NUMBER GUSSESING GAME

A PROJECT REPORT

Submitted by

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in partial fulfillment of requirements for the award of the course

CGB1201 – JAVA PROGRAMMING

in

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by AICTE, New Delhi)

SAMAYAPURAM – 621 112

DECEMBER, 2024

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY (AUTONOMOUS)

SAMAYAPURAM – 621 112

BONAFIDE CERTIFICATE

Certified that this project report on **"NUMBER GUSSESING GAME"** is the bonafide work of **PRAVEENA V 2303811724322083** who carried out the project work during the academic year 2024 - 2025 under my supervision.

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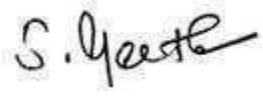

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Submitted for the viva-voce examination held on 3.12.24 .

INTERNAL EXAMINER

EXTERNALEXAMINER

DECLARATION

I declare that the project report on "**NUMBER GUSSESING GAME**" is the result of original work done by me and best of my knowledge, similar work has not been submitted to "**ANNA UNIVERSITY CHENNAI**" for the requirement of Degree of **BACHELOR OF TECHNOLOGY**. This project report is submitted on the partial fulfillment of the requirement of the award of the **CGB1201 – JAVA PROGRAMMING.**

Signature

PRAVEENA V

Place: Samayapuram

Date: 3/12/2024

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VISION OF THE INSTITUTION

To serve the society by offering top-notch technical education on par with global standards.

MISSION OF THE INSTITUTION

- Be a centre of excellence for technical education in emerging technologies by exceeding the needs of industry and society.
- Be an institute with world class research facilities.
- Be an institute nurturing talent and enhancing competency of students to transform them as all- round personalities respecting moral and ethical values.

VISION AND MISSION OF THE DEPARTMENT

To excel in education, innovation and research in Artificial Intelligence and Data Science to fulfill industrial demands and societal expectations.

Mission 1: To educate future engineers with solid fundamentals, continually improving teaching methods using modern tools.

Mission 2: To collaborate with industry and offer top-notch facilities in a conductive learning environment.

Mission 3: To foster skilled engineers and ethical innovation in AI and Data Science for global recognition and impactful research.

Mission 4: To tackle the societal challenge of producing capable professionals by instilling employability skills and human values.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO 1: Compete on a global scale for a professional career in Artificial Intelligence and Data Science.

PEO 2: Provide industry-specific solutions for the society with effective communication and ethics.

PEO 3: Hone their professional skills through research and lifelong learning initiatives.

PROGRAM OUTCOMES

Engineering students will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO 1:** Capable of working on data-related methodologies and providing industry-focussed solutions.
- **PSO2:** Capable of analysing and providing a solution to a given real-world problem by designing an effective program.

ABSTRACT

The **“ Number Guessing Game “** is an interactive program where the compute selects random number within a range specified by the player. The player’s objective is to guess the number through iterative attempts, with the programs Providing feedback on whethereach guess is too high or too low. The game Keeps track of the total number of guesses and displays the count when the player successfully identifies the number his program demonstrates key programming concepts, such as handling user input, generating random numbers, implemention loop and conditionals, and validating input. By adjusting the range, players can the difficulty level of the game, making it suitable for different skill level the game encourages logical reasoning and problem-solving skills, as players must adjust their guesses based on the feedback provided. It is both an entertaining activity and a practical tool for teaching and understanding fundamental programming principles.

TABLE OF CONTENTS

CHAPTER 1
INTRODUCTION

1.1 INTRODUTION

The “Number Guessing Game” is a fun and interactive program where the player guesses a random number selected by the computer within a user-specified range. The game provides feedback on each guess, indicating whether it is too high or too low. It tracks the number of attempts and displays the count when the correct number is guessed. This simple game enhances logical thinking while demonstrating key programming concepts like loops, conditionals, and random number generation.

1.2 OBJECTIVE

The objective of the Number Guessing Game is to create an interactive program where the computer randomly selects a number within a user-defined range, and the player attempts to guess it. The game provides feedback on each guess to guide the player and keeps track of the number of attempts. It aims to improve logical reasoning, problem-solving skills, and engagement while showcasing fundamental programming techniques such as input handling, random number generation, and iterative loops.

