The hardest sudokus (new thread)

Re: The hardest sudokus (new thread)

by **ronk** » Sat Dec 04, 2010 11:07 am

> **champagne wrote:**
>
> > **ronk wrote:**
> >
> > > **champagne wrote:**
> > >
> > > solved using only 2 cells AAHS (print 256K)
> >
> > I've read about this "2 cell AAHS" umpteen times recently ... and it makes no sense to me. An AALS may be said to have a certain number of cells, but an AAHS has a certain number of digits.
>
> AALS n cells n+2 digits
> AAHS/AC2 n cells n-2 known digits
>
> in fact, 2 cells with no known digit is both an AAHS and an AALS.

Don't recall anyone else mentioning "known" digit in the context of an AAHS. What is it?

Without its apparent modifying influence ... at least to you ... a 2-cell AAHS would have 2-2=0 (the "n-2") digits. That's zero, nada, zilch.

ronk
2012 Supporter
Posts: 4764
Joined: 02 November 2005
Location: Southeastern USA

Re: The hardest sudokus (new thread)

by **champagne** » Sat Dec 04, 2010 12:34 pm

> **ronk wrote:**
>
> Don't recall anyone else mentioning "known" digit in the context of an AAHS. What is it?
>
> Without its apparent modifying influence ... at least to you ... a 2-cell AAHS would have 2-2=0 (the "n-2") digits. That's zero, nada, zilch.

better to stop these endless discussions on vocabulary.

I will not any more use the AAHS word and stick to AC2 which is clearly defined in my tagging procedure. I just omitted to say here that we have only 4 free digits in it.

But for sure

an AC with 0 known digit is a cell
an AC2 with 0 known digit has 2 cells

champagne

champagne
2007 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by **Mauricio** » Sun Dec 05, 2010 5:36 pm

A bit off-topic.

An example of a puzzle made harder by adding a clue (though only champagne's software will notice it, AFAIK)

CODE: SELECT ALL

```
.....1..2..3....4..5..6.7....8...7..7..38..9...5...1..6.8.2...4.6....72....9.6.
```

Add 1 clue, and it gets harder, you can not use symmetry anymore.

CODE: SELECT ALL

```
.....1..2..3....4..5..6.7....8...7..7..38..9...5...1..6.8.2...4.6....72....9.6. ED=10.8/10.8/10.6
.....1..2..3....4..5..6.7.3..8...7..7..38..9...5...1..6.8.2...4.6....72....9.6. ED=10.8/10.8/10.5
```

Mauricio
Posts: 1179
Joined: 22 March 2006

Re: The hardest sudokus (new thread)

by **champagne** » Sun Dec 05, 2010 7:11 pm

> **Mauricio wrote:**
> A bit off-topic.
>
> An example of a puzzle made harder by adding a clue (though only champagne's software will notice it, AFAIK)
>
> CODE: SELECT ALL
>
> ```
> .....1..2..3....4..5..6.7....8...7..7..38..9...5...1..6.8.2...4.6....72....9.6.
> ```
>
> Add 1 clue, and it gets harder, you can not use symmetry anymore.
>
> CODE: SELECT ALL
>
> ```
> .....1..2..3....4..5..6.7....8...7..7..38..9...5...1..6.8.2...4.6....72....9.6. ED=10.8/10.8/10.6
> .....1..2..3....4..5..6.7.3..8...7..7..38..9...5...1..6.8.2...4.6....72....9.6. ED=10.8/10.8/10.5
> ```

Amazing. Unless I misred, it is the same puzzle, which mean puzzles 2 and 3 are not minimal.

Using uniqueness, the first is solved with a naked pair (I wonder whether it's not a puzzle you already posted)

whithout uniqueness, my solver

fails for the first puzzle
finds the second puzzle extremely hard
solves "relatively easily" the third one.

Also "off topic" due to the fact that the puzzle is ot minimal, we see again one of the "hardest puzzles" with a relatively low SE rating (but the first one is not "rated" by my solver)

champagne

champagne
2007 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by **eleven** » Mon Dec 06, 2010 9:42 am

Nice catch, Mauricio.
I only read about this trick with unique rectangles, but of course symmetry can be used either.

btw i dont see any reason, why a "hardest" puzzle should be minimal (this is not the patterns game).

Champagne, did i understand that right, that this second puzzle is harder for your solver than all the known 11+ puzzles except maybe 3 or 4 of them ?
Then i wonder, if Explainer's 10.8 solution is not "easier" than the solutions, your solver prefers.

