

# SudokuMeister Version 1.0 Manual

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# Chapter 1

## Introduction

Sudoku, Sodoko, Soduko - no matter how you spell it, Sudoku is a fascinating puzzle game. Byteplant's SudokuMeister is Windows®<sup>1</sup> software to play and solve Sudoku puzzles. It is very easy and comfortable to use and offers a lot of useful features, e.g. giving solution hints or the ability to create puzzles of different difficulty levels.

### 1.1 What is Sudoku?

**Definition** (from the Wikipedia): Sudoku, sometimes spelled Su Doku, is a placement puzzle, also known as Number Place in the United States. The aim of the puzzle is to enter a number from 1 through 9 in each cell of a grid, most frequently a 9x9 grid made up of 3x3 subgrids (called "regions"), starting with various numbers given in some cells (the "givens"). Each row, column and region must contain only one instance of each number. Completing the puzzle requires patience and modest logical ability (although some puzzles can be very difficult). Its classic grid layout is reminiscent of other newspaper puzzles like crosswords and chess problems. First published in the United States, Sudoku initially became popular in Japan in 1986 and attained international popularity in 2005.

The word Sudoku means "single number" in Japanese. The numerals in Sudoku puzzles are used for convenience; arithmetic relationships between numerals are not important. Any set of distinct symbols will do; letters, shapes, or colours may be used without altering the rules. Indeed, Penny Press uses letters in their version called Scramblets. Dell Magazines, the puzzle's originator, has been using numerals for Number Place in its magazines since they first published it over 25 years ago.

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<sup>1</sup>Windows is registered trademark of Microsoft Corporation

### 1.1.1 The Rules

Playing Sudoku puzzles is easy. There is just one simple rule:

**Fill in the grid so that every row, every column, and every 3x3 box contains the digits 1 through 9.**

### 1.1.2 Solving Strategies

This is what the Wikipedia says:

The strategy for solving a puzzle may be regarded as comprising a combination of three processes: scanning, marking up, and analysing.

#### 1.1.2.1 Scanning

Scanning is performed at the outset and periodically throughout the solution. Scans may have to be performed several times in between analysis periods. Scanning comprises two basic techniques, cross-hatching and counting, which may be used alternately:

- Cross-hatching: the scanning of rows (or columns) to identify which line in a particular region may contain a certain number by a process of elimination. This process is then repeated with the columns (or rows). For fastest results, the numbers are scanned in order of their frequency. It is important to perform this process systematically, checking all of the digits 1-9.
- Counting 1-9 in regions, rows, and columns to identify missing numbers. Counting based upon the last number discovered may speed up the search. It also can be the case (typically in tougher puzzles) that the value of an individual cell can be determined by counting in reverse - that is, scanning its region, row, and column for values it cannot be to see which is left.

Advanced solvers look for "contingencies" while scanning - that is, narrowing a number's location within a row, column, or region to two or three cells. When those cells all lie within the same row (or column) and region, they can be used for elimination purposes during cross-hatching and counting. Particularly challenging puzzles may require multiple contingencies to be recognized, perhaps in multiple directions or even intersecting - relegating most solvers to marking up (as described below). Puzzles which can be solved by scanning alone without requiring the detection of contingencies are classified as "easy" puzzles; more difficult puzzles, by definition, cannot be solved by basic scanning alone.

### 1.1.2.2 Marking up

Scanning comes to a halt when no further numbers can be discovered. From this point, it is necessary to engage in some logical analysis. Many find it useful to guide this analysis by marking candidate numbers in the blank cells. There are two popular notations: subscripts and dots. In the subscript notation the candidate numbers are written in subscript in the cells. The drawback to this is that original puzzles printed in a newspaper usually are too small to accommodate more than a few digits of normal handwriting. If using the subscript notation, solvers often create a larger copy of the puzzle or employ a sharp or mechanical pencil. The second notation is a pattern of dots with a dot in the top left hand corner representing a 1 and a dot in the bottom right hand corner representing a 9. The dot notation has the advantage that it can be used on the original puzzle. Dexterity is required in placing the dots, since misplaced dots or inadvertent marks inevitably lead to confusion and may not be easy to erase without adding to the confusion.

### 1.1.2.3 Analysing

There are two main analysis approaches - elimination and what-if.

