

Unassigned Dialing Code – Full Solution Guide

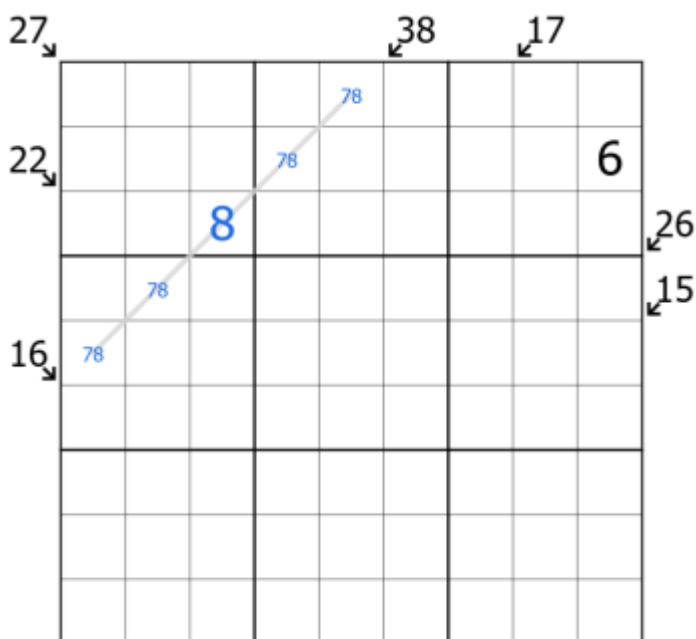
This is a full solution guide to my puzzle *Unassigned Dialing Code*, and so spoilers are ahead.

Rules

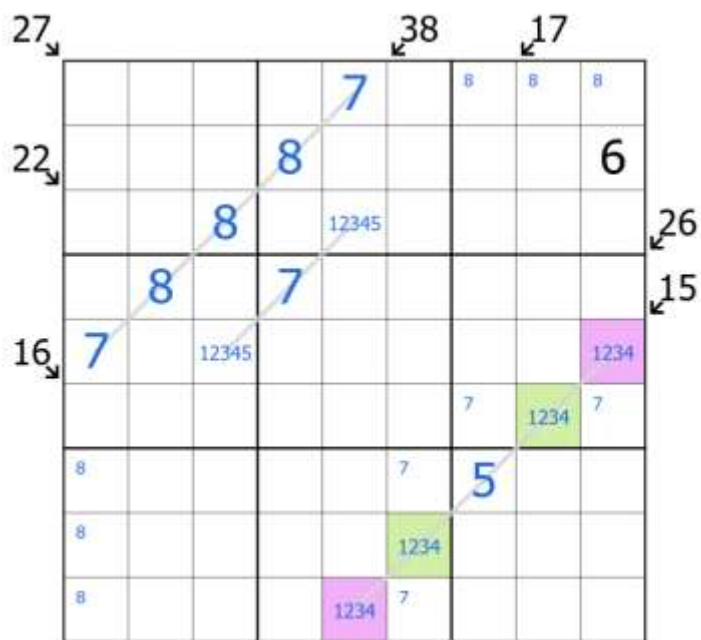
- Normal sudoku rules apply: Place the digits 1 to 9 once each in every row, column, and 3x3 box
- Little Look and Say Palindrome :
 - Along each marked diagonal identify a group of cells that form a palindrome
 - The palindrome must read the same forwards as backwards
 - Clues outside the grid give the sum of the digits on the palindrome
 - In addition, clues outside the grid must be read as a look and say clue for the palindrome, where the first digit indicates the number of times the second digit must appear in the palindrome. For example the palindrome that sums to 27 must also include 2 7s as part of the sum. (More 7s can appear elsewhere on the diagonal if not part of the palindrome)

Solve Path

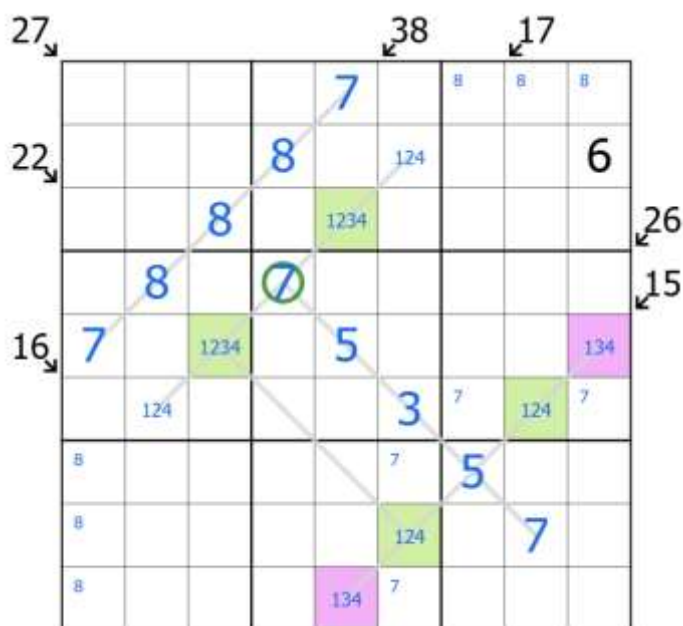
- 38 diagonal has maximum 5 cells, and it must both sum to 38 and contain 3 8s
- Hence the middle cell of the palindrome is an 8 and the other cells are 78 pairs