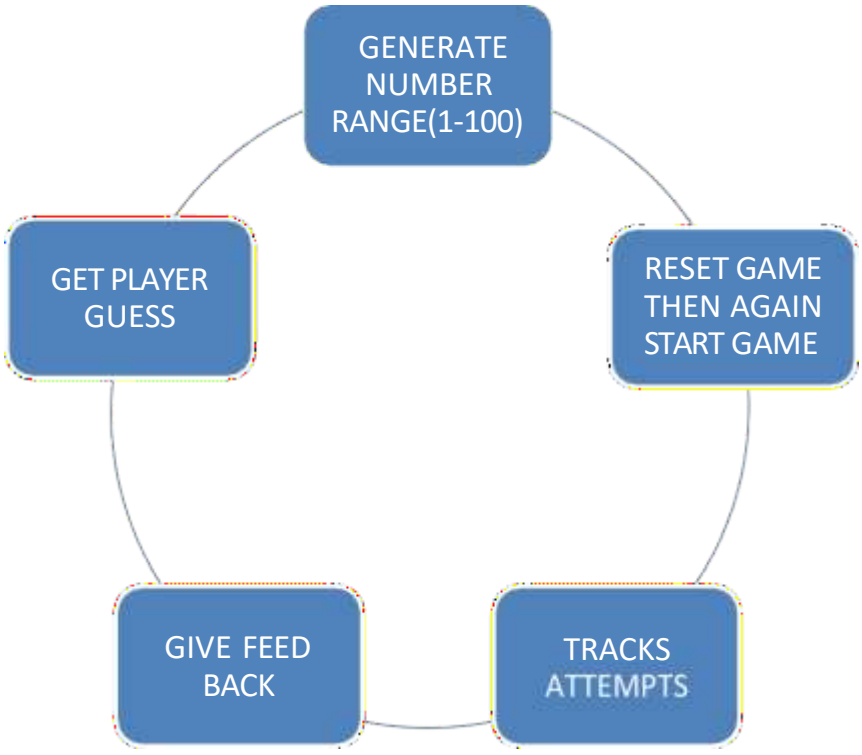
CHAPTER 2

PROJECTMETHODOLOGY

2.1 PROPOSED WORK

The Number Guessing Game will generate a random number within a user-defined range and prompt the player to guess it. The program will provide feedback on whether each guess is too high or too low while tracking the number of attempts. It ensures input validation, offers flexibility in difficulty, and concludes with a summary of the player's performance.

2.2 BLOCK DIAGRAM



CHAPTER 3

JAVA PROGRAMMING CONCEPTS

3.1 SWING FOR GUI DEVELOPMENT

- **JFrame, JPanel, JLabel, JTextField, JTextArea, JButton**: Used to create and arrange graphical components in the application.
- **JScrollPane:** Allows for scrollable text areas.
- **Pop-ups (JDialog, JOptionPane)**: Used for showing temporary notifications, error messages, and game instructions.

3.2 EVENT HANDLING

- **ActionListener Interface**: Implements listeners to handle button clicks and other user actions.
- **Anonymous Classes and Lambda Expressions**: Simplify event-handling code for buttons like "Play Again" and "Reset game."

3.2.1 Control structure

- **If-Else Statements**: Handle game logic, such as determining whether the guess is "Too High" or "Too Low." or “correct the guess number”.
- **Loops :** The player iteratively guesses until the correct number is found controlled by repeated button clicks and the game

CHAPTER 4

MODULE DESCRIPTION

4.1 RANGE INPUT MODULE

The Range Input Module is responsible for accepting the range within which the random number is generated. It validates the user input to ensure proper gameplay and initializes the game with the specified range.

4.2 GAME LOGIC MODULE

The Game Logic module implements the core mechanics, including generating a random target number using the Random class, validating user input, and comparing guesses with the target to provide feedback like “Too High” or “Too Low.” It also tracks attempts and handles game termination when the user wins

4.3 RESET MODULE

The Reset Module is responsible for reinitializing the game state, clearing user inputs, and preparing the game for a new session. This ensures that the player can start a fresh game without restarting the application.

4.4 EVENT HANDLING MODULE

The Event Handling Module is responsible for managing user interactions with the GUI components of the Number Guessing Game. It listens for events like button clicks and triggers appropriate actions to drive the game logic

4.5 GRAPHICAL USER INTERFACE (GUI) MODULE

The Graphical User Interface (GUI) module manages the visuallayout, incorporating components like Jframe the main window with TextFlied , label , Button components for users to input a range, make guesses, and receive dynamic feedback on their attempts the interface includes reset functionality and model dialogs for error handing

CHAPTER 5
CONCLUSION

The Number Guessing Game is an engaging application that combines GUI-basedinter activity with logical problem-solving. Players can specify a range, make guesses, and receive feedback in real time, enhancing the user experience. The game ensures robustness through input validation and includes essential features like reset functionality for seamless replayability. By leveraging Java AWT, the application demonstrates how to create intuitive and interactive graphical interfaces. Additionally, the modular design simplifies the implementation and ensures scalability, making it a practical example of blending core programming concepts with user interface development.

