```java
import java.util.*;
import javax.imageio.ImageIO;
import java.util.Timer;
import java.awt.*;
import java.awt.event.*;
import java.awt.image.*;
import java.io.*;
import javax.swing.*;

class Game extends JPanel {
    private Timer timer;
    private Snake snake;
    /**
     *
     */
    private Point cherry;
    public Point getCherry() {
        return cherry;
    }

    public void setCherry(Point cherry) {
        this.cherry = cherry;
    }

    private int points = 0;
    private int best = 0;
    private BufferedImage image;
    private GameStatus status;
    private boolean didLoadCherryImage = true;

    private static Font FONT_M = new Font("MV Boli", Font.PLAIN, 24);
    private static Font FONT_M_ITALIC = new Font("MV Boli", Font.ITALIC, 24);
    private static Font FONT_L = new Font("MV Boli", Font.PLAIN, 84);
    private static Font FONT_XL = new Font("MV Boli", Font.PLAIN, 150);
    private static int WIDTH = 760;
    private static int HEIGHT = 520;
    private static int DELAY = 50;
```

```
38
39      // Constructor
40      public Game() {
41          try {
42              image = ImageIO.read(new File("cherry.png
    "));
43          } catch (IOException e) {
44              didLoadCherryImage = false;
45          }
46
47          addKeyListener(new KeyListener());
48          setFocusable(true);
49          setBackground(new Color(130, 205, 71));
50          setDoubleBuffered(true);
51
52          snake = new Snake(WIDTH / 2, HEIGHT / 2);
53          status = GameStatus.NOT_STARTED;
54          repaint();
55      }
56
57      @Override
58      public void paintComponent(Graphics g) {
59          super.paintComponent(g);
60
61          render(g);
62
63          Toolkit.getDefaultToolkit().sync();
64      }
65
66      // Render the game
67      private void update() {
68          snake.move();
69
70          if (cherry != null && snake.getHead().
    intersects(cherry, 20)) {
71              snake.addTail();
72              cherry = null;
73              points++;
74          }
75
76          if (cherry == null) {
```

```
 77              spawnCherry();
 78          }
 79
 80          checkForGameOver();
 81      }
 82
 83      private void reset() {
 84          points = 0;
 85          cherry = null;
 86          snake = new Snake(WIDTH / 2, HEIGHT / 2);
 87          setStatus(GameStatus.RUNNING);
 88      }
 89
 90      private void setStatus(GameStatus newStatus) {
 91          switch(newStatus) {
 92              case RUNNING:
 93                  timer = new Timer();
 94                  timer.schedule(new GameLoop(), 0,
    DELAY);
 95                  break;
 96              case PAUSED:
 97                  timer.cancel();
 98              case GAME_OVER:
 99                  timer.cancel();
100                  best = points > best ? points : best
    ;
101                  break;
102          }
103
104          status = newStatus;
105      }
106
107      private void togglePause() {
108          setStatus(status == GameStatus.PAUSED ?
    GameStatus.RUNNING : GameStatus.PAUSED);
109      }
110
111      // Check if the snake has hit the wall or itself
112      private void checkForGameOver() {
113          Point head = snake.getHead();
114          boolean hitBoundary = head.getX() <= 20
```

```
115                 || head.getX() >= WIDTH + 10
116                 || head.getY() <= 40
117                 || head.getY() >= HEIGHT + 30;
118
119         boolean ateItself = false;
120
121         for(Point t : snake.getTail()) {
122             ateItself = ateItself || head.equals(t);
123         }
124
125         if (hitBoundary || ateItself) {
126             setStatus(GameStatus.GAME_OVER);
127         }
128     }
129
130     // Spawn a cherry at a random location
131     public void drawCenteredString(Graphics g,
    String text, Font font, int y) {
132         FontMetrics metrics = g.getFontMetrics(font
    );
133         int x = (WIDTH - metrics.stringWidth(text
    )) / 2;
134
135         g.setFont(font);
136         g.drawString(text, x, y);
137     }
138
139     private void render(Graphics g) {
140         Graphics2D g2d = (Graphics2D) g;
141
142         g2d.setColor(Color.BLACK);
143         g2d.setFont(FONT_M);
144
145         if (status == GameStatus.NOT_STARTED) {
146             drawCenteredString(g2d, "SNAKE", FONT_XL
    , 200);
147             drawCenteredString(g2d, "GAME", FONT_XL
    , 300);
148             drawCenteredString(g2d, "Press  any  key
      to  begin", FONT_M_ITALIC, 330);
149
```

```
150             return;
151         }
152 
153         Point p = snake.getHead();
154 
155         g2d.drawString("SCORE: " + String.format ("%
    02d", points), 20, 30);
156         g2d.drawString("BEST: " + String.format ("%
    02d", best), 630, 30);
157 
158         if (cherry != null) {
159             if (didLoadCherryImage) {
160                 g2d.drawImage(image, cherry.getX(),
    cherry.getY(), 60, 60, null);
161             } else {
162                 g2d.setColor(Color.BLACK);
163                 g2d.fillOval(cherry.getX(), cherry.
