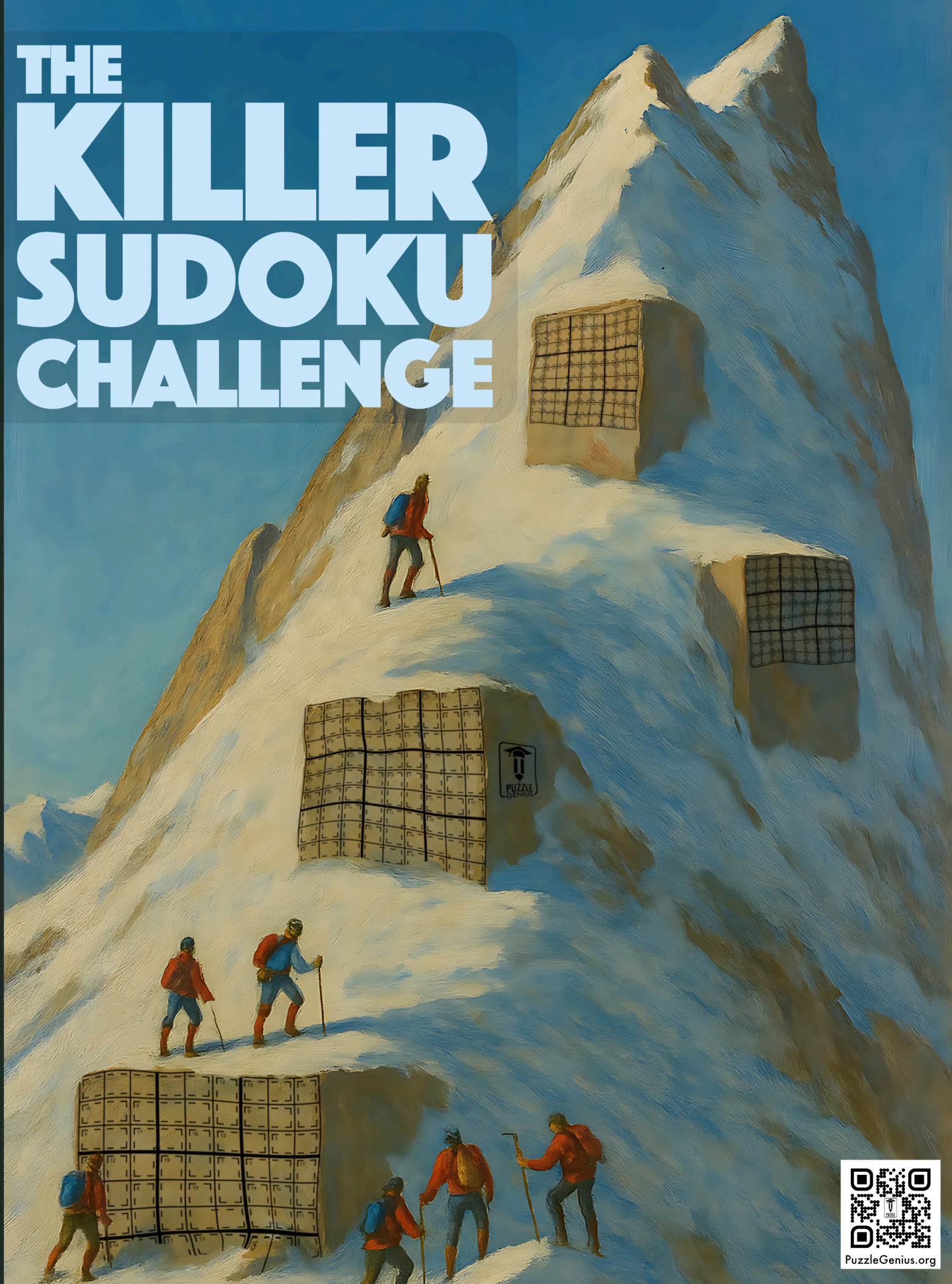
THE KILLER SUDOKU CHALLENGE



PuzzleGenius.org

Killer Sudoku Challenge

Welcome

Greetings, and congratulations! You've just taken the first step in proving your puzzling prowess. I'm guessing you already know at least the basics of Killer Sudoku. Now it's time to push your skills further. This free challenge pack is our gift to you – carefully curated puzzles that grow in difficulty as you go. They're designed not just to entertain, but to stretch your logic skills, sharpen your strategies, and maybe even teach you a trick or two along the way.

Each puzzle page gives you space to log your start and finish time, so you can track your speed as well as your success. And with the Skill Tracker at the back, you'll be able to monitor your progress and spot areas for improvement. Whether you breeze through or battle hard, you'll come out stronger for the experience.

We're fellow puzzle-lovers here at *Puzzle Genius*. We know the thrill of cracking a tough grid and the satisfaction of spotting that one sneaky deduction others might miss. So thank you for joining us; we hope this is the start of a long and rewarding puzzling journey together. Now, let's see what you're made of!

Contents

There's more than just puzzles in this challenge pack. You'll also find:

Solving Techniques

Killer Sudoku has some special techniques over and above those used to solve regular Sudoku, and we cover those on the next page.

Skill Tracker

Keep track of how long each puzzle takes you, whether or not you used assistance, and the solving techniques you've used in this checklist and tracker at the back of the pack.

Cheat Sheet

We've included a full copy of our limited sum and required digit cheat sheet right here in the pack for your convenience.

Solutions

The quickest way to check your answers is against the solutions in the back. They're definitely not there in case you get stuck…honest!

Resources

We have more resources to help you in your quest to solve these puzzles, at PuzzleGenius.org :

Sudoku From Scratch

Solving Killer Sudoku requires some specialised techniques, but it also need you to understand how to complete a good old regular Sudoku, too. If you want to brush up your skills, or are just starting out, then our comprehensive three-part Sudoku From Scratch tutorial should be the first step on your journey.

