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Abominable TRIAL-and-ERROR and lovely BRAIDS

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Author

Message

denis_berthier

Posted: Sat Jan 16, 2010 3:30 pm Post subject:



Joined: 19 Jun 2007
Posts: 1187
Location: Paris, France

Allan Barker wrote:

then my solution uses hinged-whips.

And it took a full page of this forum to reach this obvious conclusion but see nothing of your solution.

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Allan Barker

Posted: Sat Jan 16, 2010 5:04 pm Post subject:



Joined: 21 Feb 2008
Posts: 511
Location: Bangkok

denis_berthier wrote:

Allan Barker wrote:

then my solution uses hinged-whips.

And it took a full page of this forum to reach this obvious conclusion but see nothing of your solution.

Seems all the answers were covered in my first post on page 11, assuming one knows grouped == hinged.

Allan Barker wrote:

Pisaacson wrote:

Do you have a pure nrczt scoring solution that you can post?

The nrczt solver that I developed in Red Ed's nrczt algorithms thread does not find a solution of any length, until, I turn on group-links, then it finds a chain of length 17. This was surprising. I could post the solution if it is useful but it would be in notation-of-the-day format. Ribbons give a best length of 16.

Would you want the notation-of-the-day (whatever I'm currently using), or, since Paul's solver has the same option, perhaps he could do the same. Then it would be nrczt notation.

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ronk

Posted: Sat Jan 16, 2010 5:10 pm Post subject:



Joined: 02 Nov 2005
Posts: 2760
Location: Southeastern USA

denis_berthier wrote:

Allan Barker wrote:

then my solution uses hinged-whips.

And it took a full page of this forum to reach this obvious conclusion but see nothing of your solution.

Allan did say his "nrc notation output was temporarily down." If you're anxious to compare results, you can run your zt-whip(BI) to see if you match Allan's max length of 17.

Also, it occurs to me that if you'd used something other than 'BI' for hinges, this time-wasting exchange probably would not have happened. For example, how about zt-whip(HNG) ? There's been a rash of two-letter symbols lately -- great for brevity, but useless in searches on this forum. ?

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denis_berthier

Posted: Sat Jan 16, 2010 5:17 pm Post subject:

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Joined: 19 Jun 2007
Posts: 1187
Location: Paris, France

BI is the name I've used since the beginning for Basic Interactions.

whip(BI) is the correct name, following the general whip(FP) and braid(FP).

I've used these names for classification results more than a year ago.

I won't change them just because Allan and you want to hide that his ribbons are a just whips(FP).

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Mauricio

Posted: Sat Jan 16, 2010 5:20 pm Post subject:

[quote](#)

Justo to calm the current discussion, let us see the following puzzle.

Code:

```
0000000102000304000506070000020010000105000707000809000360000090004080600030005
r7c8<>2, whip[2] c8n1{r7 r9} - c8n7{r9 .}
r8c7<>2, whip[2] r8n3{c7 c9} - r8n6{c9 .}
r8c9<>2, whip[2] r8n3{c9 c7} - r8n6{c7 .}
r9c8<>2, whip[2] c8n1{r9 r7} - c8n7{r7 .}
r1c4<>5, whip[3] r2n5{c4 c7} - r6n5{c7 c1} - r8n5{c1 .}
r1c7<>5, braid[3] r2n5{c7 c4} - r6n5{c7 c1} - r8n5{c1 .}
r1c7<>6, whip[3] r2n6{c9 c3} - r6n6{c3 c9} - r8n6{c9 .}
r3c4<>1, braid[3] r2n1{c5 c1} - r6n1{c4 c5} - r8n1{c5 .}
r4c1<>5, whip[3] r6n5{c1 c7} - r2n5{c7 c4} - r8n5{c4 .}
r4c3<>6, braid[3] c2n6{r5 r1} - c6n6{r4 r5} - c8n6{r5 .}
r4c9<>6, whip[3] r6n6{c7 c3} - r2n6{c3 c7} - r8n6{c7 .}
r5c7<>6, whip[3] r6n6{c9 c3} - r2n6{c3 c9} - r8n6{c9 .}
r7c1<>1, whip[3] c2n1{r9 r3} - c6n1{r3 r9} - r8n1{c5 .}
r7c1<>5, whip[3] r6n5{c1 c7} - r2n5{c7 c4} - r8n5{c4 .}
r7c5<>1, whip[3] r6n1{c5 c4} - r2n1{c4 c1} - r8n1{c1 .}
r9c4<>1, whip[3] r6n1{c4 c5} - r2n1{c5 c1} - r8n1{c1 .}
r1c7<>2, braid[8] r3n2{c9 c6} - c8n2{r3 r5} - r9n2{c6 c3} - r8c3{n2 n7} - r6n2{c3
c1} - c1n5{r6 r8} - r8c4{n5 n1} - c6n1{r9 .}
r7c1<>2, braid[8] r8n2{c3 c5} - c3n2{r9 r6} - c9n2{r6 r3} - r3c8{n2 n3} - r1n2{c8
c6} - r1n5{c6 c8} - r4c8{n5 n6} - r6n6{c9 .}
r6c7<>4, braid[17] r6c5{n4 n1} - r6n5{c7 c1} - c9n4{r4 r7} - r4n5{c2 c8} -
r8n5{c1 c4} - r8n1{c4 c1} - c1n2{r8 r5} - r6c3{n2 n6} - r4n6{c2 c6} - r4n7{c6 c5}
- r8n7{c5 c3} - c5n4{r4 r1} - r7c1{n7 n8} - c5n8{r7 r2} - r2c3{n8 n9} - r3c4{n8
n9} - c9n9{r3 .}
r7c6<>9, braid[17] r5c6{n9 n6} - r9n9{c4 c7} - c6n5{r7 r1} - c4n5{r2 r8} -
c8n5{r1 r4} - c8n6{r4 r1} - r1n2{c8 c5} - r3c6{n2 n1} - c4n1{r2 r6} - c4n3{r6 r5}
- r5n9{c4 c1} - c8n3{r5 r3} - r1c7{n3 n8} - r5n8{c7 c2} - r3c2{n8 n4} - r4c3{n8
n4} - r9n4{c3 .}
r2c7<>6, braid[27] r8c7{n6 n3} - r8n6{c7 c9} - b3n5{r2c7 r1c8} - r6n6{c9 c3} -
r4n5{c8 c2} - r1n6{c3 c2} - c1n5{r6 r8} - r1n3{c2 c1} - c2n3{r3 r5} - c4n3{r5 r6}
- r6n1{c4 c5} - r8n1{c5 c4} - r2n1{c4 c1} - c1n7{r2 r7} - r8n7{c3 c5} - r4n7{c5
c6} - c6n6{r4 r5} - r5c8{n6 n2} - b3n2{r3c8 r3c9} - c9n3{r3 r4} - c9n8{r4 r2} -
r2c5{n8 n9} - r3n9{c6 c1} - r5n9{c1 c4} - r9c4{n9 n8} - r3n8{c4 c2} - r7n8{c2 .}
r1c3<>6, whip[3] r2n6{c3 c9} - r6n6{c9 c7} - r8n6{c7 .}
r4c9<>3, braid[9] r8c9{n3 n6} - c7n6{r8 r6} - r5c8{n6 n2} - r6c9{n2 n4} - r6c3{n4
n2} - r6c5{n4 n1} - r8c3{n2 n7} - r8c5{n7 n2} - c1n2{r8 .}
r6c3<>4, whip[11] c3n6{r6 r2} - r1n6{c2 c8} - r1n5{c8 c6} - r1n2{c6 c5} - c5n4{r1
r4} - r4c9{n4 n8} - r2c9{n8 n9} - c5n9{r2 r7} - b8n8{r7c5 r9c4} - c3n8{r9 r1} -
r3n8{c2 .}
r3c9<>3, braid[8] r8c9{n3 n6} - r2n6{c9 c3} - r6c3{n6 n2} - r6c9{n2 n4} - r8c3{n2
n7} - r6c5{n4 n1} - r8c5{n1 n2} - c1n2{r8 .}
r1c2<>8, braid[12] r1n6{c2 c8} - r2n6{c9 c3} - b3n5{r1c8 r2c7} - r6c3{n6 n2} -
c7n8{r2 r5} - r4c9{n8 n4} - r5n2{c7 c8} - b3n2{r3c8 r3c9} - r3n8{c9 c4} - r9n8{c4
c3} - c3n4{r9 r1} - r3n4{c2 .}
r5c1<>3, braid[12] r4n3{c2 c8} - r3c8{n3 n2} - r5n2{c8 c7} - r5n8{c7 c2} -
r4n8{c3 c9} - r5n4{c2 c4} - r3c9{n8 n9} - r3c4{n9 n8} - r9n8{c4 c3} - r9n2{c3 c6}
- r1n2{c6 c5} - c5n4{r1 .}
r2c9<>8, braid[12] r2n6{c9 c3} - c7n8{r1 r5} - r6c3{n6 n2} - r8c3{n2 n7} -
r5n2{c1 c8} - r3c8{n2 n3} - r1c7{n3 n9} - c3n9{r1 r4} - r5c1{n9 n4} - r7c1{n4 n8}
- c3n8{r9 r1} - c5n8{r1 .}
```

```

r1c2<>3, braid[10] b1n6{r1c2 r2c3} - r2c9{n6 n9} - r1c7{n9 n8} - r3c9{n8 n2} -
c9n8{r3 r4} - r7c9{n2 n4} - c3n8{r4 r9} - r7c1{n8 n7} - r8c3{n7 n2} - r6c3{n2 .}
r4c2<>6, braid[7] r6c3{n6 n2} - r1n6{c2 c8} - r4n5{c2 c8} - r4n3{c8 c1} - r1n3{c1
c7} - r6c7{n3 n6} - r8c7{n6 .}
r3c6<>9, braid[7] r5c6{n9 n6} - r4n6{c6 c8} - r4n5{c8 c2} - r7n5{c2 c6} - r8n5{c4
c1} - c6n1{r7 r9} - r8n1{c5 .}
r3c1<>1, whip[6] r3c6{n1 n2} - r1n2{c5 c8} - r1n5{c8 c6} - c4n5{r2 r8} - r8n1{c4
c5} - c6n1{r9 .}
r7c6<>2, braid[7] r7n5{c6 c2} - r4n5{c2 c8} - r7n1{c2 c8} - r4n6{c8 c6} - r9c8{n1
n7} - c6n7{r9 r1} - r1n5{c6 .}
r7c5<>7, braid[7] r7c8{n7 n1} - r7c6{n1 n5} - r8n5{c4 c1} - r8n7{c1 c3} - c1n1{r8
r2} - r2n7{c1 c4} - c4n5{r2 .}
r5c8<>2, braid[8] r3c8{n2 n3} - r1n3{c7 c1} - r4n3{c1 c2} - b4n5{r4c2 r6c1} -
c1n2{r6 r8} - r8c3{n2 n7} - c1n1{r8 r2} - c1n7{r2 .}
r3c9<>2, whip[1] c8n2{r1 .}
r6c7<>6, braid[3] r5c8{n6 n3} - r8c7{n6 n3} - c9n3{r8 .}
r8c7=6
r8c9=3
r6c3<>2, braid[4] r5n2{c1 c7} - r6n6{c3 c9} - b6n4{r6c9 r4c9} - b6n8{r4c9 .}
r6c3=6
r2c9=6
r1c2=6
r8c1<>2, whip[1] c3n2{r9 .}
r3c4<>9, whip[5] c9n9{r3 r7} - r9n9{c7 c6} - r5n9{c6 c1} - r5n2{c1 c7} - c9n2{r6
.}
r4c3<>8, whip[3] c9n8{r4 r3} - r3n9{c9 c1} - c3n9{r2 .}
r2c1<>8, braid[6] c3n8{r1 r9} - r7n8{c2 c5} - c3n2{r9 r8} - c5n2{r8 r1} - r3c6{n2
n1} - r2n1{c5 .}
r6c4<>4, braid[6] r3c4{n4 n8} - r3c9{n8 n9} - c5n8{r2 r7} - r7n9{c5 c7} - r7n2{c7
c9} - r6c9{n2 .}
r1c4<>4, braid[8] r3c4{n4 n8} - r3c9{n8 n9} - c5n8{r2 r7} - r7n9{c5 c7} - r7n2{c7
c9} - r9c7{n2 n4} - c3n4{r9 r4} - r5n4{c2 .}
r3c1<>4, braid[6] r3c4{n4 n8} - r1n4{c3 c5} - c5n8{r2 r7} - r7c1{n8 n7} - r8c3{n7
n2} - c5n2{r8 .}
r4c6<>9, whip[6] r4n6{c6 c8} - r5c8{n6 n3} - r5c4{n3 n4} - r3n4{c4 c2} - c2n3{r3
r4} - r4n5{c2 .}
r4c5<>9, whip[7] r5c6{n9 n6} - r5c8{n6 n3} - r5c4{n3 n4} - r3n4{c4 c2} - c2n3{r3
r4} - r4n5{c2 c8} - r4n6{c8 .}
r5c1<>9, whip[1] r4n9{c3 .}
r1c6<>9, braid[6] r1n5{c6 c8} - c5n9{r2 r7} - r1n2{c8 c5} - r9n9{c4 c7} - r2c7{n9
n8} - c5n8{r2 .}
r2c5<>7, braid[6] r4c5{n7 n4} - r4c3{n4 n9} - r4c9{n4 n8} - r2c3{n9 n8} - r3n8{c2
c4} - c4n4{r3 .}
r7c2<>1, braid[6] r7c8{n1 n7} - c1n1{r8 r2} - b7n5{r7c2 r8c1} - c1n7{r8 r1} -
r2n7{c3 c4} - c4n5{r2 .}
r9c3<>7, whip[6] r9c8{n7 n1} - r7n1{c8 c6} - c6n5{r7 r1} - c6n7{r1 r4} - r4n6{c6
c8} - c8n5{r4 .}
r9c4<>7, whip[6] r9c8{n7 n1} - r7n1{c8 c6} - c6n5{r7 r1} - c6n7{r1 r4} - r4n6{c6
c8} - c8n5{r4 .}
r1c5<>7, whip[5] r4c5{n7 n4} - r6c5{n4 n1} - r8c5{n1 n2} - r8c3{n2 n7} - c4n7{r8
.}
r1c1<>7, braid[7] r2n7{c3 c4} - c3n7{r2 r8} - b2n5{r2c4 r1c6} - r8n2{c3 c5} -
r1n2{c5 c8} - r3c8{n2 n3} - r1n3{c7 .}
r2c1<>9, braid[5] c1n1{r2 r8} - r8n5{c1 c4} - c1n7{r8 r7} - r7c6{n7 n1} - r7c8{n1
.}
r1c4<>9, braid[6] r9c4{n9 n8} - c5n9{r2 r7} - c9n9{r7 r3} - r2n9{c7 c3} - c3n8{r2
r1} - r3n8{c2 .}
r1c3<>7, braid[6] r1c4{n7 n8} - r2c1{n7 n1} - r2c5{n1 n9} - r2c3{n9 n8} - r9n8{c3
c2} - c2n1{r9 .}
r2c4<>7, whip[1] r1n7{c6 .}
r2c3<>9, braid[6] r4c3{n9 n4} - r1c3{n4 n8} - r4c9{n4 n8} - r3n8{c9 c4} -
b2n4{r3c4 r1c5} - b2n9{r1c5 .}
r1c5<>4, braid[7] r3c4{n4 n8} - r3n4{c4 c2} - r9c4{n8 n9} - c2n1{r3 r9} - r9c8{n1
n7} - r9c6{n7 n2} - c5n2{r8 .}
r3c4=4
r5c2<>3, whip[3] r5c4{n3 n9} - r5c6{n9 n6} - r5c8{n6 .}
r5c7<>3, whip[3] r5c4{n3 n9} - r5c6{n9 n6} - r5c8{n6 .}
r6c7<>2, whip[3] r6c9{n2 n4} - r4c9{n4 n8} - r5c7{n8 .}
r2c4<>1, whip[3] r6c4{n1 n3} - r6c7{n3 n5} - r2n5{c7 .}
r3c2<>8, braid[5] r5c2{n8 n4} - c2n3{r3 r4} - r4c3{n4 n9} - r4c1{n9 n8} - c9n8{r4
.}
r3c1<>3, whip[2] r3n8{c1 c9} - r3n9{c9 .}
r5c1<>8, whip[2] r3n8{c1 c9} - r4n8{c9 .}
r7c5<>9, braid[4] r9c4{n9 n8} - c9n9{r7 r3} - r3c1{n9 n8} - c3n8{r2 .}
r2c4<>9, whip[1] c5n9{r1 .}
r9c7<>9, whip[1] r7n9{c9 .}
r1c8<>2, whip[4] r3n2{c8 c6} - b2n1{r3c6 r2c5} - r2n9{c5 c7} - b3n5{r2c7 .}
r3c8=2
r3c6=1
r3c2=3

