Online Activity #5

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```
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;

    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;

// Constructor
public Game() {
    try {
        image = ImageIO.read(new File("cherry.png"));
    } catch (IOException e) {
      didLoadCherryImage = false;
    }

    addKeyListener(new KeyListener());
    setFocusable(true);
    setBackground(new Color(130, 205, 71));
    setDoubleBuffered(true);

    snake = new Snake(WIDTH / 2, HEIGHT / 2);
    status = GameStatus.NOT_STARTED;
    repaint();
}

@Override
public void paintComponent(Graphics g) {
    super.paintComponent(g);
```

```
        render(g);

        Toolkit.getDefaultToolkit().sync();
    }

    // Render the game
    private void update() {
        snake.move();

        if (cherry != null && snake.getHead().intersects(cherry, 20)) {
            snake.addTail();
            cherry = null;
            points++;
        }

        if (cherry == null) {
            spawnCherry();
        }

        checkForGameOver();
    }

    private void reset() {
        points = 0;
        cherry = null;
        snake = new Snake(WIDTH / 2, HEIGHT / 2);
        setStatus(GameStatus.RUNNING);
    }

    private void setStatus(GameStatus newStatus) {
        switch(newStatus) {
            case RUNNING:
                timer = new Timer();
                timer.schedule(new GameLoop(), 0, DELAY);
                break;
            case PAUSED:
                timer.cancel();
            case GAME_OVER:
                timer.cancel();
                best = points > best ? points : best;
                break;
        }

        status = newStatus;
    }

    private void togglePause() {
        setStatus(status == GameStatus.PAUSED ? GameStatus.RUNNING : GameStatus.PAUSED);
    }

    // Check if the snake has hit the wall or itself
    private void checkForGameOver() {
```

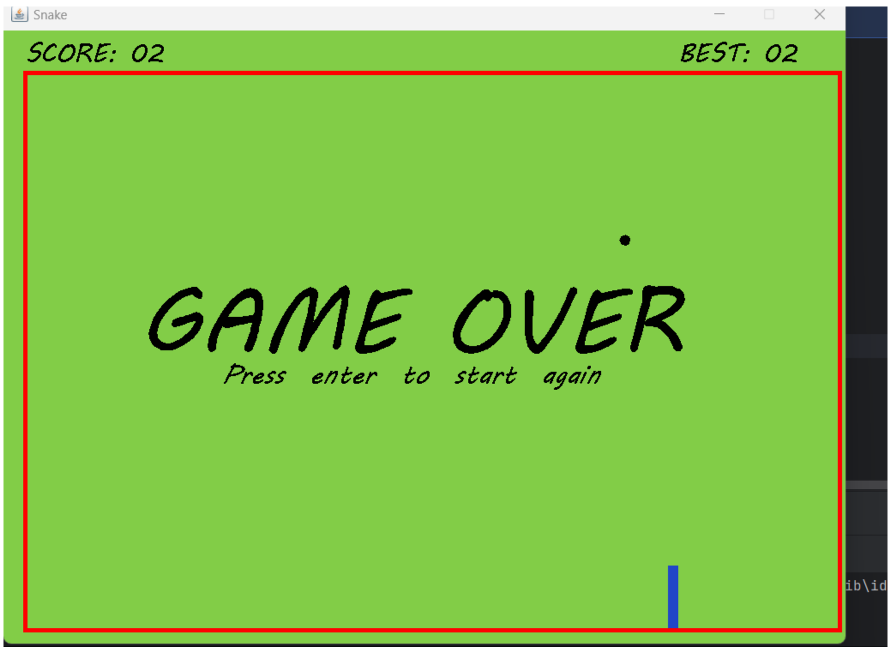
```
    Point head = snake.getHead();

    boolean hitBoundary = head.getX() <= 20

        || head.getX() >= WIDTH + 10

        || head.getY() <= 40

        || head.getY() >= HEIGHT + 30;


    boolean ateItself = false;


    for(Point t : snake.getTail()) {

        ateItself = ateItself || head.equals(t);

    }


    if (hitBoundary || ateItself) {

        setStatus(GameStatus.GAME_OVER);

    }

}


// Spawn a cherry at a random location

public void drawCenteredString(Graphics g, String text, Font font, int y) {

    FontMetrics metrics = g.getFontMetrics(font);

    int x = (WIDTH - metrics.stringWidth(text)) / 2;


    g.setFont(font);

    g.drawString(text, x, y);

}
```

```
private void render(Graphics g) {
    Graphics2D g2d = (Graphics2D) g;

    g2d.setColor(Color.BLACK);
    g2d.setFont(FONT_M);

    if (status == GameStatus.NOT_STARTED) {
      drawCenteredString(g2d, "SNAKE", FONT_XL, 200);
      drawCenteredString(g2d, "GAME", FONT_XL, 300);
      drawCenteredString(g2d, "Press   any   key   to   begin", FONT_M_ITALIC, 330);

      return;
    }

    Point p = snake.getHead();

    g2d.drawString("SCORE: " + String.format ("%02d", points), 20, 30);
    g2d.drawString("BEST: " + String.format ("%02d", best), 630, 30);

    if (cherry != null) {
      if (didLoadCherryImage) {
        g2d.drawImage(image, cherry.getX(), cherry.getY(), 60, 60, null);
      } else {
        g2d.setColor(Color.BLACK);
        g2d.fillOval(cherry.getX(), cherry.getY(), 10, 10);
        g2d.setColor(Color.BLACK);
      }
    }

