whack-a-mole-java

> Whack-A-Mole - Java Swing Game using timed events and score logic

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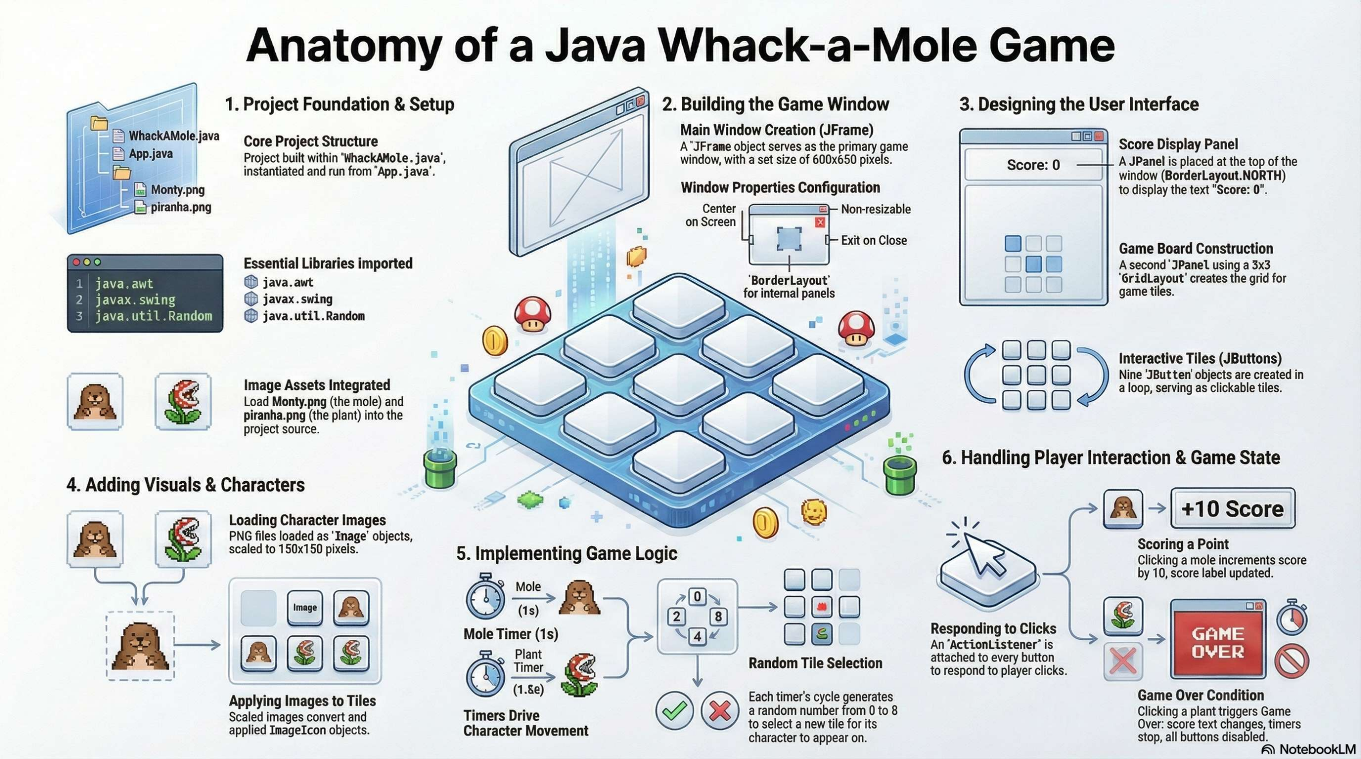
> Simple Java Swing desktop game implementing a 3x3 Whack-A-Mole with Modern-themed assets, timed mole and Plant movement, score tracking, and game-over logic.

> TechStack: Java, Swing, AWT, javax.swing.Timer, ImageIcon, VS Code

- Author: Kintsugi-Programmer



Anatomy of a Java Whack-a-Mole Game

1. Project Foundation & Setup

Core Project Structure
Project built within 'WhackAMole.java', instantiated and run from 'App.java'.

Essential Libraries imported
java.awt
javax.swing
java.util.Random

Image Assets Integrated
Load Monty.png (the mole) and piranha.png (the plant) into the project source.

2. Building the Game Window

Main Window Creation (JFrame)
A 'JFrame object serves as the primary game window, with a set size of 600x650 pixels.

Window Properties Configuration

3. Designing the User Interface

Score Display Panel
A JPanel is placed at the top of the window (BorderLayout.NORTH) to display the text "Score: 0".

Game Board Construction
A second 'JPanel using a 3x3 'GridLayout' creates the grid for game tiles.

Interactive Tiles (JButtons)
Nine 'JButten' objects are created in a loop, serving as clickable tiles.

4. Adding Visuals & Characters

Loading Character Images
PNG files loaded as 'Image' objects, scaled to 150x150 pixels.

Applying Images to Tiles
Scaled images convert and applied ImageIcon objects.

5. Implementing Game Logic

Timers Drive Character Movement

Random Tile Selection

Each timer's cycle generates a random number from 0 to 8 to select a new tile for its character to appear on.

6. Handling Player Interaction & Game State

Scoring a Point
Clicking a mole increments score by 10, score label updated.

Responding to Clicks
An 'ActionListener' is attached to every button to respond to player clicks.

Game Over Condition
Clicking a plant triggers Game Over: score text changes, timers stop, all buttons disabled.

> Disclaimer: The content presented here is a curated blend of my personal learning journey, experiences, open-source documentation, and invaluable knowledge gained from diverse sources. I do not claim sole ownership over all the material; this is a community-driven effort to learn, share, and grow together.

Table of Contents

Introduction

This Documentation teaches how to create a simple Whack-a-Mole game in Java with a graphical user interface (GUI). This is an excellent beginner project for those starting to learn Java and GUI development.

Game Overview

- **Game Elements**: Uses images AI-Generated
- **Game Board**: Nine tiles arranged in a 3x3 grid
- **Main Character**: A mole that hops around the tiles
- **Obstacle**: A Piranha Plant that also moves around the board
- **Objective**: Click on tiles with the mole to earn points
- **Losing Condition**: Clicking on the Piranha Plant results in "Game Over"

Project Setup

Development Environment

- **IDE**: Visual Studio Code
- **Language**: Java
- **Prerequisites**: Java setup in Visual Studio Code (Documentation available in video description)

Project Creation Steps

1. Open Visual Studio Code

2. Use keyboard shortcut: `Ctrl + Shift + P`
3. Select "Java: Create Java Project"
4. Choose "No build tools"
5. Create project on Desktop
6. Name the project: "whack-a-mole"
7. This creates a project folder with a `src` folder containing `App.java`

- java readme default

```
## Getting Started

Welcome to the VS Code Java world. Here is a guideline to help you get
started to write Java code in Visual Studio Code.

## Folder Structure

The workspace contains two folders by default, where:

- `src`: the folder to maintain sources
- `lib`: the folder to maintain dependencies

Meanwhile, the compiled output files will be generated in the `bin` folder
by default.

> If you want to customize the folder structure, open
`.vscode/settings.json` and update the related settings there.

## Dependency Management

The `JAVA PROJECTS` view allows you to manage your dependencies. More
details can be found [here](https://github.com/microsoft/vscode-java-
dependency#manage-dependencies).
```

Initial Project Structure

```
whack-a-mole/
├── src/
│   ├── App.java
│   ├── WhackAMole.java (create this file)
│   ├── piranha.PNG (download)
│   └── monty.PNG (download)
```

Download Required Files

Before coding:

1. Visit GitHub link in video description

2. Download two image files:
    - `piranha.PNG` (Piranha Plant image)
    - `monty.PNG` (Mole image)
3. Drag both images into the `src` folder

Initial App.java Setup

Modify the default `App.java` file:

```
public class App {
    public static void main(String[] args) throws Exception {
        new WhackAMole();
    }
}
```

- Remove the default print statement
- Create an instance of the `WhackAMole` class

    ```
    public class WhackAMole {
    }
    ```

- Collapse the App.java file as main code goes in WhackAMole.java

Game Window Setup

- creating window
-

Window Specifications

- **Width**: 600 pixels
- **Height**: 650 pixels
- **Note**: Game board is 600x600, but height is 650 to provide room for a score display text at the top

Creating the Window Frame

```
// Create variables
int boardWidth = 600;
int boardHeight = 650;
JFrame frame = new JFrame("Whack-A-Mole");
```

Import Statements

Add these import statements at the top of WhackAMole.java:

```java
import java.awt.*; // GUI
import java.awt.event.*;
import java.util.Random; // Random Positions
import javax.swing.*; // GUI , Contain JFrame
```

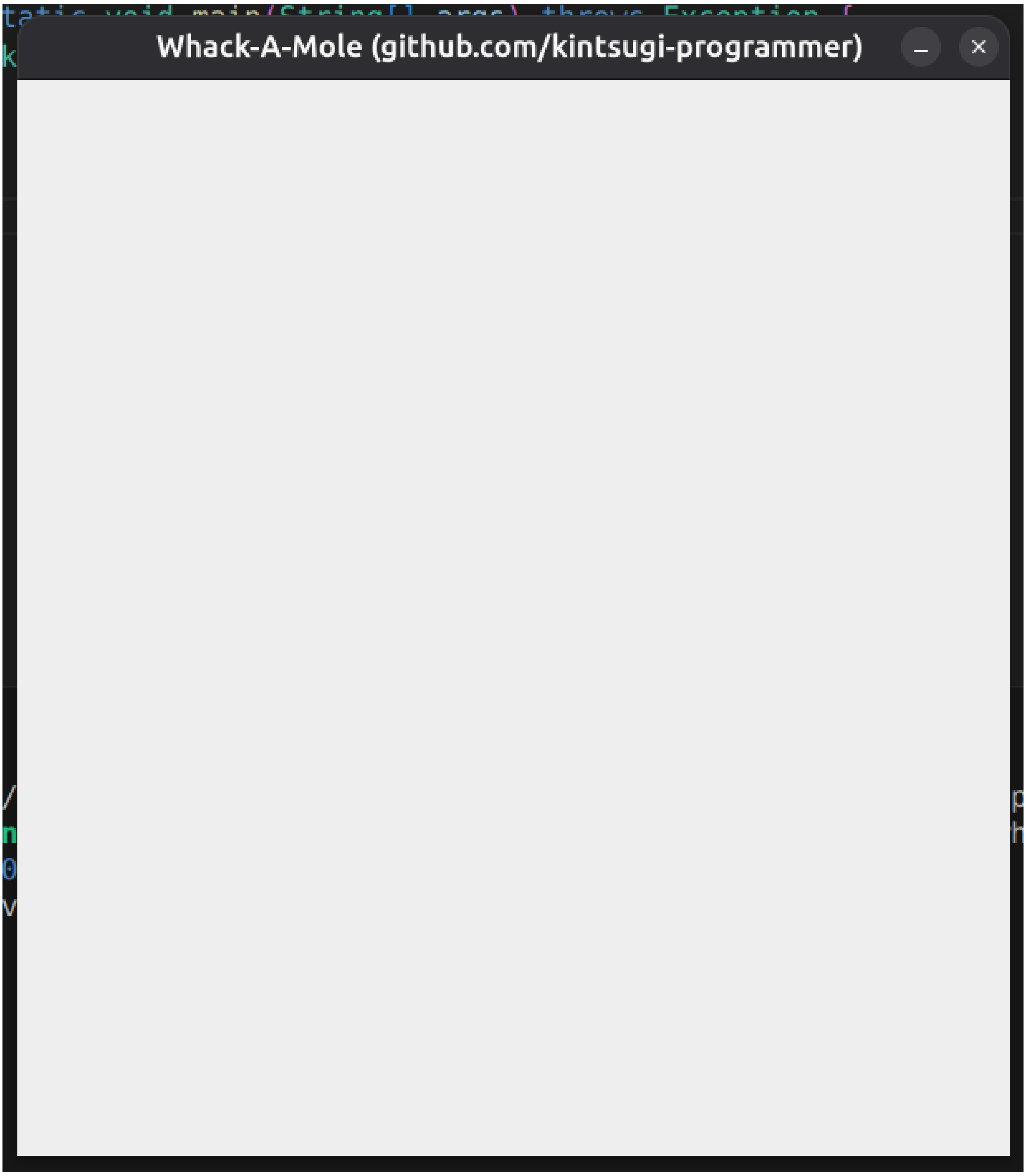
> Originally javax was intended to be for extensions, and sometimes things would be promoted out of javax into java.

Frame Properties

Set frame properties in the constructor:

```java
frame.setVisible(true);
frame.setSize(boardWidth, boardHeight);
frame.setLocationRelativeTo(null);  // Opens window at center of screen
frame.setResizable(false);
frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);  // X button terminates program
frame.setLayout(new BorderLayout());
```

this will create empty window blank, when run App.java



Important Note on Timing

Place `frame.setVisible(true)` at the very end of the constructor after all components are added. This ensures all components load before the window becomes visible, preventing slow loading of individual buttons.

Text Panel and Score Display

Creating the Text Panel

```
// Create text label
JLabel textLabel = new JLabel();
```

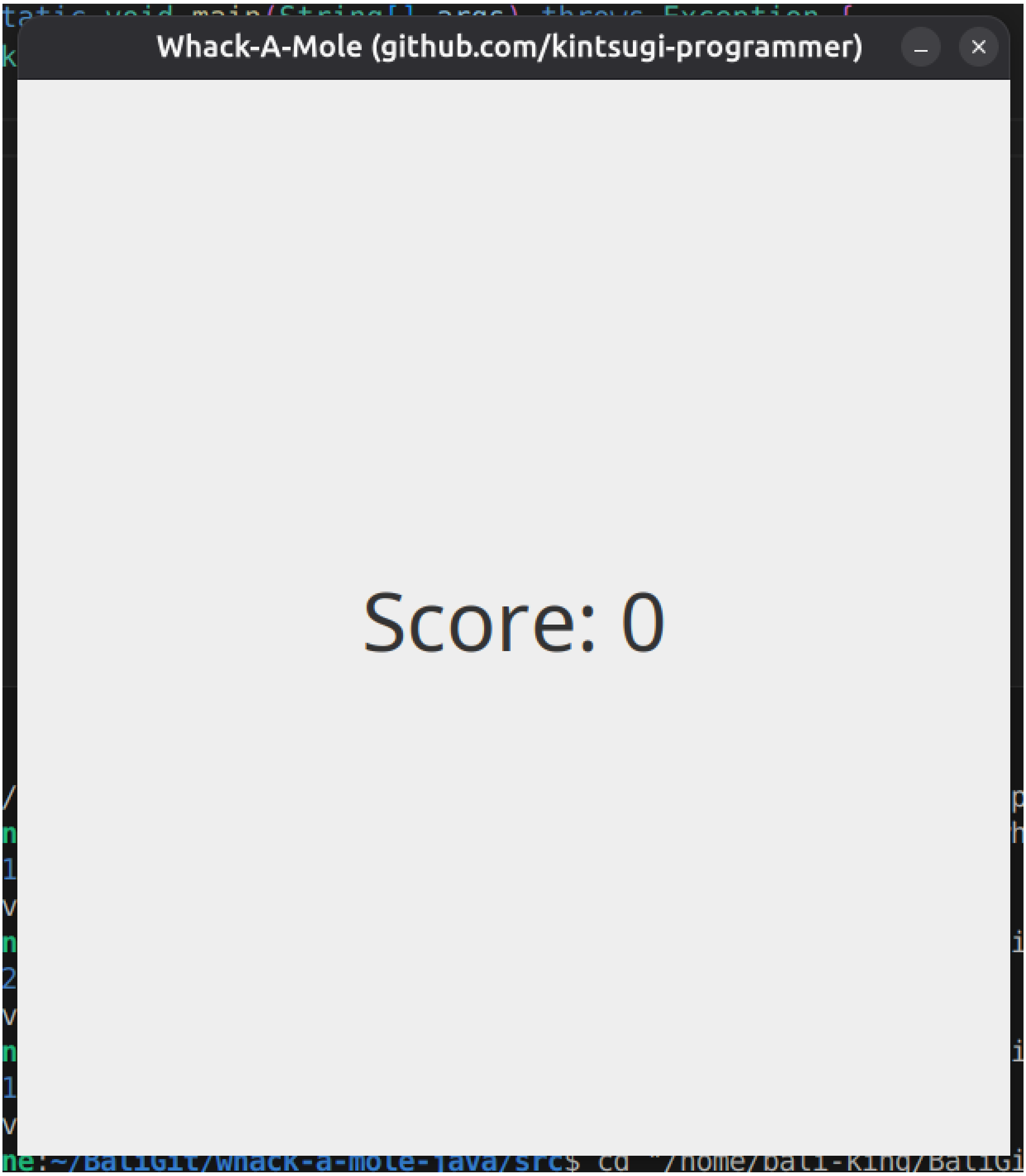
```
// Create text panel to hold label
JPanel textPanel = new JPanel();
```

