VIPS
योग: कर्मसु कौशलम्
IN PURSUIT OF PERFECTION
VIVEKANANDA SCHOOL OF ENGINEERING AND TECHNOLOGY

DAA projects
Topic: " Sudoku Solver"

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1. Introduction & Motivation

Sudoku is a popular logic-based number puzzle game originating in the late 1970s but inspired by earlier number placement puzzles. The classic version of Sudoku consists of a 9x9 grid divided into nine 3x3 sub-grids. The objective is to fill in all 81 cells with digits from 1 to 9 so that each row, each column, and each 3x3 sub-grid contains every digit from 1 to 9 exactly once.

- **Number Placement**

  The goal is to fill a 9x9 grid with digits from 1 to 9.

- **Unique Values**

  Each row, column, and 3x3 subgrid must contain all digits without repetition.

- **Logic and Deduction**

  Players use logic and deduction to determine the correct placement of numbers.

2. Problem Statement

The problem statement for a Sudoku solver is to create a program that can efficiently determine the correct placement of numbers in a partially filled Sudoku grid to satisfy all the rules of the game.

RULES

1. **Row Constraint**

   Each row must contain all the digits from 1 to 9, without any repetition.

2. **Column Constraint**

Similarly, each column must also contain all the digits from 1 to 9, with no repetitions.

3. **Subgrid Constraint**

Each 3x3 subgrid, within the larger 9x9 grid, must have all the digits from 1 to 9, without repetition.

3. Implementing Backtracking Algo

1. Find Empty Cell The algorithm begins by finding an empty cell in the grid.
2. Try Possible Values For each empty cell, the algorithm iterates through possible values (1 to 9).
3. Check Validity The algorithm checks if the candidate value is valid based on Sudoku rules.
4. Recursive Call If valid, the algorithm recursively calls itself to solve the rest of the puzzle.
5. Backtrack If no valid value is found, the algorithm backtracks and tries another value.

4. Tech Stack

JavaScript

The primary programming language for implementing the Sudoku solver logic and user interface.

HTML

Used for structuring the web page and defining elements like the Sudoku grid, buttons, and input fields..

CSS

For styling the user interface, ensuring a visually appealing and user-friendly experience.

5. Enhancing the User Experience

- **Difficulty Levels**

  Allow users to select from different difficulty levels, ranging from easy to expert, providing a tailored experience.