Killer Sudoku From Scratch

Our Killer Sudoku tutorial covers all the rules and basic techniques you'll need to get started.

Calculator

If you want to shortcut some of the arithmetic involved in solving these puzzles, our Cheat Sheet is the perfect reference. We also have a dedicated Killer Sudoku calculator on our website. It has some extra features over and above the cheat sheet, such as being able to require or exclude numbers based on where you are in your solve. Is it cheating to use a cheat sheet or calculator? Only you can be the judge of that!

Terminology

Before we move ahead and look at some solving strategies, let's just make sure we're all on the same page when it comes to Killer Sudoku terminology.

Row – A row of nine cells in a puzzle.

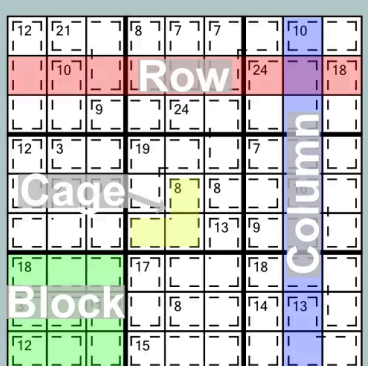
Column – A column of nine cells in a puzzle.

Block – A bolded 3x3 block of cells in a puzzle.

Cage – A dashed area within a puzzle.

Cage Target / Target Sum – The number that the digits within the cage must add up to.

Candidate Number – A number you have determined could be the valid entry for a cell but you aren't yet sure.



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Solving Techniques

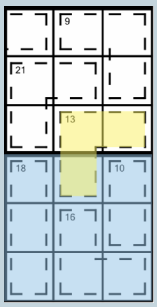
The 45 Rule

If there's one thing you need to know above all else when it comes to solving Killer Sudoku puzzles, it's the 45 rule. This states that the digits comprising every column, row, and block in a puzzle must add up to 45, because that's the sum of the digits 1-9.

The 45 rule can be applied in a number of ways. Sometimes it lets you solve a cell (or even multiple cells) immediately. Other times it won't solve a cell but will reduce the list of numbers that could go into a cell. Those candidate numbers can be combined with other techniques, including regular Sudoku methods, to solve other parts of the puzzle.

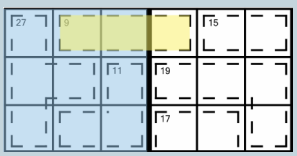
Innies and Outies

No, we're not talking about Severance! Innies and outies are the simplest way of using the 45 rule. When a cage crosses into or out of a row, column or block, you can use the rule to deduce the value of the parts that don't belong.



This blue block comprises three cages that are entirely contained within it (18, 16, and 10). Additionally, there is a yellow cell jutting in (hence "innie") from the 13-cage in the neighbouring block. If we add together the sums of the fully contained cages (18+16+10) we get 44. As we know the total sum of the cage must be 45, we can determine that the contents of the intruding innie cell must be 1 (45-44=1).

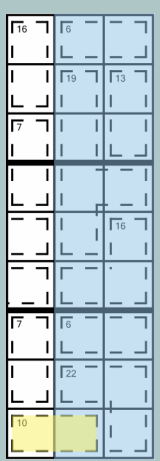
An outie is the same thing in reverse – a single cell that juts out of a row, column, or block. Here, one cell of the 9-cage is protruding out from the blue block. If we add together the sums of all the cages in the block (27+9+11) we get 47, so we can deduce that the outie cell must contain 2 (because 47-45=2).



The great thing about innies and outies is that they don't just apply to blocks, they work on rows and columns, too.

Combining Rows / Columns / Blocks

As puzzles get harder, you're less likely to find innies or outies in a single column, row or block. But you might have more luck if you combine them.



In this example we have two columns in which all the cages are contained within their entirety, and an innie cell poking in from the 10-cage in the neighbouring column. Adding together the cages in the two columns (6+19+13+16+6+22) gives us 82. As we know the total sum of those two columns must be 90 (two columns of 45 each), we can determine the contents of the innie cell must be 8 since the target of 90 minus the actual sum of 82 is 8. We can then solve the other cell in that 10 cage, which must contain a 2.

Combining rows and columns is useful, but combining blocks is even better because there are lots of ways of lumping them together to find innies and outies.

Multiple Outies

Multiple outies, while not immediately solvable, can still be useful. In this example the combined two blue blocks have two outies (the 13-cage and the 12-cage). Though we cannot solve them yet, they are useful. Adding up all the cages in the blue blocks (20+10+14+12+13+12+13+12) gives us 106. We can deduce that the combined value of the two outies is 16 (since 106-90 is 16). Therefore we can deduce that one outie must contain a 7 and the other a 9 (the only combination to reach 16), so we can write those in as candidate numbers which may help progress other areas of the puzzle.

Multiple Innies

Multiple innies can also be useful in reducing candidate numbers. In this example, the two blue blocks have two different innies jutting in. The sum of the blocks (16+6+19+13+16) is 77, therefore we can deduce the sum of the two innies must be 13 (since 90-77=13). That reduces the candidate numbers to 4-9, 5-8, or 6-7.

Multiple innies like this are sometimes called *pseudo cages*, because you can think of the two innies as forming their own cage given that we know their combined target sum (13).

Innie + Outie

In this scenario, you have a row, column, block (or combination of multiples), in which there is one innie and one outie. You can use the difference between the multiple of 45 and the sum of all cages to determine the difference between the innie and outie.

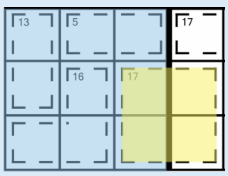
This blue block has an innie (from the 17-cage) and an outie (jutting from the 8-cage). If we add together all the sum numbers in the block (14+8+18) we get 40, which is 5 short of the required sum of 45. That means the numbers which go in the innie and outie cells must have a difference of 5. That way they will offset each other so that the block adds up to 45.

