

The hardest sudokus (new thread)

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Re: The hardest sudokus (new thread)

by marek stefanik » Sat Jul 17, 2021 12:13 am

It definitely can be useful, even though probably not when looking for very hard puzzles.

This puzzle, for example, simplifies to singles:
....3.127132..8.421.3.9.21....3.37.421.4..8132...34.21...1.4..62329.37..41
YZF_Sudoku rates it 8.2.

The hardest puzzle I was able to get (with a setting algorithm you can probably get a better one):
....3.127132..8.421.63.9.21....3.3...421.4.5.132...34.21...1.4..62329.3...41
YZF_Sudoku rates it 9.0.
With the trick it only requires a Skyscraper to finish.

SE might rate them differently.

QUOTE

marek stefanik

Posts: 269
Joined: 05 May 2021

Re: The hardest sudokus (new thread)

by dxSudoku » Sat Jul 17, 2021 1:49 am

For this one:
1 2 . | 4 . . | 3 . .
3 . . | . 1 . | . 5 .
..6 | . . | 1 . .

7 . . | 9 . | . . .
..4 | 6 . 3 | . . .
..3 | . 2 | . . .

5 . . | 8 . | 7 . .
..7 | . . | . . 5
... | . . | . 9 8

I made it harder by setting R6C9 to have a value of 1:

Rating Program: gsf's sudoku q1
Rating: 99529
Poster: eleven
Label: HardestSudokusThread-02085;Discrepancy
1 2 . | 4 . . | 3 . .
3 . . | . 1 . | . 5 .
..6 | . . | 1 . .

7 . . | 9 . | . . .
..4 | 6 . 3 | . . 1
..3 | . 2 | . . .

5 . . | 8 . | 7 . .
..7 | . . | . . 5
... | . . | . 9 8

At least it made it harder on the solver I use.

Here's the hardest puzzle I've ever seen:

```
..9|...|2..  
..8.|5...|1..  
7..|...|..6  
-----  
..6|.9|...  
..5|.8...|3..  
4..|..7|...  
-----  
...|.4|..9  
..3.|.1|.8.  
...|2...|5..
```

QUOTE

dxSudoku

Posts: 43
Joined: 06 April 2020

Re: The hardest sudokus (new thread)

by m_b_metcalf » Sat Jul 17, 2021 8:28 am

dxSudoku wrote:
Here's the hardest puzzle I've ever seen:

For the curious:

CODE: SELECT ALL
..9...2...8.5...1.7.....6...6.9.....5.8...3.4...7.....4...9.3...1..8...2...5... ED=10.7/10.7/3.4

Hard, but not that hard by the standards of this thread, with its recent posts of 11.8.

Regards,

Mike

QUOTE



m_b_metcalf
2017 Supporter
Posts: 1327
Joined: 15 May 2006
Location: Berlin

Re: The hardest sudokus (new thread)

by dxSudoku » Sat Jul 17, 2021 4:05 pm

m_b_metcalf wrote:
dxSudoku wrote:
Here's the hardest puzzle I've ever seen:

For the curious:

CODE: SELECT ALL
..9...2...8.5...1.7.....6...6.9.....5.8...3.4...7.....4...9.3...1..8...2...5... ED=10.7/10.7/3.4

Hard, but not that hard by the standards of this thread, with its recent posts of 11.8.

Regards,

Mike

I'm not using the same software as you. I'm using Hodoku which is probably not as high-tech as what you guys are using. But in Hodoku, the 11.8 ones clocked in at a difficulty level of about 35,000. The one I posted has a difficulty level of 39806. I guess it depends on how you weight difficulty levels for the required puzzle-solving techniques as to how a constellation of givens is scored.

Re: The hardest sudokus (new thread)

by marek stefanik » Sat Jul 17, 2021 4:43 pm

Hodoku takes the point value of each step and sums them up, whereas SE uses Nested Dynamic Chains (for the most part) and gives the rating of the hardest step (depending on the total length of the chains used).

Since Hodoku needs brute force to solve these puzzles, giving the same value every time, it will rate a puzzle higher when it gets in a few nets before having to use the brute force.

QUOTE

marek stefanik

Posts: 269
Joined: 05 May 2021

Re: The hardest sudokus (new thread)

by denis_berthier » Mon Jul 19, 2021 6:29 am

denis_berthier wrote:
marek stefanik wrote:
what kind of magic would one have to use to prove this contradiction

CODE: SELECT ALL
123 . . | . 123 123
..123 | . 123 .

..123 | 123 .
123 . . | . 123 .

As it seems related to "braids analysis", I've asked an expert of it; waiting his answer.

