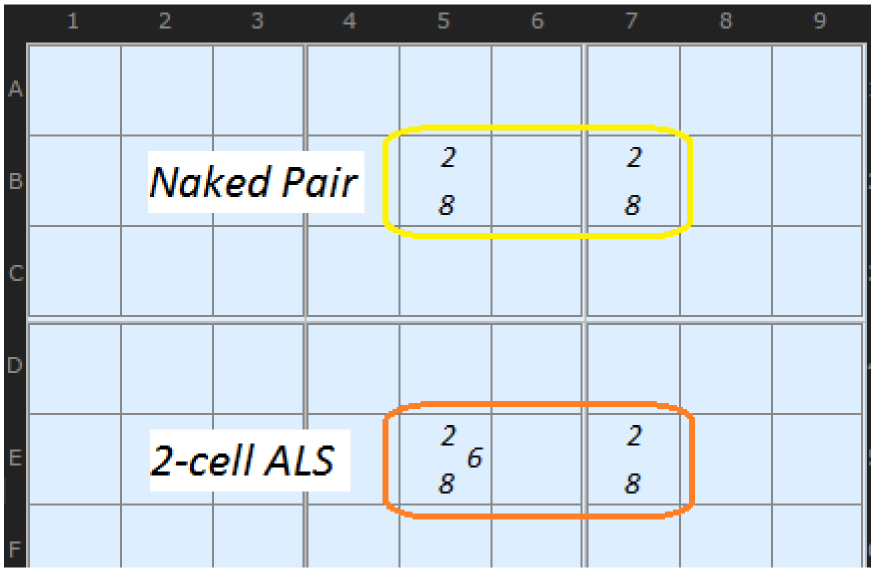
AIC with ALSs

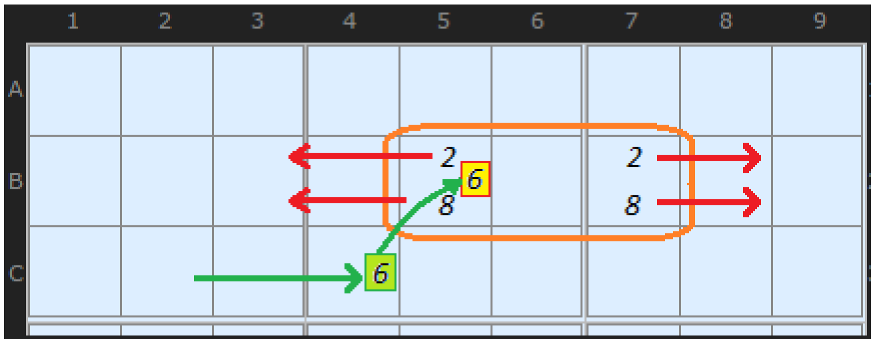
From sudokuwiki.org, the puzzle solver's site

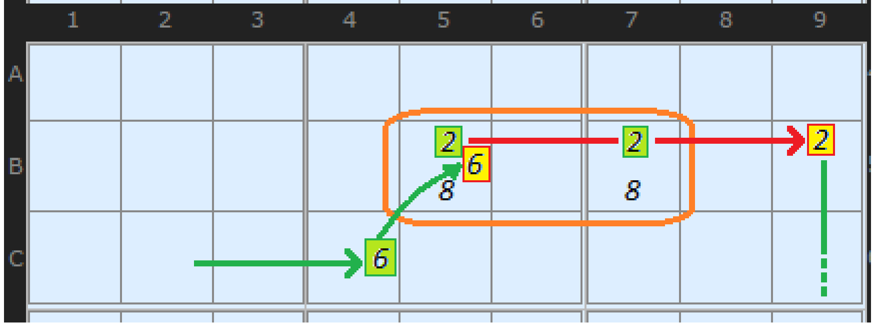
A **Locked Set** is a group of cells (that can all see each other) of size N where the number of candidates in those cells is equal to the size of the group. That is N cells contain N candidates. A solved cell or a clue is a Locked Set where N=1, but such a cell is not useful. The smallest useful Locked Set is a Naked Pair (where N=2) as in the [2,8] set in the diagram. The next smallest Locked Set is a Naked Triple (N=3) and so on.