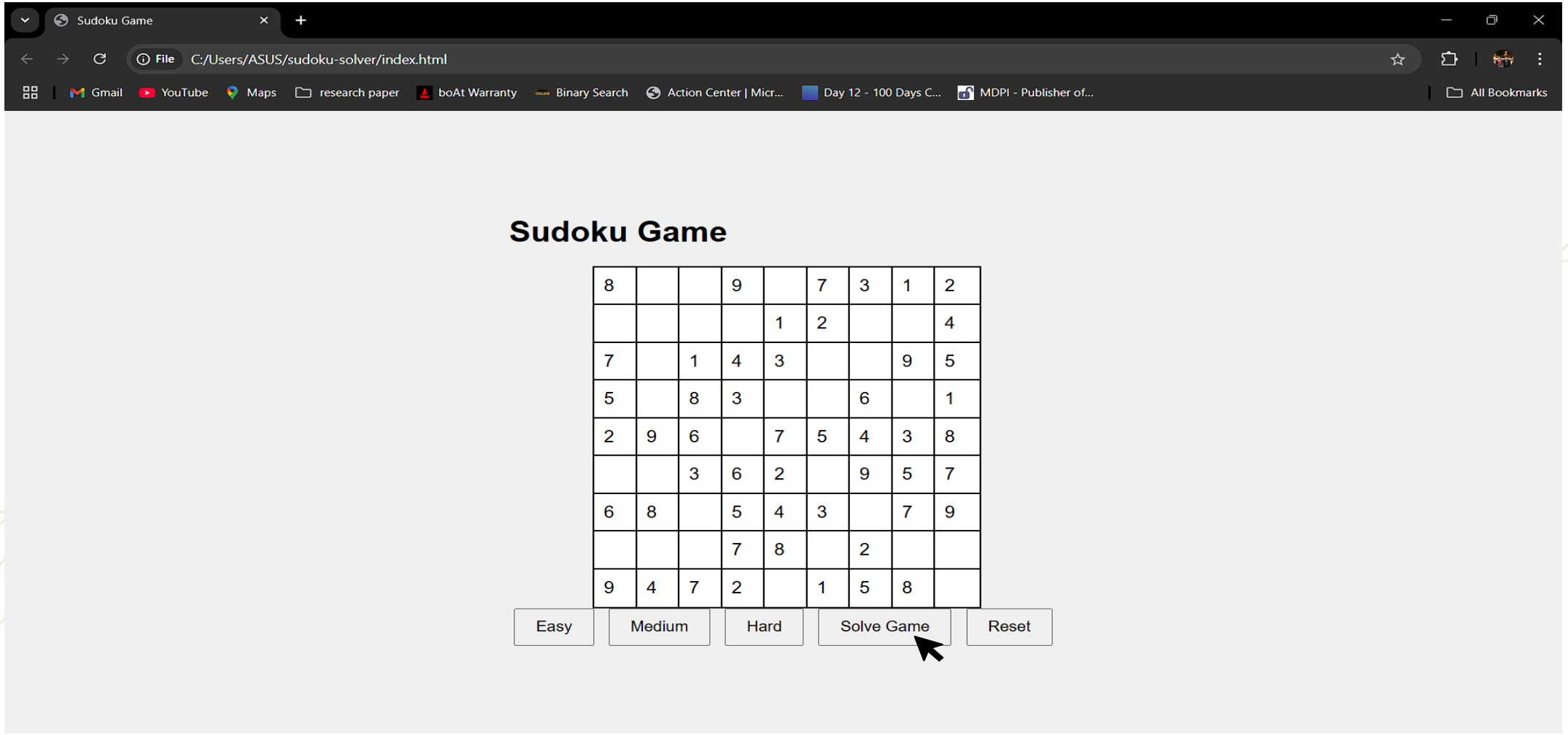
- **Hints**

  Implement a hint feature that provides a suggestion for an empty cell, helping users progress when stuck.