Formatting the Text Label

```
textLabel.setFont(new Font("Arial", Font.PLAIN, 50));// 50px
textLabel.setHorizontalAlignment(JLabel.CENTER);  // Centers text horizontally
textLabel.setText("Score: 0");
textLabel.setOpaque(true);  // Makes background visible
```

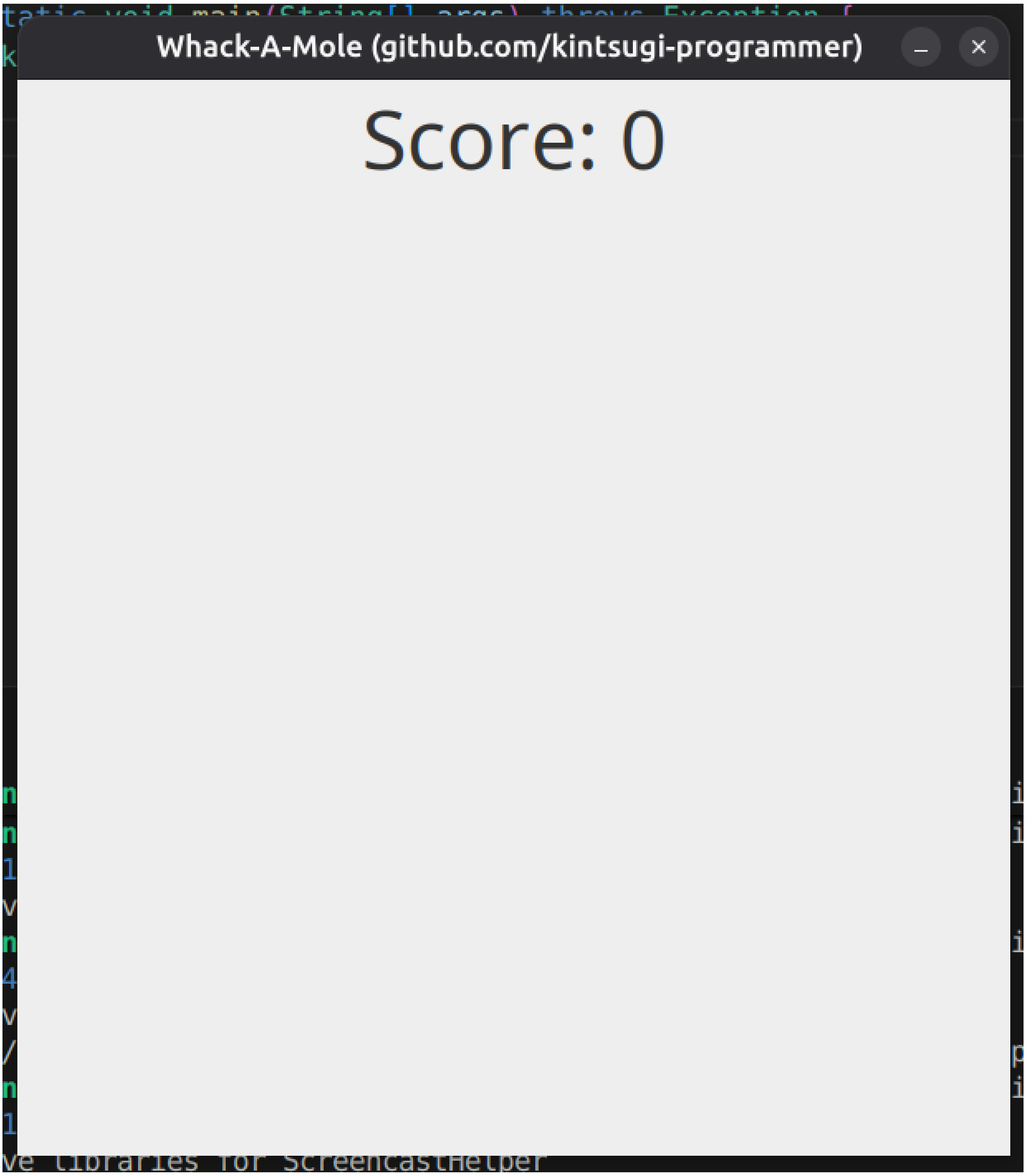
Adding to Frame

```
textPanel.setLayout(new BorderLayout());
textPanel.add(textLabel);// add textLabel in textPanel
frame.add(textPanel);// add textPanel to frame
```



Score: 0

```
frame.add(textPanel, BorderLayout.NORTH);  // BorderLayout.NORTH pushes
panel to top // add textPanel to frame
```



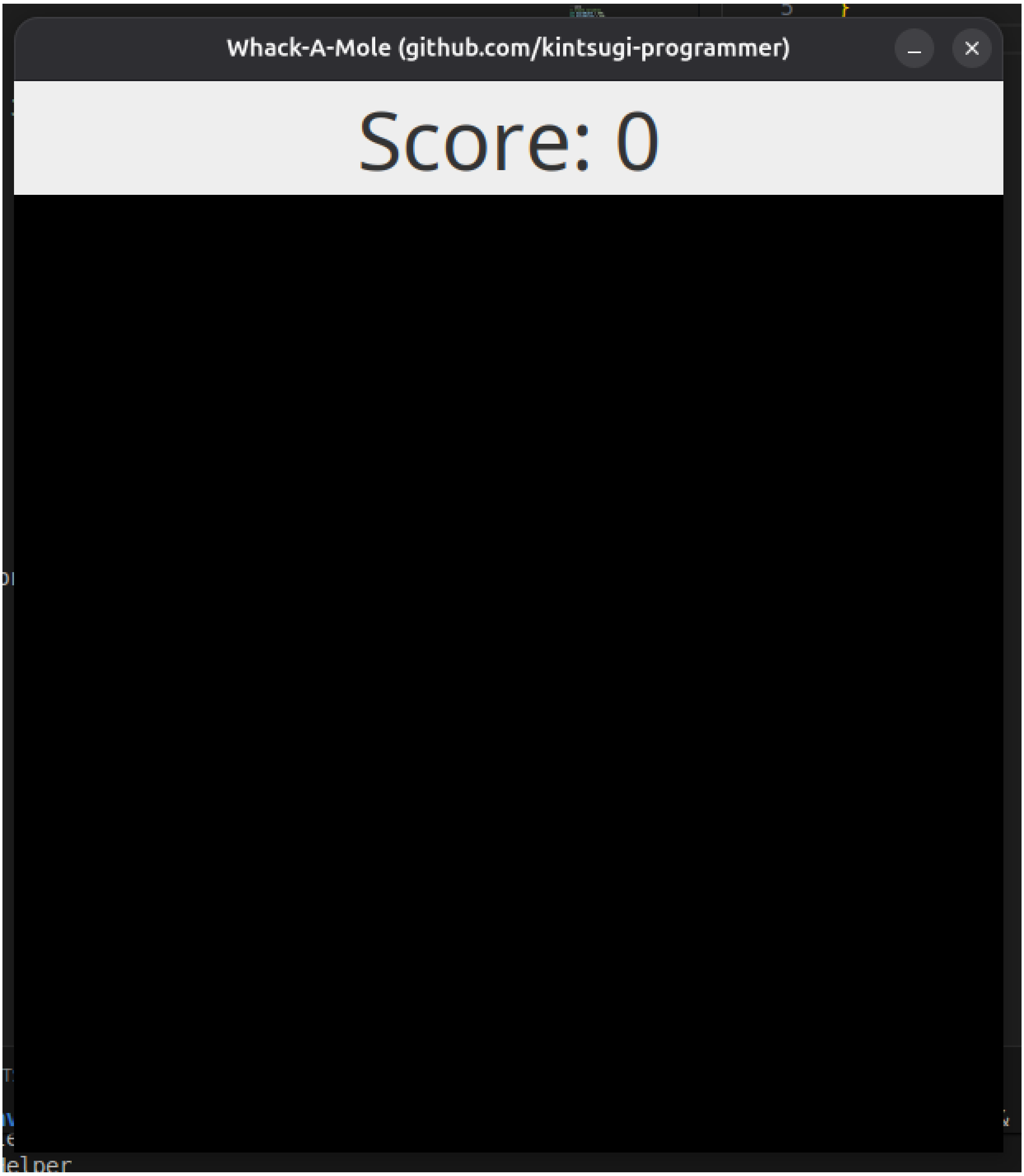
Game Board Panel Setup

Creating the Board Panel

```
JPanel boardPanel = new JPanel();
boardPanel.setLayout(new GridLayout(3, 3));  // 3x3 grid of tiles
frame.add(boardPanel);
```

Optional Styling

```
boardPanel.setBackground(Color.BLACK);  // Optional: makes background
visible during development
```



Creating Buttons for Tiles

Button Array Setup

Create an array to track all nine buttons(outside constructor):

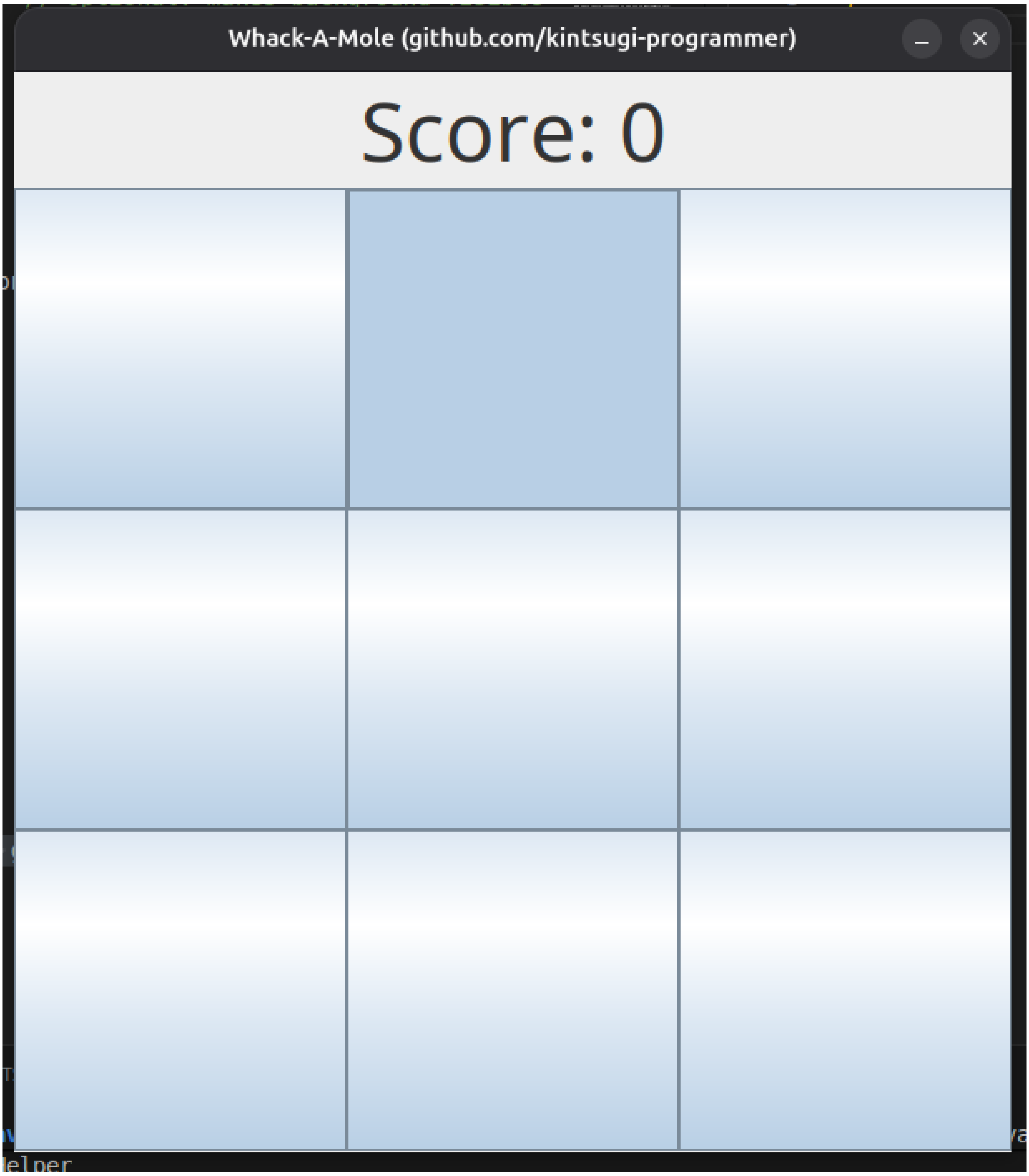
```
JButton[] board = new JButton[9];
```

Creating and Adding Buttons

Use a for loop to create nine buttons:

```
for (int i = 0; i < 9; i++) {
    JButton tile = new JButton();
    board[i] = tile;
    boardPanel.add(tile);
}
```