Naked Pair and Almost Locked Set

An **Almost Locked Set** (ALS) is N cells containing N+1 candidates. In the context of Alternating Inference Chains in this solver, an ALS is of size N=2 and the number of different candidates in those cells is 3, although bigger ALS groups are possible. So an ALS of size 2 will be a two Conjugate Pairs plus one other candidate. In the diagram above the [2,8] paisr are joined by a stray 6 which stops it being a useful Naked Pair.





Lets continue with this ALS.

While solving a puzzle I am hunting around for Inference Chains and perhaps I find my chain turns ON the 6 in cell **C4**. That will remove all other 6s in the box including the 6 in our ALS. If that 6 is **OFF** then we create an on-the-fly Naked Pair.

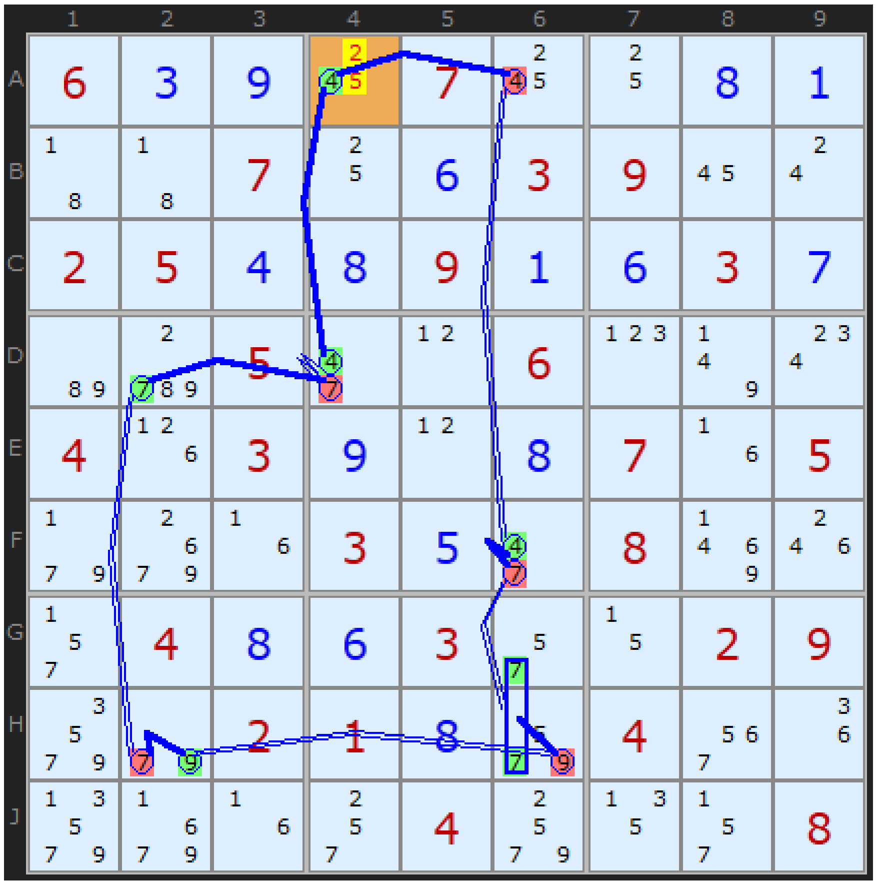
Now, a Naked Pair eliminates candidates in the row or column (or box) it is aligned on so we can use this elimination property as part of our chain. This is the trick! By removing the 6 in **B5** we fix 2 and 8 into those two cells so we can look along the

ALS in an AIC fragment

row at other 2s and 8s and turn them **OFF**.
This I do in cell **B9**. From there I can continue the inference chain. You get two cracks of the whip: check both branches - the 2s and the 8s in the pseudo Naked Pair.

