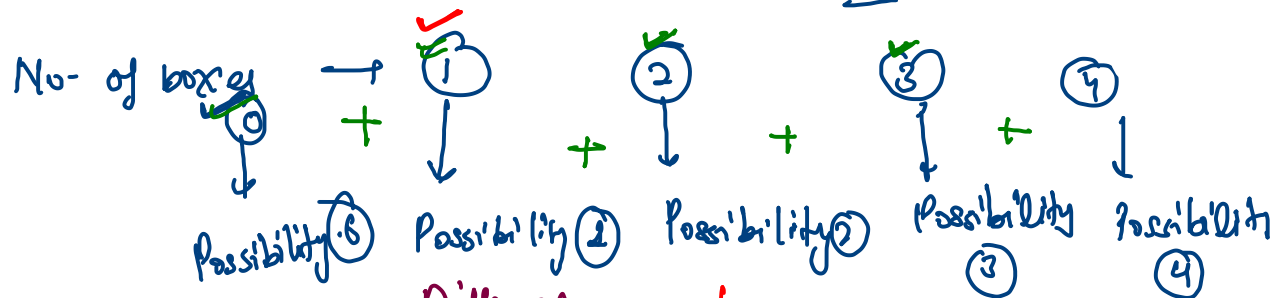


print all possibility  
to select boxes.

b0	b1	b2	b3

Box



Different ways  $\downarrow$

Solve ??

$\{ \dots \}$   
 $\textcircled{1}$

$\{$   
b0  
b1  
b2  
b3  
 $\}$   
 $\textcircled{4}$

$\{$   
b0 b1  
b0 b2  
b0 b3  
b1 b2  
b1 b3  
b2 b3  
 $\}$   
 $\textcircled{7}$

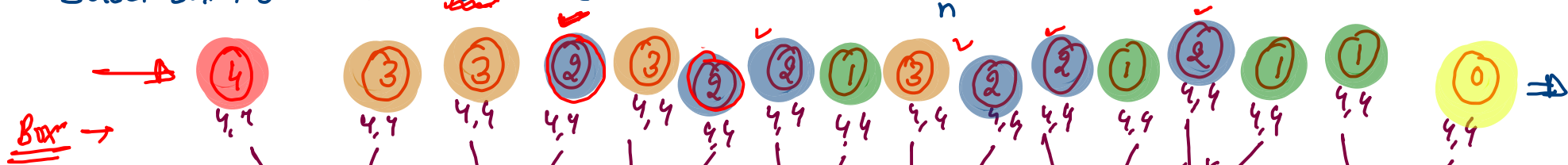
$\{$   
b0 b1 b2  
b0 b1 b3  
b0 b2 b3  
b1 b2 b3  
 $\}$   
 $\textcircled{7}$

b0 b1 b2 b3

$\textcircled{1}$

$2^4$   
 $= 2^1 \times 2^1$   
 $\textcircled{2^1}$   
 $\textcircled{4}$   
 $= \textcircled{16}$

$(x+1)^n =$   $\underbrace{2^n}_{\text{Select box} \rightarrow 0} \Rightarrow \underbrace{{}^nC_0}_{\uparrow 0} + \underbrace{{}^nC_1}_{\uparrow 1} + \underbrace{{}^nC_2}_{\uparrow 2} + \underbrace{{}^nC_3}_{\uparrow 3} + \dots + \underbrace{{}^nC_n}_{\uparrow n}$  } No. of Subseq



<input checked="" type="checkbox"/> b0	b1	b2	b3
<input checked="" type="checkbox"/> b0	b1	b2	
<input checked="" type="checkbox"/> b0	b1	b3	
<input checked="" type="checkbox"/> b0	b1		
<input checked="" type="checkbox"/> b0	b2	b3	
<input checked="" type="checkbox"/> b0	b2		
<input checked="" type="checkbox"/> b0	b3		
<input checked="" type="checkbox"/> b1	b2	b3	
<input checked="" type="checkbox"/> b1	b2		
<input checked="" type="checkbox"/> b1	b3		
<input checked="" type="checkbox"/> b1			
<input checked="" type="checkbox"/> b2	b3		
<input checked="" type="checkbox"/> b2			
<input checked="" type="checkbox"/> b3			

4 boxes:  
ways

${}^4C_0 \rightarrow$		1
${}^4C_1 \rightarrow$		4
${}^4C_2 \rightarrow$		6
${}^4C_3 \rightarrow$		4
${}^4C_4 \rightarrow$		1

color

Count

Permutat.

