The hardest sudokus (new thread)

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Re: The hardest sudokus (new thread)
□ by **mith** » Fri Apr 08, 2022 3:13 pm

QUOTE

Me too; at some point I'll run SE minus uniqueness on the lowest rated puzzles until I find one that is still low. [edit]Doing that now, for all grids <=10.3. The low with uniqueness is now down to 9.0, with both rating 11.7 without uniqueness.[/edit]

(And yes, I can add some sort of temporary index; may be a bit before I post an update, it's still generating at a pretty good pace right now, up to 3415 expanded forms.)

mith
Posts: 862
Joined: 14 July 2020

Re: The hardest sudokus (new thread)
□ by **mith** » Fri Apr 08, 2022 3:36 pm

QUOTE

Not too surprising, but none of the <=10.3 with uniqueness grids rated below 11.6 without.

mith
Posts: 862
Joined: 14 July 2020

Re: The hardest sudokus (new thread)
□ by **denis_berthier** » Fri Apr 08, 2022 3:40 pm

QUOTE

> **mith wrote:**
> Me too; at some point I'll run SE minus uniqueness on the lowest rated puzzles until I find one that is still low. [edit]Doing that now, for all grids <=10.3. The low with uniqueness is now down to 9.0, with both rating 11.7 without uniqueness.[/edit]

BTW, how do you run SER without uniqueness?
The command I use for standard SER is:
java -cp SudokuExplainer.jar diuf.sudoku.test.serate --format=%r ....8...5..4..52...9...2..1.8....5.7.3..6.81.7.1..8.9.6..4...5...28..4......3....
and similarly for files of puzzles:
java -cp SudokuExplainer.jar diuf.sudoku.test.serate --format=%r --input=input.txt --output=output.txt

Is there any option for disabling rules or are you running a different version of SE?

> **mith wrote:**
> it's still generating at a pretty good pace right now, up to 3415 expanded forms.)

I'll tax you for giving me too much analysis work 🙂

denis_berthier
2010 Supporter
Posts: 3334
Joined: 19 June 2007
Location: Paris

Re: The hardest sudokus (new thread)
□ by **denis_berthier** » Fri Apr 08, 2022 3:44 pm

QUOTE

> **mith wrote:**
> Not too surprising, but none of the <=10.3 with uniqueness grids rated below 11.6 without.

That's also what I was expecting and probably true above 10.3 too.
It also means that in the previous database, there may be hidden jewels with SER 11.9 without uniqueness.

denis_berthier
2010 Supporter
Posts: 3334
Joined: 19 June 2007
Location: Paris

Re: The hardest sudokus (new thread)
□ by **mith** » Fri Apr 08, 2022 4:02 pm

QUOTE

I'm using: https://github.com/SudokuMonster/SukakuExplainer (1.17.8 I believe, which is not the latest)

```
CODE: SELECT ALL
--techs=11110000110101110110110110000101000010111111 (1.2.1 mode)
--techs=11110000110101110110100101100000100010111111 (without uniqueness)
```

I don't know if the original has this parameter, but at least in this fork you can get a list of techniques with "--techs=" (it will tell you there is an error because you didn't give characters, and then a list of the techniques by index).

mith
Posts: 862
Joined: 14 July 2020

□ by **1to9only** » Fri Apr 08, 2022 5:07 pm

QUOTE

See this post: http://forum.enjoysudoku.com/pgexplainer-a-minimal-sudokuexplainer-in-56-712-bytes-t39049-15.html#p310358
PGExplainer with the -M option will do the same, and much faster!!
-M was implemented for sudokus with multiple solutions, with uniqueness (UR/UL and BUG) techniques disabled.

java.exe -jar PGExplainer.jar --input=92.45.26.txt --output=output.txt
........1.....234.....56.7.....8......6.928..6821..9..59..1..86.29.8..581.5..... ED=9.2/4.5/2.6

java.exe -jar PGExplainer.jar -M --input=92.45.26.txt --output=output.txt
........1.....234.....56.7.....8......6.928..6821..9..59..1..86.29.8..581.5..... ED=11.6/8.4/2.6

1to9only
Posts: 4075
Joined: 04 April 2018

Re: The hardest sudokus (new thread)
□ by **mith** » Fri Apr 08, 2022 6:09 pm

QUOTE

Now have some 37c expanded forms not in T&E(2); here was the first found:

```
CODE: SELECT ALL
.......12..3.1456.16..524.3...2.513.3.1.78...6..391....3.....5141.5..62.5..1..3.4  ED=11.7/11.7/3.4
```

[edit]Make that 38c.

```
CODE: SELECT ALL
.......12.13.245.6.5261.34.....3.6.11....6.353...5142..7816....23....16.691.4....  ED=11.7/11.7/3.4
```

I just started the "adder" script (the fourth script mentioned on the previous page), maybe it will go even higher.

mith
Posts: 862
Joined: 14 July 2020

Re: The hardest sudokus (new thread)
□ by **mith** » Fri Apr 08, 2022 8:43 pm

QUOTE

Down to 6.7 for lowest SE-with-uniqueness for a depth 3 puzzle:

```
CODE: SELECT ALL
........1...23.45..51.4.6....2.54.626.34....54..16.23.51...632672.31...8....2...  ED=6.7/4.5/2.6
```

11.6 without

mith
Posts: 862
Joined: 14 July 2020

Re: The hardest sudokus (new thread)
□ by **mith** » Fri Apr 08, 2022 10:02 pm

QUOTE

The pace really picked up with the fourth script; over 11k expanded puzzles now, with over 45k minimals.

