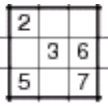
Intersection Removal

From sudokuwiki.org, the puzzle solver's site



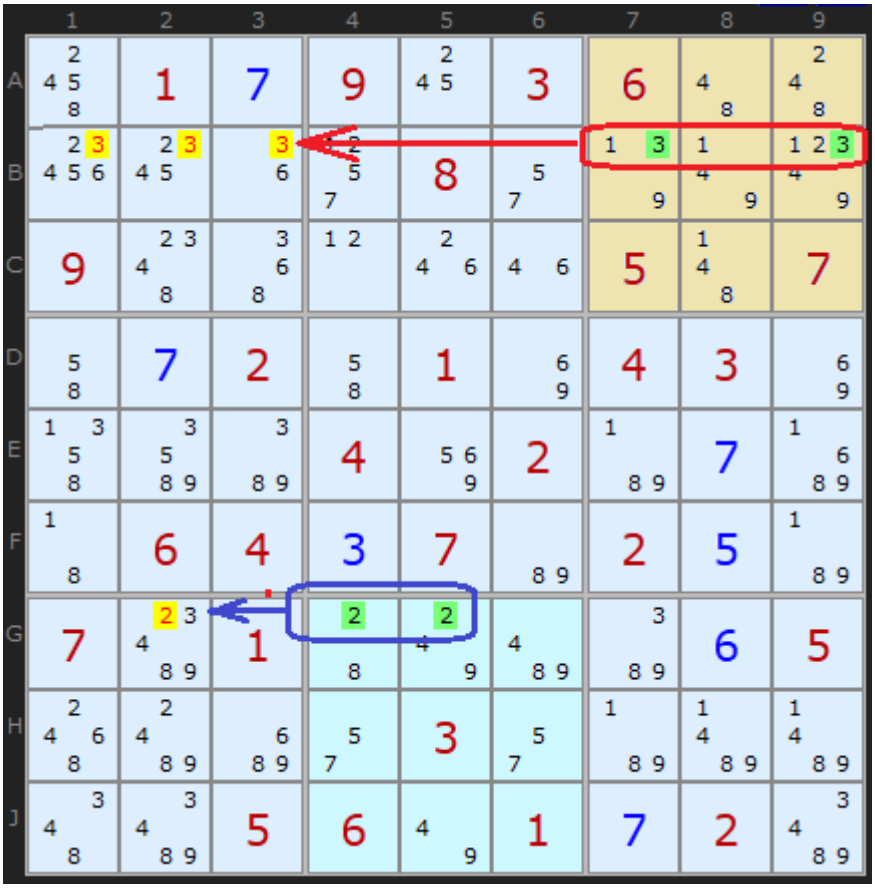
If any one number occurs twice or three times in just one **unit** (any row, column or box) then we can remove that number from the intersection of another unit. There are four types of intersection:

- A Pair or Triple in a box - if they are aligned on a row, n can be removed from the rest of the row.
- A Pair or Triple in a box - if they are aligned on a column, n can be removed from the rest of the column.
- A Pair or Triple on a row - if they are all in the same box, n can be removed from the rest of the box.
- A Pair or Triple on a column - if they are all in the same box, n can be removed from the rest of the box.

Pointing Pairs, Pointing Triples

Looking at each box in turn there may be two or three occurrences of a particular number. If these numbers are aligned on a single row or column (as a pair or a triple) then we know that number MUST occur on that line. Therefore, if the number occurs anywhere else on the row or column outside the box WHICH THEY ARE ALIGNED ON then it can be removed. The pair or triple *points* along the line at any numbers which can be removed.

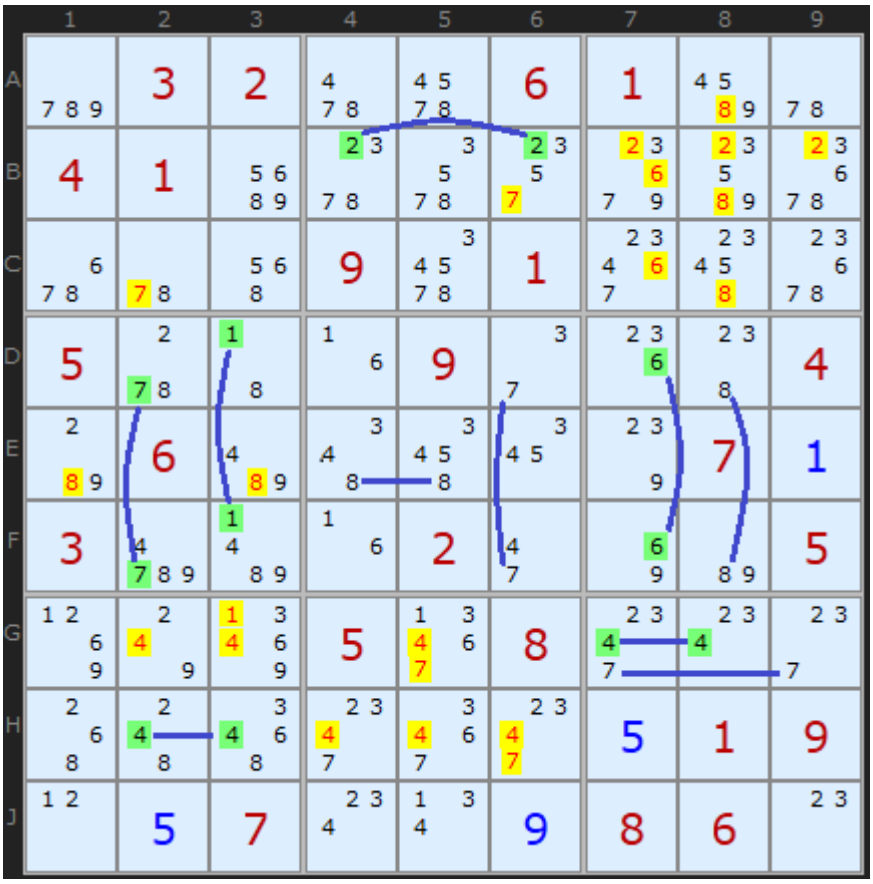
Here are two Pointing Pairs at the same time on this tough rated puzzle. The 3s in **B7** and **B9** are alone in box 3 and they are aligned on the row. So looking along the row we can remove all the 3s in Box 1. In a similar manner the 2s in **G4** and **G5** point along the row to **G2**.



