

```
import java.awt.Color;
import java.awt.Graphics;
public class MovingBall
{
    private double x;
    private double y;
    private int radius;
    private double xStep;
    private double yStep;

    public MovingBall(double pX, double pY, int pRadius, double pXStep, double pYStep)
    {
        x = pX;
        y = pY;
        radius = pRadius;
        xStep = pXStep;
        yStep = pYStep;
    }

    public double getX()
    {
        return x;
    }

    public double getY()
    {
        return y;
    }

    public int getRadius()
    {
        return radius;
    }

    public double getXStep()
    {
        return xStep;
    }

    public double getYStep()
    {
        return yStep;
    }

    public void draw(Graphics g)
    {
        g.setColor(Color.BLUE);
        g.drawOval((int) x - radius, (int) y - radius, 2 * radius, 2 * radius);
    }

    public void doStep(int width, int height)
    {
        // Vérifier les limites puis déplacer
        if ((x + xStep + radius >= width) || (x + xStep - radius < 0))
            xStep = -xStep;
        if ((y + yStep + radius >= height) || (y + yStep - radius < 0))
            yStep = -yStep;

        x = x + xStep;
        y = y + yStep;

        /*
        // Version améliorée
        if (x + xStep + radius >= width)
        {
            x = width - radius;
            xStep = -xStep;
        }
        else if (x + xStep - radius < 0)
        {
            x = radius;
            xStep = -xStep;
        }
        else
            x = x + xStep;

        if (y + yStep + radius >= height)
        {
            y = height - radius;
            yStep = -yStep;
        }
        else if (y + yStep - radius < 0)
        {
            y = radius;
            yStep = -yStep;
        }
        else
            y = y + yStep;
        */
    }
}
```

```
import java.awt.Color;
import java.awt.Graphics;
public class DrawPanel extends javax.swing.JPanel
{
    private MovingBall ball = null;

    public DrawPanel()
    {
        initComponents();
    }

    public void setBall(MovingBall ball)
    {
        this.ball = ball;
    }

    public void paintComponent(Graphics g)
    {
        // clean the background
        g.setColor(Color.WHITE);
        g.fillRect(0, 0, getWidth(), getHeight());

        // draw the ball
        if (ball != null)
            ball.draw(g);
    }
// Skipped: ... initComponents { ... }
// Variables declaration - do not modify//GEN-BEGIN:variables
// End of variables declaration//GEN-END:variables
}
```

```
import javax.swing.Timer;
public class MainFrame extends javax.swing.JFrame
{
    private MovingBall ball = new MovingBall(30, 30, 30, 5, 5);

    private int delay = 10;
    private Timer timer;

    public MainFrame()
    {
        initComponents();
        drawPanel.setBall(ball);
        timer = new Timer(delay, stepButton.getActionListeners()[0]);
        stepButton.setVisible(false);
    }
    // Skipped: ... initComponents { ... }
    private void startStopButtonActionPerformed(java.awt.event.ActionEvent evt) {GEN-FIRST:event_startStopButtonActionPerformed
        if (timer.isRunning())
        {
            timer.stop();
            startStopButton.setText("Start");
        }
        else
        {
            timer.start();
            startStopButton.setText("Stop");
        }
    } //GEN-LAST:event_startStopButtonActionPerformed

    private void stepButtonActionPerformed(java.awt.event.ActionEvent evt) {GEN-FIRST:event_stepButtonActionPerformed
        ball.doStep(drawPanel.getWidth(), drawPanel.getHeight());
        repaint();
    } //GEN-LAST:event_stepButtonActionPerformed
    // Skipped: ... Look & Feel
    // Variables declaration - do not modify//GEN-BEGIN:variables
    private DrawPanel drawPanel;
    private javax.swing.JButton startStopButton;
    private javax.swing.JButton stepButton;
    // End of variables declaration//GEN-END:variables
}
```