Each button represents one tile on the game board; also clickable



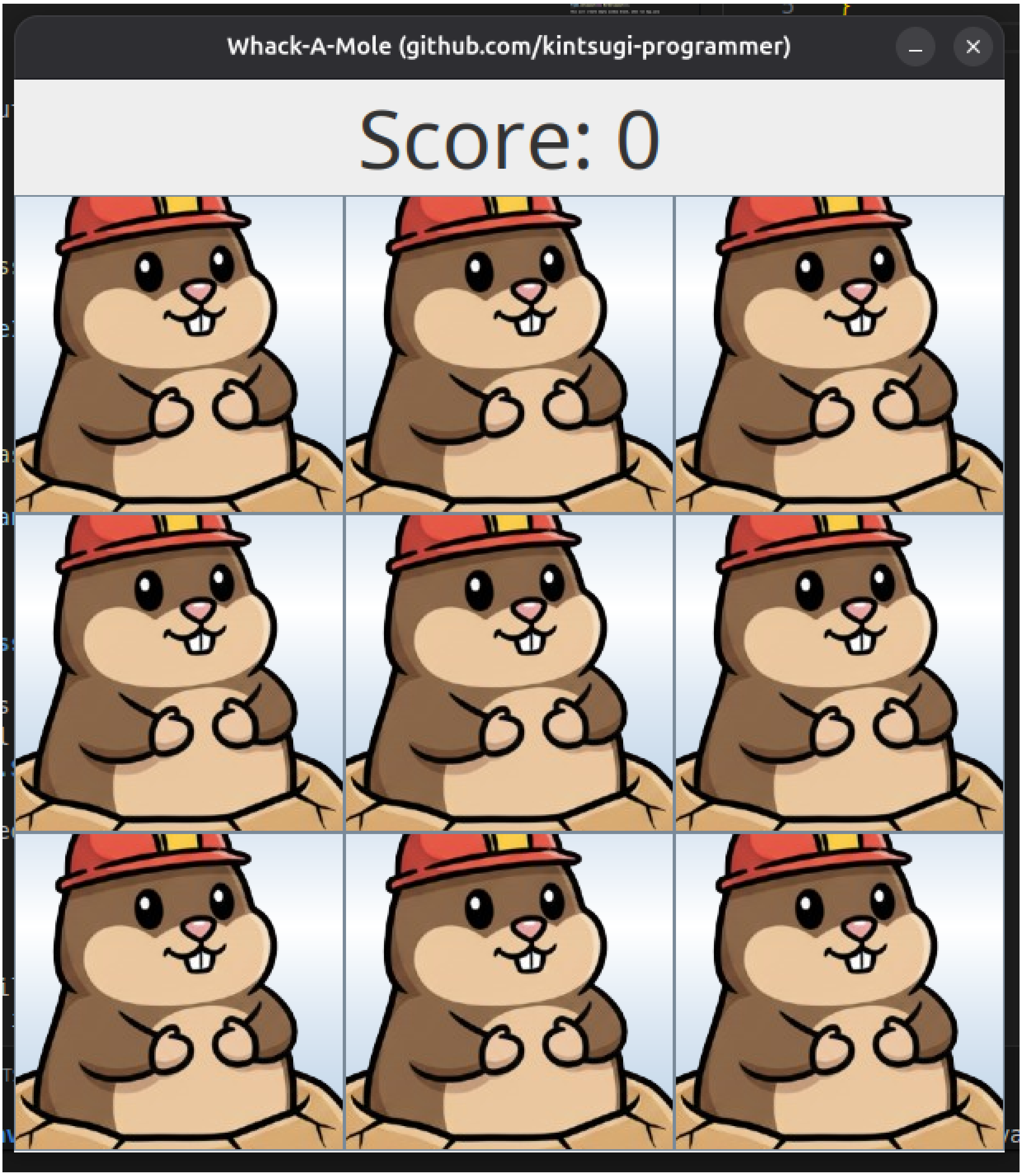
Loading and Scaling Images

Make ImageIcon outside Constructors

```
    ImageIcon moleIcon;
    ImageIcon plantIcon;
```

Inside Constructor

```
    // Loading and Scaling Images
    moleIcon = new ImageIcon(getClass().getResource("./monty.png"));

    // constructing buttons/ tiles
    // JButton button1 = new JButton(); // one button
    for ( int  i = 0; i<9; i++){ // using loop, to create tiles/buttons; instead of hardcode
        JButton tile = new JButton();
        board[i] = tile;
        boardPanel.add(tile); // appending to boardPanel Grid one-by-one
        tile.setIcon(moleIcon); // IMAGE INSIDE TILE
    }   // Each button represents one tile on the game board.
        // also clickable
```



now as you can see, image is not setted ,but; image is not scaled...

Image Files

The game uses two image files:

- `piranha.png` - Piranha Plant image
- `monty.png` - Mole image

put it in src for direct access ease

```
bali-king@war-machine:~/BaliGit/whack-a-mole-java/src$ tree
.
├── App.class
├── App.java
├── monty2.png
├── monty.png
├── piranha.png
├── WhackAMole.class
└── WhackAMole.java

1 directory, 7 files
bali-king@war-machine:~/BaliGit/whack-a-mole-java/src$
```

Loading and Scaling Images

The images must be scaled to fit the buttons (150x150 pixels). The process involves two steps:

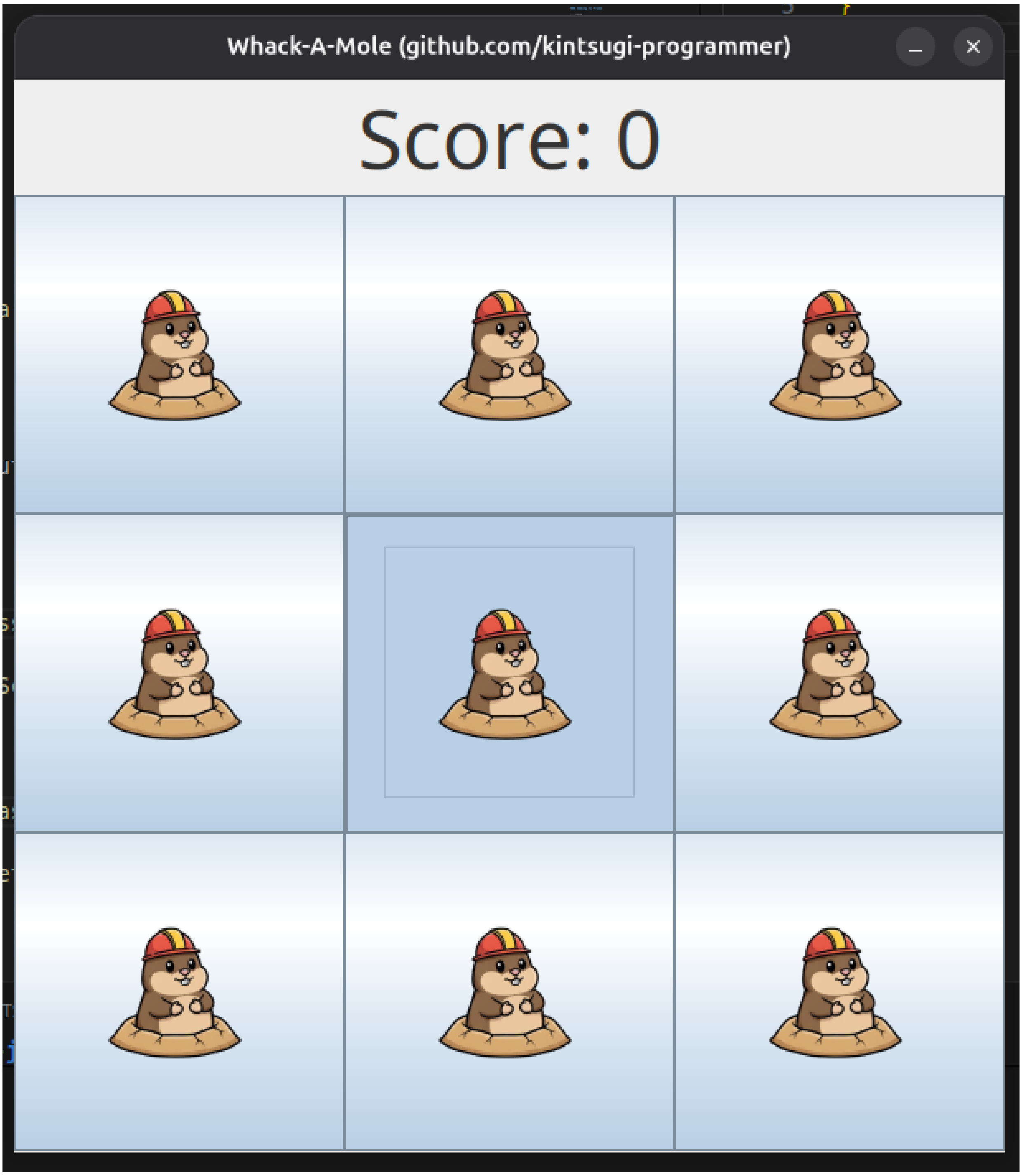
```
// Load mole image
Image moleImage = new
ImageIcon(getClass().getResource("./monty.png")).getImage();
moleIcon = new ImageIcon(moleImage.getScaledInstance(150, 150,
Image.SCALE_SMOOTH));

// Load plant image
Image plantImage = new
ImageIcon(getClass().getResource("./piranha.png")).getImage();
plantIcon = new ImageIcon(plantImage.getScaledInstance(150, 150,
Image.SCALE_SMOOTH));
```

Explanation of Image Loading Process

1. **getClass().getResource()** - Loads the image file from the source folder
2. **getImage()** - Extracts the actual image from the ImageIcon
3. **getScaledInstance(150, 150, Image.SCALE_SMOOTH)** - Resizes image to 150x150 pixels with smooth scaling
4. **new ImageIcon()** - Converts scaled image back to ImageIcon for button display

Why Two-Step Process?

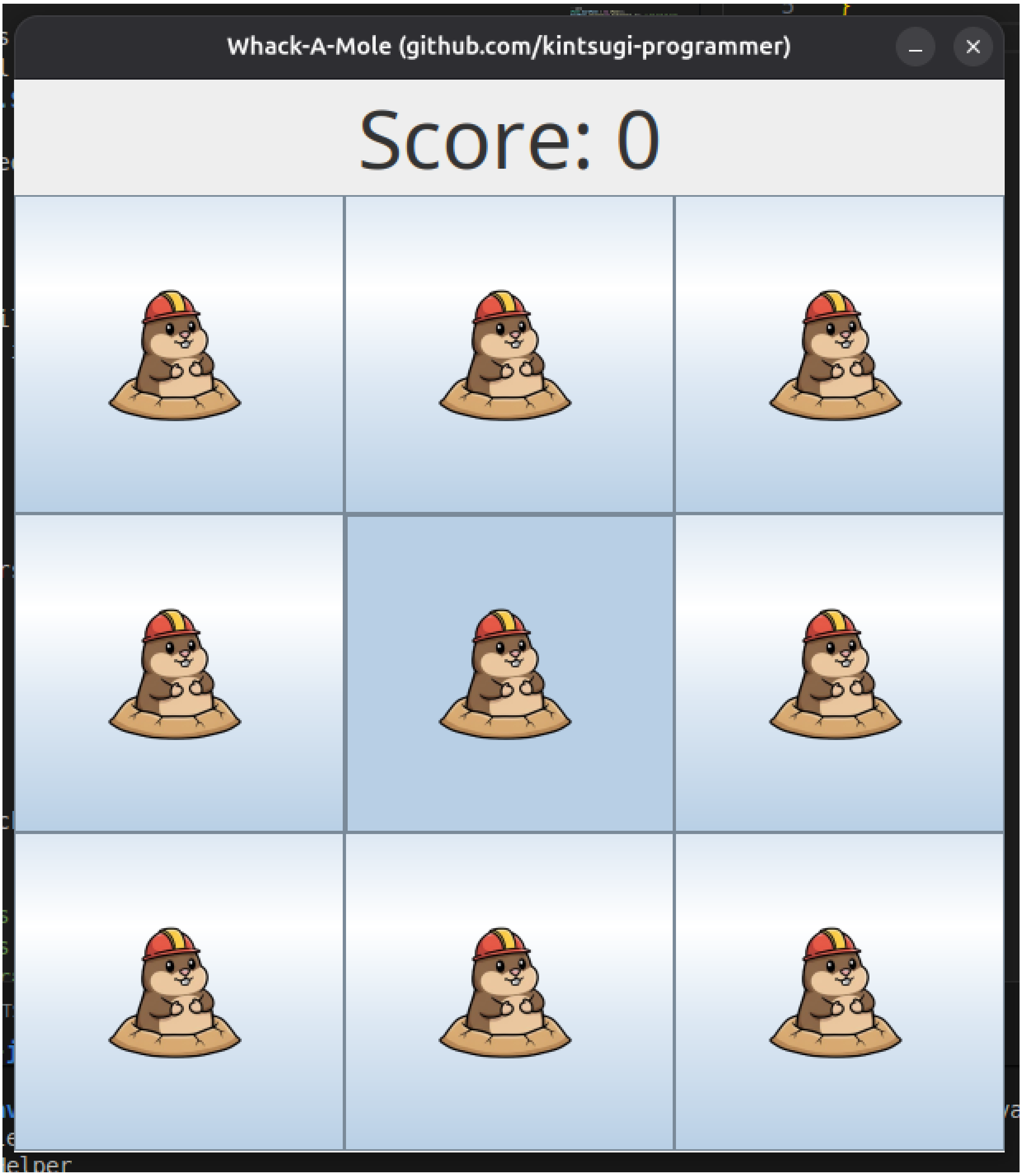
- Cannot directly set ImageIcon from file path with scaling
- Must first get the image, then scale it, then create ImageIcon from scaled image



Removing Button Focus Rectangle

Disable the focus rectangle that appears when buttons are clicked:

```java
tile.setFocusable(false);
```



Variables for Game State

Create these instance variables to track game state:

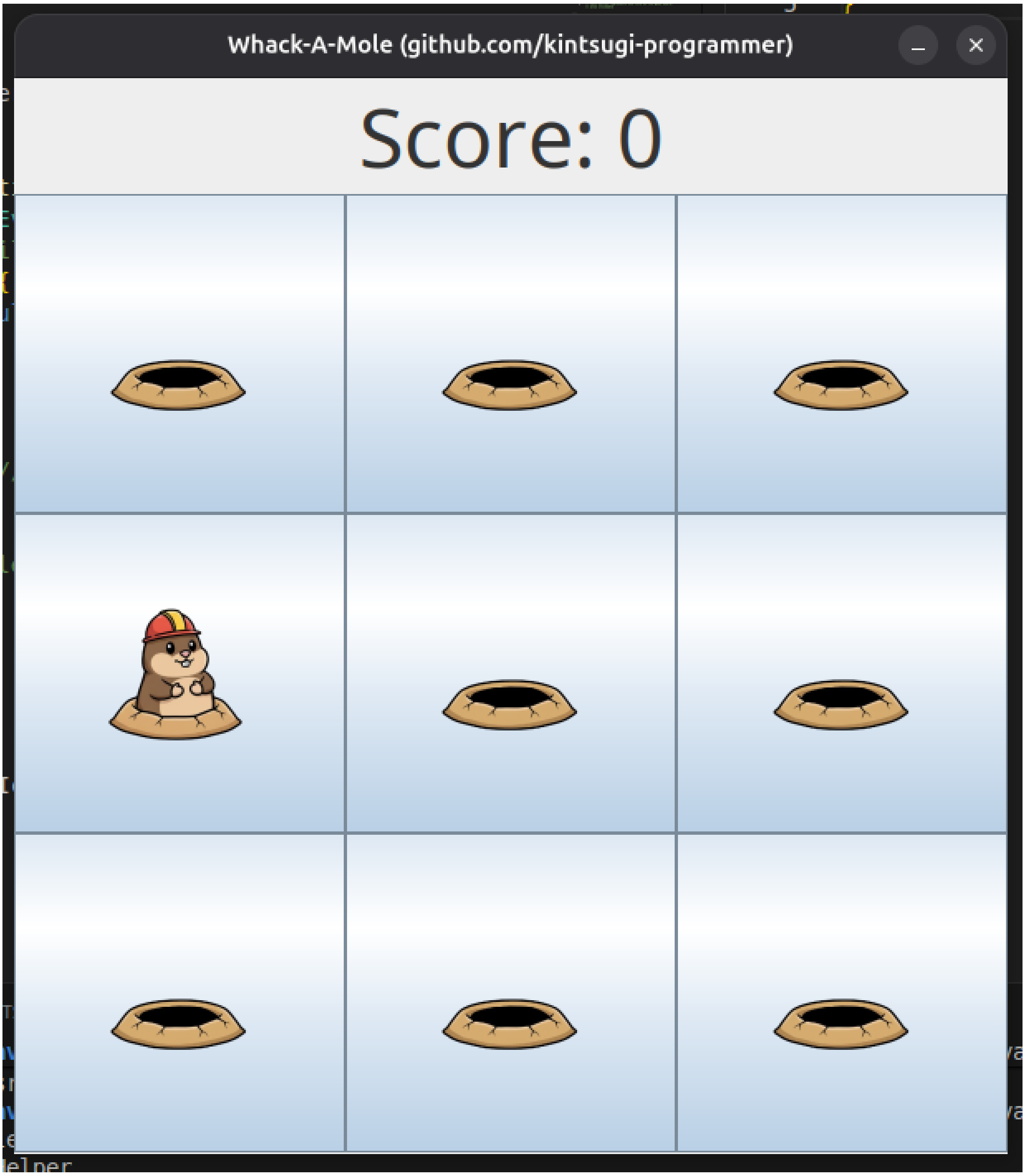
```
JButton currentMoleTile;      // Tracks which button currently has the mole
JButton currentPlantTile;     // Tracks which button currently has the plant
Random random = new Random();  // For random tile selection
Timer setMoleTimer;            // Timer to move mole to new tiles
Timer setPlantTimer;           // Timer to move plant to new tiles
int score = 0;                 // Tracks player score
```

Moving the Mole

Mole Timer Setup

Create a timer that moves the mole every 1000 milliseconds (1 second):

```java
setMoleTimer = new Timer(1000, new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        // Remove mole from current tile
        if (currentMoleTile != null) {
            currentMoleTile.setIcon(null);  // Remove image from button
            currentMoleTile = null;
        }

        // // normal way, but doesn't check if other object also have same tile or not
        // currentMoleTile = board[random.nextInt(9)];
        // currentMoleTile.setIcon(moleIcon);

        // new way, makes objects of random number and check if plant already is at tile
          // Select random tile
          int num = random.nextInt(9);  // Random number 0-8
          JButton tile = board[num];

          // Check if plant is on this tile (avoid conflict)
          if (currentPlantTile == tile) {
              return;  // Skip this turn
          }

          // Place mole on new tile
          currentMoleTile = tile;
          currentMoleTile.setIcon(moleIcon);
    }
});

setMoleTimer.start();
```



Why Use Intermediate Variable?

