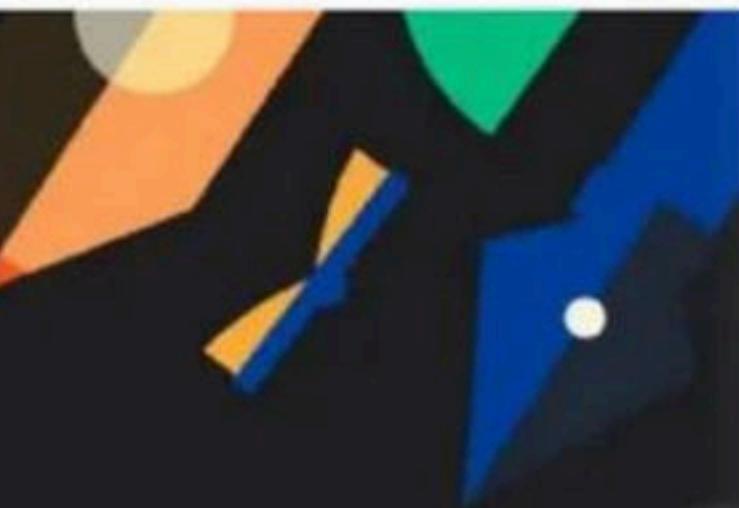


100% 



Doubt Class with Lakshay [DnC]

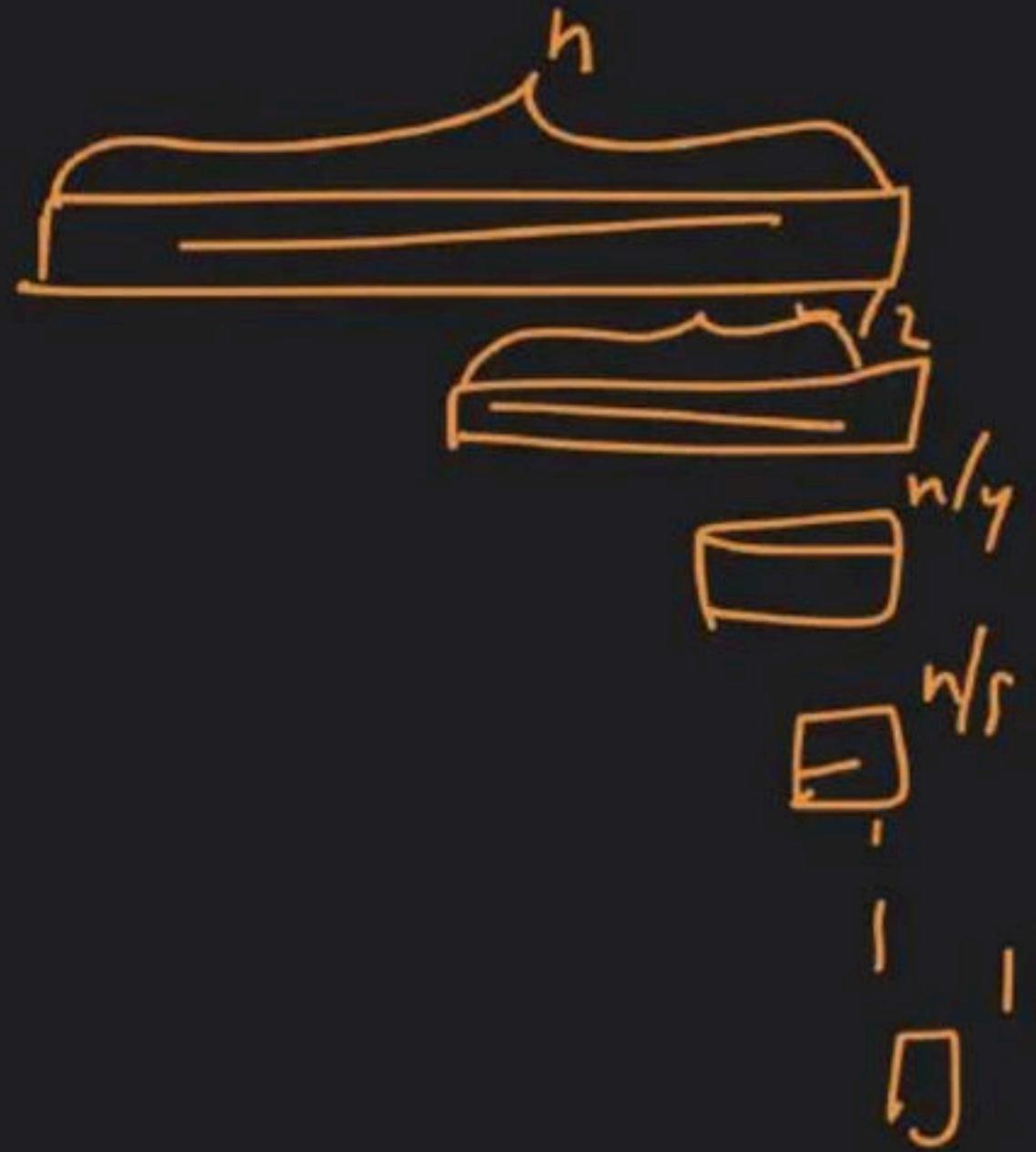
Special class



DnC Class - 1

Special class

Merge Sort



O_n C

Angre 3

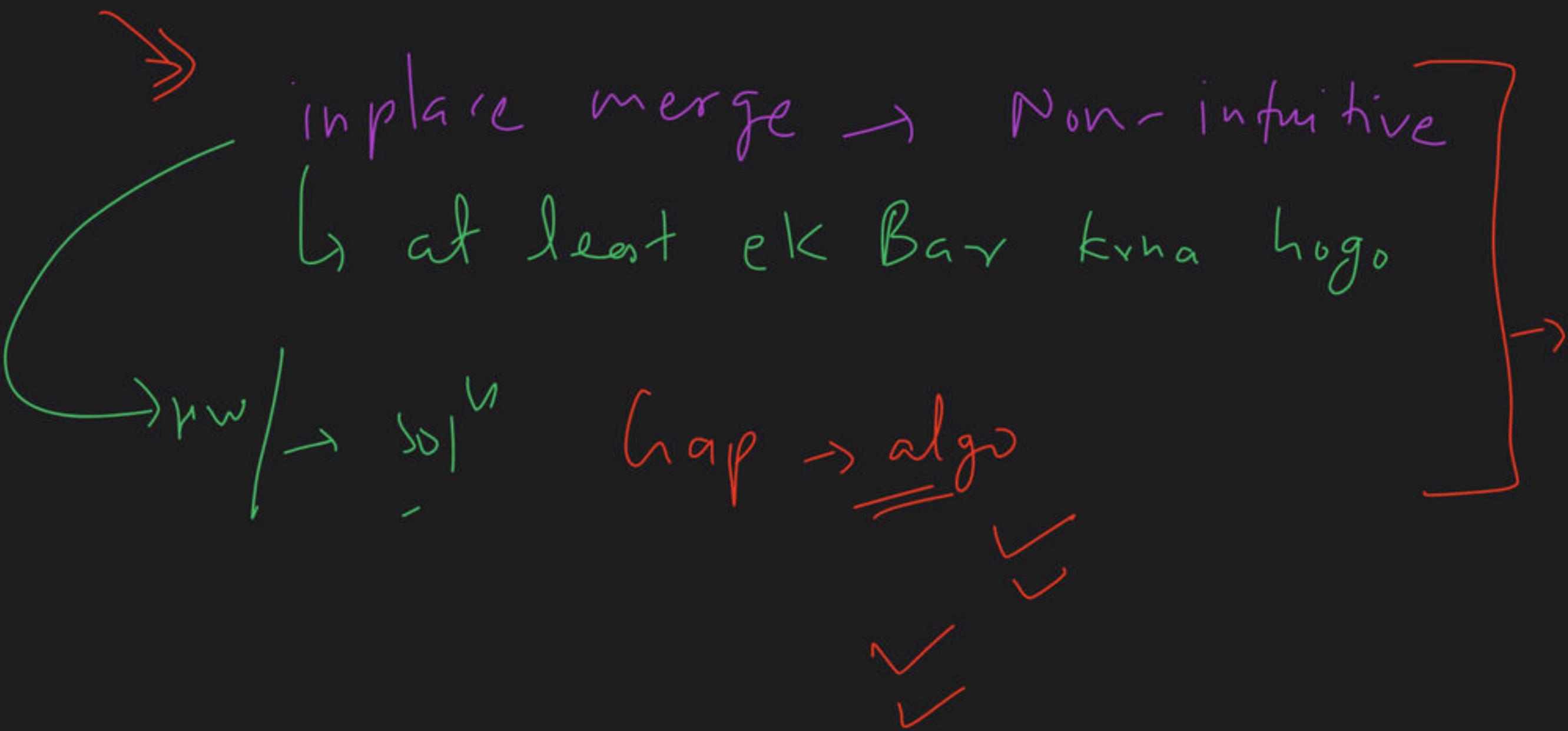
Single element array

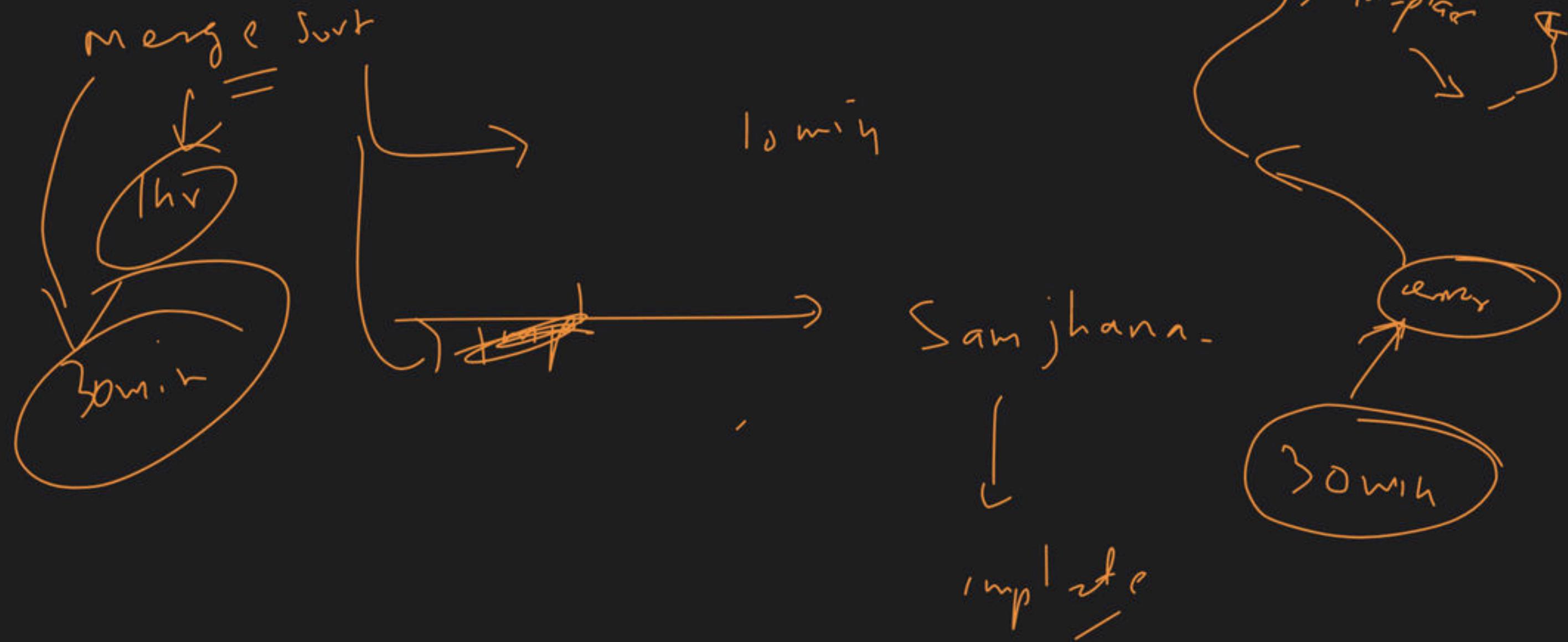
ω SORTED

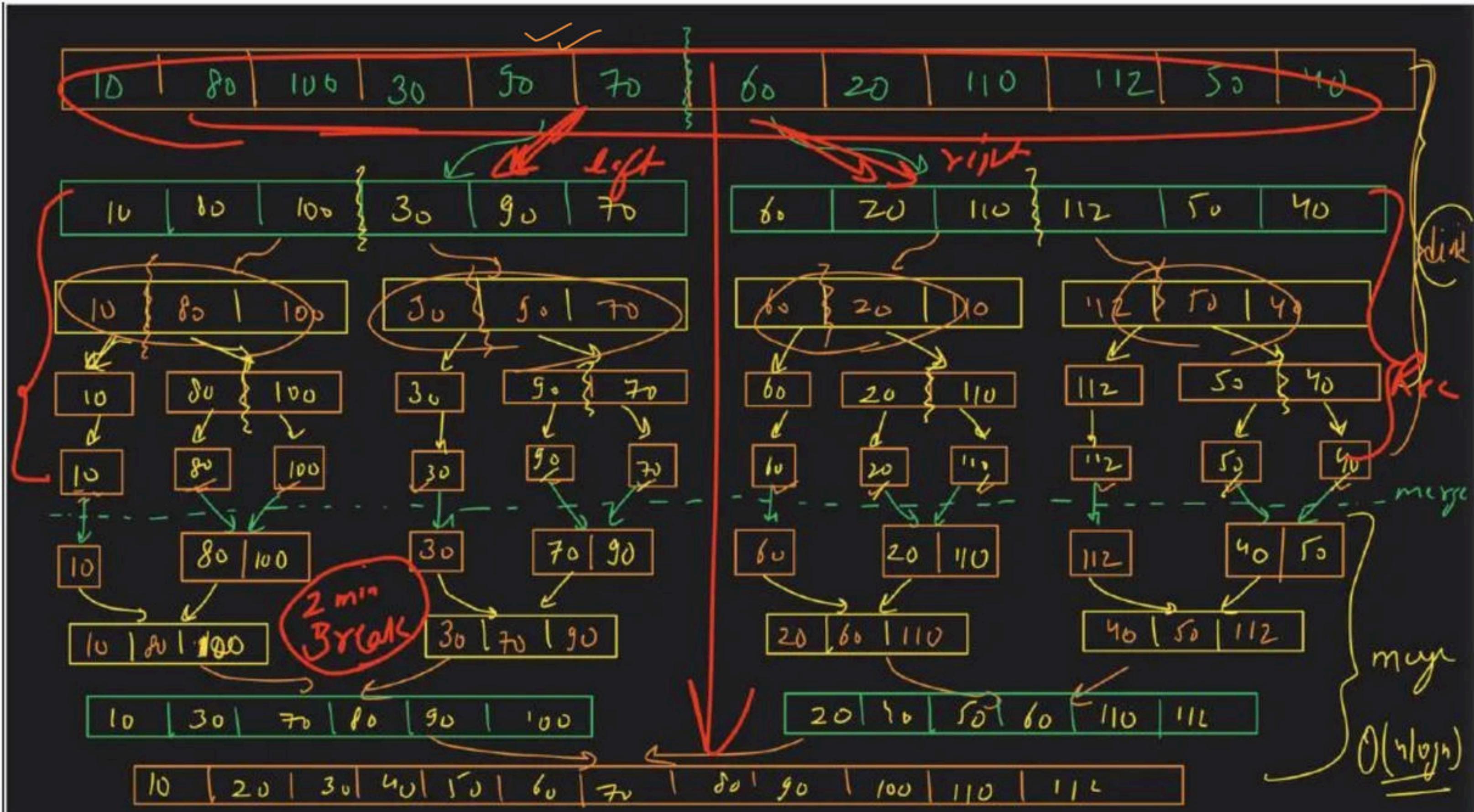
is considered

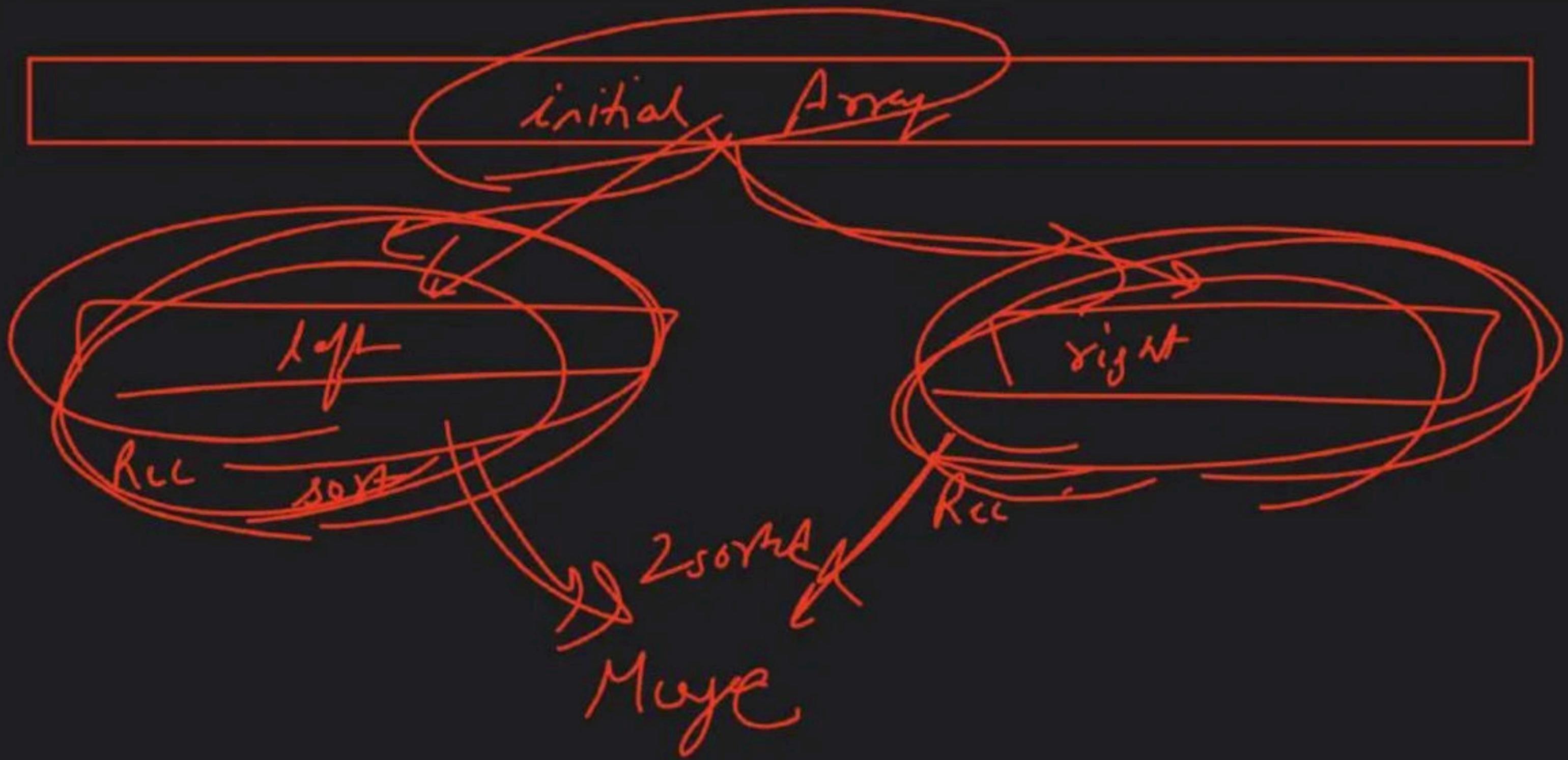
New allocator → 10 20 36 40

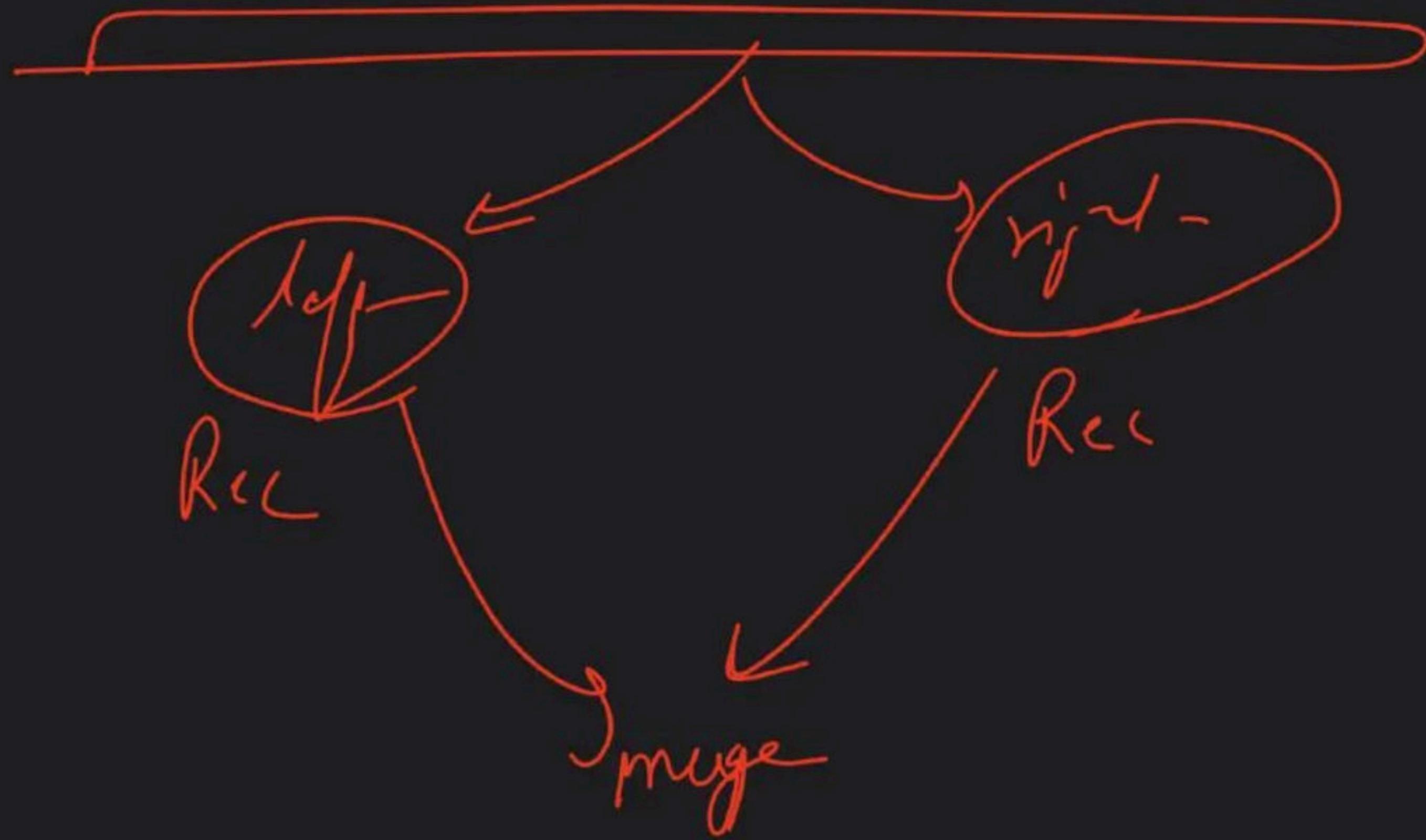
temp

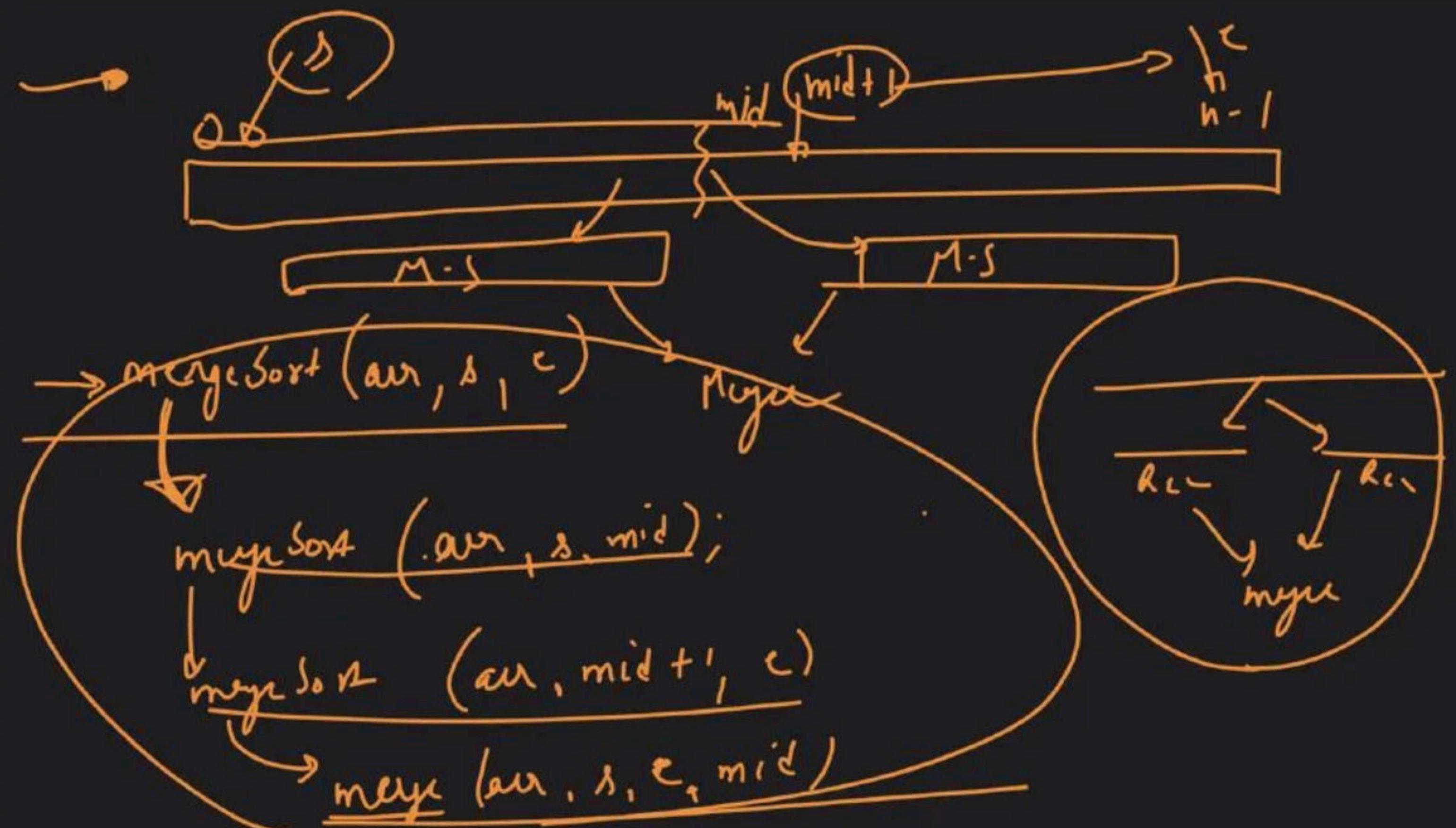


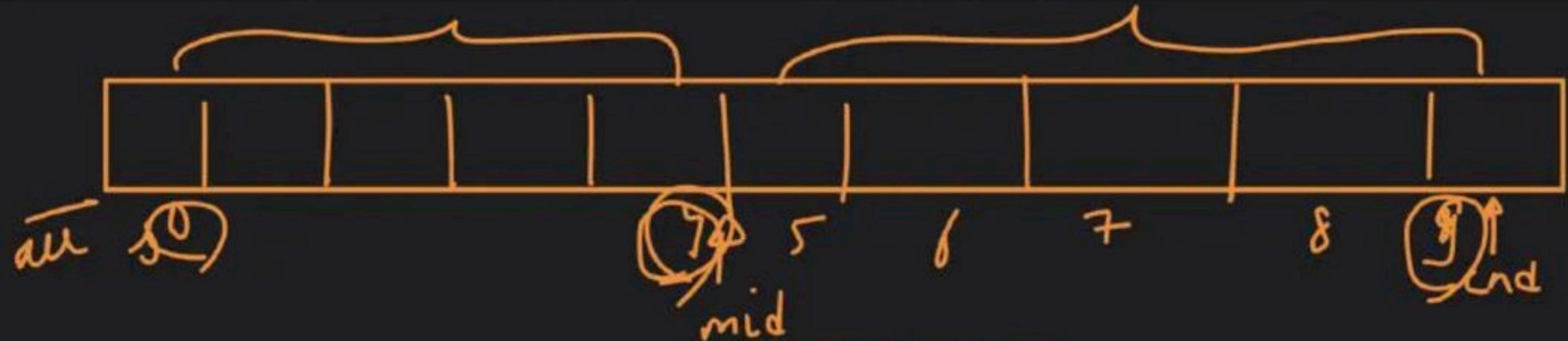






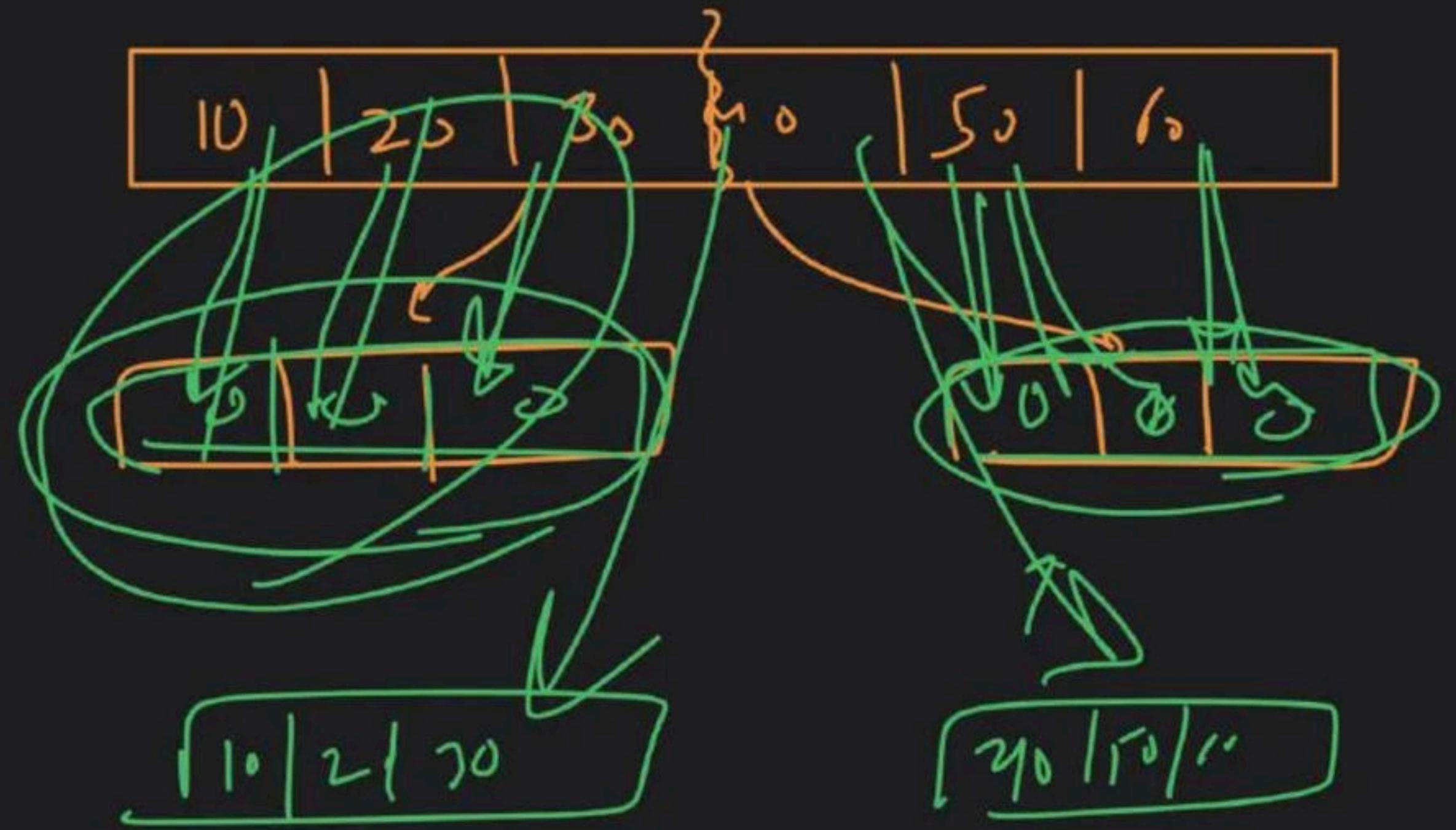




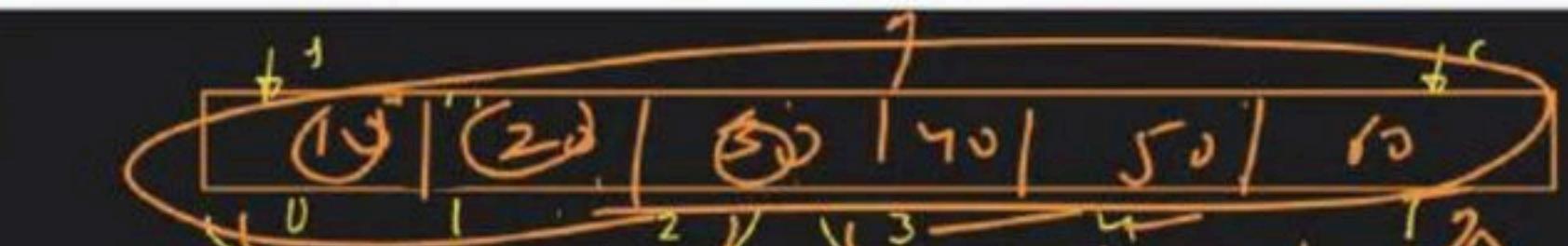


$$\text{left Len} = 4 - 0 + 1 \rightarrow \text{mid} - s + 1$$

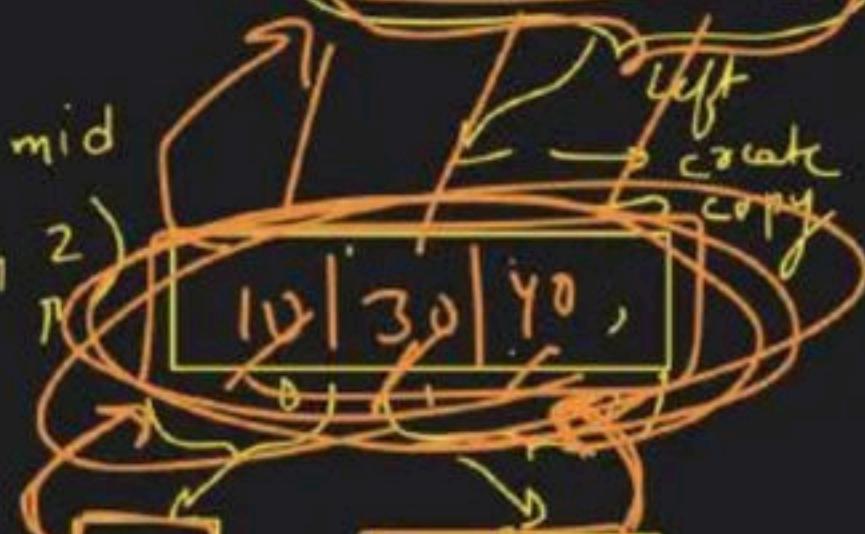
$$\text{right Len} = g - r - e - \text{mid}$$



