TEXT BASED ADVENTURE GAME

A Project Report

Submitted By

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Submitted in partial fulfillment of requirements for the award of the course

CGB1201 – JAVA PROGRAMMING

in

DEPARTMENT OF

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(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

K. RAMAKRISHNAN COLLEGE OF ENGINEERING

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

SAMAYAPURAM - 621 112

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K. RAMAKRISHNAN COLLEGE OF ENGINEERING

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BONAFIDE CERTIFICATE

Certified that this project report on **" TEXT BASED ADVENTURE GAME"** is the bonafide work of **VISHWAM KUMAR M A (8115U23059)** who carried out the project work during the academic year 2024 - 2025 under my supervision.

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Submitted for the End Semester Examination held on …….

INTERNAL EXAMINER **EXTERNAL EXAMINER**

DECLARATION

I jointly declare that the project report on "**TEXT BASED ADVENTURE GAME**" is the result of original work done by us and best of our knowledge, similar work has not been submitted to **"ANNA UNIVERSITY CHENNAI"** for the requirement of Degree of BACHELOR OF ENGINEERING. This project report is submitted on the partial fulfillment of the requirement of the award of the course **CGB1201- JAVA PROGRAMMING**.

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VISHWAM KUMAR M A

Place: Samayapuram
Date:

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INSTITUTE VISION AND MISSION

VISION OF THE INSTITUTE:

To achieve a prominent position among the top technical institutions.

MISSION OF THE INSTIITUTE:

M1: To best owstandard technical education parexcellence through state of the art infrastructure, competent faculty and high ethical standards.

M2: To nurture research and entrepreneurial skills among students in cutting edge technologies.

M3: To provide education for developing high-quality professionals to transform the society.

DEPARTMENT VISION AND MISSION

DEPARTMENT OF CSE(ARTIFICIAL INTELLIGENCE AND MACHINELEARNING)

Vision of the Department

To become a renowned hub for Artificial Intelligence and Machine Learning

Technologies to produce highly talented globally recognizable technocrats to meet

Industrial needs and societal expectations.

Mission of the Department

M1: To impart advanced education in Artificial Intelligence and Machine Learning,

Built upon a foundation in Computer Science and Engineering.

M2: To foster Experiential learning equips students with engineering skills to

Tackle real-world problems.

M3: To promote collaborative innovation in Artificial Intelligence, machine Learning, and related research and development with industries.

M4: To provide an enjoyable environment for pursuing excellence while upholding Strong personal and professional values and ethics.

Programme Educational Objectives (PEOs):

Graduates will be able to:

PEO1: Excel in technical abilities to build intelligent systems in the fields of Artificial Intelligence and Machine Learning in order to find new opportunities.

PEO2: Embrace new technology to solve real-world problems, whether alone or As a team, while prioritizing ethics and societal benefits.

PEO3: Accept lifelong learning to expand future opportunities in research and Product development.

Programme Specific Outcomes (PSOs):

PSO1: Ability to create and use Artificial Intelligence and Machine Learning Algorithms, including supervised and unsupervised learning, reinforcement Learning, and deep learning models.

PSO2: Ability to collect pre-process, and analyze large datasets, including data Cleaning, feature engineering, and data visualization..

PROGRAM OUTCOMES(POs)

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. **Problemanalysis:**Identify,formulate,reviewresearchliterature,andanalyzecomplex 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 effectivelyon 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.

ABSTRACT

This project presents a **Text-Based Number Guessing Game**, a simple yet engaging console application designed for entertainment and cognitive skill development. The game challenges users to guess a randomly generated number within a predefined range. With each guess, the system provides feedback, such as "Too High" or "Too Low," guiding players toward the correct answer. Developed using fundamental programming concepts, the project demonstrates the use of random number generation, conditional statements, loops, and user input handling. The application is lightweight, platform-independent, and suitable for players of all ages. Beyond entertainment, the game also serves as an educational tool, helping beginners understand core programming principles. Future enhancements could include difficulty levels, score tracking, and a multiplayer mode for added engagement. This project highlights how simple games can combine fun and learning effectively.

