Christmas puzzle 2023

Solution booklet

Dear puzzler

This booklet has taken a while. As I write this, we are about to head into June 2025. There were... distractions. Covid was just the first of them, I suppose, but a big one. And once the smoke cleared, I never seemed to find the time to do it. I wanted to do it well or not at all, you see, so here we are. I hope you can forgive me :)

By now it's become a recurring thing, the Christmas Puzzle Card, but back in 2019 it was just a noncommittal, possibly one-off idea. I did put "This is number one" on the back, so the desire was there to do more, but I had also learned that year not to overcommit, and take better care of my energy levels. It goes without saying that I am very happy that it *did* turn into a series, one I hope to extend for years to come.

Here's how it all started.

Back in 2019 I was recovering from a burnout, and one of the things the doctor said I was supposed to do was set myself small, achievable goals, and then achieve them. Take out the trash this week, that sort of thing. It was a humbling time. I also needed low-stress, soothing distractions. At some point I bumped into a youtube channel called Cracking the Cryptic. Their videos were just a guy solving a sudoku and explaining his reasoning as he did it, and it was just what I needed (I also watched a lot of glass-blowing videos of all things). I still watch it regularly, and can heartily recommend it.

The point is, that got me back into the habit of solving puzzles. Towards the middle of the year I saw a video on the CtC channel (which I can't for the life of me find back) that combined a QR code with a solved sudoku and that was the inciting incident, so to speak.

I could see how I could make it my own thing, and that made me decide to throw together a simple puzzle card using a similar approach, to send around as my Christmas card.

The rest, as they say, is history.

So, at long last, here is one way to solve it.

Step one. Resolve the movies in the number-crossword

I didn't want to just put the given digits in the sudoku, and I eventually landed on the idea of a simple 'crossword' where all answers were numbers. I had to go through several versions of the sudoku, until I arrived at a set of numbers that made the sudoku solvable. I then worked my way back from that to create corresponding clues. I've done puzzles like that before, especially having one clue referring to another is a trick I like to use - it also adds a layer of logic to the solving process. Rather than use only numbers in the clues, I replaced some of them with references to movies that had that number in their title. A complicated idea but easy to 'get', I felt.

So let's start with the movies.

The Taking of Pelham 123 (1974, remade 2009) is a compelling movie (both versions) about a train hijacking in New York.

Five Mins of Heaven (2009) is a fictionalized movie inspired by true events - a man comes face to face with the assassin whom he witnessed kill his brother, 25 years later.

Leeloo is a character in the marvellous Luc Besson movie The 5th Element (1997), played by Milla Jovovich.

Walter Sparrow was an actor, but is also the main character of the movie The Number 23 (2007), featuring one of Jim Carrey's best performances (not a comedic role) ever.

1. Put numbers in grid
(italic clues refer to movies)

Across
1. Next Year / 2.02 - *Pelham Taken* + 110 (3)
3. Chess Squares - *Mins of Heaven* (2)
5. Clue 9 × 10 + *Leeloo* (5)
7. Clue 1 - *Walter Sparrow* (3)
9. *THX* + 189 (4)
11. 32Kb - 5 - *Dalmatians* × 6 (5)

Down
2. *Kill Bill Crazies* × 100 - 239 (4)
4. Clue 1 × 10 - 2 - *Weight of a Soul* (4)
6. Clue 5 + Clue 11 + *Interstella* + 2210 (5)
8. Clue 7 / 2 - *Capricorn* (3)
10. *Dolphin Hotel* × 2 - 18 (4)

THX-1138 is George Lucas' graduation movie. The number is hidden in many of his other movies (especially the Star Wars franchise).

101 Dalmatians (1961; we don't do sequels) is the well known Disney animation movie. This clue was supposed to be one of the easy ones.

Kill Bill Vol. 1 (2003) features The Crazy 88 as the henchmen of O'Ren Ishi, one of The Bride's adversaries.

21 Grams (2003) is supposedly the weight of a soul - the change in weight when a person dies. The movie title refers to experiments by Dr. Duncan MacDougall hoping to show this, in the early 20th century.

Interstella 5555 (2003) is an anime movie with a soundtrack by Daft Punk (released as Discovery), best known for Harder, Better, Faster, Stronger (among other hits)

Capricorn One (1977) is a movie about a faked Mars landing (it is unclear whether this inspired all the fake moon landing conspiracies; Kubrick had nothing to do with it)

1408 (2007), based on a book by Stephen King, is a room in the Dolphin Hotel.

