Hyper SUDOKU

Dear puzzler,

Puzzles are a good way to take your mind off the outside world. And each puzzle solved, no matter how hard or easy, is a small source of satisfaction in these hard times.

So here is my small contribution. I hope these free puzzles will make a pleasant diversion to pass the time through the day.

The Hyper Sudoku is a variation I developed in 2005. The rules: Insert the digits 1-9 just once in each row, column, bold outlined area AND in each gray area. *The International New York Times* first started publishing these puzzles in 2007 and is still doing so every day.

Have fun and take care,

~Peter

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PUZZLE-SOLVING FIRST AID

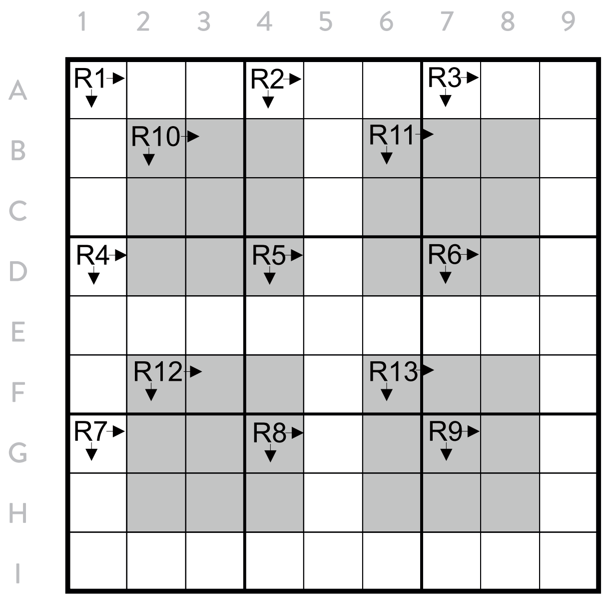
The rules: insert the digits 1 to 6 in the grid in such a way that each digit occurs just once in each row, column or region.

There are thirteen regions: regions R1 to R9 are the standard sudoku regions enclosed by a boldface border, regions R10 to R13 are the extra gray regions.

A number of puzzle-solving techniques are reviewed below. Some are simple and can be applied to any puzzle, whereas others are highly advanced and will only be needed for the most difficult 5 dot puzzles.

1 or 2 dot puzzles can be solved using methods A and B only. In principle the same applies to 3 dot puzzles, but as everyone occasionally misses a trick method C can be very handy. All 4 dot puzzles need trick C several times.

Most important of all: only insert a digit if you are 100% certain that no other digit is possible!



METHOD A

The only possibility in a space

If there is only one remaining possibility for a space, that digit can be inserted immediately. In that case all the other digits must have already been inserted in the row, column or region, or already been eliminated using another technique.

In spite of the simplicity of this method it is easily overlooked. In the puzzle below for example, for what space is there only one possibility left?

The answer is b6, which can only contain a 9 since 1, 2, 4 and 5 are already in row b, 6 in column 6, 7 in region 2 (R2), and 3 and 8 in gray region R11. This 8 is a good example of the effect of a gray region.

Method A can be applied five more times: in c6, c8, b9, d6 and d7.

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

METHOD B

No other place for the digit

Here is the same puzzle again, including the digits that we discovered with method A. What now? Each space has at least two possibilities.

One method which can often be applied is to check whether there is just one space left in a certain row, column or region in which a particular digit can be inserted. This method works here in column 6 for example, where the only space left for a 5 is e6, because of the 5 in i1 and the 5 in g8 (gray region!).

We can apply this method three more times: in row i the 6 can only go to i8, in region 13 the 2 has to be in h7, and in row i the 2 can be inserted in i4.

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

METHOD C

Certain uncertainties

Sometimes it helps if you know approximately where a digit should be inserted. Because of the 4 in column 3 for example, there has to be a 4 in region 7 in g2, h2 or i2.

In other words in column 2, which means that in region 4 the 4 has to go somewhere in column 1, therefore in d1, e1 or f1.

The gray regions can be tricky here as well. In gray region 12 the 8 has to go to either f2 or f3, because of the 8 in h1 and c4. Since both f2 and f3 are in row f, there cannot be an 8 in any of the other spaces in that row.

This means that in region 13 the 8 cannot go to f6. We already knew an 8 was not possible for f7, f8 and h8 because of the 8 in d8, and it is not possible for h6 either, because of the 8 in h1. Which leaves g7 as the only possible spot for an 8 in region 13!

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

METHOD D

Digit groups

Both c4 and c5 can only contain a 5 or an 8. This means there can be no 5 or 8 in any of the other spaces in that row. Such as an 8 in c3, which would result in a 5 in both c4 and c5.

So there can be no 8 in c2 or c3. Because of the 8 in b9 and d8 there is only one spot left in gray region 10 for an 8, namely c4. Resulting in a 5 in c5.

Here we had a digit group of two, with two spaces for two possible digits. The same reasoning can also be applied to larger groups.

Suppose there is a puzzle where a1 can only contain a 5 or 6, a2 a 6 or 7, a3 a 7 or 8, and a4 a 5, 6 or 8. This would mean that for four spaces (a1, a2, a3, a4) there are only four possible digits available (5, 6, 7, 8). This means there cannot be a 5, 6, 7 or 8 in a5 - a9!

	1	2	3	4	5	6	7	8	9
A				7		1		2	
B			4		2	9	5	1	8
C				58	58	4	3	7	6
D						2	6	8	
E						5	7		2
F									
G	2					6		5	
H	8		6				2		
I	5		9	2				6	

METHOD E

X-wing

One advanced method is referred to as the 'X-wing'. In column 4 in the puzzle below, the 7 has to be in a4 or i4. In column 7 the 7 has to be in a7 or i7. If a 7 is inserted in column 4 in a4, it follows that the 7 in column 7 goes to i7. And if it is inserted in i4, the 7 in column 7 has to be inserted in a7. Connecting the possible combinations by a line produces an X, hence the name *X-wing*.

Once a 7 has been inserted in a4/a7 or i4/i7, it is no longer possible to insert a 7 in any of the remaining spaces of row a or row i. Therefore also not in i1, leaving g1 as the only possible space for a 7 in that column (and region 7).

We can extend this line of reasoning. The same applies to three rows with two possibilities in three columns. For further examples look for "swordfish" on the internet.

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

FINALLY

The methods described above are sufficient to solve all the puzzles in these free booklets. Most can be solved with less. Having said that however, discovering an X-wing in a simple puzzle can be a lot of fun even if you do not need it.

There are other methods out there. Most are variations on the ones described above or involve extra hidden regions following the gray regions.

But we prefer to let you discover those for yourself!