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SUDOKU SOLVING TIPS

Terms you will need to know

Block: One of the nine 3x3 sections that make up the Sudoku grid.
Candidate(s): The possible numbers that could be in a cell.
Cell: A single square in a Sudoku grid.

GETTING STARTED

To solve a regular Sudoku puzzle, place a number into each cell of the diagram so that each row across, each column down, and each block within the larger diagram (there are 9 of these) will contain every number from 1 through 9. In other words, no number may appear more than once in any row, column, or block. Working with the seeds already given as a guide, complete each puzzle with the missing numbers that will lead to the correct solution.

For example, look at the ninth column of the example puzzle to the right. There are clues in the puzzle that will tell you where, in this column, the number 3 belongs.

The first clue lies in the eighth column of the diagram. There is a 3 in the fifth cell. Since numbers can't be repeated in any 3 x 3 block, we can't put a 3 in the fourth, fifth, or sixth cells of the ninth column.

We can also eliminate the bottom three cells of the ninth column because there's a 3 in that 3 x 3 block as well. Therefore, the 3 must go in the second or third cell of the ninth column.

The final clue lies in the second row of the diagram, which already has a 3 in it. Since numbers can't be repeated within a row, there's only one cell left for the 3—the third cell of the ninth column.

The basic elimination process used in the example above results in a Direct Solve. The best way to work through a Sudoku puzzle is to tackle the Direct Solves first, since they are the easiest. In fact, all easy-level puzzles can be completed using only Direct Solves.

With more difficult Sudoku puzzles, you will reach a point at which Direct Solves no longer exist. At this stage, you need to review the possible candidates for each cell, and then start looking at the relationships among cells to see what candidates you can eliminate. This will eventually reveal the next solvable cell.

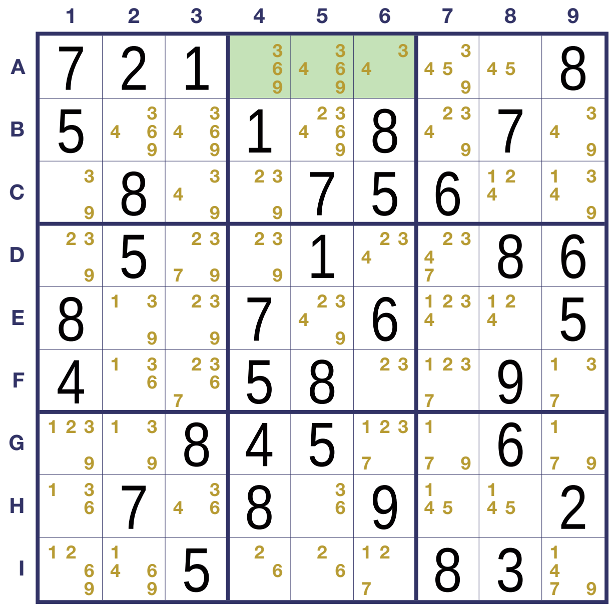
		7	9					1
	2	3	8			6	7	
		6		2	7			
	7	8		5				
	5		2		6		3	
				1		9	5	
			6	3		8		
	8	4			9	2	1	
2					1	3		

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

Finding the candidates to eliminate is where advanced solving techniques—called Deductions—come in. There are 8 different deductive techniques that SudokuSolver will point out for you when they are available. Below is a description of each, in order of their complexity. Please note that applying deductions will often result in Indirect Solves. Indirect Solves are similar to Direct Solves, except that some of the candidates will have been eliminated via deductions, rather than directly from the solved cells.

