

Java Programming II

Lab7

514770-1

Fall 2025

11/12/2025

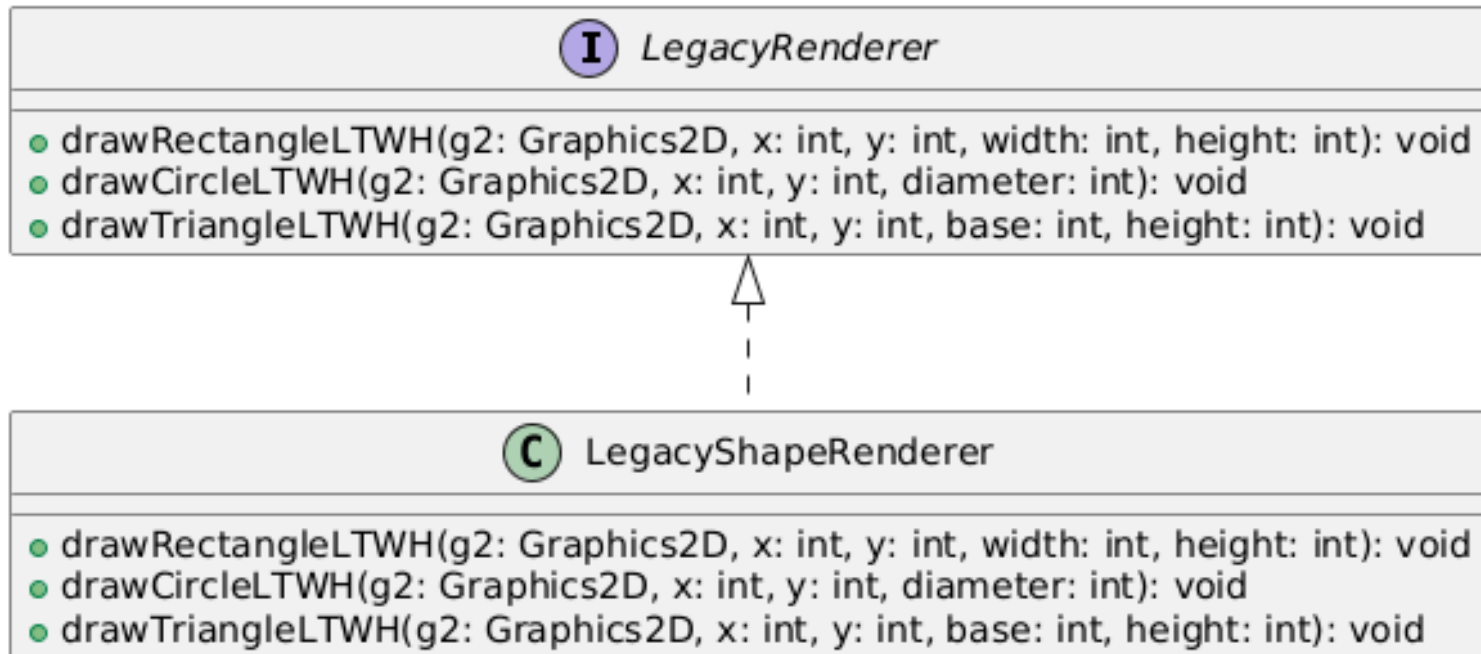
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Lab7

- ❑ Practice to write a program that adapts CartesianRenderer to LegacyRenderer.
 - **LegacyRenderer** interface
 - ❑ drawRectangleLTWH, drawCircleLTWH, drawTriangleLTWH
 - **LegacyShapeRenderer** class implements LegacyRenderer using g2.drawRect, g2.drawOval, g2.drawPolygon.
 - **CartesianRenderer** interface
 - ❑ drawRectangle, drawCircle, drawTriangle
 - **CartesianShapeRenderer** class implements CartesianRenderer using g2.draw(new Rectangle2D.Double(s[0], s[1], s[2], s[3]));
 - **LegacyCartesianAdapter** class takes **LegacyShapeRenderer** adaptee class to support **CartesianRenderer** target interface.
 - **CartesianLegacyAdapter** class takes **CartesianShapeRenderer** adaptee class to support **LegacyRenderer** target interface.