He came up with a proof, but not simpler than those already provided.

Re: The hardest sudokus (new thread)

by denis_berthier » Mon Jul 19, 2021 6:35 am

marek stefanik wrote:
Hodoku takes the point value of each step and sums them up, whereas SE uses Nested Dynamic Chains (for the most part) and gives the rating of the hardest step (depending on the total length of the chains used).

Summing up the steps is probably the dumbest way of computing the rating of a full resolution path.
The complexity of a step of length n increases as $\exp(n)$. The only kind of sum that could make sense is $\sum(\exp(\text{length}(\text{step})))$, for some k to be determined.

Re: The hardest sudokus (new thread)

by mith » Sun Jul 25, 2021 12:48 pm

CODE: SELECT ALL
32c:
.....1.....2.3...4.15.....346...47...8.1.6.31.78...78...1.63...8...744.67.138... ED=11.3/1.2/1.2
.....1.....2.3...4.15.....346...7...8.13.631.784...3...8...74.467.3.8.7.8...1.6 ED=11.3/1.2/1.2
.....1.....2.3...4.15.....346...47...8.136.31.78...78...1.63...8...744.67.1.8... ED=11.3/1.2/1.2
.....1.....2.3...4.15.....346...7...8.1...631.784...3...8...74.467.138.7.8...1.6 ED=11.3/1.2/1.2

Re: The hardest sudokus (new thread)

by mith » Sat Jul 31, 2021 1:08 am

First 30c minimal in the +DFC range. Bumped up the 33c high as well.

CODE: SELECT ALL
38c:
.....12...3...4.....1.25.....6...71.7...8.3.81.3762...386...71.2...3.76.3...8... ED=11.6/1.2/1.2
33c:
.....12.....13...4.....5.3...647...6837...14.71.8...43.16...68.74.1.37...8.3.6... ED=11.2/1.2/1.2

QUOTE

mith

Posts: 862
Joined: 14 July 2020

Re: The hardest sudokus (new thread)

by mith » Thu Aug 05, 2021 1:06 am

CODE: SELECT ALL
31c
.....1...2.....3...45...14.3.67.6...78...37...16.4...731.8.4.14.87...83.6...7... ED=11.5/1.2/1.2 (DFC+DFC)
.....1...2.....3...45...14.3.67.6...87...37...16.4...731.8.4.14.78...83.6...7... ED=11.5/1.2/1.2 (DFC+DFC)

QUOTE

mith

Posts: 862
Joined: 14 July 2020

Re: The hardest sudokus (new thread)

by mith » Fri Aug 13, 2021 3:54 pm

CODE: SELECT ALL
27c
.....1.....23.....4...5.....56...1...7.86.8.5...4.675...48.4.1...7.58.7...1.6 ED=11.7/1.2/1.2
.....1.....23.....4...5.....56...1...7.86.8.5...14.675...48.4.1...7.58.7...6 ED=11.7/1.2/1.2

(Quite a few 11.6 as well in the 26c-29c range since last update, will post a full list at some point.)

Re: The hardest sudokus (new thread)

by mith » Fri Aug 13, 2021 11:37 pm

dxSudoku wrote:
m_b_metcalf wrote:
dxSudoku wrote:
Here's the hardest puzzle I've ever seen:

For the curious:

CODE: SELECT ALL
..9...2...8.5...1.7.....6...6.9.....5.8...3.4...7.....4...9.3...1..8...2...5... ED=10.7/10.7/3.4

Hard, but not that hard by the standards of this thread, with its recent posts of 11.8.

Regards,

Mike

I'm not using the same software as you. I'm using Hodoku which is probably not as high-tech as what you guys are using. But in Hodoku, the 11.8 ones clocked in at a difficulty level of about 35,000. The one I posted has a difficulty level of 39806. I guess it depends on how you weight difficulty levels for the required puzzle-solving techniques as to how a constellation of givens is scored.

I skipped over this earlier, but it caught my eye today. The puzzle is actually a morph of a puzzle from Ocean, and nowhere near the highest Hodoku rating anyway.

“
..3.....593....3..721..6.....87..79.5...95.23.3.52.7..4..... (Hodoku 64028)
..5..3.1.1.....7..8.173...1.84.3..2...9...3...6....8...4.78.3.....4... (Hodoku 13958, morph of same puzzle)

Hodoku's rating for anything requiring brute force is basically useless; it depends a great deal on how many brute force steps it need, which varies wildly with morphs (5 vs. 1 in the examples). I'm really surprised to see you claiming this is the hardest puzzle you've seen, since I posted all this on reddit several months ago...