REFERENCES:

Books

4.4.1 **Head First Java** by Kathy Sierra and Bert Bates

4.4.2 **Java: The Complete Reference** by Herbert Schildt

Websites

Number guessing game in Java - GeeksforGeeks

Pinball Game in Java - GeeksforGeeks

YouTube Channels

1. **Programming with Mosh**: Programming with Mosh
2. **Telusko**: Telusko
3. **The New Boston**: The New Boston
4. **Java Brains**: Java

APPENDICES
APPENDIXA – SOURCE CODE

```
import java.awt.*; import
java.awt.event.*; import
java.util.Random;
public class MyGame { private Frame frame;
private TextField rangeFieldMin, rangeFieldMax, guessField;
private Label messageLabel, guessLabel, attemptsLabel;
private Button startButton, guessButton, resetButton;
private int targetNumber, attempts, minRange, maxRange;
private boolean isGameRunning;
public MyGame() {
frame = new Frame("Number Guessing Game");
frame.setSize(400, 300);
frame.setLayout(new GridLayout(6, 1));
frame.addWindowListener(new WindowAdapter() {
public void windowClosing (WindowEvent e) {
System.exit(0);
}
});


// Range input panel
Panel rangePanel = new Panel();
rangePanel.setLayout(new FlowLayout());
```

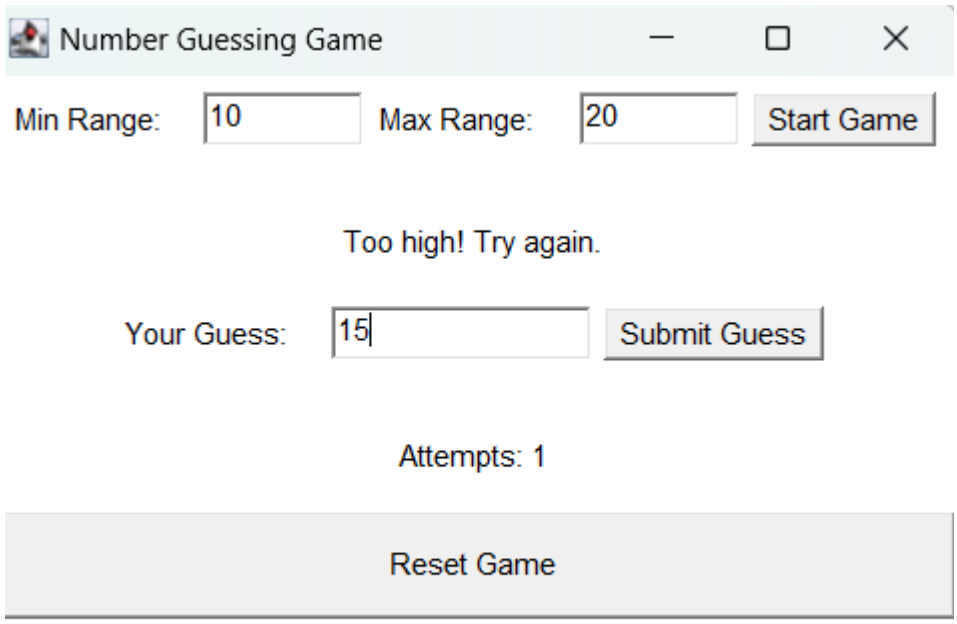
```
rangePanel.add(new Label("Min Range:")); rangeFieldMin =
new TextField(5); rangePanel.add(rangeFieldMin);
rangePanel.add(new Label("Max Range:")); rangeFieldMax =
new TextField(5); rangePanel.add(rangeFieldMax);
startButton = new Button("Start Game");
rangePanel.add(startButton); frame.add(rangePanel);

// Message label
messageLabel = new Label("Enter range and click Start Game.");
messageLabel.setAlignment(Label.CENTER);
frame.add(messageLabel);

// Guess input panel
Panel guessPanel = new Panel(); guessPanel.setLayout(new
FlowLayout()); guessLabel = new Label("Your Guess:");
guessPanel.add(guessLabel);
guessField = new TextField(10); guessPanel.add(guessField);
guessButton = new Button("Submit Guess");
guessButton.setEnabled(false); guessPanel.add(guessButton);
frame.add(guessPanel);

// Attempts label
attemptsLabel = new Label("Attempts: 0");
attemptsLabel.setAlignment(Label.CENTER);
```

