SONAR – Full Solution Guide

This is a full solution guide to my puzzle *SONAR*, and so spoilers are ahead.

Rules

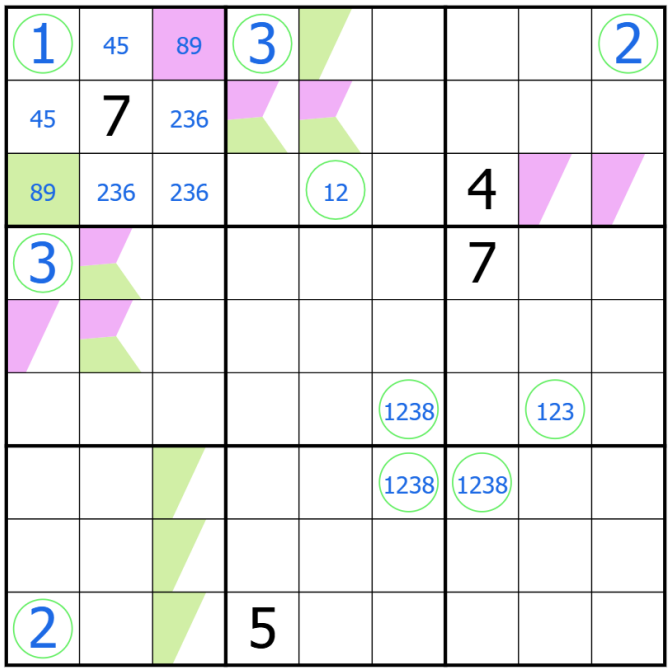
- Normal sudoku rules apply: Place the digits 1 to 9 once each in every row, column, and 3x3 box
- German Whisper Minesweeper: A digit in a circle counts the number of digits in the (up to 8) surrounding cells that differ by at least 5 from the digit in the circle

Solve Path

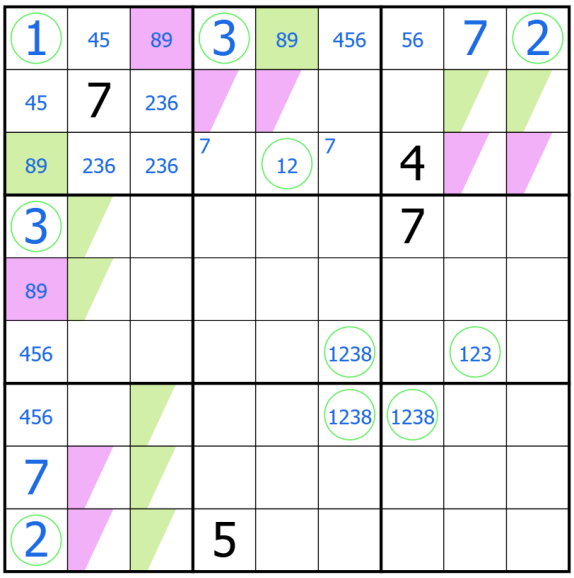
- Meta: The circles can only contain the digits 1238. (A 4 can't be surrounded by 4 9s, etc.) 3 would be surrounded by 3 89s, 8 would be surrounded by 8 123s
- R1C1, R1C9, R9C1 can only be from 12
- Hence R1C4 and R4C1 are 3

12			3					12
	7	3						
	3	3		12		4		
3						7		
					1238		123	
					1238	1238		
12			5					

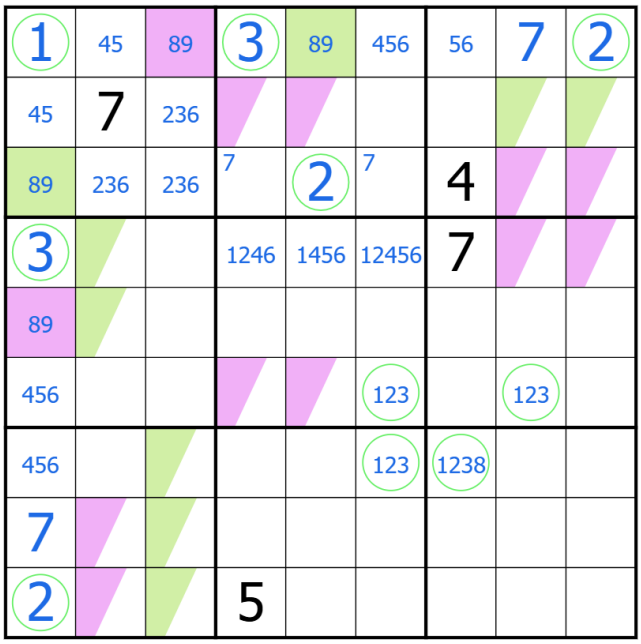
- R1C4 indicates that there are 3 89s covering the six cells from R1C3 to R2C5, and R4C1 indicates that there are 3 89s covering the six cells from R3C1 to R5C2. Using pink and green as placeholders for 89 we can roughly place these
- 89 in box 1 does not border R1C1, so tis cell has to be a 1, making R9C1 and R1C9 both 2s
- R1C1 already borders a 7, so the 6 must be kept away, giving some pairs and triples