The code uses:

```
JButton tile = board[num];
```

Instead of:

```
currentMoleTile = board[num];
```

This is because there's an edge case that must be covered (conflict checking with plant tile).

Moving the Plant

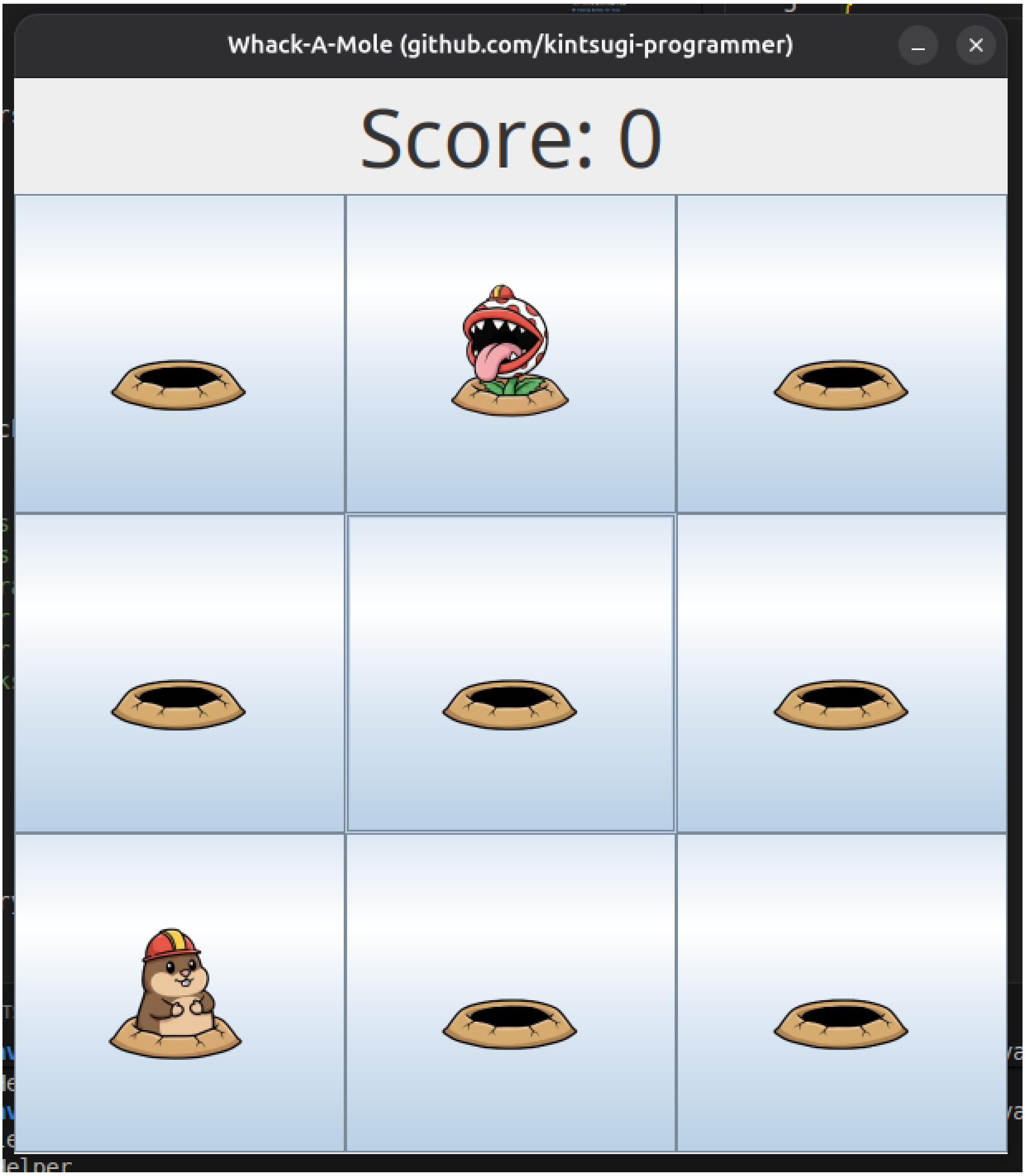
Plant Timer Setup

Create a timer that moves the plant every 1500 milliseconds (1.5 seconds):

```java
setPlantTimer = new Timer(1500, new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        // Remove plant from current tile
        if (currentPlantTile != null) {
            currentPlantTile.setIcon(null);  // Remove image from button
            currentPlantTile = null;
        }

        // Select random tile
        int num = random.nextInt(9);  // Random number 0-8
        JButton tile = board[num];

        // Check if mole is on this tile (avoid conflict)
        if (currentMoleTile == tile) {
            return;  // Skip this turn
        }

        // Place plant on new tile
        currentPlantTile = tile;
        currentPlantTile.setIcon(plantIcon);
    }
});

setPlantTimer.start();
```

Why Different Timer Values?

- Mole: 1000 milliseconds (moves every second)
- Plant: 1500 milliseconds (moves every 1.5 seconds)
- This creates variety in movement patterns



Handling Tile Conflicts

The Conflict Problem

Since there are only 9 tiles and two separate timers randomly placing mole and plant:

- High chance both timers select the same tile
- One icon overwrites the other
- Only one image displays on the shared tile
- Game logic becomes inconsistent

Solution: Tile Occupancy Check

When placing mole or plant, check if the target tile is occupied:

In Mole Timer:

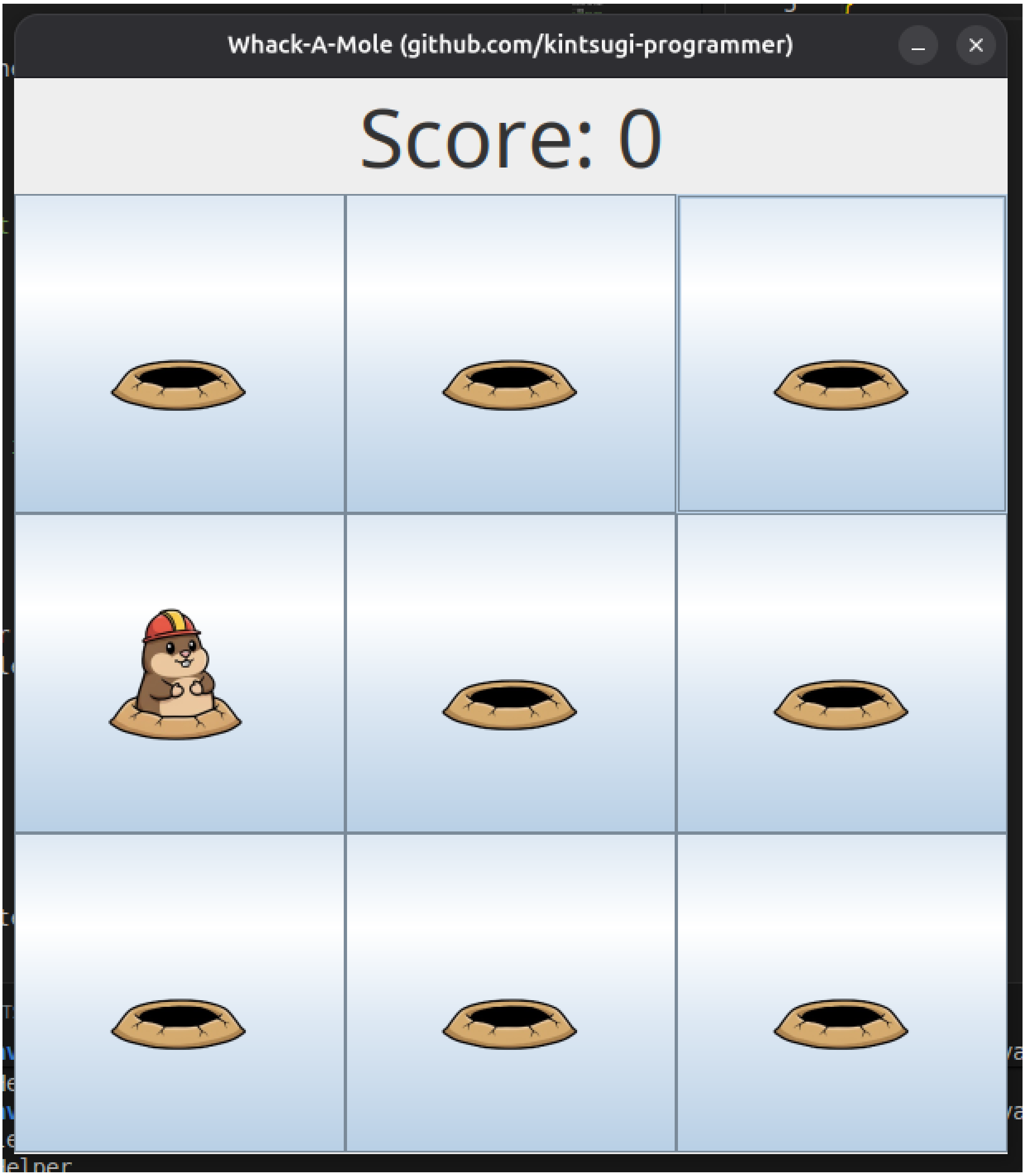
```
if (currentPlantTile == tile) {
    return;  // Skip this turn if plant is here
}
```

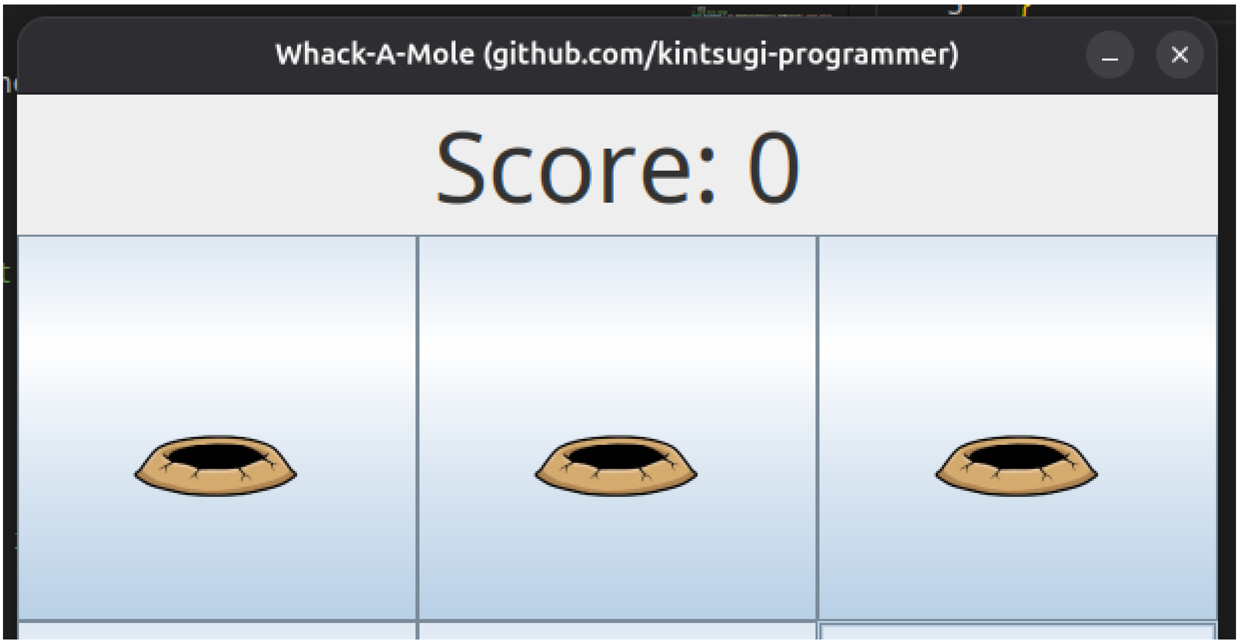
In Plant Timer:

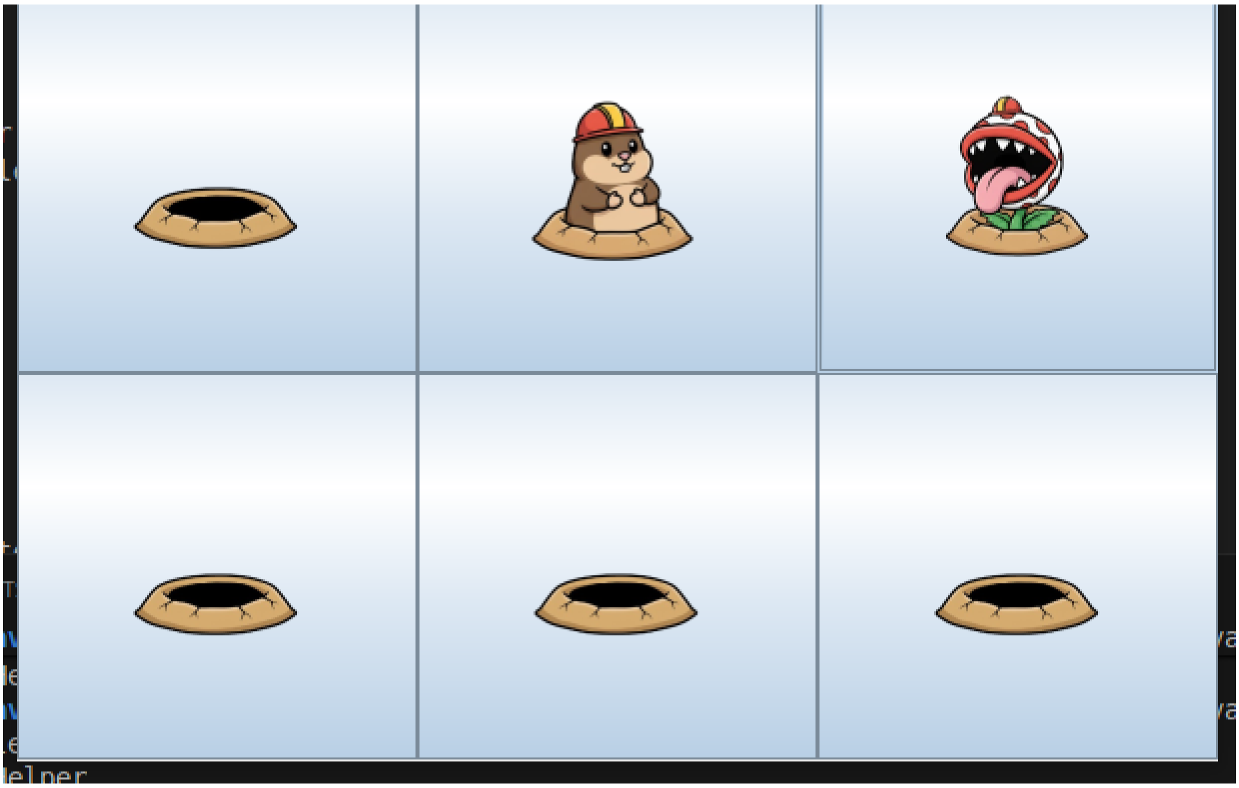
```
if (currentMoleTile == tile) {
    return;  // Skip this turn if mole is here
}
```

