NTOU Java Programming
Homework 3

SOSEL
Service-Oriented Software Engineering Lab

Spring 2024

3-1 Simple GUI1

- Write a temperature conversion (溫度轉換) application that converts among Fahrenheit (華氏), Celsius (攝氏), and Kelvin (克氏).
- The temperature should be entered from the keyboard (via a JTextField).
- A JLabel should be used to display the converted temperature. Use the following formula for the conversions.

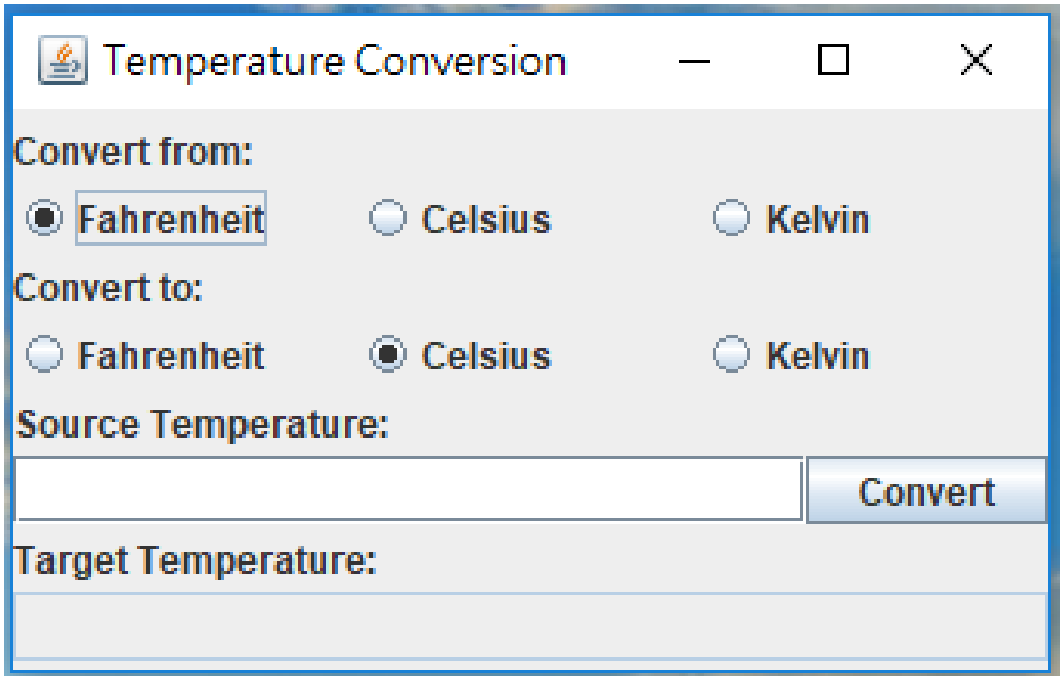
$$Celsius = (Fahrenheit - 32) \times 5/9$$

