

```
import java.awt.Color;
import java.awt.Graphics;
public class MovingBall
{
    /*
     * Version 4:
     *
     * Solution comme la version 3 (classe Emoticon + emoticon qui tire la langue) mais un seul emoticon est visible.
     * En cliquant sur un emoticon il se duplique et divise sa vitesse par 2.
     */

    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 setNewSpeed(double pXStep, double pYStep)
    {
        xStep = pXStep;
        yStep = pYStep;
    }

    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;
    }
}
```

```
import java.awt.Color;
import java.awt.Graphics;
public class Emoticon extends MovingBall
{
    public Emoticon(double pX, double pY, int pRadius, double pXStep, double pYStep)
    {
        super(pX, pY, pRadius, pXStep, pYStep);
    }

    public void draw(Graphics g)
    {
        // Accès rapide
        double x = getX();
        double y = getY();
        int r = getRadius();

        // Dessine le disque jaune et les yeux
        g.setColor(Color.YELLOW);
        g.fillOval((int) x - r, (int) y - r, 2 * r, 2 * r);

        // Oeil gauche / droit - partie blanche
        g.setColor(Color.WHITE);
        g.fillOval((int) (x - r * 5 / 8), (int) (y - r * 4 / 8), r / 2, r / 2);
        g.fillOval((int) (x + r * 1 / 8), (int) (y - r * 4 / 8), r / 2, r / 2);

        // Oeil gauche / droit - contour gris
        g.setColor(Color.LIGHT_GRAY);
        g.drawOval((int) (x - r * 5 / 8), (int) (y - r * 4 / 8), r / 2, r / 2);
        g.drawOval((int) (x + r * 1 / 8), (int) (y - r * 4 / 8), r / 2, r / 2);

        // Oeil gauche / droit - iris en bleu
        g.setColor(Color.BLUE);
        g.fillOval((int) (x - r * 10 / 16 + r * 2 / 16), (int) (y - r * 8 / 16 + r * 3 / 16), (int) (r / 4), (int) (r / 4));
        g.fillOval((int) (x + r * 2 / 16 + r * 2 / 16), (int) (y - r * 8 / 16 + r * 3 / 16), (int) (r / 4), (int) (r / 4));
    }
}
```

```
import java.awt.Color;
import java.awt.Graphics;
public class EmoBigSmile extends Emoticon
{
    public EmoBigSmile(double pX, double pY, int pRadius, double pXStep, double pYStep)
    {
        super(pX, pY, pRadius, pXStep, pYStep);
    }

    public void draw(Graphics g)
    {
        // Dessine le cercle et les yeux
        super.draw(g);

        // Accès rapide
        double x = getX();
        double y = getY();
        int r = getRadius();

        // Dessiner la bouche
        g.setColor(Color.BLACK);
        g.fillArc((int) (x - r * 0.5), (int) (y - r * 0.25), r, r, 0, -180);
    }
}
```

```
import java.awt.Color;
import java.awt.Graphics;
public class EmoNaughty extends Emoticon
{
    // Durée (en pas) pour tirer la langue - valeur entre 10..50

    private int steps = (int) (Math.random() * 41) + 10;
    private int counter = 0;
    private boolean tongueOut = false;

    public EmoNaughty(double pX, double pY, int pRadius, double pXStep, double pYStep)
    {
        super(pX, pY, pRadius, pXStep, pYStep);
    }

    public void draw(Graphics g)
    {
        // Dessine le cercle et les yeux
        super.draw(g);

        // Accès rapide
        double x = getX();
        double y = getY();
        int r = getRadius();

        // Dessiner la langue
        if (tongueOut)
        {
            g.setColor(Color.PINK);
            g.fillArc((int) (x - r * 0.3), (int) (y - r * 0.25), (int) (r * 0.6), (int) r, 0, -180);
        }

        // Dessiner la bouche (ligne simple)
        g.setColor(Color.BLACK);
        g.drawLine((int) (x - r * 0.5), (int) (y + r * 0.25), (int) (x + r * 0.5), (int) (y + r * 0.25));
    }

    public void doStep(int width, int height)
    {
        super.doStep(width, height);

        // Vérifier s'il faut sortir ou rentrer la langue
        counter++;
        if (counter >= steps)
        {
            tongueOut = !tongueOut;
            counter = 0;
        }
    }
}
```

```
import java.awt.Color;
import java.awt.Graphics;
public class EMoSad extends Emoticon
{
    public EMoSad(double pX, double pY, int pRadius, double pXStep, double pYStep)
    {
        super(pX, pY, pRadius, pXStep, pYStep);
    }

    public void draw(Graphics g)
    {
        // Dessine le cercle et les yeux
        super.draw(g);

        // Accès rapide
        double x = getX();
        double y = getY();
        int r = getRadius();

        // Dessiner la bouche
        g.setColor(Color.BLACK);
        g.drawArc((int) (x - r * 0.5), (int) (y + r * 0.25), r, r, 0, 180);
    }
}
```

```
import java.awt.Color;
import java.awt.Graphics;
public class EmoSmile extends Emoticon
{
    public EmoSmile(double pX, double pY, int pRadius, double pXStep, double pYStep)
    {
        super(pX, pY, pRadius, pXStep, pYStep);
    }

    public void draw(Graphics g)
    {
        // Dessine le cercle et les yeux
        super.draw(g);

        // Accès rapide
        double x = getX();
        double y = getY();
        int r = getRadius();

        // Dessiner la bouche
        g.setColor(Color.BLACK);
        g.drawArc((int) (x - r * 0.5), (int) (y - r * 0.25), r, r, 0, -180);
    }
}
```

```
import java.awt.Color;
import java.awt.Graphics;
public class EmoSurprised extends Emoticon
{
    public EmoSurprised(double pX, double pY, int pRadius, double pXStep, double pYStep)
    {
        super(pX, pY, pRadius, pXStep, pYStep);
    }

    public void draw(Graphics g)
    {
        // Dessine le cercle et les yeux
        super.draw(g);

        // Accès rapide
        double x = getX();
        double y = getY();
        int r = getRadius();

        // Dessiner la bouche
        g.setColor(Color.BLACK);
        g.fillOval((int) (x - r * 0.25), (int) (y + r * 0.25), (int) (r * 0.5), (int) (r * 0.5));
    }
}
```

```
import java.awt.Graphics;
import java.util.ArrayList;
public class MovingBalls
{
    private ArrayList<MovingBall> alBalls = new ArrayList<>();

    public void addBall(MovingBall pBall)
    {
        alBalls.add(pBall);
    }

    public void clear()
    {
        alBalls.clear();
    }

    public MovingBall getBall(int x, int y)
    {
        MovingBall b = null;
        boolean found = false;
        double dx, dy;
        int i = 0;
        while (!found && (i < alBalls.size()))
        {
            b = alBalls.get(i);
            dx = Math.abs(b.getX() - x);
            dy = Math.abs(b.getY() - y);
            //System.out.println("x="+x+" | y="+y+" | br="+b.getRadius()+" | bx="+b.getX()+" | by="+b.getY()+" | dx="+dx+" | dy="+dy);
            if ((dx <= b.getRadius()) && (dy <= b.getRadius()))
                found = true;
            else
                i++;
        }
        if (found)
            return b;
        else
            return null; // par default rien trouve
    }

    public void draw(Graphics g)
    {
        for (int i = 0; i < alBalls.size(); i++)
            alBalls.get(i).draw(g);
    }

    public void doStep(int width, int height)
    {
        for (int i = 0; i < alBalls.size(); i++)
            alBalls.get(i).doStep(width, height);
    }
}
```



