Colouring Book: Greyscale Edition – Full Solution Guide

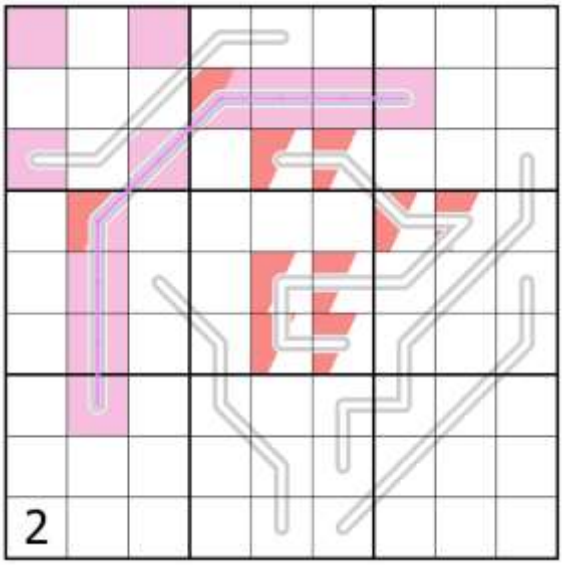
This is a full solution guide to my puzzle *Colouring Book: Greyscale Edition*, and so spoilers are ahead.

Rules

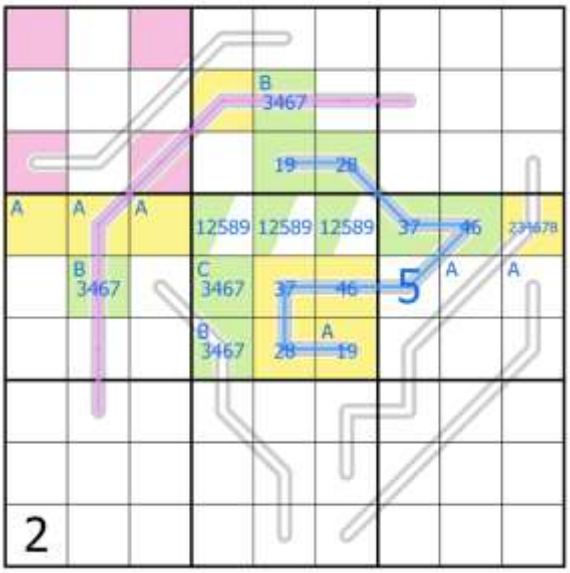
- Normal sudoku rules apply: Place the digits 1 to 9 once each in every row, column, and 3x3 box
- Each grey line is either a thermometer or a palindrome, to be determined by the solver
- **Thermometers**: Digits along a grey line must strictly increase from one end of the line to the other
- **Palindromes**: Digits along a palindrome must read the same in both directions

Solve Path

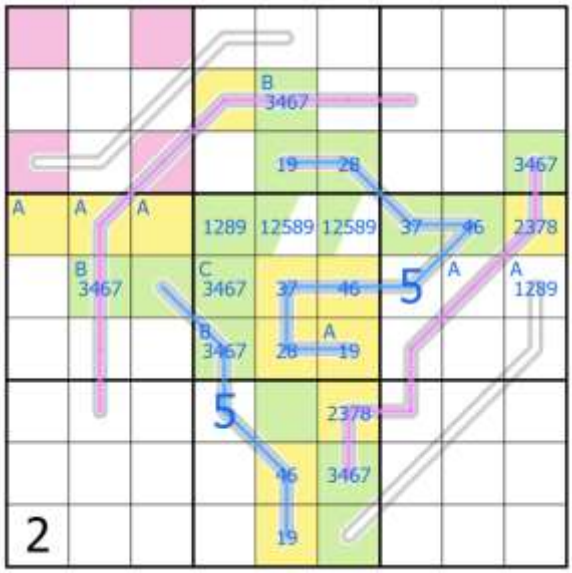
- Can the line containing R7C2 be a thermo? No, as it would contain all of the digits 1 to 9 and leave R2C2 with no options, so this is a palindrome
- Note that the four digits on the palindrome are limited to 4 spots in box 1 (pink)
- By palindrome R2C4 = R4C2. Where is this in box 5? It goes on the line
- If the line containing R6C6 were a palindrome then this digit would be copied into a position where it sees itself in the row or the box. Hence R6C6 line is a thermo



- Can mark the digits up the thermo from R6C6. We don't know which end the bulb is, so I will mark pairs with yellow and green to represent unknown high/low
- 5 is known and is R5C7
- R4C78 can be placed in box 5, leaving a triple in row 4 of box 5
- Remaining cells in row 4 are yellow
- R4C9 is not 19 as this digit doesn't work regardless of whether R3C9 line is a palindrome or a thermo

