

# Introduction to Computer Science 2

## Lab 4: Programming Graphics

### Learning Goals:

- To learn programming simple graphics in Java.
- To learn how to use classes `JComponent`.
- To learn the event-handling mechanism in Java and its main components.
- To learn how to write listener classes and how to install their objects.

### Exercise 1 (3 points)

Write a program that draws a picture of a house. It could be as simple as the accompanying figure, or if you like, make it more elaborate (it must include, at least, a facade, a window, a door and the roof). Show the world your talent!



Implement a class `House` and supply a method `draw(Graphics2D g2)` that draws the house.

### Exercise 2 (3 points)

Write a program that displays the Olympic rings. Color the rings in the Olympic colors.



Provide a class `OlympicRingViewer` and a class `OlympicRingComponent`.

### Exercise 3 (4 points)

Enhance the ButtonViewer program (see the code below) so that it has two buttons, each of which prints a message *"I was clicked n time"*. The value *n* should be incremented with each click and may reflect the number of times **the relevant button** was clicked (therefore, two different counters are needed). **Make sure that all the components and functionalities are properly shown in the video to be submitted!**

```
import java.awt.event.ActionListener;
import javax.swing.JButton;
import javax.swing.JFrame;

/**
 * This program demonstrates how to install an action listener.
 */
public class ButtonViewer {
    public static void main(String[] args) {
        JFrame frame = new JFrame();
        JButton button = new JButton("Click me!");
        frame.add(button);

        ActionListener listener = new ClickListener();
        button.addActionListener(listener);
        frame.setSize(FRAME_WIDTH, FRAME_HEIGHT);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setVisible(true);
    }

    private static final int FRAME_WIDTH = 100;
    private static final int FRAME_HEIGHT = 60;
}
```

```
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

/**
 * An action listener that prints a message.
 */
public class ClickListener implements ActionListener {
    public void actionPerformed(ActionEvent event) {
        System.out.println("I was clicked.");
    }
}
```

**Honor code, coding style, and deliverable:**

Try to solve the exercises with what you already know. You are welcome to expand your program to do extra things but they are not mandatory.

**Plagiarism is not allowed!** We will run sophisticated software that automatically detects similarities on source code among students. All plagiarism incidents will be immediately reported to the Board of Examiners

**Submission!**

**Submit your java files to CodeGrade (see more information in the Syllabus).**

**Ask your instructor in case there is a problem with your submission.**

**DO NOT SEND SUBMISSIONS VIA EMAIL  
YOUR LAB WILL NOT GET GRADED!**