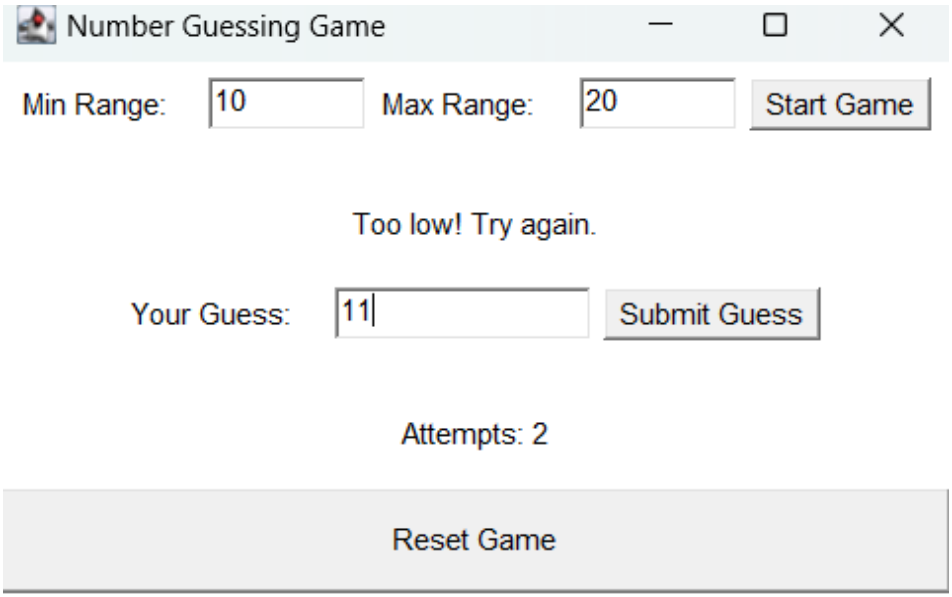
```
frame.add(attemptsLabel);

// Reset button
resetButton = new Button("Reset Game");
resetButton.setEnabled(false); frame.add(resetButton);

// Action listeners startButton.addActionListener(e -> startGame());
guessButton.addActionListener(e -> submitGuess()); resetButton.addActionListener(e -
> resetGame());

frame.setVisible(true);
}

private void startGame() { try {
minRange = Integer.parseInt(rangeFieldMin.getText()); maxRange =
Integer.parseInt(rangeFieldMax.getText());

if (minRange >= maxRange) {
showMessageDialog("Invalid Range", "Min range must be less than Max range.");
return;
}

Random random = new Random();
targetNumber = random.nextInt(maxRange - minRange + 1) + minRange; attempts = 0;
isGameRunning = true;
```

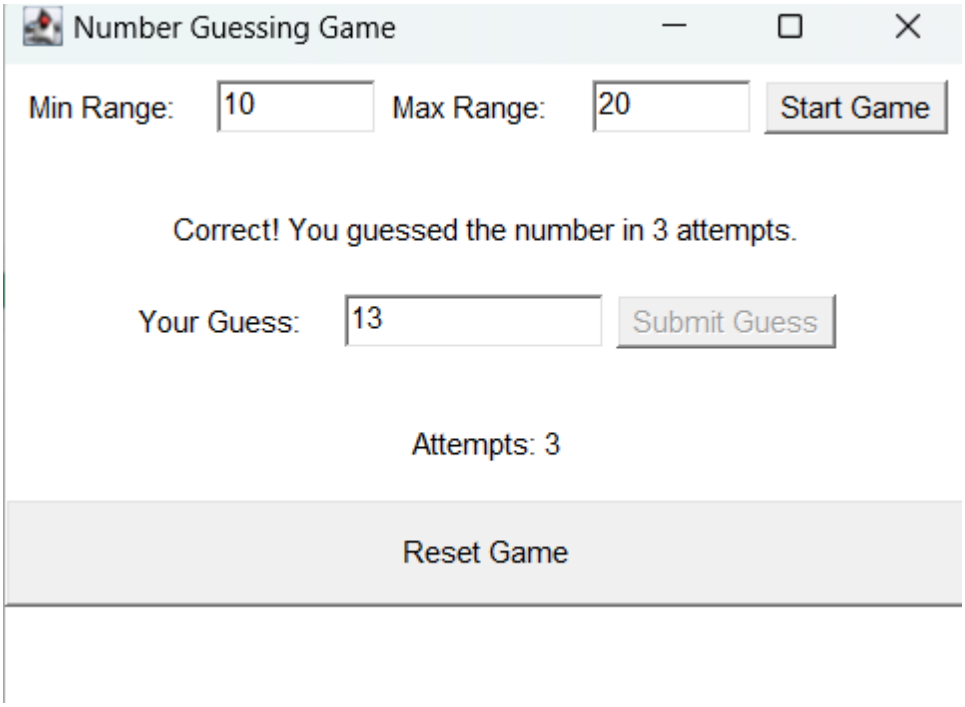
```
        messageLabel.setText("Game started! Guess a number between " + minRange + " and " +
maxRange + ".");
        attemptsLabel.setText("Attempts: 0");
        guessButton.setEnabled(true); resetButton.setEnabled(true); guessField.setEnabled(true);
        } catch (NumberFormatException ex) {
        showMessageDialog("Invalid Input", "Please enter valid numbers for the range.");
        }
        }

        private void submitGuess() {
        if (!isGameRunning) return;

        try {
        int guess = Integer.parseInt(guessField.getText()); attempts++;
        attemptsLabel.setText("Attempts: " + attempts);

        if (guess < targetNumber) { messageLabel.setText("Too low! Try again.");
        } else if (guess > targetNumber) { messageLabel.setText("Too high! Try again.");
        } else {
        messageLabel.setText("Correct! You guessed the number in " + attempts + " attempts.");
isGameRunning = false;
                                        guessButton.setEnabled(false);
        }
        } catch (NumberFormatException ex) {
        showMessageDialog("Invalid Input", "Please enter a valid number.");
```