Meaning

${}^nC_r \rightarrow$

comb. no. of ways to  
select 'r' boxes  
from 'n' boxes

$${}^nC_r = \frac{n!}{r!(n-r)!}$$

$$n! = n \times (n-1) \times (n-2) \times \dots \times 1$$

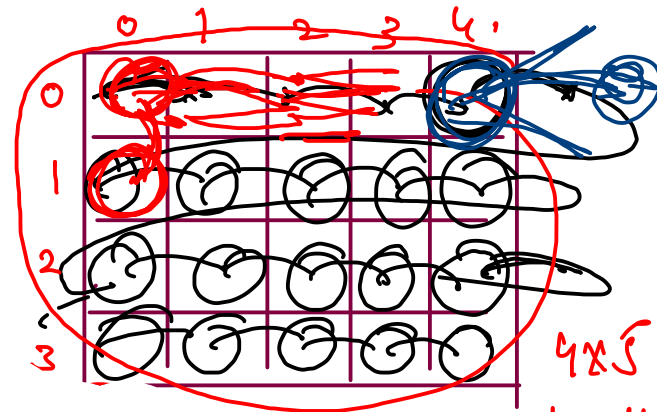
① 4 - (0-0), (0-1), (1-0), (1-1)

④ 3 - (0-0), (0-1), (1-0), (1-1)  
 (0-0), (0-1), (1-1)  
 (0-0), (1-0), (1-1)  
 (0-1), (1-0), (1-1)

④ 1 - (0-0),  
 (0-1),  
 (1-0),  
 (1-1),

② 2 - ~~(0-0)~~, (0-1) X  
 (0-0), (1-0)  
 (0-0), (1-1)  
 (0-1), (1-0)  
 (0-1), (1-1)  
 (1-0), (1-1)

