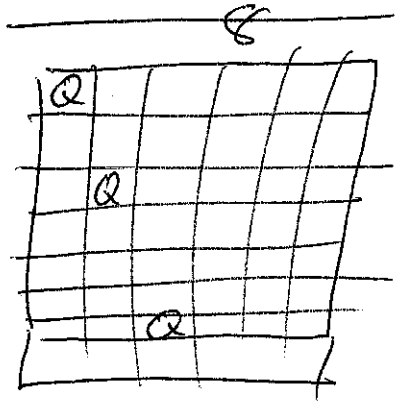
Backtracking

1st old program - Sudoku Solver
9 x 9 puzzle
some squares have numbers (1-9)
fill in blanks so each ~~square~~ row, col and "box" contain 1-9 each exactly.

8 Queens



Q ↔ I ↙ ↖

in each row
→ 1 queen
→ in a diff col each time →

perm 2, 0, ~~8~~, 6, 3, 4, 5

0, 1, _, _, _, _, _, _
2

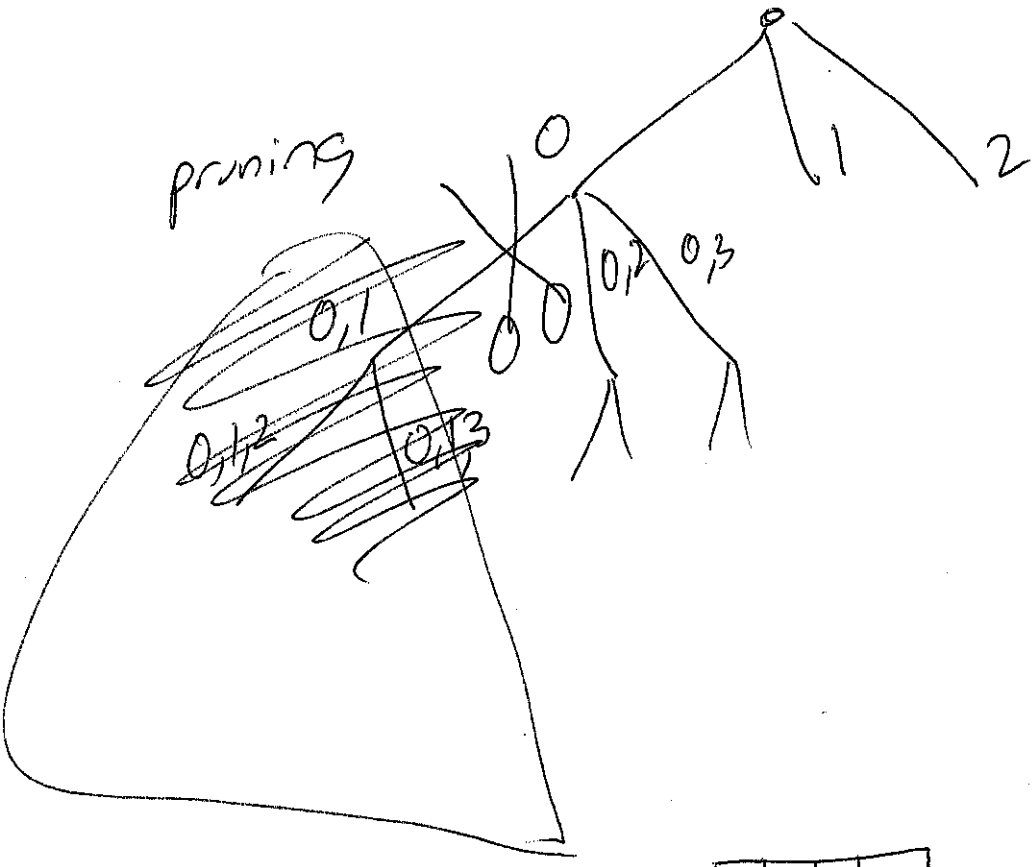
(0,0)
(1,1)

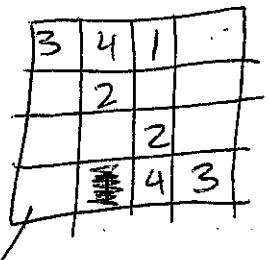
6! permutations all doomed

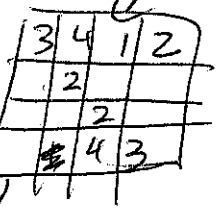
row 0 col 2
row 1 col 0
row 2 col 7
row 3 col 6

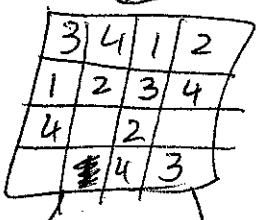
:)

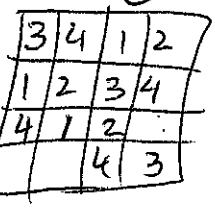
1/9/17 (2)

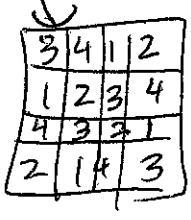

pruning
0
1
2
0,1
0,2
0,3
0,1,2
0,1,3


3 4 1
2
2
4 3


3 4 1 2
2
2
4 3


3 4 1 2
1 2 3 4
4 2
4 3


3 4 1 2
1 2 3 4
4 1 2
4 3


3 4 1 2
1 2 3 4
4 3 2 1
2 1 4 3

3, 0, 2 T F T T F F

```
perm(int[] order, boolean[] used, int k)
if (k == order.length) {
    //Process completed perm
    return;
}
// Try each possible value in slot k
for (int i=0; i<order.length; i++) {
    if (used[i]) continue;
    if (conflict(perm, i, k)) continue;
    order[k] = i;
    used[i] = true;
    perm(order, used, k+1);
    used[i] = false;
}
}
```

1/9/17 ③

* In backtracking, we continue if filling in i is DOOMED to FAIL!!!

k Divisible integer

22520

2 mod 1 = 0

22 mod 2 = 0

225 mod 3 = 0

2252 mod 4 = 0

22520 mod 5 = 0

Given k (k = 6) , print all k divisible #s with exactly k digits. (No leading zeros)

22 → 225

22 × 10 + 5

Input
8
1
2
3
4
5
6
7
8