Take Control of Sudoku

3x3

SEE

Method

3-by-3

Sub-grid
Exhaustive
Elimination

Method

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* MagneScribe™: A 3-in-1 Auto-Retractable Pen <http://MagneScribe.com/>

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- **Solve 5-Star Sudoku Puzzles with the 3x3 SEE (3-by-3 Sub-grid Exhaustive Elimination) Method!**

- The origin of **Sudoku** can be traced back to Swiss mathematician **Leonhard Euler,** who devised "Latin Squares" in 1783, which he described as "a new kind of magic squares". **Euler** created a grid in which every number or symbol appears once in each row or column.

- **Sudoku** puzzles were first published in the late 1970's in Math Puzzles and Logic Problems magazine by **Dell Magazines. Dell** took **Euler**'s Latin Square concept and applied it to a 9x9 grid with the addition of nine 3x3 boxes, each containing all numbers from 1 to 9. **Dell** called the puzzle "Number Place" and still do today.

- There are many excellent on-line tutorials for solving **Sudoku** puzzles. Here are some examples from which you can learn the concept and basic skills to solve 1-star (very easy) to 3-star (medium) **Sudoku** puzzles.

  - **Sudoku**
    <**http://en.wikipedia.org/wiki/Sudoku**>

  - **Sudoku puzzles: how to solve**
    <**http://www.sudoku.com/howtosolve.htm**>

  - **sudoku tutorial**
    <**http://www.kingfeatures.com/features/puzzles/sudoku/tutorial.htm**>

- This E-book is meant to give power to the people who want to solve difficult **Sudoku** puzzles but lack the time to read books with hundreds of pages.

- The concentrated knowledge presented in this E-book will allow you to quickly master the techniques in order to solve 4-star (difficult) to 5-star (very difficult) **Sudoku** puzzles without guessing whatsoever.

- Instead of having a unique solution, some **Sudoku** puzzles have no solution or have multiple solutions.

- Out of hundreds **Sudoku** puzzles published in several newspapers, there has been 0 (zero) **Sudoku** puzzle that could not be solved by the **3x3 SEE Method.**

- The basic approach of the **3x3 SEE Method** is systematic logic and reasoning.

  - A **row** refers to a horizontal 9 x 1 matrix.
  - A **column** refers to a vertical 1 x 9 matrix.
  - A **box** refers to a 3 x 3 matrix.

  - A **cell** refers to a spot in which a number is placed.
  - A **sub-grid** refers to a 3 x 3 matrix inside each cell.

How to Play

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

- This one is a 5-star **Sudoku** puzzle (very difficult).

- To solve the puzzle, each **row,** each **column,** and each **box** must contain all the numbers 1 through 9.

- The same number must be used only once in each **row,** in each **column,** and in each **box.**

Scan within Three Rows

1. Focus on the first set of **three rows,** as shown above.

2. Search for two numbers or one number within the **three rows.**

    o "4" in red circles

3. Find a unique cell in which the selected number can be placed.

    o "4" in green

4. Repeat steps **2** through **3** within the **three rows.**

5. Focus on the second set of **three rows** and repeat steps **2** through **3.**

6. Focus on the third set of **three rows** and repeat steps **2** through **3.**

Scan within Three Columns

1. Focus on the first set of **three columns,** as shown above.

2. Search for two numbers or one number within the **three columns.**

   - "4" in red circles

3. Find a unique cell in which the selected number can be placed.

   - "4" in green

4. Repeat steps **2** through **3** within the **three columns.**

5. Focus on the second set of **three columns** and repeat steps **2** through **3.**

6. Focus on the third set of **three columns** and repeat steps **2** through **3.**

Get Stuck

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

- Repeat scanning sets of **three rows** and sets of **three columns** because the situation changes when a number is placed in a cell.

- In this example, only two more numbers can be entered by repeating the scanning process.

- The Scanning Method may be enough to solve 1-star (very easy) to 3-star (medium) **Sudoku** puzzles.

- More difficult ones, such as the 5-star (very difficult) **Sudoku** puzzle of this example, cannot be solved by the Scanning Method alone.

Mark Sub-grids

1. Starting with number 1, examine each cell to see if the number can be placed there, excluding prohibitive zones of the **row** in which the number belongs, of the **column** in which the number belongs, and of the **box** in which the number belongs, as shown above.

   - Large "1" in red circles

2. Mark the sub-grid with the number.

   - Small "1" everywhere

3. Repeat marking sub-grids with numbers 2, 3, 4, 5, 6, 7, 8, and 9.

Check the Exhaustive Sub-grids

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

- Sub-grid marking is time-consuming and requires self-discipline. High quality sub-grids are essential for solving the puzzle. Therefore, it is highly recommended that you double-check the numbers in the sub-grids.

- There is a website that automatically generates **Exhaustive Matrix** on-line. The printable **Exhaustive Matrix** is correct by construction.

  - **Sudoku <http://WWW.HyperInfo.CA/Sudoku/>**

- The puzzle is now ready for the **3x3 SEE Method**.

