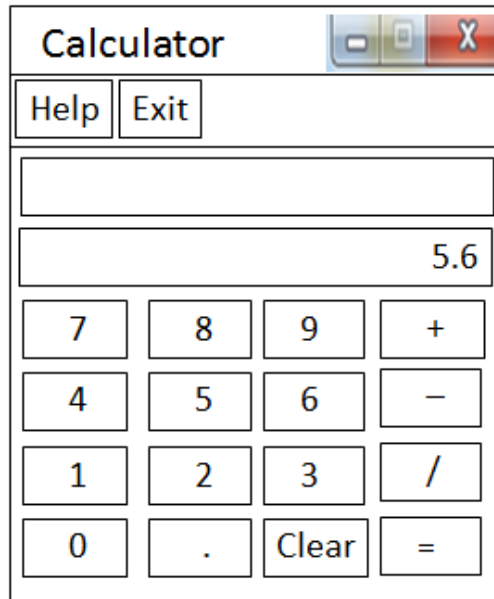


The image shows the same "Calculator" window. The first input field is now empty. The second input field displays the text "Cannot divide by zero". The button grid remains the same as in the previous state.

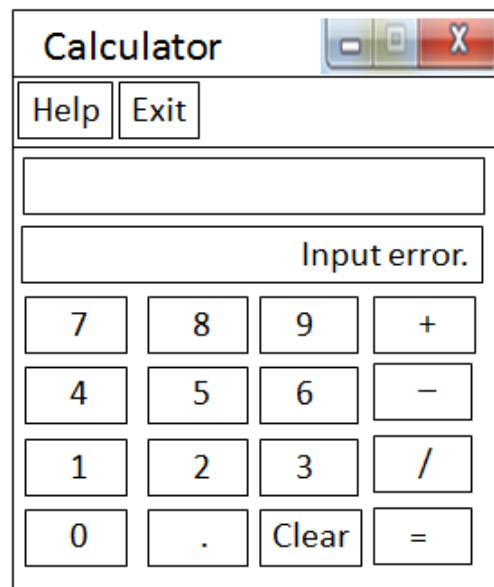
c) After the user clicks Clear button, the program should display 0 as the first example.

(4) Incorrect number type example: **5.6.** (Note that there's another period symbol after the digit 6)

a) When a user types 5, ., and 6, the GUI should be updated like below



b) When a user types . (period symbol), the program should display an error message like below



(5) Exit and Help menu: When a user clicks the “Exit” menu, the program should finish. When a user clicks the “Help” menu, your program should create a separate window (or a dialog box) to display information about your program. It should include at least your name and version number such as version 1.0. When the user clicks “OK” button on the separate window (or dialog box), the window should disappear.

### **How to turn in?**

Submit your source program (**Calculator.java**) on the **iLearn**.