Valid pairs that are five apart are 1-6, 2-7, 3-8 and 4-9, so these become our candidate numbers for the innie and outie cells. Of course, the fact the outie cage has a sum target of 8 further reduces the options…

Solving Techniques

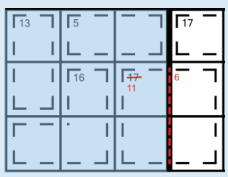
Cage Splitting

While single-cell innies and outies are the easiest to use and usually allow you to solve at least one cell completely, innies or outies comprising multiple cells in the same cage can still be useful.



This 17-cage has two cells outside the block – a double-outie if you like. If we add all the cage sums together (13+5+16+17) we get 51. So we know that the contents of the two outie cells belonging to the 17-cage must add up to 6 (because 51-45=6).

Although we haven't solved the cells, we can split the 17 cage into two. The part within the block has a sum of 11, and the two cells outside the block have a total of 6.



Splitting the cage allows us to attack each new cage separately, limiting candidate numbers considerably. The new 6-cage only has two possible candidate combinations (1-5 and 2-4).

Limited Sums

When looking at a given cage, we can work out all the possible combinations of numbers that can be used to arrive at its target sum. Sometimes there will be lots of them, which isn't much help. But sometimes you will find there are just one or two possible combinations. For example, a 2-cell cage with a target of 3 can only contain a 1 and 2. A 3-cell cage with a target of 7 can only contain a 1, 2 and 4. Writing these in as candidate numbers will help you as you use regular Sudoku techniques in the rest of the puzzle.

Required Digits

These are more rare than limited sums, but very useful. There are certain cage-size / target sum combinations that will, whatever combination of digits they contain, *require* one or more digits to be present. For example, a 4-cell cage with a target of 13 must include a 1 somewhere, because all the possible sum combinations include a 1 (1,2,3,7 or 1,2,4,6 or 1,3,4,5). If you find a required digit you can write it into each cell in the cage as a candidate number, thus helping you in other areas of the puzzle.

Cheat Sheet

2-Cell Cage Combinations

3	12			
4	13			
5	14	23		
6	15	24		
7	16	25	34	
8	17	26	35	
9	18	27	36	45
10	19	28	37	46
11	29	38	47	56
12	39	48	57	
13	49	58	67	
14	59	68		
15	69	78		
16	79			
17	89			

3-Cell Cage Combinations

6	123						
7	124						
8	125	134					
9	126	135	234				
10	127	136	145	235			
11	128	137	146	236	245		
12	129	138	147	156	237	246	345
13	139	148	157	238	247	256	346
14	149	158	167	239	248	257	347
15	159	168	249	258	267	348	357
16	169	178	259	268	349	358	367
17	179	269	278	359	368	458	467
18	189	279	369	378	459	468	567
19	289	379	469	478	568		
20	389	479	569	578			
21	489	579	678				
22	589	679					
23	689						
24	789						

4-Cell Cage Combinations

10	1234											
11	1235											
12	1236	1245										
13	1237	1246	1345									
14	1238	1247	1256	1346	2345							
15	1239	1248	1257	1347	1356	2346						
16	1249	1258	1267	1348	1357	1456	2347	2356				
17	1259	1268	1349	1358	1367	1457	2348	2357	2456			
18	1269	1278	1359	1368	1458	1467	2349	2358	2367	2457	3456	
19	1279	1369	1378	1459	1468	1567	2359	2368	2458	2467	3457	
20	1289	1379	1469	1478	1568	2369	2378	2459	2468	2567	3458	3467
21	1389	1479	1569	1578	2379	2469	2478	2568	3459	3468	3567	
22	1489	1579	1678	2389	2479	2569	2578	3469	3478	3568	4567	
23	1589	1679	2489	2579	2678	3479	3569	3578	4568			
24	1689	2589	2679	3489	3579	3678	4569	4578				
25	1789	2689	3589	3679	4579	4678						
26	2789	3689	4589	4679	5678							
27	3789	4689	5679									
28	4789	5689										
29	5789											
30	6789											

Cheat Sheet

5-Cell Cage Combinations

15	12345
16	12346
17	12347 12356
18	12348 12357 12456
19	12349 12358 12367 12457 13456
20	12359 12368 12458 12467 13457 23456
21	12369 12378 12459 12468 12567 13458 13467 23457
22	12379 12469 12478 12568 13459 13468 13567 23458 23467
23	12389 12479 12569 12578 13469 13478 13568 14567 23459 23468 23567
24	12489 12579 12678 13479 13569 13578 14568 23469 23478 23568 24567
25	12589 12679 13489 13579 13678 14569 14578 23479 23569 23578 24568 34567
26	12689 13589 13679 14579 14678 23489 23579 23678 24569 24578 34568
27	12789 13689 14589 14679 15678 23589 23679 24579 24678 34569 34578
28	13789 14689 15679 23689 24589 24679 25678 34579 34678
29	14789 15689 23789 24689 25679 34589 34679 35678
30	15789 24789 25689 34689 35679 45678
31	16789 25789 34789 35689 45679
32	26789 35789 45689
33	36789 45789
34	46789
35	56789

6-Cell Cage Combinations

21	123456							
22	123457							
23	123458	123467						
24	123459	123468	123567					
25	123469	123478	123568	124567				
26	123479	123569	123578	124568	134567			
27	123489	123579	123678	124569	124578	134568	234567	
28	123589	123679	124579	124678	134569	134578	234568	
29	123689	124589	124679	125678	134579	134678	234569	234578
30	123789	124689	125679	134589	134679	135678	234579	234678
31	124789	125689	134689	135679	145678	234589	234679	235678
32	125789	134789	135689	145679	234689	235679	245678	
33	126789	135789	145689	234789	235689	245679	345678	
34	136789	145789	235789	245689	345679			
35	146789	236789	245789	345689				
36	156789	246789	345789					
37	256789	346789						
38	356789							
39	456789							