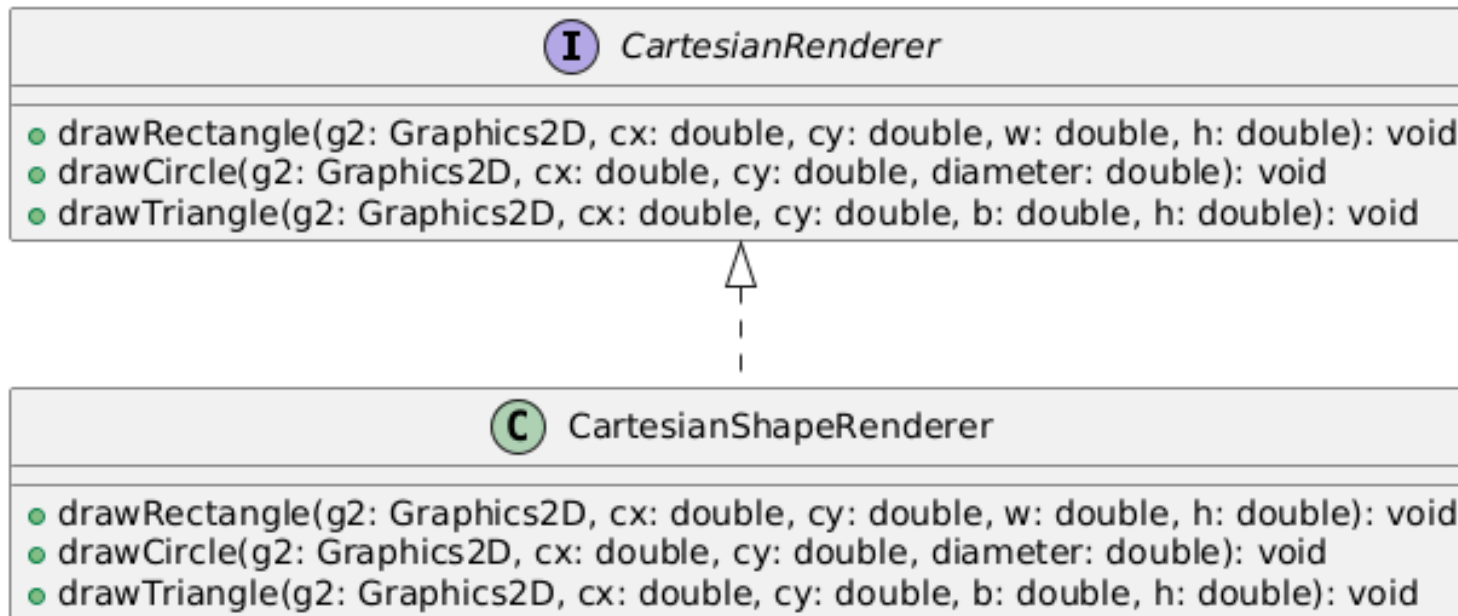
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- ❑ **LegacyRenderer** interface
- ❑ **LegacyShapeRenderer** class implements LegacyRenderer using `g2.drawRect`, `g2.drawOval`, `g2.drawPolygon`.



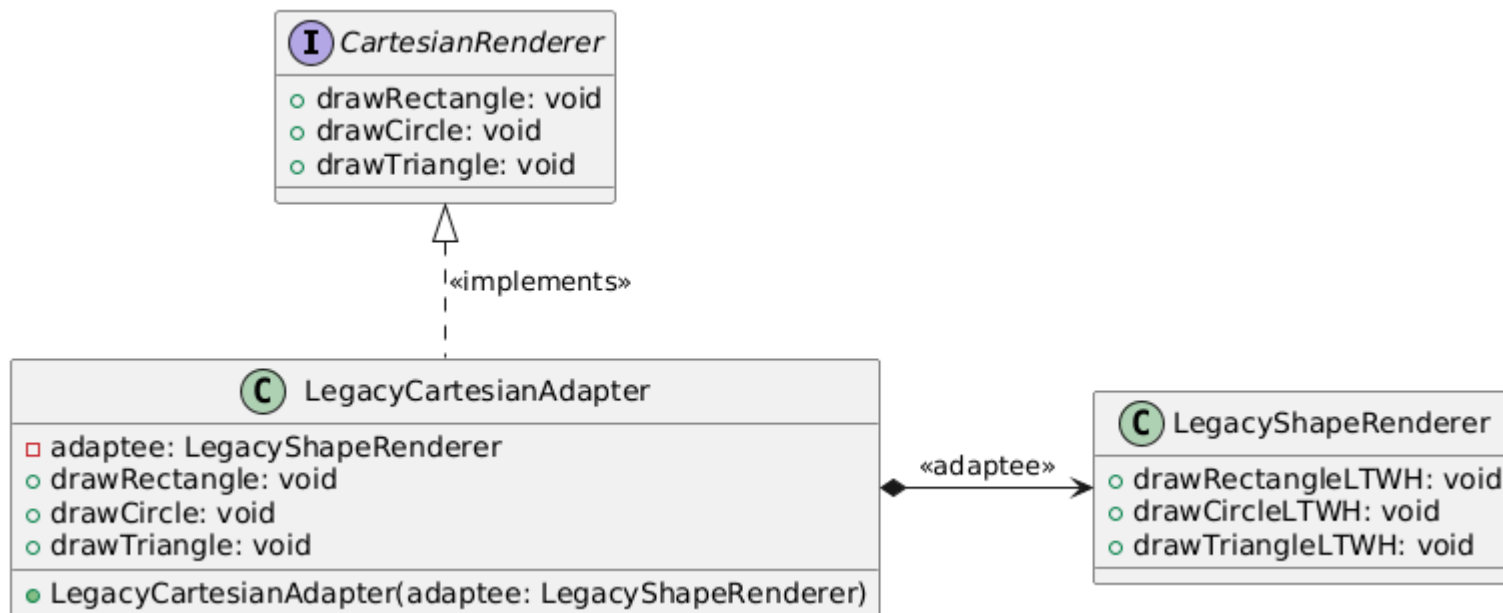
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- ❑ **CartesianRenderer** interface
- ❑ **CartesianShapeRenderer** class implements CartesianRenderer using `g2.draw(new Rectangle2D.Double(s[0], s[1], s[2], s[3]));`