Pointing Pairs : Load Example or : From the Start

Now this is a rather special puzzle and a little extreme, but if we look at the whole board you can see I have highlighted

a whole cluster of Pointing Pairs. It is obviously not necessary to spot everyone to progress the board but there are so many good examples it is worth looking at. The eliminations are highlighted in yellow. You should be able to see which eliminations belong to which Pointing Pair. A couple are consequences of a previous elimination.



Pointing Pairs Example 2 : Load Example

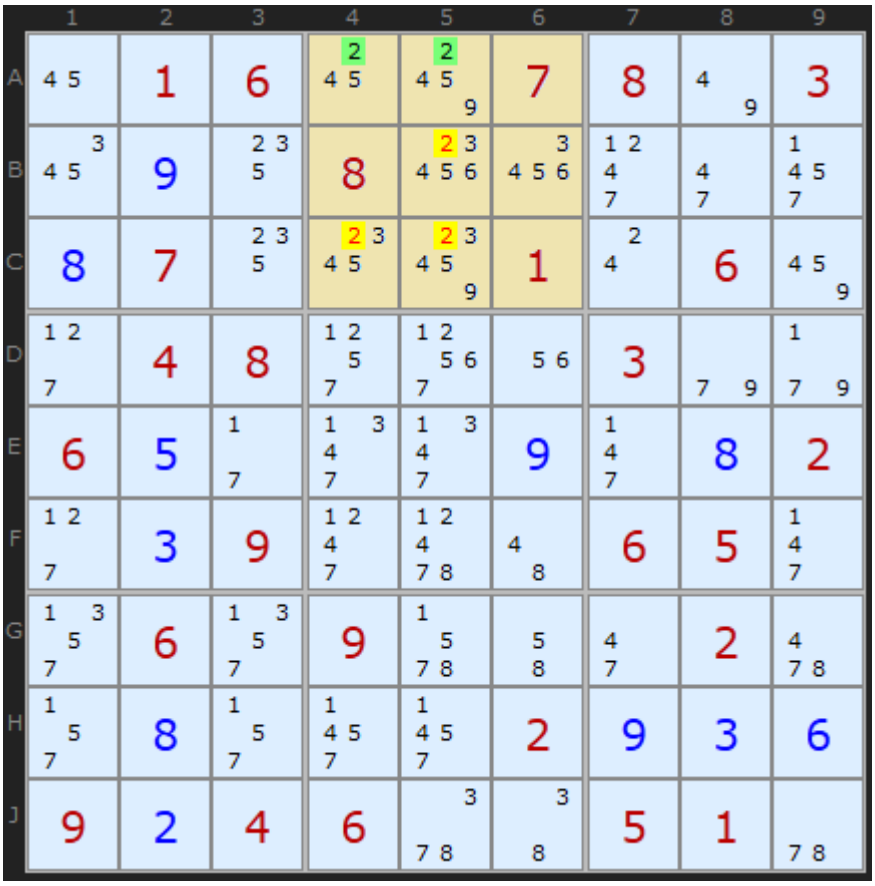
Here is a Pointing Triple found in a tough grade puzzle containing many wholesome and nutritious Pointing Pairs. All the 3s are found in **G6**, **H6** and **J6** and nowhere else in box 8, so they point up the column to another 3 which can be removed.

Box Line Reduction

Pointing Triple : Load Example or : From the Start

This strategy involves careful comparison of rows and columns against the content of boxes (3 x 3 squares). If we find numbers in any row or column that are grouped together in just one box, we can exclude those numbers from the rest of the box. For example:

This Sudoku contains numerous Pointing Pairs and Box/Line Reductions and is worth stepping through from the start. Consider row A. The only 2s left are in **A4** and **A5** which means we should should check the rest of the box. 2 has to go somewhere on row A and it will be in one of those two cells. So we can eliminate 2 from **B5**, **C4** and **C5**.



Box/Line Reduction : Load Example or : From the Start

In the very next step of the same puzzle we have two 4s alone in column 8. That fixes 4 to be in either cell **A8** or **B8**. We can remove the other 4s in box 3 and get our next solved cell: 2 in **C7**.

Box/Line Reduction : Load Example or : From the Start

I've rolled two examples into one diagram here, I hope it wont be confusing. The one involving 6s follows on immediately from the first one found among the 3s (purely because it searches in order from 1 to 9). They are both 'triple' versions of Box/Line reduction.

In column 1 the 3s occupy **G1**, **H1**, **J1** (shorthand = **GHJ1**) which are all in box 7. The solution is pinned to column 1 so the other 3s in the box must go.

The 6s are likewise pinned by column 2. You can see there are other 6s in column 3, in **A3** and **J3**) which is why it's okay to remove the 6s in **DEF3**. You won't run out.

Triple BLR : Load Example or : From the Start

If you are a fan of Jigsaw Sudoku puzzles, you may want to read the articles on Double Pointing Pairs and Double Line/Box Reduction which extend the ideas here but are strategies possible only in the Jigsaw variant of the puzzle.

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