Lab Assignment NO :6

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```java
public class PatternDrawing extends JPanel {

    // ---------- DDA Algorithm ----------
    private void DDA(Graphics g, int x0, int y0, int x1, int y1, String style) {
        int dx = x1 - x0;        int dy = y1 -
y0;

        int steps = Math.max(Math.abs(dx), Math.abs(dy));        float xInc = dx /
(float) steps;        float yInc = dy / (float) steps;
         float x = x0;        float
y = y0;

        for (int i = 0; i <= steps; i++) {
            // Style control            if
(style.equals("DOTTED")) {
                if (i % 2 == 0) g.fillRect(Math.round(x), Math.round(y),
1, 1);
            } else if (style.equals("THICK")) {
                g.fillRect(Math.round(x), Math.round(y), 2, 2);
            } else {
                g.fillRect(Math.round(x), Math.round(y), 1, 1);            }            x += xInc;
y += yInc;
        }
    }

    // ---------- Bresenham Algorithm ----------
    private void Bresenham(Graphics g, int x0, int y0, int x1, int y1, String style) {
        int dx = Math.abs(x1 - x0);        int dy =
Math.abs(y1 - y0);        int sx = (x0 < x1) ? 1 : -1;
int sy = (y0 < y1) ? 1 : -1;        int err = dx - dy;

        int count = 0; // for dashed style

        while (true) {
            if (style.equals("DASHED")) {
                if ((count / 5) % 2 == 0) g.fillRect(x0, y0, 1, 1);
            } else { // SOLID
                g.fillRect(x0, y0, 1, 1);
            }

            if (x0 == x1 && y0 == y1) break;
            int e2 = 2 * err;            if (e2 > -
dy) {            err -= dy;            x0
+= sx;
            }            if (e2 < dx) {
err += dx;            y0 += sy;
```

```java
        }           count++;
      }
    }

    @Override
    protected void paintComponent(Graphics g) {        super.paintComponent(g);
setBackground(Color.WHITE);

        // Outer Rectangle (DDA - Dotted)
        g.setColor(Color.BLUE);
        DDA(g, 50, 50, 250, 50, "DOTTED");
        DDA(g, 250, 50, 250, 200, "DOTTED");
        DDA(g, 250, 200, 50, 200, "DOTTED");
        DDA(g, 50, 200, 50, 50, "DOTTED");

        // Inner Rectangle (DDA - Thick)
        g.setColor(Color.GREEN);
        DDA(g, 100, 100, 200, 100, "THICK");
        DDA(g, 200, 100, 200, 150, "THICK");
        DDA(g, 200, 150, 100, 150, "THICK");
        DDA(g, 100, 150, 100, 100, "THICK");

        // Diamond (Bresenham - mix styles)        int midX = (50 +
250) / 2; // center x        int midY = (50 + 200) / 2; // center y

        g.setColor(Color.RED);
        Bresenham(g, midX, 50, 250, midY, "SOLID");    // top-right
        Bresenham(g, 250, midY, midX, 200, "DASHED");  // right-bottom
        Bresenham(g, midX, 200, 50, midY, "SOLID");    // bottom-left
        Bresenham(g, 50, midY, midX, 50, "DASHED");    // left-top
    }
    public static void main(String[] args) {
        JFrame f = new JFrame("Pattern Drawing: DDA + Bresenham");
        f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        f.setSize(400, 300);
        f.add(new PatternDrawing());
        f.setVisible(true);
    }
}
```