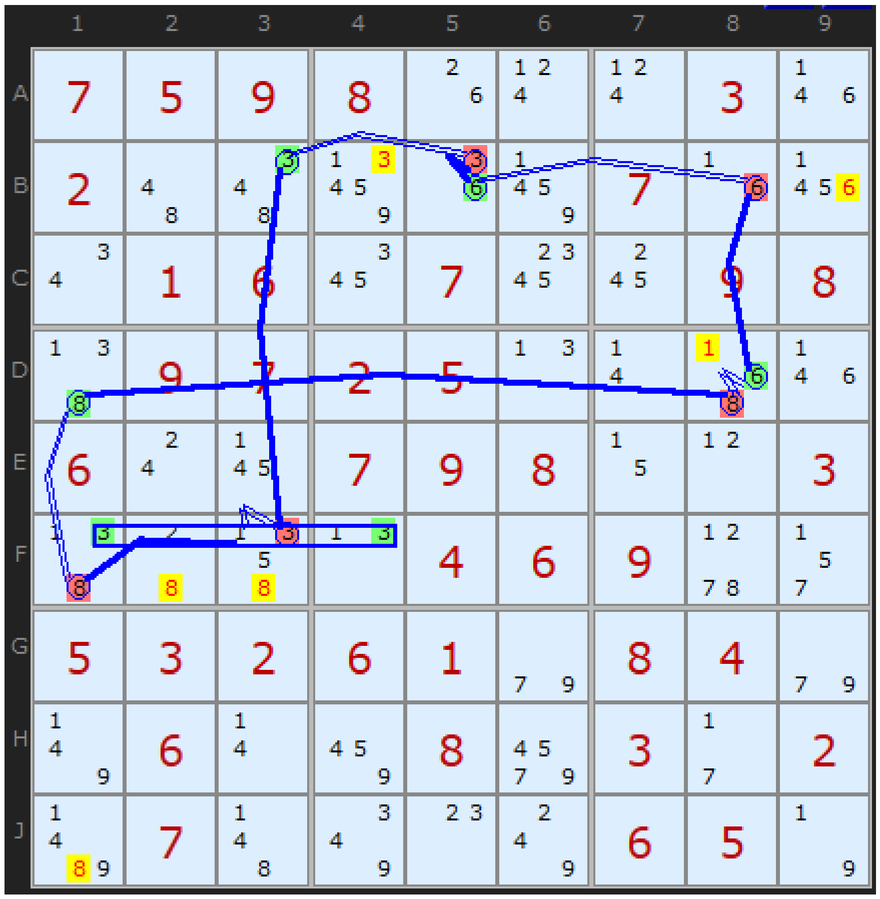
A real life example now. This chain contains an ALS on the cells **{G6,H6}** (I used squiggly brackets to denote ALS as opposed to square brackets for Grouped Cells). 9s in row H are the entry point. We turn 9 ON in **H2** which turns **OFF** the 9 in **H6** - the extra candidate that makes the ALS an ALS. This gives us a Naked Pair of [5,7] that points up column 6 turning **OFF** the 7 in **F6** and the chain continues.

Ultimately we use Nice Loop Rule 2 to place 4 in **A4**
AIC on 4 (Discontinuous Alternating Nice Loop, length 12):
-4[A4]+4[D4]-7[D4]+7[D2]
-7[H2]+9[H2]-9[H6]**+7{H6|G6}**
-7[F6]+4[F6]-4[A6]+4[A4]
- Contradiction: When 4 is removed from A4 the chain implies it must be 4 - other candidates 2/5 can be removed



AIC with ALS : Load Example or : From the Start

This second example uses a chain to kill off-chain candidates, which is Nice Loop Rule 1. The ALS is in **{F1,F4}** and consists of [1/3/8] and [1/3] respectively. We turn off the extra candidate, 8 in **F1** to enable the Naked Pair to be formed.



Off Chain eliminations : Load Example or : From the Start

Alternating Inference Chain

AIC Rule 1: -3[B5]+6[B5]-6[B8]+6[D8]-8[D8]+8[D1]-8[F1]+3{F1|F4}-3[F3]+3[B3]-3[B5]

- Off-chain 6 taken off B9 - weak link: B5 to B8
- Off-chain candidates 1 taken off cell D8, link is between 6 and 8 in D8
- Off-chain 8 taken off F2 - weak link: D1 to F1
- Off-chain 8 taken off F3 - weak link: D1 to F1
- Off-chain 8 taken off J1 - weak link: D1 to F1
- Off-chain 3 taken off B4 - weak link: B3 to B5

Go back to AICs with Grouped Cells Continue to Digit Forcing Chains