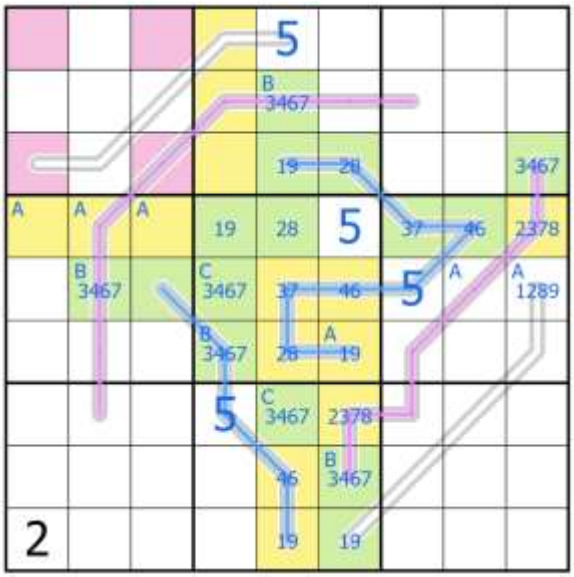


- Yellow 19 (I have given it the letter A) points from box 6 into box 4
- By palindrome R5C2 = R2C5, and which digit is this in box 5? It sees 5 digits in the box directly, it also sees green 19 and 28, and 5, and yellow 19 from box 6
- Hence this can only be the digit in R6C4, which is green 3467 and I have given the letter B
- Can R3C9 line be a thermo? No, as the digit in R5C8 sees 34567, and it is too far from the end of the thermo to be 1289. Hence this is a palindrome

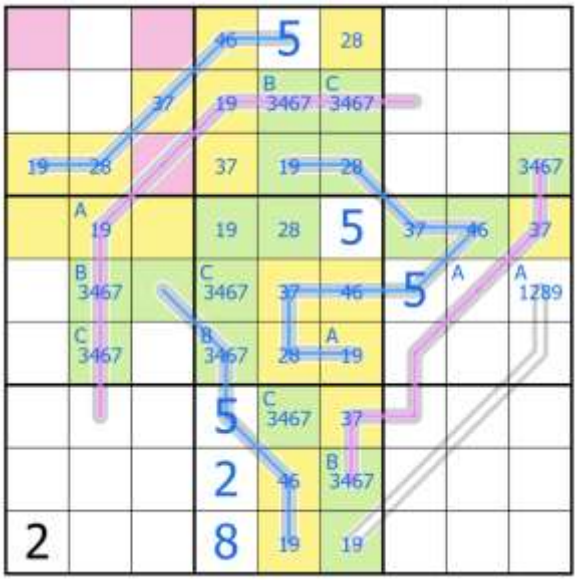


- R5C3 line now can't be a palindrome as B would be copied into a position where it sees itself in column 5, so this line is a thermos
- By available digits, R5C3 must be a more extreme (i.e. closer to the 19 end) of the thermo, so is green, and digits along the thermo towards R9C5 are known
- R4C4 is now not 5 so is the green 19
- R456C4 are all green, and these can be roughly placed in box 8
- R8C6 = R3C9 by palindrome, and can only be green 3467 (B)

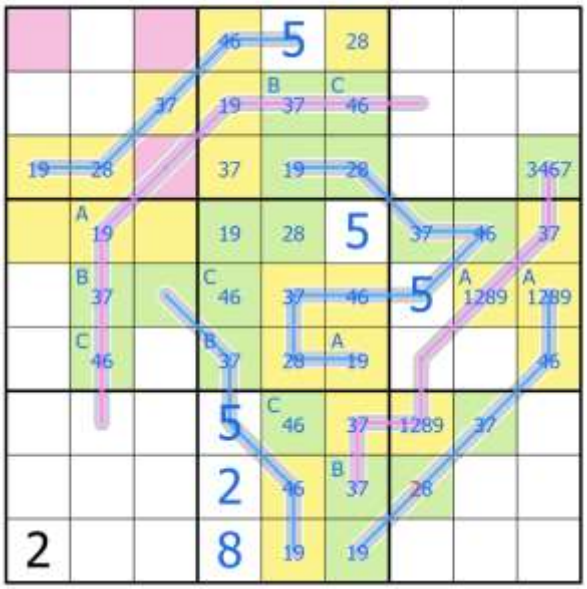
- Can R9C6 be green 3467 (C)? No. It trivially fails if that line is a palindrome, but it also fails if that line is a thermo as there are not enough available digits to stretch even to yellow 19 in R5C9
- Hence R9C6 is green 19, but this does not yet tell us what the nature of that line is
- Places 5 in box 5 and column 5



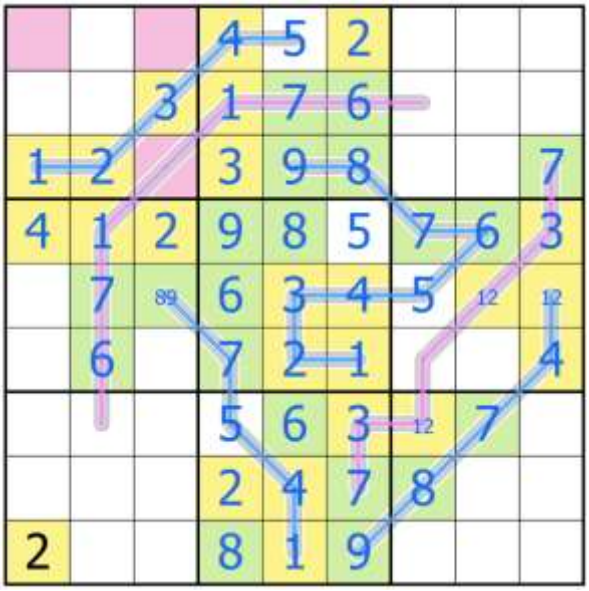
- By pink cells in box 1, it is not possible for R3C1 to be a 5 as 5 can't appear anywhere on R7C2 line
- Hence R1C5 line is not a palindrome and is a thermo, and thermo digits are entirely known
- Places yellow 37 in box 2, box 8, box 6 by palindrome
- Gives us a 28 pair in box 8 whose order is known by the given digit, but colours for 28 yet to be known