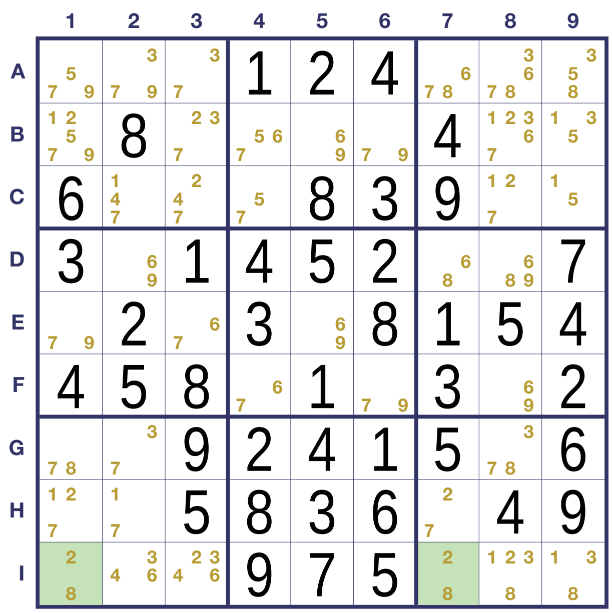
LOCKED CANDIDATE

In a locked candidate, a value must appear at the intersection of a particular block and row or column, and can therefore be removed as a candidate from the rest of that block and row or column. In the example at right, we've filled in the candidates for each cell, and the 6 in Row A can only be in Block 2 (in other words, none of the cells in Row A in either Block 1 or Block 3 have 6 as a candidate). Therefore, 6 can be eliminated as a candidate from all other cells in Block 2—that is, the 6 can be eliminated from B5.



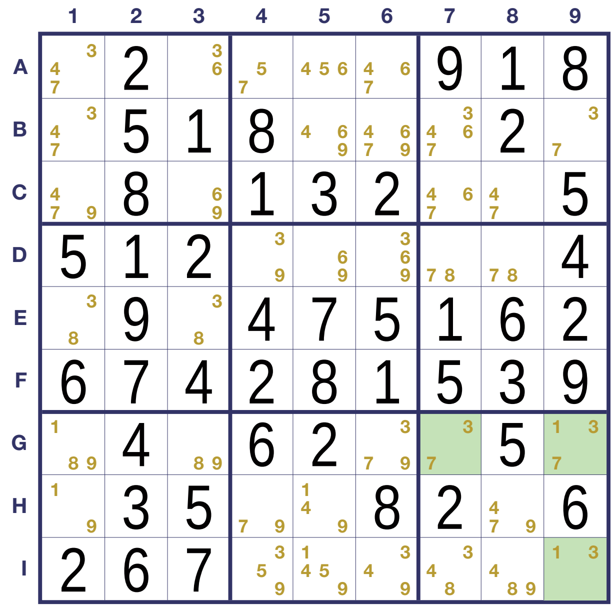
NAKED PAIR

In a naked pair, two cells in a row, column, or block each contain the same two candidates, and only those candidates. If a naked pair appears in a row, column, or block, those two candidates can be eliminated from every other cell in that row, column, or block. In the example at right, we've filled in the candidates for each cell, and the only possible candidates for cells I1 and I7 are 2 and 8, forming a naked pair. Since 2 and 8 must be in cells I1 and I7, in some order, none of the other cells in row I can be either a 2 or an 8 (or we could not give values to both I1 and I7). Therefore, 2 and 8 can be eliminated from all other cells in row I—that is, the 2 can be eliminated from I3, 2 and 8 can be eliminated from I8, and 8 can be eliminated from I9.



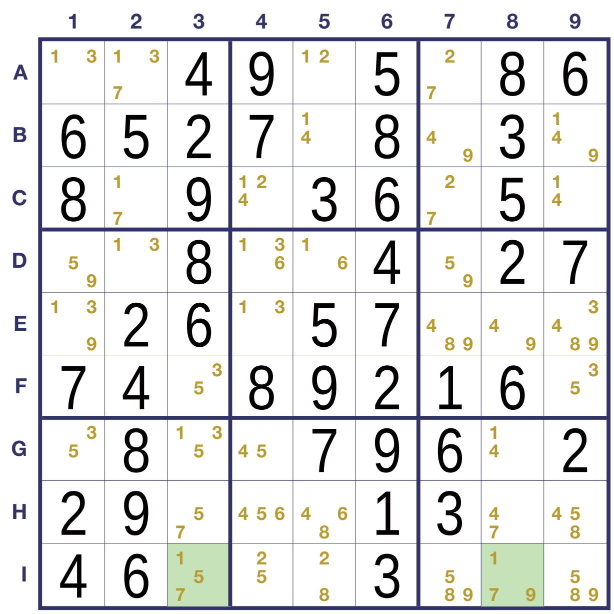
NAKED TRIPLET

The naked triplet is similar to the naked pair, but it involves three cells instead of two. In the example at right, cell G7 is 3 or 7; cell G9 is 1, 3, or 7; and cell I9 is 1 or 3, so in that block, 1, 3, and 7 must be in cells G7, G9, and I9, in some order. Therefore, 1, 3, and 7 can be eliminated from all other cells in that block. With a naked triplet, some (or all) of the three cells in question may have only 2 out of the 3 candidates, as in our example.



