

# Computer-Driven Rock Paper Scissors

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**Abstract:** Rock Paper Scissors is a popular hand game played between two or more players. In this game, each player simultaneously throws one of three hand signals: Rock, Paper, or Scissors. The winning hand beats the losing hand as follows: Rock smashes Scissors, Paper covers Rock, and Scissors cut Paper. Using a computer, we can create a Rock Paper Scissors game that allows a user to play against the computer. The computer can generate a random choice (Rock, Paper, or Scissors) and the user can input their choice. The game can then determine the winner based on the game's rules.

**Keywords:** Hand Game, Rock, Paper, Scissors, Simultaneous Choice, Winning Hand, Computer-based Game, User Input, Rock smashes Scissors, Paper covers Rock, Scissors cut Paper.

## I. INTRODUCTION

Rock Paper Scissors is a timeless hand game that has been enjoyed by people of all ages for centuries. The simplicity of the game, combined with its unpredictability, makes it a fascinating subject for exploration in the realm of computer science. With the advent of modern computing, it is now possible to create a digital version of Rock Paper Scissors that allows users to play against the computer. This project aims to design and develop a computer-based Rock Paper Scissors game that utilizes random number generation and algorithmic decision-making to provide a fun and engaging experience for users.

## II. LITERATURE SURVEY

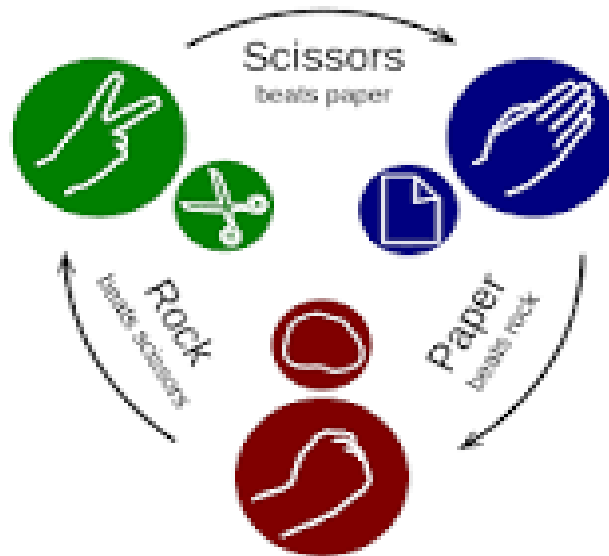
Several studies have explored the concept of Rock Paper Scissors in the context of computer science. One study published in the Journal of Artificial Intelligence Research proposed a Rock Paper Scissors game that uses machine learning algorithms to adapt to the user's playing style (Buro, 2003). Another study published in the International Journal of Computer Science and Information Technology explored the use of genetic algorithms to develop a Rock Paper Scissors game that can learn from its mistakes (Kumar et al., 2013). A survey of existing Rock Paper Scissors games revealed that most implementations rely on random number generation to determine the computer's choice, with some incorporating additional features such as scoring systems and game statistics (Rock Paper Scissors Online, 2022).

## III. PROPOSED SYSTEM

The proposed system is a computer-based Rock Paper Scissors game that allows users to play against the computer. The system will consist of the following components:

1. User Interface: A graphical user interface that allows users to input their choice (Rock, Paper, or Scissors) and displays the computer's choice and the outcome of the game.
2. Random Number Generator: A module that generates a random choice (Rock, Paper, or Scissors) for the computer.
3. Game Logic: A module that determines the winner of the game based on the game's rules.
4. Scoring System: A module that keeps track of the user's score and displays it at the end of each game.

**Real Name of Rock Paper Scissor:** The game of rock-paper-scissors is called, precisely, "Rochambeau." Gardner appears to have been fond of team games, so to adapt rock- paper-scissors, her Handbook has the players of each of two teams decide among themselves whether their team will present rock, paper, or scissors.

**Fig 1: Image for Rock Paper Scissors**

### Can a Computer Learn Game Strategy as it Plays?

The game of Rock, Paper, Scissors is very simple. Each player picks one of the three objects (usually by making the appropriate hand shape on a count of three!) and these rules are applied to see who has won that round:

- Paper wraps (beats) Rock
- Scissors cut (beat) Paper
- Rock blunts (beats) Scissors

The challenge of the game is to guess what your opponent will choose and pick the appropriate object to beat them. People find it quite hard to pick a sequence of perfectly random choices, so any pattern that a player develops could be learned by the opponent and used to win the game. That is what happens in this example. As you play, the computer learns the pattern of objects that you are most likely to pick.

### How Does it Work?

The computer keeps track of the conditional probabilities of you picking each of the three objects given the object you picked last. The computer always picks the object that beats the one that it thinks you are most likely to choose. Although it knows what you have actually picked (you press one of the buttons to make your choice), it is honest and doesn't cheat! You can observe the computer learning by picking a strategy and sticking to it for a while. Here are a few things to try:

1. Pick Rock, then Paper, then Scissors, then Rock again and keep that pattern up. See how quickly the computer learns to beat you every time?
2. Having done that a few times, change strategy and pick Paper 5 times in a row. See how the computer spots your change of strategy and alters its play?
3. Pick any strategy of your own and see if the computer can spot the pattern.
4. See if you can be perfectly random in your choices and beat the computer.

