n - Queen

Queen
- Avoid same row
- Avoid same column
- Avoid keeping them diagonally

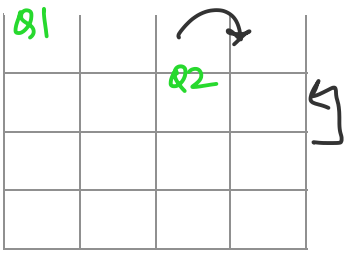
Given a chessboard of size "n * n", place n Queens in such a way that no two Queens should attack each other.

n = 4

↓

chessboard size = 4 * 4

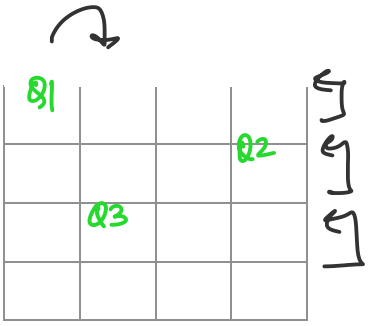
No of Queens = 4



Q3 cannot be placed

↓

Backtrack Q2



Q4 cannot be placed

↓

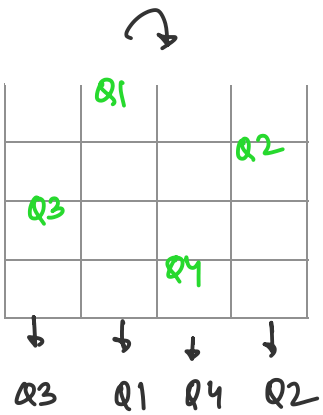
Backtrack Q3

↓

Backtrack Q2

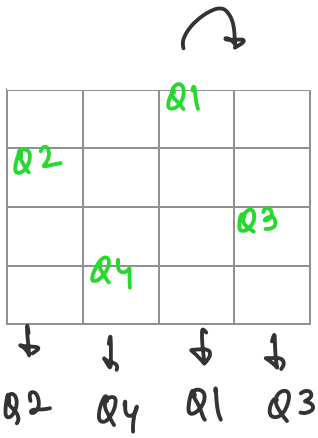
↓

Backtrack Q1

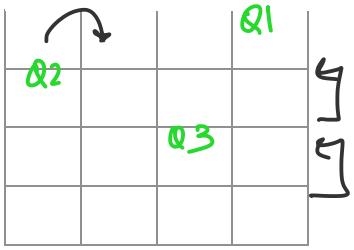


Soln – Q3, Q1, Q4, Q2

Another soln –



Soln – Q2, Q4, Q1, Q3



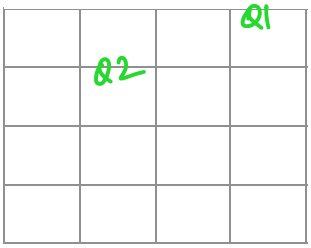
Q4 cannot be placed

↓

Backtrack Q3

↓

Backtrack Q2



Q3 cannot be placed

↓

Q2 cannot be backtracked

So for n=4, we have 2 sol^n's possible –

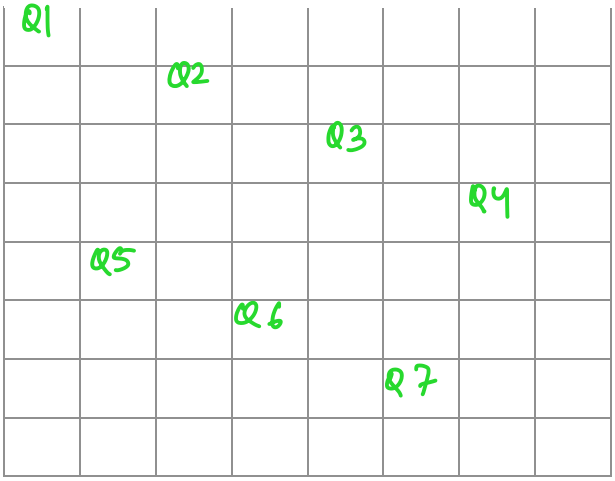
{ Q3, Q1, Q4, Q2

Q2, Q4, Q1, Q3 }

$n = 8$

Chessboard size = $8 * 8$

No of queens = 8



Q8 cannot be placed

↓

Backtrack Q7

Algorithm for n - Queen

1. Initialize a 2-D array of size $n * n$.
2. Start with the leftmost column and place a queen in the first row of that column.

