PROJECT REPORT

ON

BRICK BREAKER GAME USING JAVA

(CSE 4TH Semester mini project)

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INTRODUCTION

Brick Breaker is a timeless and popular arcade game that has captivated players for decades with its simple yet addictive gameplay. Originating in the late 1970s, the game has seen numerous adaptations and versions across various platforms, from dedicated arcade machines to home consoles and mobile devices. Despite the advancements in gaming technology and the proliferation of complex video games, Brick Breaker remains a beloved classic that continues to attract players of all ages.

Objective of the game

The primary objective of Brick Breaker is to break all the bricks on the screen using a ball, which the player controls indirectly through a paddle. The player must maneuver the paddle to ensure the ball bounces back and hits the bricks. Each time a brick is hit, it breaks and disappears, and the player earns points. The game is won when all bricks are destroyed, and it ends if the ball falls off the bottom edge of the screen.

GAME DESIGHN

Gameplay Mechanics

1. Paddle: The player controls a paddle at the bottom of the screen, moving it left and right to hit the ball.
2. Ball: The ball bounces around the screen, breaking bricks it collides with. The player must keep the ball in play using the paddle.
3. Bricks: The wall of bricks is arranged at the top of the screen. Each brick is destroyed when hit by the ball.
4. Score: Points are awarded for each brick destroyed. The game ends when all bricks are broken or the ball falls off the bottom edge of the screen.

Controls

- **Left Arrow Key**: Move the paddle to the left.
- **Right Arrow Key**: Move the paddle to the right.

IMPLEMENTATION DETAILS

Classes and Methods

1. **Gameplay Class**
   - Implements the core game mechanics.
   - Manages game state, rendering, and user input.

2. **MapGenerator Class**

   - Generates the wall of bricks.
   - Manages the state of each brick (broken or unbroken).

Key Methods

1. **paintComponent(Graphics g)**:
   - Draws the game elements: background, borders, paddle, ball, and bricks.
   - Uses the Graphics2D class for rendering the bricks.
2. **actionPerformed(ActionEvent e)**:
   - Updates the game state on each timer tick.
   - Handles ball movement, collision detection, and game logic.
3. **keyPressed(KeyEvent e)**:
   - Handles user input for moving the paddle left or right.

COLLISION DETECTION

Collision detection is a crucial part of the game, ensuring interactions between the ball, paddle, and bricks are handled correctly.

1. **Paddle Collision**:

    - Checks if the ball intersects with the paddle and reverses the ball's vertical direction if true.
2. **Brick Collision**:

    - Iterates through the array of bricks.
    - Checks for intersection between the ball and each brick.
    - Updates the game state by removing the brick and adjusting the ball's direction upon collision.

ENHANCEMENTS AND FEATURES

Several features and enhancements can improve the game:

1. **Levels**: Introduce multiple levels with increasing difficulty.
2. **Power-ups**: Add power-ups such as multi-ball, larger paddle, or slower ball.
3. **Sound Effects**: Implement sound effects for collisions and game events.
4. **High Score Tracking**: Track and display high scores.

SUMMARY

This Brick Breaker game project is a recreation of the classic arcade game using Java, focusing on fundamental game development concepts and techniques. The project involves creating a game where the player controls a paddle to bounce a ball and break a wall of bricks. The goal is to destroy all the bricks while preventing the ball from falling off the screen. Here's a brief summary of the key aspects of the project:

Key Components

5. **Gameplay Mechanics**:
    - **Paddle**: Controlled by the player to hit the ball back into play.
    - **Ball**: Moves continuously, bouncing off the paddle, walls, and bricks.
    - **Bricks**: Arranged in a grid and break upon being hit by the ball.
    - **Score**: Points awarded for each brick broken.
6. **User Controls**:
    - **Arrow Keys**: Move the paddle left or right to keep the ball in play.
7. **Collision Detection**:
    - Detects collisions between the ball and paddle, walls, and bricks.
    - Adjusts ball direction based on collision points.
8. **Graphics and Rendering**:
    - Uses Java's Graphics and Graphics2D for rendering game elements.
    - Draws background, paddle, ball, and bricks on the screen.
9. **Game State Management**:
    - Handles the game loop using a timer to update and repaint the game at regular intervals.
    - Manages game start, play, and end states.
10. **Class Structure**:

- **Gameplay**: Core class managing the game logic, rendering, and user input.
- **MapGenerator**: Utility class generating and managing the brick layout.

REFERENCE

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- All My Faculty members, Class Coordinator, along with all my classmates & friends.