Hopefully it was clear we were looking for the numbers associated with these movies, not their year of release.

Now that we know the numbers they represent, we also need the non-movie clues.

The next year was of course 2020, there are 64 squares on a chessboard, and 32Kb is 32768 bytes, which is 2 to the power 10.

Now that all the numbers have been resolved, the clues become a sort of logical maze, the way some clues refer to each other. The next step is figuring that out.

Step two. Resolve the clue references in the number-crossword

There are a few clues that can already be calulated, they don't refer to anything else. So let's do that first, and then build on that.

1. Put numbers in grid
(italic clues refer to movies)

Across
1. 2020 / 2.02 - 123 + 110 (3)
3. 64 - 5 (2)
5. Clue 9 × 10 + 5 (5)
7. Clue 1 - 23 (3)
9. 1138 + 189 (4)
11. 32768 - 5 - 101 × 6 (5)

Down
2. 88 × 100 - 239 (4)
4. Clue 1 × 10 - 2 - 21 (4)
6. Clue 5 + Clue 11 + 5555 + 2210 (5)
8. Clue 7 / 2 - 1 (3)
10. 1408 × 2 - 18 (4)

1: 2020 / 2.02 = 1000, and 1000 - 123 + 110 = 987.

3: 64 - 5 = 59.

9: 1138 + 189 = 1327.

11: 32768 - 5 - 101 x 6 = 32157.

2: 88 x 100 - 239 = 8561.

10: 1408 x 2 - 18 = 2798.

1. Put numbers in grid
(italic clues refer to movies)

Across
1. 987 (3)
3. 59 (2)
5. Clue 9 × 10 + 5 (5)
7. Clue 1 - 23 (3)
9. 1327 (4)
11. 32157 (5)

Down
2. 8561 (4)
4. Clue 1 × 10 - 2 - 21 (4)
6. Clue 5 + Clue 11 + 5555 + 2210 (5)
8. Clue 7 / 2 - 1 (3)
10. 2798 (4)

Now we can resolve the rest:

5: 1327 x 10 + 5 = 13275.

7: 987 - 23 = 964.

4: 987 x 10 - 2 - 21 = 9847.

6: 13275 + 32157 + 5555 + 2210 = 53197.

8: 964 / 2 - 1 = 481.

1. Put numbers in grid
(italic clues refer to movies)

Across
1. 987 (3)
3. 59 (2)
5. 13275 (5)
7. 964 (3)
9. 1327 (4)
11. 32157 (5)

Down
2. 8561 (4)
4. 9847 (4)
6. 53197 (5)
8. 481 (3)
10. 2798 (4)

Now this crossword looks a lot easier to solve!

Step three. Solve the sudoku

With the numbers filled in, this sudoku looks like it shouldn't give us too much trouble. There's a few rows and columns that are almost completely filled already! Let's start with those first. I mean, how hard can it be...

[1]9	[2]8	7						
	5							
	6						[3]5	[4]9
	[5]1	3	2	7	[6]5			8
					3			4
	[7]9	6	[8]4		[9]1	3	[10]2	7
			8		9		7	
	[11]3	2	1	5	7		9	
							8	

There is only one place left for the 9 in box 7 - R9C3.

In box 5 the last 3 numbers are 6, 8, and 9. Only 8 doesn't yet occur in row 6, so R6C5 is 8. That means R6C1 must be 5.

Now we can also put the 5 in box 7 - R7C3.

Next, in box 6 we have 1, 5, 6, and 9 left; only 6 and 9 don't yet occur on row 4, and 9 is already in column 8. So R4C7 is 9, and R4C8 is 6. Because 5 is also in column 8, we can also place 1 in R5C8, and 5 in R5C7. Row 4 can be completed with a 4 in R4C1.

In column 2, the 2 can only go in R5C2. Then the 7 must go in R9C2, leaving the 4 for R7C2.

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

We can now complete box 4 with 7 in R5C1 and 8 in R5C3. In box 7, the 8 goes into R8C1.

We can complete row 8 with a 4 in column 7 and a 6 in column 9. Also in box 9, the 5 can only go in R9C9. Only one place remains for the 3 - R7C9.

Now we move to the top row. The final 5 goes in R1C4. In box 3, the cells in column 9 are now reserved for 1 and 2, and in column 8 we can only put 3 and 4. The 8 and 7 can't go in R1C7, so that must be a 6.