ABSTRACT WITH POs AND PSOs MAPPING

ABSTRACT	POs MAPPED	PSOs MAPPED
A text-based adventure game is a genre of interactive fiction that relies on text inputs and outputs to drive the gameplay experience. Players navigate through an imaginary world by reading descriptive text and typing commands to interact with the environment, solve puzzles, and progress through a storyline. The game typically involves exploration, problem-solving, and decision-making, where the player's actions determine the narrative's direction. Text-based adventure games, also known as interactive fiction (IF), offer a unique, immersive experience that emphasizes creativity and storytelling. They provide a platform for developing complex narratives, intricate puzzles, and character-driven plots, without the need for advanced graphics or real-time interaction.	**POs 3** **POs 5** **POs 9**	PSOs 1 PSOs 2

Note: 1- Low, 2-Medium, 3- High

SUPERVISOR **HEAD OF THE DEPARTMENT**

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CHAPTER 1

INTRODUCTION

1.1 Objective

The primary objective of the Text-Based Number Guessing Game project is to create an interactive and engaging game that enhances logical thinking and programming skills. The project aims to:

1. Provide an entertaining user experience through a simple, text-based interface.
2. Demonstrate the practical application of core Java programming concepts such as loops, conditionals, and input/output handling.
3. Enhance problem-solving abilities by integrating logical feedback mechanisms (e.g., "Too High" or "Too Low").
4. Serve as an educational tool for beginners to understand foundational programming principles in Java.

1.2 Overview

The Text-Based Number Guessing Game is a lightweight Java application where the user attempts to guess a randomly generated number within a predefined range. The game operates through a command-line interface, offering clear prompts and feedback for every guess.

- The program generates a random number using Java's Random class.
- Users input their guesses, and the program evaluates them, providing

feedback to help refine the guesses.

- Optional enhancements include customizable range settings, difficulty

levels, and replay functionality.

The project is designed to be intuitive and accessible, focusing on simplicity while leveraging fundamental Java programming constructs.

1.3 Java Programming Concepts

Object-Oriented Design: Use classes like Event, User, and Scheduler to model entities and their behaviors.

Date and Time Handling: Utilize Java's Local Date Time and related classes for accurate event scheduling and time calculations.

Data Storage: Store events and user data using data structures like Array List, HashMap, or a database for persistence.

CHAPTER 2
PROJECT METHODOLOGY

2.1 Proposed Work

The Text-Based Number Guessing Game project aims to create an interactive and user-friendly console-based application. The proposed work involves a systematic approach to design, development, testing, and enhancement of the game using core Java programming concepts. Below are the key steps for the proposed work:

1. Requirements Gathering and Analysis :

- Define the game rules and features:
    - A random number is generated within a specified range (e.g., 1 to 100).
    - Users are allowed unlimited attempts to guess the number, with feedback provided for each attempt.
    - Display the number of attempts upon successfully guessing the number.
- Ensure compatibility with different platforms through a lightweight, console-based design.

2. System Design:

- Game Logic Design:
    - Use Java's Random class for number generation.
    - Design feedback mechanisms for each guess, guiding the user with messages like "Too High" or "Too Low."
    - Allow users to restart the game after completion.

- Interface Design:
    - Provide a clear and engaging text-based user interface using System.out.println() for instructions and feedback.
    - Include options for difficulty levels and customizable ranges (optional).
- Flow Diagram:
    - Create a flowchart to represent the game's logic, from random number generation to user input validation and feedback.

3. Implementation

- Game Core:
    - Implement random number generation and user input handling using Java's Scanner and Random classes.
    - Use loops (while or do-while) to allow continuous guesses until the user wins.
    - Implement if-else conditions to provide feedback for guesses.
- Additional Features (Optional):
    - Add difficulty levels (e.g., Easy: 1–50, Medium: 1–100, Hard: 1–500).
    - Track and display the best score (minimum attempts) for replay sessions.
    - Include error handling for invalid inputs (e.g., non-numeric entries).