- In elimination, progress is made by successively eliminating candidate numbers from one or more cells to leave just one choice. After each answer has been achieved, another scan may be performed - usually checking to see the effect of the latest number. There are a number of elimination tactics. One of the most common is "unmatched candidate deletion". Cells with identical sets of candidate numbers are said to be matched if the quantity of candidate numbers in each is equal to the number of cells containing them. For example, cells are said to be matched within a particular row, column, or region if two cells contain the same pair of candidate numbers (p,q) and no others, or if three cells contain the same triple of candidate numbers (p,q,r) and no others. These are essentially coincident contingencies. These numbers (p,q,r) appearing as candidates elsewhere in the same row, column, or region in unmatched cells can be deleted.
- In the what-if approach, a cell with only two candidate numbers is selected and a guess is made. The steps above are repeated unless a duplication is found, in which case the alternative candidate is the solution. In logical terms this is known as *reductio ad absurdum*. Nishio is a limited form of this approach: for each candidate for a cell, the question is posed: will entering a particular number prevent completion of the other placements of that number? If the answer is yes, then that candidate can be eliminated. The what-if approach requires a pencil and eraser. This approach may be frowned on by logical purists as too much trial and error but it can arrive at solutions fairly rapidly.

Ideally one needs to find a combination of techniques which avoids some of the drawbacks of the above elements. The counting of regions, rows, and columns can feel boring. Writing candidate numbers into empty cells can be time-consuming. The what-if approach can be confusing unless you are well organised. The Holy Grail is to find a technique which minimises counting, marking up, and rubbing out.

## 1.2 Overview

Installation procedures are covered in *Installation* (chapter 2).

Creating, playing and solving Sudoku puzzles is described in *Playing Sudoku* (chapter 3).

See *Licensing* (chapter 4) for ordering and license details.

You may also want to look in the SudokuMeister support forum.

SudokuMeister support can also be contacted by email to [sudokusupport@byteplant.com](mailto:sudokusupport@byteplant.com).

## Chapter 2

# Installation

The installation section covers system requirements, SudokuMeister install, and SudokuMeister uninstall. SudokuMeister requires Windows 98SE/ME/NT/2000/XP/2003.

### 2.1 Quick Start Installation Procedure

- Download SudokuMeister
- Install SudokuMeister using the *setup program* (section 2.2)

### 2.2 SudokuMeister Setup

SudokuMeister setup features a standard Microsoft Windows®setup interface and you need only complete a few steps. You can cancel setup at any time by clicking the 'Cancel' button.

Double click `sudokumeister.exe` (or similar filename) file on either the distribution media or from the downloaded .ZIP file. This will launch the SudokuMeister Setup Wizard.

Click 'Next' on the Welcome screen.

Read the SudokuMeister license and click 'I accept' to agree with this license.

Choose a folder where SudokuMeister should be installed. The setup program will suggest a default location. If you do not want to use the default location, you can browse for a specific directory in the provided input field (placing SudokuMeister in a location other than the default will not affect the operation of the program). Unless your SudokuMeister directory already exists (either the suggested, default directory or one of your choosing), the setup program will ask you if it can create

that directory. Click "yes." If you want to change the location of the program, click 'No'. This will keep you on the directory screen to choose another location.

The next step is to decide upon the name of the SudokuMeister "Program Group Name" that you will see in the Start Menu. SudokuMeister suggests a default, but you can change that to whatever name you would like (changing the name of the SudokuMeister program group will not affect the program operation in any way). After you have decided upon a name, click 'Next'.

Click on the 'Next' button to continue. SudokuMeister will now install the program files and options. If there were no problems during installation (if you encounter problems during installation, please visit the Trouble Shooting section of this manual), you will see the Finish screen. From here you can launch the SudokuMeister. If you don't want to launch SudokuMeister, un-check the corresponding checkbox. Click the 'Finish' button when done.

## **2.3 Uninstalling SudokuMeister**

When uninstalling SudokuMeister, do not forget to undo any changes you might have made in your firewall configuration or mail client configuration. SudokuMeister itself can be uninstalled in one of two ways.

### **2.3.1 Using SudokuMeister Uninstall**

This program is located in the SudokuMeister program group (the program group name may be different if you chose another name during setup). You can access it through the Start menu: Find and select 'Uninstall SudokuMeister' to run the uninstall program.

You will be asked if you want to "completely remove SudokuMeister and all of its components." Click 'Yes' to continue with the de-installation or "No" to cancel. If you click 'Yes', all installed files will be removed, any configuration files you created will be preserved. If removal was successful, a "success" message will appear (if you encounter problems during de-installation, please visit the Trouble Shooting section of this manual). Click okay to close this message. SudokuMeister is no longer installed on your computer.

### **2.3.2 Using The Microsoft Windows Control Panel**

Select 'Add or Remove Programs' icon and then SudokuMeister. This will launch the SudokuMeister uninstall program. Follow the process as described in the *previous section* (section2.3.1).