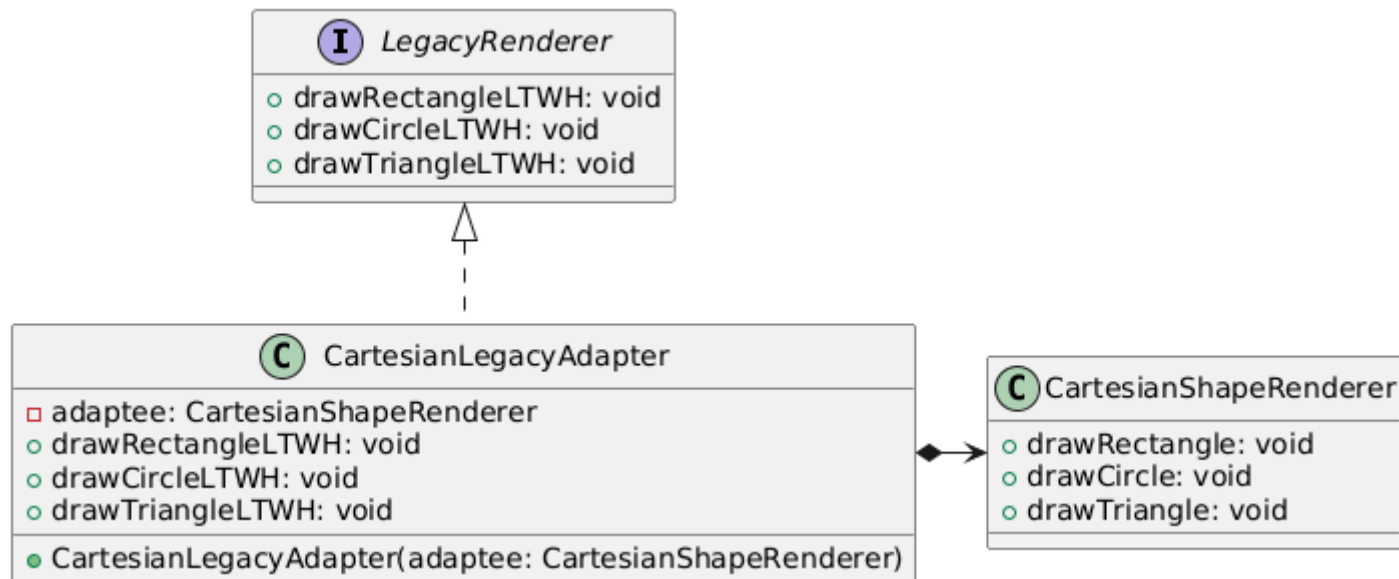
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- LegacyCartesianAdapter adapter class takes LegacyShapeRenderer adaptee class to support CartesianRenderer target interface.