```

```

r2c1=1
r2c3=7
r8c3=2
r7c8=1
r9c8=7
r9c2=1
r1c5<>8, whip[2] c3n8{r1 r9} - r7n8{c2 .}
r4c3<>4, whip[2] r5n4{c2 c7} - r9n4{c7 .}
r4c3=9
r4c1<>4, braid[3] r1n4{c1 c3} - r5n4{c2 c7} - r9n4{c7 .}
r6c1<>4, braid[3] r1n4{c1 c3} - r5n4{c2 c7} - r9n4{c7 .}
r5c7<>4, whip[4] r4c9{n4 n8} - r3n8{c9 c1} - r1c3{n8 n4} - r9n4{c3 .}
r4c2<>4, whip[1] r5n4{c1 .}
r7c9<>4, whip[1] c7n4{r9 .}
r1c7<>8, whip[4] r5c7{n8 n2} - r6n2{c9 c1} - r6n5{c1 c7} - c7n3{r6 .}
r7c1<>8, whip[4] r7c5{n8 n2} - r1n2{c5 c6} - c6n5{r1 r7} - r7n7{c6 .}
r1c3<>8, braid[5] r9n8{c3 c4} - c1n8{r3 r4} - r4n3{c1 c8} - r5n3{c8 c4} - c4n9{r5 .}
}
Singles to the end
Most difficult rule: NRCZT Braid[27]

```

Paul would give it a rating of 26?

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denis_berthier

Posted: Sat Jan 16, 2010 6:44 pm Post subject:



Mauricio,

Joined: 19 Jun 2007
Posts: 1187
Location: Paris, France

It seems you don't find all the whips before the braids of same length:

(solve

```
"000000001020003040005060700000200100001050007070008090003600000090004080600030005")
```

```
***** SudoRules version 13.7wter2 *****
```

```
000000001020003040005060700000200100001050007070008090003600000090004080600030005
```

```
hidden-pairs-in-a-row r8{n3 n6}{c7 c9} ==> r8c9 <> 2
```

```
hidden-pairs-in-a-row r8{n3 n6}{c7 c9} ==> r8c7 <> 2
```

```
hidden-pairs-in-a-column c8{n1 n7}{r7 r9} ==> r9c8 <> 2
```

```
hidden-pairs-in-a-column c8{n1 n7}{r7 r9} ==> r7c8 <> 2
```

```
;;; all the following are indeed swordfish (but they don't make all the swordfish eliminations, only those that can be justified by a whip)
```

```
nrc-chain[3] r8n5{c4 c1} - r6n5{c1 c7} - c8n5{r4 r1} ==> r1c4 <> 5
```

```
nrc-chain[3] c8n5{r4 r1} - b2n5{r1c6 r2c4} - r8n5{c4 c1} ==> r4c1 <> 5
```

```
nrc-chain[3] b4n5{r6c1 r4c2} - c8n5{r4 r1} - c6n5{r1 r7} ==> r7c1 <> 5
```

```
nrc-chain[3] c6n5{r1 r7} - b7n5{r7c2 r8c1} - r6n5{c1 c7} ==> r1c7 <> 5
```

```
nrczt-whip[3] r2n6{c9 c3} - r6n6{c3 c9} - r8n6{c9 .} ==> r1c7 <> 6
```

```
nrczt-whip[3] b1n1{r3c2 r2c1} - r8n1{c1 c5} - c6n1{r9 .} ==> r3c4 <> 1
```

```
nrczt-whip[3] c6n6{r4 r5} - c8n6{r5 r1} - r2n6{c9 .} ==> r4c3 <> 6
```

```
nrczt-whip[3] c6n6{r4 r5} - c8n6{r5 r1} - c2n6{r1 .} ==> r4c9 <> 6
```

```
nrczt-whip[3] c6n6{r5 r4} - c8n6{r4 r1} - c2n6{r1 .} ==> r5c7 <> 6
```

```
nrczt-whip[3] c8n1{r7 r9} - c6n1{r9 r3} - c2n1{r3 .} ==> r7c1 <> 1
```

```
nrczt-whip[3] r6n1{c5 c4} - r8n1{c4 c1} - r2n1{c1 .} ==> r7c5 <> 1
```

```
nrczt-whip[3] r6n1{c4 c5} - r8n1{c5 c1} - r2n1{c1 .} ==> r9c4 <> 1
```

```
;;; end swordfish
```

```
;;; same situation as before your two braid[8]
```

```
nrczt-whip[8] c3n2{r9 r6} - c9n2{r6 r3} - b9n2{r7c9 r9c7} - c6n2{r9 r1} - r1n5{c6 c8} - c8n2{r1 r5} - c8n6{r5 r4} - r6n6{c9 .} ==> r7c1 <> 2
```

```
nrczt-whip[8] b9n2{r9c7 r7c9} - r3n2{c9 c6} - r9n2{c6 c3} - r6n2{c3 c1} - c1n5{r6 r8} - r8n2{c1 c5} - r8n1{c5 c4} - c6n1{r9 .} ==> r1c7 <> 2
```

...

(All pairs are whip[2])

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Mauricio

Posted: Sat Jan 16, 2010 6:58 pm Post subject:



Joined: 22 Mar 2006
Posts: 1101

denis_berthier wrote:

It seems you don't find all the whips before the braids of same length:

I don't look for whips, the only thing that I do is that if the given braid is also a whip, I list it as a whip.

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denis_berthier

▢ Posted: Sat Jan 16, 2010 7:13 pm Post subject:



Joined: 19 Jun 2007
Posts: 1187
Location: Paris, France

Mauricio wrote:**denis_berthier wrote:**

It seems you don't find all the whips before the braids of same length:

I don't look for whips, the only thing that I do is that if the given braid is also a whip, I list it as a whip.

OK. I understand.

But I'm wondering: as whips are much easier to code than braids, couldn't you easily look for them before braids of same length?

As I said once to Paul:

- it makes nicer solutions (whips are nicer than braids)
- in SudoRules, it makes computation times shorter (but that wouldn't be necessarily the case in your approach).

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Mauricio

▢ Posted: Sat Jan 16, 2010 7:19 pm Post subject:



Joined: 22 Mar 2006
Posts: 1101

denis_berthier wrote:

...
- in SudoRules, it makes computation times shorter (but that wouldn't be necessarily the case in your approach).

In fact, that is the point. I think that looking for whips is slower in my approach. I have not coded them but I am 99.9% sure it would be slower.

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Red Ed

▢ Posted: Sat Jan 16, 2010 7:58 pm Post subject:



Joined: 06 Jun 2005
Posts: 1054

denis_berthier wrote:

whips are much easier to code than braids

That depends how you do it. In my dual whips/braids implementation, probably 95%+ of the code is identical in the two cases. Actually, if it wasn't for the pain that braids are causing Paul, I would've said they were definitely *easier* to implement than whips (because, for example, there's no need to keep track of "L" candidates).