Cheat Sheet

7-Cell Cage Combinations

28	1234567			
29	1234568			
30	1234569	1234578		
31	1234579	1234678		
32	1234589	1234679	1235678	
33	1234689	1235679	1245678	
34	1234789	1235689	1245679	1345678
35	1235789	1245689	1345679	2345678
36	1236789	1245789	1345689	2345679
37	1246789	1345789	2345689	
38	1256789	1346789	2345789	
39	1356789	2346789		
40	1456789	2356789		
41	2456789			
42	3456789			

8-Cell Cage Combinations

36	12345678
37	12345679
38	12345689
39	12345789
40	12346789
41	12356789
42	12456789
43	13456789
44	23456789

9-Cell Cage Combination

45	123456789

3-Cell Cage Required Digits

8	1
22	9

4-Cell Cage Required Digits

12	12
13	1
27	9
28	8 9

5-Cell Cage Required Digits

17	123
18	12
19	12
20	12
21	1
31	9
32	89
33	789

6-Cell Cage Required Digits

23	1234
24	123
25	12
26	1
34	9
35	89
36	789
37	6789

7-Cell Cage Required Digits

30	12345
31	1234
32	123
33	126
34	1
36	9
37	89
38	789
39	36789
40	56789

Skill Tracker

PUZZLES COMPLETED

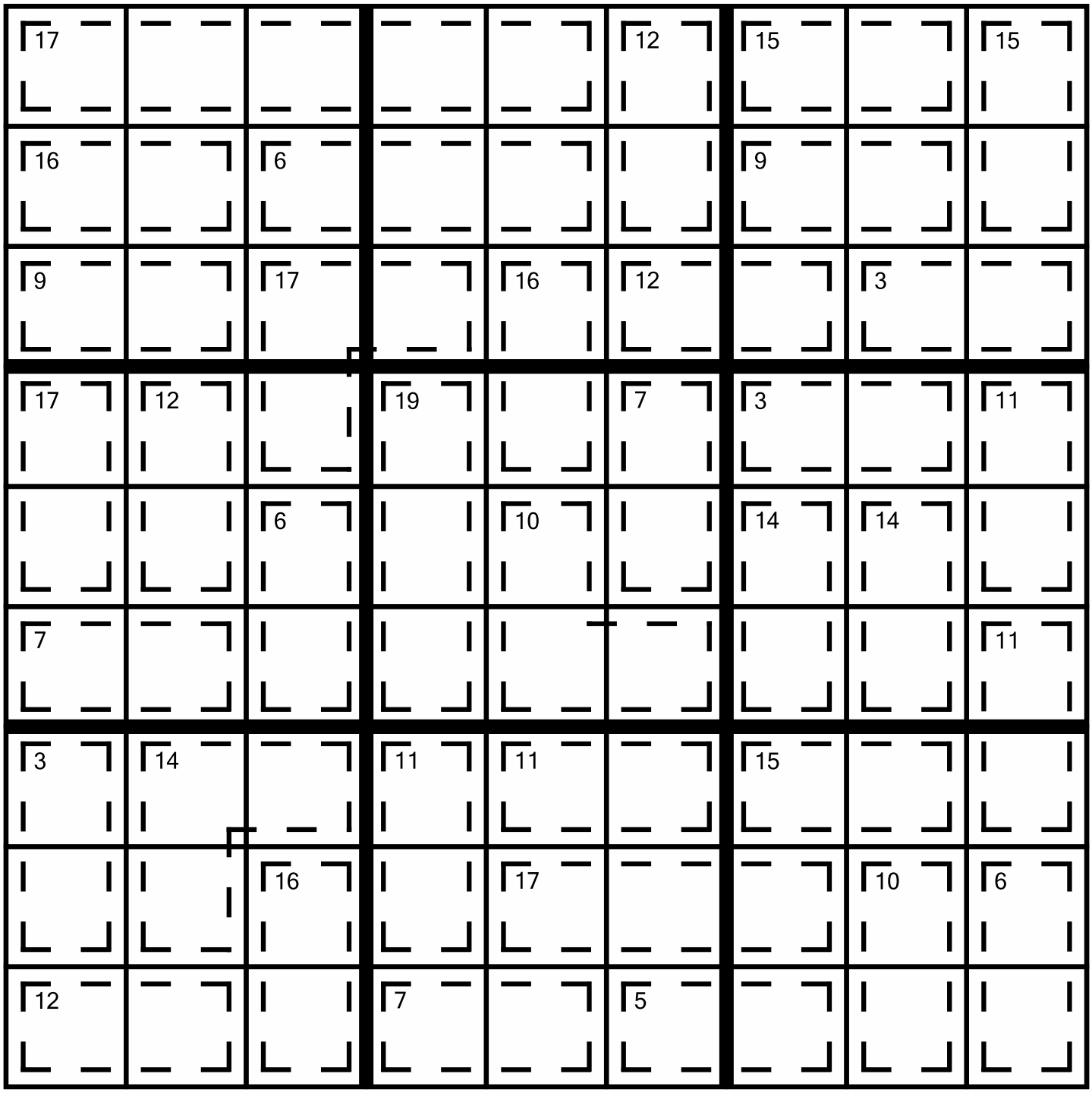
Puzzle	Time Taken	Used Calculator?	Used Cheat Sheet?	Solved Correctly?	Notes
1					
2					
3					
4					
5					
6					
7					

TECHNIQUES USED

SOLVING TECHNIQUE	USED ✅
Single Innie	
Single Outie	
Multiple Innies	
Multiple Outies	
Innie + Outie	
Cage Splitting	
Combined Row/Column/Block	
Limited Sums	
Required Digits	