    getY(), 10, 10);
164                 g2d.setColor(Color.BLACK);
165             }
166         }
167 
168         if (status == GameStatus.GAME_OVER) {
169             drawCenteredString(g2d, "Press  enter
    to  start  again", FONT_M_ITALIC, 330);
170             drawCenteredString(g2d, "GAME OVER",
    FONT_L, 300);
171         }
172 
173         if (status == GameStatus.PAUSED) {
174             g2d.drawString("Paused", 600, 14);
175         }
176 
177         g2d.setColor(new Color(33, 70, 199));
178         g2d.fillRect(p.getX(), p.getY(), 10, 10);
179 
180         for(int i = 0, size = snake.getTail().size
    (); i < size; i++) {
181             Point t = snake.getTail().get(i);
182 
183             g2d.fillRect(t.getX(), t.getY(), 10, 10
```

```
183 );
184         }
185 
186         g2d.setColor(Color.RED);
187         g2d.setStroke(new BasicStroke(4));
188         g2d.drawRect(20, 40, WIDTH, HEIGHT);
189     }
190 
191     // spawn cherry in random position
192     public void spawnCherry() {
193         cherry = new Point((new Random()).nextInt(
    WIDTH - 60) + 20,
194                 (new Random()).nextInt(HEIGHT - 60
    ) + 40);
195     }
196 
197     // game loop
198     private class KeyListener extends KeyAdapter {
199         @Override
200         public void keyPressed(KeyEvent e) {
201             int key = e.getKeyCode();
202 
203             if (status == GameStatus.RUNNING) {
204                 switch(key) {
205                     case KeyEvent.VK_LEFT: snake.
    turn(Direction.LEFT); break;
206                     case KeyEvent.VK_RIGHT: snake.
    turn(Direction.RIGHT); break;
207                     case KeyEvent.VK_UP: snake.turn(
    Direction.UP); break;
208                     case KeyEvent.VK_DOWN: snake.
    turn(Direction.DOWN); break;
209                 }
210             }
211 
212             if (status == GameStatus.NOT_STARTED) {
213                 setStatus(GameStatus.RUNNING);
214             }
215 
216             if (status == GameStatus.GAME_OVER &&
    key == KeyEvent.VK_ENTER) {
```

```
217                 reset();
218             }
219
220             if (key == KeyEvent.VK_P) {
221                 togglePause();
222             }
223         }
224     }
225
226     private class GameLoop extends java.util.
    TimerTask {
227         public void run() {
228             update();
229             repaint();
230         }
231     }
232 }
233
234
235 enum GameStatus
236 {
237     NOT_STARTED, RUNNING, PAUSED, GAME_OVER
238 }
239
240 // direction of snake
241 enum Direction {
242     UP, DOWN, LEFT, RIGHT;
243
244     public boolean isX() {
245         return this == LEFT || this == RIGHT;
246     }
247
248     public boolean isY() {
249         return this == UP || this == DOWN;
250     }
251 }
252
253
254 class Point {
255     private int x;
256     private int y;
```

```
257
258     public Point(int x, int y) {
259         this.x = x;
260         this.y = y;
261     }
262
263     public Point(Point p) {
264         this.x = p.getX();
265         this.y = p.getY();
266     }
267
268     public void move(Direction d, int value) {
269         switch(d) {
270             case UP: this.y -= value; break;
271             case DOWN: this.y += value; break;
272             case RIGHT: this.x += value; break;
273             case LEFT: this.x -= value; break;
274         }
275     }
276
277     public int getX() {
278         return x;
279     }
280
281     public int getY() {
282         return y;
283     }
284
285     public Point setX(int x) {
286         this.x = x;
287
288         return this;
289     }
290
291     public Point setY(int y) {
292         this.y = y;
293
294         return this;
295     }
296
297     public boolean equals(Point p) {
```

```
298         return this.x == p.getX() && this.y == p.
    getY();
299     }
300
301     public String toString() {
302         return "(" + x + ", " + y + ")";
303     }
304
305     public boolean intersects(Point p) {
306         return intersects(p, 10);
307     }
308
309     public boolean intersects(Point p, int tolerance
    ) {
310         int diffX = Math.abs(x - p.getX());
311         int diffY = Math.abs(y - p.getY());
312
313         return this.equals(p) || (diffX <= tolerance
     && diffY <= tolerance);
314     }
315 }
316
317 class Snake {
318     private Direction direction;
319     private Point head;
320     private ArrayList<Point> tail;
321
322     public Snake(int x, int y) {
323         this.head = new Point(x, y);
324         this.direction = Direction.RIGHT;
325         this.tail = new ArrayList<Point>();
326
327         this.tail.add(new Point(0, 0));
328         this.tail.add(new Point(0, 0));
329         this.tail.add(new Point(0, 0));
330     }
331
332     public void move() {
333         ArrayList<Point> newTail = new ArrayList<
    Point>();
334
```

```
335         for (int i = 0, size = tail.size(); i < size
    ; i++) {
336             Point previous = i == 0 ? head : tail.
    get(i - 1);
337 
338             newTail.add(new Point(previous.getX(),
    previous.getY()));
339         }
340 
341         this.tail = newTail;
342 
343         this.head.move(this.direction, 10);
344     }
345 
346     public void addTail() {
347         this.tail.add(new Point(-10, -10));
348     }
349 
350     public void turn(Direction d) {
351         if (d.isX() && direction.isY() || d.isY
    () && direction.isX()) {
352             direction = d;
353         }
354     }
355 
356     public ArrayList<Point> getTail() {
357         return this.tail;
358     }
359 
360     public Point getHead() {
361         return this.head;
362     }
363 }
364 
365 public class Main extends JFrame {
366     public Main() {
367         initUI();
368     }
369 
370     private void initUI() {
371         add(new Game());
```

```
372
373         setTitle("Snake");
374         setSize(800, 610);
375
376         setLocationRelativeTo(null);
377         setResizable(false);
378         setDefaultCloseOperation(JFrame.
    EXIT_ON_CLOSE);
379     }
380
381     public static void main(String[] args) {
382         EventQueue.invokeLater(() -> {
383             Main ex = new Main();
384             ex.setVisible(true);
385         });
386     }
387 }
```