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Red Ed

▢ Posted: Sat Jan 16, 2010 11:28 pm Post subject: Interesting braid



Here's an interesting braid ... if the weird memory management bug I've been experiencing hasn't mangled it, that is.

Puzzle:

Code:

```
0000000124000900000000000050070200000600000400000108000018000000000030700502000000
```

After the four initial singles (4r3c9, 7r7c1, 3r9c2, 9r8c1), look for a contradiction net/braid eliminating 3r6c3.

I get:

Code:

```

R0 is 3r6c3 (true val 4)
L1 is 3r6c1 , R1 is 2r6c1 (true val 2)
L2 is 2r6c7 , R2 is 2r7c7 (true val 2)
L3 is 2r8c8 , R3 is 2r8c6 (true val 2)
L4 is 2r7c5 , R4 is 2r3c5 (true val 2)
L5 is 2r3c1 , R5 is 2r2c2 (true val 2)
L6 is 1r8c6 , R6 is 1r8c9 (true val 1)
L7 is 5r8c6 , R7 is 5r8c4 (true val 5)
L8 is 1r3c5 , R8 is 1r9c5 (true val 1)
L9 is 8r3c5 , R9 is 8r1c5 (true val 8)
L10 is 1r5c9 , R10 is 1r4c7 (true val 1)
L11 is 8r8c4 , R11 is 8r9c4 (true val 8)
L12 is 7r9c5 , R12 is 7r9c6 (true val 7)
L13 is 8r1c1 , R13 is 3r1c1 (true val 3)
L14 is 1r4c1 , R14 is 1r3c1 (true val 1)
L15 is 8r2c2 , R15 is 8r3c2 (true val 8)
L16 is 8r1c7 , R16 is 8r2c7 (true val 8)
L17 is 3r4c7 , R17 is 3r3c7 (true val 3)
L18 is 7r3c6 , R18 is 6r3c6 (true val 6)
L19 is 6r8c4 , R19 is 6r7c4 (true val 6)
L20 is 2r7c5 , R20 is 4r7c5 (true val 4)
L21 is 9r9c4 , R21 is 9r5c4 (true val 9)
L22 is 9r3c7 , R22 is 9r1c7 (true val 9)
L23 is 9r3c2 , R23 is 9r6c2 (true val 9)
Voided constraint is 4r6

```

Apart from the initial (wrong) candidate, every forced single is correct!

[Back to top](#)**Mauricio**
 Posted: Sun Jan 17, 2010 2:32 am Post subject:


This is the puzzle with the highest rating I've seen

Code:

```

000001002000030040001500600007100800020090007100004050008600000040007090300050000
r9c9<>4, whip[3] r4n4{c9 c1} - r3n4{c1 c5} - r7n4{c5 .}
r2c9<>8, braid[7] r2n1{c9 c7} - r5n1{c7 c8} - b3n5{r2c7 r1c7} - c7n9{r1 r6} -
b6n2{r6c7 r4c8} - c8n6{r4 r9} - c8n8{r9 .}
r9c2<>6, braid[7] r8n6{c3 c9} - c2n1{r9 r7} - c5n1{r7 r8} - r8n8{c5 c4} -
b8n3{r8c4 r7c6} - r7n9{c6 c1} - b7n7{r7c1 .}
r2c6<>9, braid[9] c4n9{r1 r9} - b2n6{r2c6 r1c5} - r4c5{n6 n2} - r6n2{c4 c7} -
c7n9{r6 r1} - c3n9{r1 r6} - r4n9{c2 c9} - c9n4{r4 r7} - r9n4{c7 .}
r6c2<>9, braid[9] r4n9{c1 c9} - b4n8{r6c2 r5c1} - r5c4{n8 n3} - c6n3{r4 r7} -
r7n9{c6 c1} - r3n9{c1 c6} - r9n9{c6 c4} - r9n4{c4 c7} - c9n4{r7 .}
r1c4<>8, braid[13] r5c4{n8 n3} - c4n4{r1 r9} - r8c4{n3 n2} - r7c5{n2 n1} -
r8c5{n1 n8} - r9c6{n8 n9} - r6n8{c5 c2} - r3c6{n9 n2} - r2n8{c2 c1} - r2n2{c1 c3} -
r9c3{n2 n6} - r8c1{n6 n5} - r8c3{n5 .}
r2c9<>9, braid[13] r2n1{c9 c7} - c7n9{r1 r6} - r5n1{c7 c8} - b3n5{r2c7 r1c7} -
b6n2{r6c7 r4c8} - r4c5{n2 n6} - c6n6{r5 r2} - b6n6{r4c9 r6c9} - r6c3{n6 n3} -
c2n6{r6 r1} - r1n3{c2 c8} - r7c8{n3 n7} - c7n7{r9 .}
r4c1<>6, braid[13] r4c5{n6 n2} - r4n4{c1 c9} - r4c8{n2 n3} - r5c7{n3 n1} -
r5c8{n1 n6} - r6c9{n6 n9} - c6n6{r5 r2} - r6c3{n9 n3} - c2n6{r2 r1} - r1n3{c2 c7} -
r3c9{n3 n8} - r1c8{n8 n7} - r3c8{n7 .}
r9c2<>9, braid[13] r7n9{c1 c6} - c2n1{r9 r7} - b8n3{r7c6 r8c4} - c5n1{r7 r8} -
r5c4{n3 n8} - r6n8{c5 c2} - b8n8{r9c4 r9c6} - r3c6{n8 n2} - r2n8{c6 c1} - r2n2{c1
c3} - r9c3{n2 n6} - r8n6{c1 c9} - r8n8{c9 .}
r7c9<>1, braid[14] r8n1{c7 c5} - c8n1{r9 r5} - c9n4{r7 r4} - r5c7{n4 n3} -
r5c4{n3 n8} - r8n8{c4 c9} - r9c9{n8 n6} - b9n3{r8c9 r7c8} - c8n6{r9 r4} - r4c5{n6
n2} - c8n2{r4 r9} - r7c5{n2 n4} - r9c3{n2 n9} - r9c4{n9 .}
r9c7<>1, braid[14] r5n1{c7 c8} - r8n1{c9 c5} - r9n4{c7 c4} - r7c5{n4 n2} -
r4c5{n2 n6} - c8n6{r4 r9} - r9c9{n6 n8} - b9n2{r9c8 r8c7} - r8n8{c9 c4} - r5c4{n8
n3} - r8n3{c4 c9} - r3c9{n3 n9} - r4c9{n9 n4} - r5c7{n4 .}
r5c8<>3, braid[16] r5c4{n3 n8} - r5n1{c8 c7} - r2n1{c7 c9} - r8n1{c9 c5} -
b8n8{r8c5 r9c6} - r9c9{n8 n6} - c8n6{r9 r4} - r4c5{n6 n2} - r6n2{c4 c7} - r7c5{n2
n4} - r3n4{c5 c1} - r3n2{c1 c6} - c6n9{r3 r7} - b8n3{r7c6 r8c4} - r8c7{n3 n5} -
c9n5{r7 .}
r8c5<>2, braid[16] r4c5{n2 n6} - c5n1{r8 r7} - c2n1{r7 r9} - c8n1{r9 r5} -
b6n6{r5c8 r6c9} - r9c9{n6 n8} - r8n8{c9 c4} - r5c4{n8 n3} - c6n3{r4 r7} - r5c7{n3
n4} - c3n4{r5 r1} - c3n3{r1 r6} - r6n9{c3 c7} - b6n2{r6c7 r4c8} - r7c8{n2 n7} -
r9n7{c7 .}
r2c6<>2, braid[30] r3n2{c5 c1} - b2n6{r2c6 r1c5} - r3n4{c1 c5} - r4c5{n6 n2} -
r7c5{n2 n1} - r8c5{n1 n8} - r9c6{n8 n9} - r3c6{n9 n8} - r7c6{n9 n3} - c9n8{r3 r9} -
r8c4{n3 n2} - c3n2{r8 r9} - r9n6{c3 c8} - c8n2{r9 r7} - r4c8{n6 n3} - r5c8{n6
n1} - r5c7{n1 n4} - r9c7{n4 n7} - r7c7{n7 n5} - c9n5{r8 r2} - c9n1{r2 r8} -