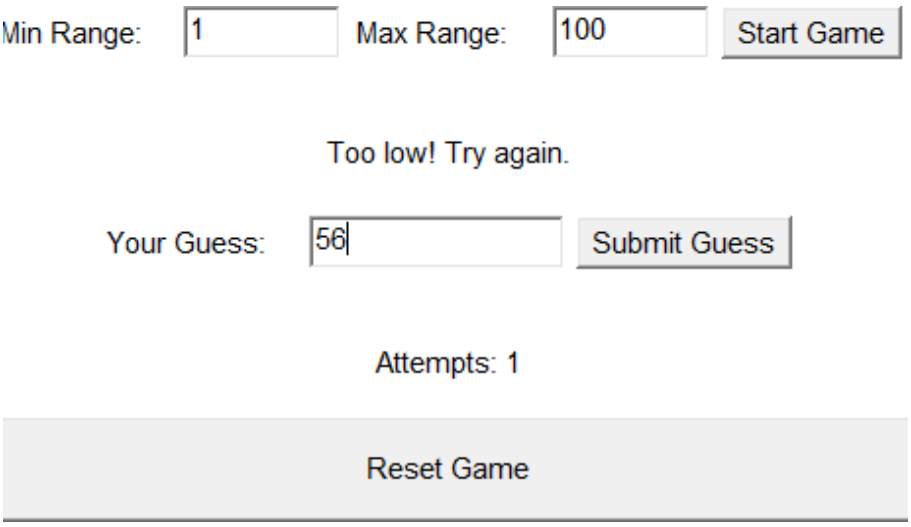
```
}
guessField.setText("");
}

private void resetGame() { targetNumber = 0;
attempts = 0; isGameRunning  = false;

rangeFieldMin.setText(""); rangeFieldMax.setText("");
guessField.setText(""); guessField.setEnabled(false);
guessButton.setEnabled(false); resetButton.setEnabled(false);

messageLabel.setText("Enter  range and click Start Game.");
attemptsLabel.setText("Attempts: 0");
}

private void showMessageDialog(String  title, String
message) { Dialog dialog = new Dialog(frame, title, true);
dialog.setLayout(new FlowLayout());
dialog.setSize(300, 150);

Label messageLabel = new Label(message, Label.CENTER);
dialog.add(messageLabel);

Button okButton = new Button("OK");
okButton.addActionListener(e -> dialog.dispose());
```

```
dialog.add(okButton);


dialog.setVisible(true);
}

public static void main(String[]
args) { new MyGame();
}
```


Number Guessing Game
Min Range:
10
Max Range:
20
Start Game
Too high! Try again.
Your Guess:
15
Submit Guess
Attempts: 1
Reset Game


Number Guessing Game
Min Range:
10
Max Range:
20
Start Game
Too low! Try again.
Your Guess:
11
Submit Guess
Attempts: 2
Reset Game


Number Guessing Game
Min Range:
10
Max Range:
20
Start Game
Correct! You guessed the number in 3 attempts.
Your Guess:
13
Submit Guess
Attempts: 3
Reset Game


Min Range:
1
Max Range:
100
Start Game
Too low! Try again.
Your Guess:
56
Submit Guess
Attempts: 1
Reset Game