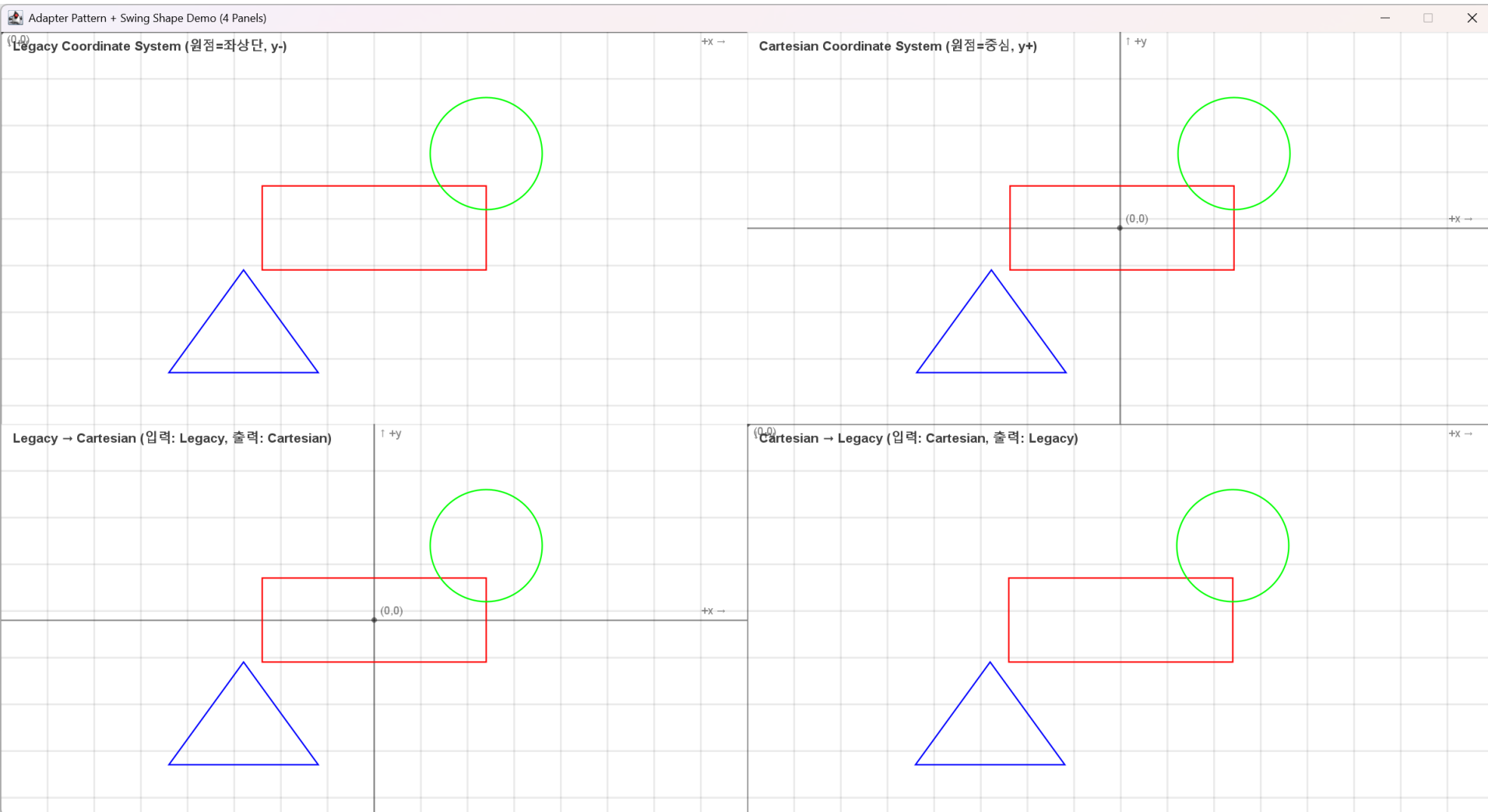


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- ❑ **CartesianLegacyAdapter adapter class** takes **CartesianShapeRenderer adaptee** class to support **LegacyRenderer target** interface.



