

Draft User Manual

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Introduction

This user manual aims to give assistance to the people using the Sudoku Program and autosolver. Sudoku originally called Number Place, is a logic-based, combinatorial number-placement puzzle. The objective is to fill a 9x9 grid with digits so that each column, each row, and each of the nine 3x3 sub-grids that compose the grid (also called "boxes", "blocks", "regions", or "sub-squares") contains all of the digits from 1 to 9. The puzzle setter provides a partially completed grid, which for a well-posed puzzle has a unique solution. Completed puzzles are always a type of Latin square with an additional constraint on the contents of individual regions. For example, the same single integer may not appear twice in the same row, column or in any of the nine 3x3 subregions of the 9x9 playing board.

Elements of the Puzzle

- **Rows** : There are 9 rows in a traditional Sudoku puzzle. Every row must contain the numbers 1, 2, 3, 4, 5, 6, 7, 8, and 9. There may not be any duplicate numbers in any row. In other words, there can not be any rows that are identical.
- **Columns** : There are 9 columns in a traditional Sudoku puzzle. Like the Sudoku rule for rows, every column must also contain the numbers 1, 2, 3, 4, 5, 6, 7, 8, and 9. Again, there may not be any duplicate numbers in any column. Each column will be unique as a result.
- **Regions** : A region is a 3x3 box like the one shown to the left. There are 9 regions in a traditional Sudoku puzzle. Like the Sudoku requirements for rows and columns, every region must also contain the numbers 1, 2, 3, 4, 5, 6, 7, 8, and 9. Duplicate numbers are not permitted in any region. Each region will differ from the other regions.

Rules and Regulations

The basic rules of Sudoku are as follows :

- There is only one valid solution to each Sudoku puzzle. The only way the puzzle can be considered solved correctly is when all 81 boxes contain numbers and the other Sudoku rules have been followed.
- When you start a game of Sudoku, some blocks will be pre-filled for you. You cannot change these numbers in the course of the game.

- Each column must contain all of the numbers 1 through 9 and no two numbers in the same column of a Sudoku puzzle can be the same.
- Each row must contain all of the numbers 1 through 9 and no two numbers in the same row of a Sudoku puzzle can be the same.
- Each block must contain all of the numbers 1 through 9 and no two numbers in the same block of a Sudoku puzzle can be the same.

In summary, the **Sudoku rule** is: *Complete the Sudoku puzzle so that each and every row, column, and region contains the numbers one through nine only once.*

Autosolver Rules

In case of the autosolver the program expects us to fill out some of the boxes randomly. Although we must ensure that the values of the numbers in the boxes that we have filled are valid. That implies that the boxes must be filled in such a way that the sudoku grid has a unique and valid solution. The computer then uses algorithms as defined by the program and brute-force mechanism to come up with a unique solution of the sudoku grid defined by the user.

Difficulty Levels

This program creates Sudoku grids and autosolves the classic Sudoku. The user is given the option of selecting any one of the three defined levels of difficulties - Easy, Moderate and Hard. There are some predefined grids that are stored in the program and the number of boxes already filled differ as the level of difficulty varies.

Other Features

The user's game is timed in this program and one can get to know the time he/she took to solve the puzzle. Based on the time taken and level of difficulty the program also keeps the score of the player. In this way a leaderboard can be formed and one can hold competitions.

Frequently Asked Questions(FAQ)

- Can a puzzle have more than one correct solution?
Ans. No. Every Sudoku puzzle has one and only one correct solution.
- Can I change or move the numbers that are already on the puzzle when I start it?
Ans. The pre-filled boxes are sometimes referred to as "givens". No, you cannot change or move any of the givens in a Sudoku puzzle.
- Are Sudoku tournaments held?
Ans. Yes. You can find information about Sudoku tournaments on the Internet. The first World Championship Sudoku Tournament was held in Lucca, Italy in March of 2006. The winner was an accountant from the Czech Republic, 2nd and 3rd place were one by US citizens - a Harvard University graduate student and a software engineer from Google. The finalists had to compete by solving 45 puzzles over two days. A number of Sudoku variations were used in addition to the basic 81 block grid.
- Are there other variations of the game besides the standard 81 box grid?
Ans. Yes, there are several variations. A few examples are:
 - Diagonal Sudoku - adds the two main diagonals of the basic 9x9 box – so the numbers along the diagonals must also run 1 through 9 and cannot repeat.
 - High Five Sudoku - is a version available in some Sunday newspapers that uses five 9x9 grids that overlap each other.
 - Even-Odd Sudoku - uses boxes of two different colors – one color box must contain only odd numbers and the other color must contain only even numbers – all of the other Sudoku rules apply.