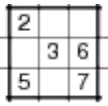
Franken Sword-Fish

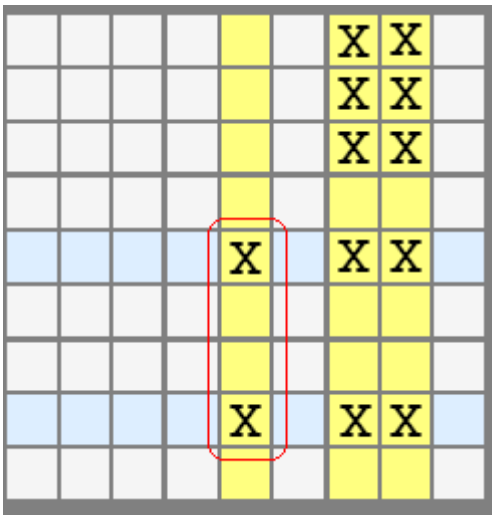
From sudokuwiki.org, the puzzle solver's site



I am testing the usefulness of this strategy which I have poached straight from Sudopedia.

Franken patterns extend the *fish* family which starts with X-Wings, Swordfish, Jellyfish and Squirmbags. Finned and Sashimi versions of these are covered under Finned X-Wings and Finned Swordfish. There is no Franken X-Wing.

With Franken Fish we look for a **defining set** and a **secondary set**. A defining set consists of three rows or columns. One of these will contain a **conjugate pair** and will belong to a different 'house' to the other two rows or columns. (A house is a set of rows or columns belonging to three boxes, such as columns 1, 2 and 3 or rows A, B and C).



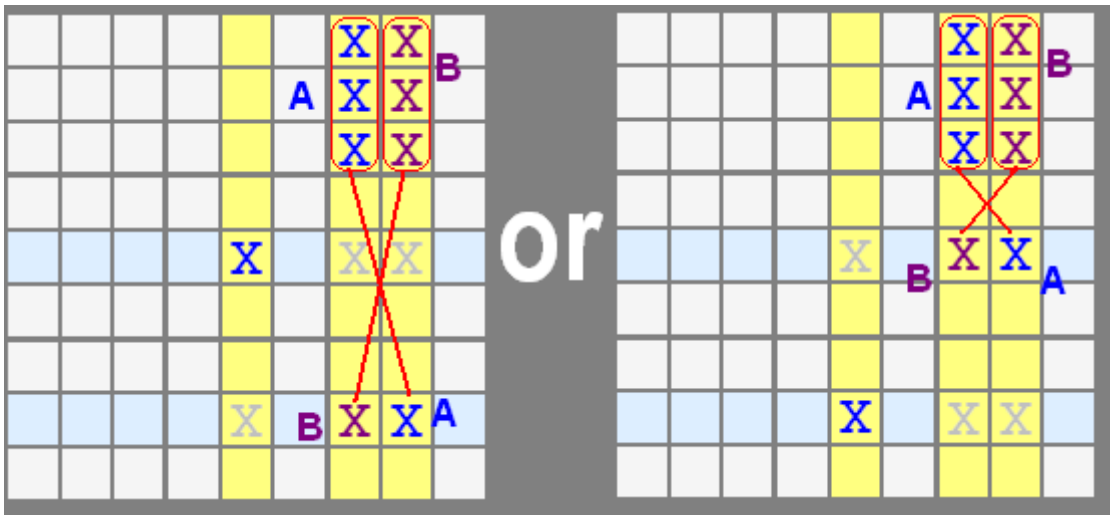
Maximal Franken Swordfish

A characteristic Franken Swordfish is set out in this first diagram. The defining set is the three columns 5, 7 and 8. One of these columns must contain a **conjugate pair** of a number X and this must much up exactly with other numbers X in the other columns. **The empty yellow spaces are very important in this configuration**. They must not contain X. The other two columns contain a bunch of X in box 3 (called the **Franken Box**) aligned on those two columns. All other cells (in white) may or may not contain X.

The **secondary set** consists of the two rows that the conjugate pair exist on - these are marked with light blue cells.

This Franken Swordfish contains 12 numbers of X which is maximal, but more often than not less will be available in that box. But at least one X must be present both columns and in the Franken Box.

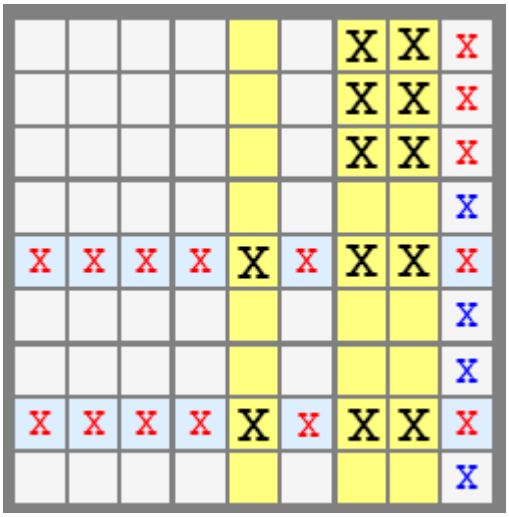
The conjugate pair in **E5** and **H5** is the key. We don't know which will be the solution but the diagram shows the consequences of first one and then the other.