4. Testing and Validation

- Functional Testing:
    - Test the game for various scenarios, such as correct guesses, incorrect guesses, and boundary cases.

    - Validate input handling for numeric and non-numeric inputs.
- User Experience Testing:
    - Collect feedback from users on the clarity of instructions and gameplay.
- Performance Testing:
    - Ensure the game performs efficiently, even for extended ranges and repeated sessions.

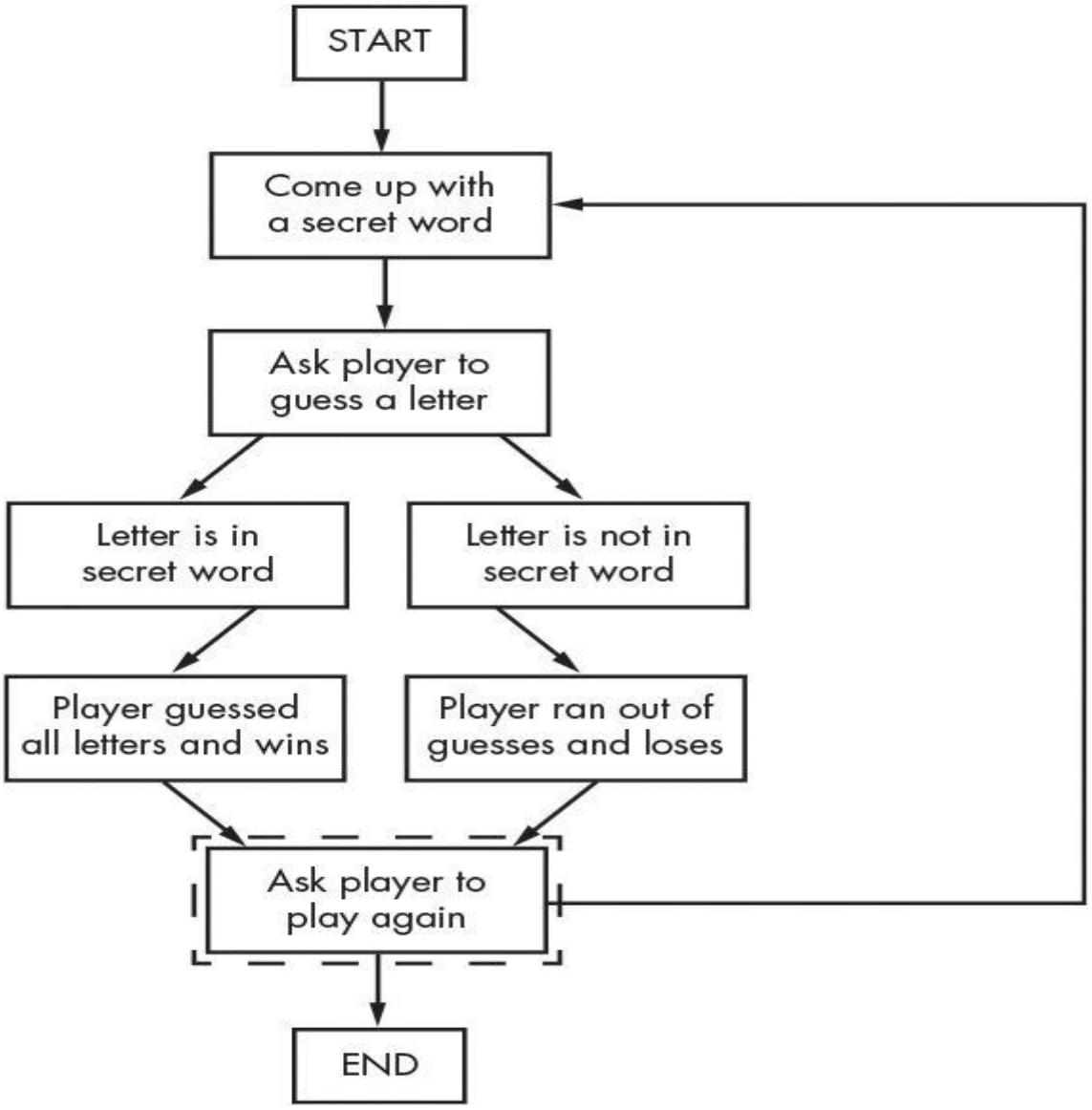
5. Deployment

- Deploy the game as a standalone Java application that can run on any system with a Java Runtime Environment (JRE).

6. Future Enhancements

- Develop a graphical user interface (GUI) version of the game using JavaFX or Swing.
- Integrate the game with a database to store user scores and track progress over time.
- Expand the game to include multiplayer functionality and a leaderboard system.

2.2 Block Diagram:



CHAPTER 3
MODULE DESCRIPTION

3.1 Random Number Generator Module

This module is responsible for generating a random target number within a predefined range. It uses Java's Random class or Math.random() to produce an unpredictable number each time the game is played, ensuring a fresh challenge for the player with each new session.

3.2 User Input and Validation Module

This module handles reading and validating the player's guess. It ensures that the input is numeric and falls within the allowed range. If the user enters an invalid input (e.g., a non-numeric value), the system prompts them to try again without crashing the program.

3.3 Feedback Module

This module provides feedback to the player based on their guess. It compares the user's guess to the target number and outputs a response such as "Too High," "Too Low," or "Correct." This feedback helps guide the user toward the correct answer and keeps the game interactive.

3.4 Game Loop Module

The game loop controls the flow of the game. It continuously allows the player to guess until the correct number is guessed. The loop integrates the random number generation, user input validation, and feedback modules, ensuring the game runs smoothly with multiple guesses.

3.5 Score Tracking Module

This module tracks the number of attempts the player takes to guess the correct number. It keeps a record of the player's performance and can optionally store the best score (i.e., the fewest attempts). This feature adds a competitive edge and encourages users to improve their performance over time.