So far we could get away with simple scanning, but now we're left with more of a challenge.

Box numbering

Rather than refer to the 3x3 boxes as "top left" etc, the convention is to number them from left to right and from top to bottom (in reading order). So, the middle top box is box 2, the central box is box 5, and the bottom right box is box 9.

1	2	3
4	5	6
7	8	9

We now look at pairs, triples, and quadruples - sets of N digits that can only occur in N different cells. In such a situation, other digits can't possibly be put in one of the N cells as well, and conversely, the digits in the N-tuple can't occur outside the N cells either. This can be used to eliminate possibilities, and this is exactly what we need to progress. In the next diagram the remaining candidates in row 2 have been filled in.

9	8	7	5			6		
23	5	14	3679	1234 69	2468	78	34	12
	6						5	9
4	1	3	2	7	5	9	6	8
7	2	8			3	5	1	4
5	9	6	4	8	1	3	2	7
	4	5	8		9		7	3
8	3	2	1	5	7	4	9	6
	7	9					8	5

The four cells marked in green form a quadruple. While we can't resolve where the 1, 2, 3, and 4 will end up - we do know they won't occur in the cells highlighted in red - the candidates can be eliminated there.

This gives us a split into two quadruples in row 2. This doesn't immediately result in new digits, but it does allow us to progress.

9	8	7	5	134	24	6	34	12
23	5	14	679	69	68	78	34	12
23	6	14	37	134	248	78	5	9
4	1	3	2	7	5	9	6	8
7	2	8	69	69	3	5	1	4
5	9	6	4	8	1	3	2	7
16	4	5	8	26	9	12	7	3
8	3	2	1	5	7	4	9	6
16	7	9	36	2346	246	12	8	5

We're now at the point where every cell has only a few possibilities remaining, so they've all been added to the diagram.

If we look closely we can see a few simpler cases of the previous step - pairs.

Most of them don't help us right now, but one does - in column 5 we have two cells that can only be 6 or 9, so no other cells in column 5 can have a 6 or 9, in particular R7C5, which must be a 2. R7C7 and R7C1 now resolve to 1 and 6 respectively, in turn resolving their pairs.

We can also remove 2 and 6 as an option from R9C5 but that is of no immediate use.

9	8	7	5	134	24	6	34	12
23	5	14	679	69	68	78	34	12
23	6	14	37	134	248	78	5	9
4	1	3	2	7	5	9	6	8

Ok, what now... Scanning and tuples won't help us here. Instead we're going to make use fo the fact that so many cells have only 2 options left.

Suppose R2C1 was a 2. That would mean R2C9 was a 1, R1C9 was another 2, R1C6 was a 4, R1C8 was a 3, and R2C8 was another 4.

What are now the options left for R2C3? It can't be 1 because of R2C9, and it can't be 4 because of R2C8!

This means our original choice was invalid - R2C1 can't be a 2. Indeed, putting a 3 in the cell does *not* lead to a contradiction.

9	8	7	5	134	24	6	34	12
23	5	14	679	69	68	78	34	12
23	6	14	37	134	248	78	5	9
4	1	3	2	7	5	9	6	8

9	8	7	5	134	24	6	3	1
3	5	1	679	69	68	78	4	2
2	6	4	37	134	248	78	5	9
4	1	3	2	7	5	9	6	8
7	2	8	69	69	3	5	1	4
5	9	6	4	8	1	3	2	7
6	4	5	8	2	9	1	7	3
8	3	2	1	5	7	4	9	6
1	7	9	36	34	246	2	8	5

Simple scanning now yields a 4 in R1C5 and an 8 in R3C6, and the puzzle gives up the ghost. All we have to do is remove one no longer legal candidate after another and the whole puzzle resolves.

Step four. Colour the sudoku

I must at this point apologize for the rather unelegant next step. I have since then come up with a few more elegant ways of turning the numbers into black and white, but alas, back in 2019 I couldn't think of anything else than I simply enumerating the black cells.

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

Row 1: 1, 2, 7, and 9.

Row 2: 6 and 9.

Row 3: 7, 8, and 9.

Row 4: 3, 4, 5, 8, and 9.

Row 5: 2, 4, 6, 7, and 9.

Row 6: 1, 5, and 8.

