CEGEP VANIER COLLEGE
CENTRE FOR CONTINUING EDUCATION
Advanced Programming in Java
420-984-VA

Teacher: Samir Chebbine **Lab 4: GUI using Java** **Jul 18, 2022**

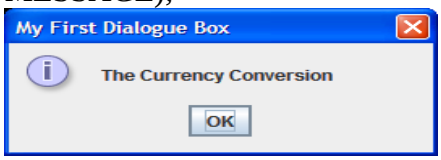
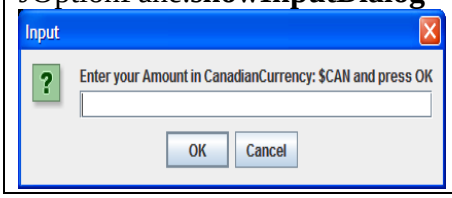
Lab 4: Advanced Graphical User Interface using Java

1. Graphical User Interface

a) Dialogue Boxes

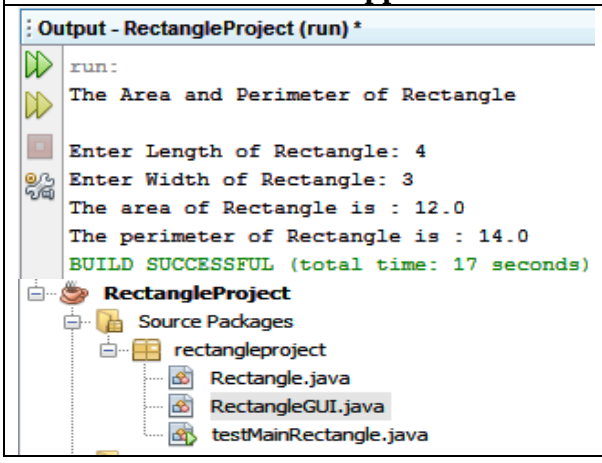
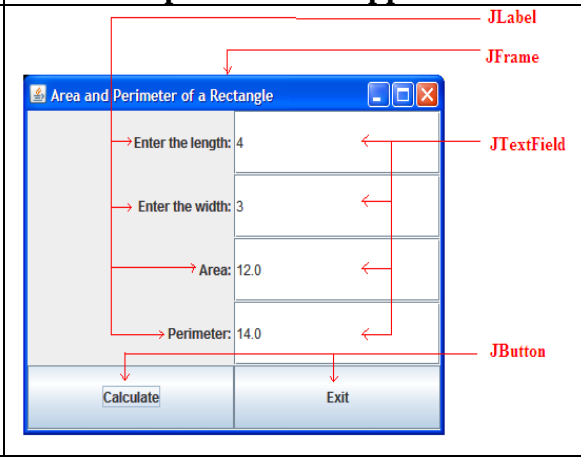
Create the following Java program that display dialog boxes. These methods are contained in the class *JOptionPane* and this class is contained in the package *javax.swing*.

The general syntax	Example of Dialogue box *ConversionDialogueBox.java*

import javax.swing.JOptionPane;
 	
JOptionPane.**showMessageDialog**(null, str,"My First Dialogue Box", JOptionPane.INFORMATION_ MESSAGE);
 
 	
JOptionPane.**showInputDialog**
 
 	
	ConversionDialogueBox.java
	`/* Program About Currency conversion`
	`Chebbine Samir */`
	
	`import java.util.*;`
	`import javax.swing.JOptionPane;`
	
	`public class ConversionDialogueBox`
	`{`
	`static Scanner console = new Scanner (System.in);`
	
	`public static void main(String[] args)`
	`{`
	`String str;`
	`double Can_Cur; // This is a Decimal declaration`
	`String Can_Cur1; // This is a String declaration`
	
	`str = "The Currency Conversion"; // This is string assignment`
	
	`JOptionPane.showMessageDialog(null, str,"My First Dialogue Box",`
	`JOptionPane.INFORMATION_MESSAGE);`
	
	`Can_Cur1 = JOptionPane.showInputDialog("Enter your Amount in Canadian"+`
	`"Currency: $CAN and press OK");`
	
	`}`
	
	`}`

b) The class JFrame, JLabel, JTextField, JButton

The Graphical user interface (GUI) may contain Button objects from JButton class, label objects from JLabel class, text field objects from JTextField class. All these objects are added within frame from JFrame class. Create a Project to be named *RectangleProject*.