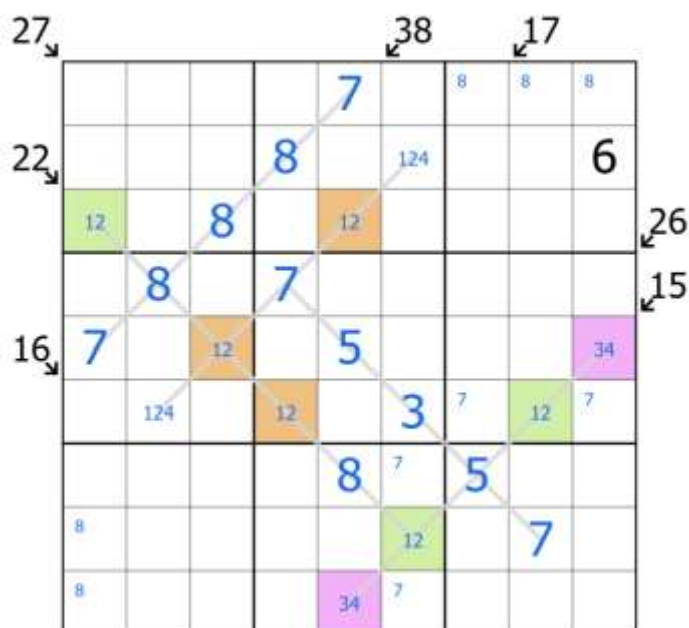
- Generalisable point: For a 1X diagonal, the X must be the middle cell as that is the only way to get 1 of a digit on the palindrome
- Hence the 17 diagonal has a 7 as the middle digit and that can only go in R4C4
- R3C5 = R5C3 and is a maximum of 5, although this palindrome could extend potentially to take 7 cells
- 15 diagonal has a 5 as the center, but in addition we can't use 555 to sum to 15 as this violates the look and say, so this must be 5 cells with a 5 in the center, and green and pink being two digits that sum to 5



- 27 diagonal must contain two 7s and this only goes through three boxes so it must take R4C4
- If the palindrome extended into box 1, then R3C3 would be the center of the palindrome, but this is even so we couldn't get to the right sum
- If the palindrome takes the 8 not as the center then the sum would be too high
- Hence this extends into box 9, and must be an odd length with an odd center digit
- Means it has to take R7C7, which clones to R5C5, and leaves R6C6 as a 3 to make the sum correct
- Now consider the 22 diagonal. 2992 is a viable option starting from R5C3, but this would mean that R5C3 = R8C6 and this digit could not be placed in box 5



- Hence the 22 diagonal must take the 8, and by math and look and say this has 12 pairs either side of the 8



- Now R6C2 sees all of 123 so has to be 4
- This resolves the remaining 1234s on the palindromes
- We can complete the 16 diagonal which has to be 6 in the center with 5s either side by available space
- Now we can complete the 26 diagonal. It needs two 6s, and the available space is very limited
- R7C6 as the center was plausible, but this cell sees all of the even digits so the math wouldn't math
- Leaves only R8C5 = R5C8 = 6
- By box 8, this has to be paired with two 7s as there are no available sums to 7 in two digits



- And now the fun logic is done and it's sudoku to the finish
- We can place all of the 6s, most of the 5s, and nearly complete boxes 24568

27					38		17	
	6		4	3	7	5	2	8
22	9		9	3	7	9		6
	2		8	6	1	5	4	4
	3	8	2	7	4	6	1	9
16	7	9	1	2	5	8	4	6
	5	4	6	1	9	3	7	2
		6	3	9	4	9	8	7
	8		5	4	9	6	2	7
	8		7	9	5	3	1	6

- Standard sudoku to finish

27					38		17	
	6	1	4	3	7	5	2	8
22	9	7	3	8	2	4	1	5
	2	5	8	6	1	9	3	4
	3	8	2	7	4	6	9	1
16	7	9	1	2	5	8	4	6
	5	4	6	1	9	3	7	2
	1	6	9	4	8	7	5	3
	4	3	5	9	6	2	8	7
	8	2	7	5	3	1	6	9