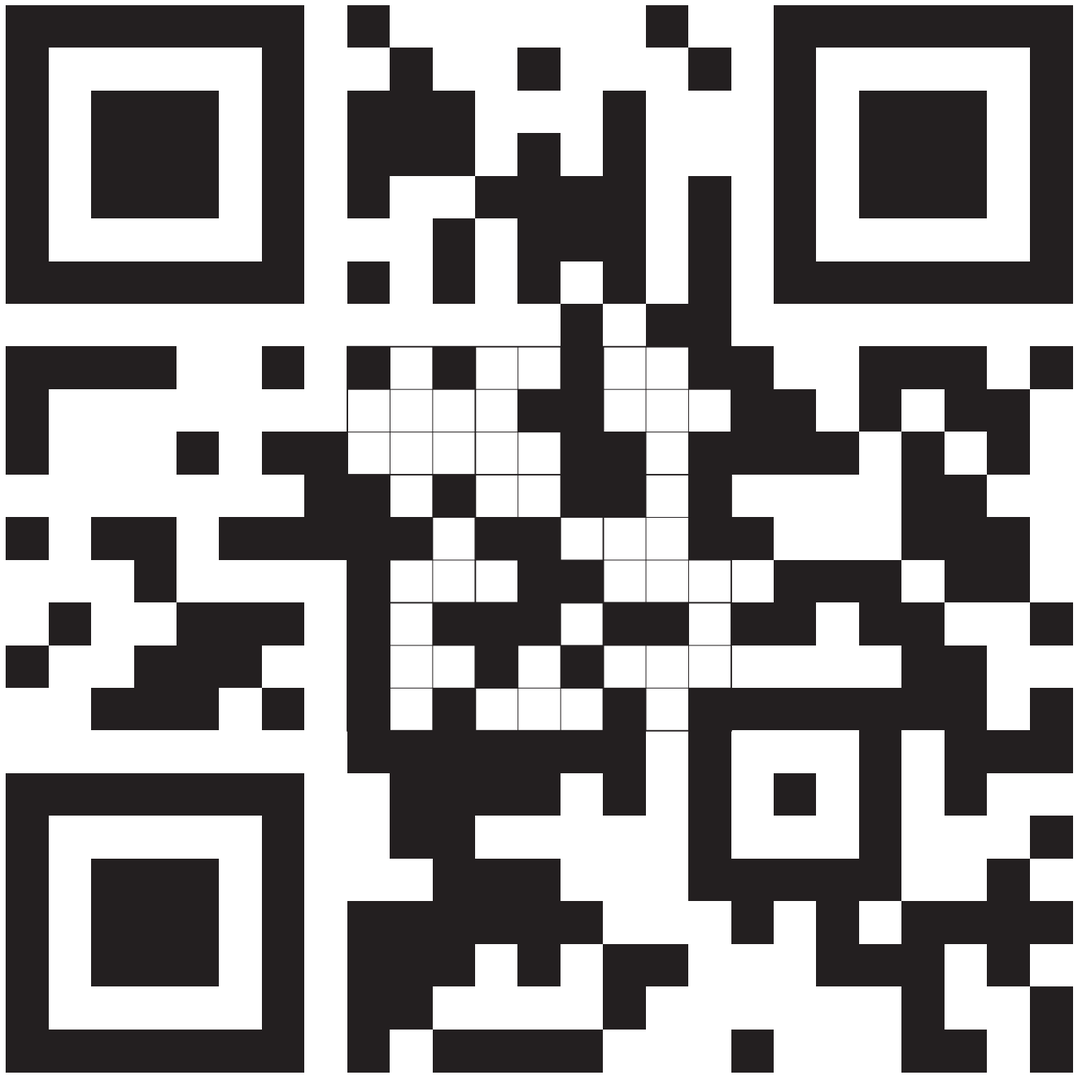
Row 7: 1, 2, 5, 6, 7, and 8.

Row 8: 1, 7, and 8.

Row 9: 1, 2, 5, and 9.

Step five. Fix the QR and scan

Nothing else to do but do it:



“May we have a better grasp of the rules in 2020”

Conclusion

So here it is, the solution to the first ever Christmas puzzle card I made. It was just a simple thing I threw together, and the reward for solving it is nothing earth shaking, but I hope you enjoyed the journey anyway. And if it should have whetted your appetite for more, there’s an ever growing set on my site, and I’m sure I’ll do more puzzle designs in the future.

I’d love to hear from you. What do you think? Was it too easy? Too hard? Did you even bother? What would you like to see in the future? Let me know :)

Remember, every Christmas card and solution booklet in the series can be found on my website - www.stack.nl/~angelo/