$$Kelvin = Celsius + 273.15$$

3-1 Simple GUI2

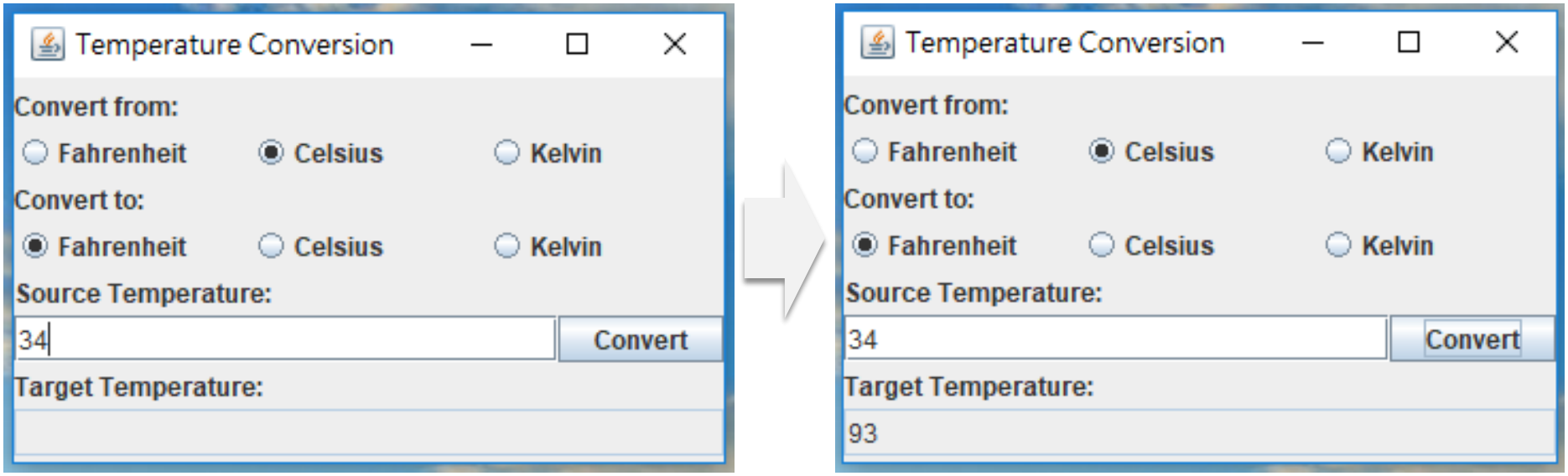
- The options for units of the source temperature and the destination temperature need to be JRadioButton.
  - Please pay attention to the use of ButtonGroup.
- The TextField displaying the conversion result needs to be set as uneditable (*setEditable(false)*)
- All of *FlowLayout, BorderLayout, and GridLayout* will be used.
- The outer layer should be an 8 x 1 GridLayout.
  - Three options for units of the source temperature and target temperature should be placed in a JPanel.
  - The source temperature contains two components, the text field and the Button placed on the right (using BorderLayout).
  - After selecting the source and target units and inputting the source temperature, **press [Enter] or click the [Convert] button**, and the target temperature will be displayed.

3-1 Expected Results1



Initial UI

3-1 Expected Results2



Select the source and target temperature units, enter the source temperature, and **press [Enter] or click the [Convert] button**

Hints

- To handle conversion from Fahrenheit to Kelvin, first convert Fahrenheit to Celsius, then Celsius to Kelvin.

3-2 GUI using Mouse Events1

- Please implement a GUI application that uses the MyShape hierarchy to create an interactive drawing application.
  - The three classes of the MyShape hierarchy require no additional changes.
- Class DrawPanel: represents the area on which the user draws the rectangles (MyRect objects).
  - An array shapes of type MyShape that will store all the rectangles the user draws.
  - An integer shapeCount that counts the number of shapes in the array.
  - A MyShape currentShape that represents the current rectangle the user is drawing.
  - A Color currentColor that represents the current drawing color.

3-2 GUI using Mouse Events2

- Class DrawPanel should also declare the following methods:
  - Overridden method paintComponent draws the shapes (rectangles) in the array.
    - Use instance variable shapeCount to determine how many shapes to draw.
    - Method paintComponent should also call currentShape's draw method. (呼叫目前正在繪製的長方形的draw函式)
  - Method clearDrawing removes all the shapes in the current drawing by setting shapeCount to zero.
    - It should call method repaint to refresh the drawing on the DrawPanel .