    if (status == GameStatus.GAME_OVER) {
        drawCenteredString(g2d, "Press   enter   to   start   again", FONT_M_ITALIC, 330);
        drawCenteredString(g2d, "GAME OVER", FONT_L, 300);
    }

    if (status == GameStatus.PAUSED) {
        g2d.drawString("Paused", 600, 14);
    }

    g2d.setColor(new Color(33, 70, 199));
    g2d.fillRect(p.getX(), p.getY(), 10, 10);

    for(int i = 0, size = snake.getTail().size(); i < size; i++) {
        Point t = snake.getTail().get(i);

        g2d.fillRect(t.getX(), t.getY(), 10, 10);
    }

    g2d.setColor(Color.RED);
    g2d.setStroke(new BasicStroke(4));
    g2d.drawRect(20, 40, WIDTH, HEIGHT);
}
```

```
// spawn cherry in random position
public void spawnCherry() {
    cherry = new Point((new Random()).nextInt(WIDTH - 60) + 20,
        (new Random()).nextInt(HEIGHT - 60) + 40);
}

// game loop
private class KeyListener extends KeyAdapter {
    @Override
    public void keyPressed(KeyEvent e) {
        int key = e.getKeyCode();

        if (status == GameStatus.RUNNING) {
            switch(key) {
                case KeyEvent.VK_LEFT: snake.turn(Direction.LEFT); break;
                case KeyEvent.VK_RIGHT: snake.turn(Direction.RIGHT); break;
                case KeyEvent.VK_UP: snake.turn(Direction.UP); break;
                case KeyEvent.VK_DOWN: snake.turn(Direction.DOWN); break;
            }
        }

        if (status == GameStatus.NOT_STARTED) {
            setStatus(GameStatus.RUNNING);
        }

        if (status == GameStatus.GAME_OVER && key == KeyEvent.VK_ENTER) {
                reset();
            }

            if (key == KeyEvent.VK_P) {
                togglePause();
            }
        }
    }

    private class GameLoop extends java.util.TimerTask {
        public void run() {
            update();
            repaint();
        }
    }
}


enum GameStatus
{
    NOT_STARTED, RUNNING, PAUSED, GAME_OVER
}

// direction of snake
enum Direction {
    UP, DOWN, LEFT, RIGHT;
    public boolean isX() {
        return this == LEFT || this == RIGHT;
    }

    public boolean isY() {
        return this == UP || this == DOWN;
    }
}


class Point {
    private int x;
    private int y;

    public Point(int x, int y) {
        this.x = x;
        this.y = y;
    }

    public Point(Point p) {
        this.x = p.getX();
        this.y = p.getY();
    }

    public void move(Direction d, int value) {
```

```
    switch(d) {
        case UP: this.y -= value; break;
        case DOWN: this.y += value; break;
        case RIGHT: this.x += value; break;
        case LEFT: this.x -= value; break;
    }
}

public int getX() {
    return x;
}

public int getY() {
    return y;
}

public Point setX(int x) {
    this.x = x;

    return this;
}

public Point setY(int y) {
    this.y = y;

    return this;
    }

    public boolean equals(Point p) {
        return this.x == p.getX() && this.y == p.getY();
    }

    public String toString() {
        return "(" + x + ", " + y + ")";
    }

    public boolean intersects(Point p) {
        return intersects(p, 10);
    }

    public boolean intersects(Point p, int tolerance) {
        int diffX = Math.abs(x - p.getX());
        int diffY = Math.abs(y - p.getY());

        return this.equals(p) || (diffX <= tolerance && diffY <= tolerance);
    }
}

class Snake {
    private Direction direction;
    private Point head;
    private ArrayList<Point> tail;
```

```java
public Snake(int x, int y) {
    this.head = new Point(x, y);
    this.direction = Direction.RIGHT;
    this.tail = new ArrayList<Point>();

    this.tail.add(new Point(0, 0));
    this.tail.add(new Point(0, 0));
    this.tail.add(new Point(0, 0));
}

public void move() {
    ArrayList<Point> newTail = new ArrayList<Point>();

    for (int i = 0, size = tail.size(); i < size; i++) {
        Point previous = i == 0 ? head : tail.get(i - 1);

        newTail.add(new Point(previous.getX(), previous.getY()));
    }

    this.tail = newTail;

    this.head.move(this.direction, 10);
}

public void addTail() {
        this.tail.add(new Point(-10, -10));
    }

    public void turn(Direction d) {
        if (d.isX() && direction.isY() || d.isY() && direction.isX()) {
            direction = d;
        }
    }

    public ArrayList<Point> getTail() {
        return this.tail;
    }

    public Point getHead() {
        return this.head;
    }
}

public class Main extends JFrame {
    public Main() {
        initUI();
    }

    private void initUI() {
        add(new Game());
        setTitle("Snake");

        setSize(800, 610);


        setLocationRelativeTo(null);

        setResizable(false);

        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

    }


    public static void main(String[] args) {

        EventQueue.invokeLater(() -> {

            Main ex = new Main();

            ex.setVisible(true);

        });

    }

}
```


Snake
SCORE: 02
BEST: 02
GAME OVER
Press enter to start again