Two options for the conjugate pair

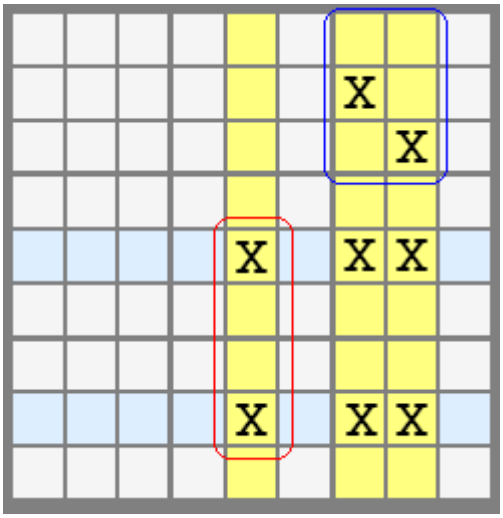
What happens when either is considered the solution is that the rest of the pattern makes an X-Wing style either/or set. Either the group marked A will be the solution or the group marked B.

If this is the case - and logically it is - then we have many places where X cannot go. You can remove any X in all the cells marked with a red **X**. We get to remove Xs in the rows of the secondary set and within the box defined by the defining set. The other consequence is that certain cells must have an X - which are marked in Blue. You may be certain which one, however, but I have added it to the diagram so show how the spaces configures when the logic is applied.



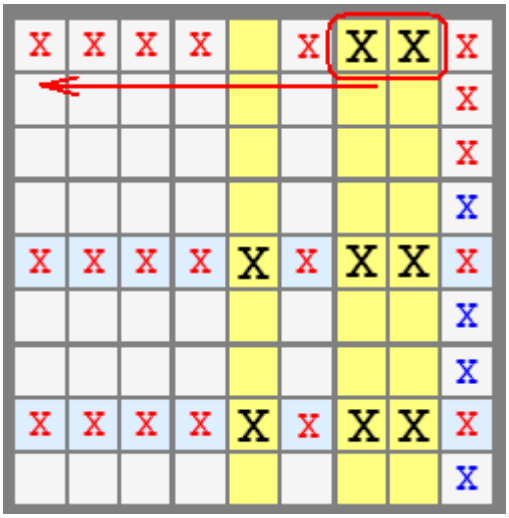
The elimination cells

Fhe ***Franken box***, box 3, does not have to contain all six candidates of X. In this version of the diagram I have left two remaining. The pattern and the eliminations are exactly the same. You can think of the Xs in this box and column as two Grouped Cells pointing down the columns. A Group Cell can contain 1, 2 or 3 cells as members.



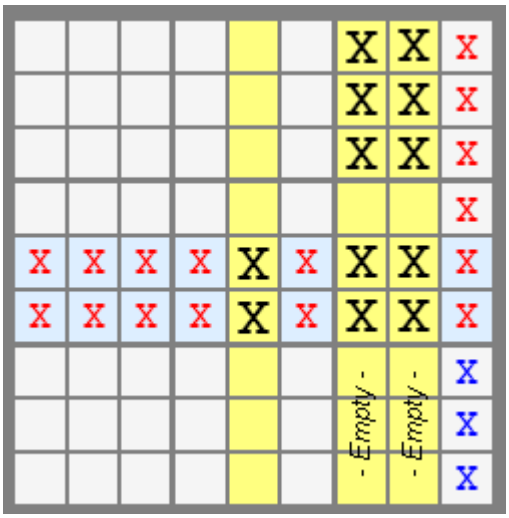
One minimal Franken Swordfish

Certain specific arrangements of X in this box give even more eliminations if X is aligned up correctly. To have two remaining X in the Franken Box that are aligned on the row causes them to be EITHER/OR as well. Which means the rest of that row can also have other candidates removed. The total extent of the elimination cells is shown on this diagram.



Extra row alignment elimination

While I was testing this it occurred to me that the pattern seems to require that the conjugate pair we start will must exist in two separate boxes as well as aligned on the column (or row). Moving them up to the same box does work, but you need the same number of empty cells in the defining set's columns. I have written on the diagram to emphasis where the empty cells are - all the yellow ones.

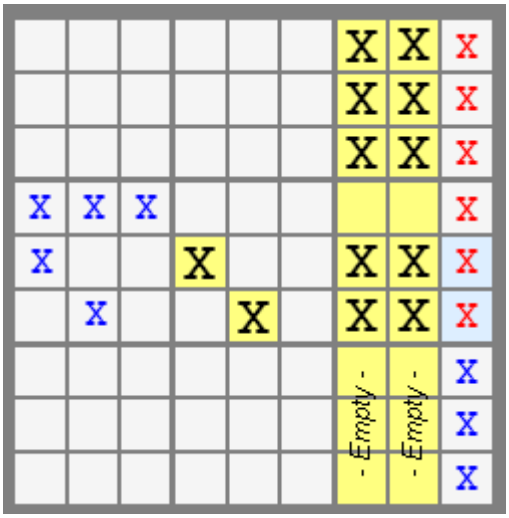


Secondary set within the same house

In the final diagram I retain the conjugate pair in the centre box, but it is now only a pair within the box, not the column. This does not break the Franken pattern but it does severely limit the eliminations. These in fact they can only take place in Box 3 and Box 6. I have labelled the yellow cells 'empty' where these need to be empty.

(Is this a mutant Franken?)

The solver does not look for this alternative pattern as it is much less useful.



Box based conjugate pair Franken

I have only noticed several Franken Swordfish per thousand very hard Sudoku so far. The position of the strategy in the testing list is important. It cannot go before the Finned and Sashimi Fish and I am testing it just after those strategies. I'll

post the results here.

If it looks viable I will add some examples with diagrams.

Go back to Finned Sword-Fish Continue to Pattern Overlay