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```
public class LegacyShapeRenderer implements LegacyRenderer {
    @Override
    public void drawRectangleLTWH(Graphics2D g2, int x, int y, int
width, int height) {
        g2.drawRect(x, y, width, height);
    }
    @Override
    public void drawCircleLTWH(Graphics2D g2, int x, int y, int
diameter) {
        g2.drawOval(x, y, diameter, diameter);
    }
    @Override
    public void drawTriangleLTWH(Graphics2D g2, int x, int y, int
base, int height) {
        // 등변삼각형: 상단 꼭짓점과 좌/우 하단
...
        g2.drawPolygon(p);
    }
}
```


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```
public class CartesianShapeRenderer implements CartesianRenderer {
    @Override
    public void drawRectangle(Graphics2D g2, double cx, double cy,
double w, double h) {
        Rectangle clip = g2.getClipBounds();
        int[] s = Conversion.c2l(clip, cx, cy, w, h);
        g2.draw(new Rectangle2D.Double(s[0], s[1], s[2], s[3]));
    }
    @Override
    public void drawCircle(Graphics2D g2, double cx, double cy,
double diameter) {
        ...
    }
    @Override
    public void drawTriangle(Graphics2D g2, double cx, double cy,
double base, double height) {
        ... // 등변삼각형: 상단 꼭짓점과 좌/우 하단
    }
}
```

```

public class Conversion {
    // Cartesian(cx,cy,w,h) → Legacy(left,top,w,h)
    public static int[] c2l(Rectangle clip, double cx, double cy,
double w, double h) {
        double W = (int)clip.getWidth();
        double H = (int) clip.getHeight();
        double left = (cx + W/2) - w/2;
        double top  = (H/2 - cy) - h/2;
        return new int[]{(int)Math.round(left), (int)Math.round(top),
                        (int)Math.round(w), (int)Math.round(h)};
    }
    // Legacy(left,top,w,h) → Cartesian(cx,cy,w,h)
    public static double[] l2c(Rectangle clip, int left, int top, int
w, int h) {
        double W = clip.getWidth();
        double H = clip.getHeight();
        double cx = (left - W/2.0) + w/2.0;
        double cy = (H/2.0 - top) - h/2.0;
        return new double[]{cx, cy, w, h};
    }
}

```

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Similarly, create a CartesianShapePanel

```
public class LegacyShapePanel extends JPanel {
    private final String title;
    private final LegacyRenderer renderer;
    private final int[][] shapes;
    public LegacyShapePanel(String title, LegacyRenderer renderer,
Dimension dimension, int[][] shapes) {
        this.title = title;
        this.renderer = renderer;
        this.shapes = shapes;
        setBackground(Color.white);
        setPreferredSize(dimension);
    }
    @Override
    protected void paintComponent(Graphics g) {
        // grid and axes
        // draw shapes
        // Panel title
    }
}
```

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```
public class ShapeCanvasFrame extends JFrame {
    public ShapeCanvasFrame() {
        super("Adapter Pattern + Swing Shape Demo (4 Panels)");
        Dimension pref = new Dimension(800, 420);
        // Legacy (left, top, width, height) (pref = 800×420)
        int[][] legacyShapes = {
            { 280, 165, 240, 90 },          // rect
            { 460, 70, 120, 120 },          // circle
            { 180, 255, 160, 110 }          // triangle
        };
        // Cartesian (centerx, centery, width, height) (pref = 800×420)
        double[][] cartesianShapes = {
            { 0, 0, 240, 90 },              // rect:  cx,cy,w,h
            { 120, 80, 120, 120 },          // circle:cx,cy,d,d
            { -140,-100, 160, 110 }         // tri:   cx,cy,w,h
        };
    }
}
```

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```
// 1. Legacy (original)
var legacyPanel = new LegacyShapePanel(
    "Legacy Coordinate System (원점=좌상단, y-)",
    new LegacyShapeRenderer(),
    pref,
    legacyShapes);

// 2. Cartesian (original)
var cartesianPanel = new CartesianShapePanel(
    "Cartesian Coordinate System (원점=중심, y+)",
    new CartesianShapeRenderer(),
    pref,
    cartesianShapes);
```

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```
// 3. Legacy -> Cartesian
var legacyToCartesianPanel = new CartesianShapePanel(
    "Legacy → Cartesian (입력: Legacy, 출력: Cartesian)",
    new LegacyCartesianAdapter(new LegacyShapeRenderer()),
    pref,
    cartesianShapes);

// 4. Cartesian -> Legacy
var cartesianToLegacyPanel = new LegacyShapePanel(
    "Cartesian → Legacy (입력: Cartesian, 출력: Legacy)",
    new CartesianLegacyAdapter(new
CartesianShapeRenderer()),
    pref,
    legacyShapes);

JPanel content = new JPanel(new GridLayout(2, 2, 0, 0));
content.add(legacyPanel); // attach lagacyPanel
content.add(cartesianPanel); // attach cartesianPanel
...
}
}
```

Submit to e-learning

- Add your code (e.g Iterator or Façade pattern) in the Lab7 assignment.
- Submit the Lab7 assignment (JAVA25-2-Lab7-YourID-YourName.zip including the report) to e-learning (due by 11/18).