Alexandria University
Faculty of Engineering
Computer and Communication Engineering
Specialized Scientific Programs

CC272
Programming II
Fall 2024/2025

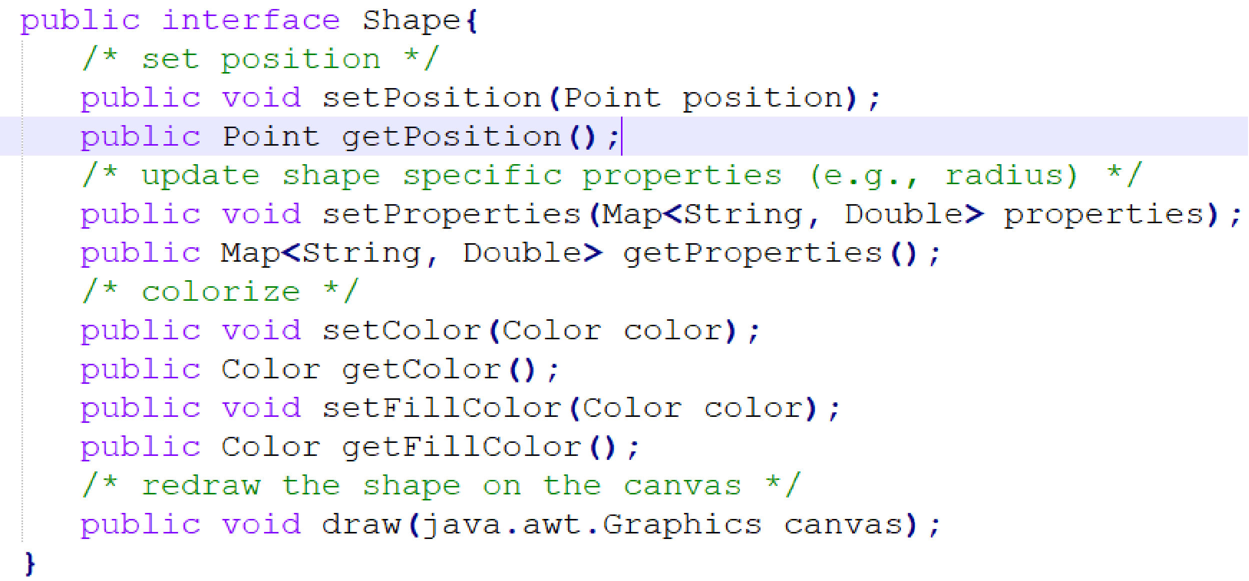
Lab 6 (Mini Paint)

Overview

Drawing and painting applications are widely used and valued for their broad feature sets, including drawing, coloring, and resizing. Such applications often come with built-in, and possibly extendable, sets of geometric shapes. In this lab, we will develop a simplified painting application called “Mini Paint”, where the user can draw shapes, colorize them or delete them. The shapes supported are circle, rectangle, square and line segment.

Tasks:

1. Design the UML class diagram for the system. It should include, but is not limited to, classes representing shapes. Apply the concepts of the OOP such as inheritance and polymorphism to your design. As a hint for you, your design should include the following two interfaces:



```
public interface Shape{
    /* set position */
    public void setPosition(Point position);
    public Point getPosition();
    /* update shape specific properties (e.g., radius) */
    public void setProperties(Map<String, Double> properties);
    public Map<String, Double> getProperties();
    /* colorize */
    public void setColor(Color color);
    public Color getColor();
    public void setFillColor(Color color);
    public Color getFillColor();
    /* redraw the shape on the canvas */
    public void draw(java.awt.Graphics canvas);
}
```