## Chapter 3

# Playing

This chapter shows you, how to

- create new puzzles of different degrees of difficulty
- play Sudoku puzzles
- find solutions automatically or get hints if you are stuck
- play puzzles found in newspapers or magazines
- load and save Sudoku puzzles and exchange them with your friends
- register SudokuMeister

### 3.1 Creating New Puzzles

You can easily create new puzzles by pressing the "New" Button in the toolbar. Puzzles can be of different degrees of difficulty. This can be configured with the "Difficulty" slider next to the "New" button. The difficulty varies from easy (difficulty slider in left position) over medium to hard (difficulty slider in right position) and is defined in terms of the number of blank cells. If you are a beginner you should start with the slider in the outer left position.

### 3.2 Playing Sudoku Puzzles

Playing Sudoku puzzles is easy. The game consists of 9x9 cells, all of these have to be filled in. There is just one simple rule:

**Fill in the grid so that every row, every column, and every 3x3 box contains the digits 1 through 9.**

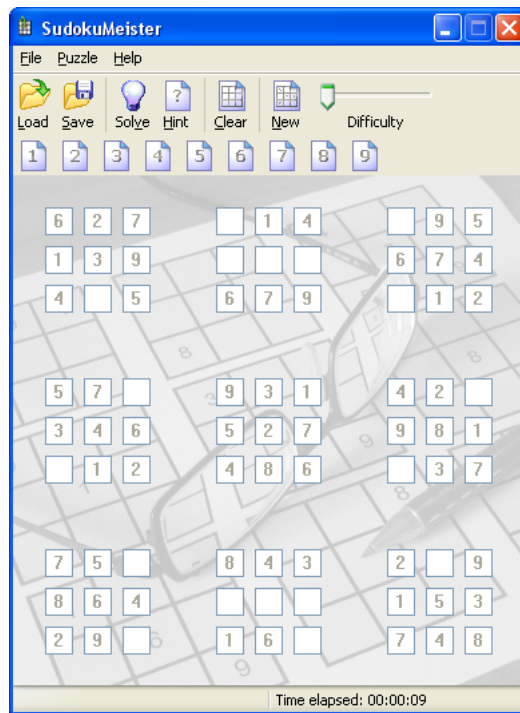


Figure 3.1: Creating new puzzles

After a puzzle was created or loaded from a file (see *Loading and Saving Sudoku puzzles* (section 3.5)) the clock begins to run and the time elapsed is shown in the status bar.

The clock stops when a solution to the current puzzle is found, either by you or by using the built-in puzzle solver.

### 3.3 Getting Hints and Finding Solutions

If you ever get stuck on your way through a puzzle, SudokuMeister will help you out giving hints. To get a hint, just click on the Hint icon in the toolbar (the question mark) and select the cell you want a hint for by clicking on it with your mouse. The cell will be filled with the correct value if there is a solution to the puzzle (see *On Hard and Unsolvable Puzzles* (section 3.3.1)).

It is also possible to have a puzzle completely solved. To do so, press the "Solve" button in the toolbar. All empty cells will be filled with their correct values.