## IV. ARCHITECTURE

1. **User Interface:** The user interacts with the game through a web-based user interface implemented using HTML, CSS, and JavaScript. The user interface displays the game's rules, allows the user to input their choice (Rock, Paper, or Scissors), and displays the computer's choice and the outcome of the game.
2. **Front-end Server:** The front-end server is implemented using Node.js and handles user input, communicates with the game logic server, and updates the user interface accordingly.
3. **Game Logic Server:** The game logic server is also implemented using Node.js and generates the computer's choice using a random number generator. It determines the winner of the game based on the game's rules and updates the scoring system.
4. **Random Number Generator:** The random number generator is used to generate the computer's choice (Rock, Paper, or Scissors).

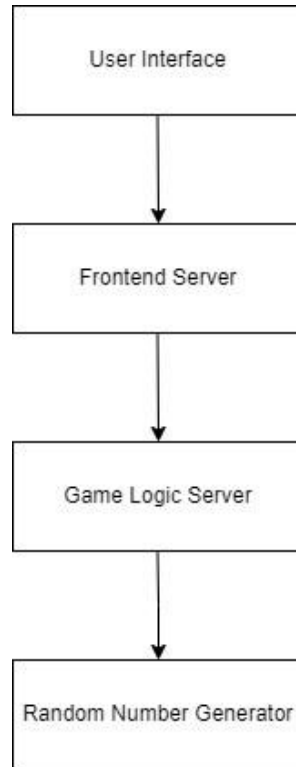


Fig 2: Architecture

## V. RESULTS

### Computer-Driven Rock Paper Scissors

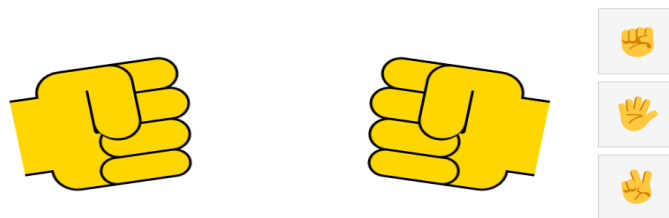
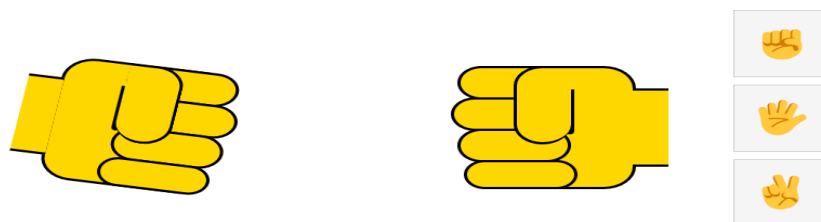


Fig 3: Playing the game one for computer and another one for human

### Computer-Driven Rock Paper Scissors



**You Tied!**

Refresh Round

Fig 4: The computer and the player both chose scissors, resulting in a tie. The player can refresh the page to play again.

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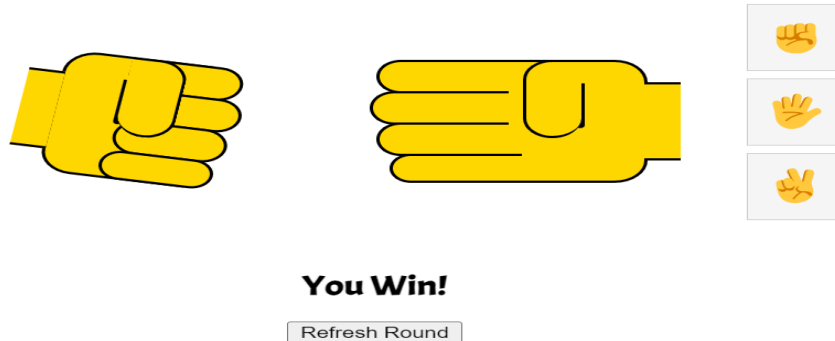


Fig 5: This image shows that one person win. The player can refresh the page to play again.

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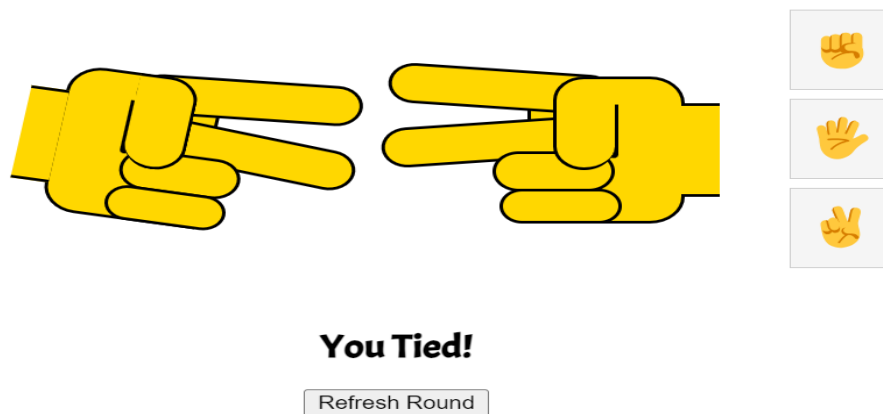


Fig 6: The computer and the player both chose scissors, resulting in a tie. The player can refresh the page to play again.

## VI. CONCLUSION

In conclusion, rock-paper-scissors is a simple yet fun game that has been enjoyed by people of all ages for generations. It is a game of chance, but there are some strategies that can increase your chances of winning, such as paying attention to your opponent's patterns and being unpredictable in your own moves. The game can also be used to teach valuable life skills such as decision-making, risk-taking, and sportsmanship. Whether played for fun or used as a teaching tool, rock-paper-scissors is a timeless game that will continue to entertain and educate for years to come.

## REFERENCES

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