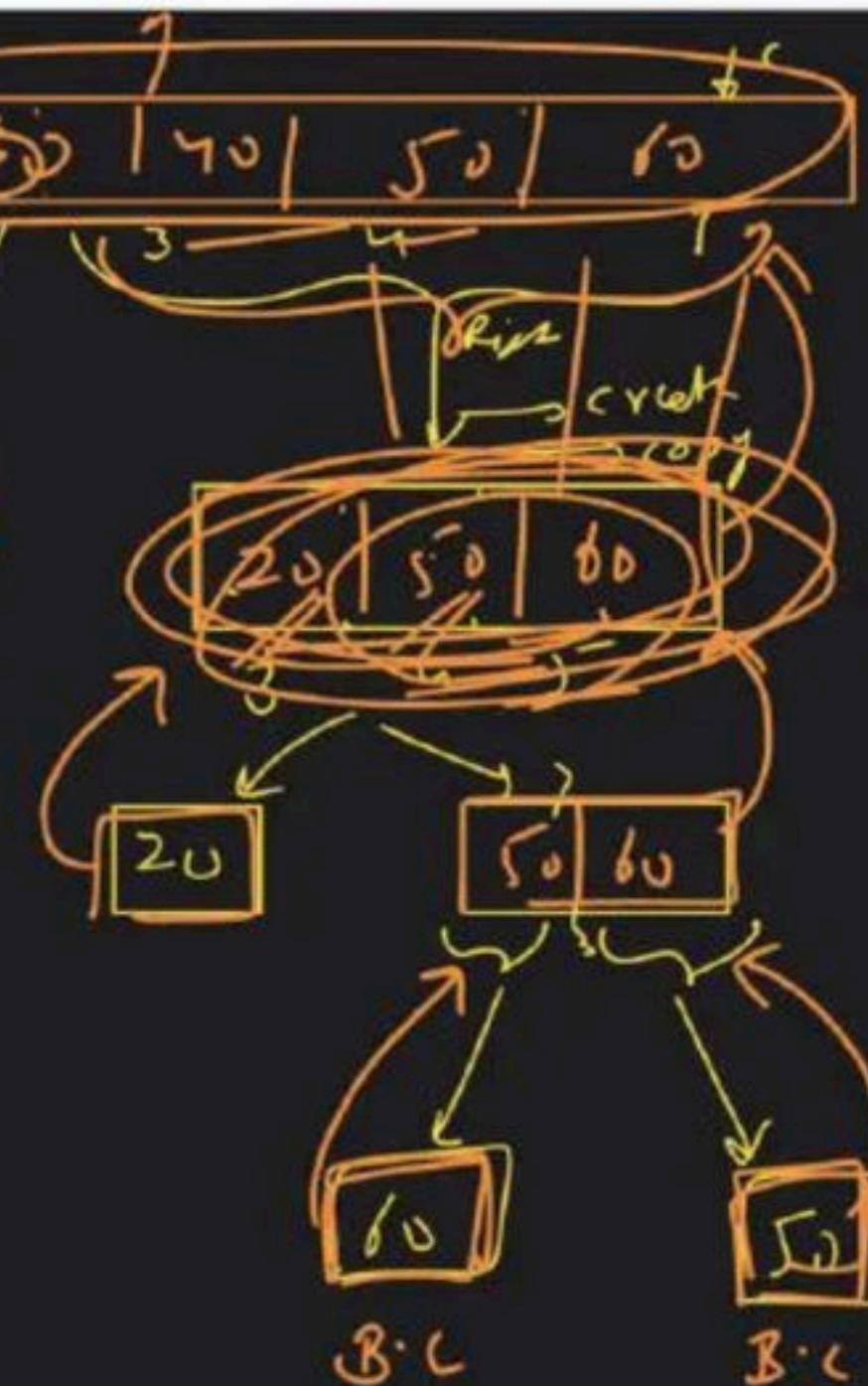
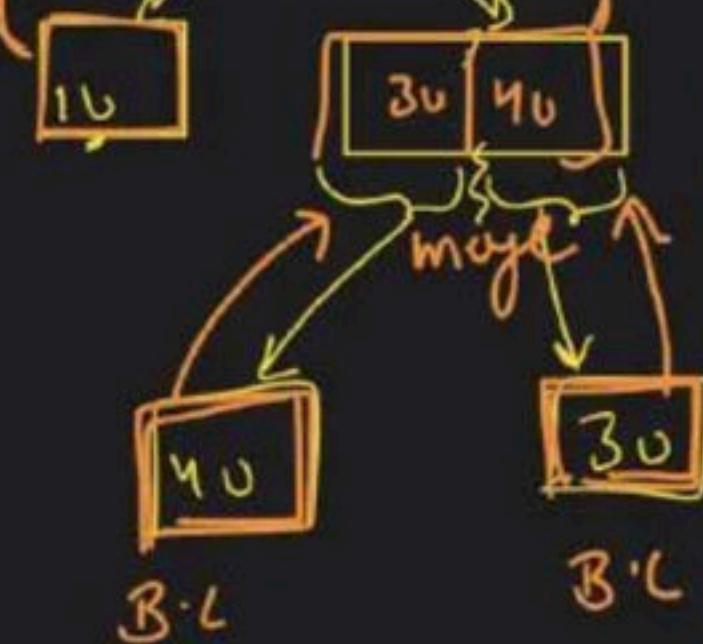
M.J (addr, 0, 5)



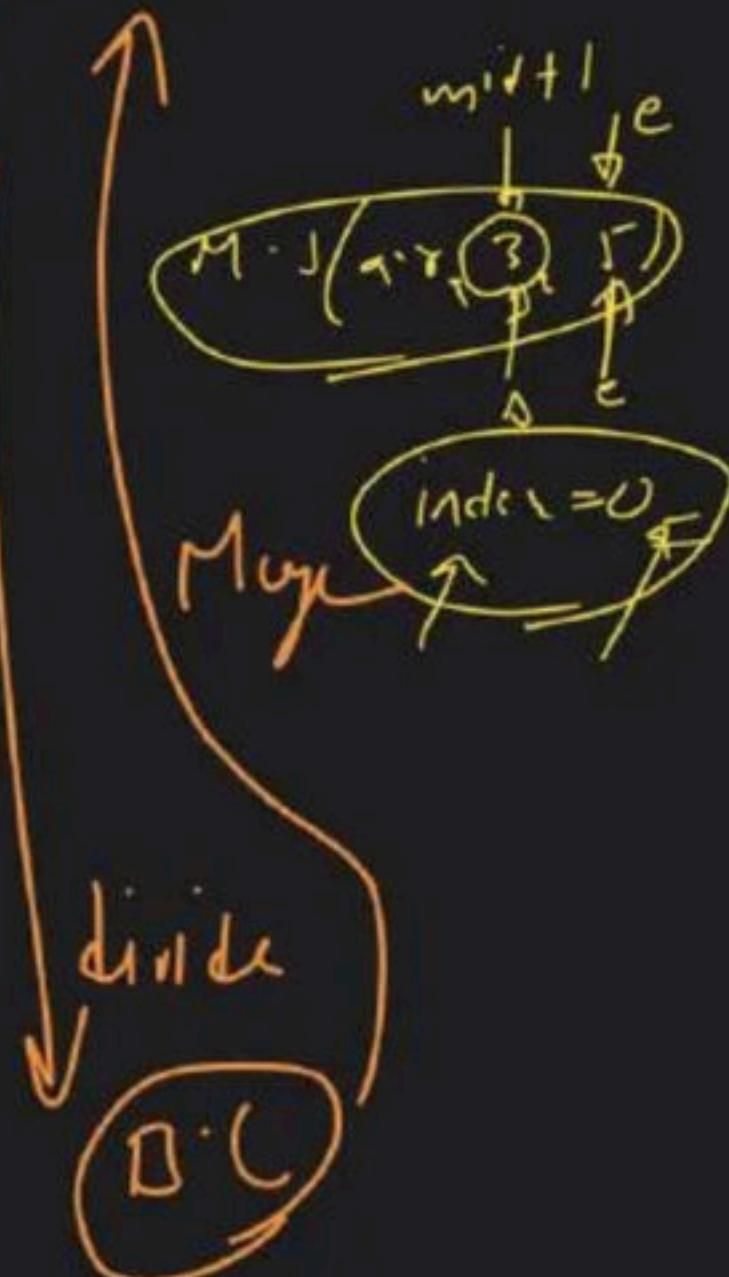
M.J (addr, 0, 2)
mid



2 - 0H
= (3)



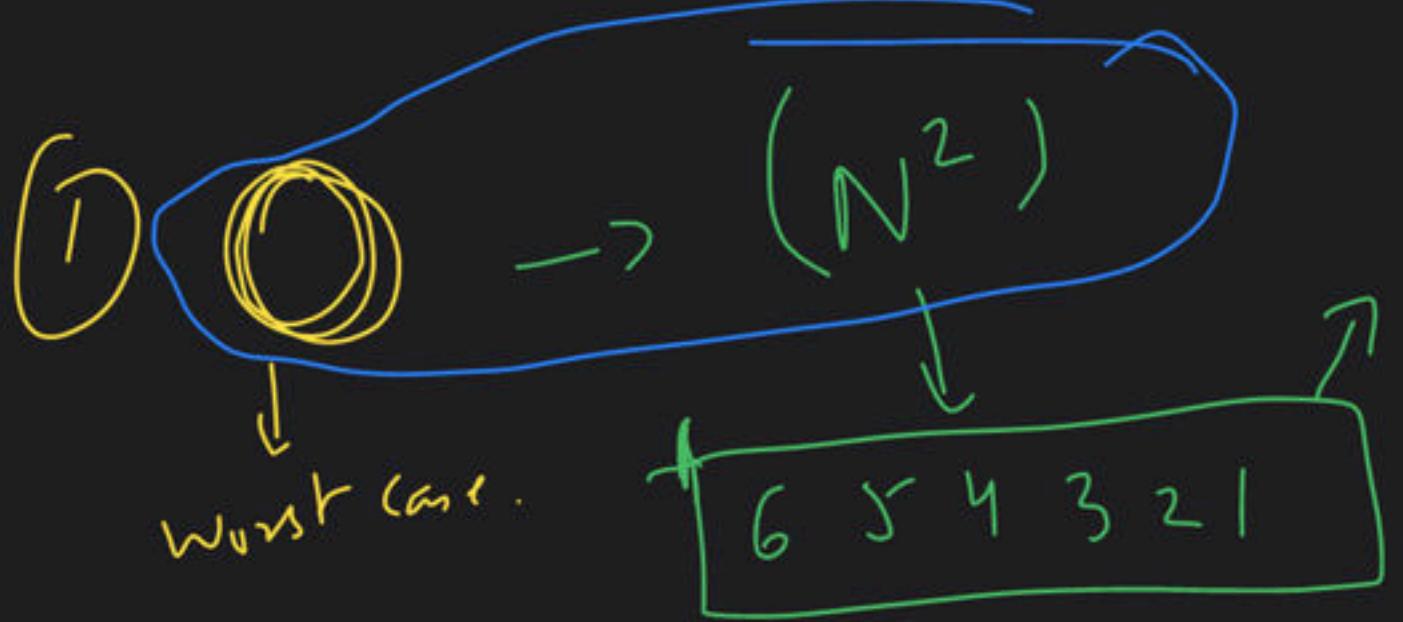
mid = 2



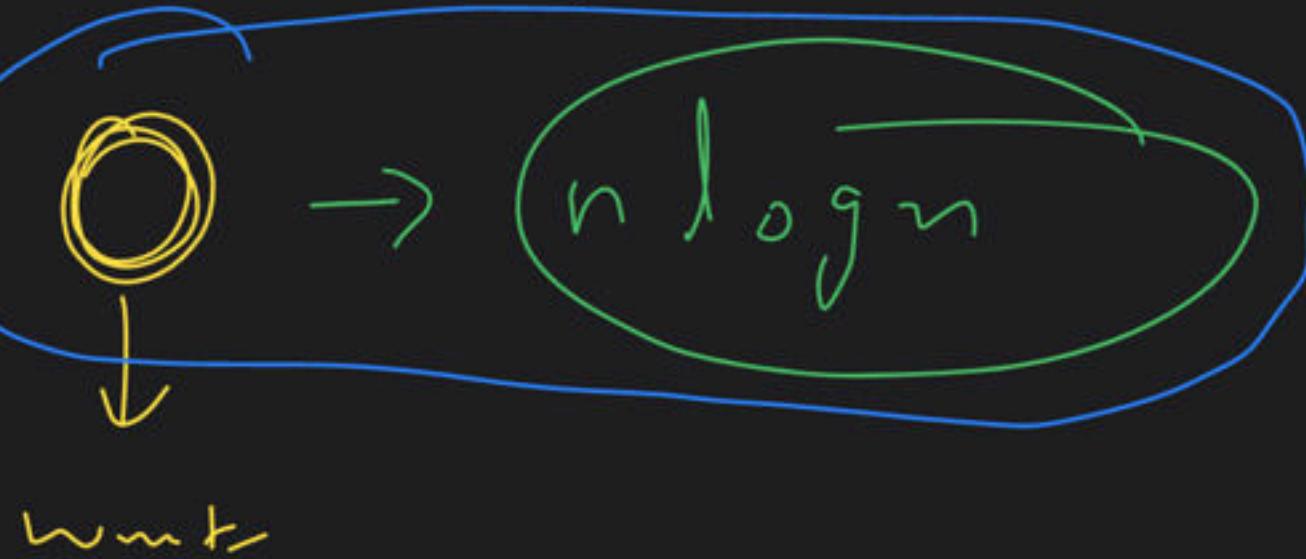
RCC

RCC

Quick Sort



Merge Sort



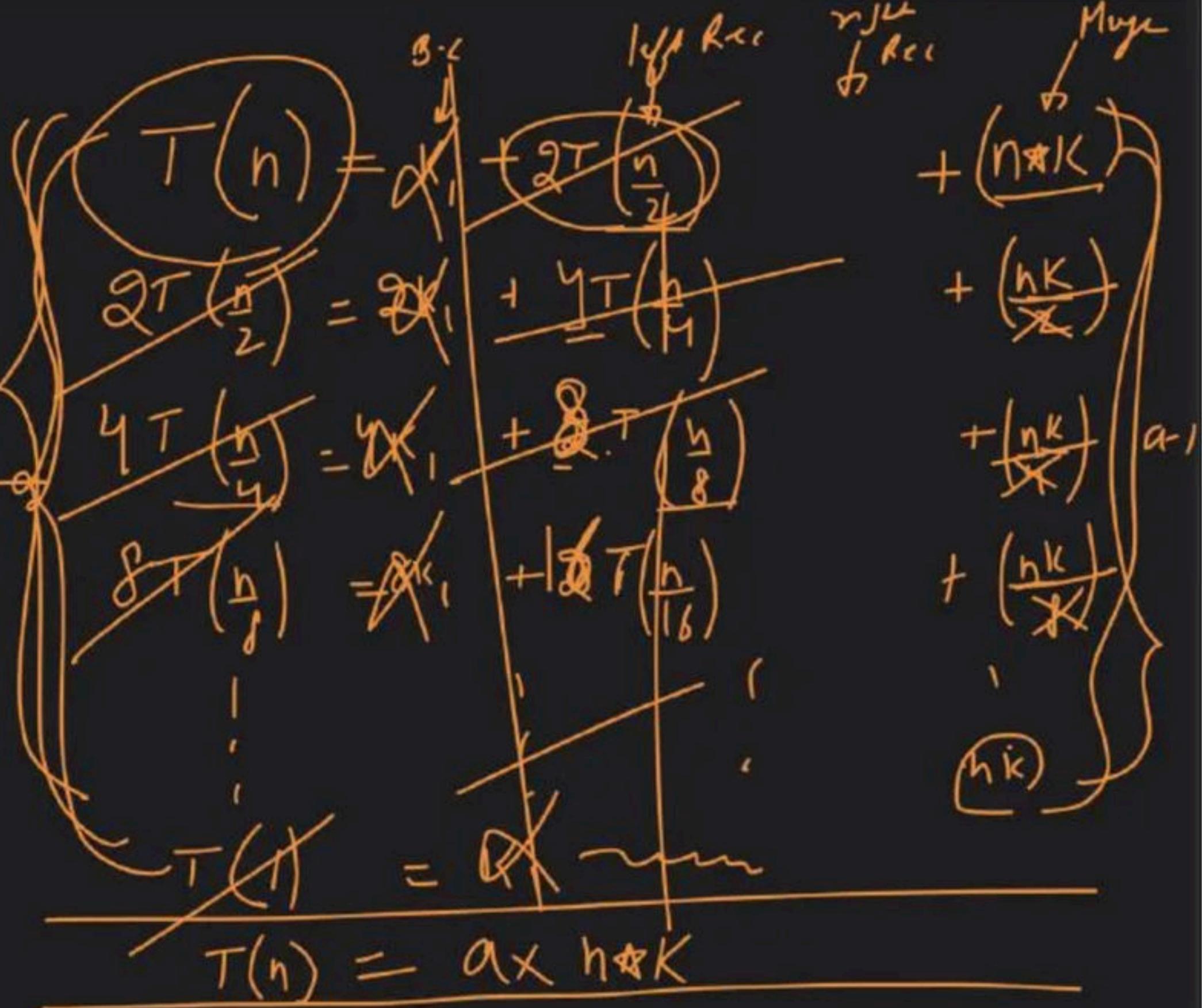
③ $\Omega(n \log n)$

$\Theta(n \log n)$

$\sim n \log n$

$\Theta(n \log n)$

$$\alpha = \log h$$



$$T(n) = \cancel{a} \times n \times \cancel{n}$$

$$= \log n \times h$$

$$\bar{T}(n) = n * \log n$$

Code

↳ left / right ↳ center / copy

Class → complexity

↓
H/w

In place merge sort

↓
H/w





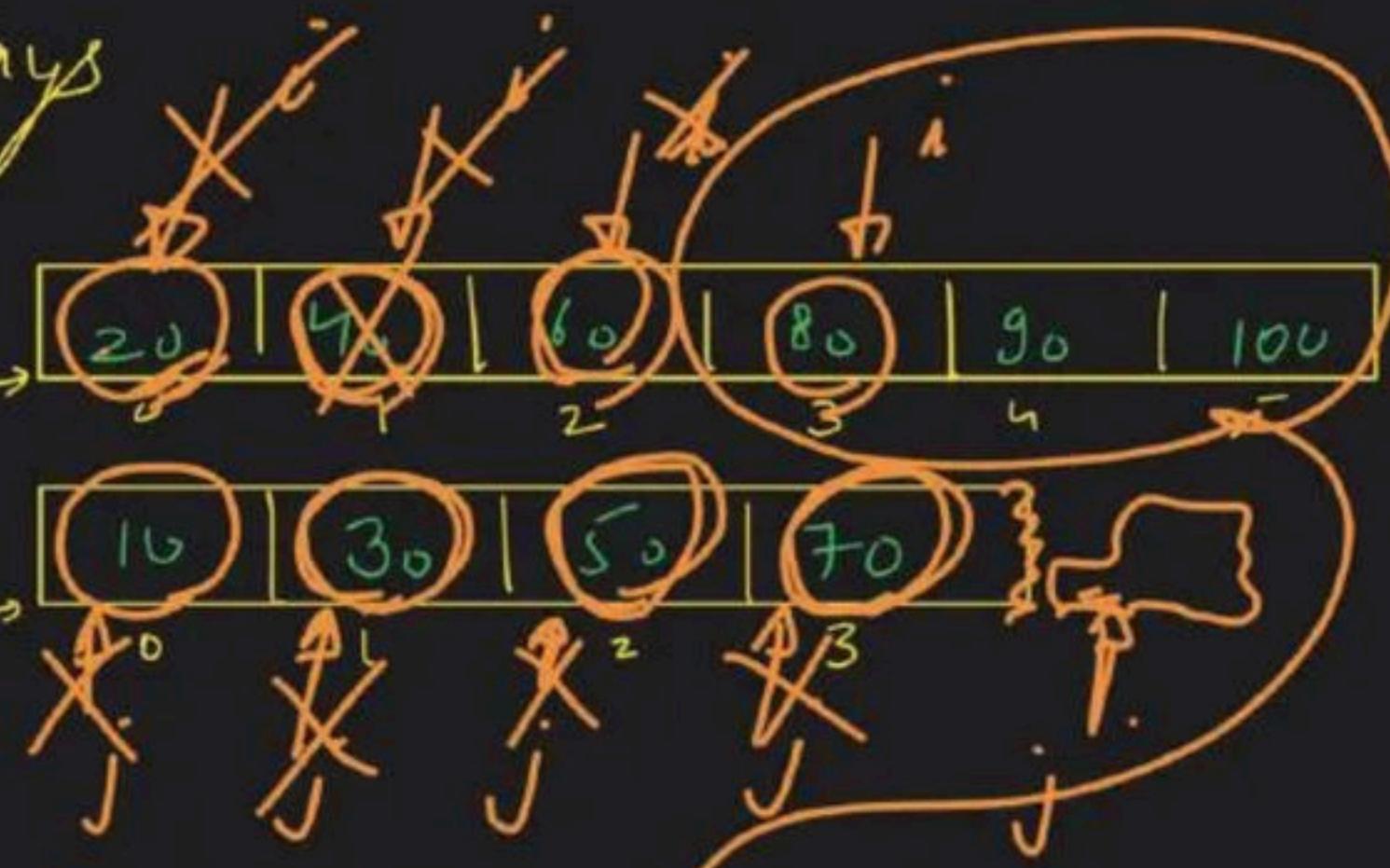
Merge 2 sorted

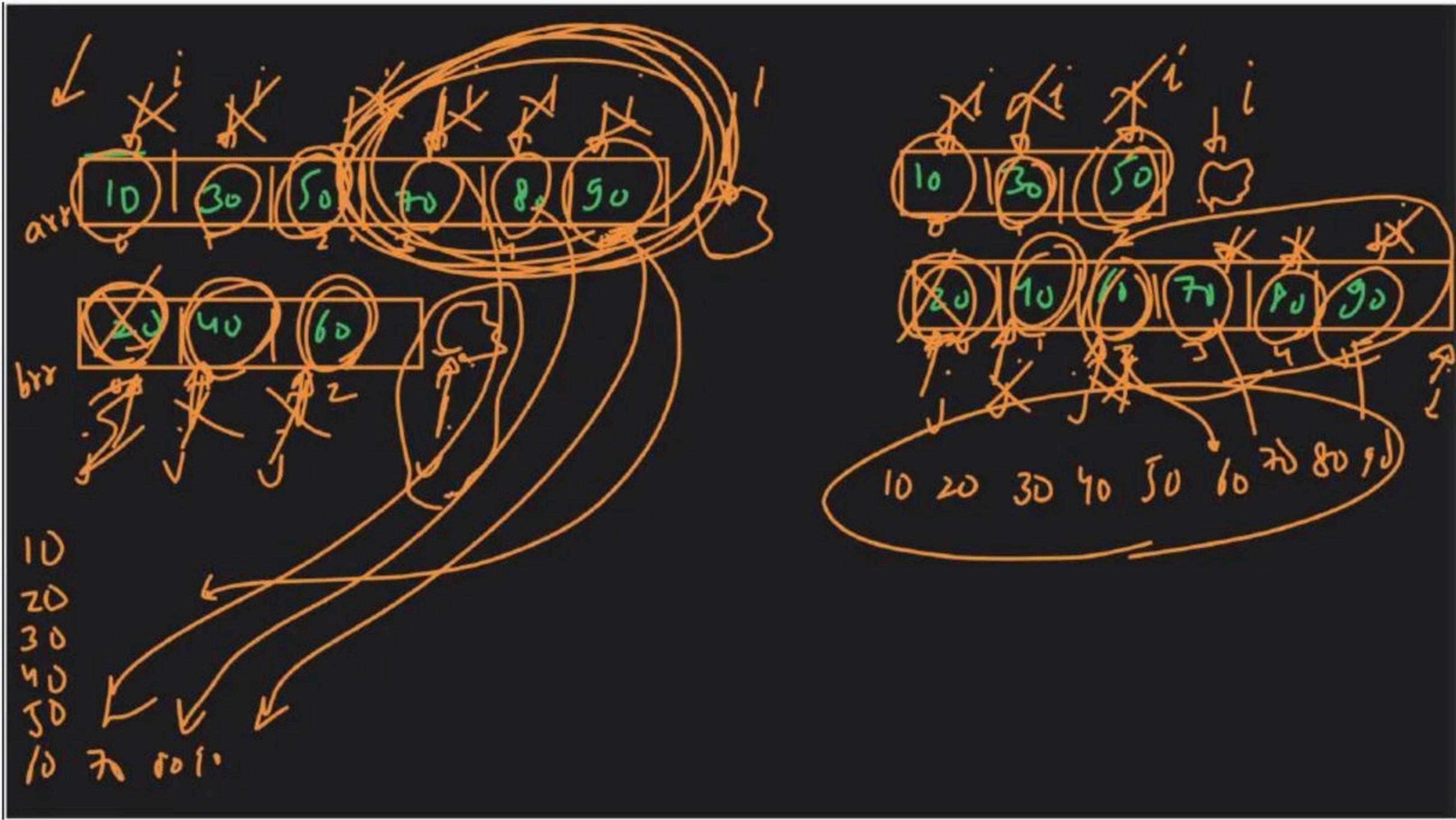
Arrays

ip

arr

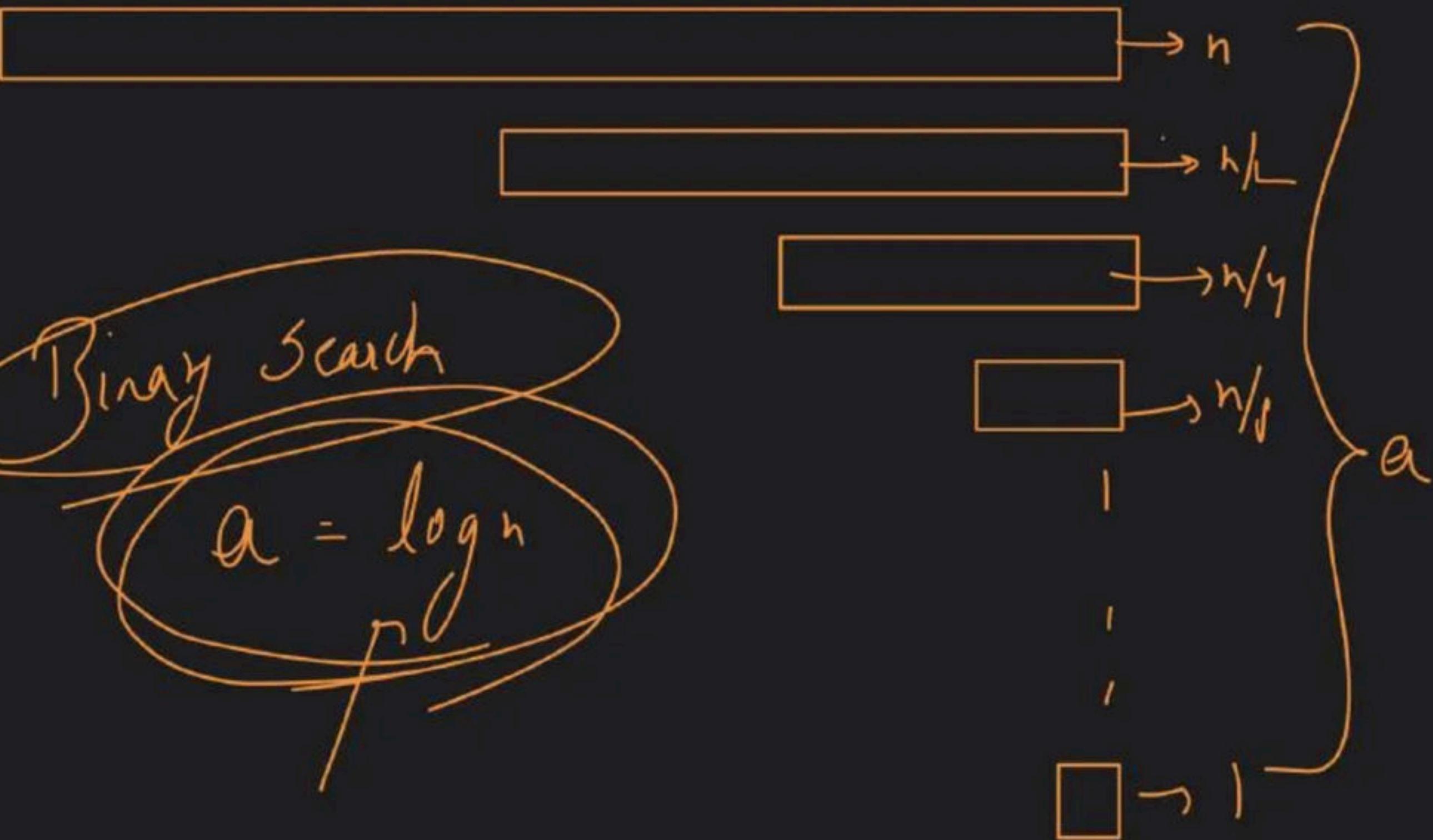
brr

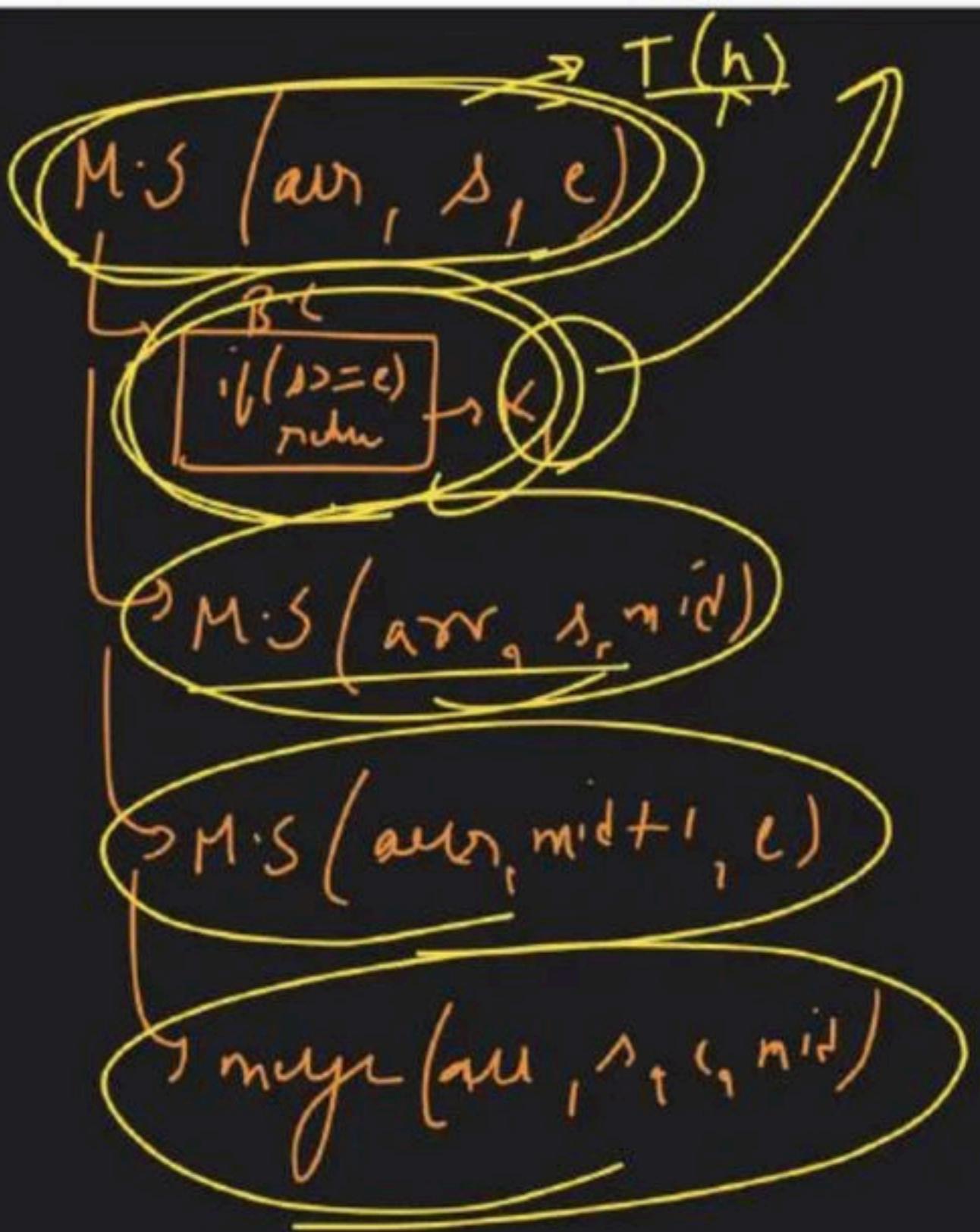




Binary Search

$a = \log n$





$$T(n) = K_1 + T\left(\frac{n}{2}\right) + T\left(\frac{n}{2}\right) + n \cdot K$$

$$2T\left(\frac{n}{2}\right)$$

$$a + a \\ = 2a$$

$$K + K \\ > 2K$$

$$\begin{aligned}
 T(n) &= K_1 + 2T\left(\frac{n}{2}\right) + n \star K \\
 2 \times \left[T\left(\frac{n}{2}\right) \right] &= K_1 + 2T\left(\frac{n}{4}\right) + n \star K \\
 4 \times \left[T\left(\frac{n}{4}\right) \right] &= K_1 + 2T\left(\frac{n}{8}\right) + n \star K \\
 8 \times \left[T\left(\frac{n}{8}\right) \right] &= K_1 + 2T\left(\frac{n}{16}\right) + n \star K \\
 &\vdots \\
 T(1) &= K_1
 \end{aligned}$$

