CASE STUDY: Rock Paper Scissors Game Using C++

1. Project Overview

This case study details the creation of a console-based Rock Paper Scissors game in C++. The project was intended to provide an interactive gaming experience while also reinforcing fundamental programming concepts.

The system enables users to compete against the computer, which generates random moves. The winner is determined using predetermined rules.

2. Problem Statement

Many new programmers struggle to apply their theoretical knowledge to real-world projects. There is a need for simple but useful applications that aid in understanding logic, conditions, and loops.

This project addresses this issue by implementing a popular game using C++ programming principles.

3. Objectives

The main goals of this project are

Develop an interactive console game.

To implement random number generation.

To validate the user input

To accurately determine game outcomes.

To enhance problem-solving abilities.

To practice modular programming.

4. Scope of the Project

The scope of this project includes the following:

Single-player mode.

User vs. Computer gameplay.

A text-based interface

The ability to replay

The project does not have a multiplayer mode or a graphical interface.

5. Tools and Technologies

Programming Language: C++

IDE: Dev-C++

Compiler: GCC

Platform: Windows OS

6. System Design

6.1 Architecture

The system has a simple procedural programming architecture.

The main components are:

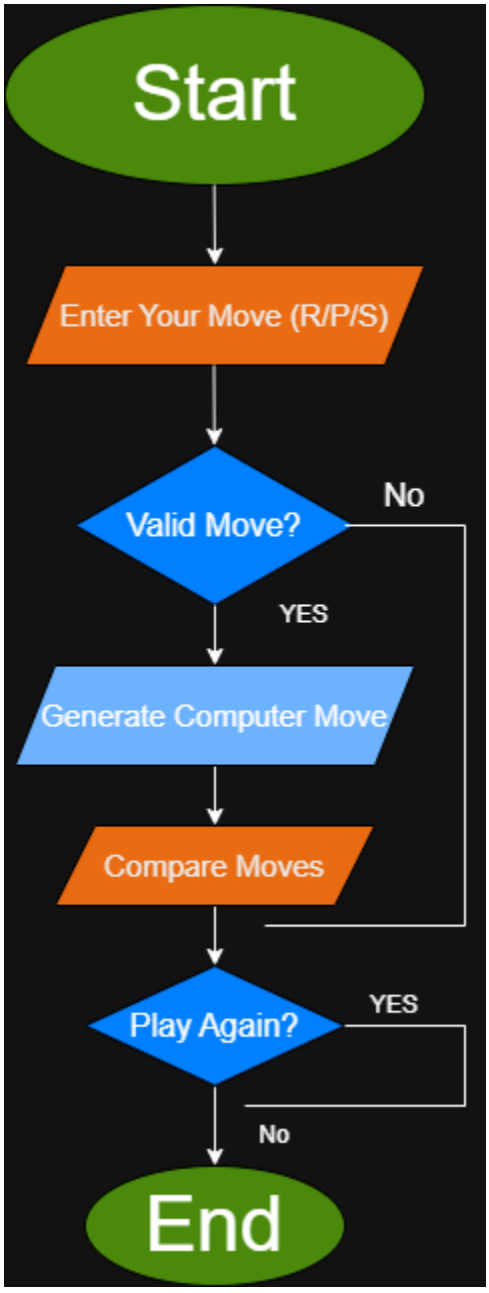
Input Module—Accepts user input.

Game Logic Module: Compares movements.

Random Module: Generates computer movements.

Output Module - Displays the results

6.2 Data Flow



7. Methodology

The project was developed using the following steps:

1. Requirement analysis
2. Designing game logic
3. Writing modular functions
4. Implementing randomization
5. Testing with multiple inputs
6. Debugging and optimization
7. Documentation

8. Implementation Details

The project uses:

rand() and srand() for random moves

Functions to separate logic

Loops for repetition

Conditional statements for decision-making

Example Logic:

If player = Rock and computer = Scissors → Player wins

If both moves are the same → Draw

9. Challenges Faced

9.1 Random Number Generation

Initially, random values repeated due to improper seeding.
This was solved by initializing srand() once in the main function.

9.2 Input Validation

Users entered invalid characters.
This was resolved by validating input using loops.

9.3 Compatibility Issues

Older compilers did not support modern C++ features.
This was handled by updating compiler settings.

10. Testing

The system was tested with various scenarios:

Test Case	Input	Expected Output	Result
TC01	r vs s	Player Wins	Pass
TC02	p vs r	Player Wins	Pass
TC03	s vs s	Draw	Pass
TC04	x	Invalid Input	Pass

All test cases passed successfully.

11. Results and Output

The project successfully:

- Generated random computer moves
- Displayed accurate results
- Allowed multiple gameplay rounds

Provided a smooth user experience

Sample Output:

Your Move: Rock
Computer Move: Scissors
Result: You Win!

12. Advantages

Easy to understand

Lightweight application

No extra dependencies

Beginner-friendly

Improves coding skills

13. Limitations

No multiplayer support

No score history

No cloud storage

14. Future Enhancements

Add score tracking

Develop GUI using Qt/SFML

Online multiplayer

Mobile app version

AI-based opponent

15. Learning Outcomes

During this project, I learned:

Modular programming

Random number handling

Input validation

Debugging techniques

Documentation practices

Version control basics

16. Conclusion

The Rock Paper Scissors project demonstrates how simple games can be used to effectively teach programming fundamentals. It provides a solid foundation for learning advanced concepts in software development.

The project was completed successfully and met all of its objectives.

17. References

C++ Official Documentation

GeeksforGeeks (Rock Paper Scissor Game in C++ - GeeksforGeekss)

Stack Overflow Rock Paper Scissors in C++ - Stack Overflow

Programming Textbooks

18. Details

Name: Ponugupati Teja Sri Krishna
Project Title: Rock Paper Scissors Game
Technology: C++
Platform: Windows 11