Re: The hardest sudokus (new thread)

by heetbeet » Mon Aug 16, 2021 9:46 am

Hi, I have a publication that is undergoing revision. For the publication I compare two techniques for solving constraint satisfaction problems (such as Sudoku). I made extensive use of Champagne's ph_1910.zip database for evaluation and comparing between the two techniques, and have referenced the database as:

CODE: SELECT ALL
@misc{champagne,
title={The hardest sudokus},
author={Champagne},
howpublished = {\url{http://forum.enjoysudoku.com/the-hardest-sudokus-new-thread-t6539.html}} and \url{http://drive.google.com/drive/u/8/folders/6B51H6NGXwzXTDFRMnVTbGN1ZU0}},
note = {Accessed: 2019-09-30},
year={2019}
}

[25] Champagne. The hardest sudokus. <http://forum.enjoysudoku.com/the-hardest-sudokus-new-thread-t6539.html> and <http://drive.google.com/drive/u/8/folders/6B51H6NGXwzXTDFRMnVTbGN1ZU0>, 2019. Accessed: 2019-09-30.

The revision requires an improvement to the quality of the publication's references, namely "Google Drive links, and [...] hyperlinks in the references".

Does anyone (including Champagne) know how I can better reference this dataset? Are there any publications that uses/references this dataset, so I can at least cross reference the URL+GDrive with that publication?

Alternatively, how can I explain the need to use this database? My thinking is that this is the most difficult Sudoku database out there, and it would be silly to use something else. But how can I formally (or at least somewhat formally) state this, or state something close to this?

QUOTE

heetbeet

Posts: 2
Joined: 16 August 2021

Re: The hardest sudokus (new thread)

by denis_berthier » Wed Aug 18, 2021 5:04 am

Hi Heetbeet,

heetbeet wrote:
Hi, I have a publication that is undergoing revision. For the publication I compare two techniques for solving constraint satisfaction problems (such as Sudoku).

Could you say a word about the two techniques, the main results and why you compare them only for the hardest instances?

heetbeet wrote:
I made extensive use of Champagne's ph_1910.zip database for evaluation and comparing between the two techniques, and have referenced the database as:

CODE: SELECT ALL
@misc{champagne,
title={The hardest sudokus},
author={Champagne},
howpublished = {\url{http://forum.enjoysudoku.com/the-hardest-sudokus-new-thread-t6539.html}} and \url{http://drive.google.com/drive/u/8/folders/6B51H6NGXwzXTDFRMnVTbGN1ZU0}},
note = {Accessed: 2019-09-30},
year={2019}
}

The revision requires an improvement to the quality of the publication's references, namely "Google Drive links, and [...] hyperlinks in the references".

Does anyone (including Champagne) know how I can better reference this dataset? Are there any publications that uses/references this dataset, so I can at least cross reference the URL+GDrive with that publication?

First, I would delete the "Accessed" part.
Second, what they require about "quality" doesn't mean how the links are written. An URL is an URL and can only be written as an URL (in their selected format). The real problem is, scientific journals hate references to personal pages, Wikipedia, forums and other asocial networks. In the present case, you need to explain why you need to do it nevertheless (if you do need it; isn't the reference to the database itself enough?)

heetbeet wrote:
Alternatively, how can I explain the need to use this database? My thinking is that this is the most difficult Sudoku database out there, and it would be silly to use something else. But how can I formally (or at least somewhat formally) state this, or state something close to this?

You're right and that's the easy part, e.g.: In the world of Sudoku, a small community has developed a large database of the hardest known 9x9 puzzles, according to the informal but widely accepted criterion of the Sudoku Explainer rating. The results of this unique collaborative research work, spanning more than a decade, are available on (and only on) <http://drive.google.com/drive/u/0/folder...nVTbGN1ZU0> [put this in the required format].

But what you must also explain is why you need to consider the hardest instances in your comparisons, instead of an unbiased sample. Also be aware that this is a very biased database, even among the hardest puzzles, due to the way it was elaborated (largely by z2 neighbourhood search).

If you need to justify using the SER as the measure of "hardness", you can refer to its very good correlation with pure logic ratings, such as B (or BpB for the hardest instances).

QUOTE

denis_berthier

Posts: 3334
Joined: 19 June 2007
Location: Paris

Re: The hardest sudokus (new thread)

by mith » Wed Aug 18, 2021 11:18 pm

CODE: SELECT ALL
28c:
.....12.....3...4...5.....6.....47.....3.86.....8.73.5...6.847...6...5.34.....67...584... ED=11.7/1.2/1.2

QUOTE

mith

Posts: 862
Joined: 14 July 2020