Text-based Application	Graphical-based Application
 	

c) Create the Project RectangleProject.

Complete all these following programs as explained in my **Lab 4 YouTube Video 1.** Notice all *missing* coding statements are presented in this video with explanation.

The Interface ActionListener	Class to be used

Handling an Event for calculateB and exitB reference objects of type JButton
public interface ActionListener
{
public void actionPerformed(ActionEvent e);
}
	• **Classes: JFrame, JLabel, JTextField, JButton**
	• **Interface implementation: each object JButton** event is implemented through method actionPerformed(ActionEvent e) of the interface ActionListener

RectangleGUI.java

```
///Given the length and width of a rectangle, this Java
//program determines its area and perimeter.

import javax.swing.*;
import ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
import ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬

public class RectangleGUI▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
{

   //Create the four text fields
        JTextField lengthTF, widthTF, areaTF, perimeterTF;


        public RectangleGUI()
        {
                    //Create the four labels
                   JLabel lengthL = ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬

                   JLabel widthL = ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬

                   JLabel areaL =  ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
                   JLabel perimeterL = ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬


                    //Create the four text fields
                   lengthTF = ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
                   widthTF = ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
                   areaTF = ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
                   perimeterTF = ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬

                     //Create Calculate Button
                   JButton calculateB = new JButton("Calculate");
                     //Associate or register this listener with the corresponding JButton
                   calculateB.▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
                     //Create Exit Button
                   JButton exitB = new JButton("Exit");
                     //Associate or register this listener with the corresponding JButton
                   exitB.▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬

                      //Set the title of the window
                   setTitle("Area and Perimeter of a Rectangle");

                      //Get the container
                   Container pane = ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬

                     //Set the layout
                   pane.setLayout(▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬

                     //Place the components in the pane
                   pane.add(lengthL);
                   pane.add(lengthTF);
                   pane.add(widthL);
                   pane.add(widthTF);
                   pane.add(areaL);
                   pane.add(areaTF);
                   pane.add(perimeterL);
                   pane.add(perimeterTF);
                   pane.add(calculateB);
                   pane.add(exitB);

                      //Set the size of the window and display it
                   setSize(400, 300);
                   setVisible(true);
        }   // end of constructor RectangleGUI

    public void actionPerformed(ActionEvent e)
        {
          if (e.getActionCommand().▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
          {
                   double widthInput, lengthInput, areaOutput, perimeterOutput;

                   Rectangle myrectangle1 = new Rectangle();

                   lengthInput = ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
                   widthInput = ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬

                   myrectangle1.setDimension(lengthInput, widthInput);

                   areaOutput = myrectangle1.area();
                   perimeterOutput = myrectangle1.perimeter();

                   areaTF.setText(▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
                   perimeterTF.setText(▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
          }
          else if (e.getActionCommand().equals("Exit"))
          {
                   System.exit(0);
          }
        }    // End of method interface actionPerformed
}           // End of class RectangleGUI
```

2. **Sport Training Application with Graphical User Interface:**

Create a Java Project to be named ***GUISportProject*** using NetBeans IDE which includes GUI Java components that allows end user to evaluate the cost of a given sport training. The user has to enter the variables `u_Name`, `u_Number_hour`, `u_Number_week`, `u_CostHour` through JTextField.
The program will display the cost of sport training within an appropriate JTextField.

a) You need to design a **Java class** called **`Sport (The same as Lab 1 Advanced Java)`**, which takes Name, Number of hours per week, Number of weeks as three **private** `non static` members called respectively `name`, `number_hour`, `number_week`. A variable hourly rate of sport training `cost_hour` as **public** `static` data member.

