

# CS -101

# SUDOKU

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

## PROJECT REPORT

# INTRODUCTION

Sudoku is a popular numerical puzzle solved and enjoyed all over the world. This game has a 9x9 grid filled with a few numbers which is given to the user. The grid is then divided into 9,3x3 boxes as shown in the figure below. The aim of the game is to fill the blank spaces with numbers from 1 to 9 in such a way that all the rows, columns and boxes have all the numbers from 1 to 9. Thus because of the dimensions of the grid, we see that no number should be repeated along a row, column or in the block.

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

Sample Sudoku

This program is designed to be a complete Sudoku game in which the user is given a Sudoku puzzle and the program can also auto solves the Sudoku given by the user.

## **Project Design**

The Sudoku game will have two basic modes-

1. Solvable Sudoku puzzle
2. Sudoku auto solver.

### **Solvable Sudoku puzzle**

In this mode the user will be given a Sudoku with a few blanks filled. The user will aim to fill in the remaining blanks with numbers from 1 to 9 according to the rules of Sudoku. The user will have three options in the level of difficulty that he/she wants- easy, medium and difficult. After choosing the difficulty the user will be given a random Sudoku of that difficulty. The Sudoku puzzles will already be saved in the files according to the difficulty level. After the user solves the Sudoku, it will be compared and verified with the model Sudoku solution already saved in the files. There will also be a clock as the user solves the Sudoku, based on the clock there will be 2 modes-

I. Stop watch

II. Timer

## I. Stop Watch

In this mode the clock will measure the amount of time needed to complete the Sudoku and the score will be calculated according to the amount of time taken per difficulty level . the watch is stopped automatically when user submits the Sudoku solved by him and then the Sudoku is compared with the correct one and the marks are accordingly displayed on the screen

## II. Timer

In this mode a fixed amount of time will be given to the user to solve the Sudoku. Different difficulty levels will have different amount of time and the game will stop once the timer runs out. The Sudoku solved by the user will be compared to the solved Sudoku and the score will be calculated corresponding to the number of blanks that the user gets right. the minimum time given for a particular Sudoku is five minutes and as soon as 5 minutes are over

the program compares the Sudoku with its solution and displays whether it is correct or not depending upon marks.

## **2. Auto solver**

In this mode the user will give the Sudoku puzzle to the program and the program will solve it or tell if it is not possible to solve the particular Sudoku. The input of the Sudoku by the user should be as per the rules of Sudoku or the program will specify that a solution to this Sudoku is not possible.

The main aim of this function is to minimize the time to solve the Sudoku and bring it to the limit of seconds using the speed capability of processing or compilation done by the computer so as to provide user with a solution within a few seconds. We have basically used the backtracking algorithm to solve the inputted Sudoku problem which has been discussed later in the algorithm.

# TEAM DETAILS

## TA(GROUP 5)

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## Team Members

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