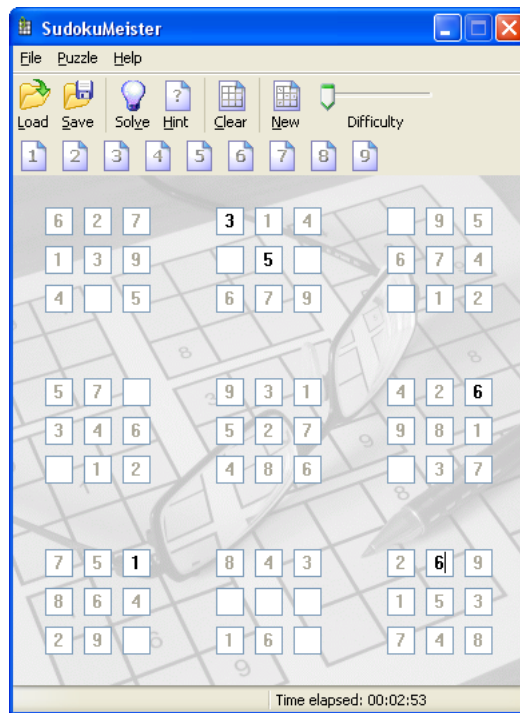


Figure 3.2: Playing a puzzle

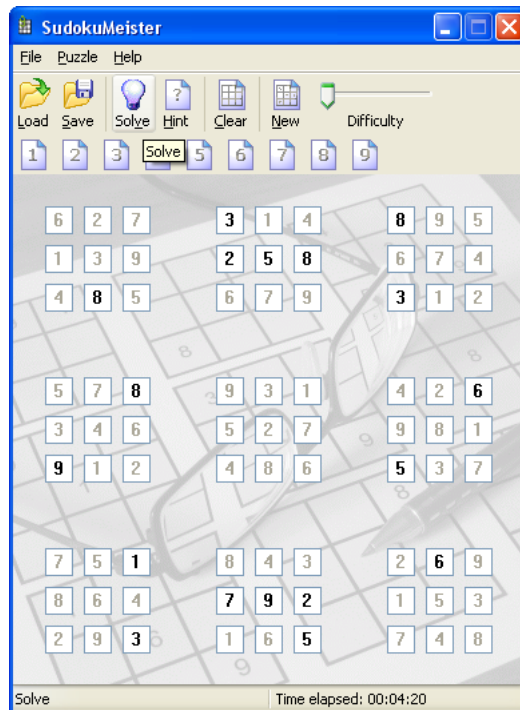


Figure 3.3: Solving a puzzle

### 3.3.1 On Hard and Unsolvable Puzzles

It can happen, that a puzzle or to be more precisely a situation in a puzzle can be unsolvable. When using the built-in solver or trying to get hints, this rare condition is signaled by a pop-up window.

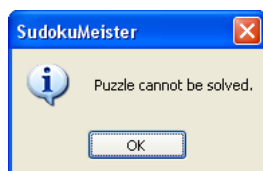


Figure 3.4: An unsolvable puzzle

As a matter of fact, some puzzles of difficulty "hard" can only be solved using a brute-force search and not with logical reasoning. Try getting some hints (see *Finding Solutions and Getting Hints* (section 3.3)) if you are stuck in such a situation.

## 3.4 Playing Puzzles Found in Newspapers or Magazines

If you want to play puzzles found in newspapers, magazines or in the internet, you can easily enter the given values into the corresponding cells. Press the "Clear" button in the toolbar first, enter the given setup and start playing.

## 3.5 Load and Save Sudoku Puzzles and Exchange Them with Your Friends

You can save the current puzzle to resume playing later or for archiving at any time. Just select the "Save" action from the "File" menu and choose a directory and a file name. To make them unique, SudokuMeister's puzzle files have the extension `.sdk`.

Loading an existing puzzle file is just as easy. Click on the "Load" icon the toolbar and a file selector dialog opens. It lets you choose the puzzle file to open.

It is a good idea to structure your puzzle library a little bit to be able to easily find puzzles again.

Another interesting option is to exchange puzzles with your friends. This is very easy to do (provided they are using SudokuMeister, too):

- Save the puzzle you want to share to a file on your disk if you not already did this before.

- Open your email software and compose an email to the people you want to send the puzzle to.
- Attach the puzzle file to the email.
- Send the email.

### **3.6 Registering SudokuMeister**

You can open the Registration Window by selecting "Register" from the Help menu.

To obtain a license key, please visit our online shop.

## Chapter 4

# Licensing and Contact Information

### 4.1 Ordering SudokuMeister

Prices for SudokuMeister start at EUR 19.95 (USD 19.95). For the latest pricing information, please visit our online shop.

SudokuMeister is distributed online electronically and shipped on CD-ROM, if requested. Please visit our online shop to place your order online. Ordering online and paying by credit card is by far the fastest way to order: Your license key is usually delivered in a matter of minutes.

If you do not want to order online using your credit card, we offer a variety of alternative ordering methods. Please visit our online shop to find out more.

### 4.2 Support

A purchase of SudokuMeister includes free email support for 6 months. Please write to us at [sudokusupport@byteplant.com](mailto:sudokusupport@byteplant.com). We will also try to help you with the Trial version of SudokuMeister if we can.

Contact us for information regarding other support options by email to [sudokusupport@byteplant.com](mailto:sudokusupport@byteplant.com)

For the latest version always check the SudokuMeister download page.

Byteplant offers consulting and the development of custom software. Please inquire by email to [sudokusupport@byteplant.com](mailto:sudokusupport@byteplant.com).

### **4.3 Copyright**

SudokuMeister is copyright ©2002-2005 by Byteplant GmbH

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### **4.4 License and Usage Terms**

For payment of the license fee the licensee is granted one (1) non-exclusive, non-transferable license to install and use SudokuMeister on one (1) computer at a time or install SudokuMeister on one (1) computer to be used by multiple users. It is expressly forbidden to install SudokuMeister for use on multiple computers without paying additional license fees. The licensee warrants that they will make a reasonable effort to remove unused licenses of SudokuMeister.

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