How It Works

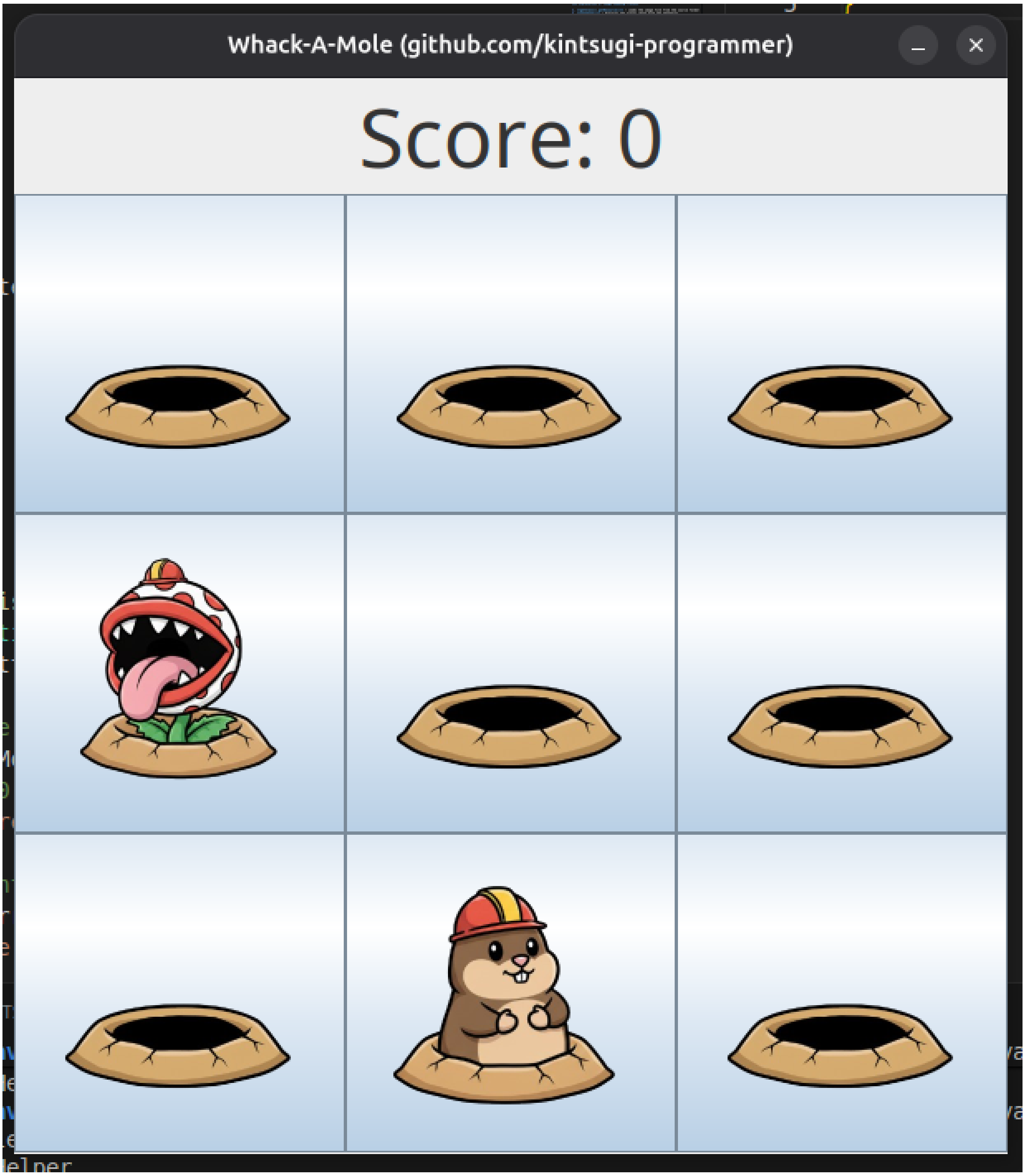
1. If selected tile already has mole or plant, return early
2. The current icon remains on that tile
3. No overwriting occurs
4. Game logic remains consistent


Whack-A-Mole (github.com/kintsugi-programmer)
Score: 0


Whack-A-Mole (github.com/kintsugi-programmer)
Score: 0



> after resizing to make pleasing



Detecting Button Clicks

Adding Click Listeners to Tiles

In the for loop where buttons are created, add an action listener to each button:

```
for (int i = 0; i < 9; i++) {
    JButton tile = new JButton();
    board[i] = tile;
    boardPanel.add(tile);

    // Add click handler
    tile.addActionListener(new ActionListener() {
        public void actionPerformed(ActionEvent e) {
            JButton clickedTile = (JButton) e.getSource();// input user click & typecast that input to button

            // Check if clicked on mole
            if (clickedTile == currentMoleTile) {
                score += 10;  // Add 10 points
                textLabel.setText("Score: " + Integer.toString(score));
            }
            // Check if clicked on plant
            else if (clickedTile == currentPlantTile) {
                textLabel.setText("Game Over");

                // Stop movement
                setMoleTimer.stop();
                setPlantTimer.stop();

                // Disable all buttons
                for (int i = 0; i < 9; i++) {
                    board[i].setEnabled(false);
                }
            }
        }
    });
}
```

Type Casting

```
JButton clickedTile = (JButton) e.getSource();
```

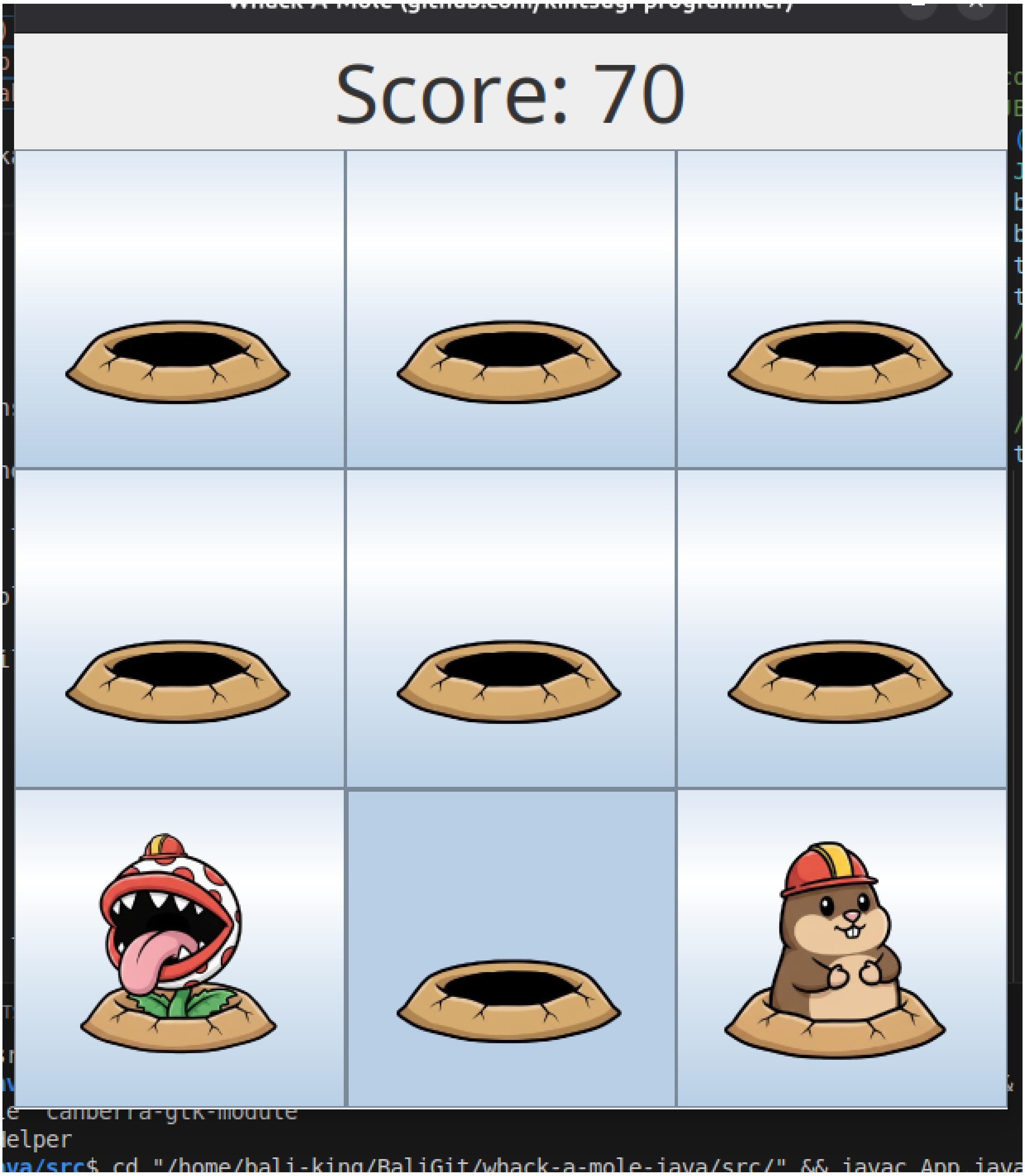
- `e.getSource()` returns an Object
- Must cast to JButton to access button-specific methods

Mole Click Behavior

- Increment score by 10 points
- Update score text display
- Mole continues moving (no stopping)
- Player can continue playing

Plant Click Behavior

- Display "Game Over" text
- Stop mole timer: `setMoleTimer.stop()`
- Stop plant timer: `setPlantTimer.stop()`
- Disable all buttons: `board[i].setEnabled(false)`
- Mole and plant stop moving
- Buttons become grayed out and unclickable



Score: 70

```
e  canberra-gtk-module
Helper
va/src$ cd "/home/bali-king/BaliGit/whack-a-mole-java/src/" && javac App.java
```

Complete Game Flow

Game Sequence

1. Window opens with 3x3 grid of buttons
2. Score displays at top as "Score: 0"
3. Mole randomly appears on one tile and moves every 1 second
4. Plant randomly appears on different tile and moves every 1.5 seconds
5. Player clicks on tiles containing mole to earn points (+10 each)
6. Player tries to avoid clicking on tile with plant
7. Clicking plant triggers "Game Over"
8. When game ends:
    - Timers stop
    - All buttons disabled

    - Text changes to "Game Over"

Important Implementation Details

- Mole and plant can never occupy same tile (prevented by checks)
- Score updates only when mole is clicked
- Game cannot be played after "Game Over" unless program is restarted
- Focus rectangles removed from buttons for cleaner appearance
- All components load before window becomes visible

Possible Enhancements

The basic game can be improved with these features:

Enhancement 1: Hole instead of null spaces

```
    ImageIcon holeIcon; // before constructor

    // Inside constructor
    Image holeImage = new ImageIcon(getClass().getResource("./hole.png")).getImage();
    holeIcon = new ImageIcon(holeImage.getScaledInstance(150, 150, Image.SCALE_SMOOTH));
```

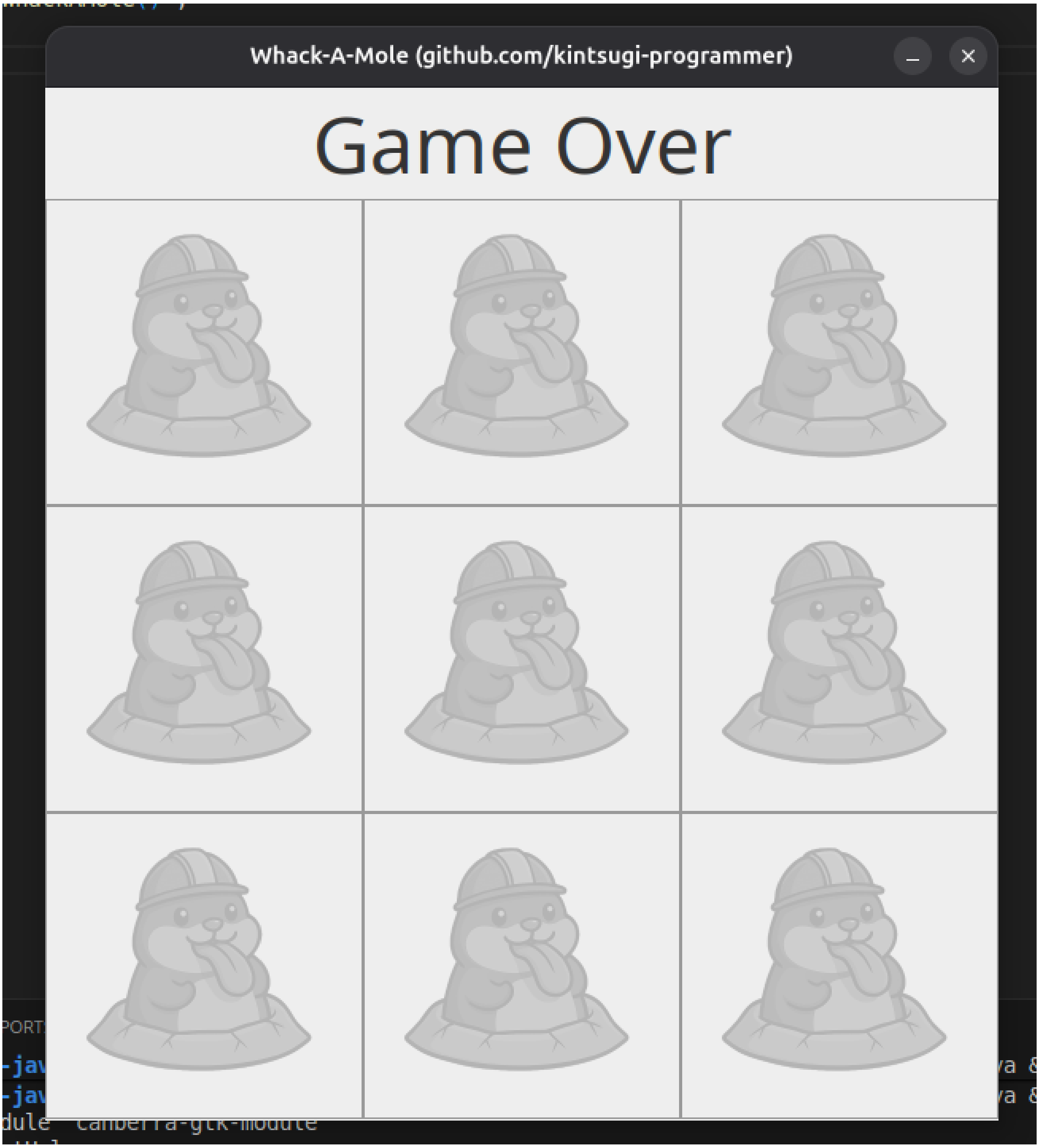
> then replace icon tiles `null` with `holeIcon`