3. Move to the next column and place queen in the first row of that column.

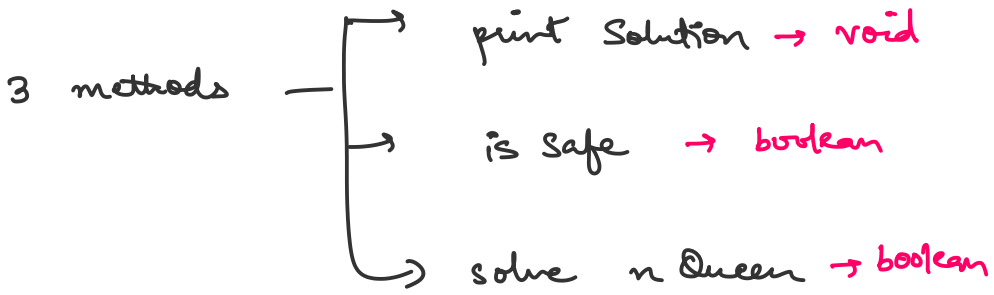
4. Repeat step 3 until all queens have been placed or it is impossible to place a queen in the current column without violating the rules.

5. If n Queens have been placed then print the solution.

6. If it is not possible to place all the n queens without violating the rules then we will backtrack.

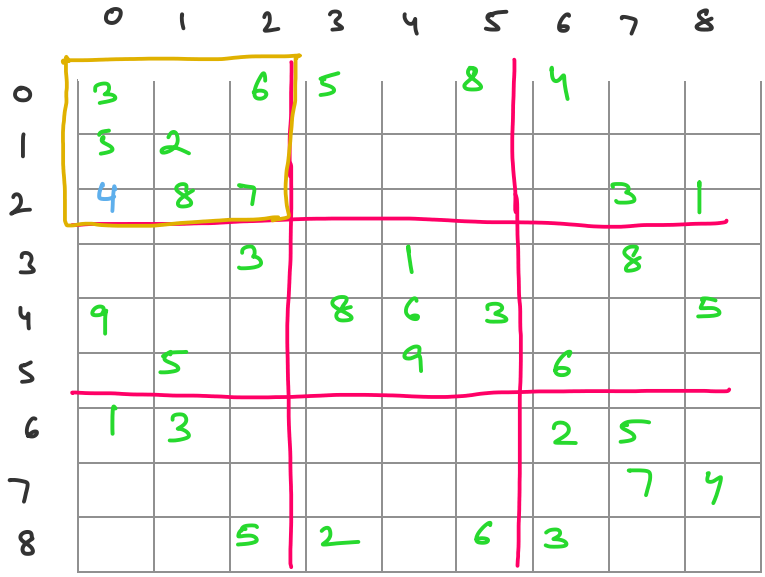
7. Remove the queen from the previous column and move it to another row.

8. Repeat steps 4-7 untill all possible configurations have been explored.



Solve Sudoku

Given a partially filled 2D grid of size 9*9, the goal is to assign numbers (1-9) to the empty in such a way that the instance of the number should be exactly once in the row, column and the subgrid.



[1, 2, 3, 4, 5, 6, 7, 8, 9]

2, 3, 5, 6, 7, 8

↓

1, 4, 9

Algorithm / steps –

1. Create a function to check that after assigning a value to the empty cell will the grid becomes safe or not.

↓

For this we can use either a