

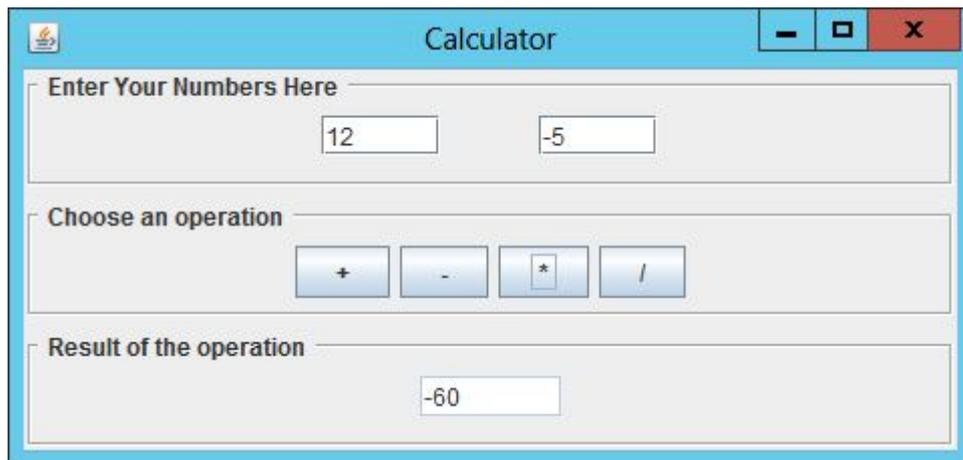
## CSC 502 PROJECT 1

DR. GODFREY C. MUGANDA  
DEPARTMENT OF COMPUTER SCIENCE  
NORTH CENTRAL COLLEGE

### 1. THE ASSIGNMENT

Write a calculator that can add, subtract, multiply and divide numbers. Your program should use the Java Swing Library.

The user interface should look as shown in the figure below



Notice that the user interface consists of three panels stacked in a 3 grid layout. Each of the three panels must have a titled border.

The panel at the top has two text fields that are used for input. The panel in the middle contains four buttons, with each button representing one of the our arithmetic operations. Finally, the panel at the bottom has an un-editable text field that is used to display the result of applying an operation to the two numbers entered in the input text fields at the top.

Your program must use a single listener added to all four buttons. When a button is clicked, the listener determines which of the four buttons was clicked and performs the operation indicated by that button.

Write two versions of your program, one that uses a lambda expression to implement the listener, and a second that uses a listener instantiated from a listener class that is *not* nested in any other class.

An additional requirement is that the main class should not have any members other than the *main* method.

## 2. BORDERS

The Swing library has a `Border` interface that describes borders that can be added to Swing components. Swing components have a method

```
void setBorder(Border b)
```

that can be used to set a border on a component. You can learn more about borders at

```
https://docs.oracle.com/javase/8/docs/api/javax/  
swing/border/package-summary.html
```

There are several classes that implement the `Border` interface. Among them is the `EtchedBorder` class.

Another useful class is `TitledBorder`. A titled border is a border that is formed by adding a string title to another border.

Here is example code for adding a titled border to a `JPanel`:

```
// Create a panel  
JPanel resultPanel = new JPanel();  
// Create an etched border  
Border resultBorder = new EtchedBorder();  
// Create a titled border by adding a title to the etched border  
TitledBorder tResultBorder  
    = new TitledBorder(resultBorder, " Result of the operation ");  
// Set the titled border on a panel  
resultPanel.setBorder(tResultBorder);
```

This is due Thursday of week 2, at midnight.