CHAPTER 4

MODULE EXPLANATION

4.1 OBJECTIVE

This module involves the creation of a text-based adventure game using Java programming. The game will provide players with an interactive narrative where they can explore different environments, solve puzzles, and make choices that affect the outcome of the story. The project will focus on core programming concepts such as object-oriented design, user input handling, file management, and creating engaging gameplay mechanics through text-based interactions.

1. Game Overview and Objective

- Game Structure: The game will be divided into multiple levels or areas, where each area represents a specific environment in the story. The player will navigate between these areas through text-based commands.
- Player Actions: The player will interact with objects, characters, and other elements in the game world by typing commands such as "look", "take", "use", "talk", "inventory", etc.

Objective: The player’s ultimate goal is to navigate through the game world, solve challenges, collect items, and uncover the story, with various endings based on the decisions made throughout the game.

4.2. Key Modules and Their Descriptions

1. Game Engine Module

- Purpose: This is the core of the game. It manages the flow of the game, handles player actions, and ensures the proper interaction between different objects and areas in the game world.
- Key Components:
  - Game Loop: The continuous loop that waits for user input, processes the input, and updates the game state accordingly.
  - Command Processor: Parses player input commands (e.g., "go north", "use key", etc.) and triggers the corresponding actions or responses.
  - Game State Management: Keeps track of the player's current location, inventory, health, and other essential game states.

2. Room/Area Module

- Purpose: Represents different locations or areas in the game. Each area will have unique descriptions, objects, characters, and possible actions.
- Key Components:
  - Room Description: Text that describes the environment and sets the atmosphere for the player.
  - Connections: Links between different rooms that allow the player to navigate (e.g., "north", "south", "exit").
  - Objects & Items: Objects that the player can interact with, pick up, or use in the game world (e.g., keys, weapons, doors).