a t m (n-1)
 α

$T(n) = (a-1) \star (n \star K)$

$$T(n) = (a - 1) \star n * k$$

g./

$$= a \star n$$

$$\geq (\log n) \times (n)$$
$$T(n) \geq n \star \log n$$

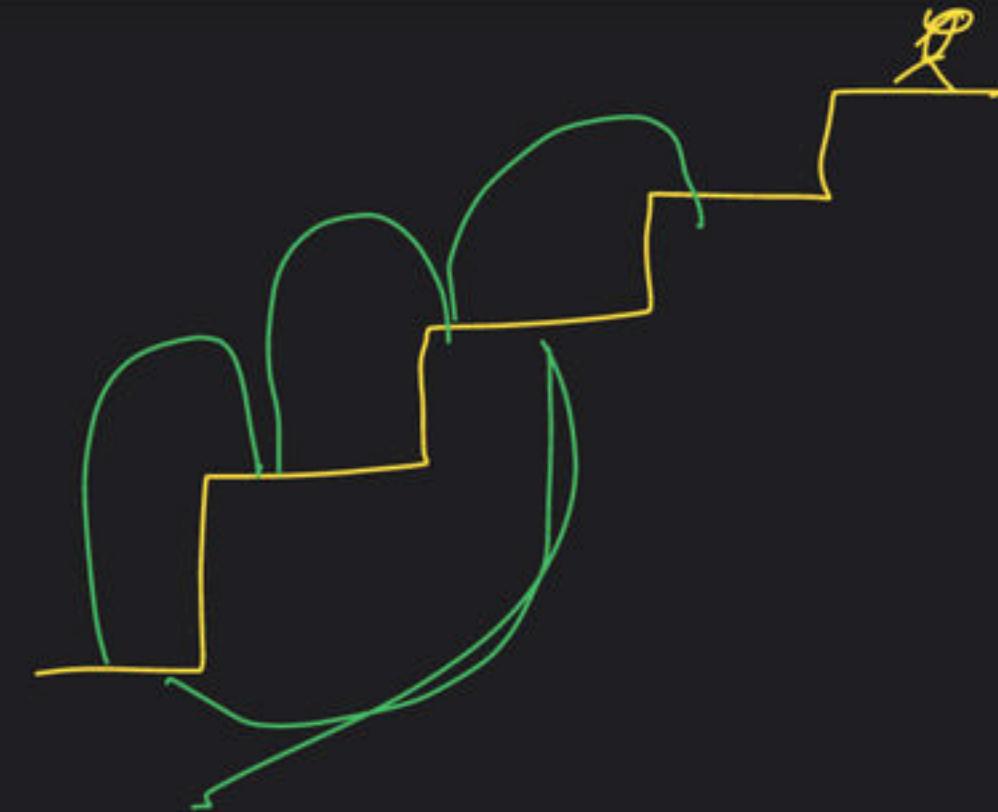
Space
Complexity

Extra

Class

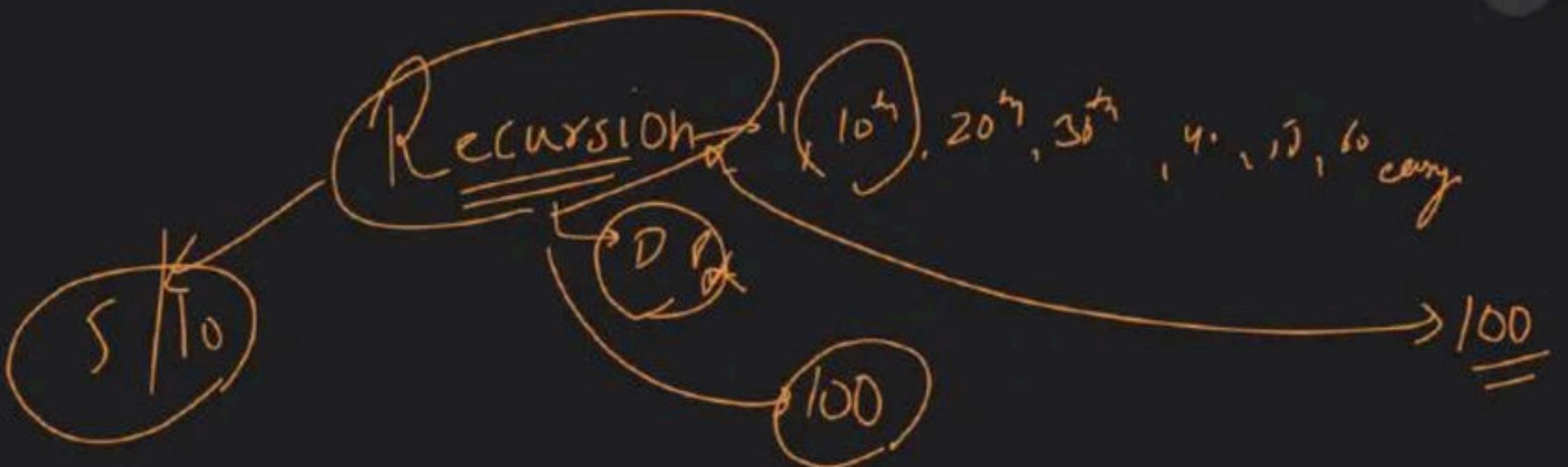


Kal



8.30 pm

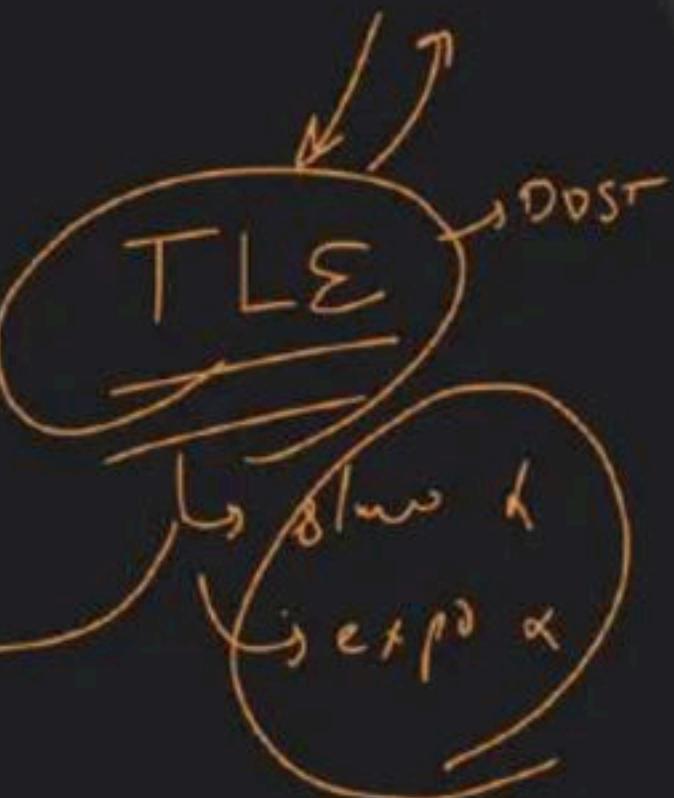




DnC && Backtracking Class - 2

Special class

$\omega \cdot A$



Rec

Video Review

Ques →

51

F-C-1 Dry Run

③ Number of Ques → Class =

Assigned

Xtra - L.C // GFH

// CN

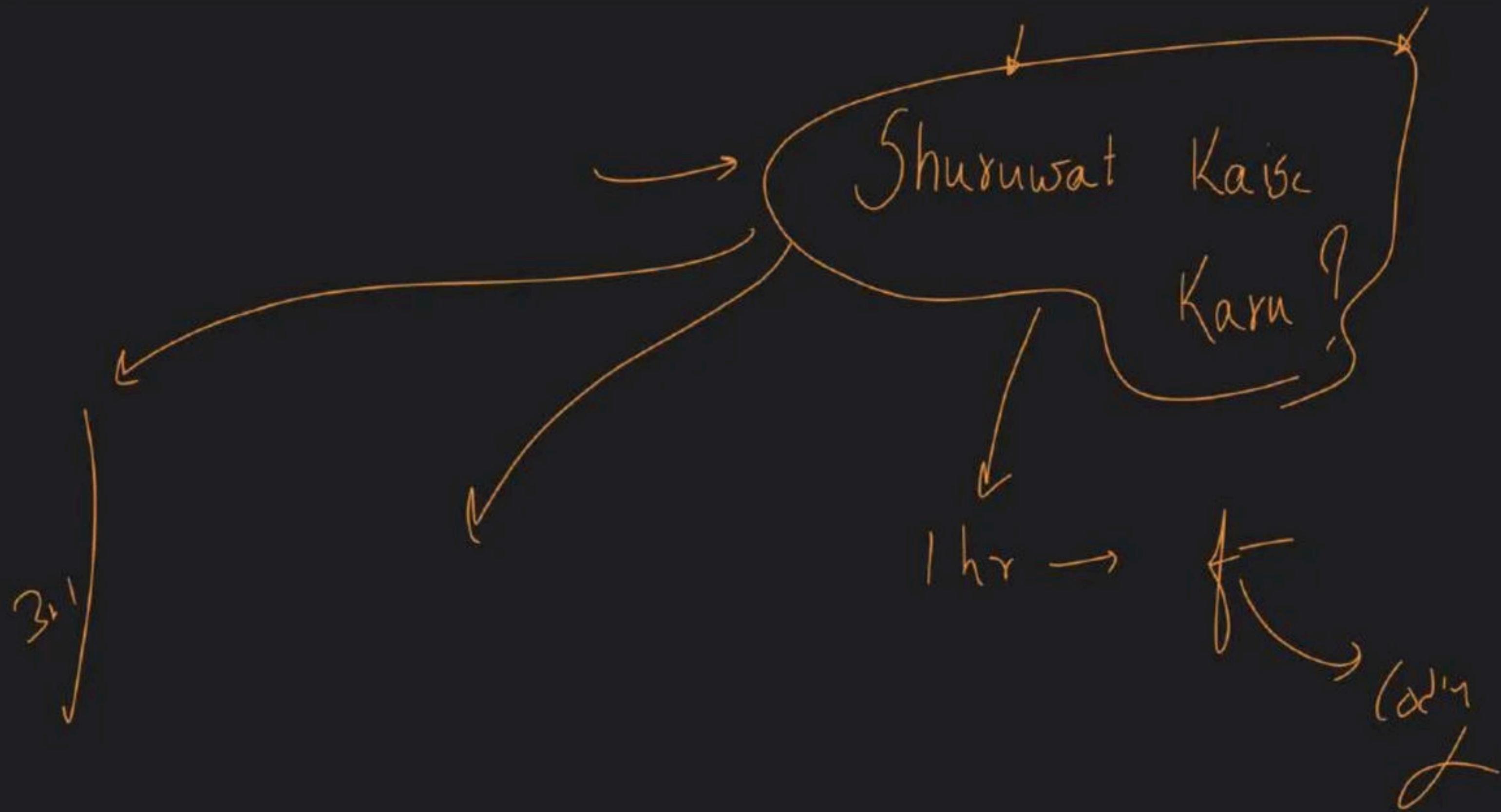
Rec

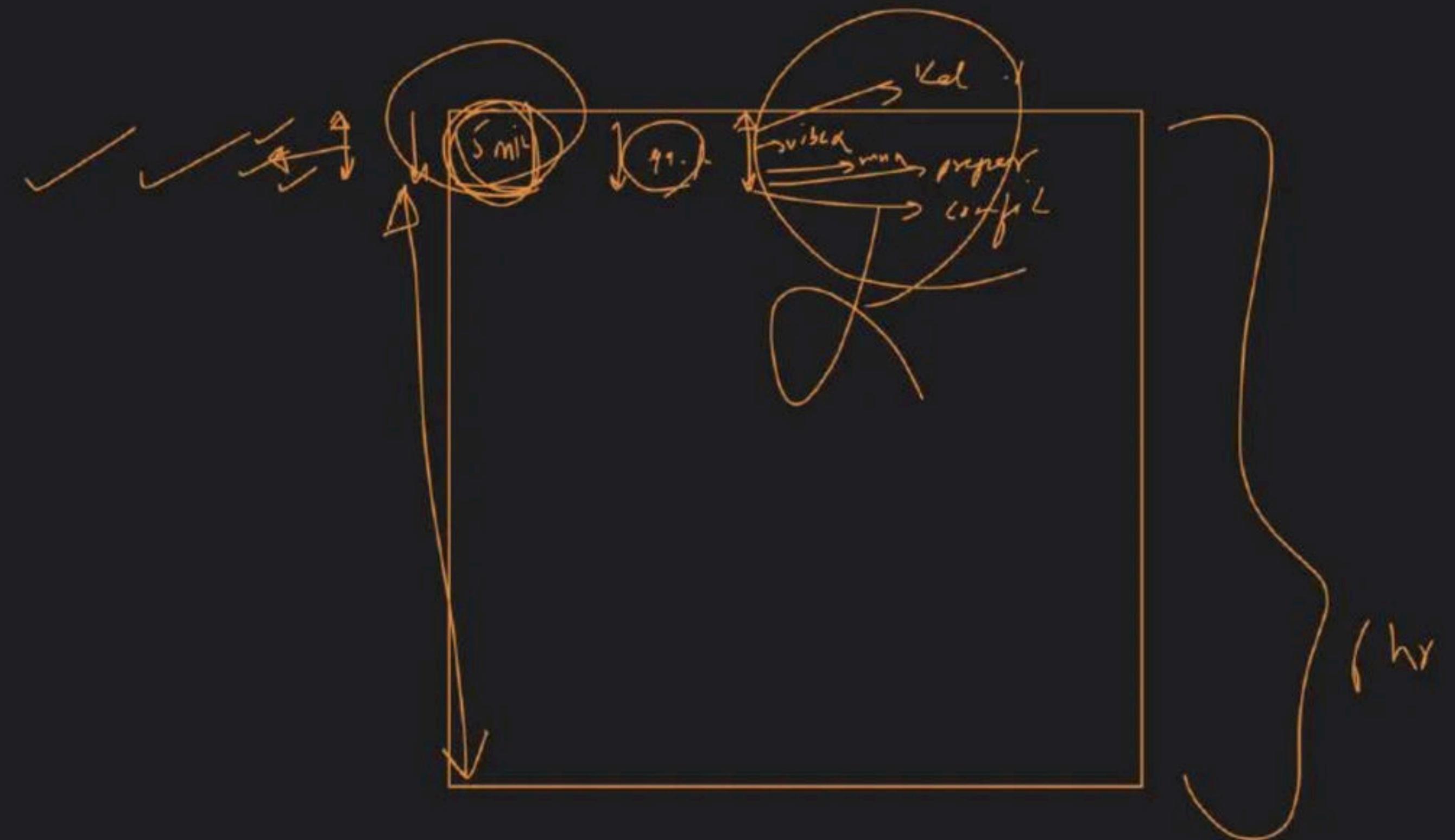
Content → |

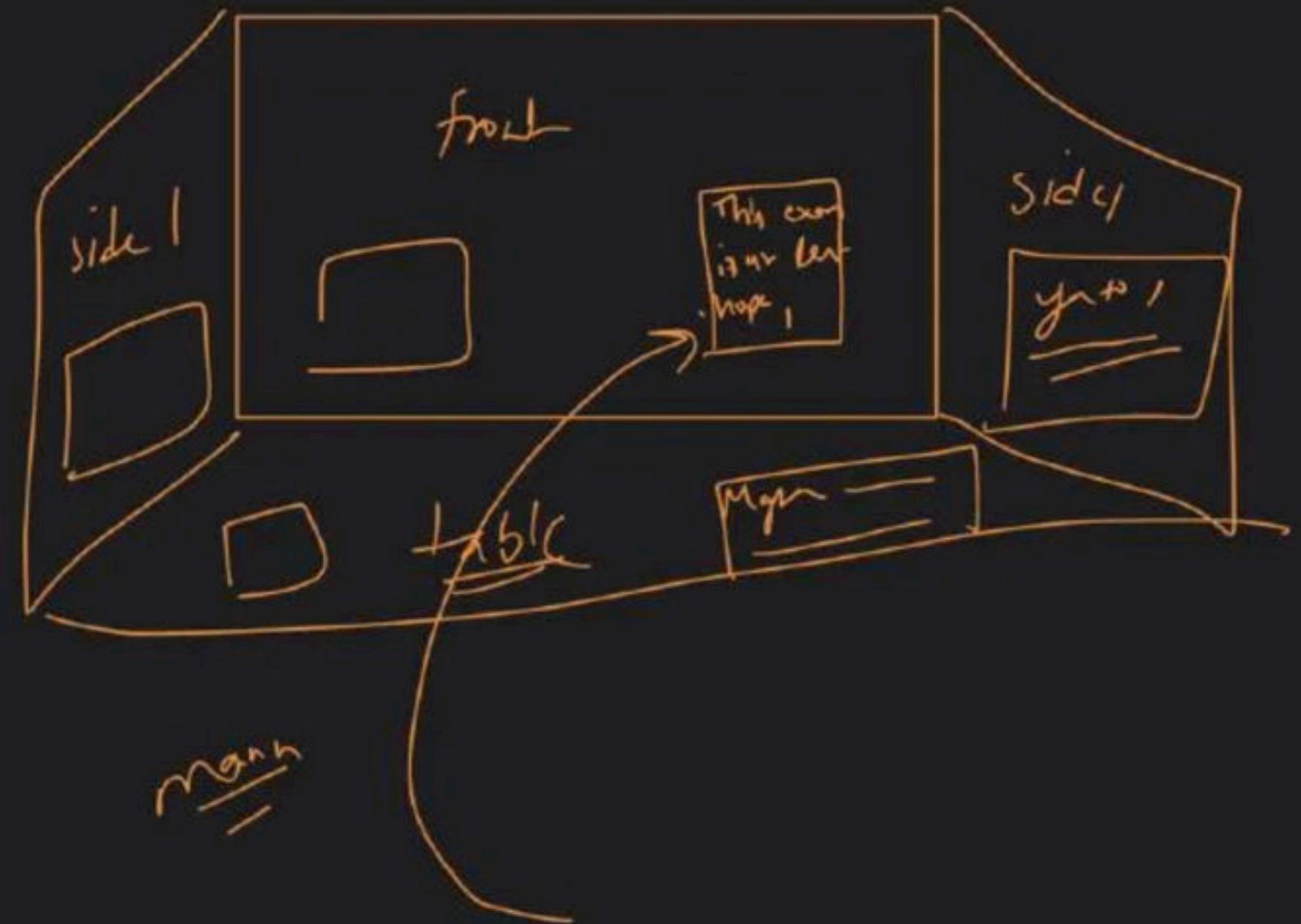
Google / Am / MS

YQ

Practical







sunday
→
Meyer

Recursion

PN

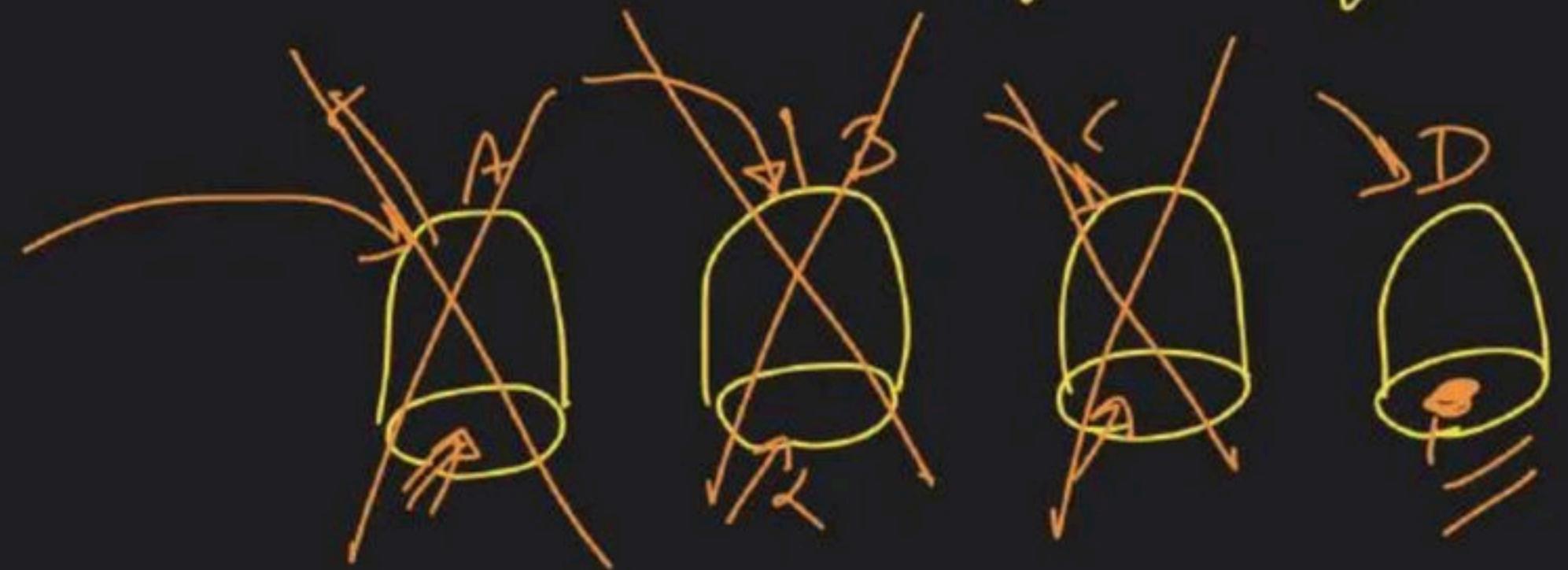
No. of Quo

→ Backtracking:-

π

explore all possible ways

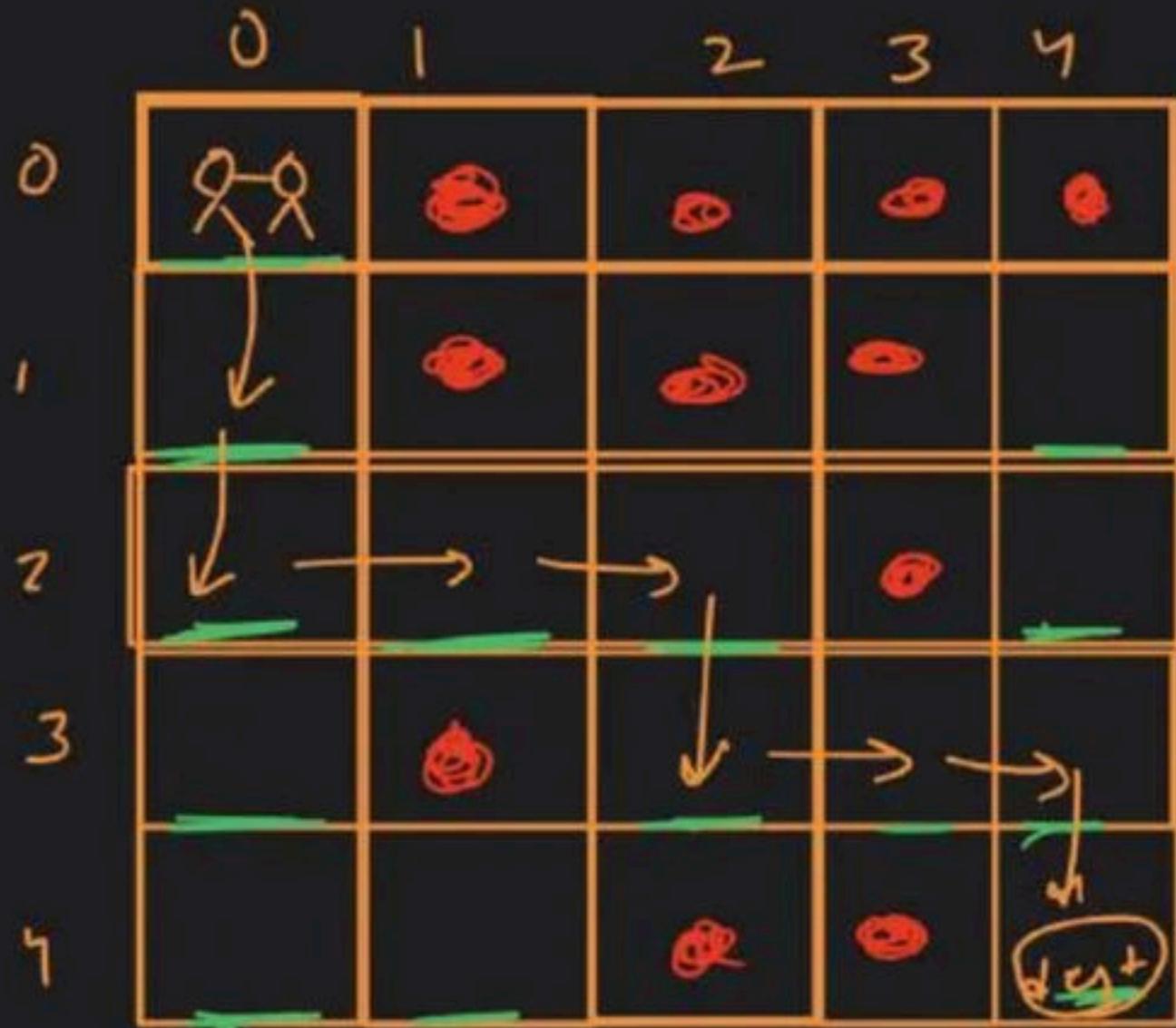
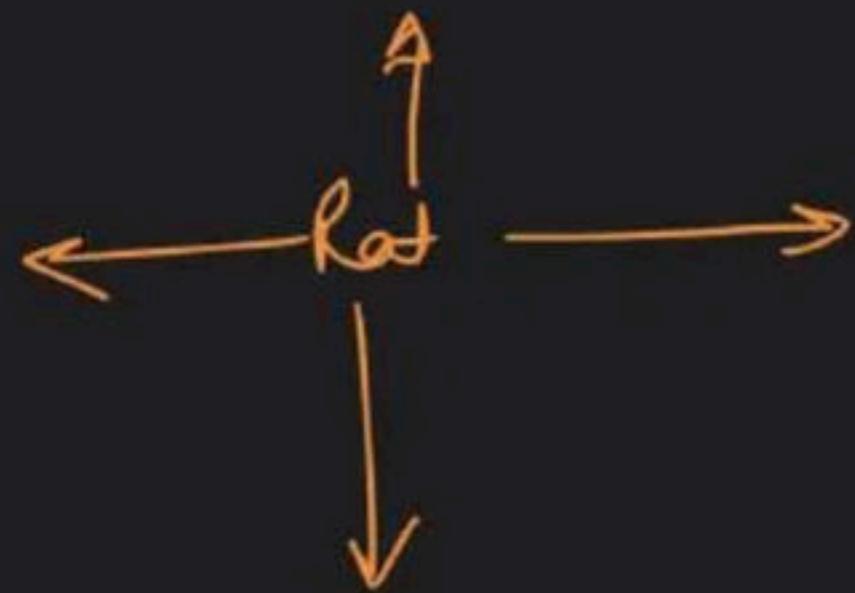
way → already explored ✗



Rat in a maze -

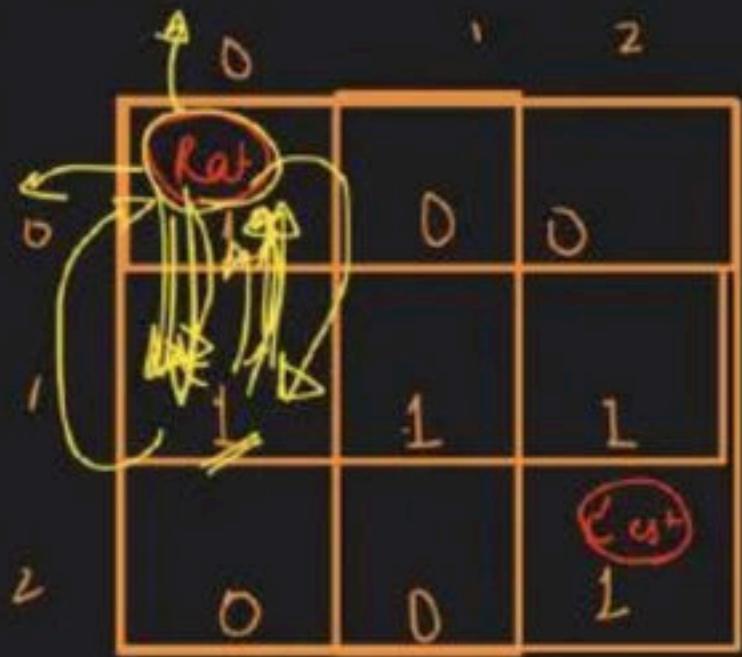
— → empty space
 ● → closed space

Rat → src →
 → dest → $(n-1, n-1)$



how rat going to reach
the destination →

D D R R D R E
D

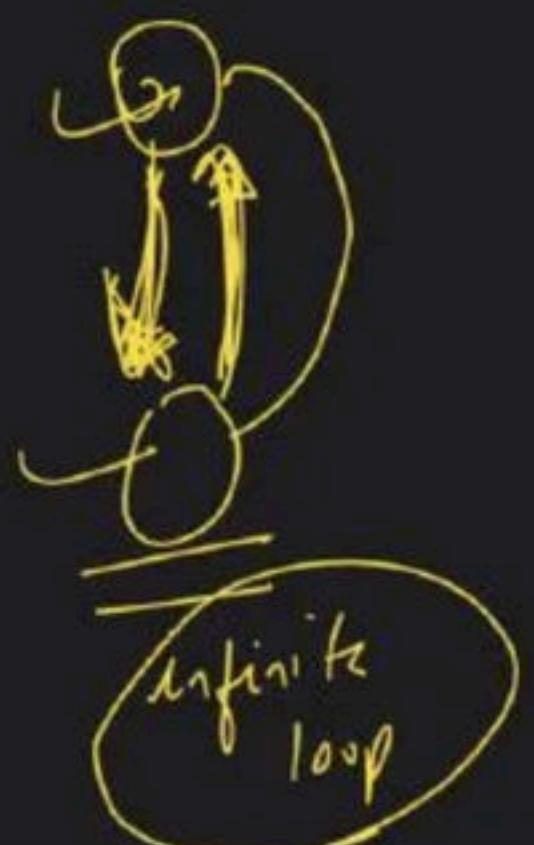
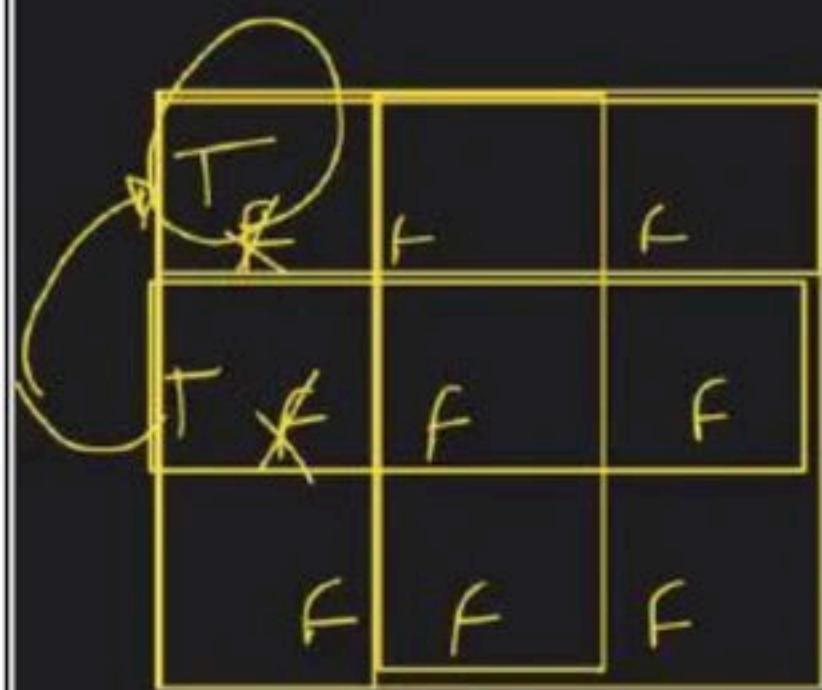


$0 \rightarrow \text{Blocked space}$
 $1 \rightarrow \text{Empty space}$

$\text{Dir} \rightarrow (0, 0)$

$\text{Dir} \rightarrow (2, 2)$

Out of Bound



$(0, 0) \rightarrow \text{U} | \text{L} | \text{D} | \text{R}$

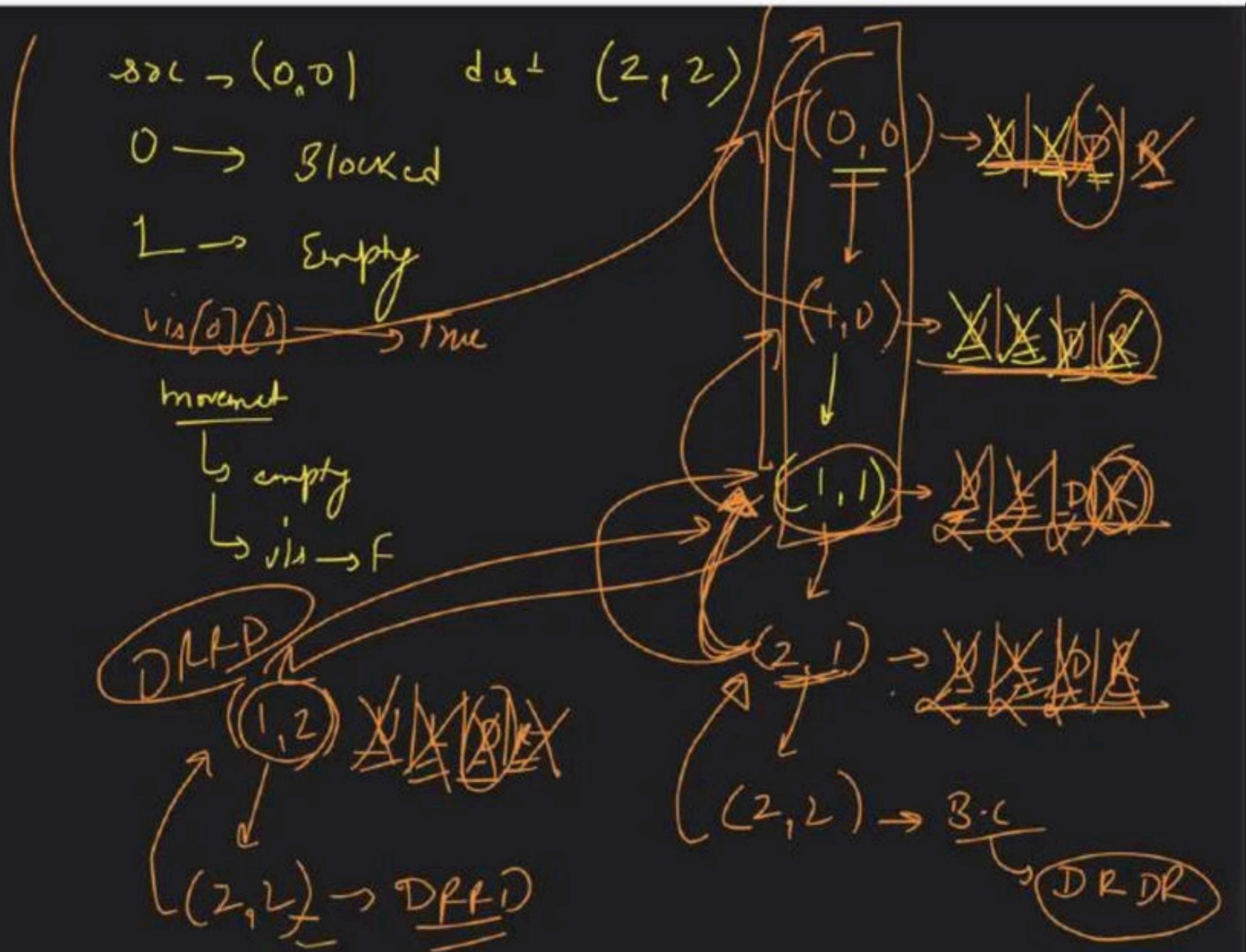
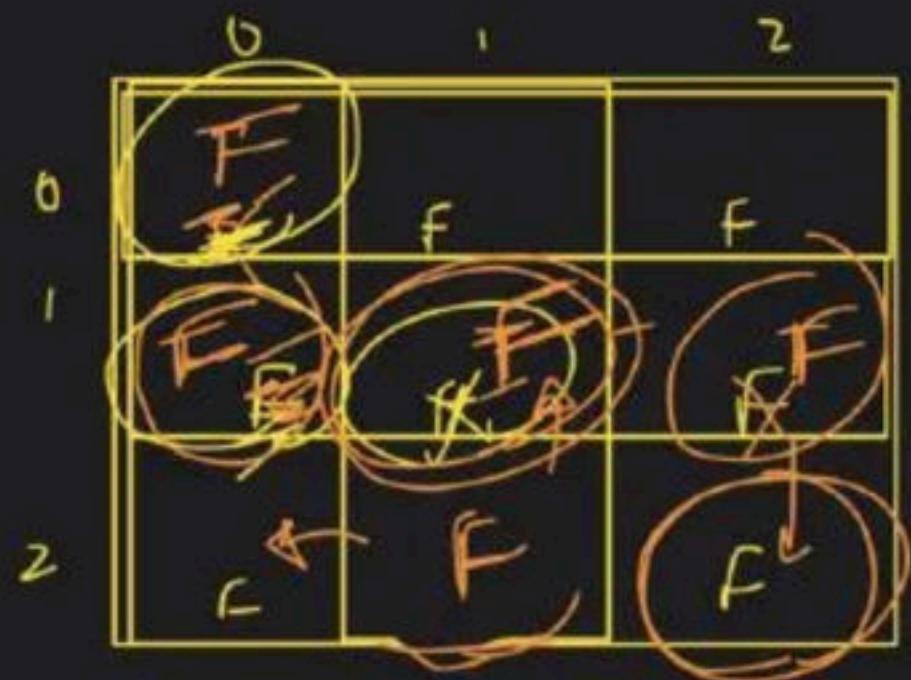
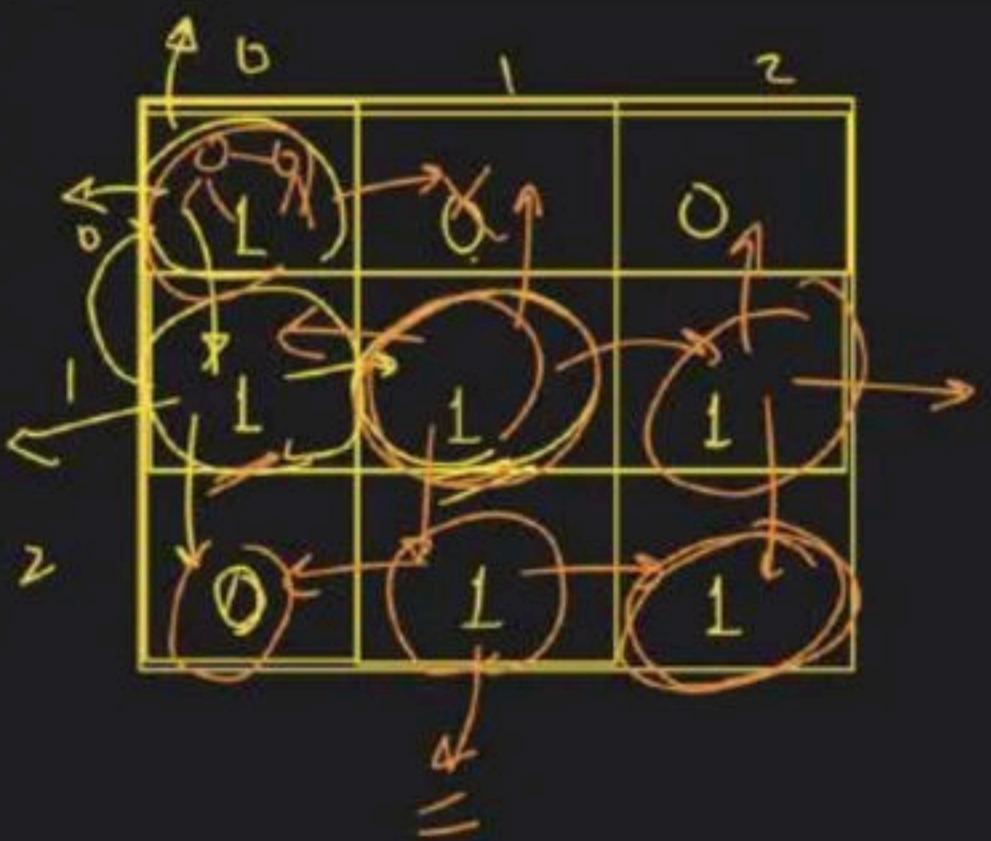
$(1, 0) \rightarrow \text{U} | \text{L} | \text{D} | \text{R}$

