CS70 Puzzle Set #1

March 1, 2017

1. Fill in the Sudoku grid like a normal Sudoku grid; however, with the additional constraints that each of the blue shaded squares must also have one of each of the numbers 1 through 9

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

Something interesting of note for ordinary sudoku puzzles certain operations on the board will still maintain its validity as a solution.

Here are a list of the operations one can use:

• Switching rows or columns within a box group:

4	2	6	5	7	1	3	9	8	б	1	3	9	4	6	8	2	7	Ī
8	5	7	2	9	3	1	4	6) [8	5	7	2	9	3	1	4	Ī
1	3	9	4	6	8	2	7	5	√ [∠	4	2	6	15	7	1	3	9	
9	7	1	3	8	5	6	2	4	[9	7	1	3	8	5	6	2	I
5	4	3	7	2	6	8	1	9		5	4	3	7	2	6	8	1	
6	8	2	1	4	9	7	5	3	(6	8	2	1	4	9	7	5	
7	9	4	6	3	2	5	8	1		7	9	4	6	3	2	5	8	
2	6	5	8	1	4	9	3	7	6	2	6	5	8	1	4	9	3	
3	1	8	9	5	7	4	6	2	;	3	1	8	9	5	7	4	6	

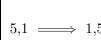
	4	2	6	5	7	1	3	9	8	
	8	5	7	2	9	3	1	A	6	$ \ $
	1	3	Ø	4	6	8	2	7	5	
	9	7	1	3	8	Z	6	2	4	
	5	4	3	7	X	6	8	1	9	\bigvee
	6	8	2	1	4	9	7	5	3	
	7	9	A	6	3	2	3	8	1	
	2	8	5	8	1	4	9	3	7	
	3	1	8	9	5	7	4	6	8	
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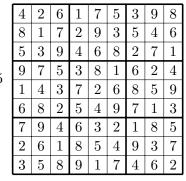
• Switching box groups row-wise or col-wise:

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

• Switching every number of one kind with another

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





2. Using the above mentioned operations turn the following sudoku puzzle solution into one that satisfies the constraints mentioned in the first problem.

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

Two possible move sets to achive a valid board are:

- $\bullet \ [[s,r,4,6],[s,r,7,9],[s,c,2,3],[s,c,7,9],[b,r,2,3],[b,c,1,2],[b,c,1,3]] \ (\text{by $<$banana emoji}>)$
- [[s, c, 1, 3], [b, c, 1, 2], [b, r, 1, 2], [b, r, 2, 3], [s, r, 7, 9], [s, c, 4, 5], [s, c, 1, 3]] (by Shoulda Woulda Sudowoodo Sue Dough Coup)

With format like so:

[sb, rc, #, #]

s - swapped single row/column

b - swapped blocks (groups of 3 rows/columns)

r - swapped rows

c - swapped columns

#,# - the first row/column/value swapped with the second row/column/value Examples being:

[s, r, 1, 2] - this swaps the first row with the second row

[b, c, 3, 1] - this swaps the third block column with the first block column

 $3.\,$ Solve the following Sudoku puzzle with the same constraints as before:

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