

# SUDOKU



Isha Yadav

2110992064

B.E(CSE)

G-19

Instructor: Pritpal Mam

## Overview

The Sudoku Solver Web Application, built with React, provides an intuitive platform for Sudoku enthusiasts. Featuring a visually appealing interface, real-time feedback, and a powerful backtracking algorithm, it offers users an interactive experience in solving Sudoku puzzles. Its user-friendly design, efficient solver, and potential for expansion make it a valuable tool for both beginners and experienced players, fostering skill development and enjoyment in the world of Sudoku.

## Objectives

The objective of this report is to provide a comprehensive overview and analysis of the Sudoku Solver Web Application. It aims to:

**Document Features and Functionalities:** Describe the core features and functionalities of the Sudoku Solver Web Application, detailing how users interact with the application, including input methods, solving capabilities, and feedback mechanisms.

**Explain Implementation Details:** Provide insights into the technologies, algorithms, and methodologies used in the development of the Sudoku Solver Web Application. This includes explaining the programming languages, frameworks, and design patterns employed.

**Highlight Design and User Experience:** Discuss the user interface design principles, layout, and interactive elements that contribute to the application's user experience. Emphasize accessibility, responsiveness, and user-friendly design.

**Present Additional Features:** Outline potential enhancements and additional features that can be integrated into the application, providing a roadmap for future development and improvement.

## Tech Used

### Frontend:

React.js, React.js is a popular JavaScript library for building user interfaces. It provides a component-based architecture, allowing for the creation of interactive and dynamic user interfaces.

JavaScript: JavaScript is the primary programming language used for implementing the application's logic, user interactions, and algorithms.

CSS: Cascading Style Sheets (CSS) are used for styling the user interface, including layout, colors, and responsive design.

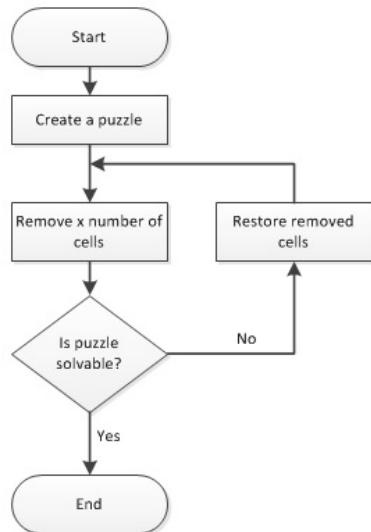
### State Management:

React Hooks (useState): The useState hook in React.js is utilized for managing the state of the Sudoku grid. It enables the application to re-render components when the state changes, ensuring real-time updates.

### Algorithm:

Backtracking Algorithm: The application uses a backtracking algorithm to solve Sudoku puzzles recursively. Backtracking is a common technique for solving constraint satisfaction problems like Sudoku, ensuring that the solver explores all possible solutions efficiently.

### Flow Process:





## Project Features

### I. User Interface:

The application provides a clean and intuitive interface for users to input Sudoku puzzles. Grid layout resembling a Sudoku board, where users can input numbers from 1 to 9. Disabled cells represent the initial puzzle provided to the user.

Visual cues, such as grid lines and different cell borders, enhance the user experience.

### II. Functionality

**Input Validation:** Users can only input numbers from 1 to 9 or leave cells empty (represented by -1).  
**Check Sudoku:** Users can check the current state of the Sudoku puzzle for correctness. The application alerts the user if the puzzle is solved correctly, partially correct, or unsolvable.

**Solve Sudoku:** The application provides an algorithm to solve the Sudoku puzzle. Users can click the "Solve" button to automatically fill in the solution.

**Reset Sudoku:** Users can reset the puzzle to its initial state by clicking the "Reset" button.

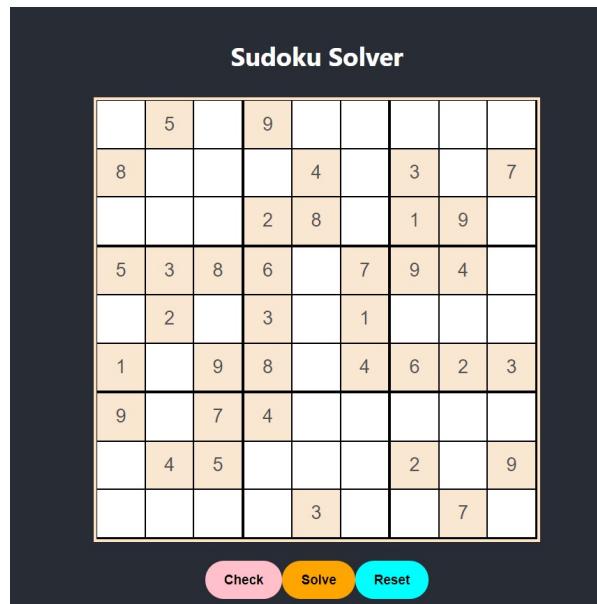
### III. Accessibility and User Experience:

Prioritize accessibility features to make the application usable for all users, including those with disabilities. Implement a user-friendly interface with intuitive controls, ensuring a seamless experience for players of all ages and skill levels.