$(1, 0) \rightarrow \text{U} | \text{L} | \text{D} | \text{R}$

visit status
track

Boolean value
vs each cell

D B L D



$\text{soln}()$
 $\text{soln}()$
 $\text{soln}()$
 $\text{soln}()$
 $+ U$

obj:-

$$3yc \rightarrow 0, 0$$

$$\downarrow \omega^+ \rightarrow (n^{-1}, n^{-1}) \rightarrow 2, 2$$

Mole -

out of bound

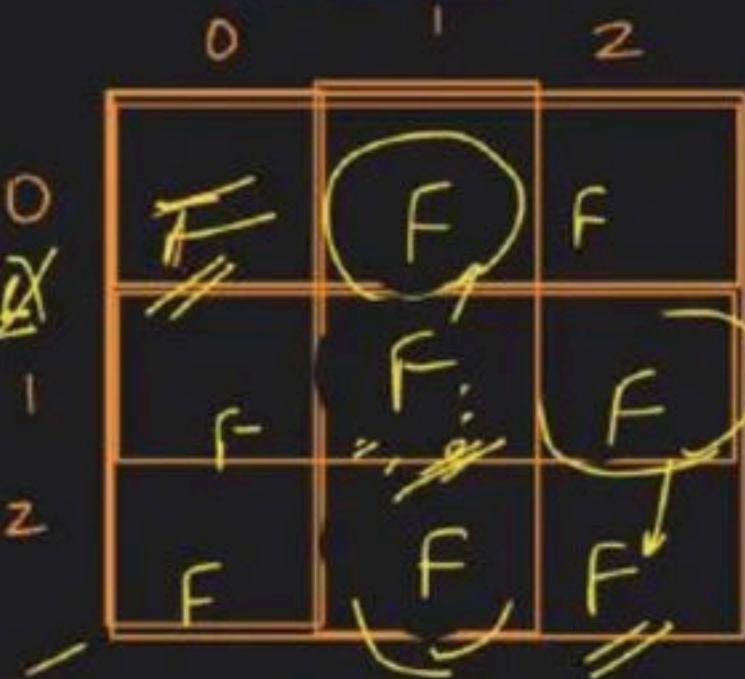
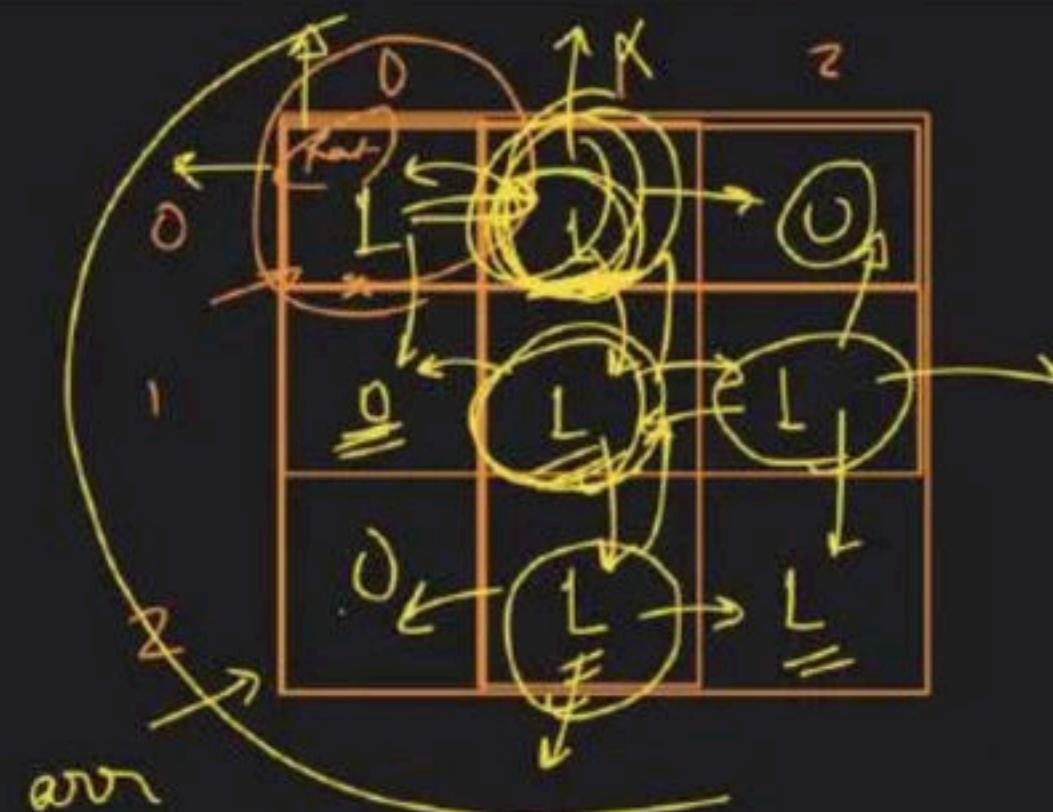
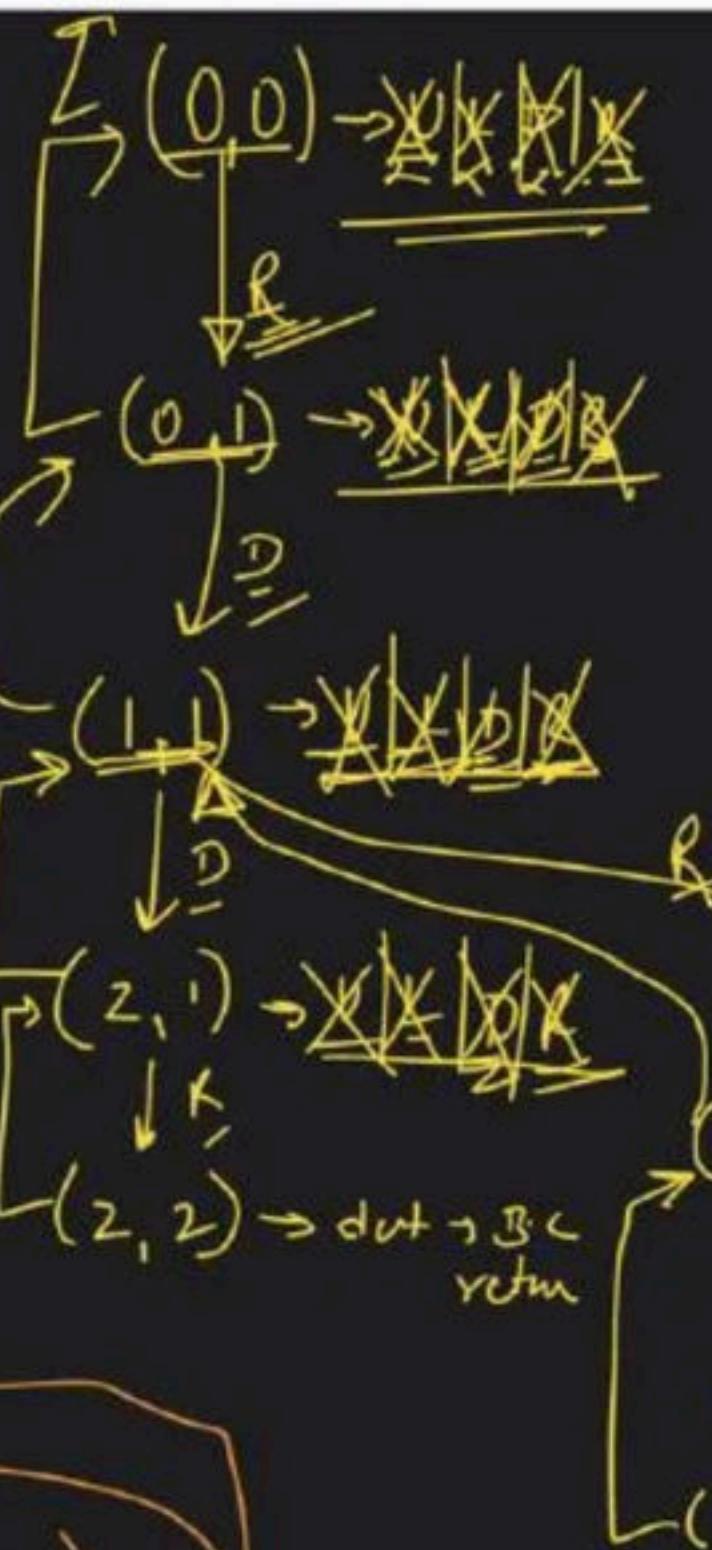
Moment after

empty space
→ not visited

all per
by
per

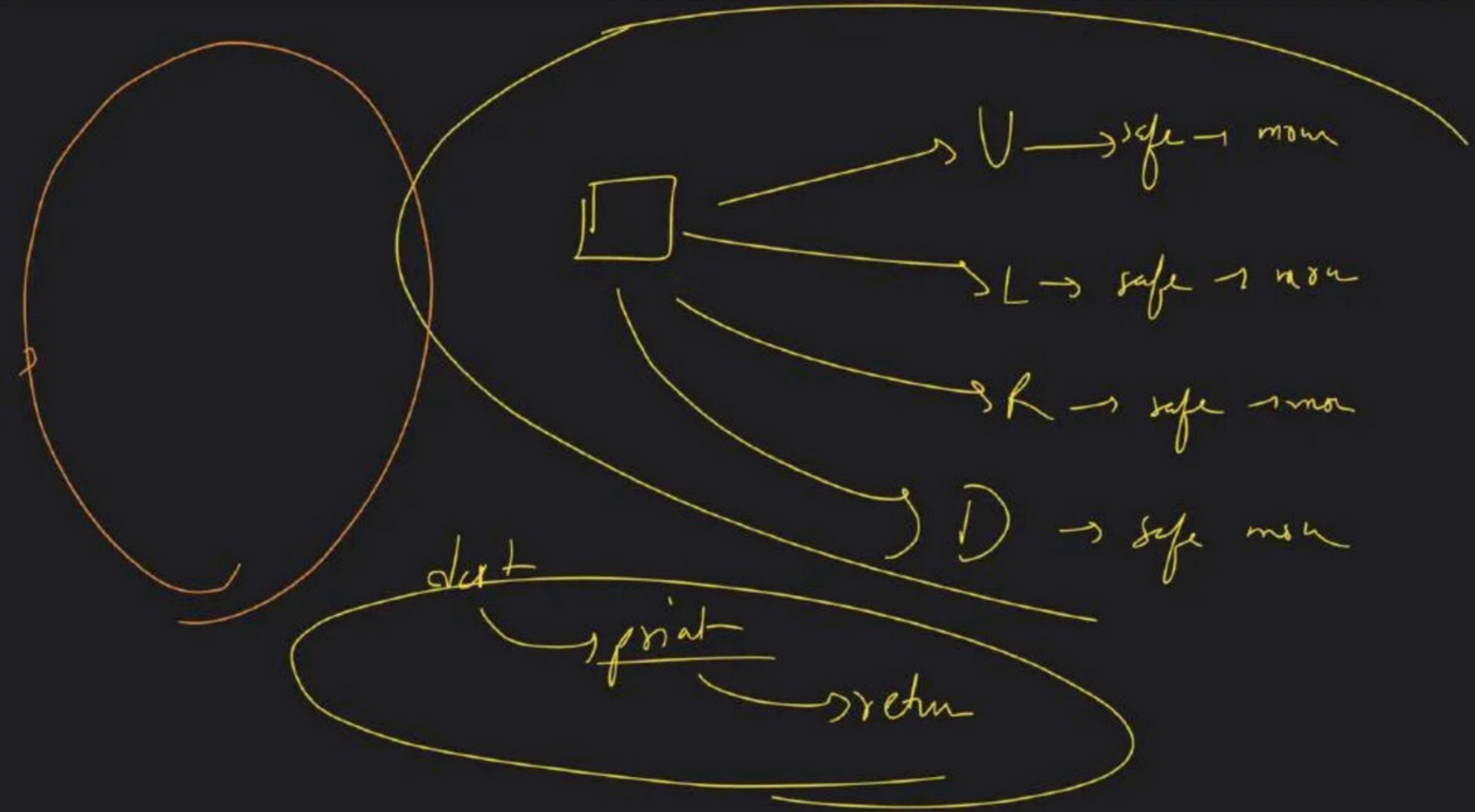
Banjo tone

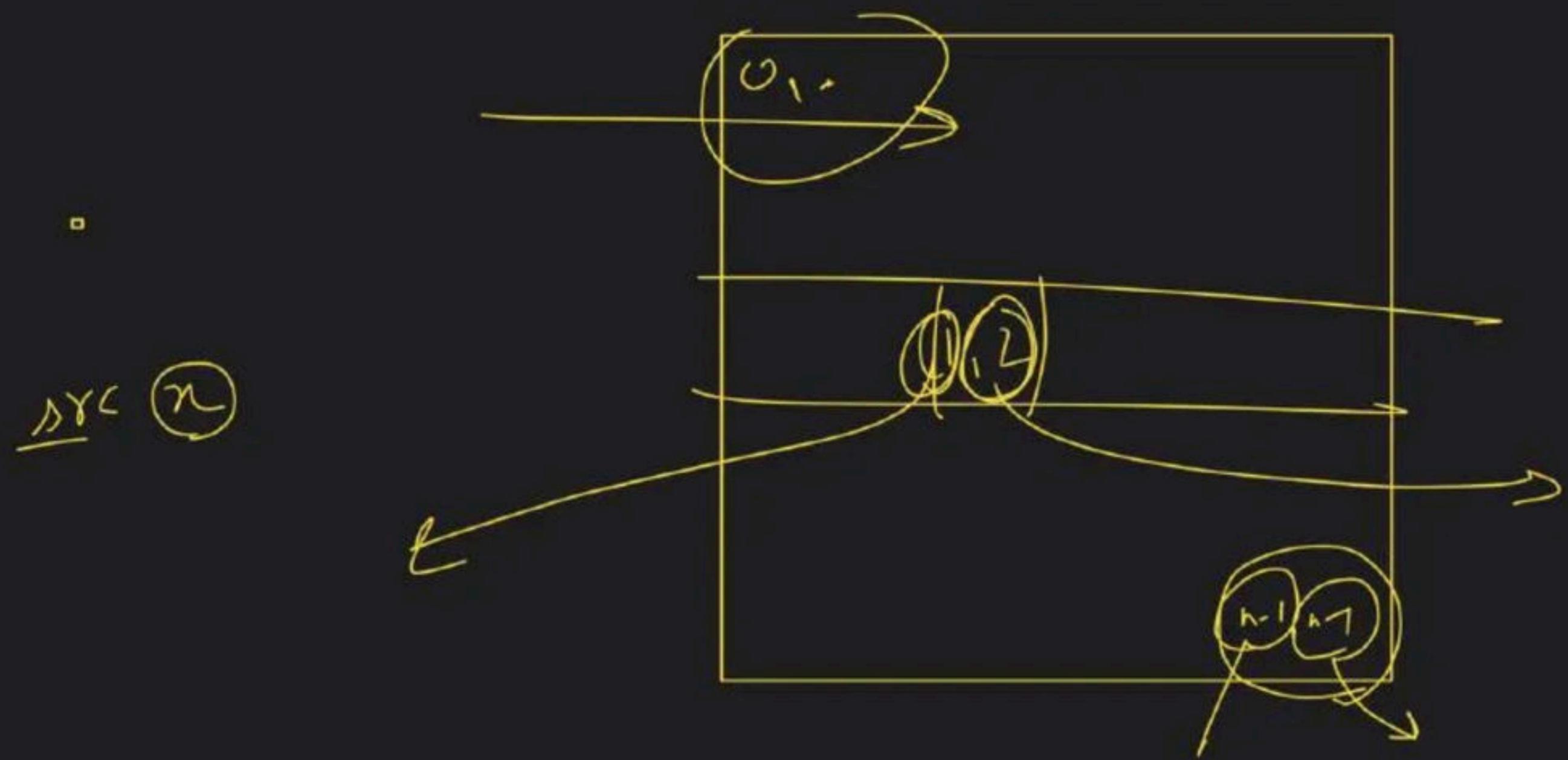
$0 \rightarrow$ Blocked space
 $1 \rightarrow$ Empty space



↳ dad → visited
↳ C → John

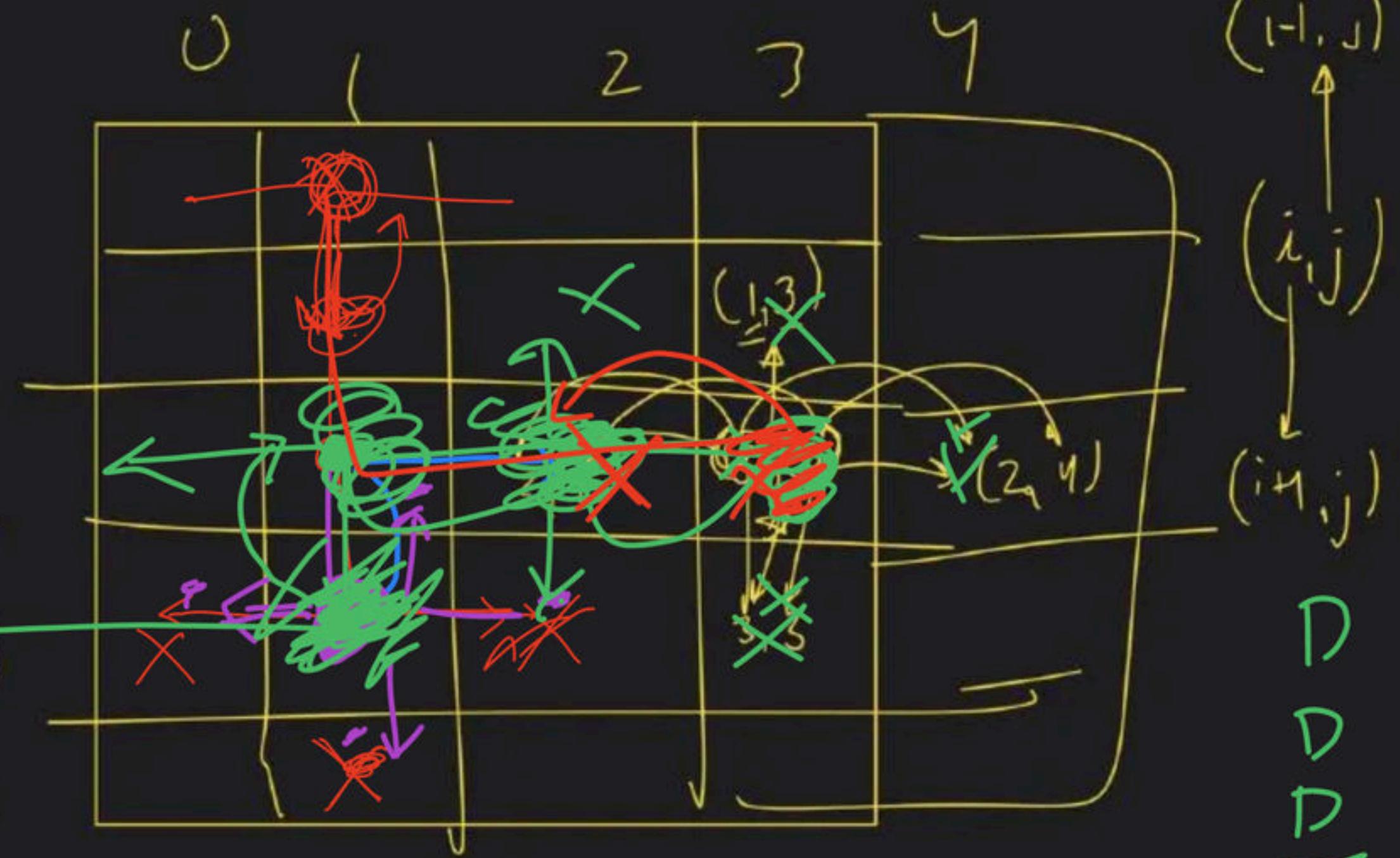
— RDDR
— RDR_D)

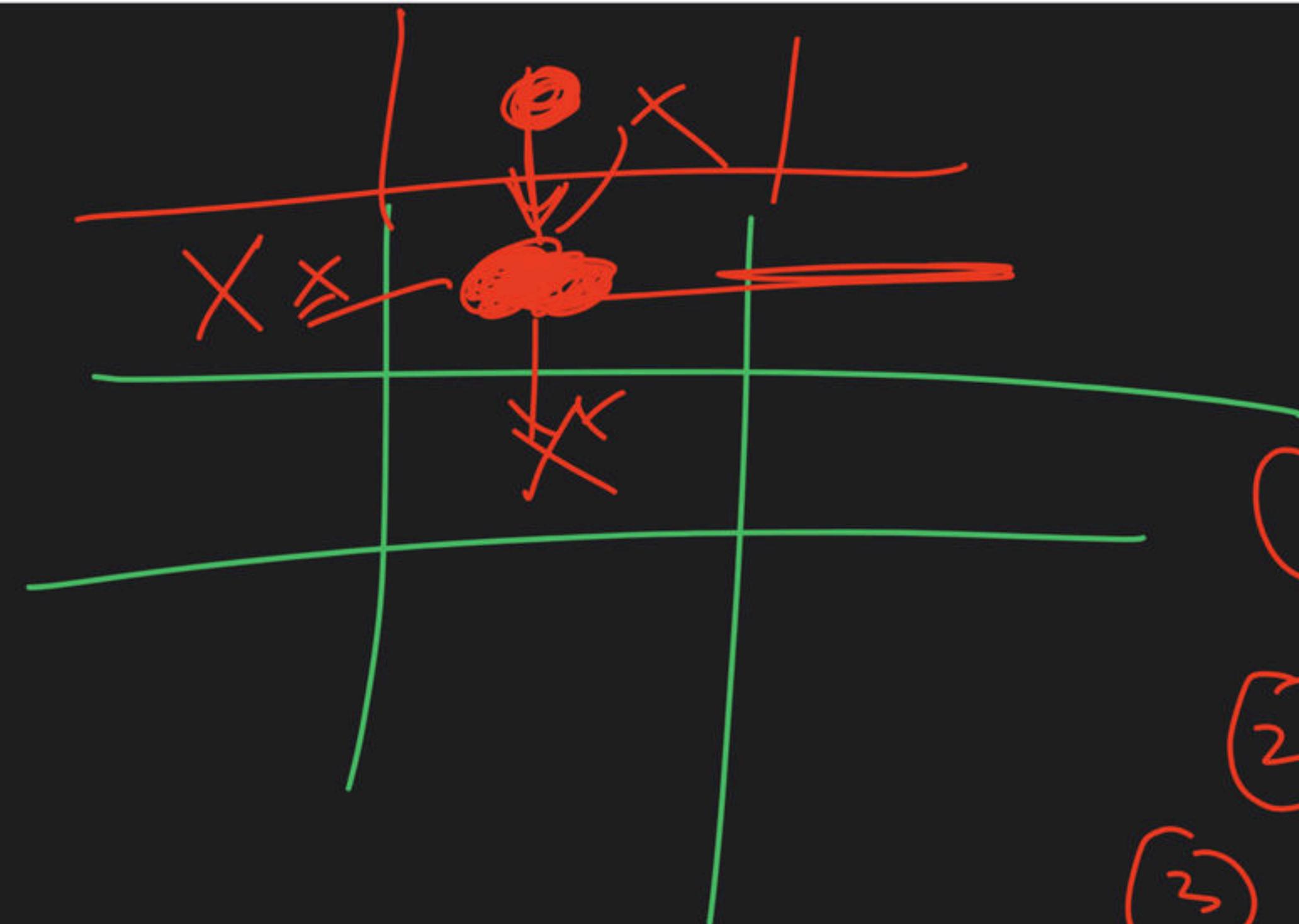




ΔY^L n

i, j
 $\nabla p \rightarrow (i-1, j)$
 down $\rightarrow (i+1, j)$
 left $\rightarrow (i, j-1)$
 right $\rightarrow (i, j+1)$
 F