Identify Single Numbers -> Eliminate!

1. If there is a single number in any cell anywhere, then select the number, as shown above.

    - Small "1" in green circle

2. Eliminate the number within the **row** to which the number belongs, within the **column** to which the number belongs, and within the **box** to which the number belongs.

    - Small "1" in red Xs

Identify Unique Numbers within a Row -> Eliminate!

1. Focus on one **row,** as shown above.

2. If there is a unique number in any cell within the **row,** then select the number.

   - Small "3" in green circle in row 9

3. Eliminate the number within the **column** to which the number belongs, and within the **box** to which the number belongs.

   - Small "3" in red Xs

4. Repeat steps **2** through **3** in all **nine rows.**

Identify Unique Numbers within a Column -> Eliminate!

1. Focus on one **column,** as shown above.

2. If there is a unique number in any cell within the **column,** then select the number.

    - Small "3" in green circle in column 6

3. Eliminate the number within the **row** to which the number belongs, and within the **box** to which the number belongs.

    - Small "3" in red Xs

4. Repeat steps **2** through **3** in all **nine columns.**

Identify Unique Numbers within a Box -> Eliminate!

1. Focus on one **box,** as shown above.

2. If there is a unique number in any cell within the **box,** then select the number.

    ○ Small "4" in green circle in box 9

3. Eliminate the number within the **row** to which the number belongs, and within the **column** to which the number belongs.

    ○ Small "4" in red Xs

4. Repeat steps **2** through **3** in all **nine boxes.**

Use the Double Technique -> Eliminate!

1. Focus on one **row**, on one **column**, or on one **box**, as shown above.

2. Within the **row**, within the **column**, or within the **box**, identify two cells, each containing two identical numbers only.

   ○ Small "2" and "9" in blue circles

3. Eliminate any of the two numbers in other cells within the **row**, within the **column**, or within the **box.**

   ○ Small "2" and "9" in red Xs

4. Select a single number each in the cells, if possible.

   ○ None

- The Double Technique may not be required for less difficult puzzles.

Use the Triple Technique -> Eliminate!

1. Focus on one **row**, on one **column**, or on one **box**, as shown above.

2. Within the **row**, within the **column**, or within the **box**, identify three cells, each containing two or three identical numbers only.

    ○ Small "2", "7" and "9" in blue circles

3. Eliminate any of the three numbers in other cells within the **row**, within the **column**, or within the **box**.

    ○ Small "2", "7" and "9" in red Xs

4. Select a single number each in the cells, if possible.

    ○ Small "5" in green circles

- The Triple Technique may not be required for less difficult puzzles.

Use the Extend Technique -> Eliminate!

1. Focus on one **box,** as shown above.

2. Within the **box,** identify one number in only one **row** or in only one **column.**

   ○ Small "5" in blue circles

3. Eliminate the number outside the **box** in other cells within the **row** or within the **column.**

   ○ Small "5" in red Xs

- The Extend Technique may not be required for less difficult puzzles.

Use the Corner Technique -> Eliminate!

1. Focus on one set of **three rows** or on one set of **three columns,** as shown above.

2. Within the set of **three rows** or within the set of **three columns,** identify two numbers each in two **boxes.**

   - Large "1" and "8" in blue circles

3. Inside a corner with two cells within the other **box,** eliminate the numbers other than the two numbers.

   - Small "2", "3" and "9" in red Xs

4. Select a single number each in the two cells, if possible.

   - Small "1" and "8" in green circles

- The Corner Technique may not be required for less difficult puzzles.

Use the Block Technique -> Eliminate!

1. Focus on one set of **three rows** or on one set of **three columns,** as shown above.

2. Within the set of **three rows** or within the set of **three columns,** identify three numbers placed consecutively.

   - Large "6", "3" and "8" in blue circles

3. Identify a number outside the **box** which contains the three numbers.

   - Large "5" in green circles

4. Recognise a **row** or a **column** in which the number is prohibited, and eliminate the number.

   - Small "5" in red Xs

5. Select the number in non-prohibited zones.

   - Small "5" in green circles

- The Block Technique may not be required for less difficult puzzles.

Complete the Puzzle

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

- Repeating these processes leads to the solution of the 5-star (very difficult) **Sudoku** puzzle.

- Once you start identifying single and unique numbers, you will see a domino effect to give you an orgasmic experience!

Appendix: MagneScribe™ Pen

MagneScribe™ Pen

New!

Wow, What a Pen!

• A 3-in-1 Auto-Retractable Ballpoint Pen with an Ergonomic Cushion that Leonardo da Vinci would have loved to wear!

Ultimate Simplicity

• No cap! No twist! No push!
• 1-finger operation
• Clock on one side
• Mirror on the other
• Patents granted

The original iPod mini's 5-colour scheme

• SILVER
• GOLD
• BLUE
• PINK
• GREEN

iPod® is a registered trade-mark of Apple Computer, Inc.

Wow!

- This pen with a very fine tip is ideal for playing **Sudoku** puzzles!

  - **MagneScribe™ Pen
    <http://MagneScribe/>**