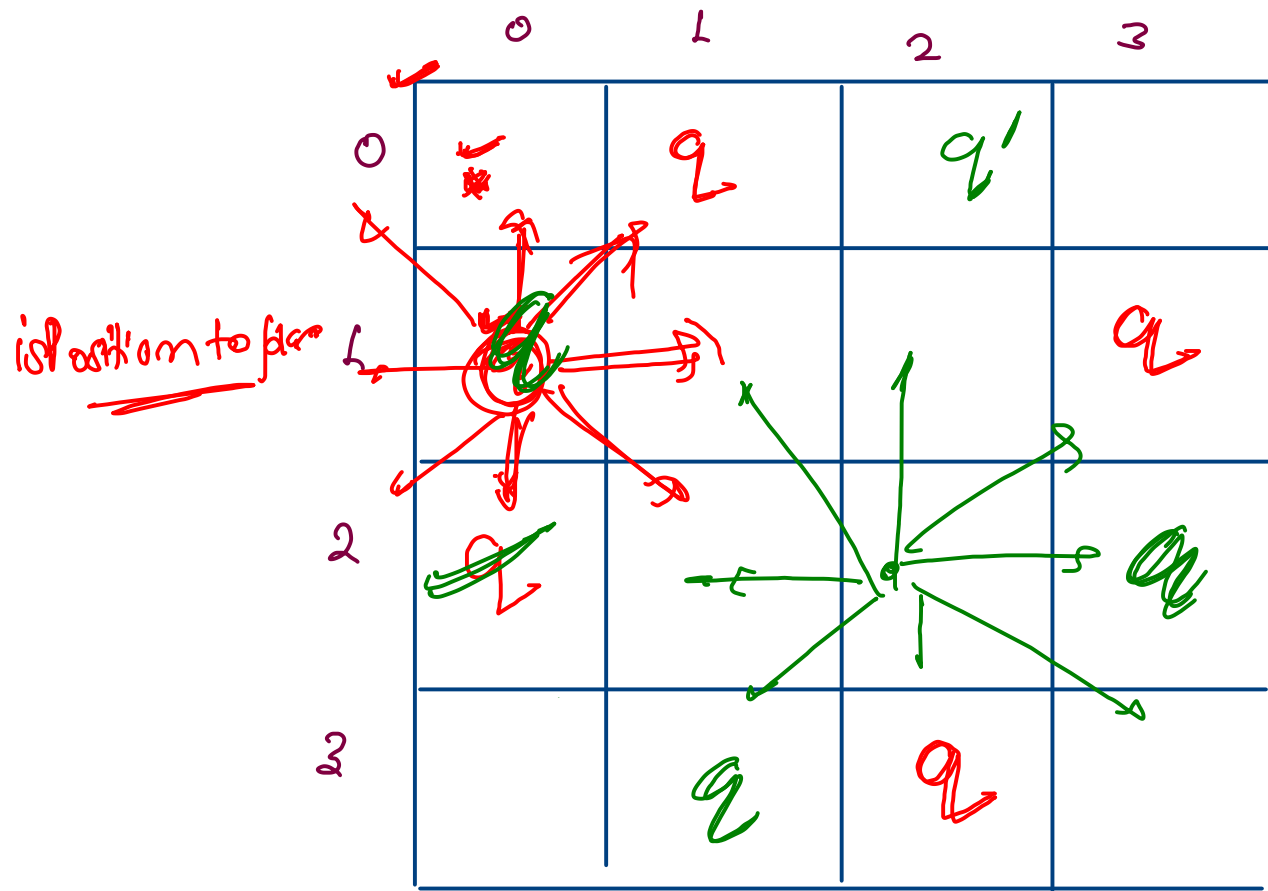
mark



4x5  
 h=4  
 m=5

1	(0-0), (0-1), (1-0), (1-1),
2	(0-0), (0-1), (1-0),
3	(0-0), (0-1), (1-1),
4	(0-0), (0-1),
5	(0-0), (1-0), (1-1),
6	(0-0), (1-0),
7	(0-0), (1-1),
8	(0-0),
9	(0-1), (1-0), (1-1),
10	(0-1), (1-0),