Enhancement 2: GameOver Mole Teasing Buttons

```
ImageIcon molemockingIcon;
```

```
// inside constructor
Image molemockingImage = new ImageIcon(getClass().getResource("./montymocking.png")).getImage();

molemockingIcon = new ImageIcon(molemockingImage.getScaledInstance(250, 250, Image.SCALE_SMOOTH));
```

```
// inside gameover logic
// Disable all buttons
for (int i = 0; i<9; i++){
    board[i].setIcon(molemockingIcon);
    board[i].setEnabled(false);
}
```



Enhancement 3: Second Piranha Plant

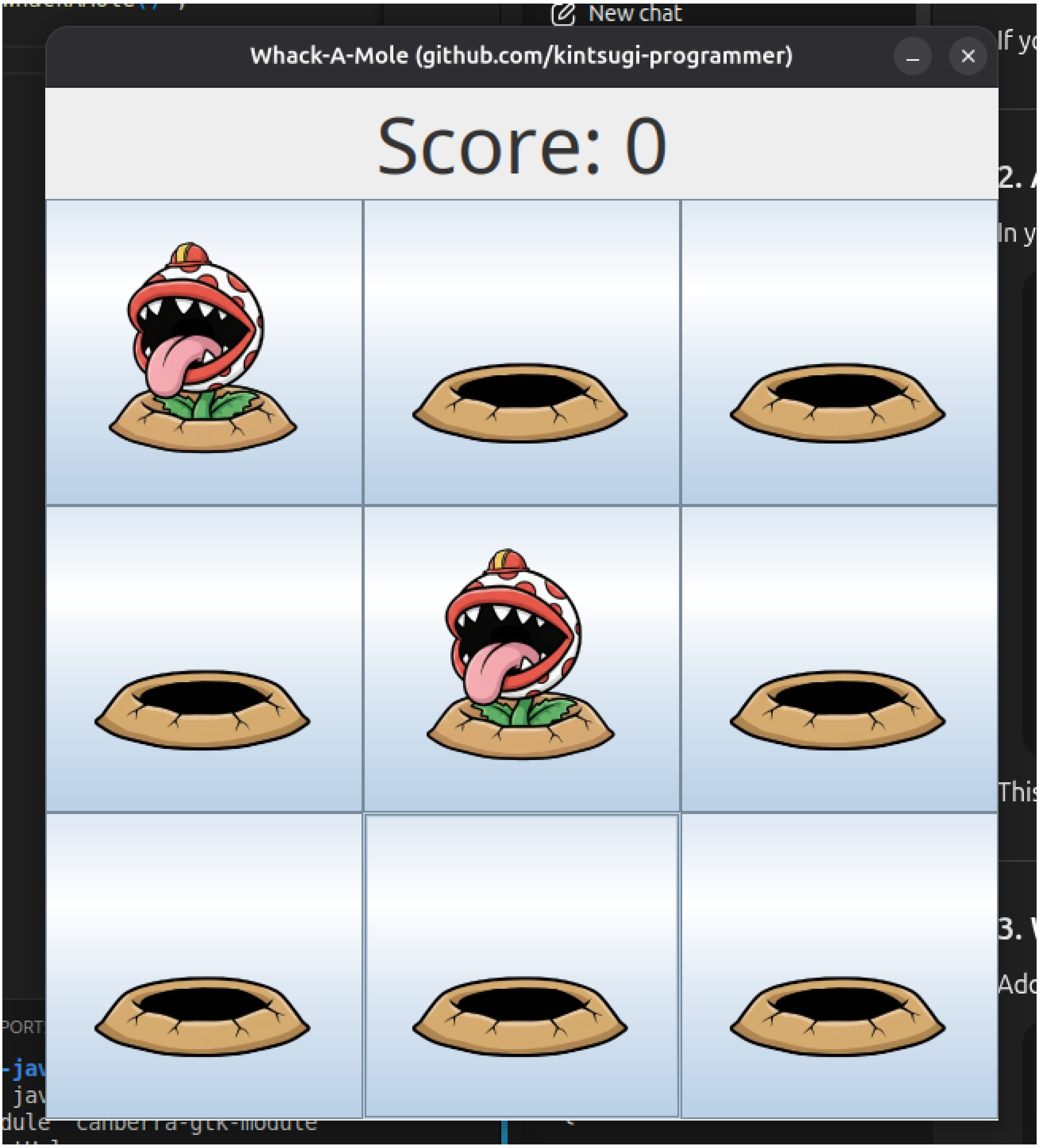
This enhancement adds a **second independent Piranha Plant** to the game, increasing difficulty without changing the core mechanics.

Implementation details:

- A new variable `currentPlantTile2` tracks the second plant's position.
- A second timer `setPlantTimer2` controls the movement of the second plant.
- Each plant:
  - Moves on its own timer interval.
  - Cannot occupy the same tile as the mole.
  - Cannot occupy the same tile as the other plant.
- Clicking **either** plant immediately ends the game.

Gameplay impact:

- Players must now track two hazards instead of one.
- Different timer intervals create unpredictable movement patterns.
- The difficulty increases naturally while keeping the implementation simple and readable.



Enhancement 4: Reset Button

This enhancement adds a **Reset** button to the top bar, to the **right of the score**. The player can restart the game at any time without closing and reopening the program.

UI Changes

- A `JButton resetButton` is added next to the score label.

- The top `textPanel` uses `BorderLayout`, with:
  - `textLabel` (Score: X) in `BorderLayout.CENTER`
  - `resetButton` in `BorderLayout.EAST`

This keeps the UI compact and visually aligned with the score.

Logic Changes

A new method `resetGame()` is introduced, which:

1. **Stops all timers** (`setMoleTimer`, `setPlantTimer`, `setPlantTimer2`) to avoid movement during the reset.
2. **Resets the score** back to `0` and updates the text label to `"Score: 0"`.
3. **Clears game state**, by setting:
   - `currentMoleTile = null`
   - `currentPlantTile = null`
   - `currentPlantTile2 = null`
4. **Restores the board** by looping over all 9 buttons:
   - Setting their icon back to the `holeIcon`
   - Re-enabling them in case they were disabled after "Game Over".
5. **Restarts all timers** so the mole and plants begin moving again from a clean state.

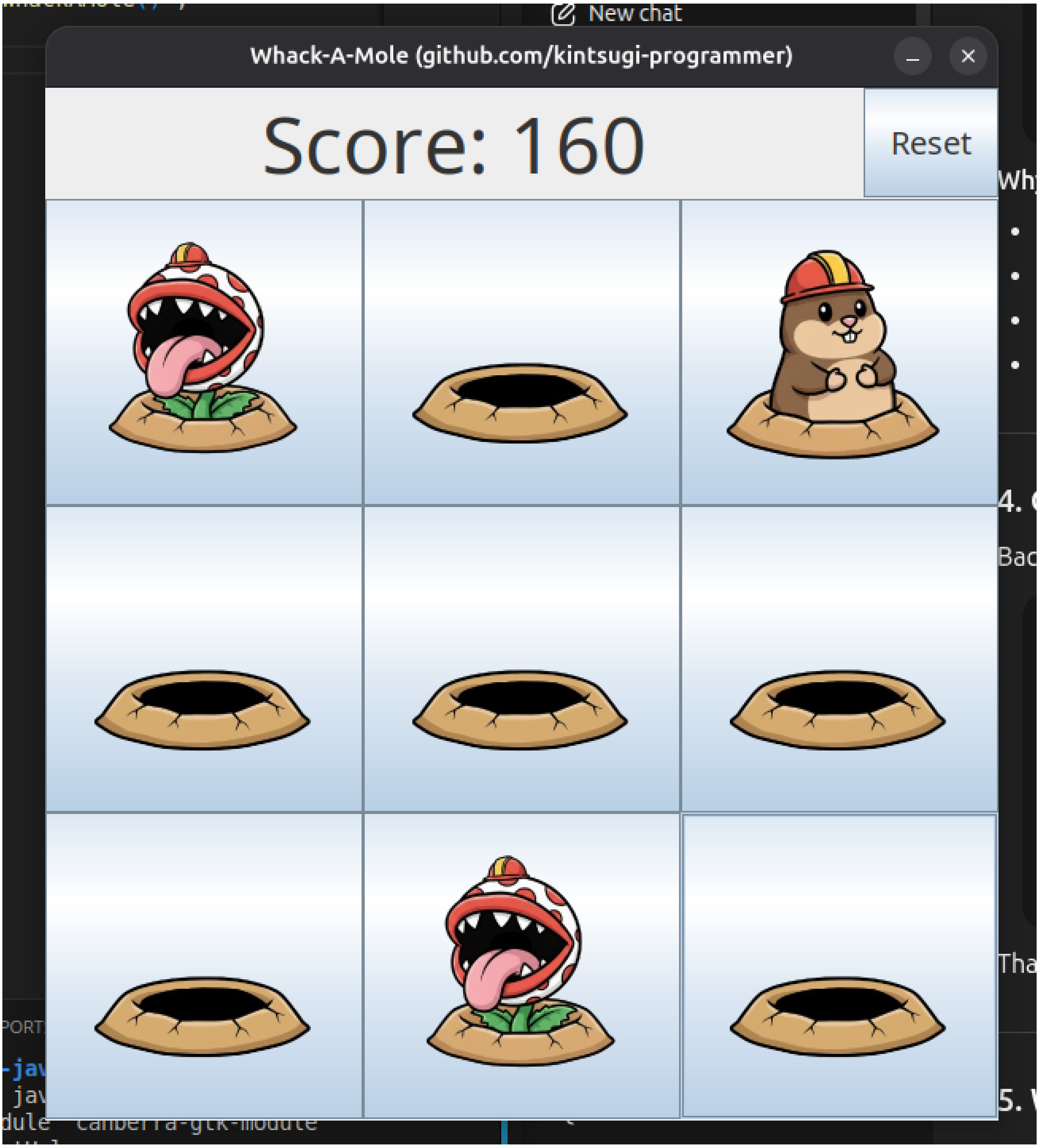
```
        // new, inside cons.
        // constructing Reset Button
        JButton resetButton = new JButton("Reset");
        resetButton.setFont(new Font("Arial",Font.PLAIN,20));
        resetButton.setFocusable(false);

        resetButton.addActionListener(new ActionListener() {
            @Override
            public void actionPerformed(ActionEvent e){
                resetGame();
            }
        });
```

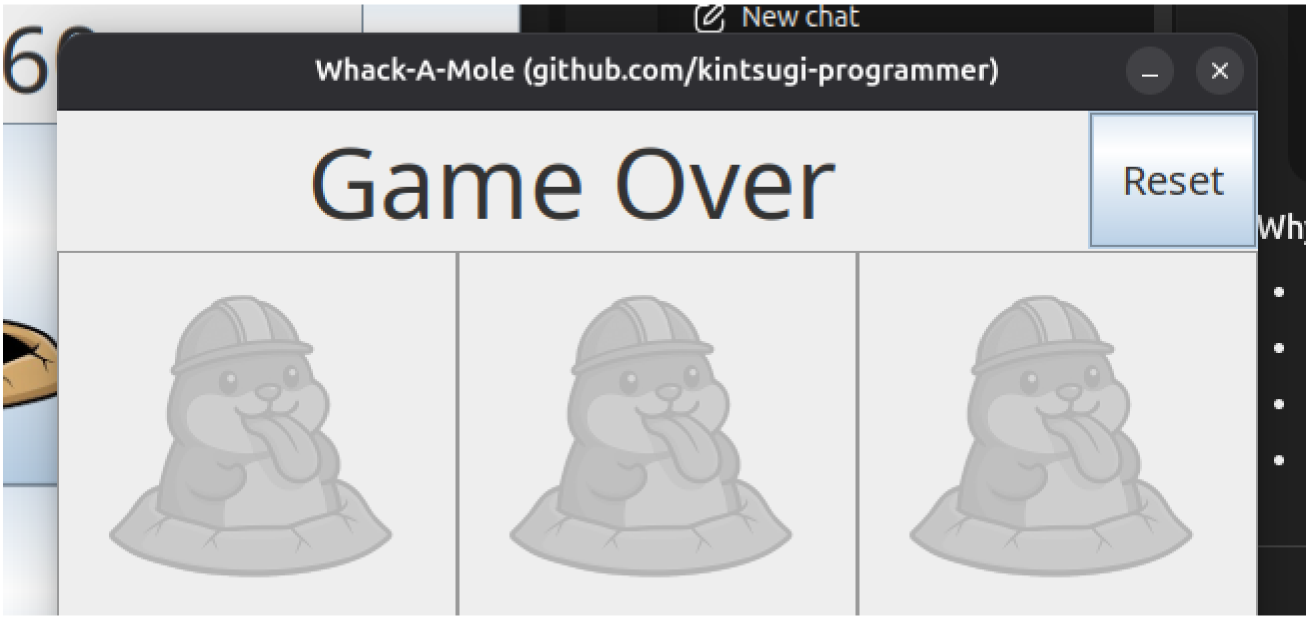
```
        // tweak
        // constructing textPanel to hold textLabel
        // and making frame to hold textPanel
        textPanel.setLayout(new BorderLayout());
        textPanel.add(textLabel, BorderLayout.CENTER); // score at center
        textPanel.add(resetButton, BorderLayout.EAST); // right side reset button
        frame.add(textPanel,BorderLayout.NORTH);
```

```
// new outside cons.
  private void resetGame(){
        // stop timers safetly check
        setMoleTimer.stop();
        setPlantTimer.stop();
        setPlantTimer2.stop();

        // reset score
        score = 0;
        textLabel.setText("Score: 0");

        // clear board, for new start
        for (int i=0; i<9; i++){
            board[i].setIcon(holeIcon);
            board[i].setEnabled(true);
        }

        // clear reference
        currentMoleTile = null;
        currentPlantTile = null;
        currentPlantTile2 = null;

        // restart timers
        setMoleTimer.start();
        setPlantTimer.start();
        setPlantTimer2.start();

    }
```