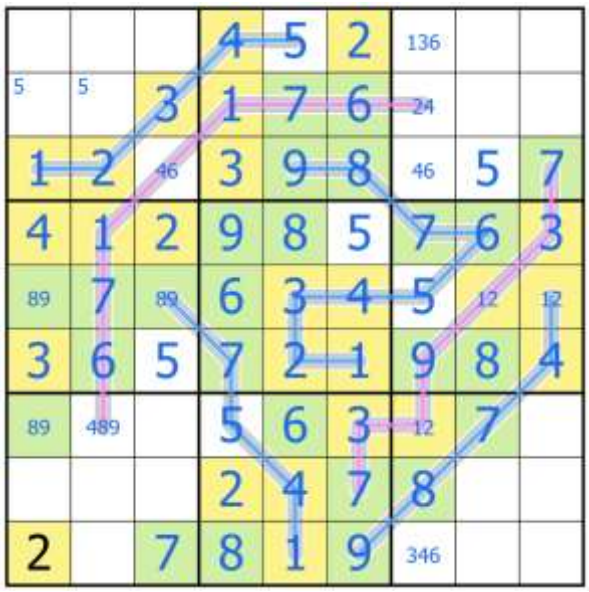
- Yellow 19 and yellow 28 form a pair in box 6, and makes R5C9 yellow
- As this line has a green at one end and yellow the other it is clearly a thermo
- Tracing available digits, we learn that R7C8 is green 37, R8C7 is green 28



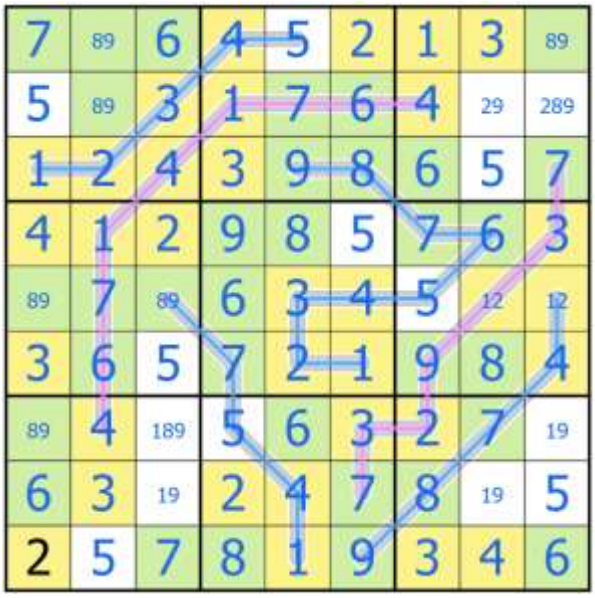
- Gives us our high-low. Green is high and yellow is low, which allows candidate pairs to be replaced with digits
- Also tells us that C was 6 and B was 7



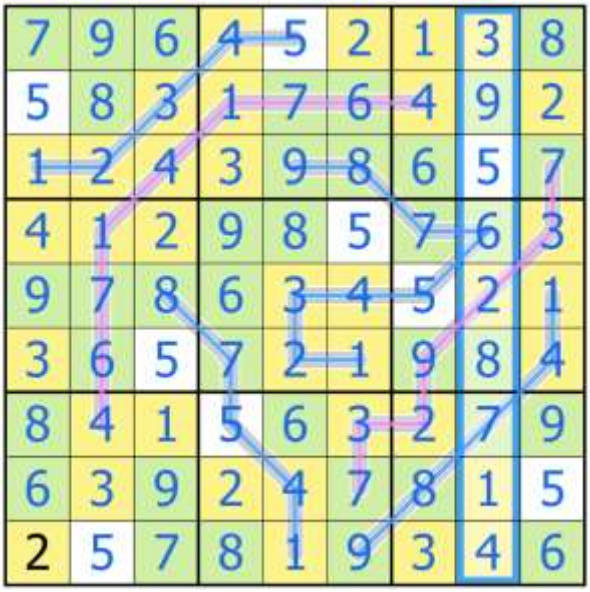
- 7 placed in box 7, 3 in box 4, 5 in box 4
- Various sudoku follows



- By palindrome R2C7 = R7C2 and only 4 works in both places
- More sudoku follows



- Final resolution by palindrome, R5C8 = R7C7 = 2


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