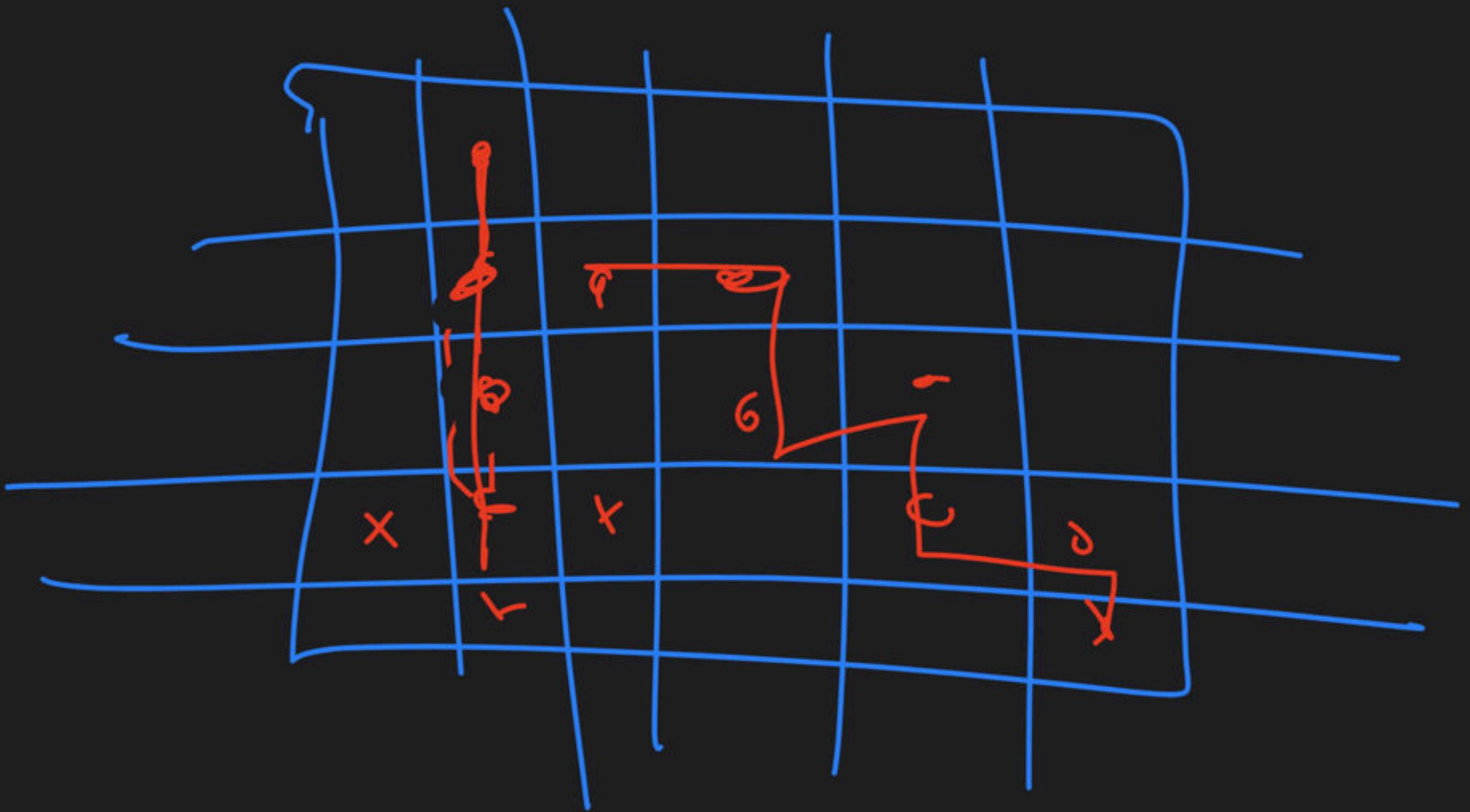


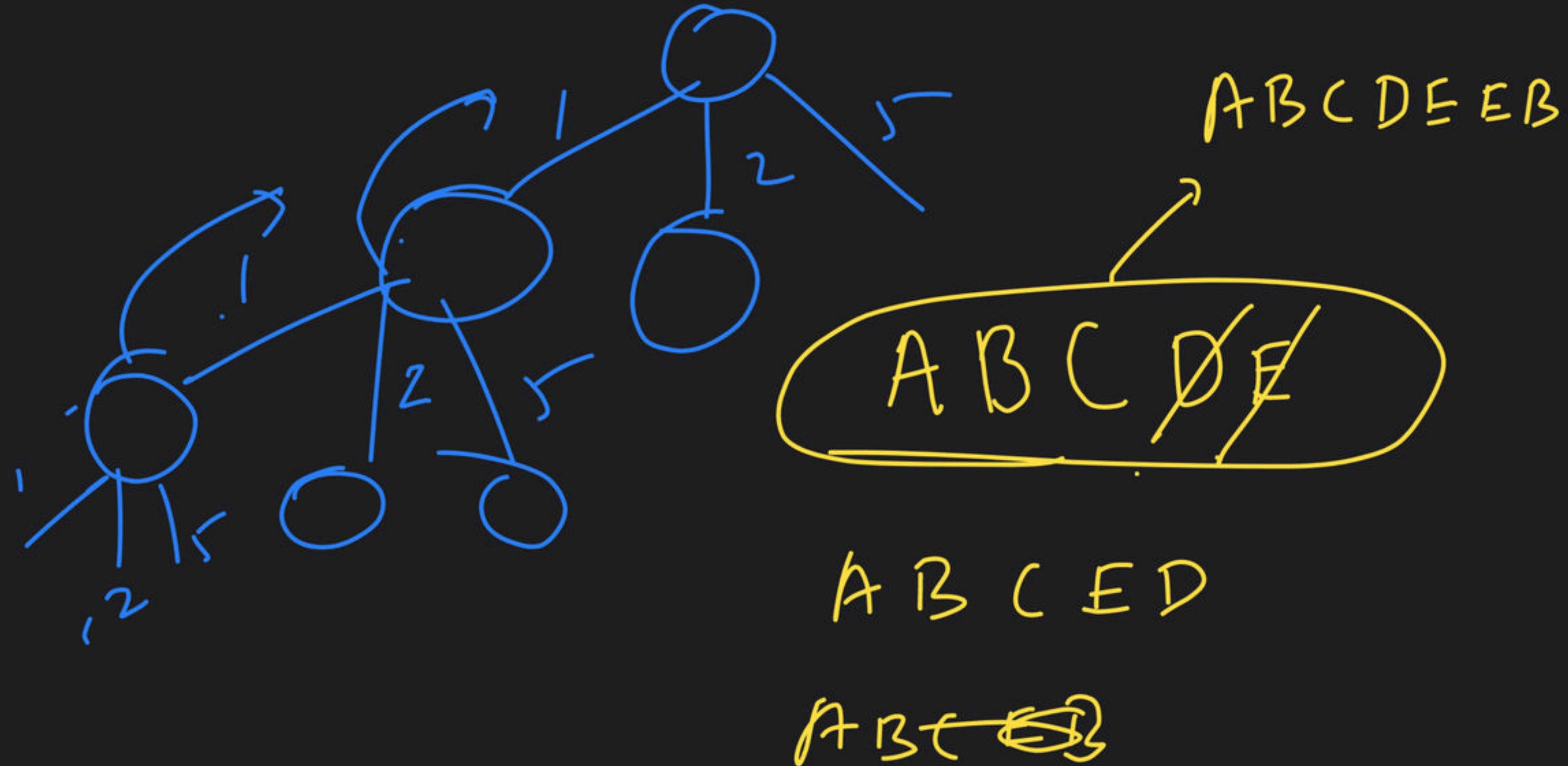


0 out of B

② Visit

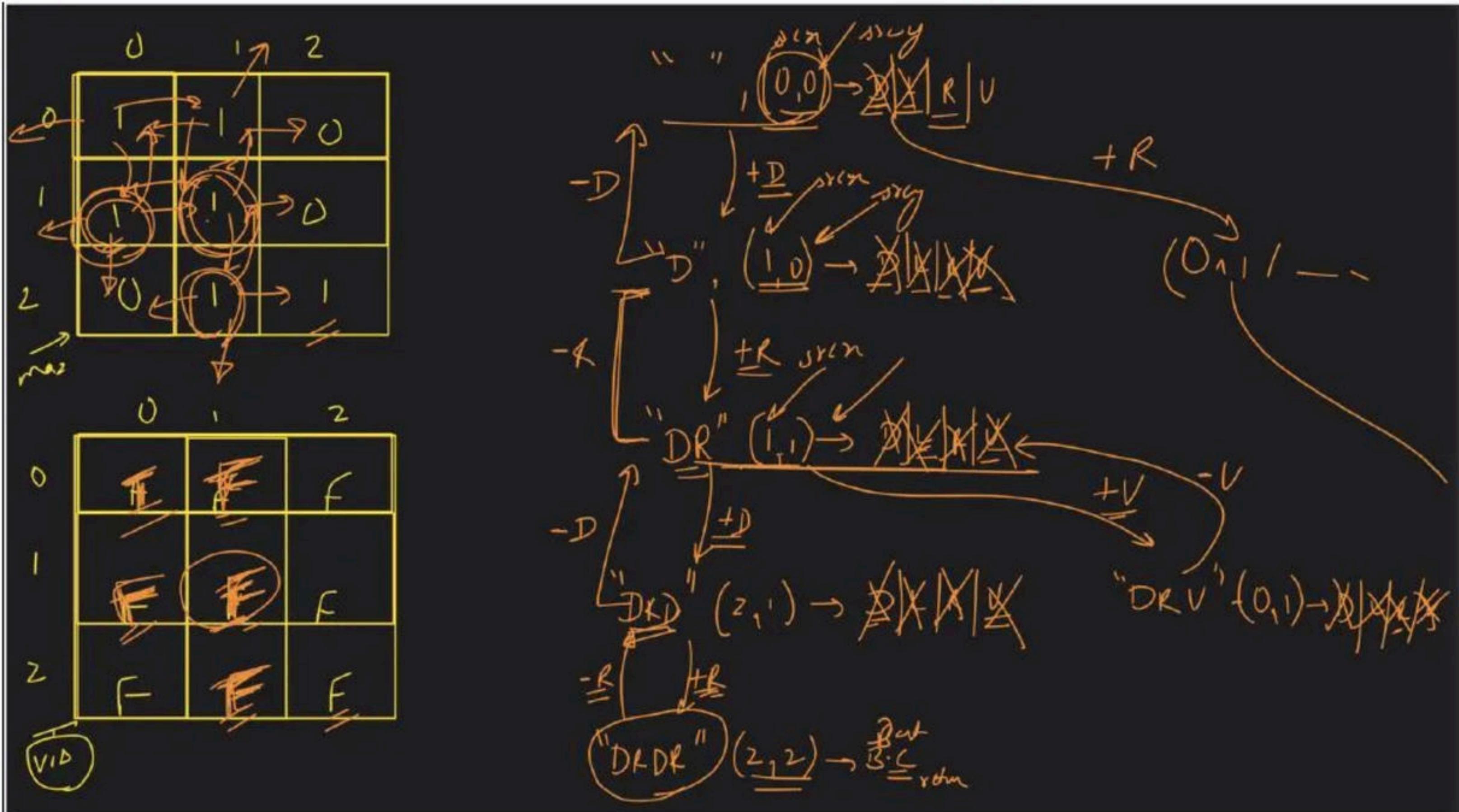
③ blocked

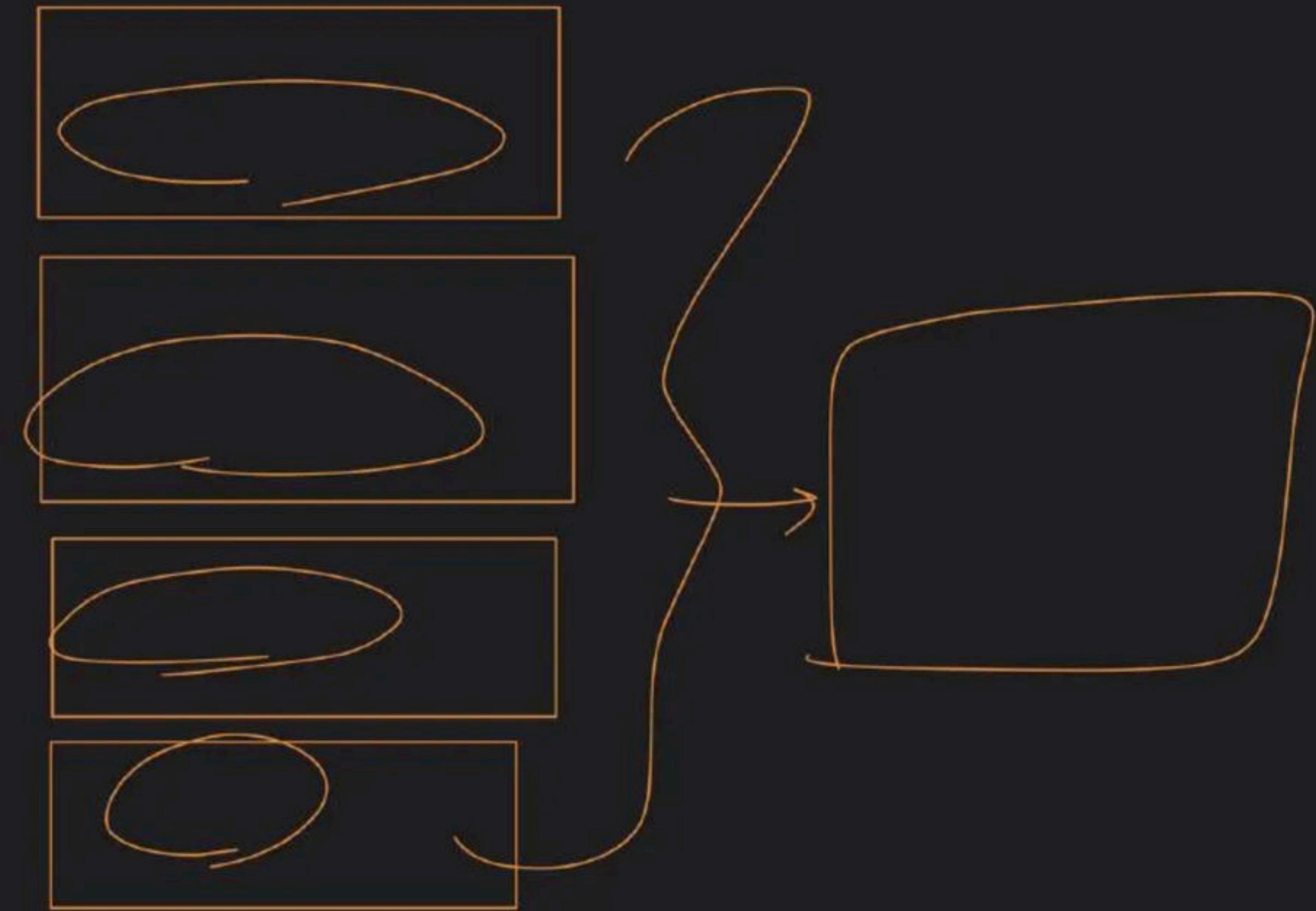


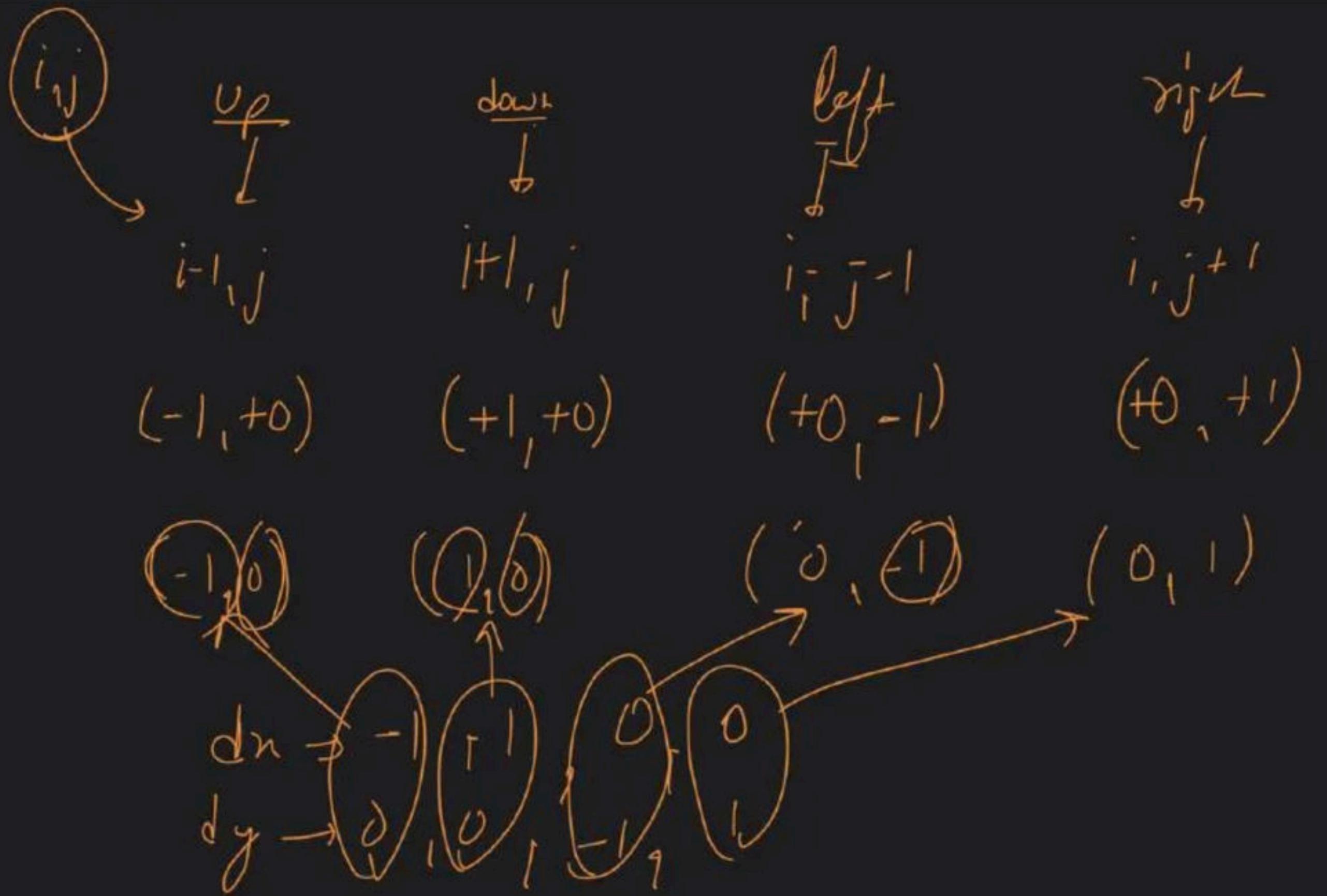


A
B

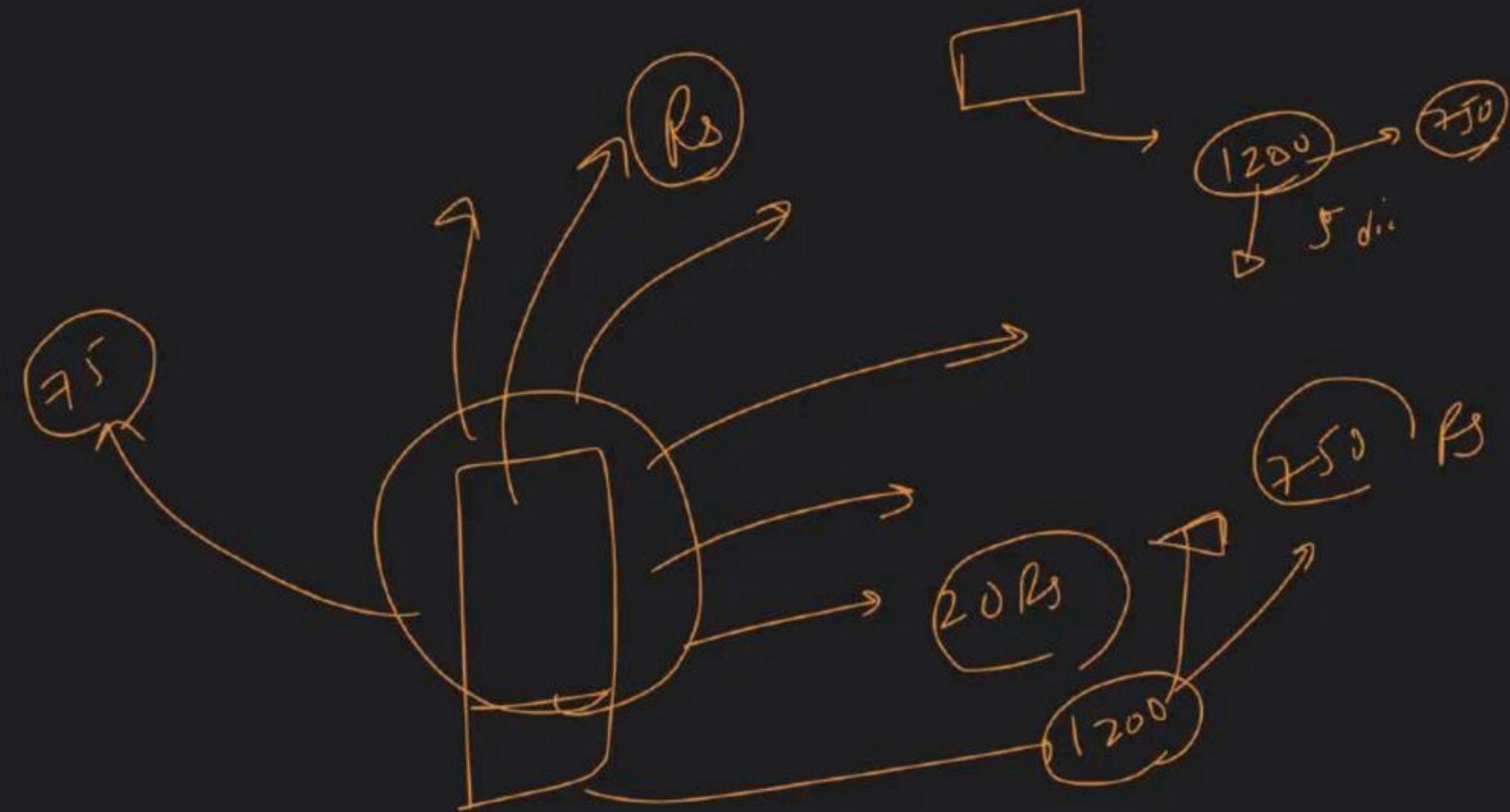
A dashed yellow arrow originates from point B and points towards point A.

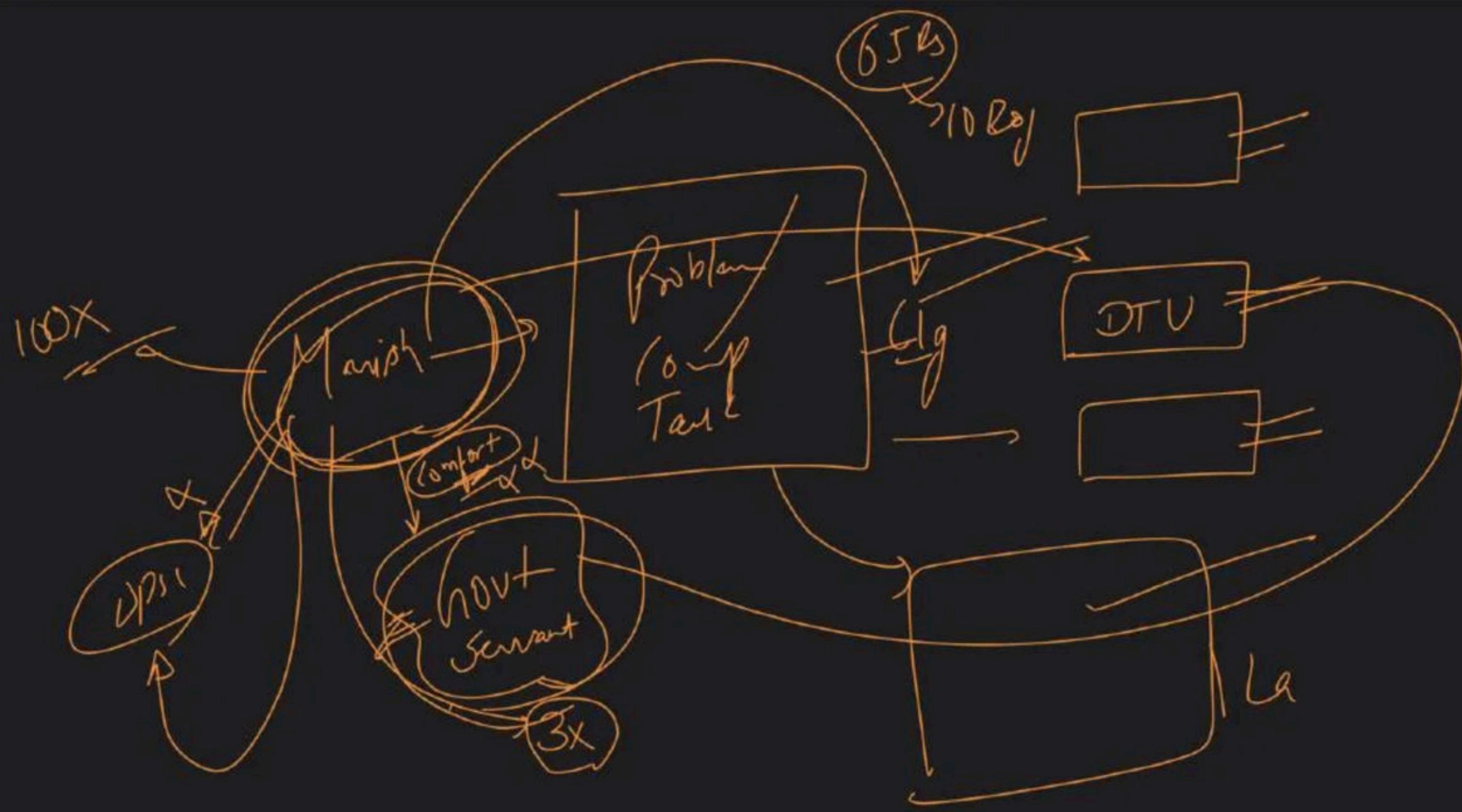


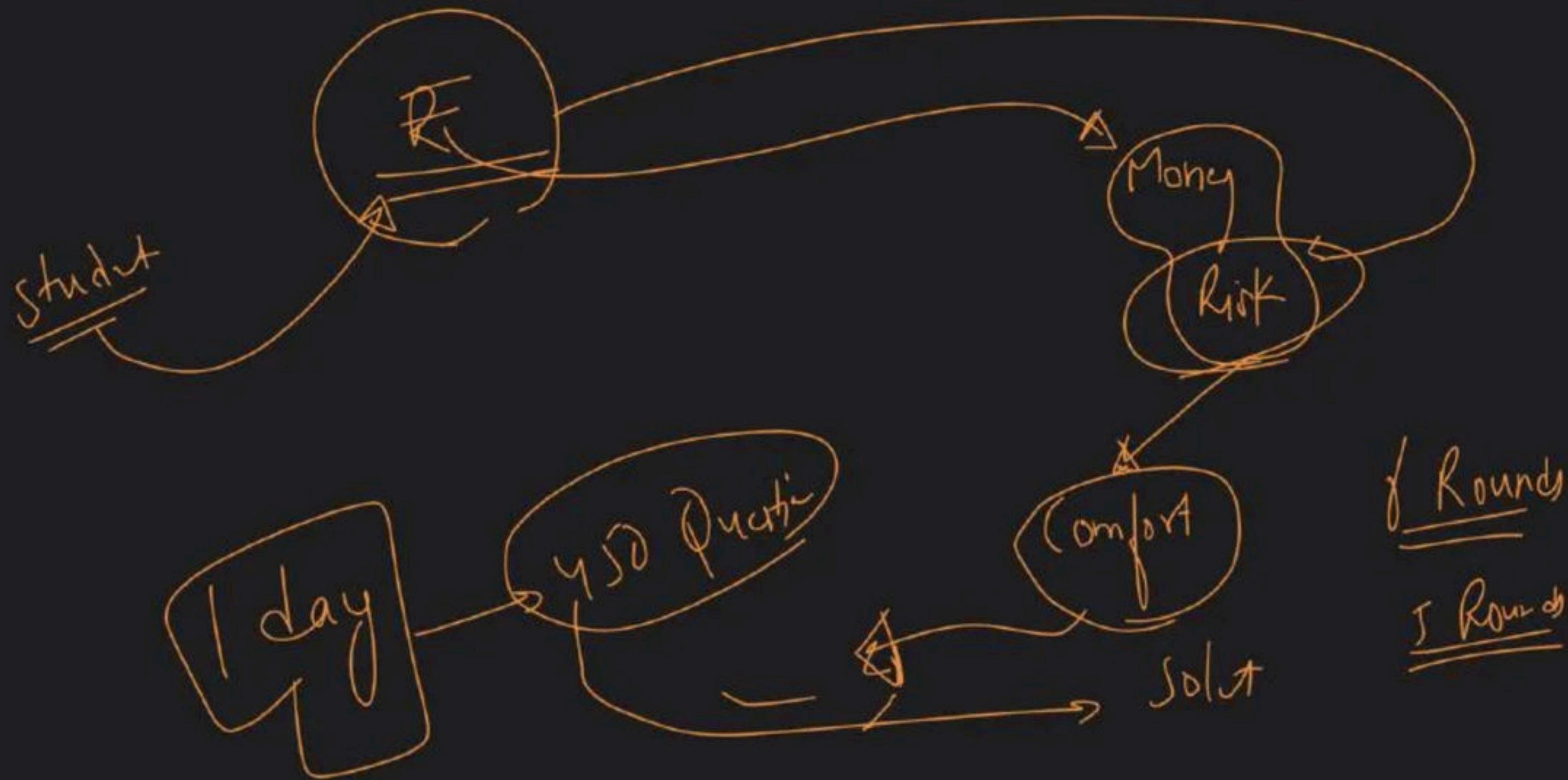


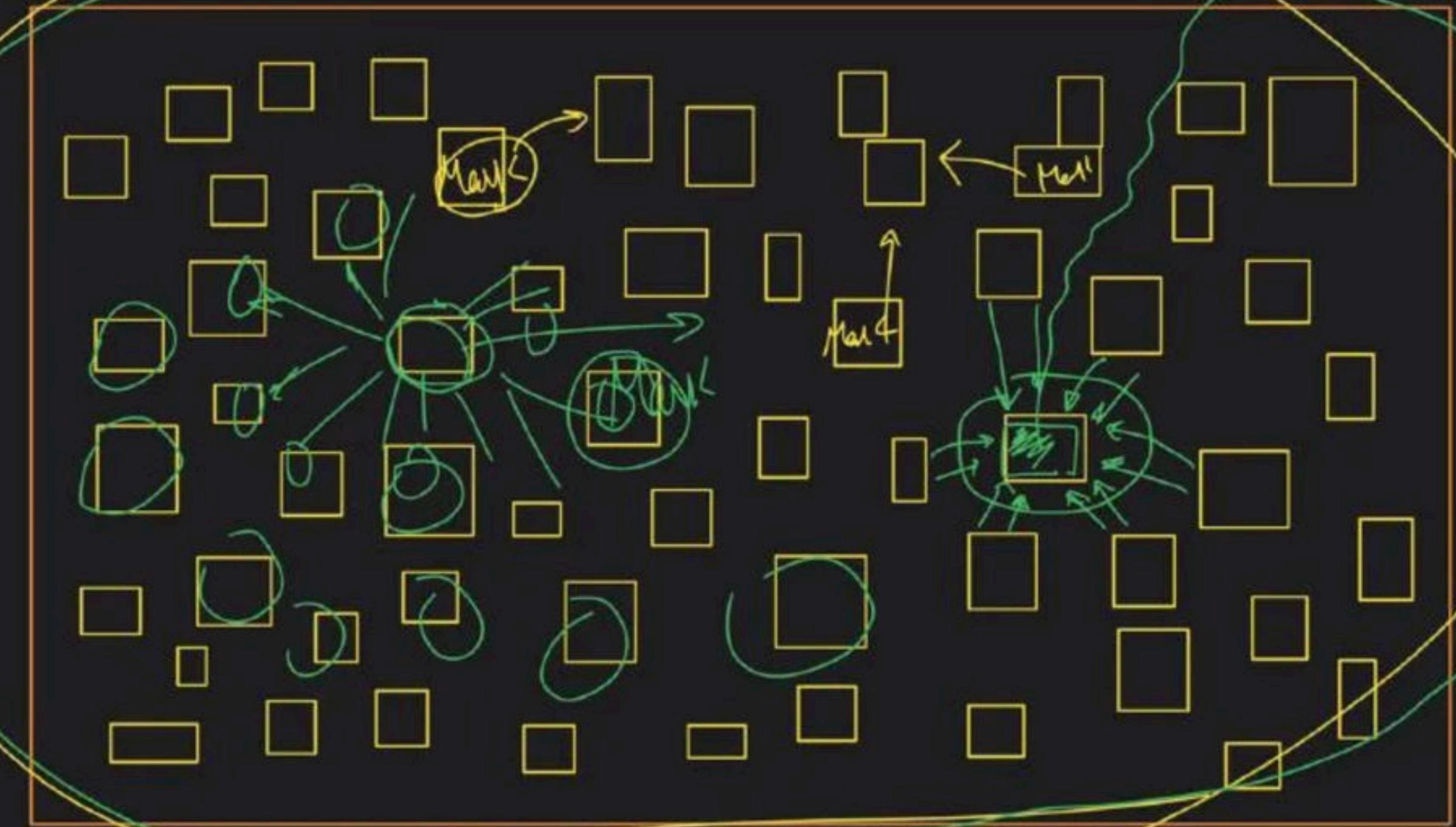


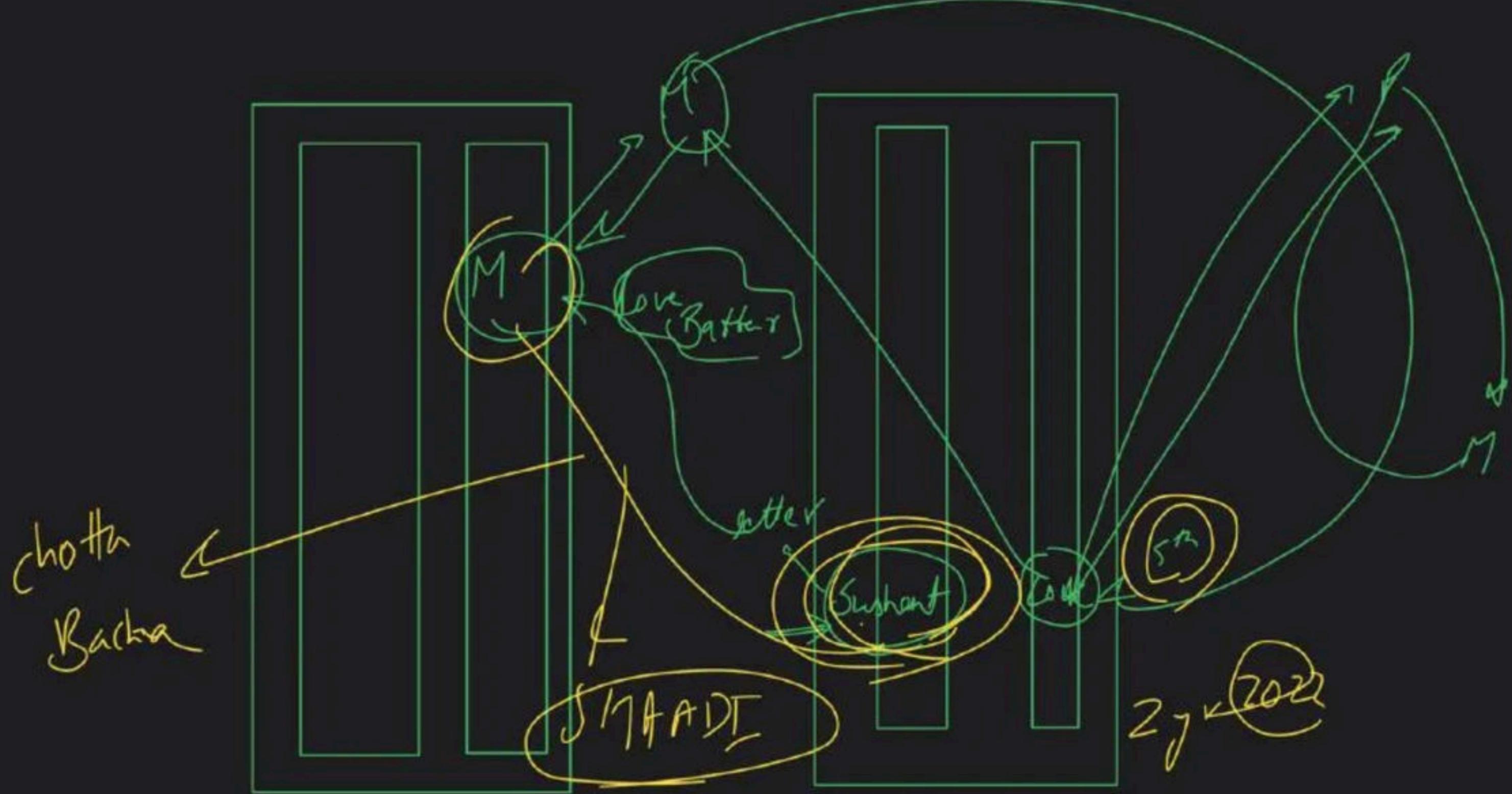
Permutations of a Strings

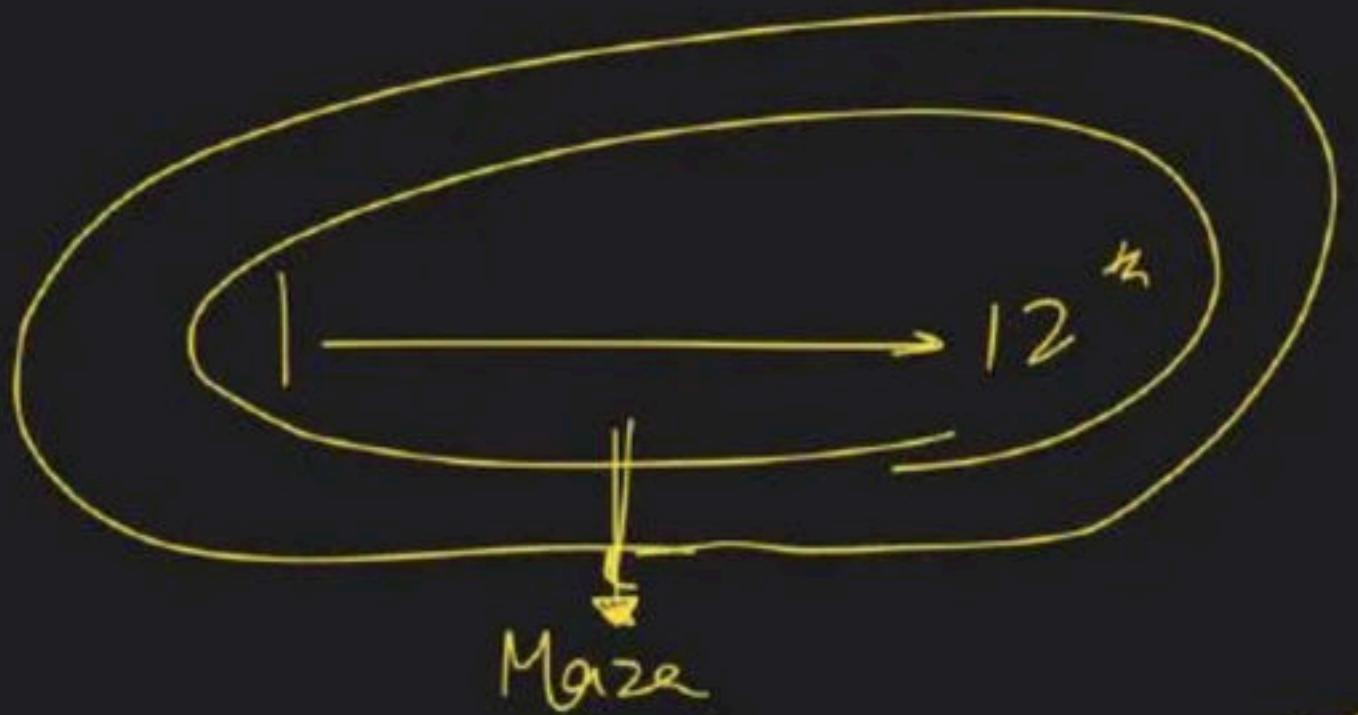












Maze

cycle

Job

1 - 2 - 3 - 4

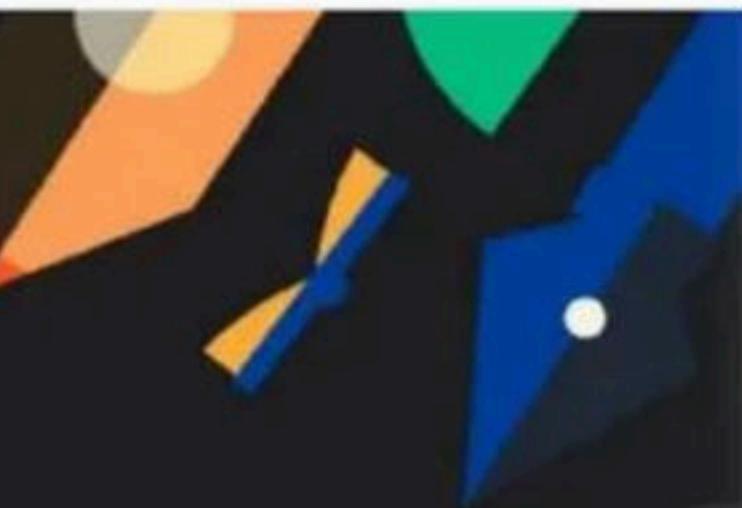
μ α

(μ)

~~interval~~

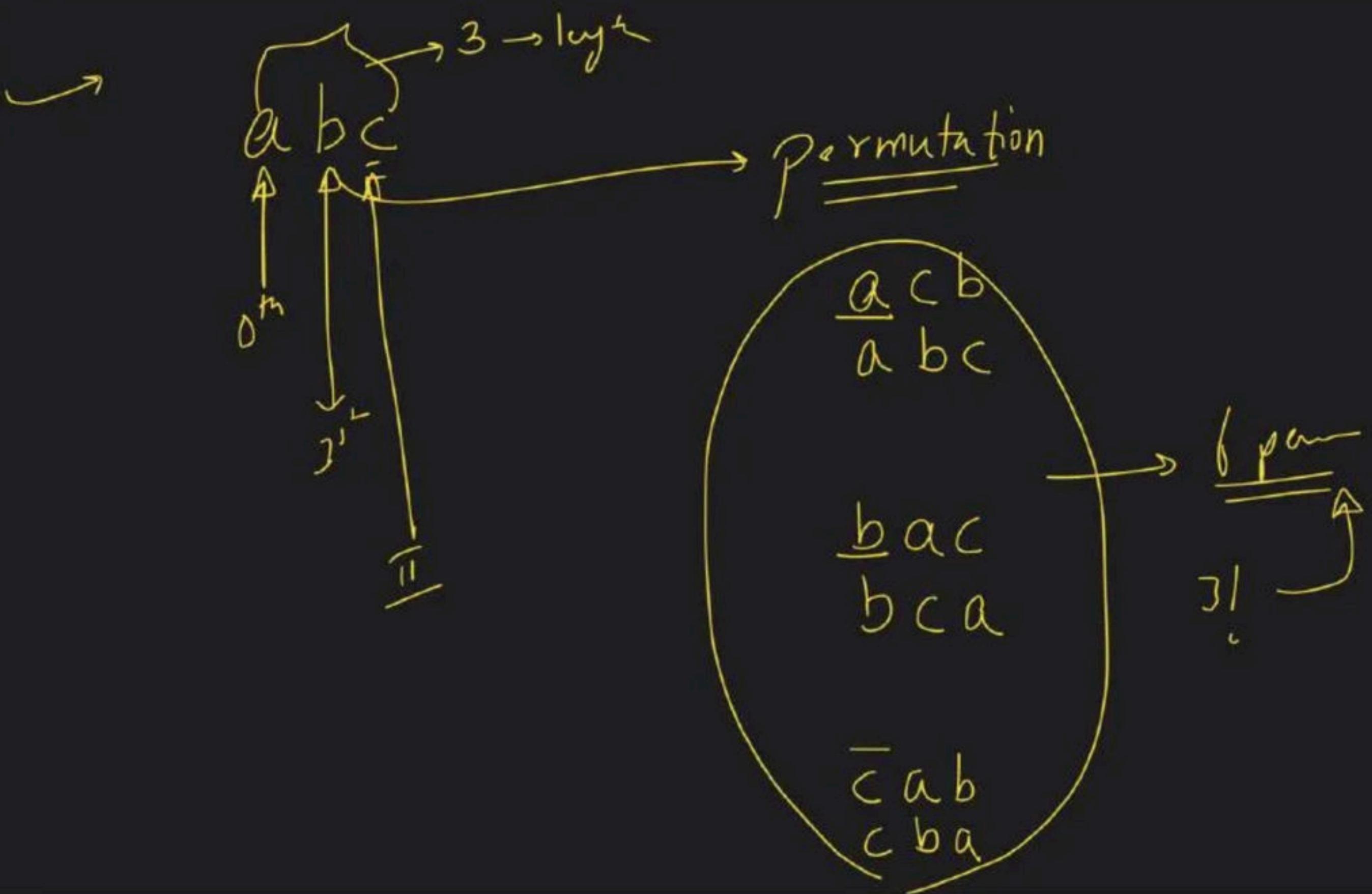
2K days

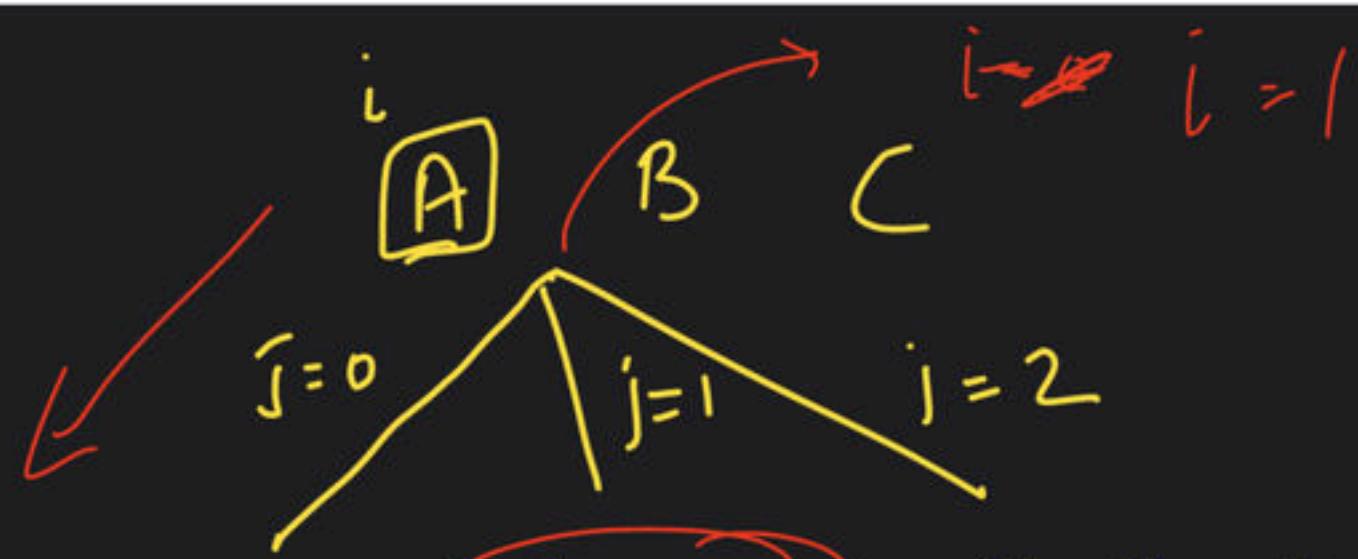
3-4000 min



DnC && Backtracking Class - 3

Special class





$A \ B \ C$
 i
 A circle containing BAC with index i below it.

$i=0$

$C \ B \ A$
 i
 A circle containing BAC with index i above it.

$j=1, i=0$
 A circle containing BAC with index i above it.