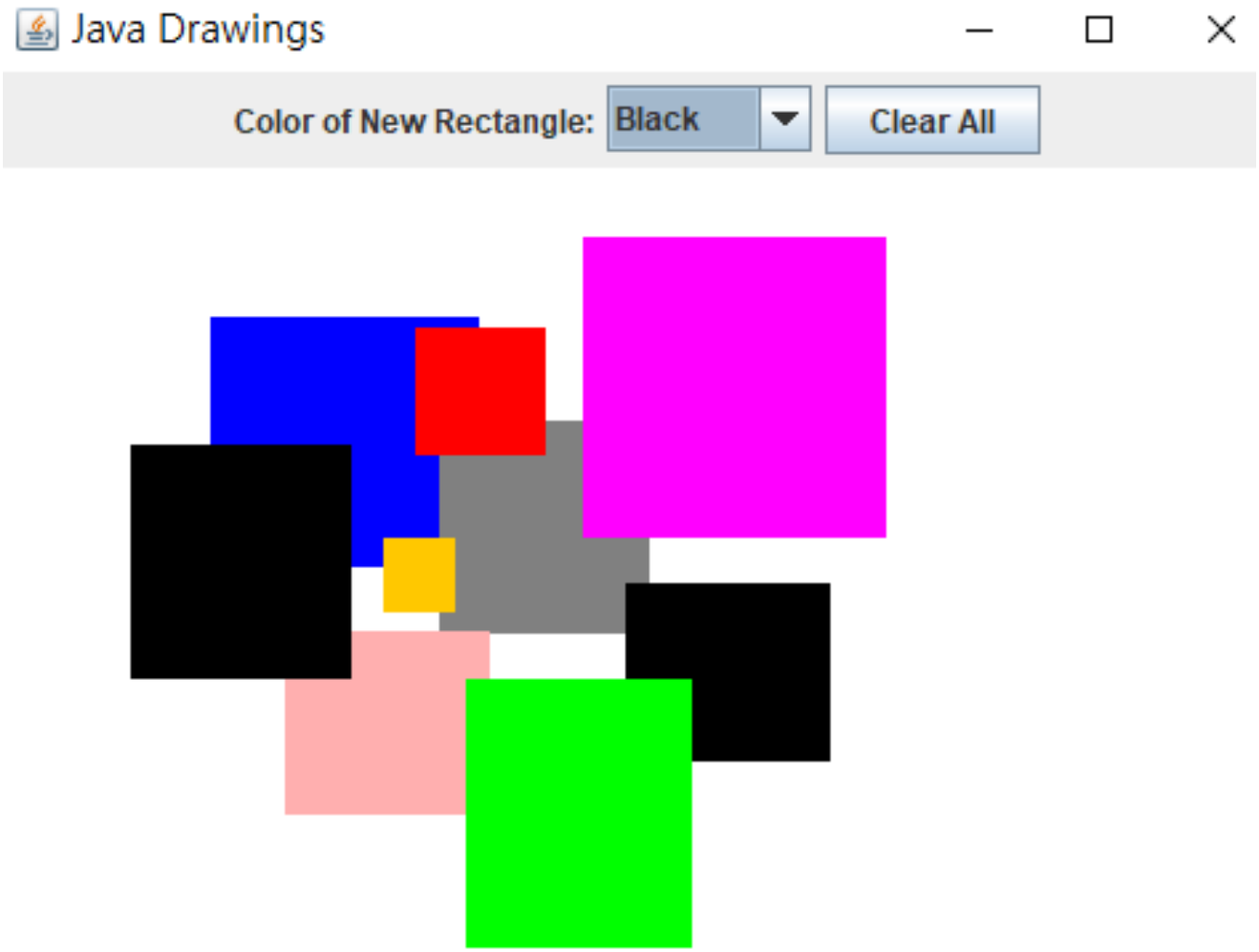
3-2 GUI using Mouse Events3

- Class DrawPanel should also provide event handling to enable the user to draw with the mouse.
  - Create a single inner class that extends MouseAdapter to handle required mouse events in one class.
    - Override method mousePressed to assign currentShape a new MyRect object and initializes both points to the mouse position.
    - Override method mouseReleased to finish drawing the current shape and place it in the array.
    - Override method mouseDragged so that it sets the second point of the currentShape to the current mouse position and calls method repaint. (拖曳過程會即時繪圖)

3-2 GUI using Mouse Events4

- Please also create a JFrame subclass called DrawFrame that provides a GUI that enables the user to control various aspects of drawing, including:
  - A text label and a combo box for selecting the color from the 10 predefined colors.
  - A button to clear all shapes from the drawing.
- In DrawFrame, each component's event handler should call the appropriate method in class DrawPanel.

3-2 Expected Results



Requirements

- The naming should conform to the CamelCase style.
- “Package“ is required: ntou.cs.java2024.
- Please submit files including .java files and .class files (upload them to TronClass).
- Code that fails to compile or execute is not accepted.