11	(0-1), (1-1),
12	(0-1),
13	(1-0), (1-1),
14	(1-0),
15	(1-1),
16	

within a Row - select  
 single box



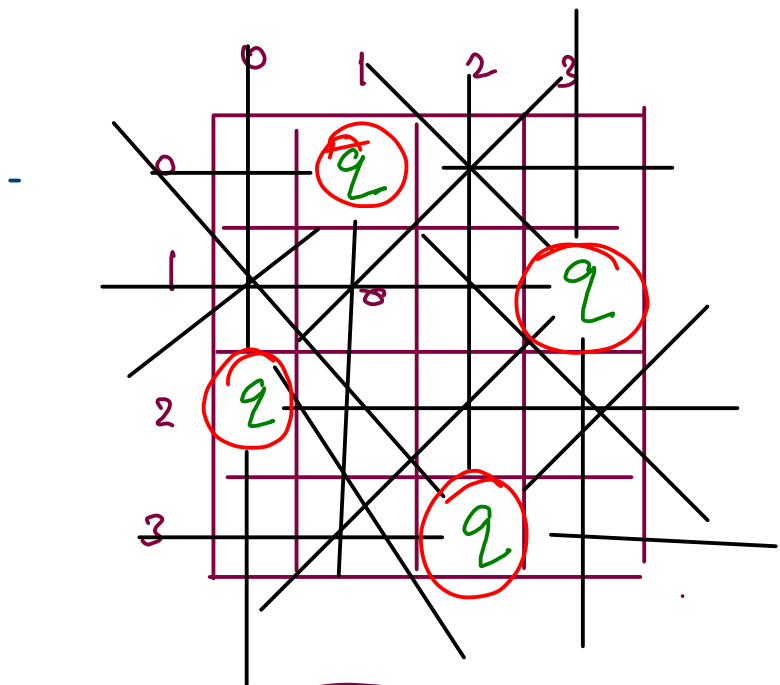
4x4

4 → queen place

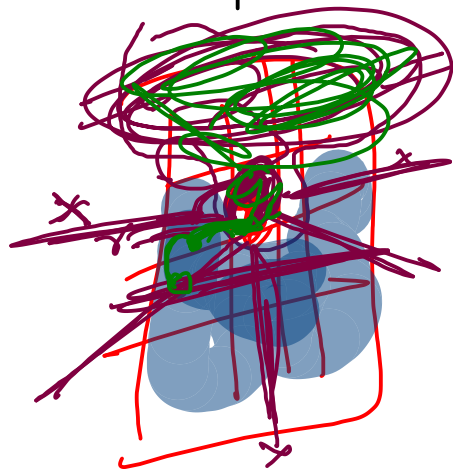
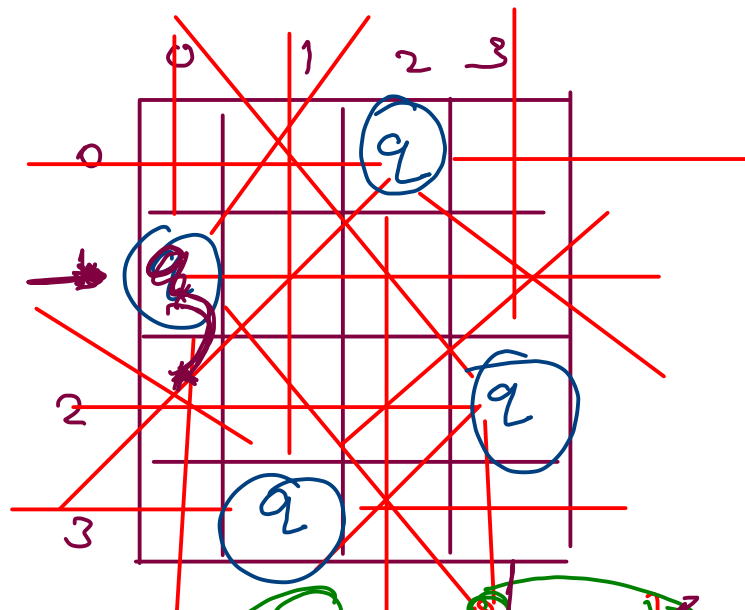
$n \times n$  → n queen