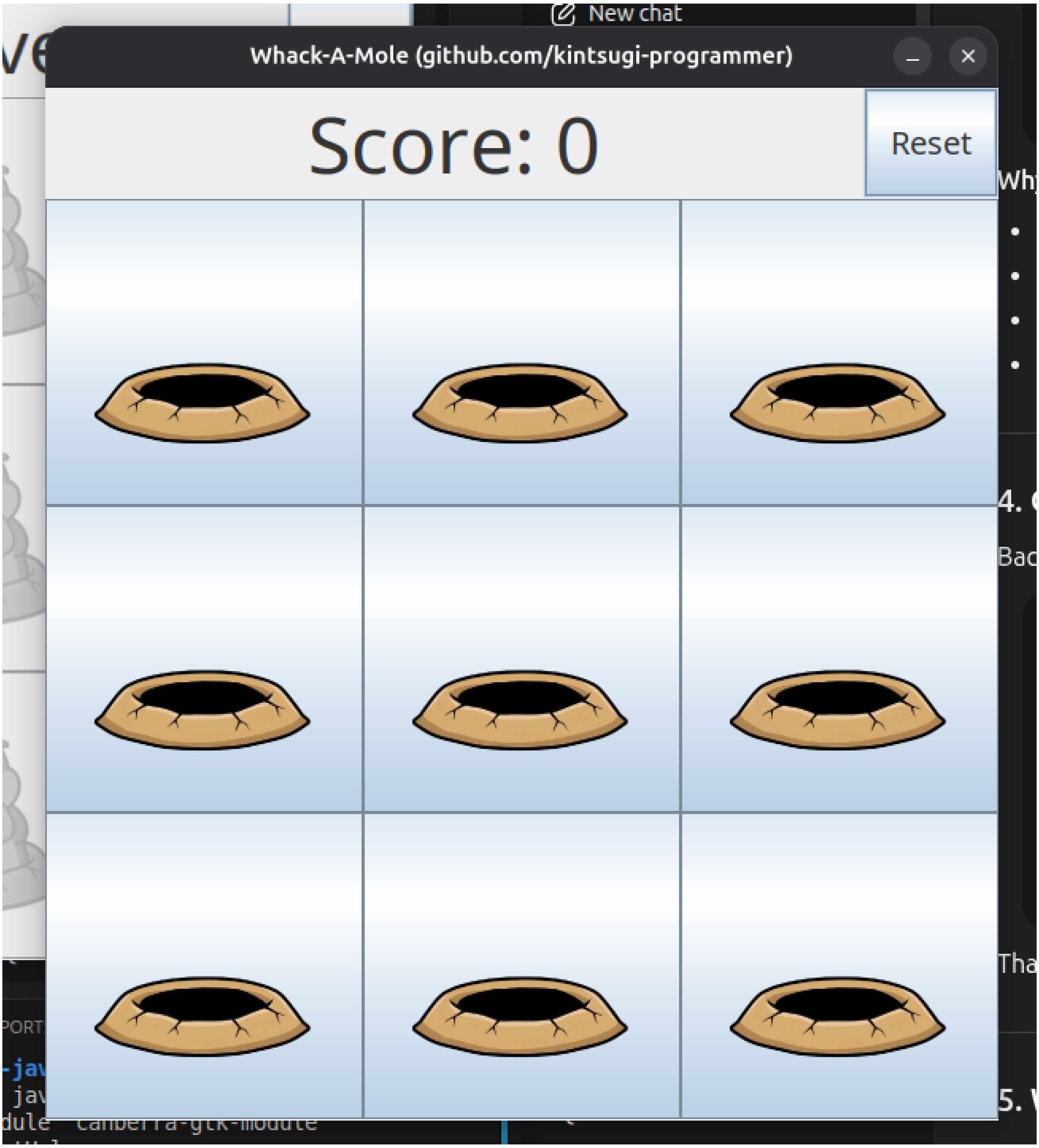
Player Experience

- After a **Game Over**, instead of restarting the application, the player can simply click **Reset** to start a new round.
- The Reset button also works mid-game, instantly restarting the board and score.
- The mocking game-over state (all tiles showing the teasing mole) is cleared on reset, returning the board to fresh hole tiles.


New chat
Whack-A-Mole (github.com/kintsugi-programmer)
Score: 160
Reset


New chat
Whack-A-Mole (github.com/kintsugi-programmer)
Game Over
Reset

```
dule  canberra-gtk-module
```



Enhancement 5: High Score Tracking

- Create variable to track all-time high score
- Display high score on screen
- Compare current score with high score
- Persist high score between games

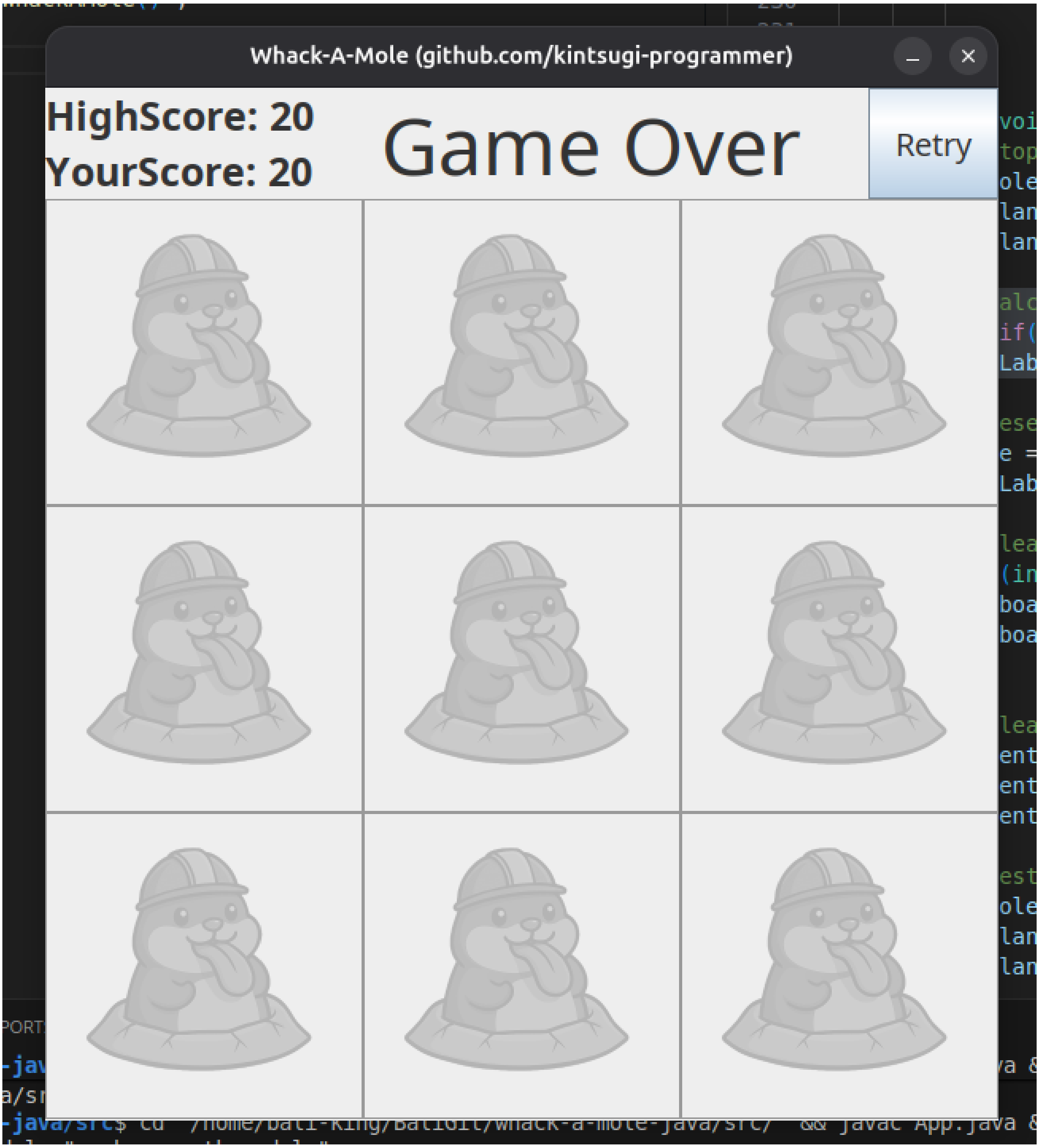
```
// outside constructor
    int score = 0,highScore=0;
```

```
// inside constructor
         // constructing textLabel2
        textLabel2.setFont(new Font("Arial",Font.BOLD,25));// Set Font to Label, Arial Font , Plain 50px
        textLabel2.setHorizontalAlignment(JLabel.CENTER);// center text auto
        textLabel2.setText("<html>"+"HighScore: "+Integer.toString(highScore)+"<br>YourScore: 0"+"</html>");
        textLabel2.setOpaque(true);
```

```
// inside constructor
        // constructing textPanel to hold textLabel
        // and making frame to hold textPanel
        textPanel.setLayout(new BorderLayout());
        textPanel.add(textLabel, BorderLayout.CENTER); // score at center
        textPanel.add(textLabel2, BorderLayout.WEST); // score at center
        textPanel.add(resetButton, BorderLayout.EAST); // right side reset button
        frame.add(textPanel,BorderLayout.NORTH);
```

```
// at game over logic
                        // calculate and update highscore
                        if(highScore<score){highScore=score;}
                        textLabel2.setText("<html>"+"HighScore: "+Integer.toString(highScore)+"<br>YourScore: "+score+ "</html>");
```

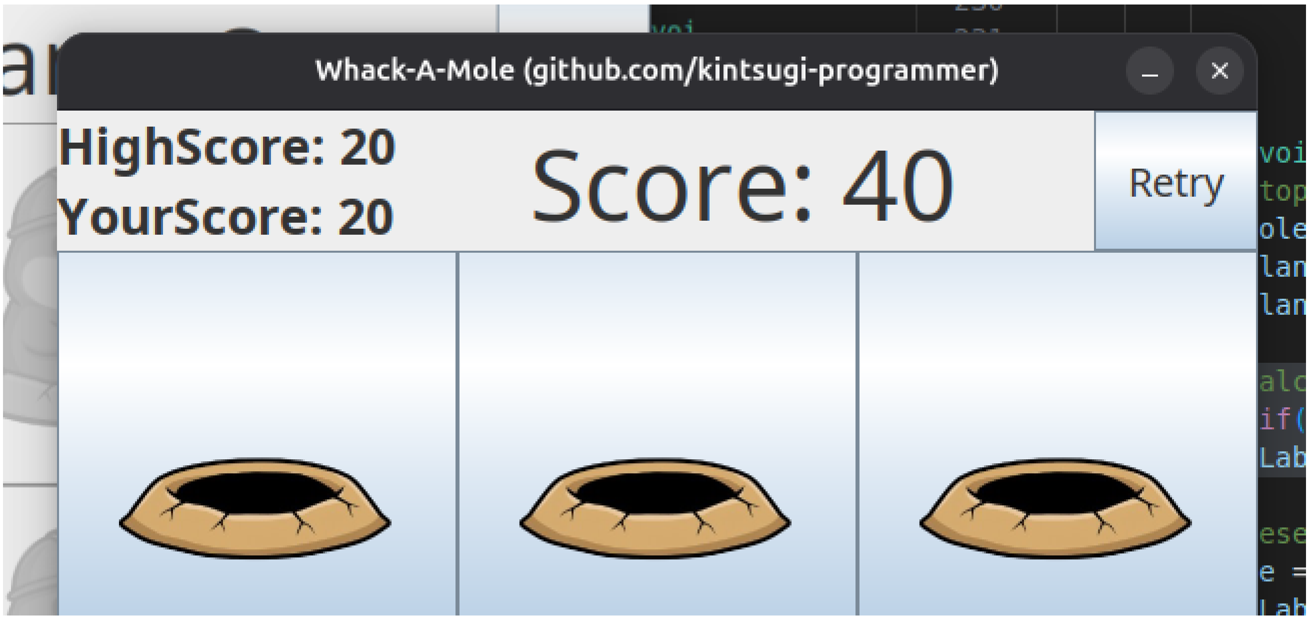
```
// at resetGame()
        // calculate and update highscore before reset score
            if(highScore<score){highScore=score;}
        textLabel2.setText("<html>"+"HighScore: "+Integer.toString(highScore)+"<br>YourScore: "+score+ "</html>");
```



Whack-A-Mole (github.com/kintsugi-programmer)