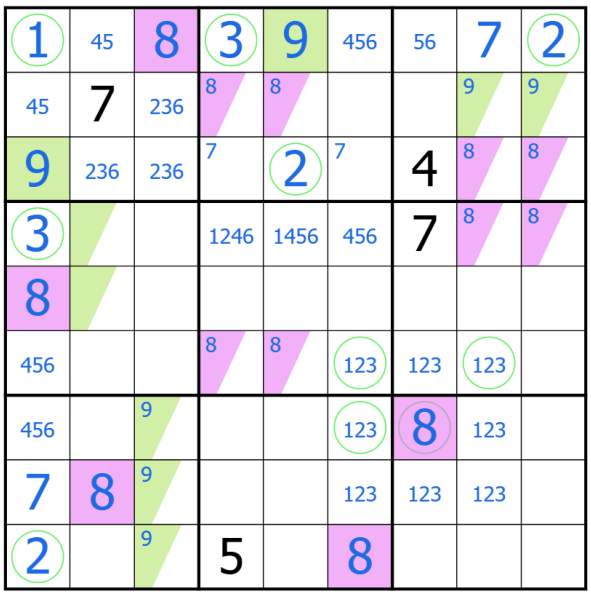
- R1C9 can't border pink, so it needs to border 7 and green, which can be roughly places. Similarly for R9C1
- Pink and green are now placed in row 1 and column 1
- 7 can be pencilmarked into row 3



- R3C5 already borders pin and a 7, so this can't be 1 and must be 2
- Hence R4C456 are all 6 or below
- R6C6 and R7C6 can't be 8, as this would place a 123 triple into column 5 breaking R3C5
- Hence pink can be roughly placed in box 5 and box 6



- Pinks in box 2 and 5 form an X wing roughly placing pink in box 8
- Then pinks in boxes 7 and 8 forcing pink into R7C789, and pinks in boxes 3 and 6 form an X wing into R789C7, and this can only be fulfilled by making R7R7 pink
- By count this must be 8, and is surrounded by 123 on all 8 sides
- (NB: There is a uniqueness argument that 8 must be placed in a circle as otherwise the 89s could never disambiguate. This is not necessary for the solve.)



- Much sudoku follows and solvers will likely find their own way through, but some key sports are placing 9 in column 6, then in row 6 and box 4
- 123 triple and 2 in box 1 place 2 in box 4

1	45	8	3	9	45	6	7	2
45	7	2	8	8	456	13	9	13
9	36	36	1	2	7	4	5	8
3	9	1	246	1456	456	7	8	346
8	2	1			9	5	346	346
456			8	8	23	1 123	1 123	9
456		9	9		1 123	8	123	5 7 4567
7	8	9	9		1 123	123	123	5 456
2			5		8	9	46	7 467

- R6C6 and R6C8 both border 2 89s, so neither of these is 1, placing 1 in R6 and resolving the square of 123 triples
- R6C6 needs to see a third 89, and only 8 in R6C5 is available

1	45	8	3	9	45	6	7	2
45	7	2	8	456	456	3	9	1
9	36	36	1	2	7	4	5	8
3	9	1 1456	2	1456	456	7	8	46
8	2	1 1467	467	1467	9	5	46	3
456	456	4567	467	8	3	1	2	9
456	3456	9 34569	9 4679	3467	2	8	1	5 7 4567
7	8	9 4569	9 469	46	1	2	3	5 456
2	1	346	5	3467	8	9	46	7 467

- R7C6 and R6C8 are both circled 2s, and they see 2 89s already. Hence there can't be any more 789s bordering these cells, which places 7 in R7
- This should unwind the remaining cells and get to a near complete solution with a few cells containing 346 ambiguous

1	5	8	3	9	4	6	7	2
4	7	2	8	5	6	3	9	1
9	36	36	1	2	7	4	5	8
3	9	46	2	1	5	7	8	46
8	2	1	46	7	9	5	46	3
5	46	7	46	8	3	1	2	9
6	34	9	7	34	2	8	1	5
7	8	5	9	46	1	2	3	46
2	1	34	5	346	8	9	46	7

- Colouring 46 pairs tells us that R9C3 sees both types of 46 and hence is 3
- If advanced classic sudoku is more your bag, there is a skyscraper on 4s in columns 3 and 8, which makes R4C9 a 6

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