Killer Sudoku #1

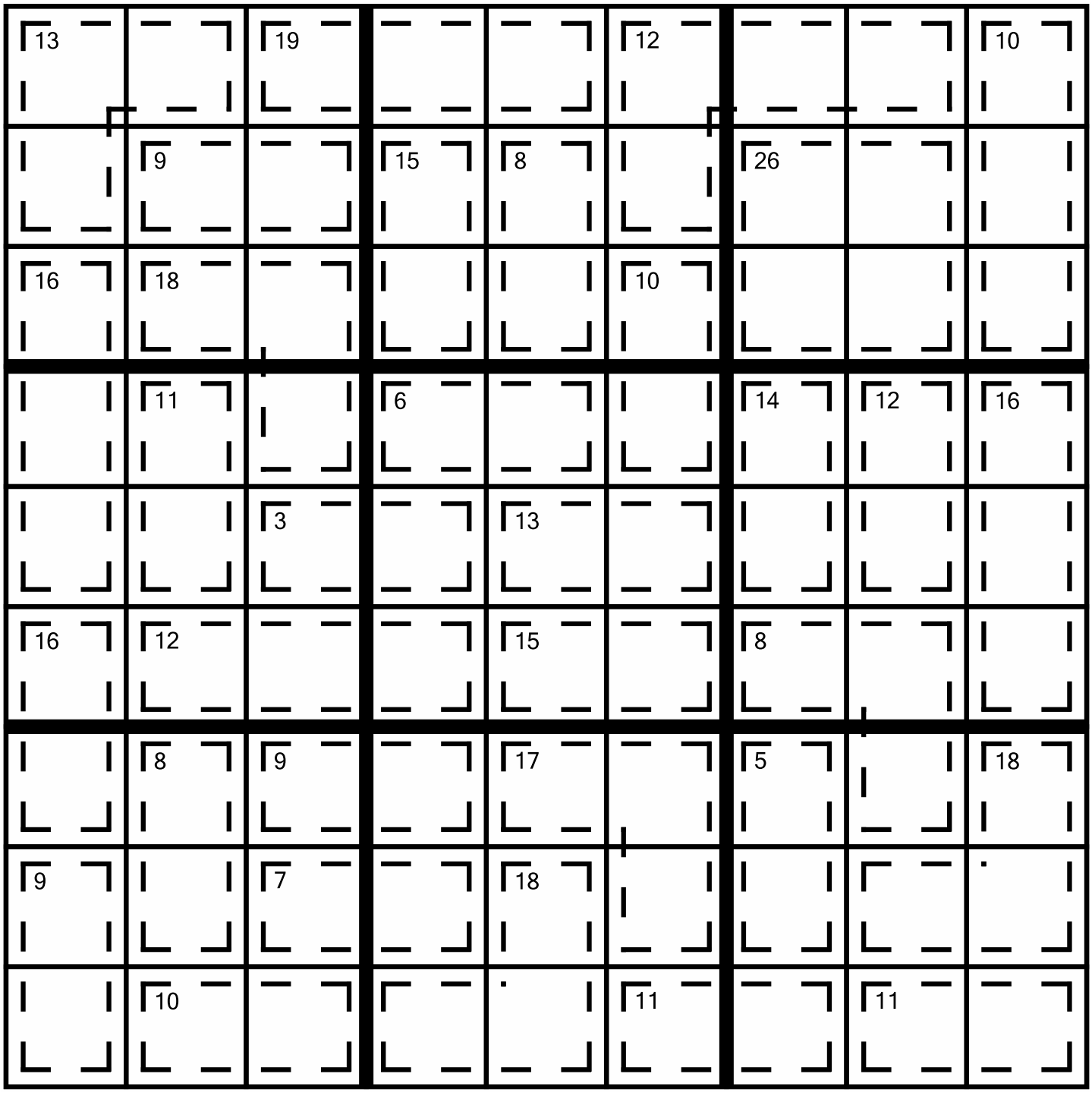
Level 1



Start Time	End Time	Total Solve Time

Killer Sudoku #2

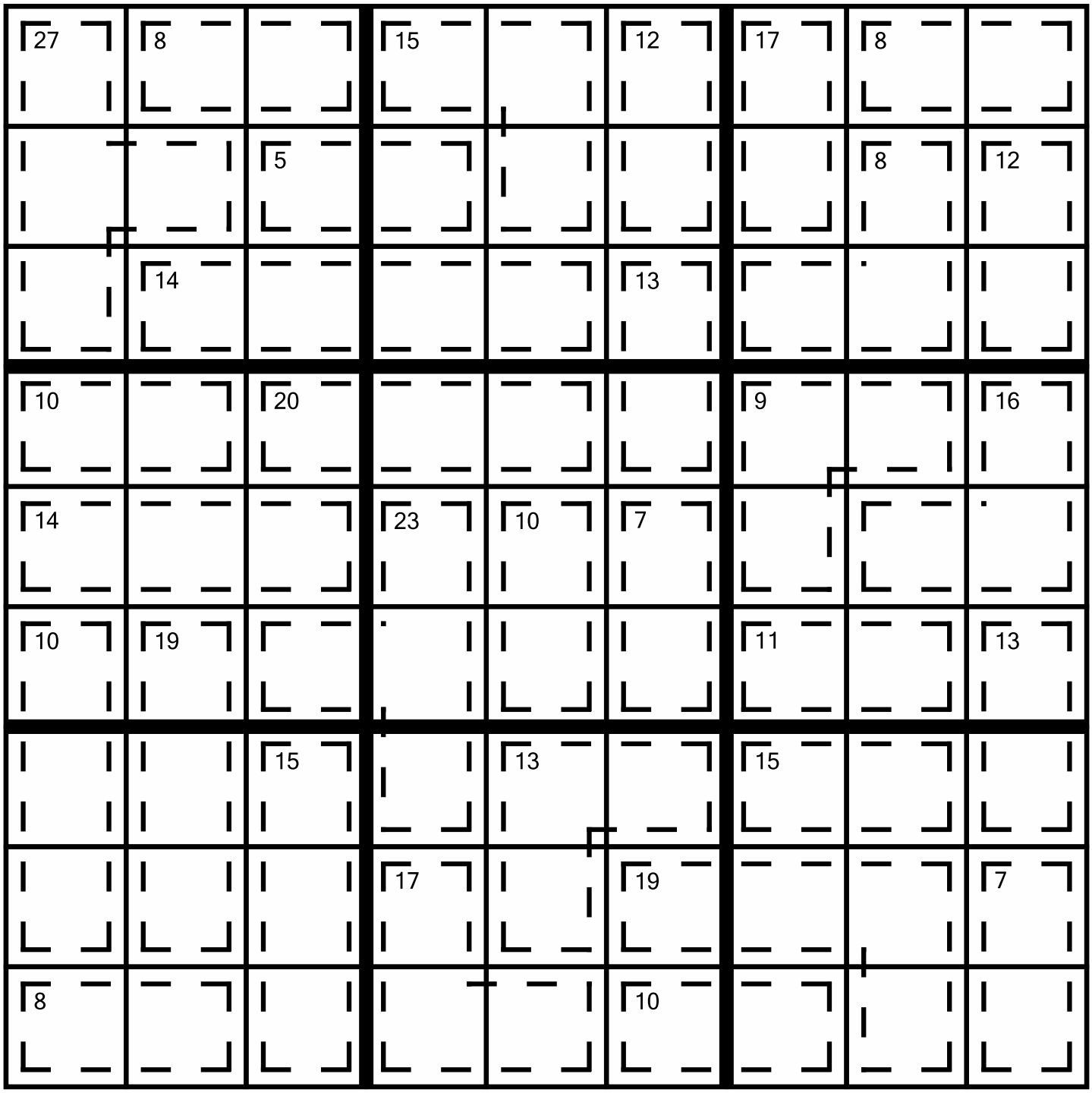
Level 2



Start Time	End Time	Total Solve Time

Killer Sudoku #3

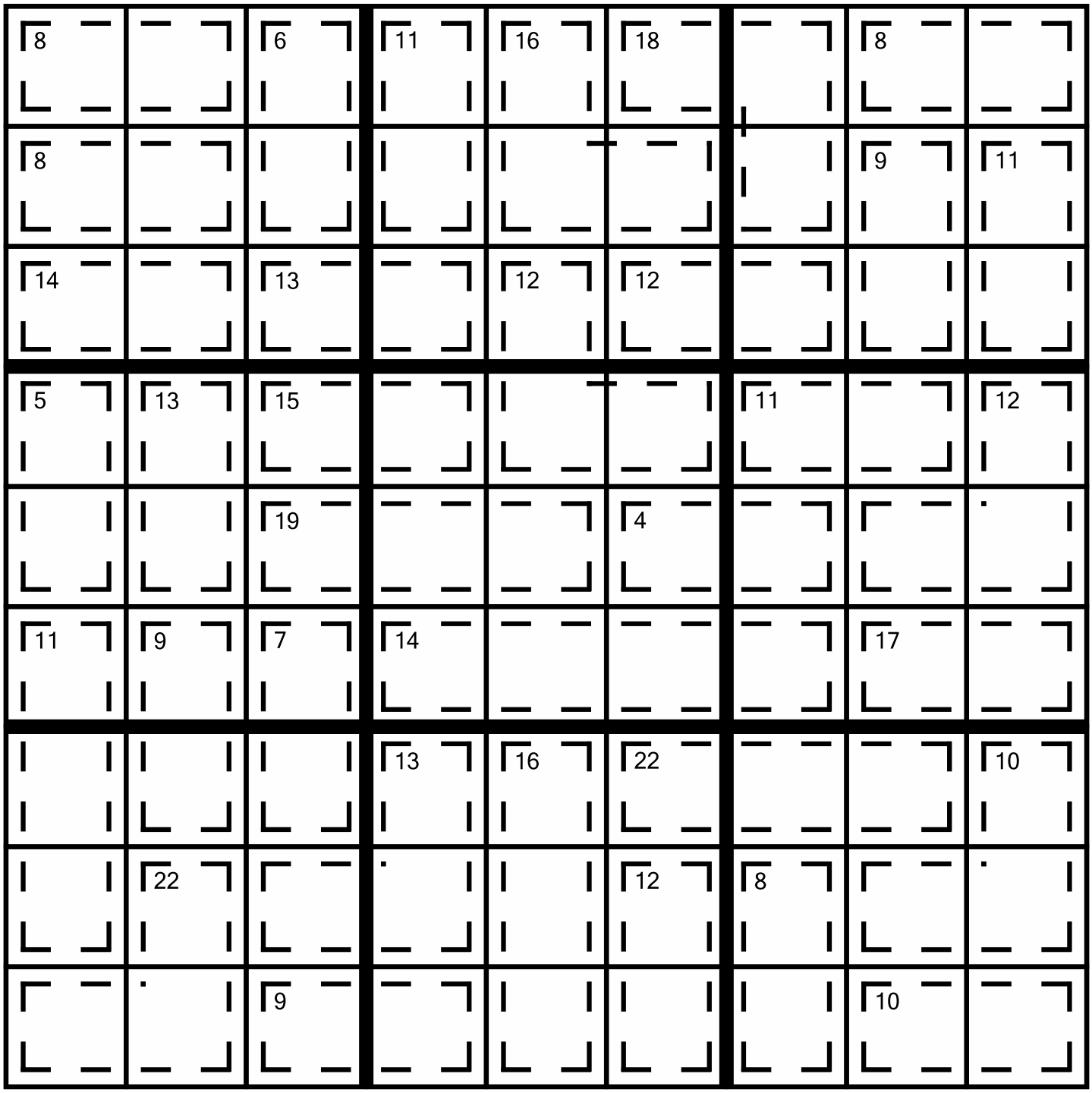
Level 3