```

```

c9n3{r8 r3} - r3n9{c9 c2} - r2c3{n9 n6} - r7c2{n9 n7} - r2c2{n7 n8} - r6n8{c2 c4}
- r5c4{n8 n3} - r5c3{n3 n5} - r8c3{n5 .}
r6c2<>3, braid[29] c3n3{r5 r1} - b4n8{r6c2 r5c1} - c3n4{r1 r5} - r5c4{n8 n3} -
r5c7{n3 n1} - r5c8{n1 n6} - r6c9{n6 n9} - r6c3{n9 n6} - r6c7{n9 n2} - r9n6{c3 c9}
- r4c8{n2 n3} - r3n3{c8 c9} - r8n3{c9 c7} - c9n8{r3 r8} - r8c4{n8 n2} - r8c5{n8
n1} - r7c5{n1 n4} - r7c9{n4 n5} - r7c7{n5 n7} - r9n7{c8 c2} - r9n1{c2 c8} -
r9n2{c8 c3} - r2n2{c3 c1} - r2n7{c1 c4} - r6c4{n7 n8} - r9n8{c4 c6} - r2n8{c6 c2}
- r3c2{n8 n9} - c3n9{r2 .}
r2c2<>6, braid[25] r2c6{n6 n8} - r6c2{n6 n8} - r1n6{c3 c5} - c5n8{r6 r8} -
r4c5{n6 n2} - c5n1{r8 r7} - r6c5{n2 n7} - r6n2{c4 c7} - b8n4{r7c5 r9c4} - r6c4{n7
n3} - r9c7{n4 n7} - r8c4{n3 n2} - c6n3{r5 r7} - r7c8{n3 n2} - r9n2{c8 c3} -
r2n2{c3 c1} - r2n7{c1 c4} - r1c4{n7 n9} - c7n9{r1 r2} - r2c3{n9 n5} - r1n5{c2 c7}
- r7c7{n5 n4} - c9n4{r7 r4} - c9n9{r4 r6} - c3n9{r6 .}
r4c6<>6, braid[16] r2c6{n6 n8} - r4c5{n6 n2} - c5n6{r6 r1} - r4c8{n2 n3} -
c2n6{r1 r6} - r6c9{n6 n9} - r4c9{n9 n4} - r5c7{n4 n1} - r2n1{c7 c9} - r8n1{c9 c5}
- r7c5{n1 n4} - r3c5{n4 n7} - r3c8{n7 n8} - r3c9{n8 n3} - c2n3{r3 r1} - c2n8{r1
.}
r4c9<>6, braid[17] r4c5{n6 n2} - r4n4{c9 c1} - r4c8{n2 n3} - c3n4{r5 r1} -
r6c9{n3 n9} - c4n4{r1 r9} - r7c5{n4 n1} - c2n1{r7 r9} - r9c9{n1 n8} - r3c9{n8 n3}
- r1n3{c7 c2} - c2n6{r1 r6} - r5n6{c3 c6} - c6n3{r5 r7} - b8n9{r7c6 r9c6} -
c3n9{r9 r2} - r3n9{c2 .}
r9c4<>8, braid[18] r5c4{n8 n3} - r8n8{c5 c9} - r9n4{c4 c7} - r8c4{n3 n2} -
r5c7{n4 n1} - r6c4{n2 n7} - r9c6{n2 n9} - r5c8{n1 n6} - r2c4{n7 n9} - c6n6{r5 r2}
- c9n6{r6 r9} - r9c3{n6 n2} - r2c3{n2 n5} - r8c3{n5 n6} - r1n5{c2 c7} - c7n9{r1
r6} - r6c3{n9 n3} - r6c9{n3 .}
r1c3<>3, braid[22] c2n3{r3 r4} - c3n4{r1 r5} - r4n4{c1 c9} - r4n9{c9 c1} -
r4n5{c1 c6} - r5n5{c6 c1} - b4n8{r5c1 r6c2} - c2n6{r6 r1} - r1n5{c2 c7} - r2n6{c3
c6} - c1n6{r2 r8} - r2c9{n5 n1} - r1n9{c7 c4} - r5n6{c6 c8} - c4n4{r1 r9} -
r5n1{c8 c7} - r8n1{c7 c5} - r7c5{n1 n2} - c6n2{r9 r3} - c1n2{r3 r2} - r2n8{c1 c4}
- c5n8{r3 .}
r4c2<>3, whip[1] c3n3{r6 .}
r8c9<>3, braid[7] r7n3{c8 c6} - r4n3{c6 c8} - c7n3{r6 r1} - b6n2{r4c8 r6c7} -
c7n9{r6 r2} - r2n1{c7 c9} - b3n5{r2c9 .}
r1c2<>8, braid[13] r6c2{n8 n6} - c1n8{r3 r5} - c2n3{r1 r3} - r5c4{n8 n3} -
c3n3{r5 r6} - c6n3{r4 r7} - r6c9{n3 n9} - c9n3{r7 r4} - c9n4{r4 r7} - r9n4{c7 c4}
- b8n9{r9c4 r9c6} - r3n9{c6 c1} - c3n9{r2 .}
r6c7<>3, braid[13] r4n3{c9 c6} - b6n2{r6c7 r4c8} - r5c4{n3 n8} - r4c5{n2 n6} -
r6n8{c5 c2} - c6n6{r5 r2} - c2n6{r6 r1} - r2n8{c6 c1} - r1n3{c2 c8} - r1n8{c8 c5}
- r8n8{c5 c9} - r3c9{n8 n9} - c7n9{r2 .}
r2c1<>6, braid[14] c6n6{r2 r5} - r4c5{n6 n2} - r5c8{n6 n1} - c6n5{r5 r4} -
c6n3{r4 r7} - r8n3{c4 c7} - r5c7{n3 n4} - r9n4{c7 c4} - b8n9{r9c4 r9c6} -
b8n2{r9c6 r8c4} - r8c1{n2 n5} - r8c3{n5 n6} - r9c3{n6 n2} - r2n2{c3 .}
r3c1<>8, braid[14] r3n4{c1 c5} - c2n8{r2 r6} - b3n8{r3c9 r1c8} - r3n2{c5 c6} -
c5n8{r1 r8} - r9c6{n8 n9} - r7c6{n9 n3} - r4c6{n3 n5} - r8n3{c4 c7} - r1n3{c7 c2}
- r8n1{c7 c9} - r2c9{n1 n5} - c2n5{r2 r7} - r8n5{c3 .}
r6c3<>6, braid[17] r6c2{n6 n8} - r2n6{c3 c6} - c3n3{r6 r5} - r5c4{n3 n8} -
r5c6{n8 n5} - r2n8{c4 c1} - r5c1{n5 n4} - r5c7{n4 n1} - r3n4{c1 c5} - r2n1{c7 c9}
- r8n1{c9 c5} - r7c5{n1 n2} - r8c4{n2 n3} - c6n3{r7 r4} - c6n2{r4 r3} - c1n2{r3
r2} - b7n6{r8c1 .}
r2c7<>7, whip[8] r2n1{c7 c9} - b3n5{r2c9 r1c7} - c7n9{r1 r6} - r6c3{n9 n3} -
r6c9{n3 n6} - c8n6{r5 r9} - r9n1{c8 c2} - r9n7{c2 .}
r6c9<>3, braid[8] r6c3{n3 n9} - r4n3{c8 c6} - r4n9{c2 c9} - c6n5{r4 r5} - r3c9{n9
n8} - c6n6{r5 r2} - c6n8{r2 r9} - r8n8{c5 .}
r4c9<>9, braid[12] r6c9{n9 n6} - r6n9{c7 c3} - c9n4{r4 r7} - c9n3{r7 r3} -
r1n3{c8 c2} - c2n6{r1 r4} - r5n6{c3 c6} - r2n6{c6 c3} - r9c3{n6 n2} - r8c3{n2 n5}
- c2n5{r7 r2} - c9n5{r2 .}
r6c3<>9, whip[1] r4n9{c2 .}
r6c3=3
r1c2<>9, whip[7] c3n9{r2 r9} - c4n9{r9 r2} - c7n9{r2 r6} - r6c9{n9 n6} - c2n6{r6
r4} - r4c5{n6 n2} - r6n2{c4 .}
r2c1<>9, whip[8] r4n9{c1 c2} - r7n9{c2 c6} - b8n3{r7c6 r8c4} - r5c4{n3 n8} -
r6n8{c5 c2} - r2n8{c2 c6} - r3c6{n8 n2} - r9c6{n2 .}
r2c3<>6, braid[9] c6n6{r2 r5} - r5c8{n6 n1} - c6n5{r5 r4} - c6n3{r4 r7} - r8n3{c4
c7} - r5c7{n3 n4} - c3n4{r5 r1} - c3n9{r1 r9} - r7n9{c2 .}
r2c6=6
r3c1<>9, braid[9] r3n4{c1 c5} - r4n9{c1 c2} - r3n2{c5 c6} - c4n4{r1 r9} - r7n9{c2
c6} - b8n3{r7c6 r8c4} - c4n2{r8 r6} - r6c7{n2 n9} - c9n9{r6 .}
r1c2<>7, braid[9] c1n7{r3 r7} - c2n3{r1 r3} - c7n7{r7 r9} - r9n4{c7 c4} - r1c4{n4
n9} - r3n9{c6 c9} - r6c9{n9 n6} - c2n6{r6 r4} - r5n6{c3 .}
r3c9<>8, whip[10] c8n8{r1 r9} - c6n8{r9 r5} - r5c4{n8 n3} - c6n3{r4 r7} - c9n3{r7
r4} - c9n4{r4 r7} - r9n4{c7 c4} - b8n9{r9c4 r9c6} - r3n9{c6 c2} - c3n9{r2 .}
r9c8<>8, whip[1] c9n8{r8 .}
r1c2<>5, whip[5] c2n3{r1 r3} - r3c9{n3 n9} - r6c9{n9 n6} - c2n6{r6 r4} - r5n6{c3
.}
r3c8<>3, whip[5] r3c9{n3 n9} - r6c9{n9 n6} - c5n6{r6 r4} - c2n6{r4 r1} - r1n3{c2
.}
r4c8<>6, whip[5] r6c9{n6 n9} - r3c9{n9 n3} - r1n3{c8 c2} - c2n6{r1 r6} - r5n6{c3
.}
r9c8<>7, whip[5] r3c8{n7 n8} - r1c8{n8 n3} - r3c9{n3 n9} - r6c9{n9 n6} - c8n6{r5
.}

```

```

r3c2<>7, whip[5] r3n3{c2 c9} - r3n9{c9 c6} - c4n9{r2 r9} - r9n4{c4 c7} - r9n7{c7
.}
r2c2<>8, whip[8] r6c2{n8 n6} - r1c2{n6 n3} - r3c2{n3 n9} - r4n9{c2 c1} - r7n9{c1
c6} - b8n3{r7c6 r8c4} - r5c4{n3 n8} - r6n8{c5 .}
r6c4<>8, whip[2] r2n8{c4 c1} - r5n8{c1 .}
r9c4<>2, braid[6] r9n4{c4 c7} - c4n4{r9 r1} - r9n7{c7 c2} - c4n9{r1 r2} - r2n7{c4
c1} - r2n8{c1 .}
r2c1<>5, braid[7] r2n8{c1 c4} - r5c4{n8 n3} - r2n2{c4 c3} - r2n7{c4 c2} - r8c4{n3
n2} - c1n2{r8 r7} - c1n7{r7 .}
r1c7<>9, braid[9] r6c7{n9 n2} - r6c4{n2 n7} - r1c4{n7 n4} - r9c4{n4 n9} - r9n4{c4
c7} - c3n9{r9 r2} - r9n7{c7 c2} - r2c2{n7 n5} - r1n5{c3 .}
r2c1<>7, braid[9] r2n8{c1 c4} - r5c4{n8 n3} - r2n2{c4 c3} - r8c4{n3 n2} - c6n3{r4
r7} - c1n2{r8 r7} - r7n9{c1 c2} - c2n1{r7 r9} - c2n7{r9 .}
r2c2<>5, whip[5] r2c9{n5 n1} - r2c7{n1 n9} - r6c7{n9 n2} - r6c4{n2 n7} - r2n7{c4
.}
r7c1<>9, whip[3] r4n9{c1 c2} - r2c2{n9 n7} - c1n7{r3 .}
r1c4<>4, whip[4] r9n4{c4 c7} - r9n7{c7 c2} - r2c2{n7 n9} - r1n9{c3 .}
r9c4=4
r3c6<>9, whip[1] c4n9{r2 .}
r3c2<>8, whip[2] r3n3{c2 c9} - r3n9{c9 .}
r6c2=8
r4c6<>2, braid[3] r4c5{n2 n6} - r6c4{n2 n7} - r6c5{n7 .}
r7c6<>3, braid[3] r4c6{n3 n5} - r7n9{c6 c2} - c2n5{r7 .}
r8c4=3
r5c4=8
r2c1=8
r3c5<>7, whip[3] r3c8{n7 n8} - r1n8{c8 c5} - c5n4{r1 .}
r7c7<>5, whip[4] r7n4{c7 c9} - r4c9{n4 n3} - r4c6{n3 n5} - c2n5{r4 .}
r7c8<>1, braid[4] r5c8{n1 n6} - r7c5{n1 n2} - r4c5{n2 n6} - r6n6{c5 .}
r9c8<>2, whip[2] c8n1{r9 r5} - c8n6{r5 .}
r8c9<>6, whip[3] r9c8{n6 n1} - r8n1{c7 c5} - r8n8{c5 .}
r9c3<>6, whip[1] r8n6{c1 .}
r1c3<>9, whip[3] r9c3{n9 n2} - r2n2{c3 c4} - c4n9{r2 .}
r4c2<>6, whip[4] r5n6{c3 c8} - r9c8{n6 n1} - c2n1{r9 r7} - c2n5{r7 .}
r4c5=6
r4c8=2
r6c7=9
r6c9=6
r5c8=1
r9c8=6
r1c2=6
r3c2=3
r3c9=9
r1c7<>5, whip[2] r2c7{n5 n1} - r2c9{n1 .}
r2c3<>5, whip[1] r1n5{c1 .}
r7c9<>5, whip[2] c9n3{r7 r4} - c9n4{r4 .}
r8c1<>5, whip[1] r7n5{c2 .}
r8c3<>5, whip[1] r7n5{c2 .}
r5c3<>6, whip[2] c3n4{r5 r1} - c3n5{r1 .}
r5c1=6
r8c1=2
r8c3=6
r9c3=9
r2c3=2
r7c6=9
r6c4=2
r6c5=7
r7c7<>1, whip[2] r2c7{n1 n5} - r8c7{n5 .}
r1c1<>5, whip[3] r1c3{n5 n4} - r3c1{n4 n7} - r7c1{n7 .}
Singles to the end
Most difficult rule: NRCZT Braid[30]

```

4 puzzles with rating 27

Code:

```

000000001000002030004030200000005060001040007080700500008007002010600090300050800
000001002000020030000400500001600200070005080400030001003700600050080090700004008
000001002030020010004500600002300070050040800800009000007010400080600001500000080
0010000203000104050006010000050007002100300050003080005030900040007006600800020

```

The last one is special

Code:

```

001000002030001040500060100000050007002100300050003080005030900040007006600800020
r7c9<>1, braid[27] r7c8{n1 n7} - c8n1{r8 r4} - c2n1{r4 r9} - r9n7{c2 c3} -
r9n3{c3 c9} - r8c8{n3 n5} - r5n5{c8 c9} - r9n5{c7 c6} - c9n4{r5 r6} - r9n9{c6 c5}
- b6n9{r6c9 r5c8} - r8c4{n9 n2} - c8n6{r5 r1} - r1n3{c8 c4} - r2n6{c7 c3} -

