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Hidden Unique Rectangles

From sudokuwiki.com, the puzzle solver's site

2		
	3	6
5		7

All the [Unique Rectangles discussed on this page](#) have had at least two bi-value cells (or a Naked Pair, if you like). An interesting situation emerges when we have only one bi-value cell and the Unique Rectangle is buried, or "hidden", under lots of other candidates. The conditions have to be just right, but this formation is surprisingly common.

In Figure 1, the cells A4, A6, H4 and H6 (also known as AH46) form a rectangle with a potential deadly pattern on {1/2}. We want to avoid reducing this rectangle to 1/2 in all four cells. There is a bi-value cell at A4, but the other corners contain a clutter of other candidates.

The types of Unique Rectangles that we've examined so far simply won't work here. However, all is not lost because something interesting is going on in the corner opposite to A4. 1 in H6 is part of two [strong links](#) in the row and column - that is, 1 occurs only twice in row H and column 6. Our 1 in this rectangle can have only one of two possibilities.

Looking at H6, let's make "Option A" the case where H6 is 1. The pairs or "[strong links](#)" remove 1 from in A6 and H4. Option B is where H6 is not a 1. That would put a 1 in A6 and H4.

	1	2	3	4	5	6	7	8	9
A	8	5	2 7	1 2	6	1 2 9	2 7 9	4	3
B	1	2 7 9	4	2 3 5	2 3 5 8 9	2 5 8	2 7	2 8 9	6
C	3	2 9	6	7	2 8 9	4	1 2 8	1 2 8 9	5
D	2	6	7 8	9	1 8	3	5	1 7	4
E	4	7 8	1	6	2 5 8	2 5 8	3	2 7	9
F	5	3	9	4	1 2	7	1 2	6	8
G	7	1	5 3	8	5 9	6	4	3 9	2
H	9	2 8	2 3 5 8	1 2 3 5	4	1 2 5	6	3 8	7
I	6	4	2 3 8	2 3	7	2 9	8 9	5	1

Hidden Unique Rectangle Type 1: [Load Example](#) or : [From the Start](#)

Let us conjecture that the solution to H6 is 2. That forces the 1s to take on option B *because they would be the only remaining 1s in that row and column (H4 and B6)*. The implication of this option is that the only candidate for A4 is 2. But, wait a moment - this is exactly the deadly pattern we need to avoid - two numbers in two rows, two columns and two boxes. Since none of these cells is a clue, the puzzle could have two solutions. We can swap the 1 and the 2 around. This makes option B unviable.

So surely we can fix the 1s in A4 and H6? Not quite. We haven't taken into account the clutter of other clues in the corners of this rectangle. But we can say something about the 2 in H6. We've excluded it for the reason above, but option A also excludes the 2 in H6. Whichever way round A4 is, H6 cannot contain a 2, so we can remove it from that cell.

Type 2 Hidden Unique Rectangles

In Figure 2, the cells E4, E6, J4 and J6 (also known as EJ46) form a rectangle with a potential deadly pattern on {2/3}. In **type 2** we have an identifiable Floor consisting of E4 and E6, both bi-value cells. And the Roof contains a clutter of other candidates. We still want to avoid reducing this rectangle to 2/3 in all four cells.

Type 2 starts with a Naked Pair and we're checking for which strong links exist on the pair candidates, in this case 2 and 3. The Naked Pair is obviously a double strong link on both numbers, but just candidate 2 has a strong link to the Roof in column 4. From this we can start using the logic of Type 1.



Figure 2, Hidden Unique Rectangle Type 2: [Load Example](#) or : [From the Start](#)

Is 3 viable for either Roof Cells? J4 is viable since J6 does not have to be a 2. However, J6 as 3 is trouble because it forces E6 to be 2, E4 to be 3 and because of the strong link, J4 becomes 2. A Deadly Pattern, so it is safe to remove 3 from J6. At first glance the formation looks symmetrical but its the other 2s and 3s (or lack of) in the columns that give us the implications of the Hidden Rectangle.

Type 2b Hidden Unique Rectangles

In common with [Unique Rectangles](#) there is a type B for this strategy, where the floor is across two boxes rather than in the same box.

The green cells are the floor with conjugate pairs 1/7. The Deadly Rectangle extends to H3 and H3 (orange and yellow) where 1 and 7 are also present amongst other candidates. The strong link on 1 between E2 and E3 means that a 7 in H3 would create a Deadly Rectangle.

Thanks to Jerry Foil of Virginia, USA for providing the first example. Interestingly this type of Hidden Unique Rectangle is almost twice as common as the Type 1 and three times as common as Type 2.



Figure 3: Hidden Unique Rectangle 2b: [Load Example](#) or : [From the Start](#)

HIDDEN UNIQUE RECTANGLE Type
2b: removing 7 at J7 because of
HJ47 and one strong link between
H4 and J4 on 5

	1	2	3	4	5	6	7	8	9
A	5	1	8	4	7	2	6	3	9
B	3	² 7	6	8	5	9	^{1 2} 7	^{1 2} 7	4
C	4	² 7	9	3	1	6	^{2 5} 7 8	^{2 5} 8	² 7 8
D	9	4	5	6	2	¹ 7	3	¹ 7 8	^{7 8}
E	8	6	1	^{7 9}	3	4	² 7 9	² 7 9	5
F	7	3	2	¹ 9	8	5	^{1 4} 9	^{1 4} 9	6
G	6	5	⁴ 7	^{1 2} 7	9	¹ 7	8	² 4 7	3
H	2	9	3	⁵ 7	4	8	⁵ 7	6	1
J	1	8	⁴ 7	^{2 5} 7	6	3	^{2 4 5} 7 9	^{2 4 5} 9	² 7

Type 2b Hidden Unique Rectangle: [Load Example](#) or : [From the Start](#)

[illegible]

... by: Andrew Stuart

... by: Thesty

so we're looking at the paragraph that begins 'Let us conjecture'. it explains that if you put a 5 in H6 then that forces 9s into H4 and B6 and thus a 5 into B4. that array of 5s and 9s forms the deadly pattern i.e. if that were right then the final grid would have an alternative solution (with those 5s and 9s reversed). thus the 5 can't go in H6.

what do you think?

... by: Otto

I have the same question as Dean on 7-JUL-2009. What (or where) is your answer?

... by: Dean

I have the same question as Don above except I can see why 9 can't be at B6. What I don't understand is why 9 can't be at A4 and B2 in option A.

Monday 6-Jul-2009

... by: Don

In figure 1, BH46, I don't understand how option A forces 9 at B4. If H6 is 9, why can't 9 be at A4 and B6? I'm not arguing; I just don't understand.

Sunday 14-Jun-2009

... by: Andrew Stuart

Yes

Sunday 10-May-2009

... by: John

I used this technique libally for several months with success until today when it kept giving me an incorrect solution. I just want to confirm that the floor has to be in the same box for hidden type 2's to work, right?

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