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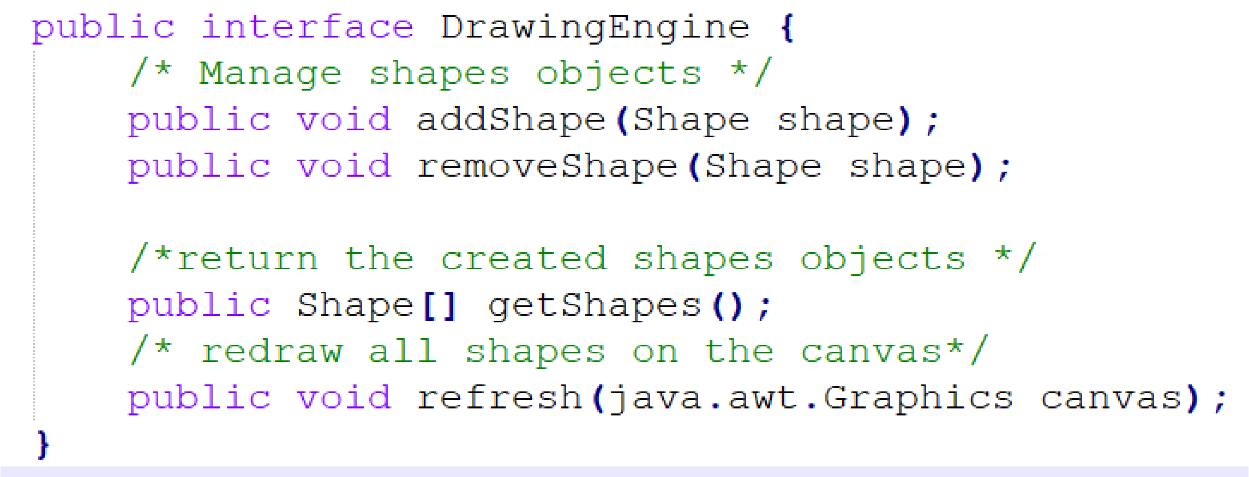

```
public interface DrawingEngine {
    /* Manage shapes objects */
    public void addShape(Shape shape);
    public void removeShape(Shape shape);

    /*return the created shapes objects */
    public Shape[] getShapes();
    /* redraw all shapes on the canvas*/
    public void refresh(java.awt.Graphics canvas);
}
```

2. Design and implement a GUI for the system that allows the user to draw, colorize, or remove an existing shape.

3. Cursor-based drawing is not required—simply provide buttons to select shapes. When a shape button is clicked, a dialog box will appear for entering properties like position, radius, length, etc.

4. To support operations like coloring and deleting shapes, the GUI should include a drop-down menu listing all drawn shapes with unique names (e.g., "circle01," "square04," etc.). This menu allows users to select a shape and apply the desired operation.
5. Implement your design in **Java** and use Swing graphics library.

The main window might look similar to the example shown in the following figure:

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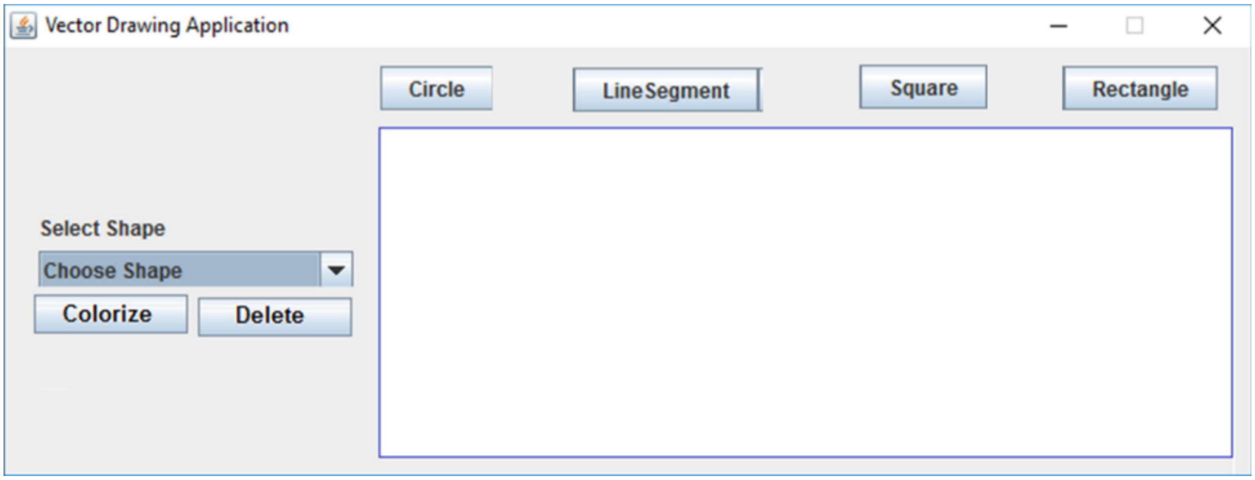

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Required:

- You are required to complete the tasks and submit a zipped file containing the Java files and the UML Diagram online through a Google form that will be available for you in next few days.
- The deadline for delivery is **Friday, November 8, 2024, at 11:59 PM**
- A discussion is made with you at your lab time next week on what you have delivered.

Policy:

- You should work **individually**.
- Submitting copied work will result in penalties for both parties. It is better to submit no work than to submit duplicated work.
- No late submission is allowed.