4.3 Inventory and Item Management Module

- Purpose: Handles the collection, storage, and usage of items throughout the game.
- Key Components:
  - Inventory System: A system that allows the player to store items they collect. Items can be added, removed, or used during the gameplay.
  - Item Interactions: Items can be used to interact with other game elements, such as opening locked doors with a key or healing the player using a potion.

3. Player Module

- Purpose: Represents the player character. This module tracks the player's stats (health, experience, inventory, etc.) and manages interactions with the world.
- Key Components:
  - Player Stats: Includes health, experience points, inventory, and other gameplay attributes.
  - Decision-Making: The player's choices will influence the game. The player can make decisions like which path to take, which NPC to trust, and how to approach various challenges.

4.4 Narrative & Story Module

- Purpose: Defines the plot, branching storylines, and the logic that governs the flow of the narrative.
- Key Components:
  - Story Flow: The game's plot is divided into chapters, each with

different possible outcomes based on player choices.

- Branching Paths: The player's choices will determine the direction of the story. This module will handle the branching narratives, creating a dynamic experience.
- Endings: The game can have multiple possible endings based on the player's actions.

4. Dialogue System Module

- Purpose: Manages conversations between the player and NPCs (non-player characters).
- Key Components:
  - Dialogue Trees: Allows for branching dialogues where the player's responses affect the flow of conversation.
  - NPC Responses: The system will store predefined NPC responses, which vary depending on the player's choices or the game state.

5. Save/Load System Module

- Purpose: Enables the player to save their progress and load it later.
- Key Components:
  - Save Game: Saves the player's current game state (location, inventory, health, and story progress) to a file.
  - Load Game: Loads a previously saved game, restoring the game state for the player to continue.

6. Error Handling and Validation Module

- Purpose: Ensures that the game remains stable by gracefully handling incorrect user input and unexpected situations.

- Key Components:

  - Input Validation: Ensures that player commands are valid and handle incorrect inputs (e.g., typing "go dragon" will prompt the player with a valid command).
  - Error Messages: Provides clear, concise error messages that guide the player toward the correct actions.

7. Graphics (Optional) Module

- Purpose: If you wish to extend the project beyond text, this module can provide ASCII art or graphical representations of rooms or characters. However, this is optional for a basic text-based game.
- Key Components:

ASCII Art: Simple art made using characters to represent rooms, characters, or objects visually.

3. Game Features

- Exploration: Players can explore various environments, finding hidden items, meeting characters, and unlocking new areas.
- Puzzle Solving: The player will face challenges that require logic, inventory management, and exploration to overcome.
- Combat System (Optional): If included, players could engage in text-based combat using items, skills, or strategies to defeat enemies.
- Quests: NPCs or game events will offer quests with different objectives, rewarding the player with items or progress in the game.

4. Game Flow

1. Introduction: The game will start by displaying an introductory message or narrative that sets the stage for the adventure. This can include setting the scene,

2. introducing the player to the world, and giving them basic instructions.

3. Main Gameplay Loop: The player will be presented with rooms to explore, challenges to face, and decisions to make. Based on the player's commands, the game will update the narrative and game world.

4. Endgame: The game will track the player's choices and lead to different possible endings based on the decisions made throughout the adventure.

5. Technologies and Tools

- Java SE: Java's standard edition will be used to develop this project. It provides all necessary tools for handling user input, file I/O, and object-oriented programming.
- Text Files (Optional): External text files (such as JSON or XML) can be used for saving game data, room descriptions, NPC dialogues, and more.
- IDE: A Java IDE like IntelliJ IDEA, Eclipse, or NetBeans will be used for development.

6. Potential Extensions

- Multiplayer Mode: Implement a system where multiple players can interact with the same world in a text-based format.
- Graphical User Interface (GUI): Implement a basic GUI to represent the game world using JavaFX or Swing, offering an alternative to pure text-based input and output.
- Advanced Combat System: Introduce an advanced combat system with player stats (strength, agility, etc.) and enemies with different abilities.