```



```

c4n5{r1 r2} - r6c3{n6 n9} - r8n9{c3 c1} - r2n9{c1 c9} - r8n3{c1 c3} - r3c9{n9 n8}
- c3n8{r3 r4} - r4c2{n8 n6} - r5c2{n6 n7} - r3n7{c2 c4} - r6c4{n7 n6} - r5n6{c6
.}
r4c7<>6, braid[8] c7n2{r4 r6} - c8n6{r5 r1} - c7n4{r6 r9} - r7c9{n4 n8} - r8c7{n8
n5} - r9n5{c9 c6} - r1n5{c6 c4} - r1n3{c4 .}
r1c8<>6, braid[8] r1n3{c8 c4} - c7n6{r2 r6} - c7n2{r6 r4} - c7n4{r4 r9} - r7c9{n4
n8} - r8c7{n8 n5} - r1n5{c7 c6} - r9n5{c6 .}
r6c7<>6, whip[1] c8n6{r5 .}
r5c9<>4, whip[2] r4c7{n4 n2} - r6c7{n2 .}
r6c9<>4, whip[2] r4c7{n4 n2} - r6c7{n2 .}
r9c7<>4, whip[1] c9n4{r7 .}
r4c8<>1, whip[5] r7c8{n1 n7} - r9c7{n7 n5} - c6n5{r9 r1} - c8n5{r1 r5} - c8n6{r5
.}
r6c9=1
r8c1<>8, whip[5] r8c7{n8 n5} - r9c7{n5 n7} - r7c8{n7 n1} - c1n1{r7 r4} - c1n3{r4
.}
r4c1<>4, braid[6] c1n3{r4 r8} - r9n3{c3 c9} - c1n1{r8 r7} - c9n4{r9 r7} - r7n8{c9
c2} - b7n2{r7c2 .}
r4c1<>8, braid[6] c1n3{r4 r8} - r9n3{c3 c9} - c1n1{r8 r7} - c9n4{r9 r7} - r7n8{c9
c2} - b7n2{r7c2 .}
r4c1<>9, braid[6] c1n3{r4 r8} - r9n3{c3 c9} - c1n1{r8 r7} - c9n4{r9 r7} - r7n8{c9
c2} - b7n2{r7c2 .}
r7c2<>1, whip[6] r4n1{c2 c1} - c1n3{r4 r8} - r9n3{c3 c9} - c9n4{r9 r7} - r7n8{c9
c1} - b7n2{r7c1 .}
r7c1<>8, whip[5] r7n1{c1 c8} - r7n7{c8 c2} - b7n2{r7c2 r8c1} - c1n1{r8 r4} -
c1n3{r4 .}
r1c2<>8, whip[4] r7n8{c2 c9} - r3n8{c9 c6} - r4n8{c6 c3} - r8n8{c3 .}
r5c2<>8, braid[4] r4n8{c3 c6} - r7n8{c2 c9} - r3n8{c9 c3} - r8n8{c3 .}
r4c2<>8, whip[5] r4n1{c2 c1} - r4n3{c1 c3} - r9n3{c3 c9} - c9n4{r9 r7} - r7n8{c9
.}
r3c2<>7, whip[2] c2n2{r3 r7} - c2n8{r7 .}
r3c2<>9, whip[2] c2n2{r3 r7} - c2n8{r7 .}
r7c2<>7, whip[2] c2n2{r7 r3} - c2n8{r3 .}
r7c1<>2, whip[2] r7n1{c1 c8} - r7n7{c8 .}
r3c4<>2, whip[4] c2n2{r3 r7} - c6n2{r7 r4} - r4n8{c6 c3} - b7n8{r8c3 .}
r8c1<>3, whip[4] r9n3{c3 c9} - c9n4{r9 r7} - r7n8{c9 c2} - b7n2{r7c2 .}
r4c1=3
r4c2=1
r9c5=1
r8c3<>9, whip[3] r8c5{n9 n2} - r7n2{c6 c2} - b7n8{r7c2 .}
r8c8<>5, whip[3] r9n5{c9 c6} - r9n4{c6 c9} - b9n3{r9c9 .}
r1c7<>5, whip[2] r2n5{c9 c4} - r8n5{c4 .}
r9c9<>5, whip[3] r8c7{n5 n8} - r8c3{n8 n3} - r9n3{c3 .}
r2c7<>5, whip[1] b9n5{r9c7 .}
r2c9<>8, whip[3] r2n5{c9 c4} - r8n5{c4 c7} - c7n8{r8 .}
r3c3<>8, whip[2] r8n8{c3 c7} - c9n8{r7 .}
r3c6<>8, whip[2] c2n8{r3 r7} - c9n8{r7 .}
r3c9<>9, whip[2] r2c9{n9 n5} - r5c9{n5 .}
r1c4<>5, whip[4] r1n3{c4 c8} - r3c9{n3 n8} - c7n8{r2 r8} - r8n5{c7 .}
r1c8<>7, whip[3] r1n5{c8 c6} - r9n5{c6 c7} - c7n7{r9 .}
r1c6<>8, whip[4] r4n8{c6 c3} - r8n8{c3 c7} - r8n5{c7 c4} - c6n5{r9 .}
r5c5<>8, whip[1] c6n8{r4 .}
r3c6<>4, whip[4] r3n2{c6 c2} - r7c2{n2 n8} - r7c9{n8 n4} - r9n4{c9 .}
r1c4<>9, whip[4] r3c6{n9 n2} - r3c2{n2 n8} - r3c9{n8 n3} - r1n3{c8 .}
r4c6<>4, whip[4] r4n8{c6 c3} - r8c3{n8 n3} - r9n3{c3 c9} - r9n4{c9 .}
r4c6<>9, whip[4] r3c6{n9 n2} - r3c2{n2 n8} - c1n8{r2 r5} - r4n8{c3 .}
r8c1<>9, whip[4] r9c2{n9 n7} - r9c3{n7 n3} - r8n3{c3 c8} - r8n1{c8 .}
r9c6<>9, whip[1] r8n9{c5 .}
r2c4<>9, whip[2] c6n9{r3 r5} - c9n9{r5 .}
r2c5<>9, whip[2] c6n9{r3 r5} - c9n9{r5 .}
r3c8<>9, braid[4] r2c9{n9 n5} - r5c9{n5 n9} - r1n5{c8 c6} - c6n9{r1 .}
r1c8<>3, whip[2] b3n5{r1c8 r2c9} - b3n9{r2c9 .}
r1c4=3
r1c2<>9, braid[4] r1c8{n9 n5} - r9c2{n9 n7} - r9c7{n7 n5} - c6n5{r9 .}
r1c1<>7, whip[4] r1c2{n7 n6} - r2n6{c3 c7} - c7n7{r2 r9} - r7n7{c8 .}
r1c5<>9, whip[4] r1c8{n9 n5} - r1c6{n5 n4} - r3n4{c4 c3} - r3n9{c3 .}
r5c1<>9, whip[5] r5c9{n9 n5} - r2n5{c9 c4} - r8n5{c4 c7} - r8n8{c7 c3} -
b4n8{r4c3 .}
r5c2<>9, braid[5] r5c9{n9 n5} - r9c2{n9 n7} - r9c7{n7 n5} - r8n5{c7 c4} - r2n5{c4
.}
r9c2=9
r3c3<>7, whip[2] r9n7{c3 c7} - c8n7{r7 .}
r2c4<>7, braid[4] r3n7{c4 c8} - c4n5{r2 r8} - r9n5{c6 c7} - c7n7{r9 .}
r6c3<>4, braid[3] r3n4{c3 c4} - r6n6{c3 c4} - c4n7{r6 .}
r6c3<>7, braid[3] r9n7{c3 c7} - c4n7{r6 r3} - c8n7{r3 .}
r2c5<>7, whip[3] r3n7{c4 c8} - r7n7{c8 c1} - c3n7{r9 .}
r2c7<>8, whip[3] r2c5{n8 n2} - r3n2{c6 c2} - r3n8{c2 .}
r7c4<>2, whip[3] r2c4{n2 n5} - r8c4{n5 n9} - r8c5{n9 .}
r4c6<>2, whip[2] r3n2{c6 c2} - r7n2{c2 .}
r1c5<>8, whip[4] r2c5{n8 n2} - r2c4{n2 n5} - r8n5{c4 c7} - c7n8{r8 .}

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```

r2c5=8
r4c4<>6, whip[4] r7c4{n6 n4} - r3n4{c4 c3} - r4n4{c3 c7} - r4n2{c7 .}
r1c6<>4, whip[4] r1c5{n4 n7} - c4n7{r3 r6} - c4n6{r6 r7} - b8n4{r7c4 .}
r1c1<>9, whip[2] r1c6{n9 n5} - r1c8{n5 .}
r3c4<>9, whip[2] b2n4{r3c4 r1c5} - b2n7{r1c5 .}
r5c6<>9, whip[1] b2n9{r3c6 .}
r6c5<>4, whip[2] r1n4{c5 c1} - r5n4{c1 .}
r4c3<>6, whip[3] c3n4{r4 r3} - r1c1{n4 n8} - b4n8{r5c1 .}
r4c3<>9, whip[3] r3c3{n9 n4} - r1c1{n4 n8} - b4n8{r5c1 .}
r6c4<>9, whip[1] b4n9{r6c3 .}
r6c5<>9, whip[1] b4n9{r6c3 .}
r5c6<>4, whip[3] r5n8{c6 c1} - r1c1{n8 n4} - c5n4{r1 .}
r7c4<>4, whip[1] c6n4{r9 .}
r7c4=6
r6c3=6
r5c2=7
r1c2=6
r2c7=6
r6c1=9
r1c5<>4, braid[4] r5c5{n4 n9} - r3n4{c4 c3} - c3n9{r3 r2} - c9n9{r2 .}
Singles to the end
Most difficult rule: NRCZT Braid[27]

```

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denis_berthier

▢ Posted: Sun Jan 17, 2010 6:55 am Post subject:



Joined: 19 Jun 2007
Posts: 1187
Location: Paris, France

Mauricio wrote:

This is the puzzle with the highest rating I've seen

Code:

```

000001002000030040001500600007100800020090007100004050008600000040007090300050000
...
Most difficult rule: NRCZT Braid[30]

```

SER = 9.6

Mauricio wrote:

4 puzzles with rating 27

Code:

```

0000000010000020300004030200000005060001040007080700500008007002010600090300050800
000001002000020030000400500001600200070005080400030001003700600050080090700004008
00000100203002001000450060000230007005004080080009000007010400080600001500000080
001000002030001040500060100000050007002100300050003080005030900040007006600800020

```

All have SER = 9.6

Mauricio wrote:

The last one is special

Code:

```

001000002030001040500060100000050007002100300050003080005030900040007006600800020
Most difficult rule: NRCZT Braid[27]

```

SER = 9.6

Nice find, with a starting giant braid and the rest relatively easy *

All these puzzles are beyond the boundary of what whips can solve (fuzzy boundary at SER = 9.3 with some rare incursions at 9.4)

Their probability of being produced by a random generator is $\leq 1/10,000,000$.

They are good examples of the added power of braids (at the cost of being a nettish pattern).

* The rest can be solved by whips of maximum length 8.