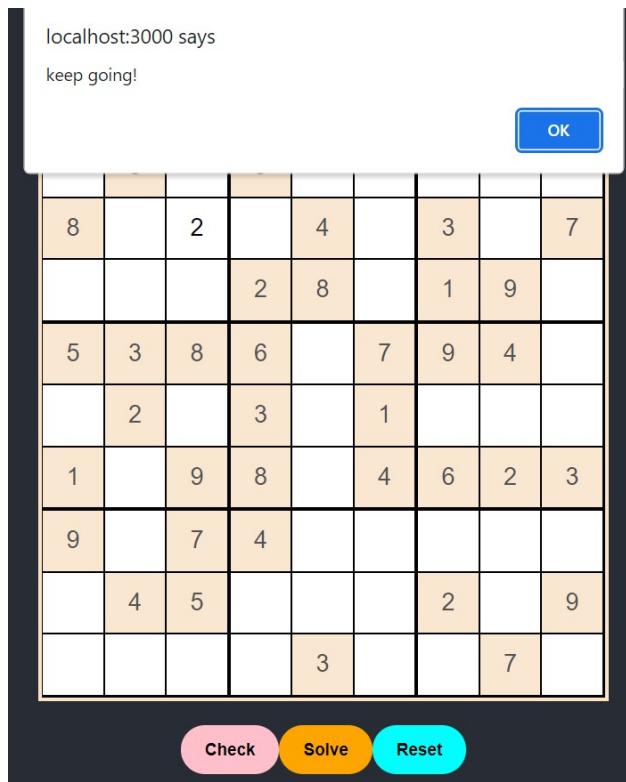
### IV. Error Handling and Feedback:

Develop clear and concise error messages to guide users when they make mistakes, helping them understand and correct their input errors.

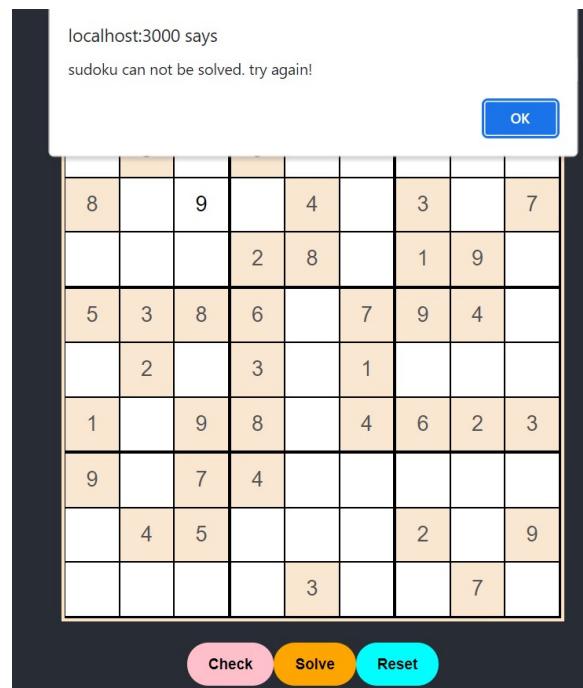
This is complete picture of project



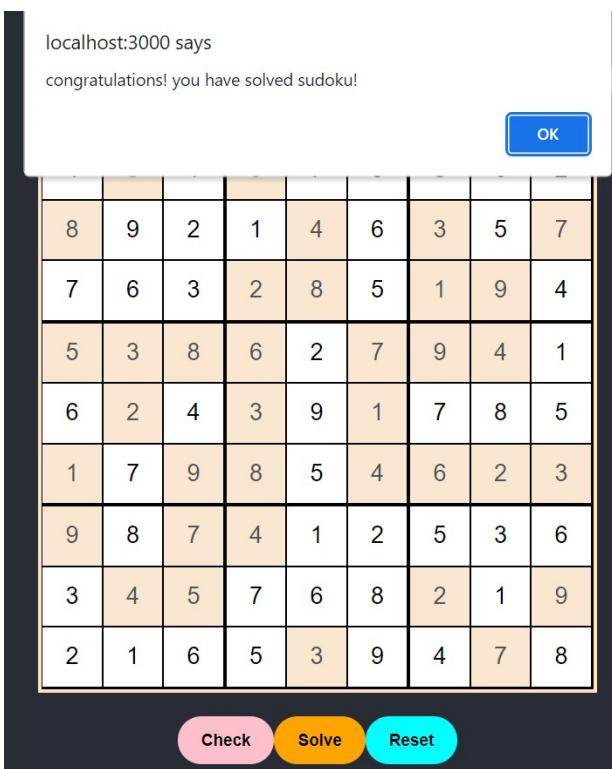
When user enters the number i.e., neither present in row nor column then the pop window of "keep going" is shown



When user enters the wrong number i.e., either present in row or column then the pop window of "sudoku can not be solved" is shown



When the user has solved the whole puzzle and clicks on the check button then "Congratulations message" is shown.





## Conclusion:

The Sudoku Solver Web Application offers Sudoku enthusiasts an intuitive and interactive platform. With a visually appealing interface and efficient backtracking algorithm, it provides real-time feedback, enabling users to solve puzzles accurately. The project's success lies in its user-friendly design, robust solver capabilities, and potential for future enhancements, making it a valuable resource for Sudoku enthusiasts looking to improve their skills and enjoy the game.