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

    public DrawPanel()
    {
        initComponents();
    }

    public void setBalls(MovingBalls pBalls)
    {
        balls = pBalls;
    }

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

        // draw the balls
        if (balls != null)
            balls.draw(g);
    }
// Skipped: ... initComponents { ... }
// Skipped: ... graphic attributes
}
```

```

import java.awt.event.MouseEvent;
import javax.swing.Timer;
public class MainFrame extends javax.swing.JFrame
{
    private MovingBalls balls = new MovingBalls();
    private int delay = 40;
    private Timer timer;

    public MainFrame()
    {
        initComponents();
        drawPanel.setBalls(balls);
        timer = new Timer(delay, stepButton.getActionListeners()[0]);
        stepButton.setVisible(false);
    }
    // Skipped: ... initComponents { ... }
    public double random(double min, double max)
    {
        return (Math.random() * (max - min)) + min;
    }

    public void createNewBall(double x, double y, int radius, double xStep, double yStep)
    {
        int kind = (int) random(0, 6); // valeurs: 0, 1, 2, 3, 4, 5
        MovingBall ball = null;

        if (kind == 0) ball = new EmoSmile(x, y, radius, xStep, yStep);
        else if (kind == 1) ball = new EmoBigSmile(x, y, radius, xStep, yStep);
        else if (kind == 2) ball = new EmoSad(x, y, radius, xStep, yStep);
        else if (kind == 3) ball = new EmoSurprised(x, y, radius, xStep, yStep);
        else if (kind == 4) ball = new EmoNaughty(x, y, radius, xStep, yStep);
        else
            ball = new MovingBall(x, y, radius, xStep, yStep);

        balls.addBall(ball);
    }

    private void startStopButtonActionPerformed(java.awt.event.ActionEvent evt) { //GEN-FIRST:event_startStopButtonActionPerformed
        if (!timer.isRunning())
        {
            balls.clear();

            int radius = 30;
            double x = random(radius, drawPanel.getWidth() - radius);
            double y = random(radius, drawPanel.getHeight() - radius);
            double xStep = random(-5, 5);
            double yStep = random(-5, 5);
            createNewBall(x, y, radius, xStep, yStep);

            timer.start();
            startStopButton.setText("Stop");
        }
        else
        {
            timer.stop();
            startStopButton.setText("Start");
        }
        repaint();
    } //GEN-LAST:event_startStopButtonActionPerformed

    private void stepButtonActionPerformed(java.awt.event.ActionEvent evt) { //GEN-FIRST:event_stepButtonActionPerformed
        balls.doStep(drawPanel.getWidth(), drawPanel.getHeight());
        repaint();
    } //GEN-LAST:event_stepButtonActionPerformed

    private void drawPanelMouseClicked(java.awt.event.MouseEvent evt) { //GEN-FIRST:event_drawPanelMouseClicked
        MovingBall ball = balls.getBall(evt.getX(), evt.getY());
        if ((ball != null) && timer.isRunning())
        {
            // modifier la "vitesse" des balles en fonction du bouton
            double speed;
            if (evt.getButton() == MouseEvent.BUTTON1)
            {
                // Ralentie la balle cliquée
                speed = 0.5;
                // ajoute une nouvelle balle "aléatoire"
                createNewBall(ball.getX(), ball.getY(), ball.getRadius(), speed*ball.getXStep(), -speed*ball.getYStep());
            }
            else
            {
                // accélère juste la balle cliquée
                speed = 1.5;
            }

            // modifie la vitesse de la balle cliquée
            ball.setNewSpeed(speed*ball.getXStep(), speed*ball.getYStep());
        }
        repaint();
    } //GEN-LAST:event_drawPanelMouseClicked
    // Skipped: ... Look & Feel
    // Skipped: ... graphic attributes
}

```