Start Time	End Time	Total Solve Time

Killer Sudoku #4

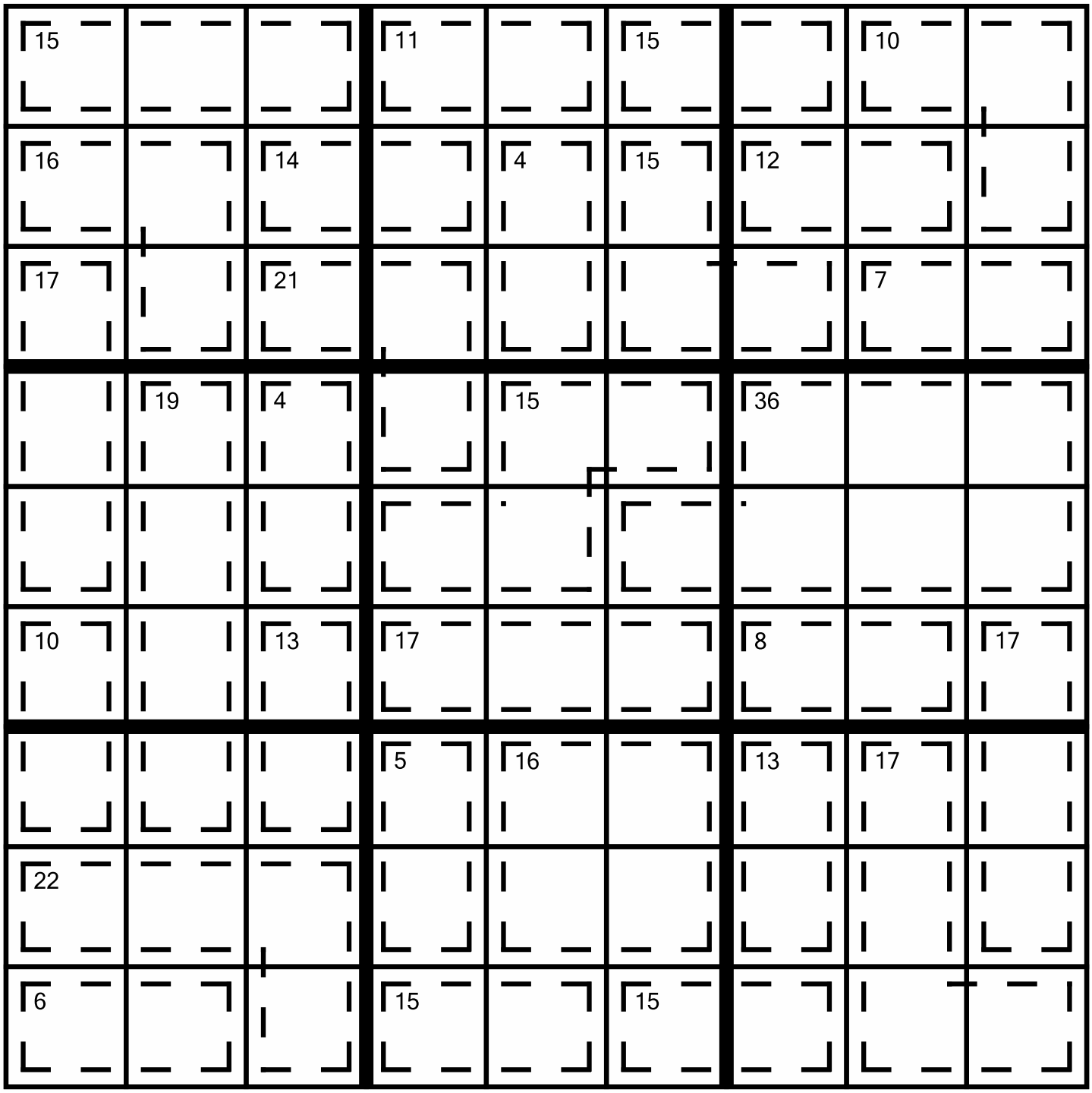
Level 4



Start Time	End Time	Total Solve Time

Killer Sudoku #5

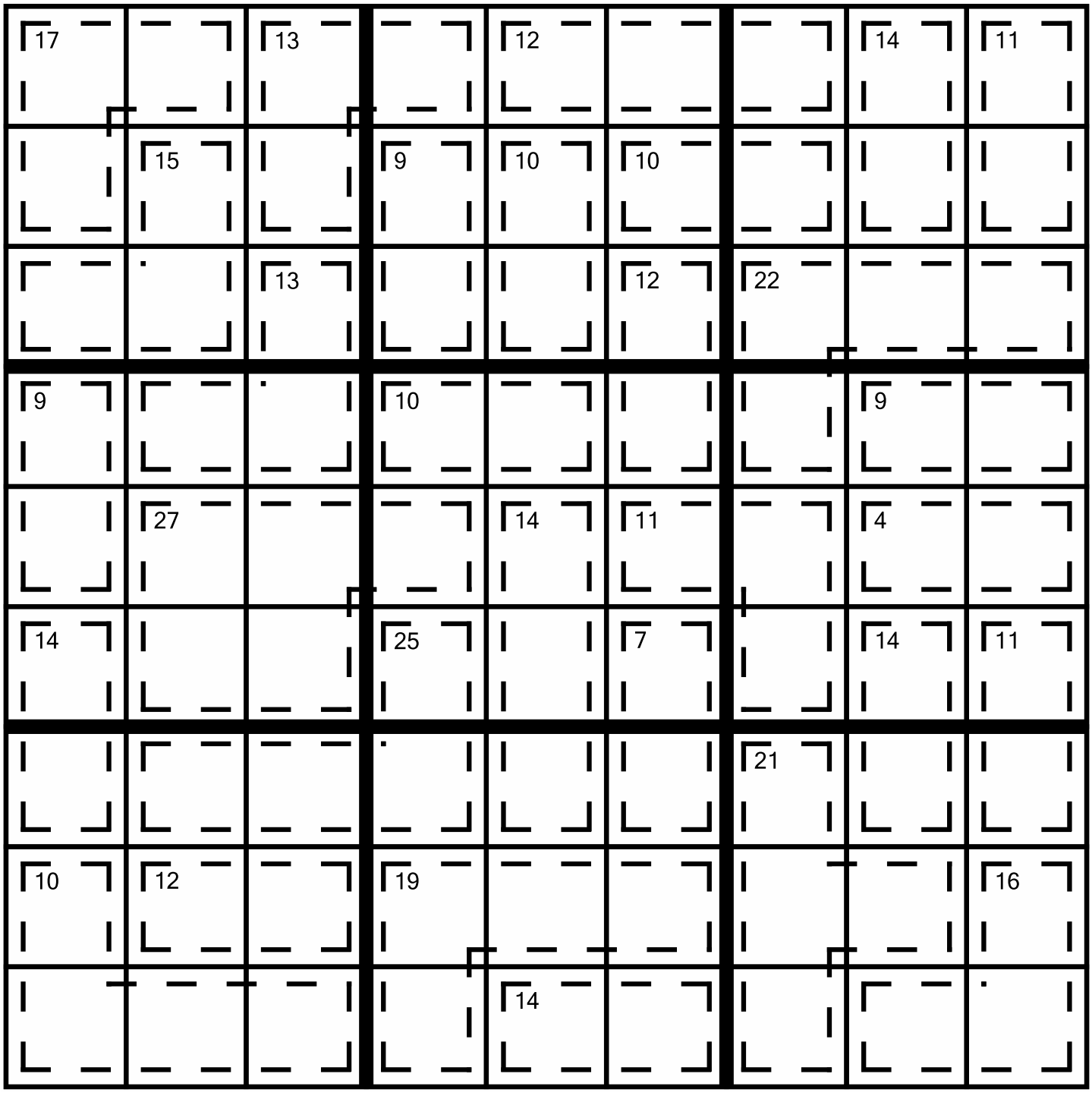
Level 5



Start Time	End Time	Total Solve Time

Killer Sudoku #6