(solve

```

"001000002030001040500060100000050007002100300050003080005030900040007006600800020")
***** SudoRules version 13.7wter2 *****
001000002030001040500060100000050007002100300050003080005030900040007006600800020
eliminate n1r7c9
nrczt-whip[8] c5n1{r9 r8} - b9n1{r8c8 r7c8} - r4n1{c8 c1} - c1n3{r4 r8} - r8n2{c1 c4} - r8n9{c4 c3} -
r9c3{n9 n7} - b9n7{r9c7 .} ==> r9c2 <> 1
nrczt-whip[5] b9n3{r8c8 r9c9} - b9n1{r9c9 r7c8} - b9n7{r7c8 r9c7} - r9c3{n7 n9} - r9c2{n9 .} ==> r8c8
<> 5
nrc-chain[2] r8n5{c7 c4} - c6n5{r9 r1} ==> r1c7 <> 5
nrczt-whip[6] r8c7{n5 n8} - r7c9{n8 n4} - r9c7{n4 n7} - r9c2{n7 n9} - r9c3{n9 n3} - r8c3{n3 .} ==>
r2c7 <> 5
interaction column c7 with block b9 ==> r9c9 <> 5
nrc-chain[3] r2n5{c9 c4} - r8n5{c4 c7} - b9n8{r8c7 r7c9} ==> r2c9 <> 8
nrct-chain[4] r9n1{c5 c9} - c9n3{r9 r3} - c9n8{r3 r7} - b9n4{r7c9 r9c7} ==> r9c5 <> 4
nrct-chain[4] b8n5{r9c6 r8c4} - r8c7{n5 n8} - r7c9{n8 n4} - b8n4{r7c4 r9c6} ==> r9c6 <> 9
nrczt-whip[4] b9n7{r7c8 r9c7} - r9n5{c7 c6} - r1n5{c6 c4} - r1n3{c4 .} ==> r1c8 <> 7
nrczt-whip[6] c8n6{r5 r1} - r1n3{c8 c4} - r1n5{c4 c6} - r9n5{c6 c7} - c7n4{r9 r4} - c7n2{r4 .} ==> r6c7
<> 6
nrczt-whip[6] b6n6{r4c8 r4c7} - c7n2{r4 r6} - c7n4{r6 r9} - r9n5{c7 c6} - r1n5{c6 c4} - r1n3{c4 .} ==>
r1c8 <> 6
interaction column c8 with block b6 ==> r4c7 <> 6
naked-pairs-in-a-block b6{r4c7 r6c7}{n2 n4} ==> r6c9 <> 4, r5c9 <> 4
interaction column c9 with block b9 ==> r9c7 <> 4
naked-pairs-in-a-column c9{r2 r5}{n5 n9} ==> r6c9 <> 9
singles ==> r6c9 = 1, r9c5 = 1
interaction row r9 with block b7 ==> r8c3 <> 9, r8c1 <> 9
naked-pairs-in-a-column c9{r2 r5}{n5 n9} ==> r3c9 <> 9
nrc-chain[3] r3c9{n8 n3} - r9n3{c9 c3} - r8c3{n3 n8} ==> r3c3 <> 8
nrc-chain[4] r8n5{c4 c7} - b9n8{r8c7 r7c9} - r3c9{n8 n3} - b2n3{r3c4 r1c4} ==> r1c4 <> 5
nrc-chain[3] r2c9{n9 n5} - c4n5{r2 r8} - b8n9{r8c4 r8c5} ==> r2c5 <> 9
nrc-chain[4] r9n3{c3 c9} - c9n4{r9 r7} - b9n8{r7c9 r8c7} - r8c3{n8 n3} ==> r8c1 <> 3
singles ==> r4c1 = 3, r4c2 = 1
nrc-chain[3] b7n1{r7c1 r8c1} - r8c8{n1 n3} - r8c3{n3 n8} ==> r7c1 <> 8
nrczt-whip[3] b5n8{r5c6 r4c6} - r3n8{c6 c9} - r7n8{c9 .} ==> r5c2 <> 8
nrc-chain[4] c1n1{r8 r7} - r7c8{n1 n7} - r9c7{n7 n5} - r8c7{n5 n8} ==> r8c1 <> 8
nrc-chain[3] r4n8{c6 c3} - b7n8{r8c3 r7c2} - c9n8{r7 r3} ==> r3c6 <> 8
x-wing-in-rows n8{r3 r7}{c2 c9} ==> r1c2 <> 8
hidden-pairs-in-a-column c2{n2 n8}{r3 r7} ==> r7c2 <> 7
hidden-pairs-in-a-row r7{n1 n7}{c1 c8} ==> r7c1 <> 2
hidden-pairs-in-a-column c2{n2 n8}{r3 r7} ==> r3c2 <> 9, r3c2 <> 7
nrc-chain[4] r9n4{c6 c9} - r7c9{n4 n8} - b7n8{r7c2 r8c3} - r4n8{c3 c6} ==> r4c6 <> 4
nrc-chain[4] b2n5{r1c6 r2c4} - r8n5{c4 c7} - r8n8{c7 c3} - r4n8{c3 c6} ==> r1c6 <> 8
interaction column c6 with block b5 ==> r5c5 <> 8
nrct-chain[4] c2n2{r3 r7} - b7n8{r7c2 r8c3} - r4n8{c3 c6} - c6n2{r4 r3} ==> r3c4 <> 2
nrc-chain[4] r3n2{c6 c2} - r7c2{n2 n8} - r7c9{n8 n4} - r9n4{c9 c6} ==> r3c6 <> 4
nrc-chain[4] r3c6{n9 n2} - r3c2{n2 n8} - r3c9{n8 n3} - b2n3{r3c4 r1c4} ==> r1c4 <> 9
nrc-chain[4] r3c6{n9 n2} - r3c2{n2 n8} - b7n8{r7c2 r8c3} - r4n8{c3 c6} ==> r4c6 <> 9
nrczt-whip[2] c9n9{r2 r5} - c6n9{r5 .} ==> r2c4 <> 9
nrct-chain[4] c9n9{r2 r5} - r5n5{c9 c8} - r1n5{c8 c6} - c6n9{r1 r3} ==> r3c8 <> 9
hidden-pairs-in-a-block b3{r1c8 r2c9}{n5 n9} ==> r1c8 <> 3
hidden-single-in-row r1 ==> r1c4 = 3
nrc-chain[4] r1c8{n9 n5} - c6n5{r1 r9} - r9c7{n5 n7} - r9c2{n7 n9} ==> r1c2 <> 9
nrczt-whip[4] r1c2{n7 n6} - r2n6{c3 c7} - c7n7{r2 r9} - b7n7{r9c3 .} ==> r1c1 <> 7
nrczt-whip[4] r1c8{n9 n5} - r1c6{n5 n4} - r3n4{c4 c3} - r3n9{c3 .} ==> r1c5 <> 9
nrc-chain[5] r9c2{n9 n7} - r9c7{n7 n5} - c6n5{r9 r1} - r1c8{n5 n9} - c9n9{r2 r5} ==> r5c2 <> 9
hidden-single-in-column c2 ==> r9c2 = 9
nrc-chain[2] c8n7{r3 r7} - r9n7{c7 c3} ==> r3c3 <> 7
nrc-chain[4] r3n7{c4 c8} - b9n7{r7c8 r9c7} - b9n5{r9c7 r8c7} - c4n5{r8 r2} ==> r2c4 <> 7
nrc-chain[3] r6n6{c3 c4} - c4n7{r6 r3} - r3n4{c4 c3} ==> r6c3 <> 4
nrc-chain[3] c4n7{r6 r3} - c8n7{r3 r7} - r9n7{c7 c3} ==> r6c3 <> 7
nrc-chain[3] c3n7{r2 r9} - r7n7{c1 c8} - r3n7{c8 c4} ==> r2c5 <> 7
nrc-chain[3] r2c5{n8 n2} - b1n2{r2c1 r3c2} - r3n8{c2 c9} ==> r2c7 <> 8

```

```

nrczt-whip[3] r8c5{n2 n9} - r8c4{n9 n5} - r2c4{n5 .} ==> r7c4 <> 2
x-wing-in-rows n2{r3 r7}{c2 c6} ==> r4c6 <> 2
nrc-chain[4] r5c2{n7 n6} - b6n6{r5c8 r4c8} - r4c6{n6 n8} - r5n8{c6 c1} ==> r5c1 <> 7
nrc-chain[4] r8n8{c3 c7} - r8n5{c7 c4} - r2c4{n5 n2} - r2c5{n2 n8} ==> r2c3 <> 8
nrc-chain[4] r2c5{n8 n2} - r2c4{n2 n5} - r8n5{c4 c7} - c7n8{r8 r1} ==> r1c5 <> 8
hidden-single-in-block b2 ==> r2c5 = 8
nrc-chain[4] c4n7{r6 r3} - r3n4{c4 c3} - r3n9{c3 c6} - b2n2{r3c6 r2c4} ==> r6c4 <> 2
nrc-chain[4] r7c4{n6 n4} - r3n4{c4 c3} - r4n4{c3 c7} - r4n2{c7 c4} ==> r4c4 <> 6
nrczt-whip[4] b5n8{r5c6 r4c6} - b5n6{r4c6 r6c4} - c4n7{r6 r3} - b2n9{r3c4 .} ==> r5c6 <> 9
interaction column c6 with block b2 ==> r3c4 <> 9
naked-pairs-in-a-block b2{r1c5 r3c4}{n4 n7} ==> r1c6 <> 4
naked-pairs-in-a-row r1{c6 c8}{n5 n9} ==> r1c1 <> 9
nrczt-whip[2] r5n4{c5 c1} - r1n4{c1 .} ==> r6c5 <> 4
nrc-chain[3] c5n4{r5 r1} - r1c1{n4 n8} - r5n8{c1 c6} ==> r5c6 <> 4
interaction column c6 with block b8 ==> r7c4 <> 4
singles ==> r7c4 = 6, r6c3 = 6, r5c2 = 7, r1c2 = 6, r2c7 = 6
x-wing-in-rows n4{r1 r5}{c1 c5} ==> r6c1 <> 4
naked-single ==> r6c1 = 9
naked-pairs-in-a-column c4{r3 r6}{n4 n7} ==> r4c4 <> 4
nrc-chain[4] r4n2{c7 c4} - b2n2{r2c4 r3c6} - r3n9{c6 c3} - c3n4{r3 r4} ==> r4c7 <> 4
singles
GRID 0 SOLVED. LEVEL = pNRCZT8, MOST COMPLEX RULE = NRCZT8
461379852
237581649
589462173
314958267
872146395
956723481
725634918
148297536
693815724

```

[Back to top](#)**ronk**

Posted: Sun Jan 17, 2010 3:22 pm Post subject: Gurth's symmetry



Joined: 02 Nov 2005
 Posts: 2760
 Location: Southeastern
 USA

Mauricio wrote:

```

00000001020003040005060700000200100001050007070008090003600000090004080600030005
000001002000030040001500600007100800020090007100004050008600000040007090300050000
00000001000002030004030200000005060001040007080700500008007002010600090300050800
000001002000020030000400500001600200070005080400030001003700600050080090700004008
000001002030020010004500600002300070050040800800009000007010400080600001500000080
001000002030001040500060100000050007002100300050003080005030900040007006600800020

```

I'm surprised to see you use puzzles with Gurth's symmetry. Someone might just come along and show very elegant solutions using uniqueness. 😊

[Back to top](#)**Mauricio**

Posted: Sun Jan 17, 2010 8:08 pm Post subject:



Joined: 22 Mar 2006
 Posts: 1101

I have implemented whips, with and without llc reuse. The one with llc reuse is only slightly slower than my braids implementation and both are much faster than the one without llc reuse. My whip implementation is very much faster than I thought it would be.