CHAPTER 5

RESULTS AND DISCUSSION

CHAPTER 6
CONCLUSION

The **Text-Based Number Guessing Game** project successfully demonstrates the application of fundamental programming concepts in Java, including random number generation, user input validation, control structures, and feedback mechanisms. The game provides an engaging and interactive experience, where users are challenged to guess a randomly generated number within a predefined range, receiving immediate feedback on their guesses.

The system was designed with simplicity in mind, allowing for easy interaction through a command-line interface. The modular approach to development ensured clear separation of functionality, with distinct modules handling different aspects of the game, such as random number generation, user input, and score tracking. The optional difficulty selection module adds flexibility, allowing the game to be customized for different user skill levels.

In conclusion, the project meets its objectives of providing both an educational tool for learning Java and an entertaining experience for users. Future enhancements, such as graphical interfaces, multiplayer modes, and advanced score tracking, could further improve the game's usability and engagement. This project showcases the power of Java programming in creating interactive, text-based applications and serves as a solid foundation for developing more complex games in the future.

APPENDIX

(Coding)

```
let gameState = {
  currentRoom: 'start',
  inventory: [],
  health: 100,
};

const rooms = {
  start: {
    description: 'You are in a dark room. There is a door to the north and a table to the east.',
    options: [
      { command: 'go north', action: 'north' },
      { command: 'go east', action: 'east' },
      { command: 'look table', action: 'lookTable' },
    ],
  },
  north: {
    description: 'You enter a dimly lit hallway. There is a door to the south and a window.',
    options: [
      { command: 'go south', action: 'south' },
      { command: 'look window', action: 'lookWindow' },
    ],
  },
  east: {
    description: 'You approach the table. There is a key on it.',
    options: [
      { command: 'take key', action: 'takeKey' },
      { command: 'go back', action: 'backToStart' },
    ],
```

```
 },
};

function startGame() {
  console.log('Welcome to the text-based adventure game!');
  showRoomDescription();
  promptPlayer();
}

function showRoomDescription() {
  let currentRoom = rooms[gameState.currentRoom];
  console.log(currentRoom.description);
  currentRoom.options.forEach((option, index) => {
    console.log(`${index + 1}: ${option.command}`);
  });
}

function promptPlayer() {
  const readline = require('readline');
  const rl = readline.createInterface({
    input: process.stdin,
    output: process.stdout,
  });

  rl.question('What will you do? ', function (input) {
    processInput(input);
    rl.close();
  });
}

function processInput(input) {
  let currentRoom = rooms[gameState.currentRoom];
  let optionFound = false;

  for (let option of currentRoom.options) {
```

```
if (input.toLowerCase() === option.command.toLowerCase()) {
      optionFound = true;
      handleAction(option.action);
      break;
    }
  }

  if (!optionFound) {
    console.log('Invalid choice, please try again.');
    promptPlayer();
  }
}

function handleAction(action) {
  switch (action) {
    case 'north':
      gameState.currentRoom = 'north';
      showRoomDescription();
      promptPlayer();
      break;
    case 'east':
      gameState.currentRoom = 'east';
      showRoomDescription();
      promptPlayer();
      break;
    case 'lookTable':
      console.log('The table is old and dusty. You find a key on it.');
      promptPlayer();
      break;
    case 'takeKey':
      gameState.inventory.push('Key');
      console.log('You have taken the key.');
      promptPlayer();
      break;
    case 'backToStart':
```

```
    gameState.currentRoom = 'start';


 showRoomDescription();
      promptPlayer();
      break;
    case 'south':
      gameState.currentRoom = 'start';
      showRoomDescription();
      promptPlayer();
      break;
    case 'lookWindow':
      console.log('The window is closed and covered with dust. It seems like it has
      not been opened in years.');
      promptPlayer();
      break;
    default:
      console.log('Action not recognized.');
      promptPlayer();
  }
}

startGame();
```

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