**CIS 181 - Lab 5**

**Java GUI: Addition of Two Small Integers**

## ****Objectives****

* To gain better understanding of ADT by designing and implemenating the SmallInt class.
* To become familiar with Java GUI (Graphical User Interface).
* To develop fail-safe programs.

## ****Description****

You are given a working program with four files: Age.java, Process.java, GUI.java, and GUIListener.java. The program prompts a user to input ages and finally prints out the highest age through a graphical user interface (GUI). Based on the given program, you are asked to develop a program that calculates the sum of two small integers using GUI.

**Exercises**

1. Download the following code

* Age.java
* Process.java
* GUI.java
* GUIListener.java

1. In Eclipse, create a new Java project called "Lab 5", and import the above 4 files into a default package.
2. Compile and run the program. Make sure it works.
3. Design and implement a class called *SmallInt*, which is specified as an ADT:

A small integer is defined as an integer *k* where

*Integer.MIN\_VALUE  ≤  k's value ≤ Integer.MAX\_VALUE*

1. The following operations can be applied on a small integer:

* **int** setValue(String s)

A method that sets the value of a *SmallInt* object to an integer that is transformed from a string. If the string does not have the appropriate numeric format, or if the integer is smaller than **Integer.MIN\_VALUE** or larger than **Integer.MAX\_VALUE**, the value of the *SmallInt* object is set to "0".

If the input is invalid, the return value is integer "-1"; otherwise, the return value is integer "0".

* **int** getValue()

A method that returns the value of a *SmallInt* object.

* **int** add(SmallInt sInt)

A method that returns the sum of the value of the *sInt* object and the value of this *SmallInt* object that invokes the method *add*. If the sum is smaller than **Integer.MIN\_VALUE** or larger than **Integer.MAX\_VALUE**, a value of "0" is returned.

Note that to make *SmallInt* a useful ADT, we should define more operations, such as "subtract". However, implementing additional operations is not required for this lab.

1. Replace the "Age.java" with a new file called "Calculator.java", which prompts a user to input two small integers in the input line and then display the sum of the two small integers in the output text area. Specifically, when the program starts, there will be a prompt in the output area of the window asking you to input the first integer. After you input the first integer to the input line and press the "Enter" key, another prompt will tell you to input the second integer. Once you input the second integer and press the "Enter" key, the result should be displayed in the output text area as follows (you do **not** have to make the integers right-justified and aligned):

|  |  |
| --- | --- |
|  | num1 |
| + | num2 |
|  | |
|  | num3 |

1. Now, the input line should be set blank and disabled, and the only action available to the user is to close the GUI window.
2. Submit your completed program (Calculator.java and SmallInt.java) to the myCourses!