To compare, here are some samples of the same puzzle solved by Denis [here](#)

No llc reuse

Code:

```

100050009000700030870000004008000000530090600000302400060004800005900310001000000
r4c9=3
r2c2=5
r9c8=4
r2c9<>6, whip[1] c8n6{r3 .}
r4c7<>5, whip[1] r6n5{c9 .}
r4c8<>5, whip[1] r6n5{c9 .}
r7c3<>3, whip[1] c1n3{r9 .}

```

```

r2c3<>4, whip[2] r1n4{c2 c4} - r5n4{c4 .}
r4c1<>9, whip[2] c2n9{r4 r9} - c7n9{r9 .}
r2c5<>1, whip[4] r3n1{c4 c7} - c7n5{r3 r9} - r7n5{c8 c4} - r7n1{c4 .}
r3c6<>6, whip[12] r3n9{c6 c3} - c3n3{r3 r1} - r1c6{r3 n8} - r8c6{r8 n7} - r5c6{r7 n1} - r2c6{r1 n9} - r2n8{c6 c9} - c9n1{r2 r6} - r6n5{c9 c8} - r6n8{c8 c5} - r5c4{r8 n4} - c3n4{r5 .}
r1c8<>2, whip[14] r1c2{r2 n4} - c3n4{r1 r5} - r5n2{c3 c9} - c7n2{r4 r9} - c7n9{r9 r4} - r4c8{r9 n7} - r5c8{r7 n8} - r5c4{r8 n1} - r7n1{c4 c5} - r4n1{c5 c2} - c2n2{r4 r8} - r7n2{c1 c4} - r3c4{r2 n6} - c8n6{r3 .}
r2c5<>2, whip[14] r2n4{c5 c1} - c3n4{r1 r5} - c2n4{r4 r8} - r1c2{r4 n2} - b4n2{r4c2 r4c1} - r8n2{c1 c9} - c7n2{r9 r3} - c7n5{r3 r9} - c9n5{r9 r6} - r7n5{c9 c4} - r7n1{c4 c5} - r6n1{c5 c2} - r4c2{r1 n9} - c7n9{r4 .}
r4c7<>2, whip[11] r5n2{c8 c3} - c3n4{r5 r1} - r1c2{r4 n2} - r2n2{c1 c9} - b3n8{r2c9 r1c8} - r5c8{r8 n7} - r4c8{r7 n9} - c7n9{r4 r9} - r9c2{r9 n8} - c4n8{r9 r5} - r5n4{c4 .}
r7c8<>7, whip[8] b9n9{r7c8 r9c7} - c7n5{r9 r3} - c8n5{r3 r6} - c8n9{r6 r4} - c2n9{r4 r6} - c2n1{r6 r4} - r4c7{r1 n7} - r1n7{c7 .}
r5c9<>7, whip[7] b9n7{r7c9 r9c7} - r1c7{r7 n2} - r1c2{r2 n4} - c3n4{r1 r5} - r5n2{c3 c8} - r4c8{r2 n9} - c7n9{r4 .}
r6c9<>7, whip[7] b9n7{r7c9 r9c7} - c7n9{r9 r4} - r4c8{r9 n2} - r5n2{c8 c3} - c3n4{r5 r1} - r1c2{r4 n2} - r1c7{r2 .}
r9c7<>7, whip[1] c9n7{r8 .}
r3c8<>2, whip[10] c7n2{r1 r9} - c7n9{r9 r4} - r4c8{r9 n7} - r5c8{r7 n8} - r6c8{r8 n5} - r6c9{r5 n1} - r6c2{r1 n9} - r9c2{r9 n8} - c4n8{r9 r1} - b2n2{r1c4 .}
r3c5<>6, whip[10] r3c8{r6 n5} - r6n5{c8 c9} - b9n5{r7c9 r9c7} - c6n5{r9 r4} - b5n6{r4c6 r4c4} - c4n5{r4 r7} - r7n1{c4 c5} - r6n1{c5 c2} - r4n1{c2 c7} - c7n9{r4 .}
r2c1<>2, whip[14] r1c2{r2 n4} - c3n4{r1 r5} - b4n2{r5c3 r4c2} - r8c2{r2 n8} - r9c2{r8 n9} - c7n9{r9 r4} - c7n7{r4 r1} - b3n2{r1c7 r3c7} - r9c7{r2 n5} - c6n5{r9 r4} - c4n5{r4 r7} - r7n1{c4 c5} - r4n1{c5 c4} - c4n4{r4 .}
r3c7<>2, whip[13] c7n5{r3 r9} - c7n9{r9 r4} - c7n1{r4 r2} - r2n2{c7 c3} - r1c2{r2 n4} - c3n4{r1 r5} - c4n4{r5 r4} - r4n5{c4 c6} - b8n5{r9c6 r7c4} - r7n1{c4 c5} - r4n1{c5 c2} - r6n1{c2 c9} - c9n5{r6 .}
r3c3<>6, whip[11] r3c8{r6 n5} - r6n5{c8 c9} - r7n5{c9 c4} - r4n5{c4 c6} - r9n5{c6 c7} - r3c7{r5 n1} - r2n1{c7 c6} - r2n6{c6 c5} - b5n6{r4c5 r4c4} - c4n1{r4 r5} - c9n1{r5 .}
r2c5<>6, whip[13] b2n4{r2c5 r1c4} - r5n4{c4 c3} - c2n4{r4 r8} - r1c2{r4 n2} - c3n2{r1 r7} - c3n7{r7 r6} - c3n6{r6 r1} - r1n3{c3 c6} - b2n8{r1c6 r2c6} - r8n8{c6 c5} - r6c5{r8 n1} - c6n1{r4 r3} - c6n9{r3 .}
r4c2<>2, whip[16] r1c2{r2 n4} - c3n4{r1 r5} - c1n4{r4 r8} - r8c2{r4 n8} - r9c2{r8 n9} - r7n9{c1 c8} - r4c8{r9 n7} - r4c1{r7 n6} - r2c1{r6 n9} - r2n4{c1 c5} - r4c5{r4 n1} - r7n1{c5 c4} - r7n5{c4 c9} - c7n5{r9 r3} - r3n1{c7 c6} - r3n9{c6 .}
r4c1<>4, whip[14] r8n4{c1 c2} - c2n8{r8 r9} - c2n2{r9 r1} - b1n4{r1c2 r1c3} - r5n4{c3 c4} - c4n8{r5 r1} - r2n8{c5 c9} - r2n2{c9 c7} - b3n1{r2c7 r3c7} - c7n5{r3 r9} - r7n5{c8 c4} - c4n1{r7 r4} - r4c2{r1 n9} - c7n9{r4 .}
r8c1<>2, whip[3] r8n4{c1 c2} - b4n4{r4c2 r5c3} - b4n2{r5c3 .}
r4c2<>9, whip[10] r6n9{c1 c8} - r6n5{c8 c9} - r6n8{c9 c5} - r2c5{r8 n4} - r4n4{c5 c4} - r5c4{r4 n1} - c9n1{r5 r2} - r2n8{c9 c6} - c6n1{r2 r3} - c6n9{r3 .}
r6c8<>9, whip[1] r4n9{c7 .}
r4c7<>1, whip[3] c2n1{r4 r6} - c2n9{r6 r9} - c7n9{r9 .}
r2c9<>1, whip[1] c7n1{r3 .}
r5c6<>1, whip[6] r4n1{c4 c2} - r6n1{c2 c9} - r6n5{c9 c8} - r6n8{c8 c5} - r5c4{r8 n4} - r4n4{c5 .}
r1c3<>6, whip[5] r2n6{c1 c6} - c6n9{r2 r3} - c6n1{r3 r4} - r4c2{r1 n4} - c3n4{r5 .}
r2c6<>6, whip[1] b1n6{r2c3 .}
r3c6<>3, whip[5] r1n3{c6 c3} - c3n4{r1 r5} - r4c2{r4 n1} - c6n1{r4 r2} - c6n9{r2 .}
r5c9<>8, whip[5] r5n1{c9 c4} - b5n8{r5c4 r6c5} - r2n8{c5 c6} - c6n1{r2 r3} - c6n9{r3 .}
r2c6<>8, whip[6] r1n8{c4 c8} - r5n8{c8 c4} - r5n4{c4 c3} - r4c2{r4 n1} - c6n1{r4 r3} - c6n9{r3 .}
r3c4<>1, whip[2] r2c6{r1 n9} - r3c6{r9 .}
r3c5<>1, whip[2] r2c6{r1 n9} - r3c6{r9 .}
r4c6<>1, whip[1] b2n1{r3c6 .}
r7c3<>9, whip[4] r3n9{c3 c6} - r3n1{c6 c7} - c7n5{r3 r9} - r9n9{c7 .}
r7c4<>2, whip[4] r3c4{r2 n6} - r3c8{r6 n5} - r6n5{c8 c9} - r7n5{c9 .}
r5c4<>1, whip[5] r5c9{r1 n2} - c8n2{r4 r7} - r7c3{r2 n7} - r7c9{r7 n5} - r7c4{r5 .}
r5c9=1
r7c8<>2, whip[1] b6n2{r5c8 .}
r7c1<>9, whip[5] r7c8{r9 n5} - r3c8{r5 n6} - r3c4{r6 n2} - r3c5{r2 n3} - r7n3{c5 .}
r7c8=9
r4c7=9
r1c7=7
r2c3<>2, whip[1] b3n2{r2c9 .}
r1c4<>6, whip[3] r1c8{r6 n8} - r2n8{c9 c5} - b2n4{r2c5 .}
r1c3<>2, whip[4] r1c2{r2 n4} - r1c4{r4 n8} - r5c4{r8 n4} - r4n4{c5 .}
r4c6<>6, whip[4] r1n6{c6 c8} - r3c8{r6 n5} - c7n5{r3 r9} - c6n5{r9 .}

```

```

r9c4<>8, whip[4] r5c4{n8 n4} - r1c4{n4 n2} - r1c2{n2 n4} - r4n4{c2 .}
r1c4<>2, whip[4] r3c4{n2 n6} - r3c8{n6 n5} - c7n5{r3 r9} - r9c4{n5 .}
r1c2=2
r1c6<>8, whip[2] r1c4{n8 n4} - r2c5{n4 .}
r4c4<>4, whip[2] r1c4{n4 n8} - r5c4{n8 .}
r8c5<>8, whip[3] r2c5{n8 n4} - r4n4{c5 c2} - r8c2{n4 .}
r7c5<>2, whip[4] r3c5{n2 n3} - r1n3{c6 c3} - c3n4{r1 r5} - c3n2{r5 .}
r8c5<>6, whip[4] r8n2{c5 c9} - r2c9{n2 n8} - r1c8{n8 n6} - c6n6{r1 .}
r9c6<>7, whip[3] r8c5{n7 n2} - r3c5{n2 n3} - c6n3{r1 .}
r8c9<>7, whip[4] r8c5{n7 n2} - r3c5{n2 n3} - r1c6{n3 n6} - r8n6{c6 .}
r9c1<>2, whip[4] r9c7{n2 n5} - r9c4{n5 n6} - r3n6{c4 c8} - r3n5{c8 .}
r7c9<>2, whip[1] b7n2{r7c3 .}
r5c8<>8, whip[4] r6c9{n8 n5} - r7c9{n5 n7} - r7c3{n7 n2} - r5n2{c3 .}
r6c5<>8, whip[1] r5n8{c6 .}
r6c8<>7, whip[2] r4c8{n7 n2} - r5c8{n2 .}
r9c5<>2, whip[3] r8n2{c5 c9} - r2c9{n2 n8} - c5n8{r2 .}
r9c5<>3, whip[4] r3c5{n3 n2} - r8n2{c5 c9} - r2c9{n2 n8} - c5n8{r2 .}
r9c1<>7, whip[4] r8c1{n7 n4} - b1n4{r2c1 r1c3} - r1n3{c3 c6} - r9n3{c6 .}
r8c5<>7, whip[3] r8n2{c5 c9} - c9n6{r8 r9} - r9n7{c9 .}
Singles
Most difficult rule: NRCZT Whip[16]