I also have a problem with strange q2 ratings. One example:
This puzzle with ER 10.4 has q2 rating 94, thats less many ER 2.6 puzzles !

CODE: SELECT ALL

```
1....67.....8..3....27...5..5....8..1..79.....3..2.73.........27..6..91...4..
```

I know about the systematic guessing, it uses, and it makes some sense for hard puzzles, but there should be a remarkable rating difference to puzzles, which dont even need basics to solve.

eleven
Posts: 2820
Joined: 18 February 2008

Re: The hardest sudokus (new thread)

by **champagne** » Mon Dec 06, 2010 10:51 am

> **eleven wrote:**
> Nice catch, Mauricio.
> I only read about this trick with unique rectangles, but of course symmetry can be used either.
>
> btw i dont see any reason, why a "hardest" puzzle should be minimal (this is not the patterns game).
>
> Champagne, did i understand that right, that this second puzzle is harder for your solver than all the known 11+ puzzles except maybe 3 or 4 of them ?
> Then i wonder, if Explainer's 10.8 solution is not "easier" than the solutions, your solver prefers.
>
> I also have a problem with strange q2 ratings. One example:
> This puzzle with ER 10.4 has q2 rating 94, thats less many ER 2.6 puzzles !
>
> CODE: SELECT ALL
>
> ```
> 1....67.....8..3....27...5..5....8..1..79.....3..2.73.........27..6..91...4..
> ```
>
> I know about the systematic guessing, it uses, and it makes some sense for hard puzzles, but there should be a remarkable rating difference to puzzles, which dont even need basics to solve.

May be I could rate differently the second and the last puzzle using the following process

1) first makes the puzzle minimal
2) then apply the symmetry of given 😁😁

Nothing to object to such a process
and then you can for sure apply the symmetry of given.

Regarding the difficulty, you are right for the 2 first puzzles if you don't apply symmetry.
The second one has nothing special (I have nothing to comment about the first one which is not solved).
The third one has several "nearly EXOCETS" leading to a much easier solution.

Comparing with SE rating that just gives a rating for the "hardest move" is somehow useless.
It could however be that SE has some tools I should introduce in my solver. From what I have seen up to now, it is likely working equally with hidden sets and naked sets. My solver does not really work on hidden sets.

Last but not least, at these high levels of rating, I am not at all convinced that SE finds the overall shortest nested chains in every situation.
(but I shoul not say that before I have a better view on that part of the program).

champagne

champagne
2007 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by **eleven** » Mon Dec 06, 2010 11:50 am

> **champagne wrote:**
> May be I could rate differently the second and the last puzzle using the following process
>
> 1) first makes the puzzle minimal
> 2) then apply the symmetry of given 😁😁
>
> Nothing to object to such a process
> and then you can for sure apply the symmetry of given.

Yes, but Mauricio chose the additional given in a way, that makes it hard to to show symmetry. Or it is easy for you to show r7c2=9 in the second puzzle ?

> ""

The second one has nothing special (I have nothing to comment about the first one which is not solved).

ER rates the symmetrical one 11.4, which is below tarek's hurdle for the list.

eleven
Posts: 2820
Joined: 18 February 2008

Re: The hardest sudokus (new thread)

by **ronk** » Mon Dec 06, 2010 12:03 pm

> **eleven wrote:**
> Mauricio chose the additional given in a way, that makes it hard to to show symmetry. Or it is easy for you to show r7c2=9 in the second puzzle ?

From the viewpoint of a manual solver, I agree. For a programmed solver, however, it's not difficult to generate minimals and test for Gurth symmetry in each minimal.

Funny thing is, no one ever seems to mention first making a "scrambled puzzle" symmetric.

ronk
2012 Supporter
Posts: 4764
Joined: 02 November 2005
Location: Southeastern USA

Re: The hardest sudokus (new thread)

by **eleven** » Mon Dec 06, 2010 12:49 pm

> **ronk wrote:**
> From the viewpoint of a manual solver, I agree. For a programmed solver, however, it's not difficult to generate minimals and test for Gurth symmetry in each minimal.
>
> Funny thing is, no one ever seems to mention first making a "scrambled puzzle" symmetric.

A programmed solver solves it in some ms, so no need to generate minimals.
Testing clues for being redundant will probably be as hard as solving it without symmetry in many cases. So it does not make much sense for me.

eleven
Posts: 2820
Joined: 18 February 2008

Re: The hardest sudokus (new thread)

by **tarek** » Mon Dec 06, 2010 12:58 pm

> **eleven wrote:**
> ER rates the symmetrical one 11.4, which is below tarek's hurdle for the list.