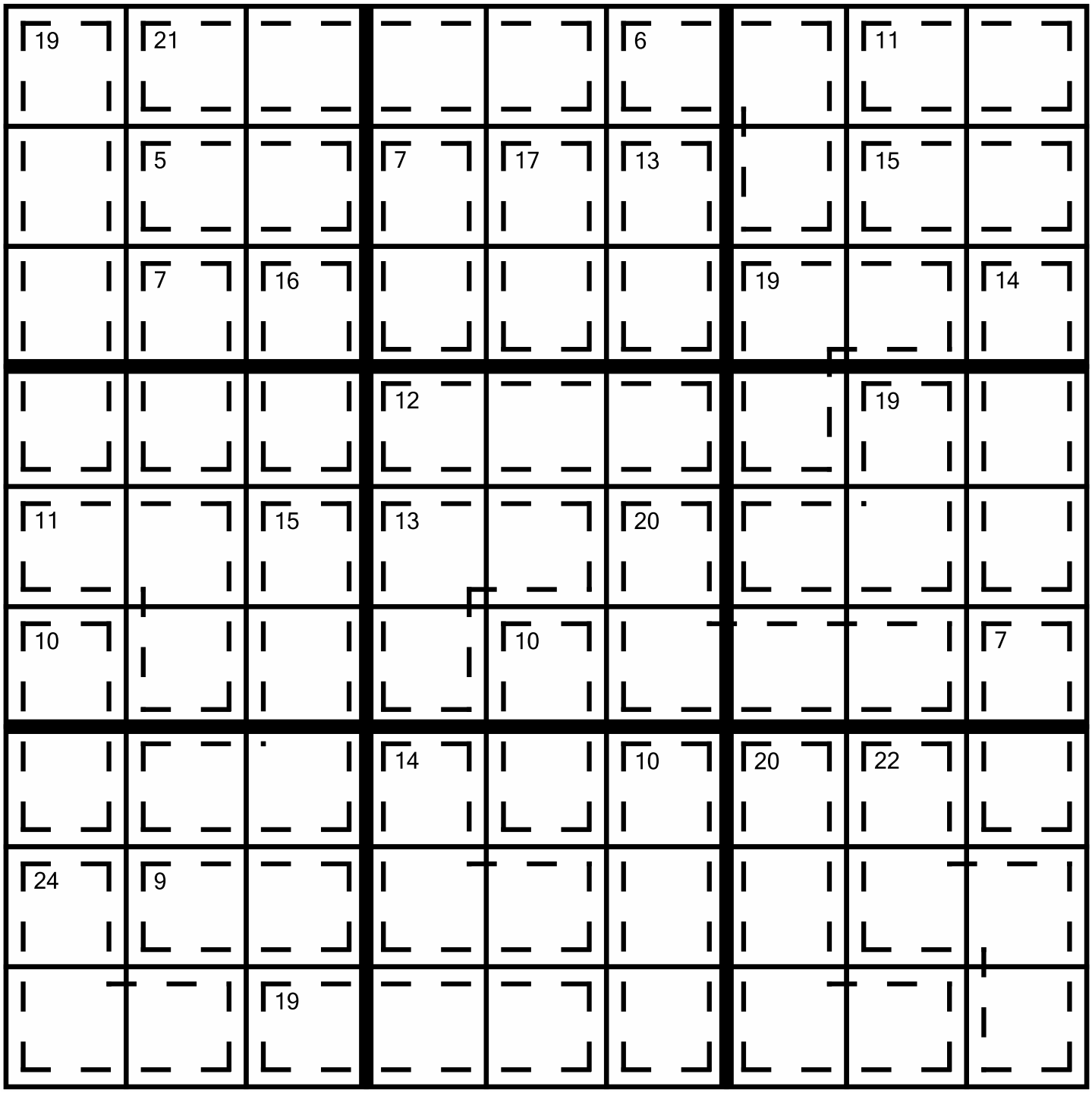
Level 6



Start Time	End Time	Total Solve Time

Killer Sudoku #7

Level 7



Start Time	End Time	Total Solve Time

Solutions

#1

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

#2

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

#3

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

#4

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

#5

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

#6

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

#7

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