

RESPONSE TO M/J problem 1 Philip Nimmo BSME 59

The short answer is yes! There are several sudoku solutions that can not be related through any of the permutations of the 4 indices proposed in Apo Sezginer's M/J problem. Consider that permuting values of m from 1,2,3 to 1,3,2 would exchange columns 3 and 2 which would transform to a valid sudoku solution. However that permutation would also exchange columns 5 and 6 and columns 8 and 9 in the 9 row x 9 column sudoku pattern. That would still produce a valid solution but unless the permutations of index "m" is conditional on the value of "M" one could not transform into a pattern containing only 1 column exchange.

A more interesting situation emerges when dealing with the particular solution in pattern (A). It is one of a limited group of solutions which can be transformed into other valid solutions, eg. solution (B). These transformations cannot be accomplished by invoking the index permutations. Rather the transformation is accomplished by first reformatting the nine , 9 number blocks, from a 3 x 3 array shown in (A) Into the 1 x 9 array in fig. (A'). Simply shifting the column of 9 blocks up by 1 block and looping back to the top of array (A') to complete array (B'). The final step simply reformats 1 x 9 block array (B') to display the 3 X 3 sudoku pattern of blocks in (B). Generally, arbitrarily selected sudoku solutions will not transform to a valid solution with this procedure.

When my wife offered to make a quilt for me I suggested that I would engineer one. I think she may have regretted her agreement to allow an unsupervised retired engineer to participate. The resulting rather unique quilt (named "NUMBER NONSENSE") used 1296 2 X 2 inch right triangles to be assembled into 162 "pinwheel" quilt elements. Colors in the pinwheel elements encode 4 bit binary representations of the numbers in array (A'). Two 9 block strips of quilt panels are assembled back to back and the quilt is looped to form a Mobius strip. The quilt is not just a representative of a single sudoku solution it is actually assembled to display nine different solutions by picking any nine successive blocks from the continuous strip of blocks. They all share some unique properties. Note that each position of the 9 number block(eg upper left or center etc) contains every number as does each column, row and block.

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

A

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

A'

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

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

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

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

B

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

B'