Thresholds have always been open to discussion and change .... From my personal experience & collection ,the list will be flooded with puzzles if the thresholds go any lower.

On a different tangent ... Has anybody looked into removing clues from MINIMAL puzzles to make them easier (More symmetrical, to unblock some easily visible information, ...) then returning the removed clue(s) to advance the puzzle ?

tarek

tarek
Posts: 3758
Joined: 06 January 2006

Re: The hardest sudokus (new thread)

by **champagne** » Mon Dec 06, 2010 1:15 pm

> **ronk wrote:**
>
> > **eleven wrote:**
> > Mauricio chose the additional given in a way, that makes it hard to to show symmetry. Or it is easy for you to show r7c2=9 in the second puzzle ?
>
> From the viewpoint of a manual solver, I agree. For a programmed solver, however, it's not difficult to generate minimals and test for Gurth symmetry in each minimal.
>
> Funny thing is, no one ever seems to mention first making a "scrambled puzzle" symmetric.

here the game is somehow tricky, so, for a manual player why not to do so:

1) you smell a possible symmetry of given.
2) try without the given in excess
. either you solve it now and find the given in the solution, the puzzle was not minimal
. or you fail and then you look for something else.

regarding scrambled puzzles, my solver detects the symmetry,(diagonal, r90, central and stick)

champagne

champagne
2007 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by **eleven** » Mon Dec 06, 2010 1:31 pm

> **champagne wrote:**
> here the game is somehow tricky, so, for a manual player why not to do so:
>
> 1) you smell a possible symmetry of given.
> 2) try without the given in excess

Nothing against "try without the given". But "in excess" - no. For the little chance, that you can show symmetry, which might be there or not, i would not invest much effort trying to solve (partially) a puzzle, which is already hard **with** this given and probably has multi solutions now.

eleven
Posts: 2820
Joined: 18 February 2008

Re: The hardest sudokus (new thread)

by **ronk** » Mon Dec 06, 2010 1:42 pm

> **eleven wrote:**
> A programmed solver solves it in some ms, so no need to generate minimals.
> Testing clues for being redundant will probably be as hard as solving it without symmetry in many cases. So it does not make much sense for me.

Sorry, rather than difficulty rating, I'm thinking of other puzzle properties, a subject for a different thread I guess.

ronk
2012 Supporter
Posts: 4764
Joined: 02 November 2005
Location: Southeastern USA

Re: The hardest sudokus (new thread)

by **champagne** » Mon Dec 06, 2010 1:52 pm

> **eleven wrote:**
>
> > **champagne wrote:**
> > here the game is somehow tricky, so, for a manual player why not to do so:
> >
> > 1) you smell a possible symmetry of given.
> > 2) try without the given in excess
>
> Nothing against "try without the given". But "in excess" - no. For the little chance, that you can show symmetry, which might be there or not, i would not invest much effort trying to solve (partially) a puzzle, which is already hard **with** this given and probably has multi solutions now.

1) the symmetry of given is easy to detect
2) without the given in excess, the puzzle has only one solution, it is "puzzle 1."

this is the easiest thing to do at that time. (unless the puzzle is scrambled)
it works only if the puzzle is completely solved. .

but again, this is just for fun

champagne

champagne
2007 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by **Mauricio** » Mon Dec 06, 2010 2:29 pm

> **champagne wrote:**
> here the game is somehow tricky, so, for a manual player why not to do so:
>
> 1) you smell a possible symmetry of given.
> 2) try without the given in excess
> . either you solve it now and find the given in the solution, **the puzzle was not minimal**
> . or you fail and then you look for something else.
> ...

Counterexample to point 2

CODE: SELECT ALL

```
.....5..2..3.4..5..6.7..8....1....3..4..9.1..7..1....6..5.7.....8.6...9.2....3..4
```

Minimal, not symmetric, remove 1@r6c4 (now multisolution, but symmetric), solve it (assuming uniqueness, wrongly), and you have r6c4=1 in the solution.

Now, if you remove one clue, giving it symmetry, solve it, and if the solution is not consistent with the original puzzle, then you now the clue you erased was not redundant; in other words, redundancy allows you to erase a clue, but IMO it is not easier to know if a clue is redundant than to solve the puzzle.

Mauricio
Posts: 1179
Joined: 22 March 2006