HighScore: 20
YourScore: 20

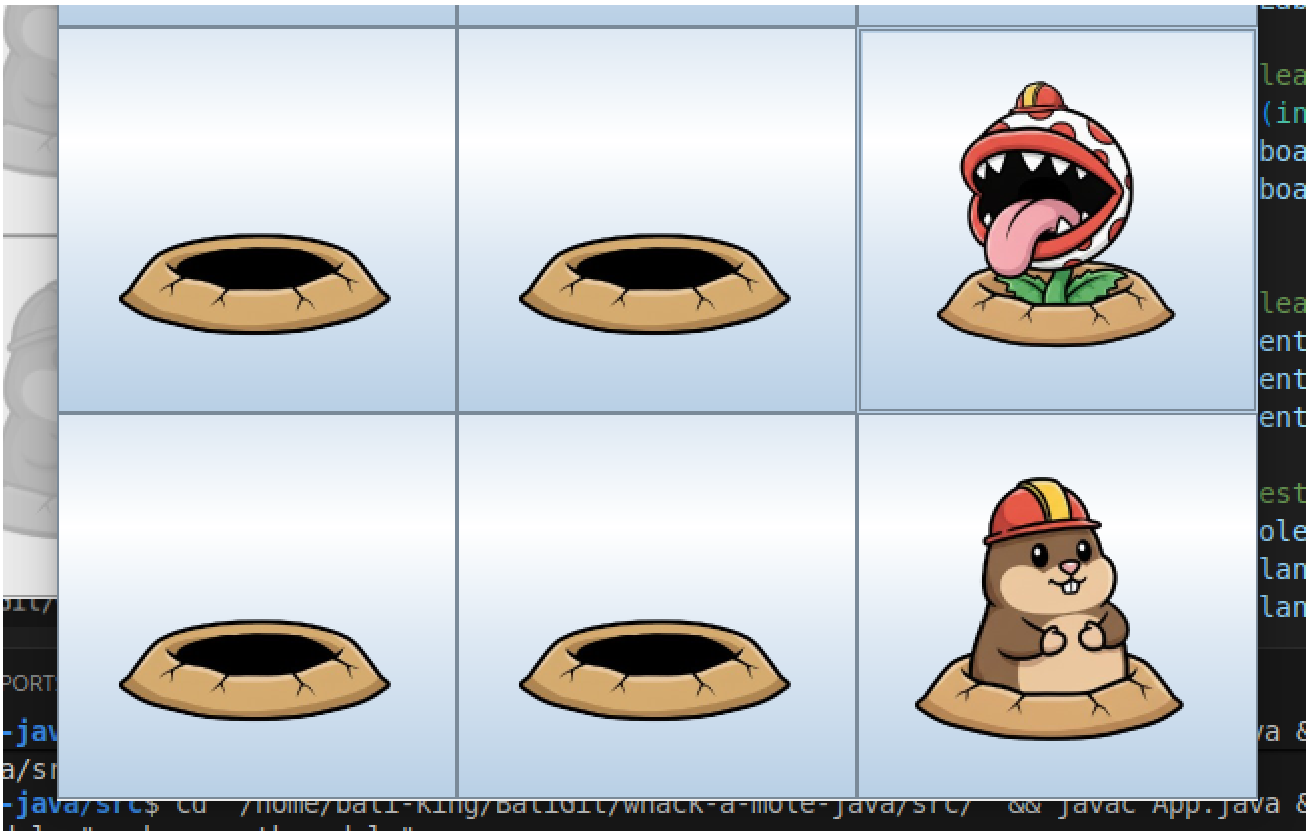
Game Over



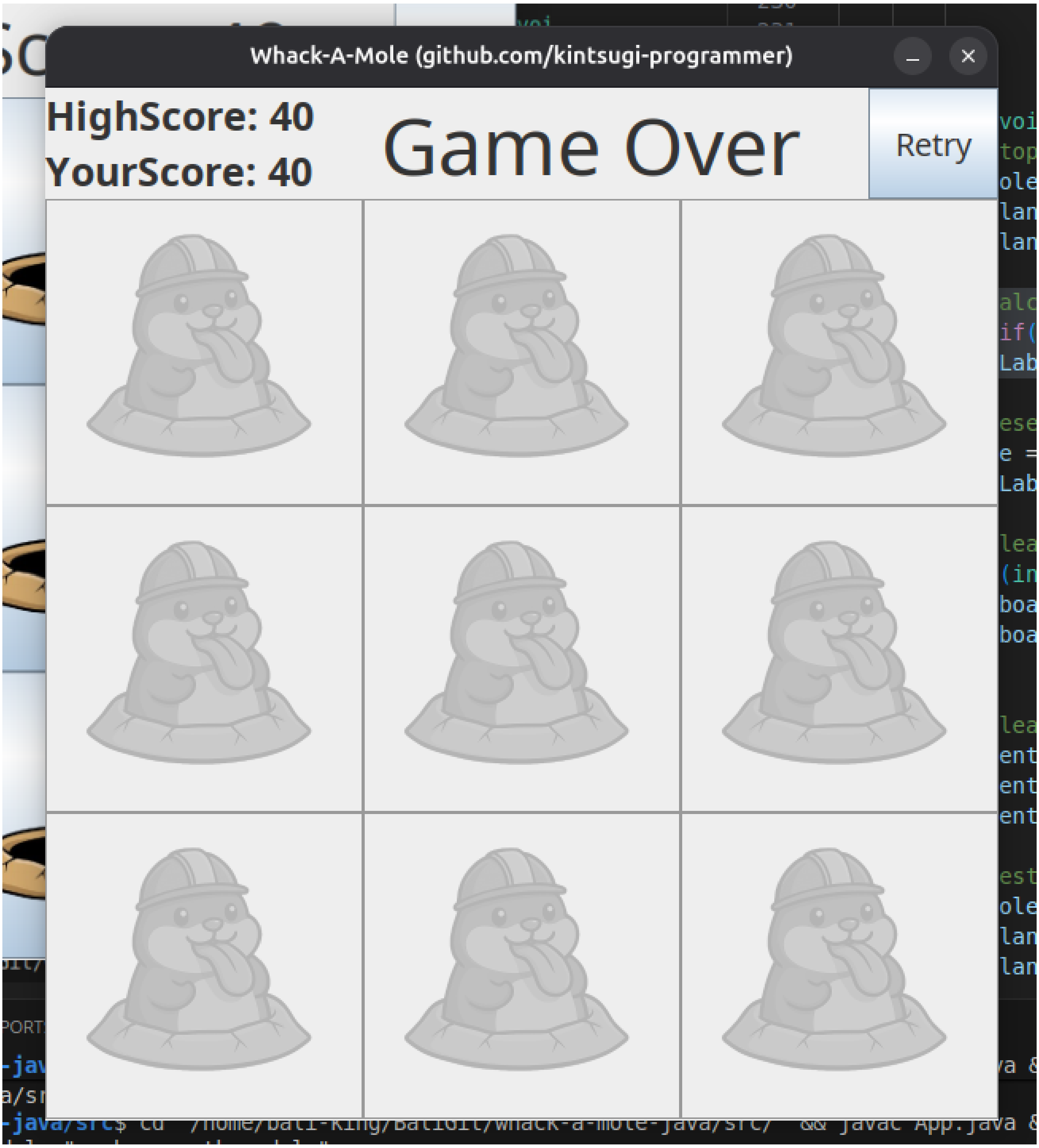
Whack-A-Mole (github.com/kintsugi-programmer)

HighScore: 20
YourScore: 20

Score: 40



```
-java/src$ cd /home/bati-king/BatiGit/whack-a-mole-java/src/ && javac App.java &
```



Complete Code Structure

Class Variables (Instance Variables)

```
int boardWidth = 600;
int boardHeight = 650;
JFrame frame;
JPanel textPanel;
JLabel textLabel;
JPanel boardPanel;
JButton[] board;
ImageIcon moleIcon;
ImageIcon plantIcon;
```

```
JButton currentMoleTile;
JButton currentPlantTile;
Random random;
Timer setMoleTimer;
Timer setPlantTimer;
int score;
```

Constructor Method

Contains all initialization code:

- Frame setup
- Component creation
- Image loading and scaling
- Button creation with event listeners
- Timer setup with movement logic
- Frame visibility set at end

Key Concepts Learned

GUI Components

- JFrame: Main window container
- JPanel: Layout containers (text panel, board panel)
- JButton: Interactive tiles
- JLabel: Text display

Layouts

- BorderLayout: For overall window layout (North for text panel)
- GridLayout: For 3x3 button grid

Event Handling

- ActionListener: Handles button clicks
- Timer: Handles repeating events (mole/plant movement)
- ActionEvent: Contains event information

Image Processing

- Loading images from files using getResource()
- Scaling images to specific dimensions
- Converting images to ImageIcons for display
- Using ImageIcon objects on buttons

Game Logic

- State tracking (current mole/plant position, score)
- Conflict prevention (checking tile occupancy)
- Game flow control (stopping timers, disabling buttons)

- User feedback (updating score display)

Final Codes

src/App.java

```
public class App {
    public static void main(String[] args) throws Exception {
        WhackAMole whackAMole = new WhackAMole() ;
    }
}
```

src/WhackAMole.java

```
// Import Packages
import java.awt.*;
import java.awt.event.*;
import java.util.Random;
import java.util.random.*;
import javax.swing.*;

public class WhackAMole {
    // Build Board
    int boardWidth= 600;
    int boardHeight= 650;
    JFrame frame = new JFrame("Whack-A-Mole (github.com/kintsugi-programmer)");// frame

    JLabel textLabel = new JLabel(); // text label
    JPanel textPanel = new JPanel(); // text panel to hold text lablel
    JLabel textLabel2 = new JLabel(); // text label
    JPanel textPanel2 = new JPanel(); // text panel to hold text lablel
    JButton[] board = new JButton[9]; // make button array for tracking all 9 buttons efficiently

    ImageIcon moleIcon;
    ImageIcon plantIcon;
    ImageIcon holeIcon;
    ImageIcon molemockingIcon;

    // game stats vars
    JButton currentMoleTile;
    JButton currentPlantTile,currentPlantTile2;
    Random random = new Random();
    Timer setMoleTimer;
    Timer setPlantTimer,setPlantTimer2;
    int score = 0,highScore=0;

    // Constructor
    WhackAMole(){
        // constructing frame
        // frame.setVisible(true);// visibility
        frame.setSize(boardWidth, boardHeight);// set size
        frame.setLocationRelativeTo(null);// make sure to open at center
        frame.setResizable(false);// no resize
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);// Close (X) Button of program,exit it
        frame.setLayout(new BorderLayout());

        // constructing textLabel
        textLabel.setFont(new Font("Arial",Font.PLAIN,50));// Set Font to Label, Arial Font , Plain 50px
        textLabel.setHorizontalAlignment(JLabel.CENTER);// center text auto
        textLabel.setText("Score: 0");// set text as score 0 default
        textLabel.setOpaque(true);

         // constructing textLabel2
        textLabel2.setFont(new Font("Arial",Font.BOLD,25));// Set Font to Label, Arial Font , Plain 50px
        textLabel2.setHorizontalAlignment(JLabel.CENTER);// center text auto
        textLabel2.setText("<html>"+"HighScore: "+Integer.toString(highScore)+"<br>YourScore: 0"+"</html>");
        textLabel2.setOpaque(true);

        // constructing Reset Button
        JButton resetButton = new JButton("Retry");
        resetButton.setFont(new Font("Arial",Font.PLAIN,20));
        resetButton.setFocusable(false);

        resetButton.addActionListener(new ActionListener() {
            @Override
            public void actionPerformed(ActionEvent e){
                resetGame();
            }
        });

        // constructing textPanel to hold textLabel
        // and making frame to hold textPanel
        textPanel.setLayout(new BorderLayout());
        textPanel.add(textLabel, BorderLayout.CENTER); // score at center
        textPanel.add(textLabel2, BorderLayout.WEST); // score at center
        textPanel.add(resetButton, BorderLayout.EAST); // right side reset button
        frame.add(textPanel,BorderLayout.NORTH);

        // constructing board panel
        JPanel boardPanel = new JPanel();
        boardPanel.setLayout(new GridLayout(3,3)); // 3x3 Grid Tiles
        frame.add(boardPanel);// add boardpanel to frame
        // boardPanel.setBackground(Color.BLACK);// Optional: makes background visible during development
        // Loading and Scaling Images
        // moleIcon = new ImageIcon(getClass().getResource("./monty.png"));
old
        // New Approach
        // Create Image Objects
        Image moleImage = new
ImageIcon(getClass().getResource("./monty.png")).getImage();
        Image plantImage = new
ImageIcon(getClass().getResource("./piranha.png")).getImage();
        Image holeImage = new
ImageIcon(getClass().getResource("./hole.png")).getImage();
        Image molemockingImage = new
ImageIcon(getClass().getResource("./montymocking.png")).getImage();
        // Create Icon of scaling that Image Object
        moleIcon = new ImageIcon(moleImage.getScaledInstance(250, 250,
Image.SCALE_SMOOTH));
        plantIcon = new ImageIcon(plantImage.getScaledInstance(250, 250,
Image.SCALE_SMOOTH));
        holeIcon = new ImageIcon(holeImage.getScaledInstance(250, 250,
Image.SCALE_SMOOTH));
        molemockingIcon = new
ImageIcon(molemockingImage.getScaledInstance(250, 250,
Image.SCALE_SMOOTH));


        // constructing buttons/ tiles
        // JButton button1 = new JButton(); // one button
        for ( int  i = 0; i<9; i++){ // using loop, to create
tiles/buttons; instead of hardcode
            JButton tile = new JButton();
            board[i] = tile;
            boardPanel.add(tile); // appending to boardPanel Grid one-by-
one
            tile.setIcon(holeIcon); // debugging purpoes
            tile.setFocusable(false);
            // also clickable
            // Each button represents one tile on the game board.

            // Click Handler Logic
            tile.addActionListener(new ActionListener() {
                public void actionPerformed(ActionEvent e){
                    JButton clickedTile = (JButton) e.getSource(); // input
user click & typecast that input to button

                    // Score Logic, when Click Mole
                    if(clickedTile==currentMoleTile){
                        score+=10; // Score Add 10pts
                        textLabel.setText("Score:
"+Integer.toString(score));
                    }

                    // GameOver Logic, when Click Plant
                    else if (clickedTile==currentPlantTile ||
clickedTile==currentPlantTile2){
```

```
                        textLabel.setText("Game Over");

                        // calculate and update highscore
                        if(highScore<score){highScore=score;}
                        textLabel2.setText("<html>"+"HighScore: 
"+Integer.toString(highScore)+"<br>YourScore: "+score+ "</html>");

                        // Stop Movement of Objects
                        setMoleTimer.stop();
                        setPlantTimer.stop();
                        setPlantTimer2.stop();

                        // Disable all buttons
                        for (int i = 0; i<9; i++){
                            board[i].setIcon(molemockingIcon);
                            board[i].setEnabled(false);
                        }
                    }
                }

            });

        }


        setMoleTimer = new Timer(750, new ActionListener() { // 1 sec, init 
ActionListner
            public void actionPerformed(ActionEvent e){
                // Remove mole from current tile
                if (currentMoleTile != null){ // if button is not null
                    currentMoleTile.setIcon(holeIcon); // clear the hole, 
replace plant/mole with hole
                    currentMoleTile = null;
                }

                // // old normal way, but doesn't check if other object 
also have same tile or not
                // currentMoleTile = board[random.nextInt(9)];
                // currentMoleTile.setIcon(moleIcon);

                // new way, makes objects of random number and check if 
plant already is at tile
                // Select random tile
                int num = random.nextInt(9); // random 0 to 8
                JButton tile = board[num];

                // Check if plant is on this tile (avoid conflict)
                if (currentPlantTile == tile || currentPlantTile2 == tile)
{return;} // skip

                // Place mole on new tile
                currentMoleTile = tile;
                currentMoleTile.setIcon(moleIcon);
            }
        });

        setPlantTimer = new Timer(500, new ActionListener() { // 1.5 sec, init ActionListner
            public void actionPerformed(ActionEvent e){
                // Remove mole from current tile
                if (currentPlantTile != null){ // if button is not null
                    currentPlantTile.setIcon(holeIcon); // clear the hole, replace plant/mole with hole
                    currentPlantTile = null;
                }

                // // old normal way, but doesn't check if other object also have same tile or not
                // currentPlantTile = board[random.nextInt(9)];
                // currentPlantTile.setIcon(moleIcon);

                // new way, makes objects of random number and check if plant already is at tile
                // Select random tile
                int num = random.nextInt(9); // random 0 to 8
                JButton tile = board[num];

                // Check if mole is on this tile (avoid conflict)
                if (currentMoleTile == tile || currentPlantTile2 == tile ) {return;} // skip

                // Place plant on new tile
                currentPlantTile = tile;
                currentPlantTile.setIcon(plantIcon);
            }
        });

        setPlantTimer2 = new Timer(850, new ActionListener() { // 1.5 sec, init ActionListner
            public void actionPerformed(ActionEvent e){
                // Remove mole from current tile
                if (currentPlantTile2 != null){ // if button is not null
                    currentPlantTile2.setIcon(holeIcon); // clear the hole, replace plant/mole with hole
                    currentPlantTile2 = null;
                }

                // // old normal way, but doesn't check if other object also have same tile or not
                // currentPlantTile2 = board[random.nextInt(9)];
                // currentPlantTile2.setIcon(moleIcon);

                // new way, makes objects of random number and check if plant already is at tile
                // Select random tile
                int num = random.nextInt(9); // random 0 to 8
                JButton tile = board[num];
                // Check if mole is on this tile (avoid conflict)
                if (currentMoleTile == tile || currentPlantTile == tile ) {return;} // skip

                // Place plant on new tile
                currentPlantTile2 = tile;
                currentPlantTile2.setIcon(plantIcon);
            }
        });

            setMoleTimer.start();
            setPlantTimer.start();
            setPlantTimer2.start();

            frame.setVisible(true);// visibility, only after loading everything



        }

    private void resetGame(){
        // stop timers safetly check
        setMoleTimer.stop();
        setPlantTimer.stop();
        setPlantTimer2.stop();

        // calculate and update highscore before reset score
            if(highScore<score){highScore=score;}
        textLabel2.setText("<html>"+"HighScore: "+Integer.toString(highScore)+"<br>YourScore: "+score+ "</html>");

        // reset score
        score = 0;
        textLabel.setText("Score: 0");

        // clear board, for new start
        for (int i=0; i<9; i++){
            board[i].setIcon(holeIcon);
            board[i].setEnabled(true);
        }

        // clear reference
        currentMoleTile = null;
        currentPlantTile = null;
        currentPlantTile2 = null;

        // restart timers
        setMoleTimer.start();
        setPlantTimer.start();
        setPlantTimer2.start();

    }
```

```
}
```

Development Notes

Performance Tip

Set `frame.setVisible(true)` at the very end of constructor to ensure all components load before window displays. This prevents UI components from appearing slowly one by one.

Testing Approach

- Test each component as it's added
- Verify image scaling displays correctly
- Check that mole and plant move independently
- Verify no conflicts occur on same tile
- Test click detection for both mole and plant
- Confirm game ends properly on plant click

Debugging

- Use `setBackground(Color.BLACK)` temporarily to visualize panel boundaries
- Watch console for any import errors
- Verify image file names match exactly (case-sensitive)
- Check that resource paths use correct file names with extensions

Conclusion

This Documentation covers all fundamental aspects of creating a GUI game in Java:

- Window and component creation
- Image loading and manipulation
- Event-driven programming with listeners and timers
- Game state management
- User interaction and feedback

The resulting game is fully functional and provides a solid foundation for learning GUI programming concepts.

End-of-File

The KintsugiStack repository, authored by Kintsugi-Programmer, is less a comprehensive resource and more an Artifact of Continuous Research and Deep Inquiry into Computer Science and Software Engineering. It serves as a transparent ledger of the author's relentless pursuit of mastery, from the foundational algorithms to modern full-stack implementation.

> Made with 💚 Kintsugi-Programmer