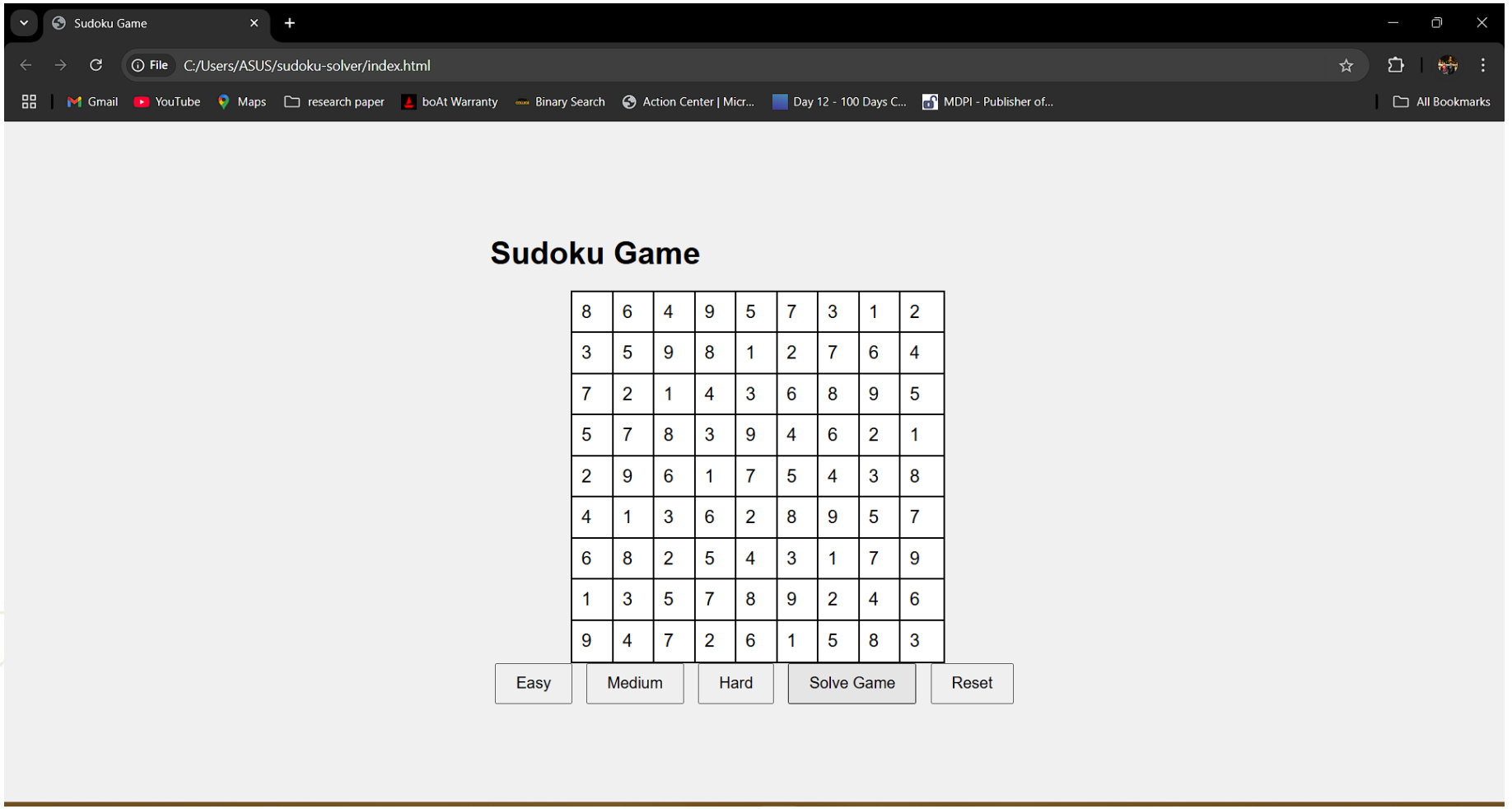
- **Timer**

  Include a timer to track the user's solving time, adding a competitive element to the game.

6. User Interface



7. Result


Sudoku Game
File C:/Users/ASUS/sudoku-solver/index.html
Gmail YouTube Maps research paper boAt Warranty Binary Search Action Center | Micr... Day 12 - 100 Days C... MDPI - Publisher of... All Bookmarks
Sudoku Game
8 6 4 9 5 7 3 1 2
3 5 9 8 1 2 7 6 4
7 2 1 4 3 6 8 9 5
5 7 8 3 9 4 6 2 1
2 9 6 1 7 5 4 3 8
4 1 3 6 2 8 9 5 7
6 8 2 5 4 3 1 7 9
1 3 5 7 8 9 2 4 6
9 4 7 2 6 1 5 8 3
Easy
Medium
Hard
Solve Game
Reset

8. Conclusion and Future Improvements

Project Summary

This project demonstrates the development of a Sudoku solver using JavaScript, encompassing logic implementation, user interface design, and user experience enhancements

Future Scope

Future improvements could include exploring different solving algorithms, optimizing the performance for larger grids, and incorporating additional game features

5	3			7				
6			1	9	5			
	9	8					6	
8				6				3
4			8		3			1
7				2				6
	6					2	8	
			4	1	9			5
				8			7	9

9. Learning Outcomes

JavaScript Programming
It reinforces JavaScript programming skills through its implementation, encompassing user interface development and logical problem solving.

Problem-Solving
Solving Sudoku puzzles using JavaScript cultivates logical reasoning, problem-solving, and critical thinking skills.

Algorithm Design
This project provides practical experience in designing and implementing algorithms, specifically a backtracking algorithm for Sudoku solving.