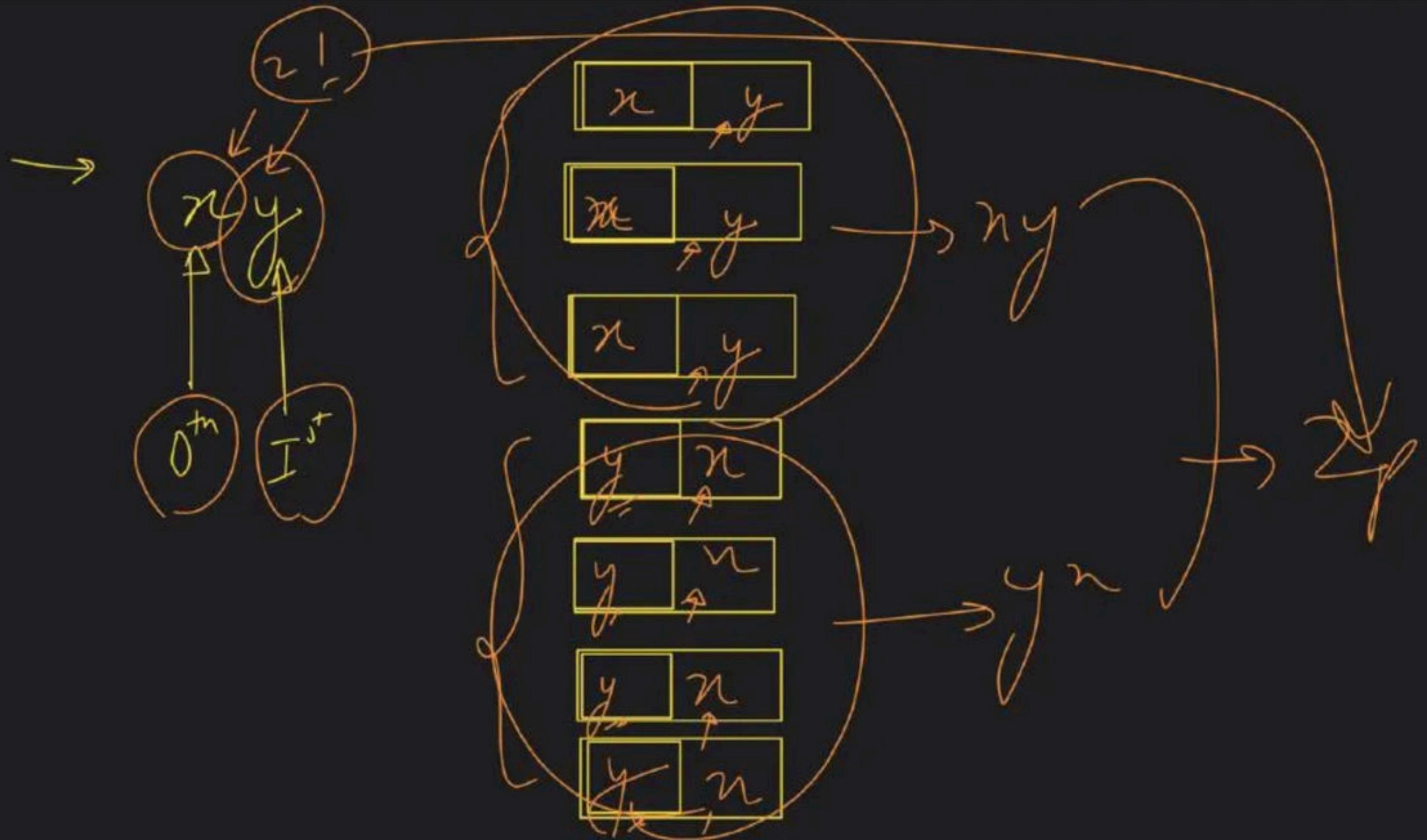
$j=1, i=1$

$BAC \rightarrow$
 A circle containing BAC .

$\text{Per}(ta, l)$
 {
 if $l == a.size$
 }
 $l = 1$
 $l =$
 $\text{for}(j = [l, size])$ $j++$

$i=0$
 swap($a[i], a[j]$)
 $i++$
 $\text{Per}(a, l+1) =$
 swap($a[i], a[j]$)

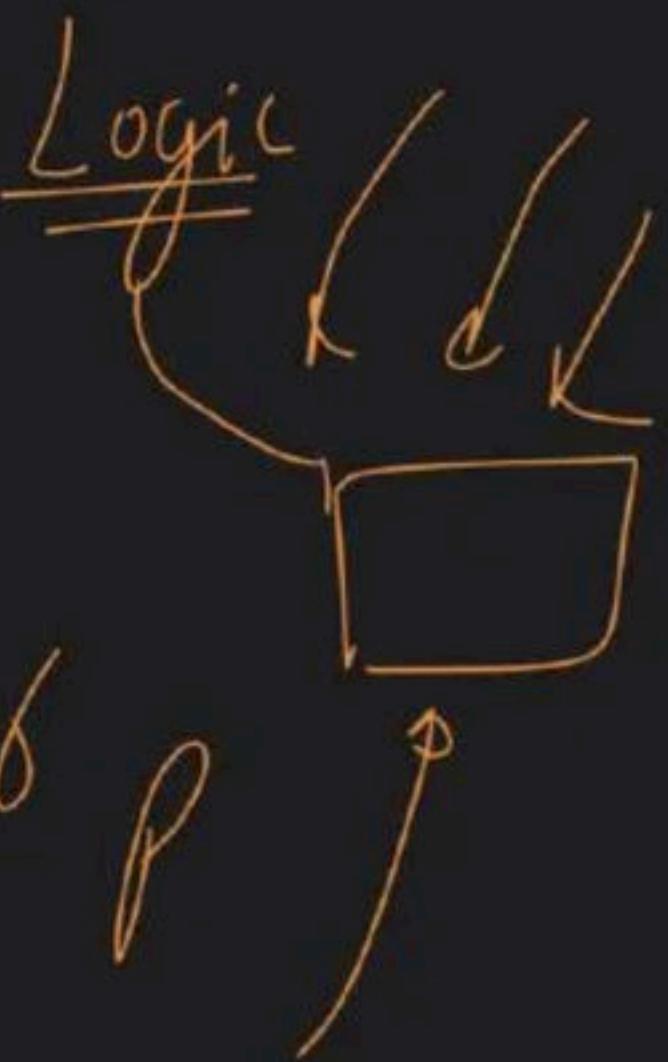
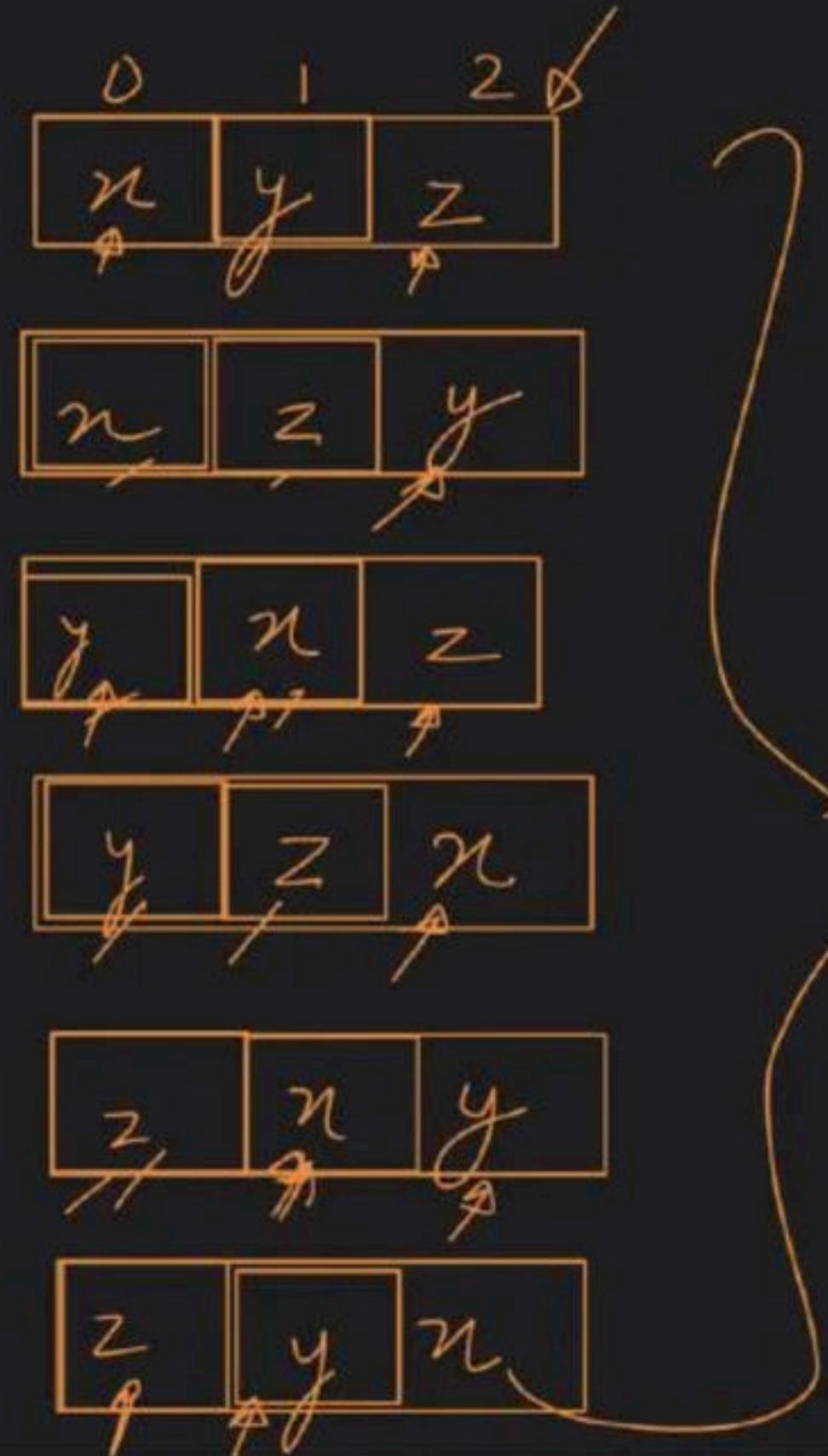
3

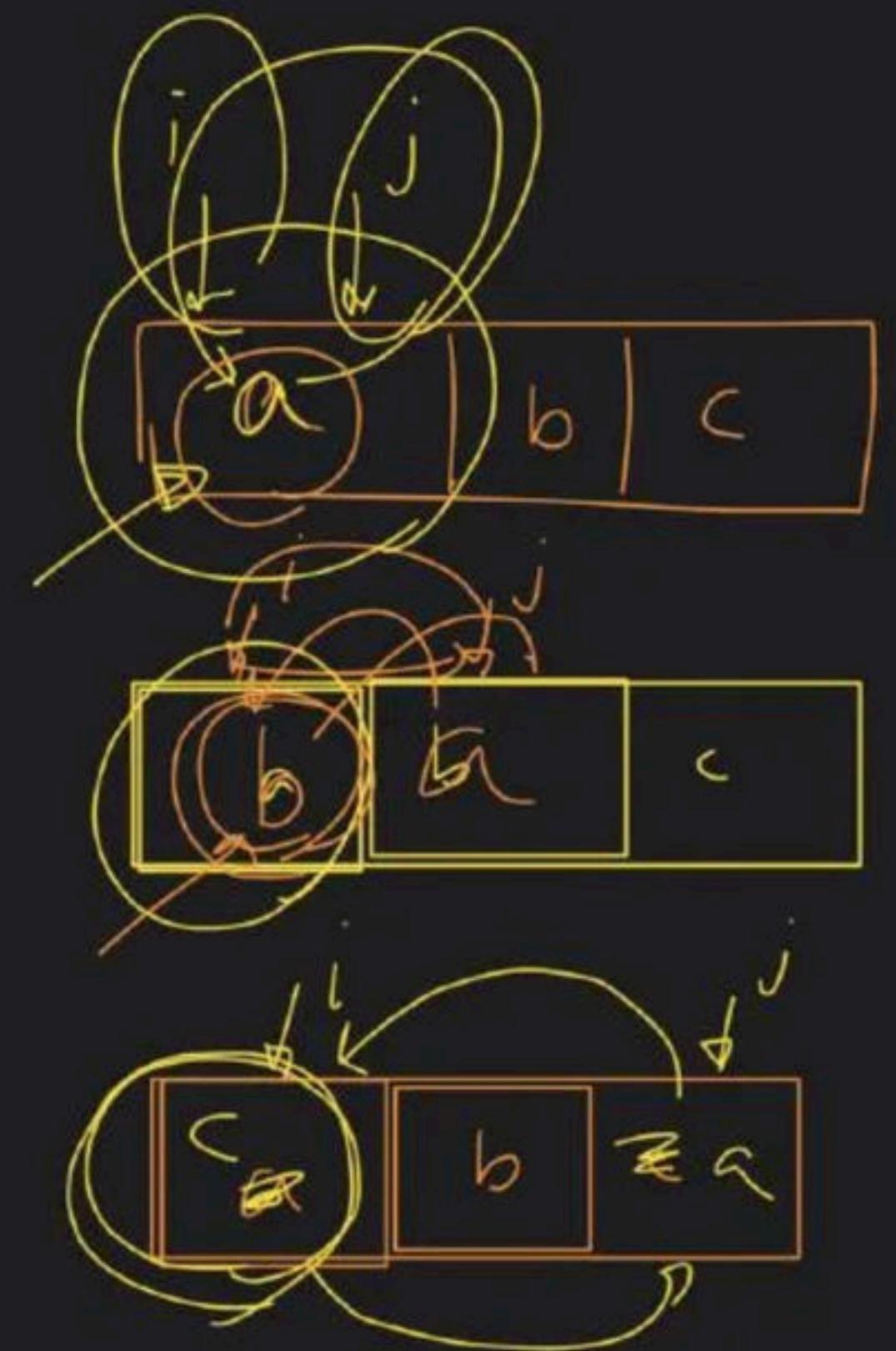




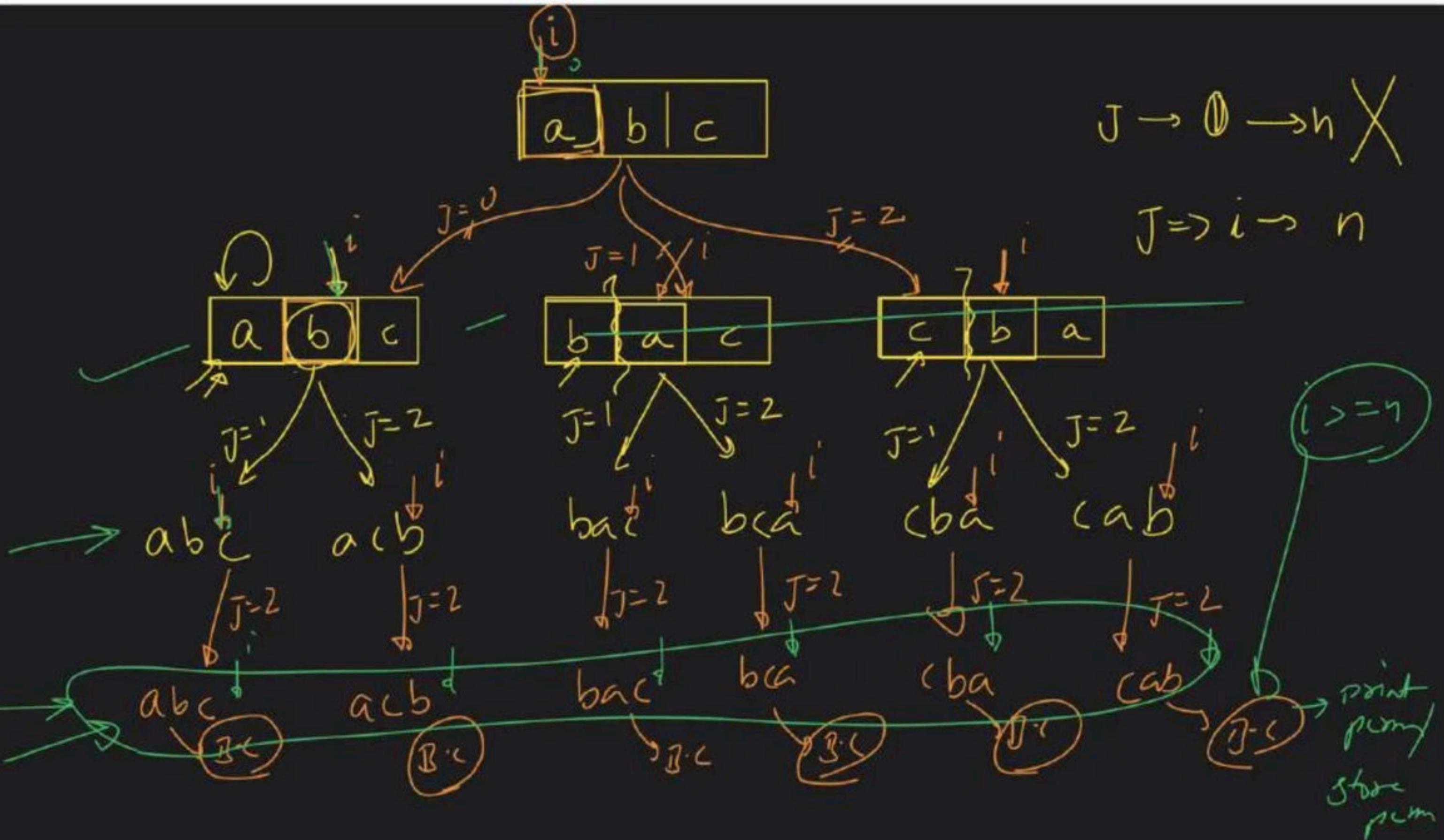
31 → 1

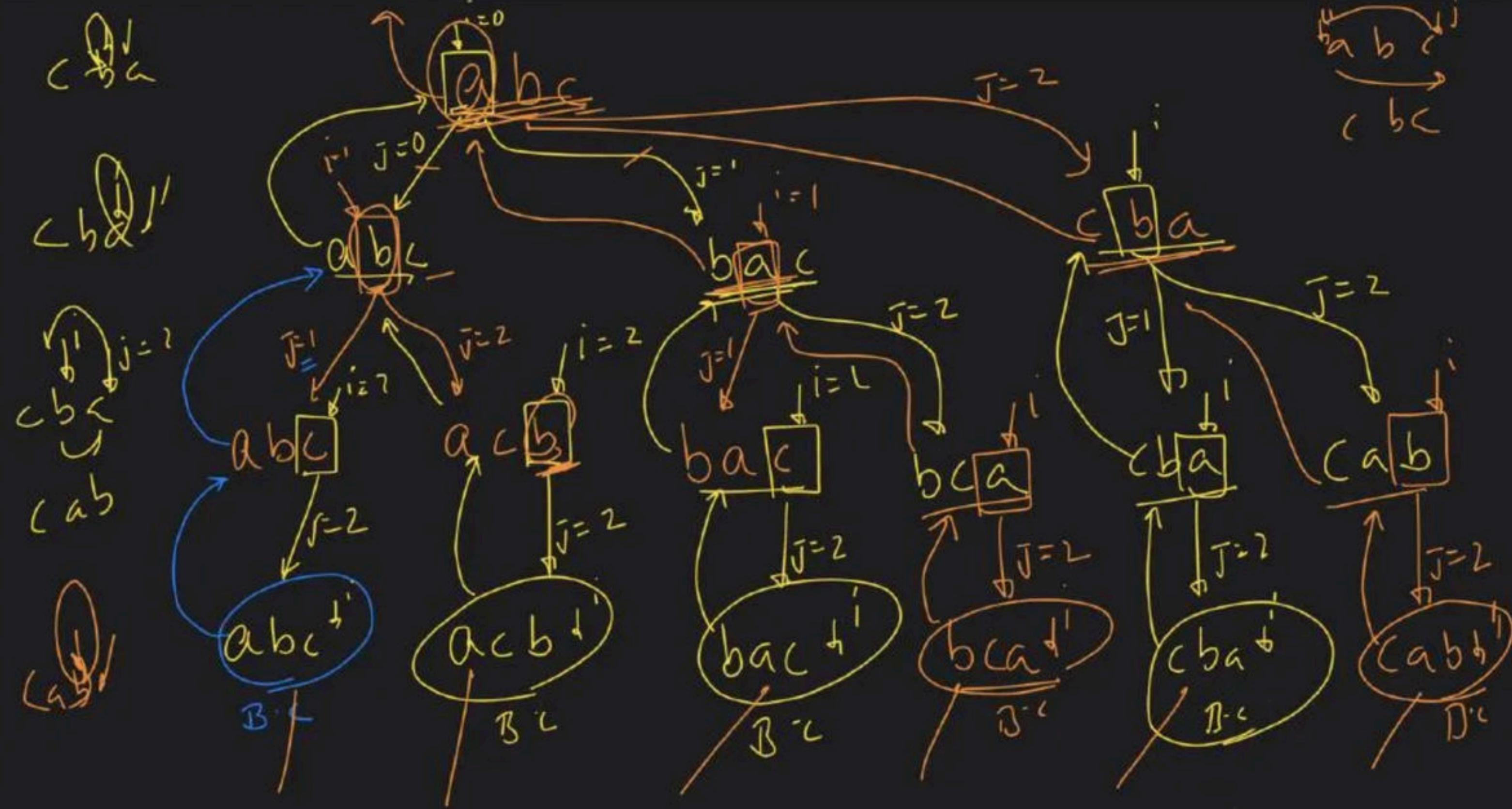
3x2x1 → 1





swap

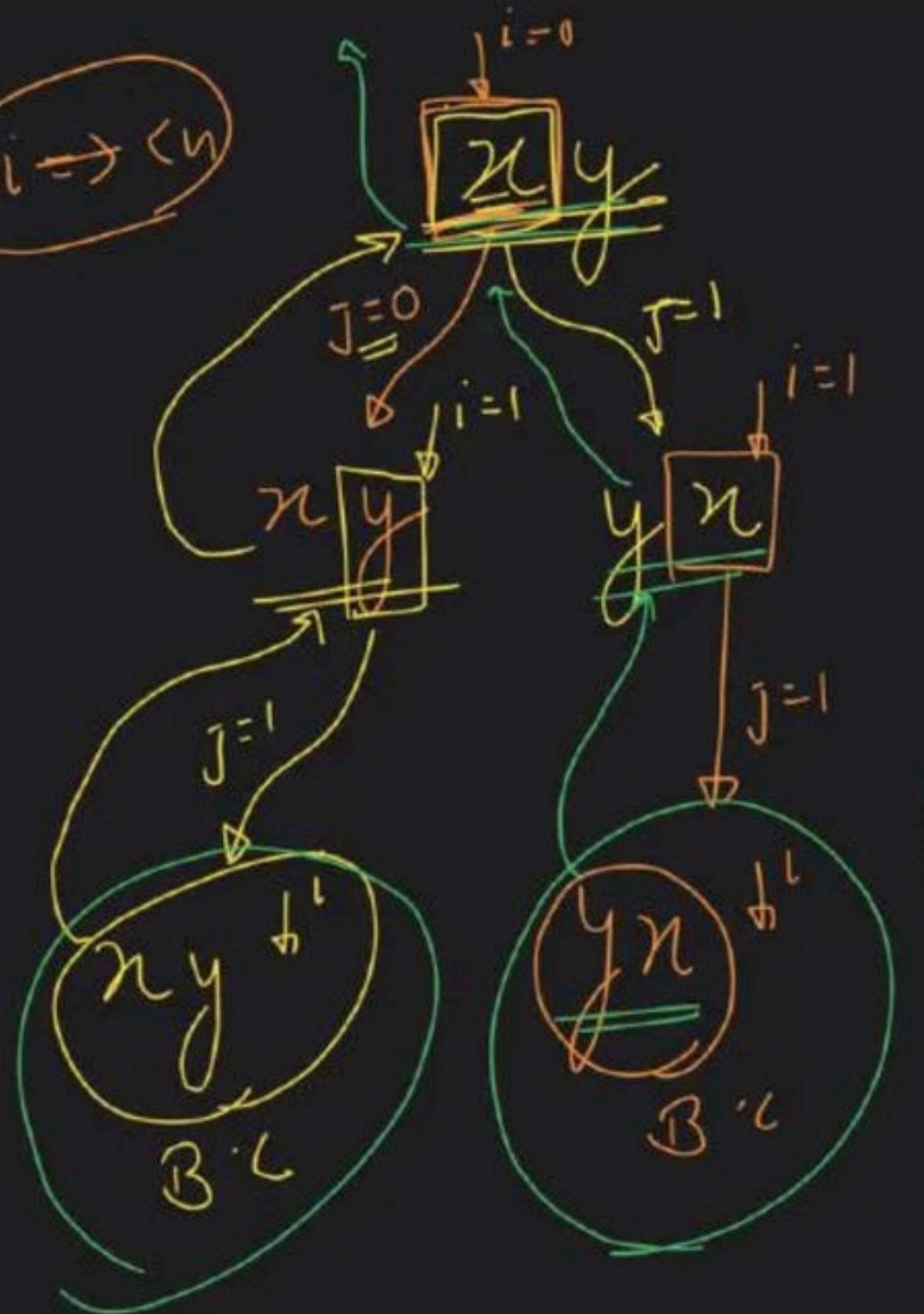




xy

$j \rightarrow i \rightarrow ny$

$i \downarrow j \downarrow$
 $y \rightarrow y$
 yx

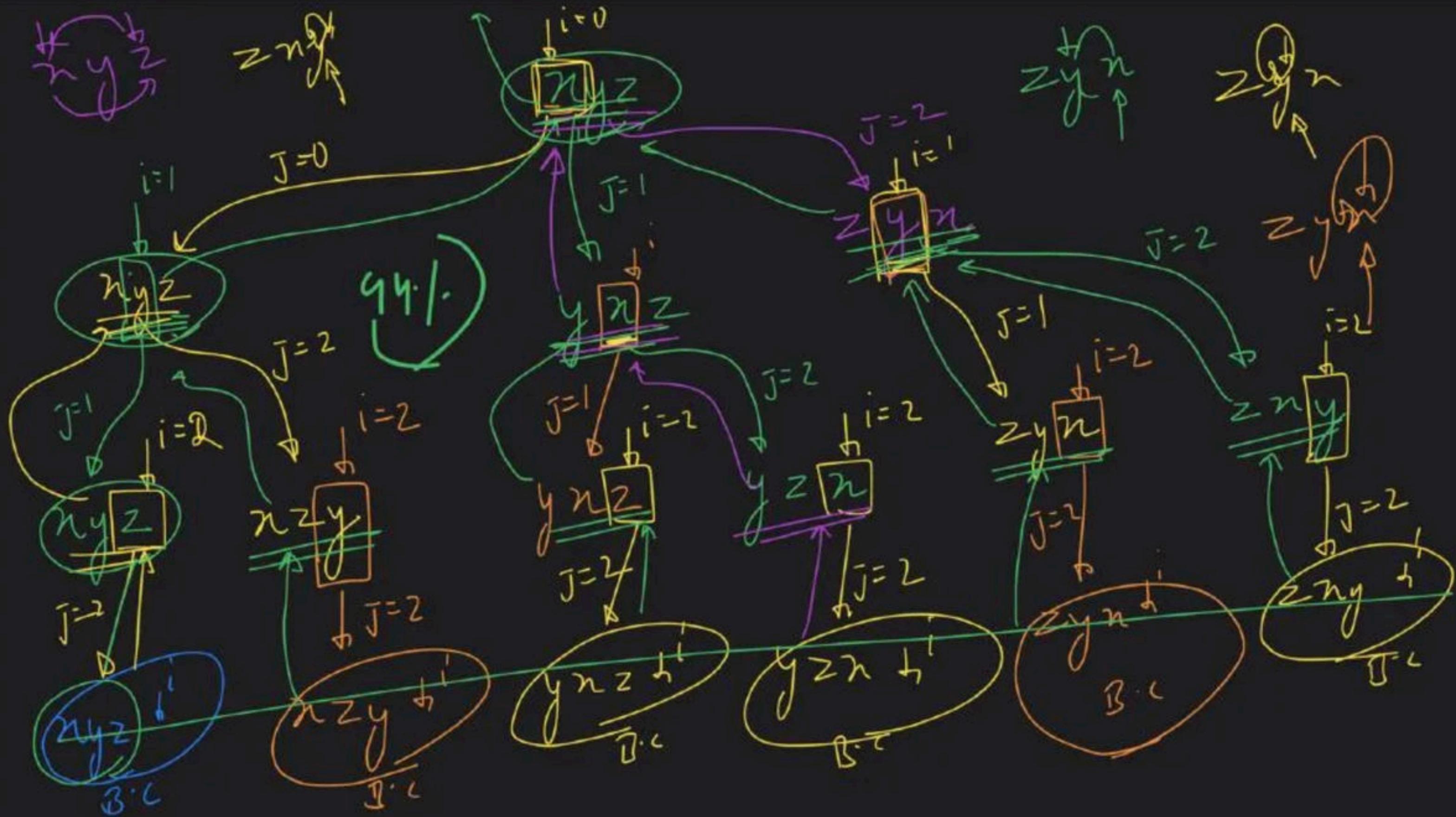


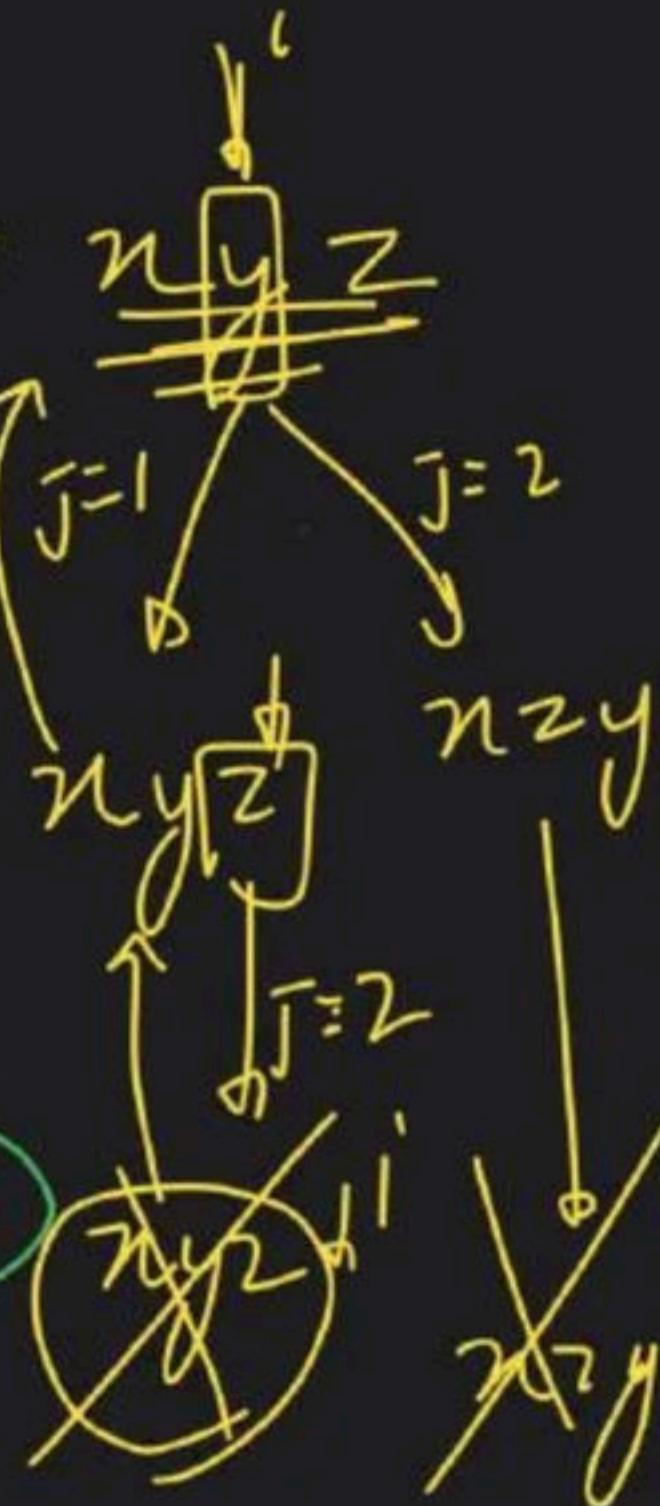
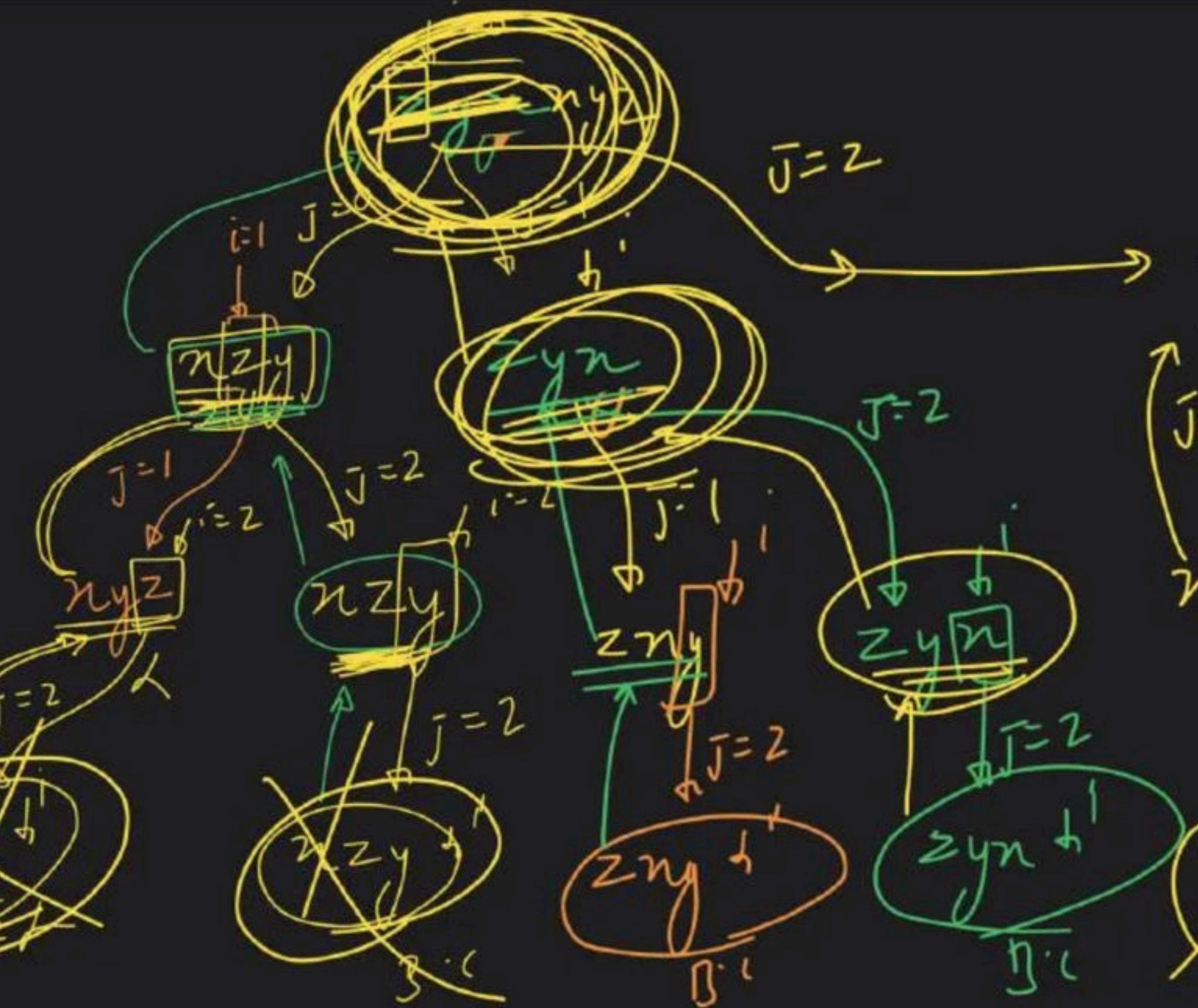
ny
 ny, yn

