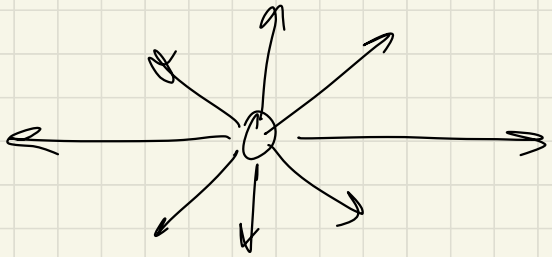
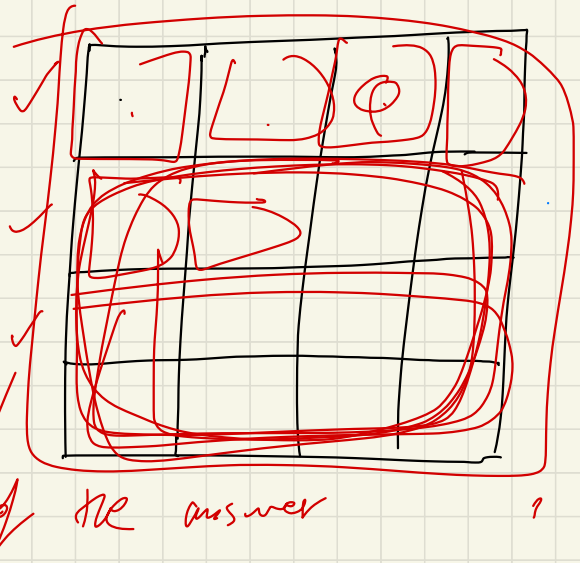
Q!

N-Queens Problem:



N = 4

(place 4 queens on it)

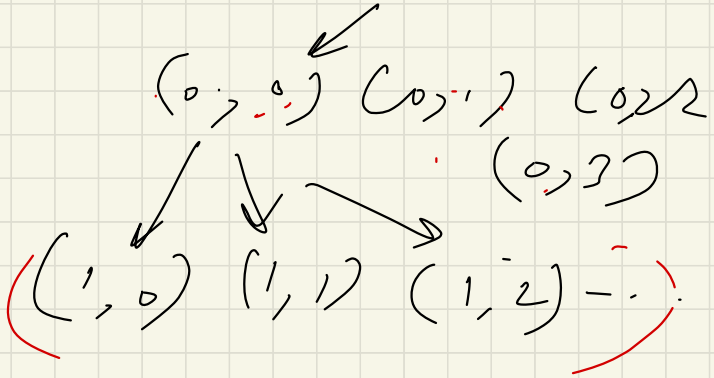


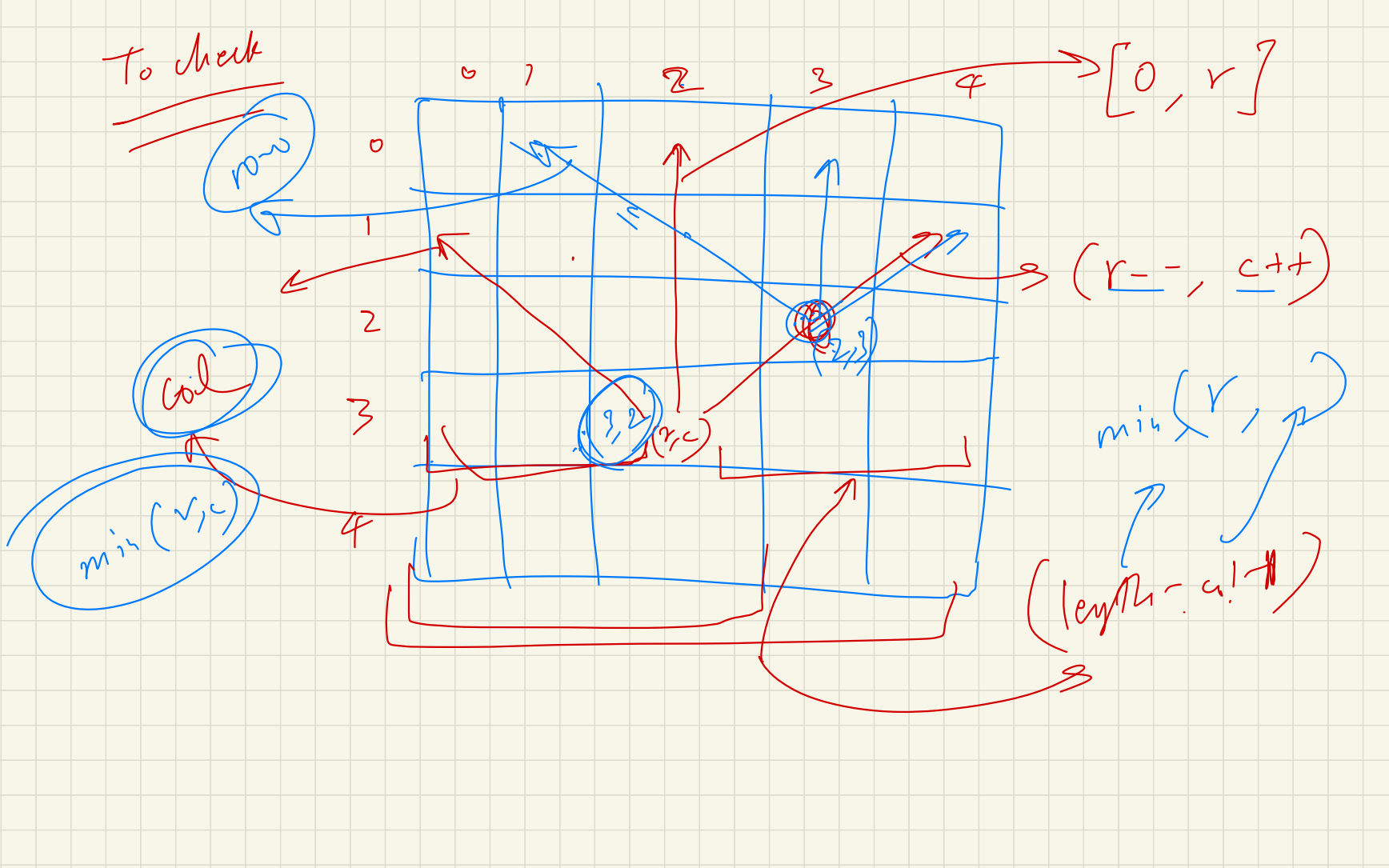
the answer ?