$n \geq 4$

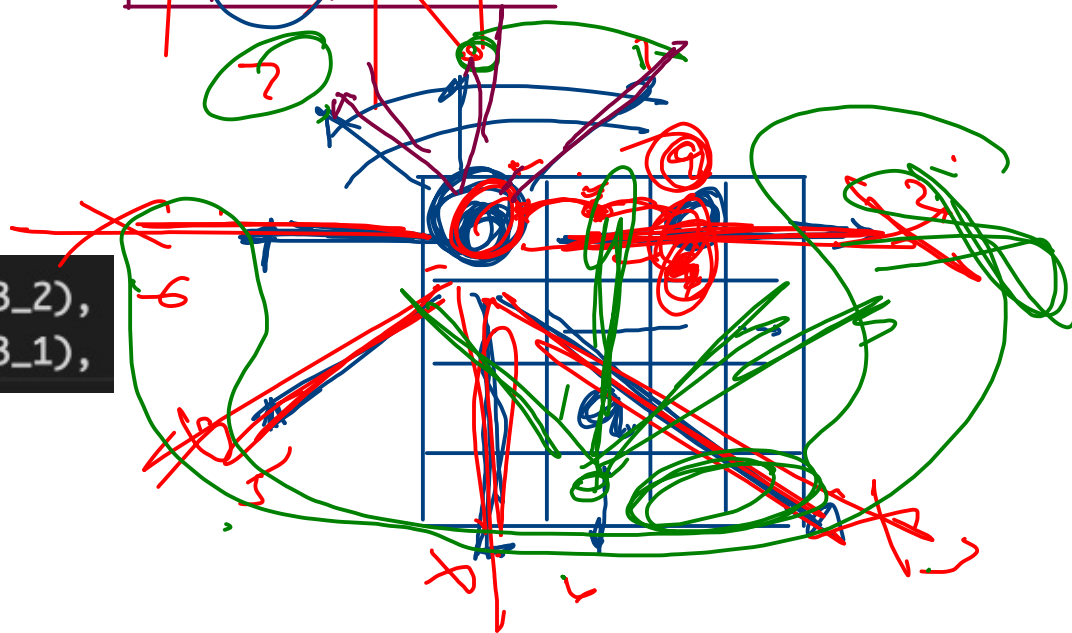
position



$p_n$



(0\_1), (1\_3), (2\_0), (3\_2),  
(0\_2), (1\_0), (2\_3), (3\_1),



# knights Tour

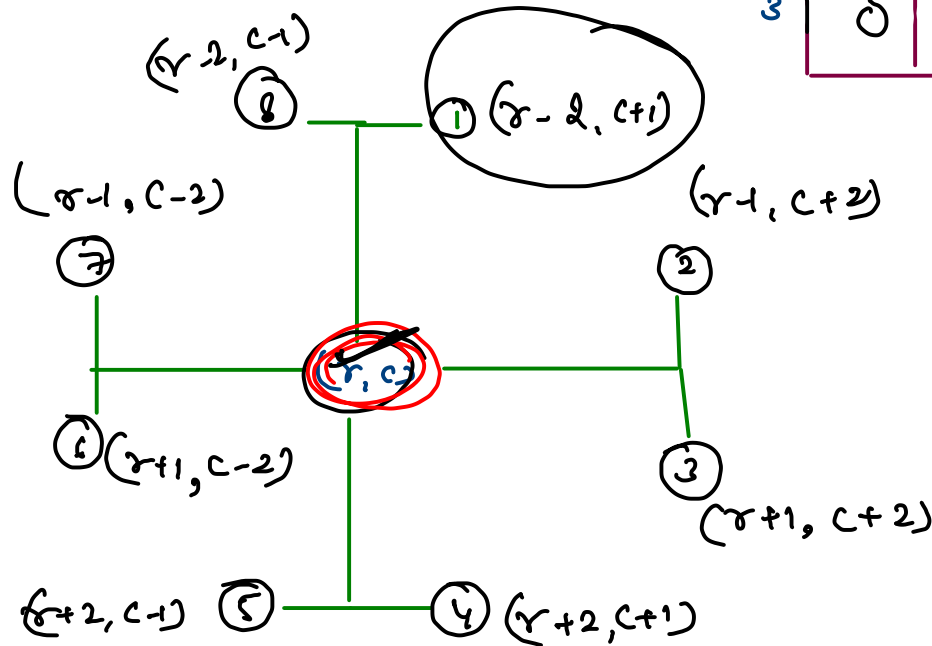
$n \times n$  - board

initial point -  $(r, c)$

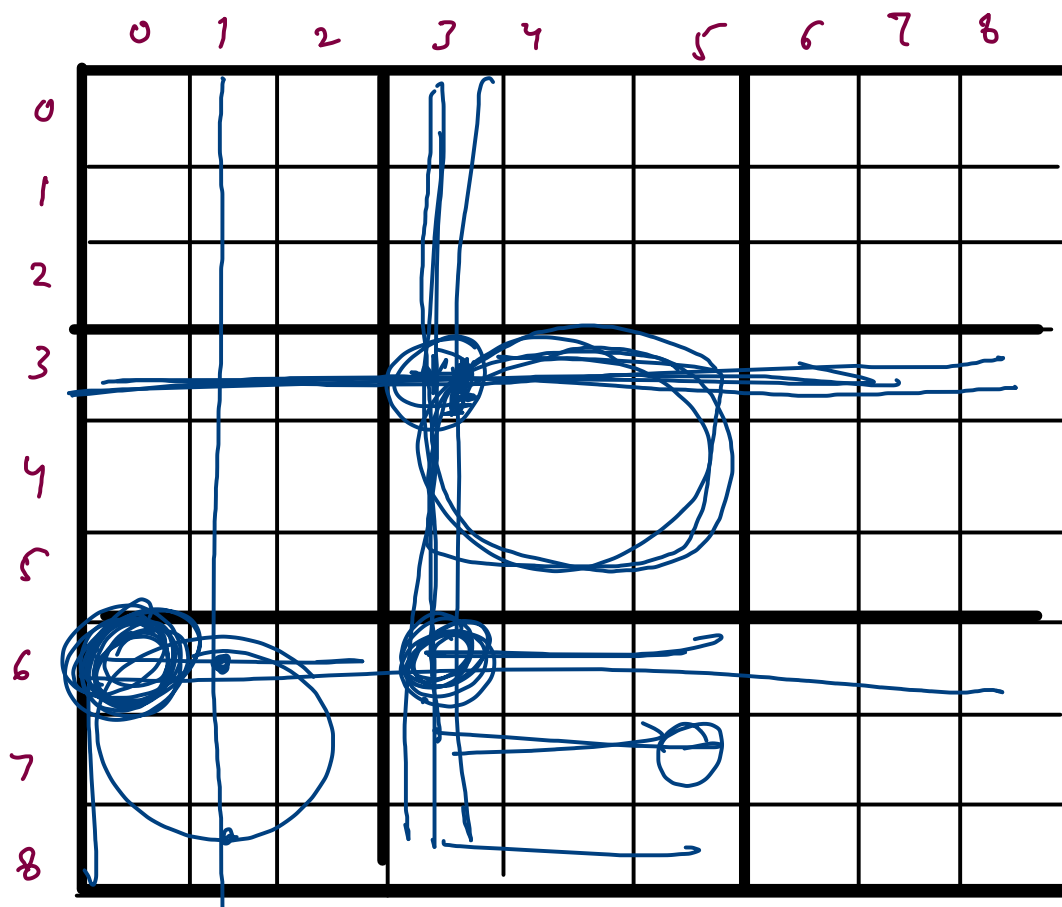
	0	1	2	3
0	11	4	2	5
1	13	1	10	7
2	0	8	3	6
3	0	0	5	9

complete board  
traversal

$$\text{conf} = n \times n$$



$9 \times 9$



Start row =  $8 \% 3$