HIDDEN PAIR

In a hidden pair, two numbers are candidates for two different cells in a row, column, or block, and in no other cells in that row, column, or block, even if the two cells in question have other possible candidates. The other possible candidates can then be eliminated from those cells, since those two numbers have to be in those cells (or they wouldn't appear in the row, column, or block). In the example at right, the only cells in row I that contain the candidates 1 and 7 are I3 and I8, so 1 and 7 must be in I3 and I8 in some order, so all other candidates in those two cells can be eliminated.



HIDDEN TRIPLET

The hidden triplet is similar to the hidden pair, but it involves three cells instead of two. In the example at right, the only cells in column 6 that contain the candidates 1, 2, or 7 are A6, D6, and I6, so 1, 2, and 7 must be in A6, D6, and I6 in some order, so all other candidates in those three cells can be eliminated.

	1	2	3	4	5	6	7	8	9
A	8	9	5	(1 7)	4	(1 7)	6	2	3
B	1	6	3	2	(8 9)	(8 9)	5	4	7
C	2	7	4	(3 6)	5	(3 6)	1	9	8
D	(6 7)	8	(1 9)	4	(1 2)	(1 2 6)	(3 9)	(3 7)	5
E	(6 7)	5	2	(6 8 9)	3	(6 8 9)	4	(7 8)	1
F	4	3	(1 9)	(1 7 8)	(1 7 8)	5	(8 9)	6	2
G	9	1	7	5	6	(3 8)	2	(3 8)	4
H	3	2	8	(1 9)	(1 9)	4	7	5	6
I	5	4	6	(3 7 8)	(2 7 8)	(2 3 7 8)	(3 8)	1	9

X-WING

An X-Wing takes into account the interaction between two different rows and columns. If a value in one row can only appear in two different cells, and that same value in another row can only appear in two different cells, and those four cells are in the same two columns, that value must appear in one of those cells in each of the two columns, and therefore can be eliminated from any other cell in the two columns. (The same theory works if you swap rows and columns.) In the example at right, the 9 in column 1 can only be in row E or row G, and the 9 in column 7 also can only be in row E or row G. If the 9 in column 1 is in row E, the 9 in column 7 must therefore be in row G, and if the 9 in column 1 is in row G, the 9 in column 7 must therefore be in row E. Therefore, the 9 cannot be in any other cells in rows E and G but E1, E7, G1, or G7 (or we would not be able to place the 9s in columns 1 and 7), so we can eliminate the 9s from all other cells in those two rows.

	1	2	3	4	5	6	7	8	9
A	4	5	8	(2 6)	(1 2 6)	(1 6)	7	9	3
B	6	9	3	5	(7 8)	(7 8)	2	1	4
C	7	(1 2)	(1 2)	4	9	3	6	8	5
D	(2 8)	(1 2 7 8)	5	9	(1 4 7 8)	(1 4 7 8)	(1 3)	(2 3)	6
E	(2 8 9)	4	(1 2 6 9)	(6 8)	3	5	(1 9)	7	(1 2 8 9)
F	3	(1 7 8)	(1 6 7 9)	(6 7 8)	(1 6 7 8)	2	4	5	(1 8 9)
G	(2 5 8 9)	6	(2 9)	1	(2 4 8)	(4 8)	(3 5 9)	(2 3)	7
H	(2 5 8)	(2 3 7 8)	4	(2 3 7 8)	(2 7 8)	9	(1 5)	6	(1 2)
I	1	(2 3 7)	(2 7 9)	(2 3 6 7)	5	(6 7)	8	4	(2 9)

XY-WING

An XY-Wing is a relationship that occurs among three cells that form an angle, where each of the three cells has only two values in it. If the stem of the angle (we'll call it cell A) has the only possible candidates x and y, and the other two cells—the branches of the angle—(we'll call them cells B and C) have the only possible candidates x or z and y or z in some order, no cell that interacts with both of those cells can have the candidate z. If it did, then cells B and C would have the values x and y, in some order, leaving no possible value for cell A. An XY-Wing can appear in two ways — with a right angle and without a right angle.