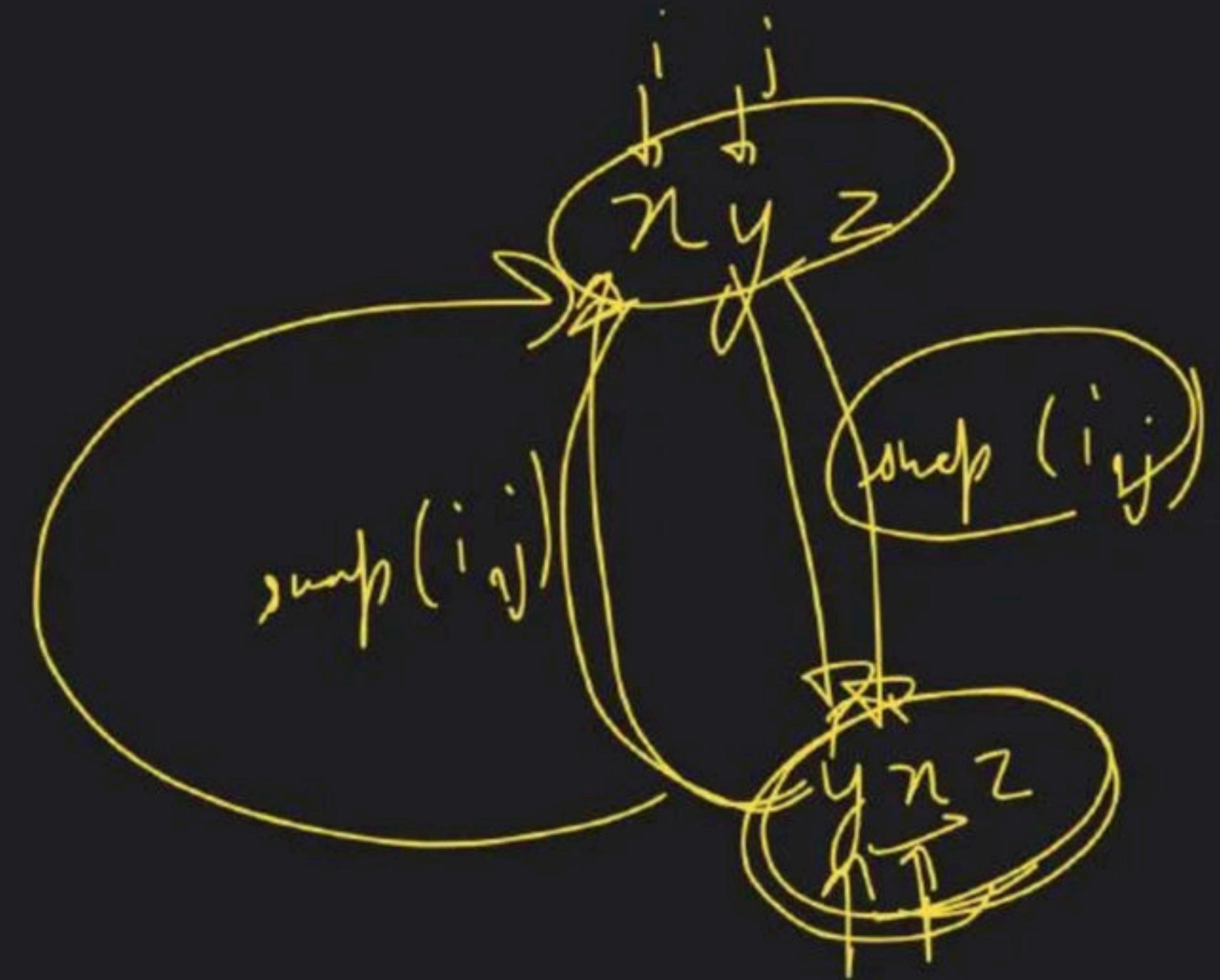
$j \downarrow$
 $y = ny$

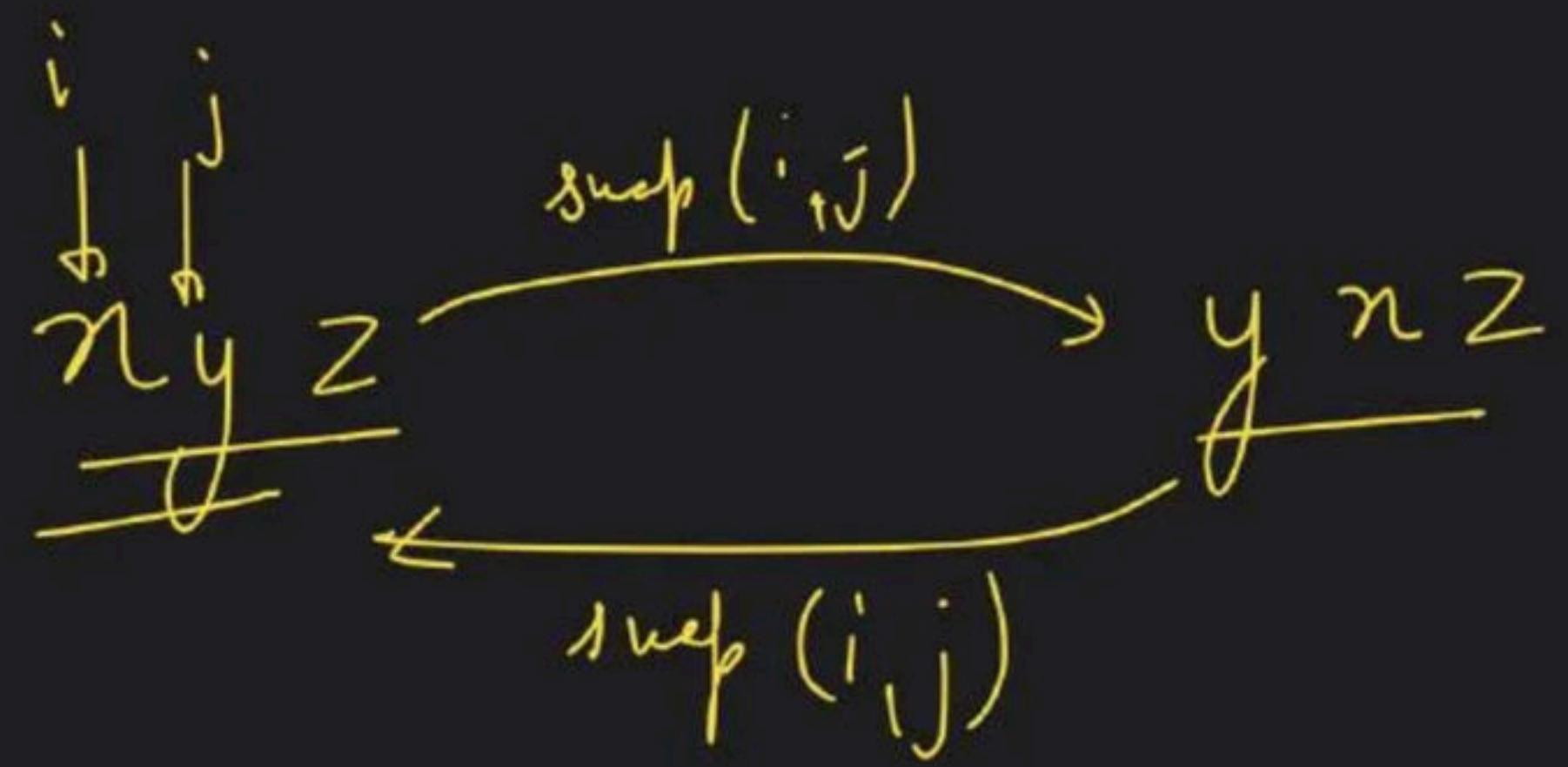
$ny = ny$
 $j \downarrow$

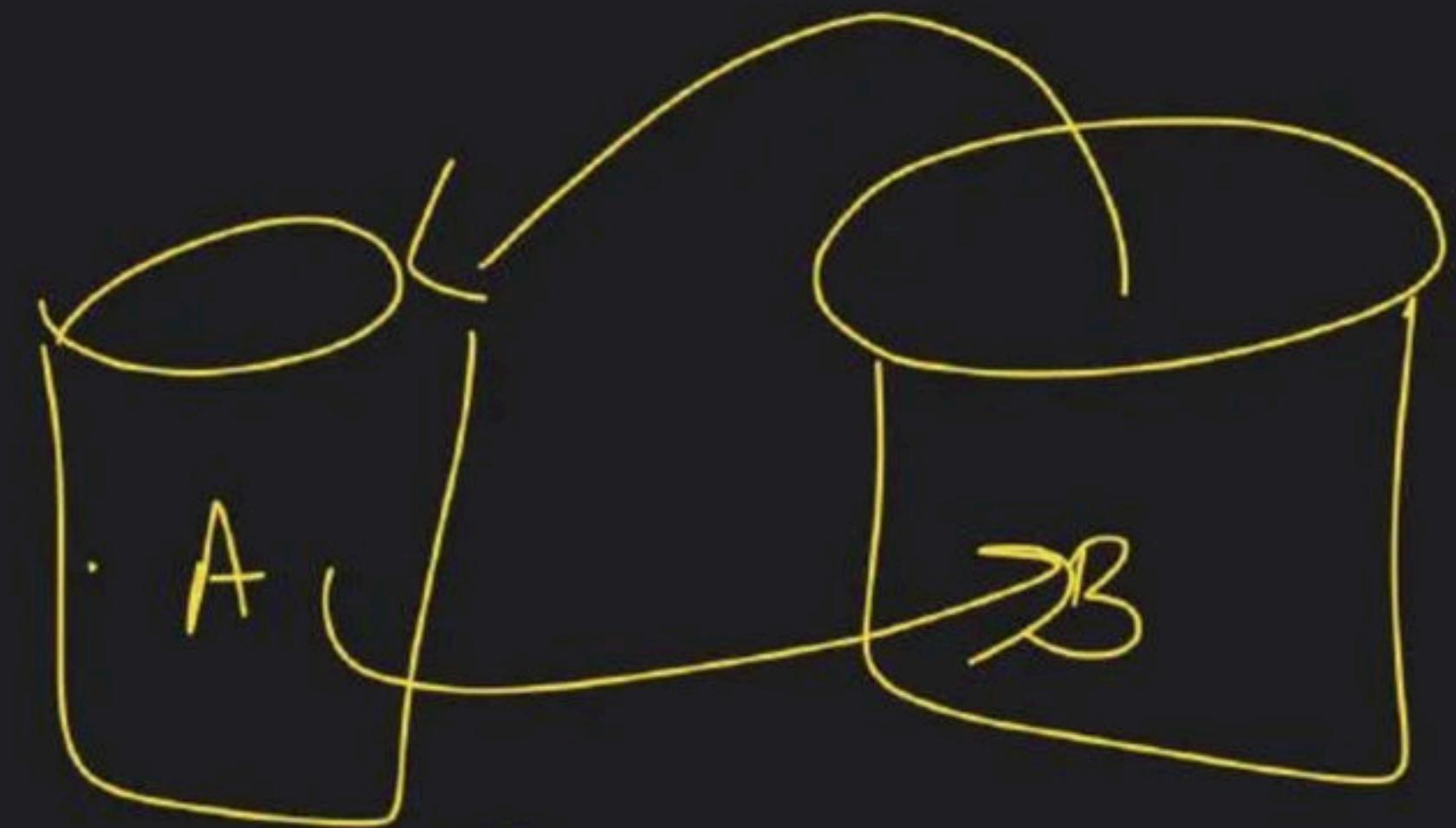
$y \rightarrow y$
 $\rightarrow yn$
 j





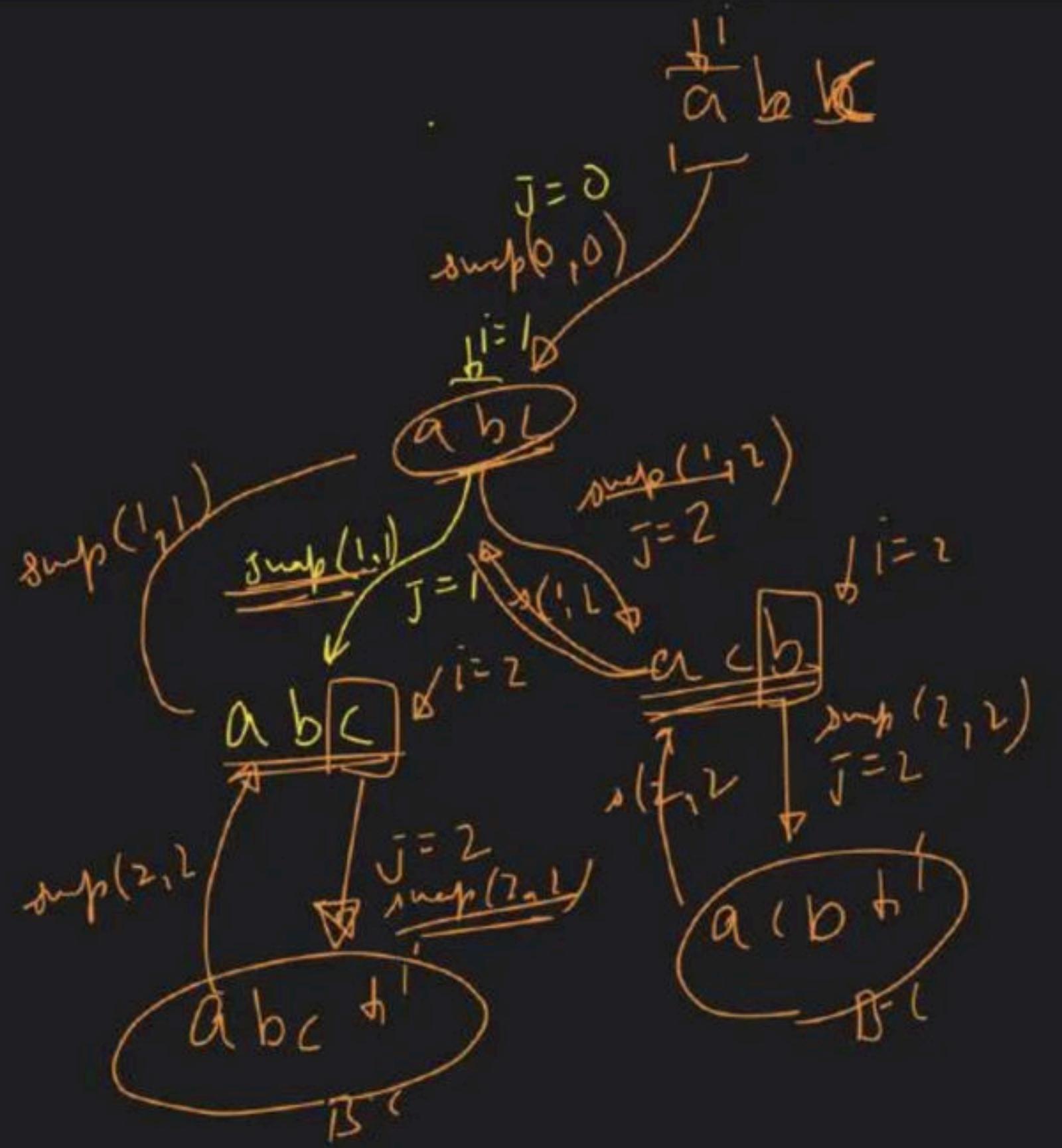




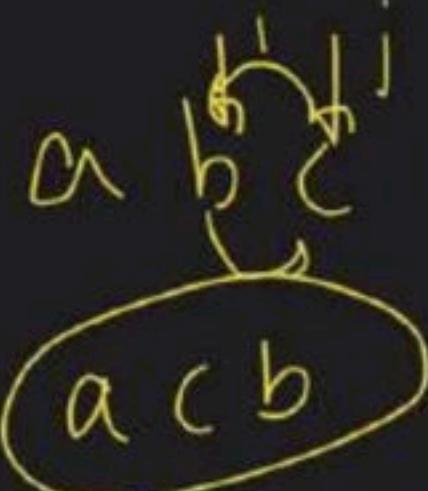
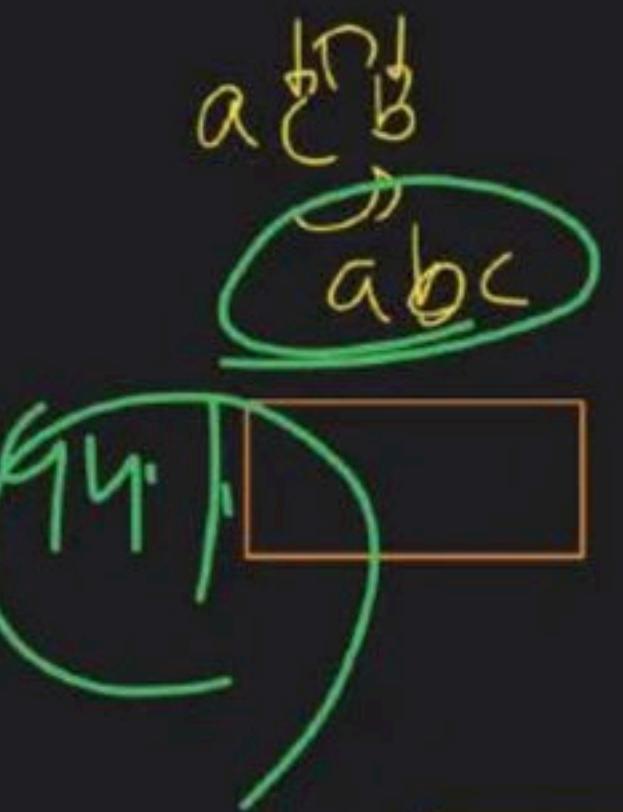
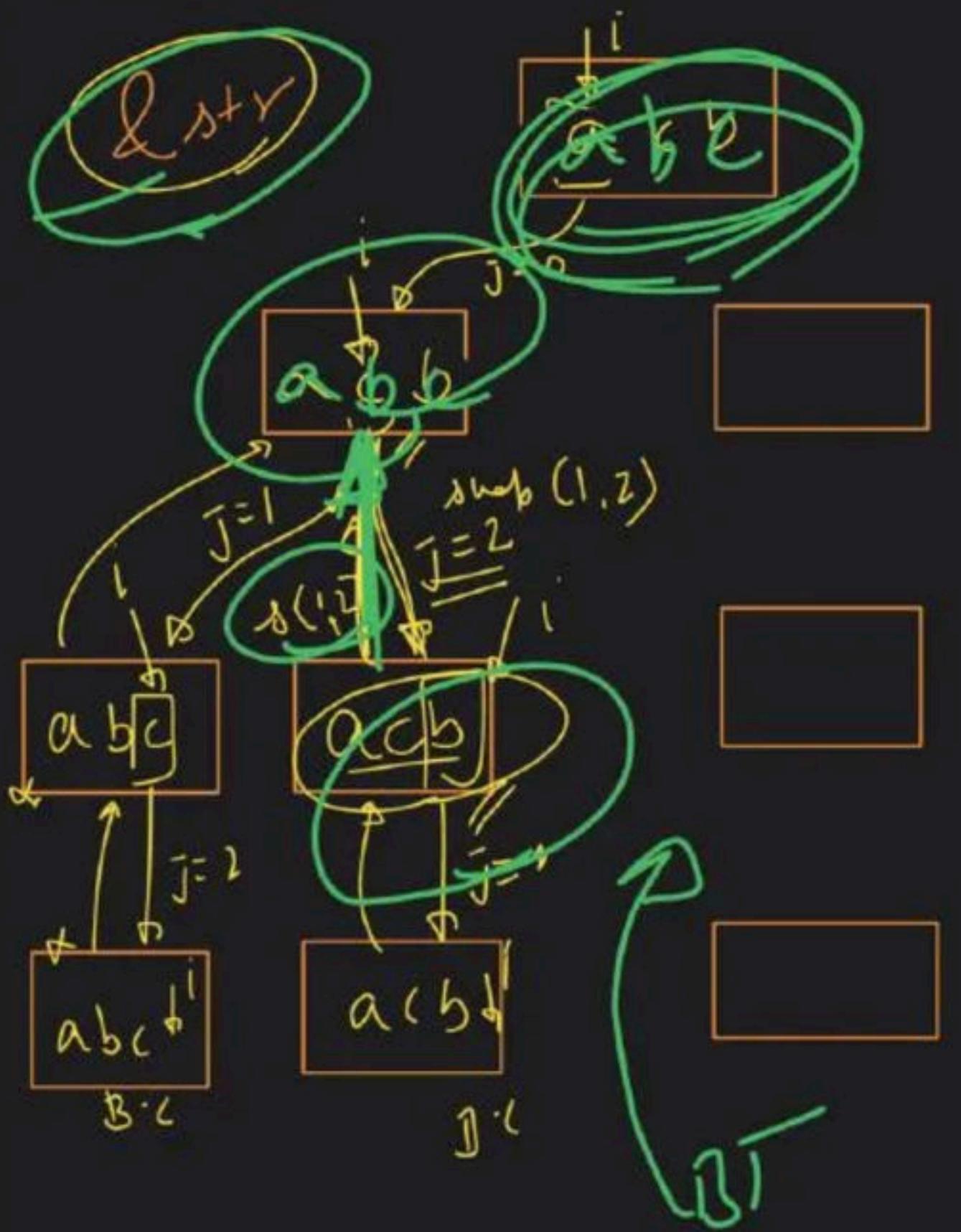


B A

A B

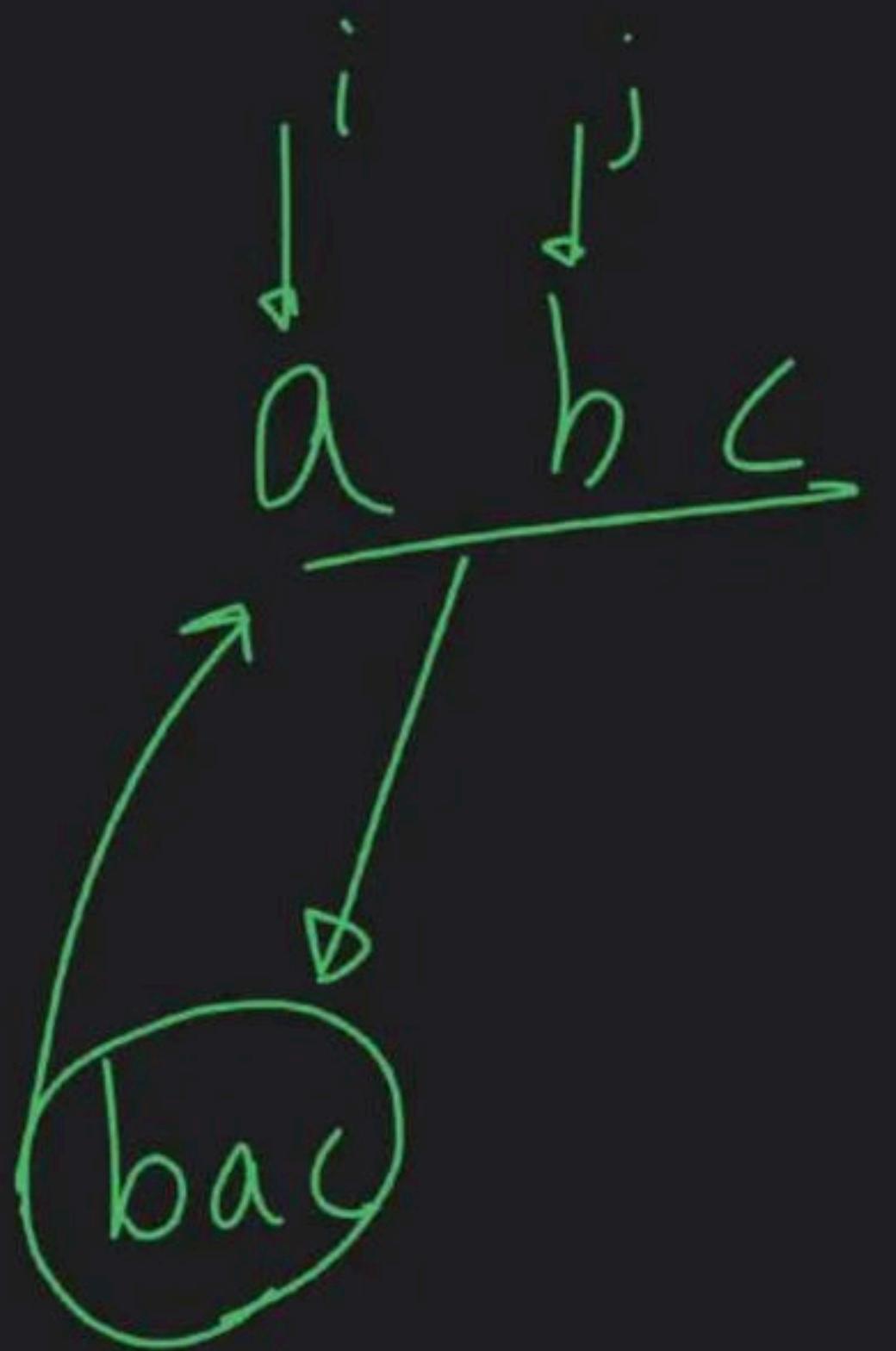


$a \downarrow \downarrow$
 $a c b$
 $a b L$



```
for ( )  
    swap  
        bai  
    solve → rec  
    }  
    else
```

4



i

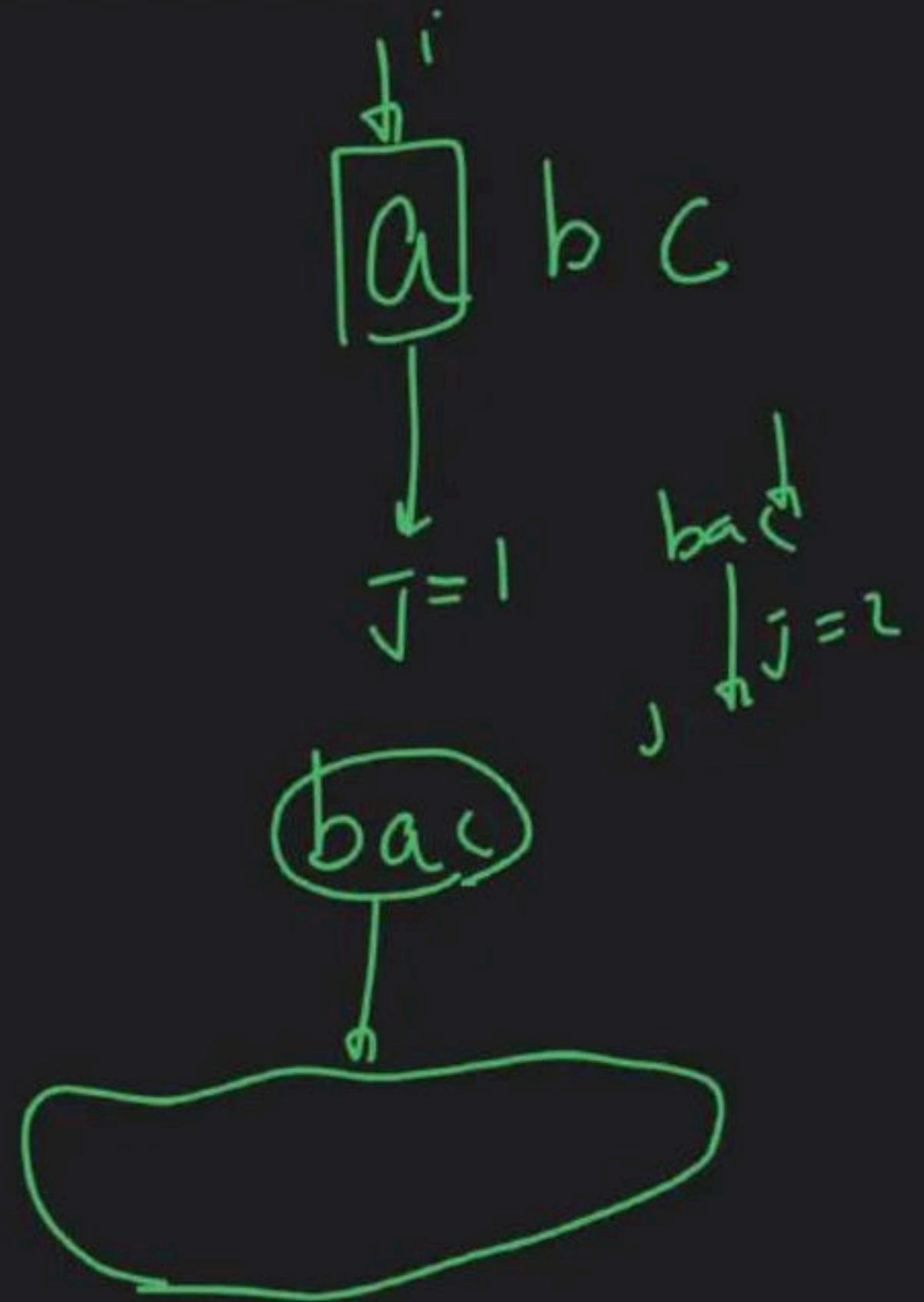
for

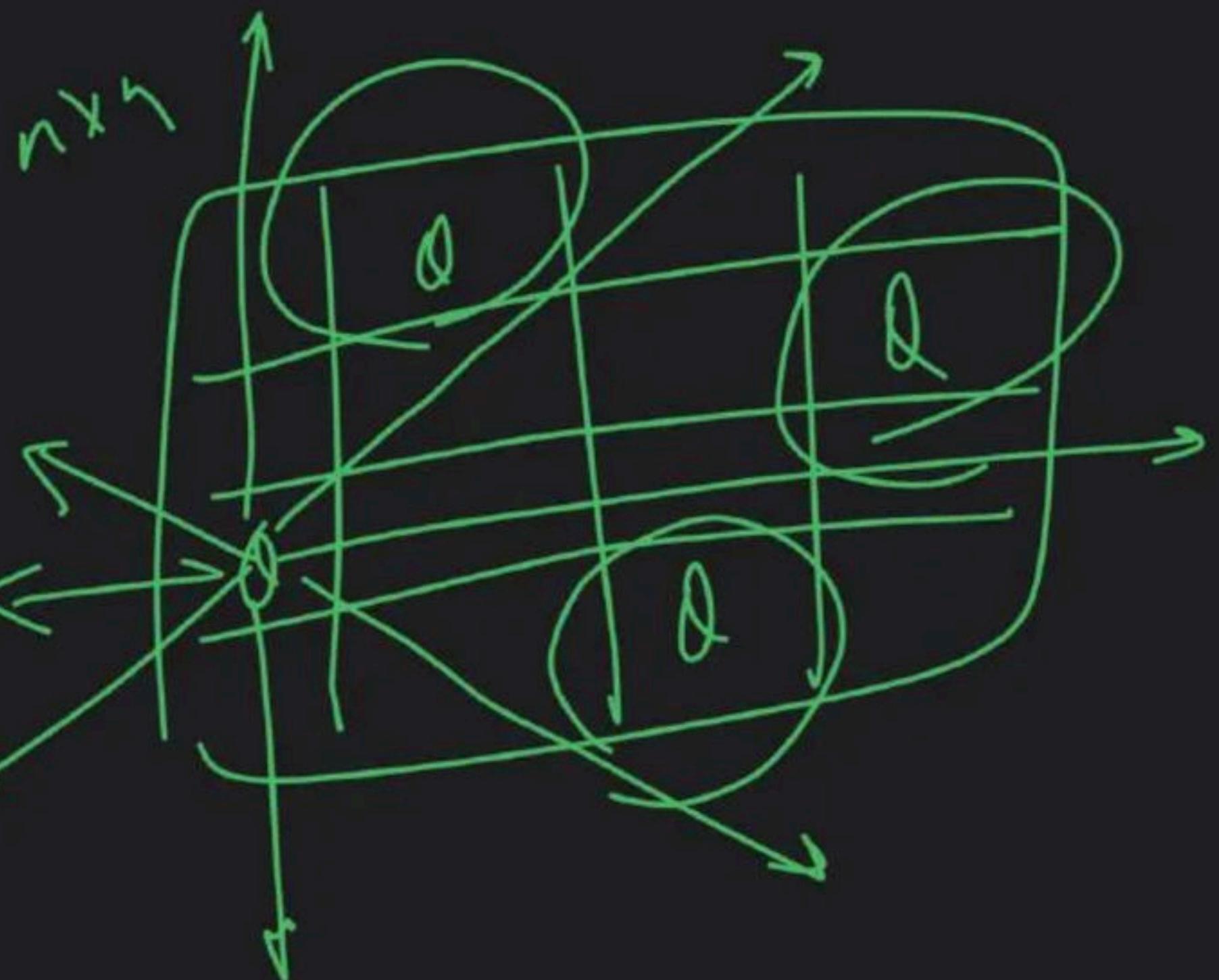
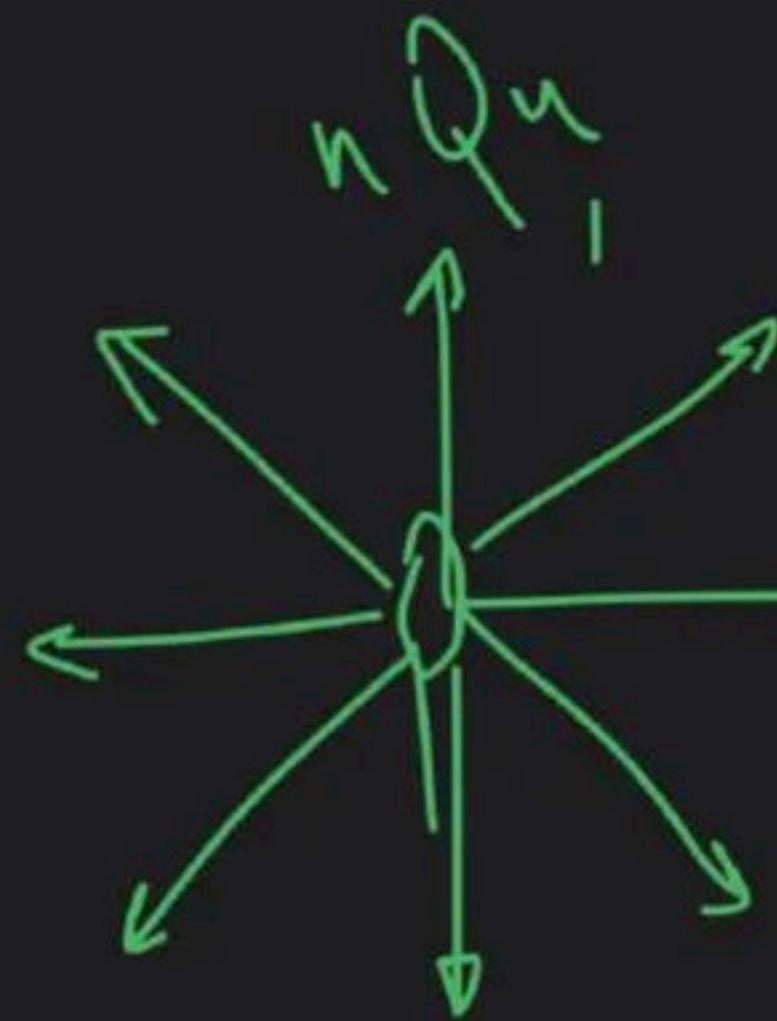
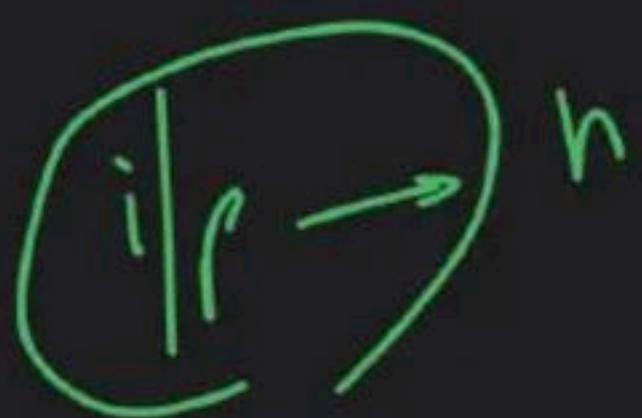
i

a b c

for ($j = 1$, $j > 2$)

a





Permutation Hack By STL

==

=> next_permutation(s.begin(), s.end())

s = a b c (.....)