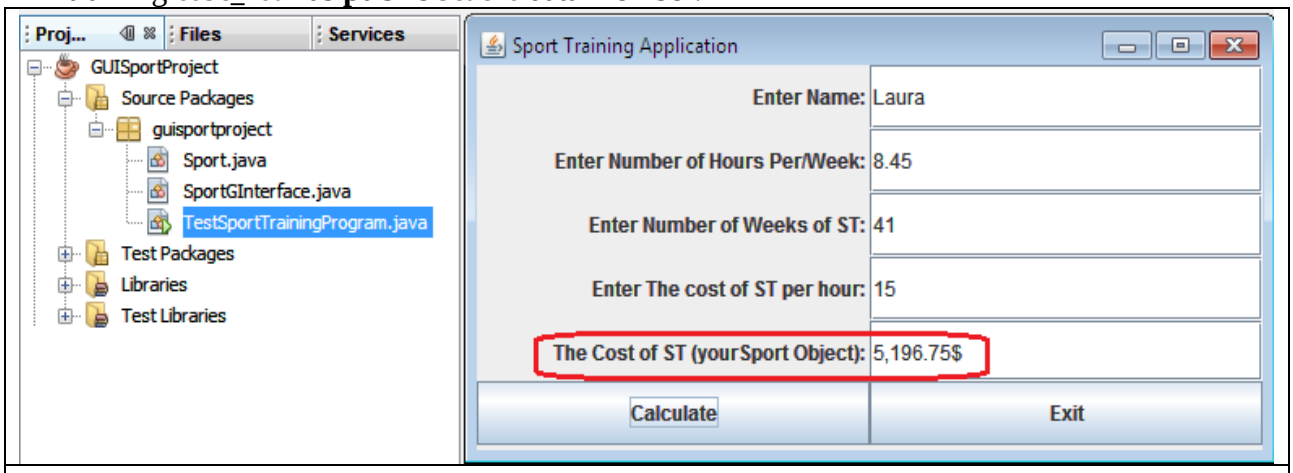


Figure 1

Remember that the **`Sport`** Class contains the following method members:

- Default constructor (`name= "", number_hour=0.00, number_week=0`)
- Constructor with parameters in order to initialize the data members (`name, number_hour`).
- Mutator **(**setter**)** methods (`setName(), setNumber_hour(),setNumber_week()`).
- `CalculateCostTraining()` to calculates and returns the cost of a training `(cost_training = cost_hour * number_hour * number_week)`.
- Method called `public String toString()` to print the Sport Training information in the form of `//name//number_hour//number_week//cost_hour$`

b) Create *SportGInterface.java* to describe the User Graphical Interface that includes the different Graphical components displayed in Figure 1 (5 labels, 5 Text Fields, and 2 buttons).

c) Create *TestSportTrainingProgram.java* to test `SportGInterface` class, where you instantiate the object of *SportGInterface* class type to display the Figure 1.

1. You should allow the user to input the variables `u_Name`, `u_Number_hour`, `u_Number_week`, `u_CostHour` from the Text Fields. Assign the entered values to the object `yourSport` of `Sport` class type by calling the setter methods `(setName(), setNumber_hour(),setNumber_week())`.

   Return its cost of sport training by calling `CalculateCostTraining()` and display it in the **Cost of ST (yourSport Object) Text Field** upon pressing on the button **Calculate** as shown in Figure 1.

3. Review Questions

A. Write necessary statements to create the following GUI components:

a. A JLabel with the text string "Enter the number of courses".
b. A JButton with the text string "Run".
c. A JTextField that can display 15 characters.
d. A window with the title "Welcome Home!".
e. A grid layout object of 5 rows and 4 columns.
f. A JButton that register a listener.
g. A JButton object added to a container.
h. A container layout set to grid layout.

B. True or False and Why

a. actionPerformed is an abstract method interface defined in interface actionListener
b. no need to register a listener to a button.
c. Container is a space within the frame.
d. getContentPane() is a method of Container class
e. You can add the control elements to JFrame object
f. addActionListener method allows you to register a listener to JTextField
g. addActionListener method allows you to register a listener to JButton
h. You add control elements within a frame set to grid layout

C. Multiple choice (only one answer per question is valid)

1. The method of the class JFrame used to access the content pane of the window.
   a. getContentPane
   b. setContentPane
   c. getPane
   d. getContent

2. Which method contains the code that the program executes when a specific event is generated?
   a. buttonListener
   b. GUIListener
   c. actionPerformed
   d. windowListener

3. Suppose that you create an application in which you instantiate a JFrame named frame1 and a JLabel named label1. Which of the following statements within the application adds label1 to frame1?
   a. label1.add(frame1);
   b. frame1.add(label1);
   c. this.add(label1);
   d. two of the above

4. Event listeners must
   a. implement an interface
   b. be included in private inner classes
   c. not receive any arguments
   d. exit the application once it has handled the event

5. A method that register a listener to button is a ____
   a. add
   b. setLayout
   c. addActionListener
   d. setText

6. Which of the following methods is part of the class JTextField?
   a. setVisible
   b. setSize
   c. setTitle
   d. getText