Points ?

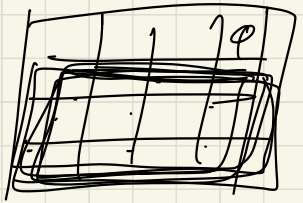
- recursion? ✓
- bt ?

(board, r, c)




To check
row
0
1
2
3
4
[0, r]
(r--, c++)
Goal
min(r, c)
(r, c)
min(r,
length - c)

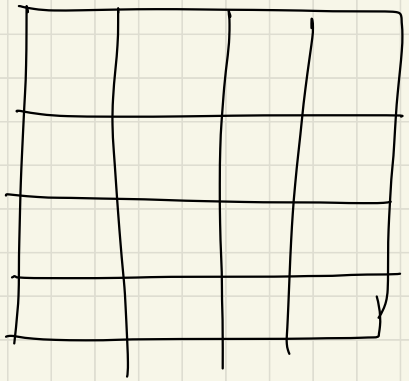
Recurrence Relation:



$$T(N) = N * T(N-1) + O(N^2)$$

Akkiva Bazzi formula: Time complexity lecture.

$$O(N^3 + N!) = O(N!)$$ Ans



$4 * 3 * 2 * 1$

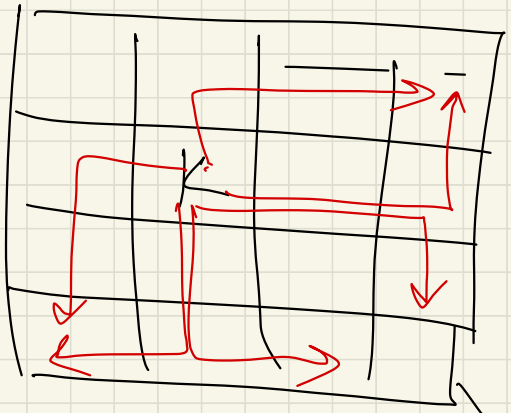
$= 4!$

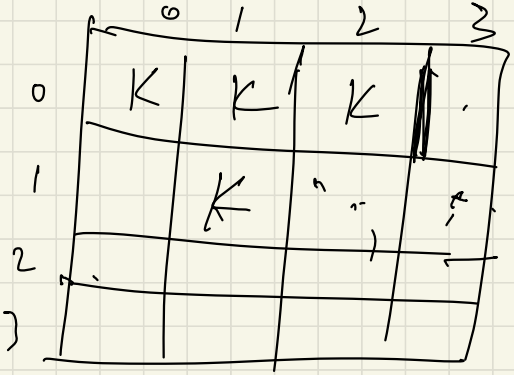
☆ You can eliminate for loops with conditions, but then you need another variable in arg.

(board, row, col, targets)

(6, 0, 4)

Note: When a choice can affect future answers, use bt.





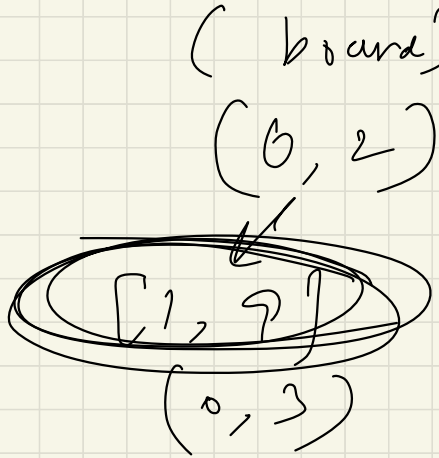
(0, 0, 4)

(0, 1, 3)

(0, 2, 2)

(1, 1, 1)

[r-2, c-1
r-2, c+1
r-1, c+2
r-1, c-2]



(3, 6)

$3 - 3\%3 = 3$

$6 - 6\%3 = 6$

(6, 8)

$6 - 6\%3$ $8 - 8\%3 =$

(6,3) ✓

7 - 7%3 = 6

4 - 4%3 = 1

(6, 6)

Complexity : Total 9 numbers.

for every one → n^2

Time : $O(9^{n^2})$

Space $O(N^2)$