The first script has a lot of catching up to do, it has only made it through about 1600 of those minimals. Really need to split it.

mith
Posts: 862
Joined: 14 July 2020

Re: The hardest sudokus (new thread)
□ by **mith** » Sat Apr 09, 2022 2:35 am

QUOTE

Alright, reached the lower limit for this:

```
CODE: SELECT ALL
.......1..1..2.34.34.156.....2.6....7.....4..89....5....5.32..3..16.4.55...24..3  ED=4.5/2.0/2.0
```

11.7 without uniqueness.

mith
Posts: 862
Joined: 14 July 2020

Re: The hardest sudokus (new thread)
□ by **mith** » Sat Apr 09, 2022 2:44 am

QUOTE

And I'm now over 23k expanded forms and 100k minimals. This is growing incredibly fast.

mith
Posts: 862
Joined: 14 July 2020

Re: The hardest sudokus (new thread)
□ by **denis_berthier** » Sat Apr 09, 2022 5:21 am

QUOTE

.
Hi **with + 1-to-9-only**
Thanks for the information. I think it will not be long before I use it.

1-to-9-only, does PGP-Explainer always produce the same result as standard SE?

denis_berthier
2010 Supporter
Posts: 3334
Joined: 19 June 2007
Location: Paris

Re: The hardest sudokus (new thread)
□ by **denis_berthier** » Sat Apr 09, 2022 5:41 am

QUOTE

> **mith wrote:**
> And I'm now over 23k expanded forms and 100k minimals. This is growing incredibly fast.

Great how fast [the auto-correct wrote fat] that grows.

This also implies that we would now really need a way of extracting the subset of "minimals" from the whole database of these expanded forms. Maybe in the short term, just a 3rd .xls table (keeping the same IDs and all the same information).

Perhaps we should also choose a name for this kind of "minimals":
- "expanded minimals" would be ambiguous (that's more accurate for what you have now in the "expanded" database
- what do you think of something like min-expands (shortcut for "minimal expanded forms")?

IMO, **in the future, these min-expands (or whatever name we give them) will play the same role as the minimals (in the usual sense) now do.**
Expanded forms correspond to a broader view of equivalence (expanded equivalence ?) and play the same role in avoiding redundancy.
Introducing their minimals "officially" by naming them is also recognising the role of the new form of proximity search allowed by considering the expanded forms.

denis_berthier
2010 Supporter
Posts: 3334
Joined: 19 June 2007
Location: Paris

Re: The hardest sudokus (new thread)
□ by **denis_berthier** » Sat Apr 09, 2022 6:34 am

QUOTE

.
One more point about the 2 (or 3) databases:
Now that you have puzzles in T&E(2), it'd be useful to have one more column for T&E-depth.

A few remarks about the min-expands database:
- first, contrary to the other databases, puzzles can get out of it if a new "smaller" one appears; but that's not a problem as they remain in the other databases; minimality in this database is only AFAWK;
- the min-expands are obviously the first choices for finding harder puzzles; I wonder if you already use this in your search or if you're currently more focused on systematic vicinity search for all the hard puzzles;

And a few open questions about it:
- question: can one find **"absolute" min-expands**, i.e. min-expands that can contain no smaller min-expand; do they always have to be minimal puzzles (with no other expansion than themselves); perhaps add a y/n/? column for mentioning who is an absolute min-expand (the ? for puzzles that haven't been explored); but I don't know if such search is practicable: calculations may involve complex recursive search;
- question: is there an absolute min-expand in T&E(2) with the tridagon pattern?

denis_berthier
2010 Supporter
Posts: 3334
Joined: 19 June 2007
Location: Paris

Re: The hardest sudokus (new thread)
□ by **1to9only** » Sat Apr 09, 2022 7:46 am

QUOTE

> **denis_berthier wrote:**
> **1-to-9-only**, does PGP-Explainer always produce the same result as standard SE?

Yes. PGExplainer should produce the same rating as the original (304,777 bytes) SE.
It also has the same misrating bug as SE, as has been noted before in the Patterns Game threads.

PGExplainer was created to rate puzzles submitted to the Patterns Game where g.r.emlin still uses original SE!
It rates very hard puzzles about 3-4 times faster.

1to9only
Posts: 4075
Joined: 04 April 2018

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