	1	2	3	4	5	6	7	8	9
A	1	6	9	3	(2 4)	(2 4)	5	8	7
B	8	4	5	7	9	1	6	2	3
C	7	2	3	5	8	6	9	1	4
D	(3 9)	(1 3 9)	6	4	(1 2 7)	(2 7)	8	5	(2 9)
E	5	8	2	6	3	9	7	4	1
F	4	(1 9)	7	8	(1 2)	5	3	6	(2 9)
G	(3 6)	(3 7)	4	2	(6 7)	8	1	9	5
H	(2 9)	(5 9)	8	1	(4 5)	3	(2 4)	7	6
I	(2 6)	(5 7)	1	9	(4 5 6 7)	(4 7)	(2 4)	3	8

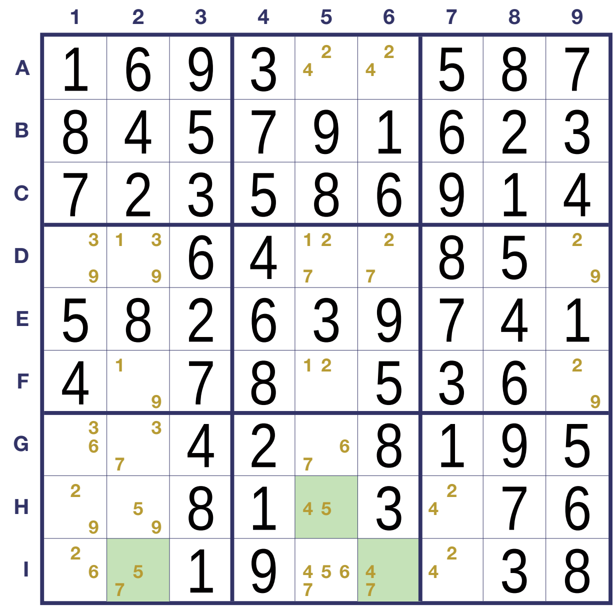
XY-WING (With a Right Angle)

In this type of XY-Wing, the three cells form a right angle. In the example at right, cell B1 (the stem of the right angle) is 4 or 9, cell B5 is 1 or 9, and cell D1 is 1 or 4. If cell D5 were 1, then B5 would have to be 9 and D1 would have to be 4, leaving no possible value for B1; therefore, 1 can be eliminated from cell D5.

	1	2	3	4	5	6	7	8	9
A	5	3	(4 9)	(4 9)	7	2	6	1	8
B	(4 9)	7	8	(1 4 9)	(1 9)	6	3	2	5
C	6	2	1	3	5	8	4	9	7
D	(1 4)	5	2	6	(1 3)	7	8	(3 4)	9
E	8	6	(4 9)	2	(3 9)	5	7	(3 4)	1
F	3	(1 9)	7	(1 9)	8	4	5	6	2
G	2	8	3	5	6	(1 9)	(1 9)	7	4
H	7	(1 9)	6	8	4	(1 9)	2	5	3
I	(1 9)	4	5	7	2	3	(1 9)	8	6

XY-WING (Without a Right Angle)

In this type of XY-Wing, the three cells in question still form an angle, but it is not a right angle. In the example at right, cell I6 (the stem of the angle) is 4 or 7, cell H5 is 4 or 5, and cell I2 is 5 or 7. If cell H2 were 5, then H5 would have to be 4 and I2 would have to be 7, leaving no possible value for I6; therefore, 5 can be eliminated from cell H2.



SWORDFISH

Swordfish is similar to X-Wing, but it takes into account the interaction among three different cells and columns. If a value can only be in two or three of three different cells in each of three rows, and all three of those cells are in the same columns in all three rows, that value must appear in one of those cells in each of the three columns, and therefore can be eliminated from any other cell in the three columns. In the example at right, the 2 in row A can only be in column 6 or column 9, the 2 in row E can only be in column 1 or column 9, and the 2 in row I can only be in column 1 or column 6. If the 2 in row A is in A9, the 2 in row E must be in E1, and the 2 in row I must be in I6; and if the 2 in row A is in A6, the 2 in row I must be in I1, and the 2 in row E must be in E9. A 2 cannot therefore be in any other cells in columns 1, 6, or 9 but A6, A9, E1, E9, I1, and I6 (or we would not be able to place the 2s in rows A, E, and I), so we can eliminate the 2s from all other cells in those three columns.