```

I/c reuse

Code:

```

100050009000700030870000004008000000530090600000302400060004800005900310001000000
r4c9=3
r2c2=5
r9c8=4
r2c9<>6, whip[1] c8n6{r3 .}
r4c7<>5, whip[1] r6n5{c9 .}
r4c8<>5, whip[1] r6n5{c9 .}
r7c3<>3, whip[1] c1n3{r9 .}
r2c3<>4, whip[2] r1n4{c2 c4} - r5n4{c4 .}
r4c1<>9, whip[2] c2n9{r4 r9} - c7n9{r9 .}
r2c5<>1, whip[4] r3n1{c4 c7} - c7n5{r3 r9} - r7n5{c8 c4} - r7n1{c4 .}
r9c7<>7, whip[8] r1n7{c7 c8} - r1c7{n7 n2} - r2c7{n2 n1} - r4c7{n1 n9} - r4c8{n9
n2} - r5n2{c8 c3} - c3n4{r5 r1} - r1c2{n4 .}
r6c9<>7, whip[8] b9n7{r7c9 r7c8} - c3n7{r7 r5} - c3n4{r5 r1} - r1c2{n4 n2} -
c3n2{r1 r7} - r7n9{c3 c1} - r2c1{n9 n6} - r6c1{n6 .}
r3c6<>6, whip[12] r3n9{c6 c3} - c3n3{r3 r1} - r1c6{n3 n8} - r8c6{n8 n7} - r5c6{n7
n1} - r2c6{n1 n9} - r2n8{c6 c9} - c9n1{r2 r6} - r6n5{c9 c8} - r6n8{c8 c5} -
r5c4{n8 n4} - c3n4{r5 .}
r1c8<>2, whip[14] r1c2{n2 n4} - c3n4{r1 r5} - r5n2{c3 c9} - c7n2{r4 r9} - c7n9{r9
r4} - r4c8{n9 n7} - r5c8{n7 n8} - r5c4{n8 n1} - r7n1{c4 c5} - r4n1{c5 c2} -
c2n2{r4 r8} - r7n2{c1 c4} - r3c4{n2 n6} - c8n6{r3 .}
r2c5<>2, whip[14] r2n4{c5 c1} - r1c2{n4 n2} - r1n4{c2 c4} - r5n4{c4 c3} -
b4n2{r5c3 r4c1} - r8n2{c1 c9} - c7n2{r9 r3} - c7n5{r3 r9} - c9n5{r7 r6} - r7n5{c9
c4} - r7n1{c4 c5} - r6n1{c5 c2} - r4c2{n1 n9} - c7n9{r4 .}
r4c7<>2, whip[9] r5n2{c8 c3} - r5n4{c3 c4} - c3n4{r5 r1} - r1c2{n4 n2} - r2n2{c1
c9} - b3n8{r2c9 r1c8} - c4n8{r1 r9} - r9c2{n8 n9} - c7n9{r9 .}
r5c9<>7, whip[8] b9n7{r7c9 r7c8} - b9n9{r7c8 r9c7} - r4c7{n9 n1} - c2n1{r4 r6} -
c2n9{r6 r4} - r6n9{c1 c8} - r6n5{c8 c9} - b9n5{r9c9 .}
r7c8<>7, whip[1] c9n7{r9 .}
r3c8<>2, whip[10] c7n2{r1 r9} - c7n9{r9 r4} - r4c8{n9 n7} - r5c8{n7 n8} - r6c8{n8
n5} - r6c9{n5 n1} - r6c2{n1 n9} - r9c2{n9 n8} - c4n8{r9 r1} - b2n2{r1c4 .}
r3c5<>6, whip[10] r3c8{n6 n5} - r6n5{c8 c9} - b9n5{r7c9 r9c7} - c6n5{r9 r4} -
b5n6{r4c6 r4c4} - c4n5{r4 r7} - r7n1{c4 c5} - r6n1{c5 c2} - r4n1{c2 c7} - c7n9{r4
.}
r2c1<>2, whip[14] r1c2{n2 n4} - c3n4{r1 r5} - b4n2{r5c3 r4c2} - r8c2{n2 n8} -
r9c2{n8 n9} - c7n9{r9 r4} - c7n7{r4 r1} - b3n2{r1c7 r3c7} - r9c7{n2 n5} - c6n5{r9
r4} - c4n5{r4 r7} - r7n1{c4 c5} - r4n1{c5 c4} - c4n4{r4 .}
r3c7<>2, whip[13] c7n5{r3 r9} - c7n9{r9 r4} - c7n1{r4 r2} - r2n2{c7 c3} - r1c2{n2
n4} - c3n4{r1 r5} - c4n4{r5 r4} - r4n5{c4 c6} - c4n5{r4 r7} - r7n1{c4 c5} -
r4n1{c5 c2} - r6n1{c2 c9} - c9n5{r6 .}
r3c3<>6, whip[11] r3c8{n6 n5} - r3c7{n5 n1} - c7n5{r3 r9} - r7n5{c8 c4} - c9n5{r7
r6} - c9n1{r6 r5} - c4n1{r5 r4} - r4n5{c4 c6} - c6n1{r4 r2} - r2n6{c6 c5} -
b5n6{r6c5 .}
r2c5<>6, whip[13] b2n4{r2c5 r1c4} - r5n4{c4 c3} - c2n4{r4 r8} - r1c2{n4 n2} -
c3n2{r1 r7} - c3n7{r7 r6} - c3n6{r6 r1} - r1n3{c3 c6} - b2n8{r1c6 r2c6} - r8n8{c6
c5} - r6c5{n8 n1} - c6n1{r4 r3} - c6n9{r3 .}
r4c1<>4, whip[14] r5n4{c3 c4} - c3n4{r5 r1} - r1c2{n4 n2} - c2n4{r1 r8} - c2n8{r8
r9} - c4n8{r9 r1} - r2n8{c5 c9} - r2n2{c9 c7} - b3n1{r2c7 r3c7} - c7n5{r3 r9} -
r7n5{c8 c4} - c4n1{r7 r4} - r4c2{n1 n9} - c7n9{r4 .}
r8c1<>2, whip[4] r8n4{c1 c2} - r1c2{n4 n2} - c3n2{r1 r5} - b4n4{r5c3 .}
r4c2<>9, whip[10] r6n9{c1 c8} - r6n5{c8 c9} - r6n8{c9 c5} - r2c5{n8 n4} - r4n4{c5
c4} - r5c4{n4 n1} - c9n1{r5 r2} - r2n8{c9 c6} - c6n1{r2 r3} - c6n9{r3 .}
r6c8<>9, whip[1] r4n9{c7 .}
r4c7<>1, whip[3] c2n1{r4 r6} - c2n9{r6 r9} - c7n9{r9 .}
r2c9<>1, whip[1] c7n1{r3 .}
r5c6<>1, whip[6] r4n1{c4 c2} - r6n1{c2 c9} - r6n5{c9 c8} - r6n8{c8 c5} - r5c4{n8

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n4} - r4n4{c5 .}
r5c9<>8, whip[5] r5n1{c9 c4} - b5n8{r5c4 r6c5} - r2n8{c5 c6} - c6n1{r2 r3} -
c6n9{r3 .}
r4c6<>6, whip[7] c6n5{r4 r9} - c7n5{r9 r3} - c7n1{r3 r2} - c6n1{r2 r3} - r3n9{c6
c3} - r3n3{c3 c5} - c6n3{r1 .}
r4c6<>7, whip[7] c6n5{r4 r9} - c7n5{r9 r3} - c7n1{r3 r2} - c6n1{r2 r3} - r3n9{c6
c3} - r3n3{c3 c5} - c6n3{r1 .}
r7c3<>9, whip[8] r3n9{c3 c6} - r2n9{c6 c1} - r6n9{c1 c2} - r9n9{c2 c7} - c7n5{r9
r3} - c7n1{r3 r2} - c6n1{r2 r4} - c2n1{r4 .}
r5c4<>1, whip[5] r5c9{n1 n2} - c8n2{r4 r7} - r7c3{n2 n7} - r7c9{n7 n5} - r7c4{n5
.}
r5c9=1
r7c8<>2, whip[1] b6n2{r5c8 .}
r7c4<>2, whip[7] r7n1{c4 c5} - r6n1{c5 c2} - c2n9{r6 r9} - c2n8{r9 r8} - r8n2{c2
c9} - r9c7{n2 n5} - r7n5{c9 .}
r3c4<>1, whip[3] r7c4{n1 n5} - r4n5{c4 c6} - c6n1{r4 .}
r1c4<>2, whip[7] r3c4{n2 n6} - r3c8{n6 n5} - c7n5{r3 r9} - r9c4{n5 n8} - r5c4{n8
n4} - r4n4{c4 c2} - r1c2{n4 .}
r3c3<>2, whip[1] b2n2{r3c5 .}
r9c1<>2, whip[6] c1n3{r9 r7} - r7n9{c1 c8} - r9c7{n9 n5} - r3n5{c7 c8} - r3n6{c8
c4} - c4n2{r3 .}
r5c8<>8, whip[5] r5n2{c8 c3} - c1n2{r4 r7} - r7c3{n2 n7} - r7c9{n7 n5} - r6c9{n5
.}
r6c5<>8, whip[1] r5n8{c6 .}
r6c8<>7, whip[2] r6n5{c8 c9} - r6n8{c9 .}
r9c4<>8, whip[3] r5c4{n8 n4} - c5n4{r4 r2} - c5n8{r2 .}
r9c6<>8, whip[4] r8n8{c5 c2} - r8n4{c2 c1} - r2n4{c1 c5} - c5n8{r2 .}
r2c6<>8, whip[7] r2c5{n8 n4} - r1c4{n4 n6} - r3c4{n6 n2} - r9c4{n2 n5} - r4n5{c4
c6} - c6n1{r4 r3} - c6n9{r3 .}
r1c3<>2, whip[6] r1c2{n2 n4} - r2n4{c1 c5} - r4n4{c5 c4} - r5c4{n4 n8} -
b2n8{r1c4 r1c6} - r1n3{c6 .}
r4c2<>2, whip[5] r1n2{c2 c7} - r1n7{c7 c8} - r4c8{n7 n9} - r7n9{c8 c1} - c1n2{r7
.}
r1c3<>6, whip[5] r2n6{c1 c6} - c6n9{r2 r3} - c6n1{r3 r4} - r4c2{n1 n4} - c3n4{r5
.}
r2c6<>6, whip[1] b1n6{r2c3 .}
r3c6<>3, whip[5] r1n3{c6 c3} - c3n4{r1 r5} - r4c2{n4 n1} - c6n1{r4 r2} - c6n9{r2
.}
r3c5<>1, whip[2] r2c6{n1 n9} - r3c6{n9 .}
r4c6<>1, whip[1] b2n1{r3c6 .}
r4c6=5
r7c5<>3, whip[4] r3c5{n3 n2} - c4n2{r3 r9} - c4n5{r9 r7} - r7n1{c4 .}
r7c1=3
r7c8=9
r4c7=9
r4c1=2
r4c8=7
r5c8=2
r1c7=7
r1c2=2
r7c3=2
r6c1<>7, whip[1] c3n7{r5 .}
r6c5<>6, whip[1] r4n6{c4 .}
r4c4<>4, whip[2] r1n4{c4 c3} - r5n4{c3 .}
r1c4<>6, whip[2] c4n4{r1 r5} - c4n8{r5 .}
r1c6<>8, whip[2] r1c4{n8 n4} - r2c5{n4 .}
r4c5<>1, whip[2] r6c5{n1 n7} - r7c5{n7 .}
r8c5<>7, whip[2] r6c5{n7 n1} - r7c5{n1 .}
r9c5<>7, whip[2] r6c5{n7 n1} - r7c5{n1 .}
r8c5<>8, whip[3] r2c5{n8 n4} - r4n4{c5 c2} - r8c2{n4 .}
r1c6<>3, whip[3] r3c5{n3 n2} - r8c5{n2 n6} - c6n6{r9 .}
Singles
Most difficult rule: NRCZT Whip[14]

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Edit: Some improvement for my implementation of whips without reuse: I was visiting branches that produced the same sequence of llc's and rlc's but a different sequence of 2D cell's they belong, now I only visit one of those branches. I tested it, now depending on the puzzle, whips (with or without llc reuse) may be faster than my braids implementation. It seems that for easy puzzles is faster while for hard puzzles is slower. For the puzzle above, whips with reuse is faster than braids, and braids is faster than whips without reuse (22 seconds, 35 seconds, 60 seconds).

Last edited by Mauricio on Mon Jan 18, 2010 10:34 pm; edited 3 times in total

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