Next - p -
s = b a c

- ① By Ref
=
- ② Lexographically next perm

$\hat{a} b \hat{c}$



Saan's permute



Sort Kavlee denq
=



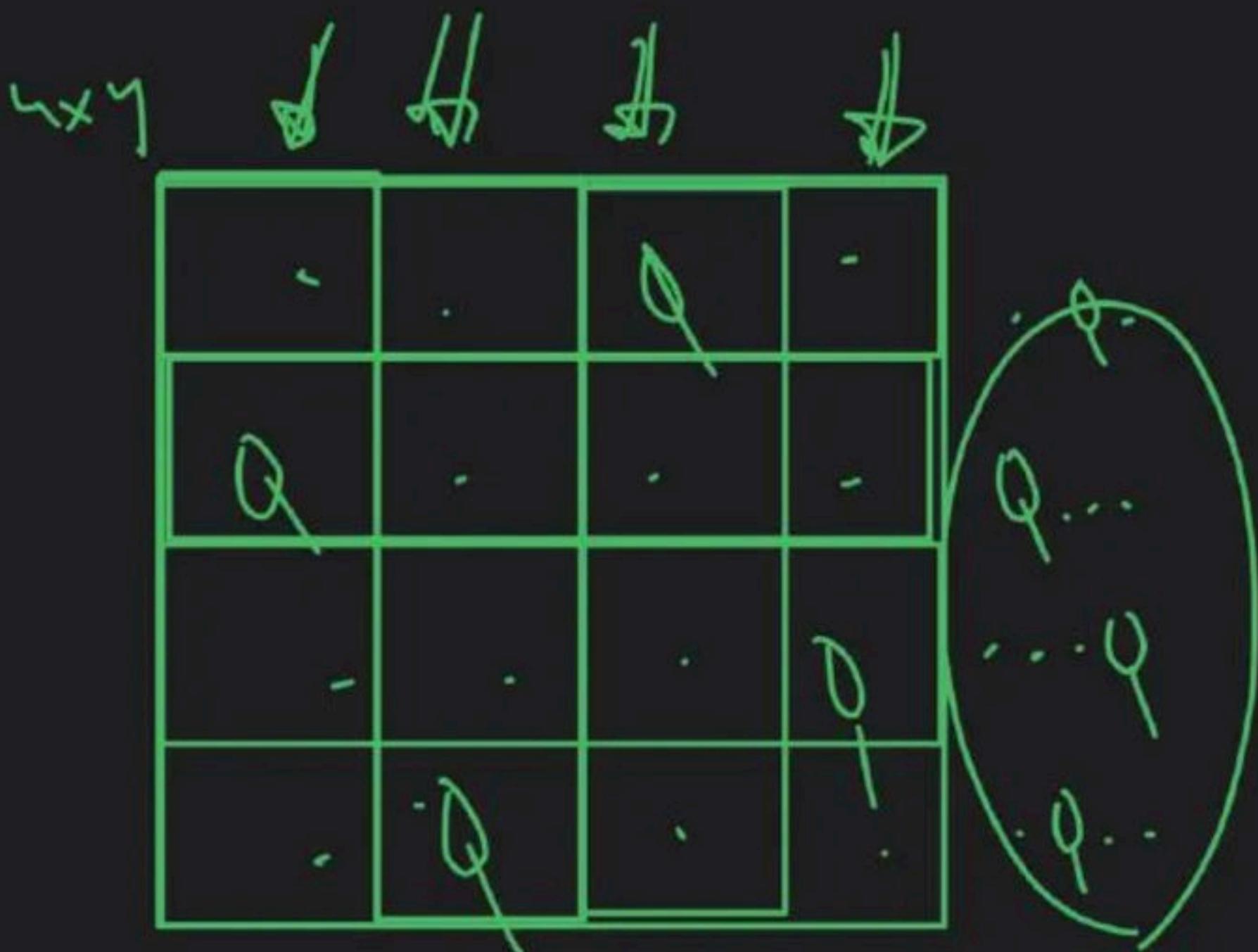
(1) S

(2) Next P (s ->)

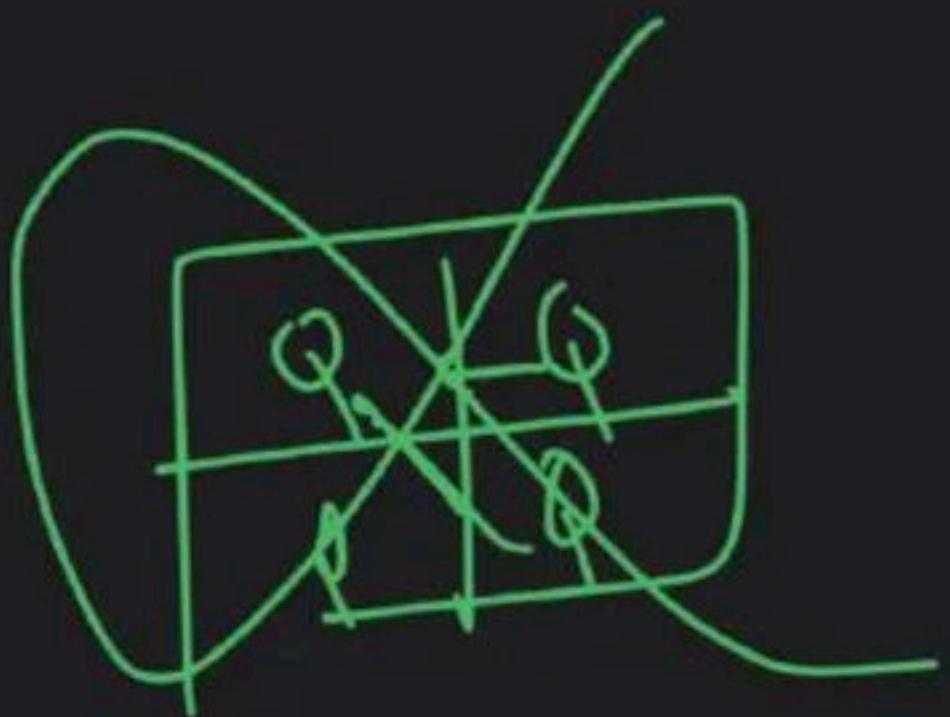
(3) Update



$n=4$



$n = 4$



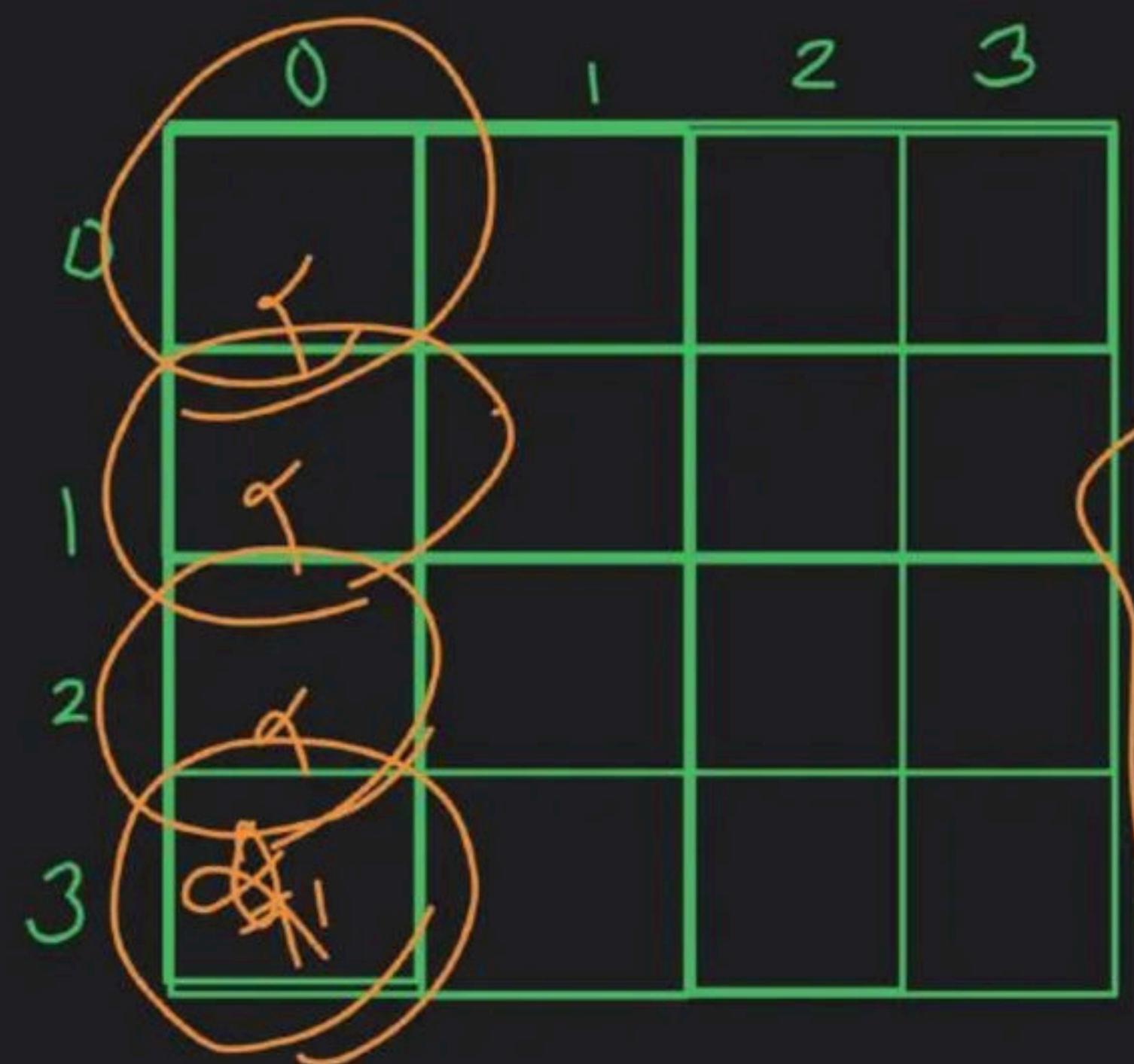
-



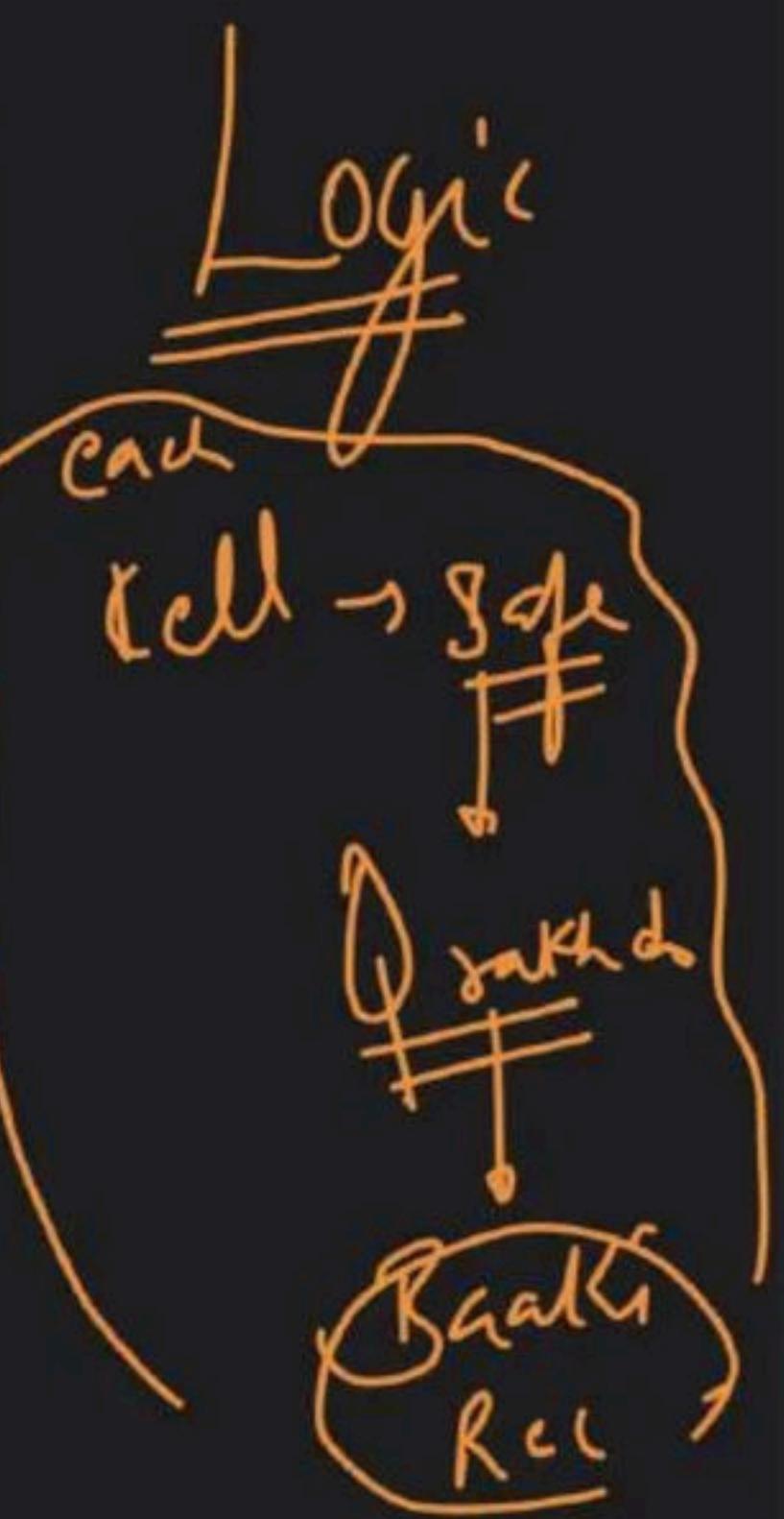
$n=4$

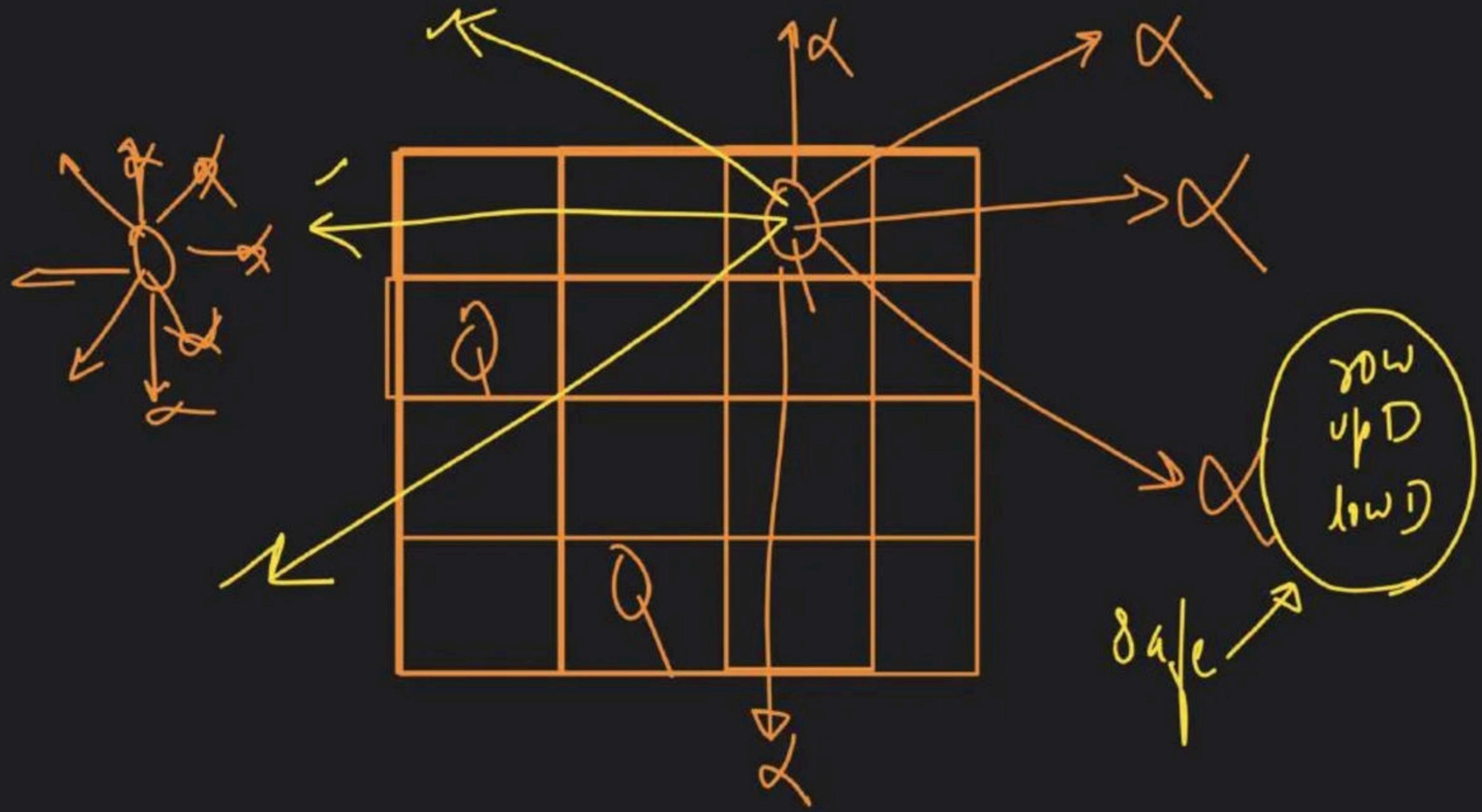
Q_1
 Q_2
 Q_3
 Q_4

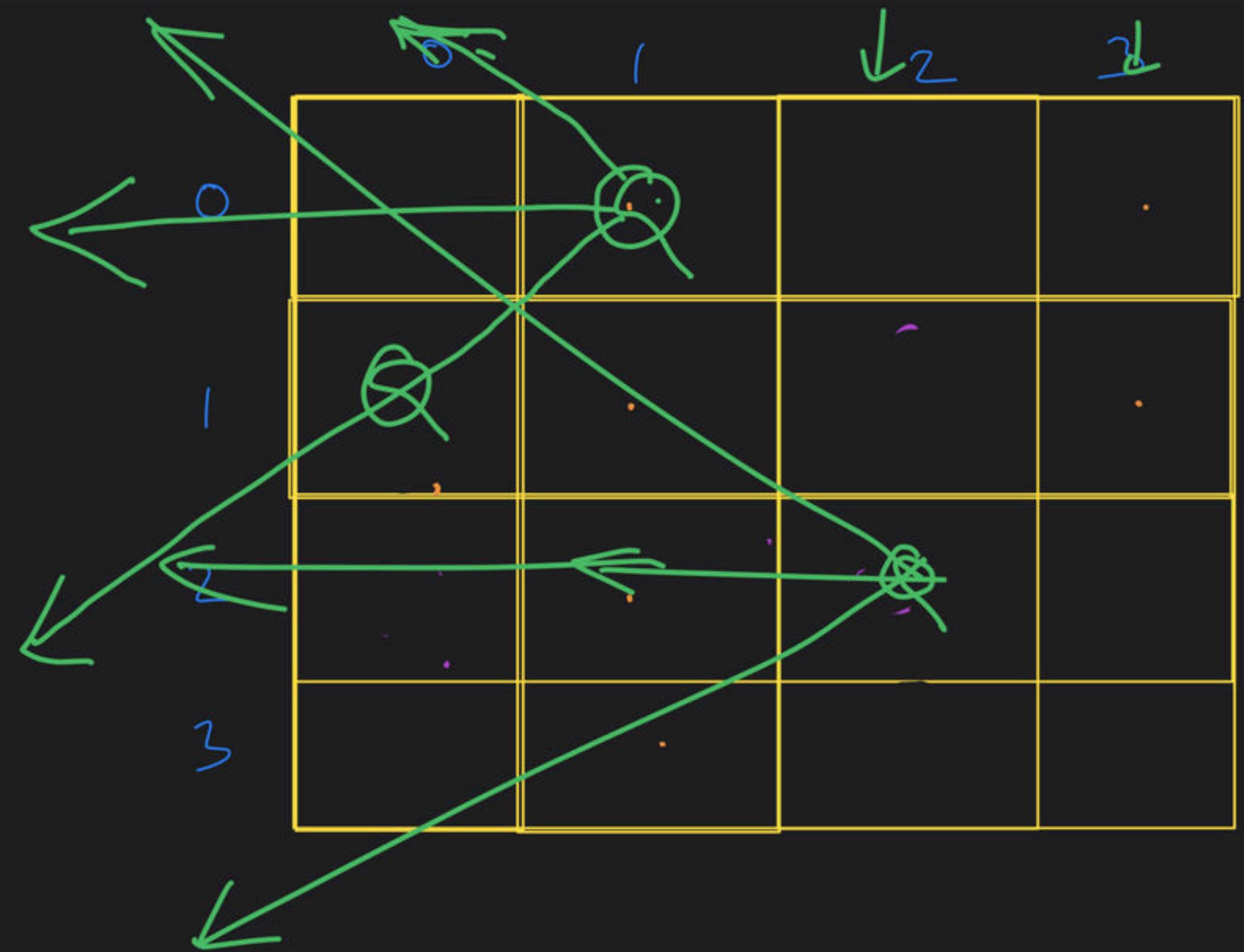
5



2 3

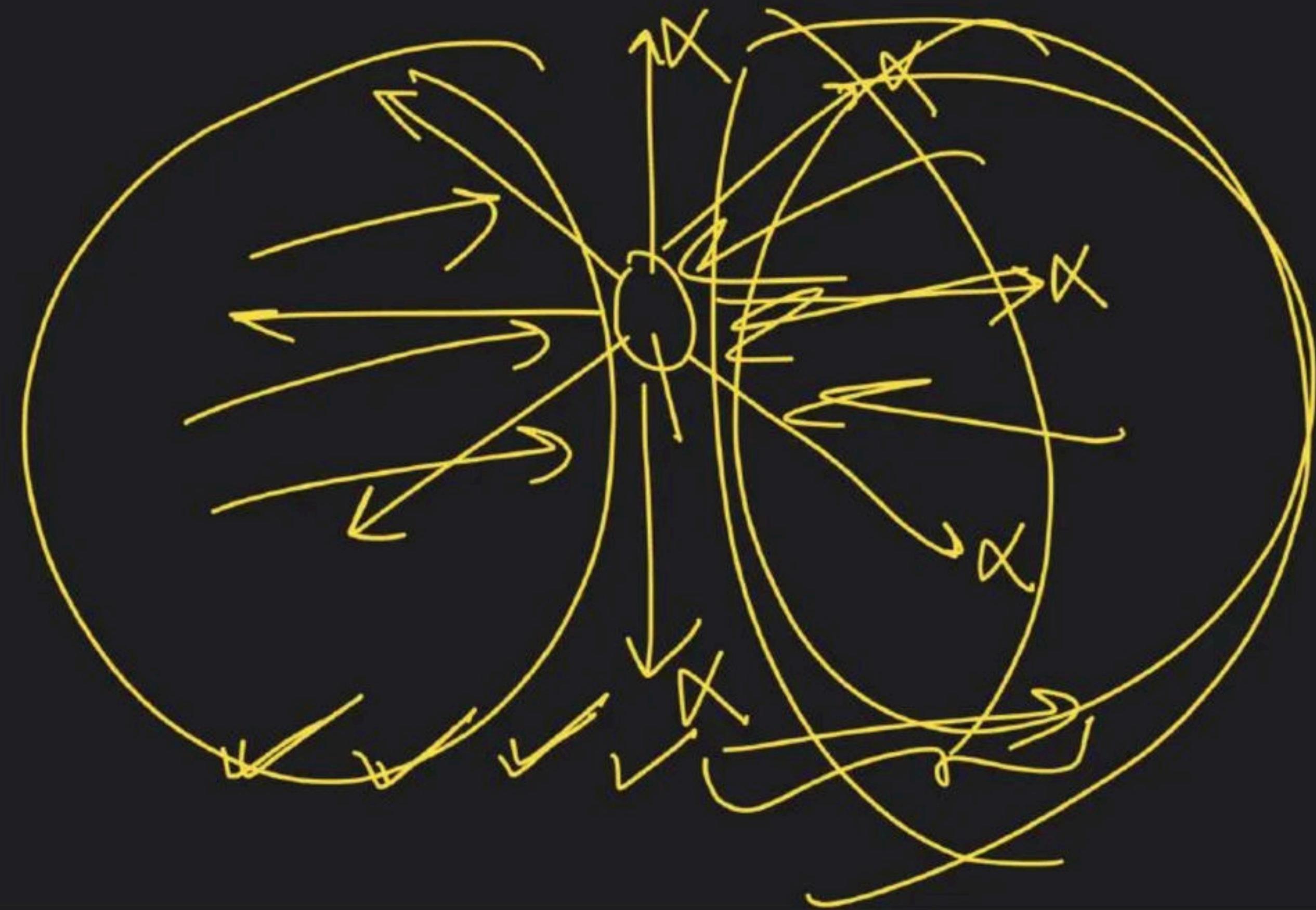


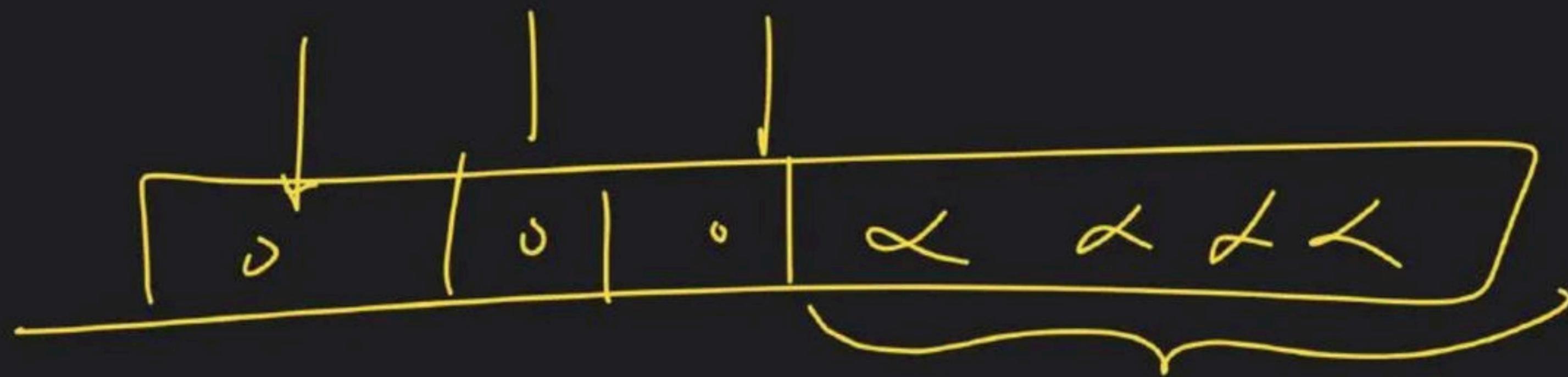


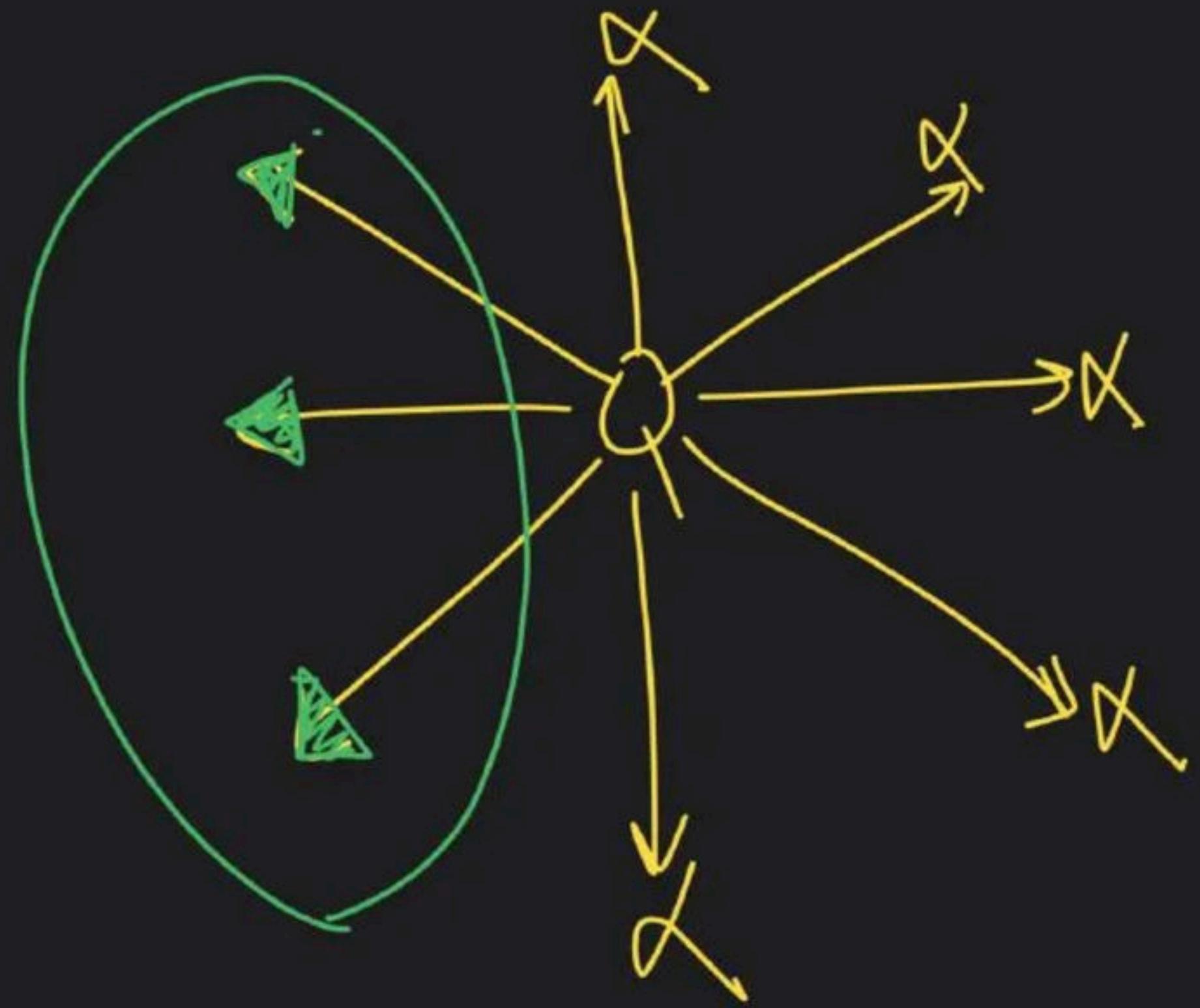


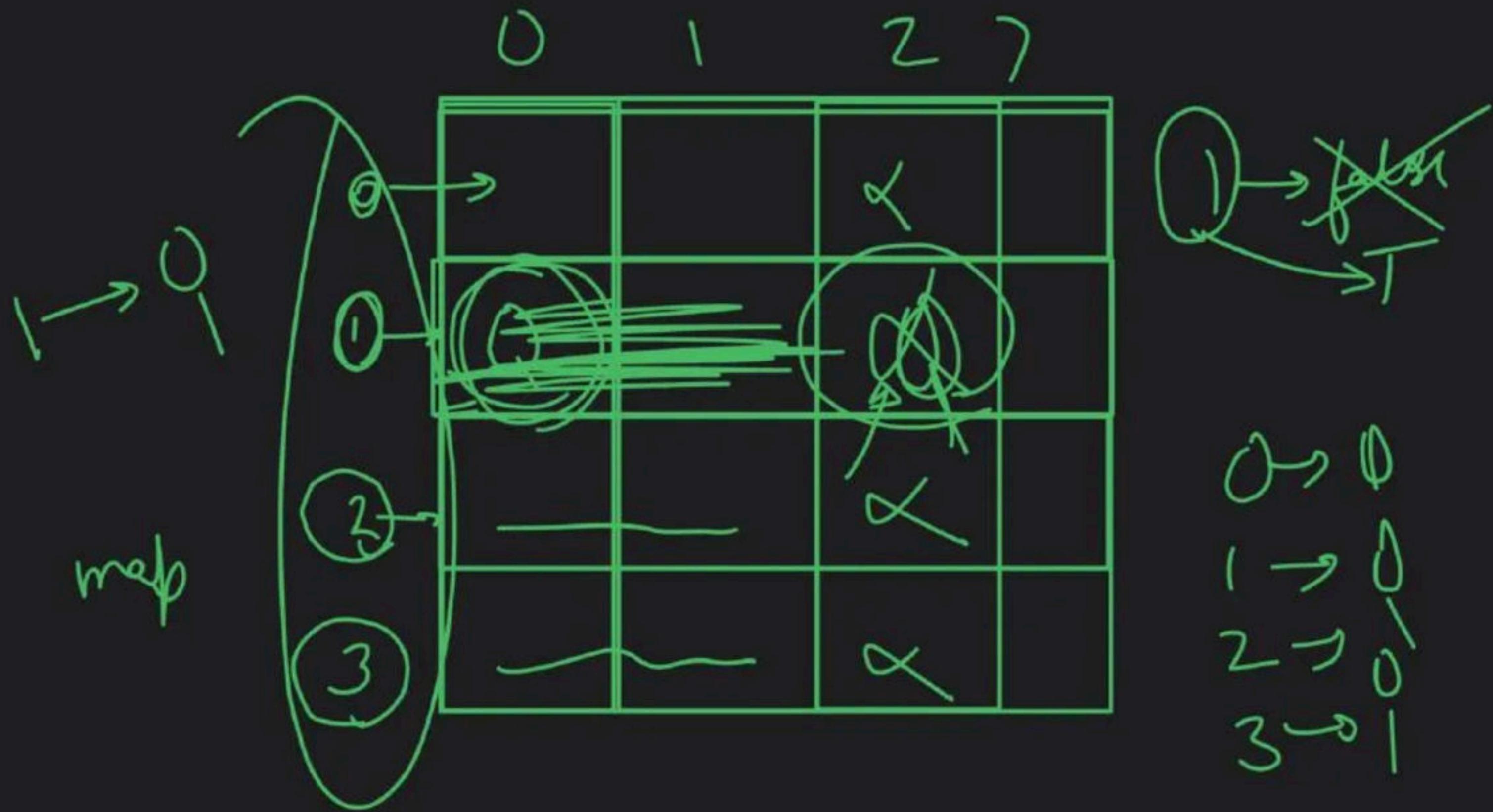
~~Safe~~

	0	1	2	3
0				
1				
2				
3				









Yours check

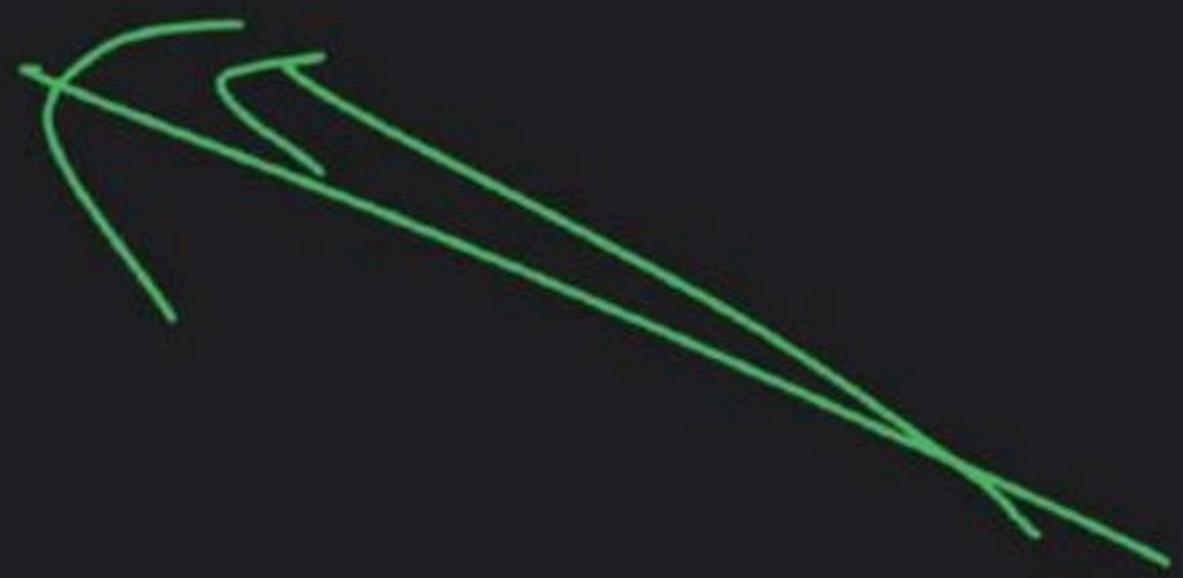
map < RowIndex -> boolean >

place → Index → T

safe → chuck index → T/F

now check

$O(\cdot)$ → safe/not
safe



Lower Diagonal

Rowlands +
Collands

Y+U

$i+j$

A diagram consisting of a circle containing the number '3'. Above the circle, the number '2' is written, with a curved arrow pointing from '2' down towards the '3'.

3

2

1

6

A hand-drawn diagram on a grid showing a path from point 0 to point 3. The path starts at 0, goes up to 1, then right to 2, and finally up to 3. A circle labeled 'H' is at (2, 1). A circle labeled 'Q' is at (3, 2). A circle labeled '3+0' is at (0, 0).

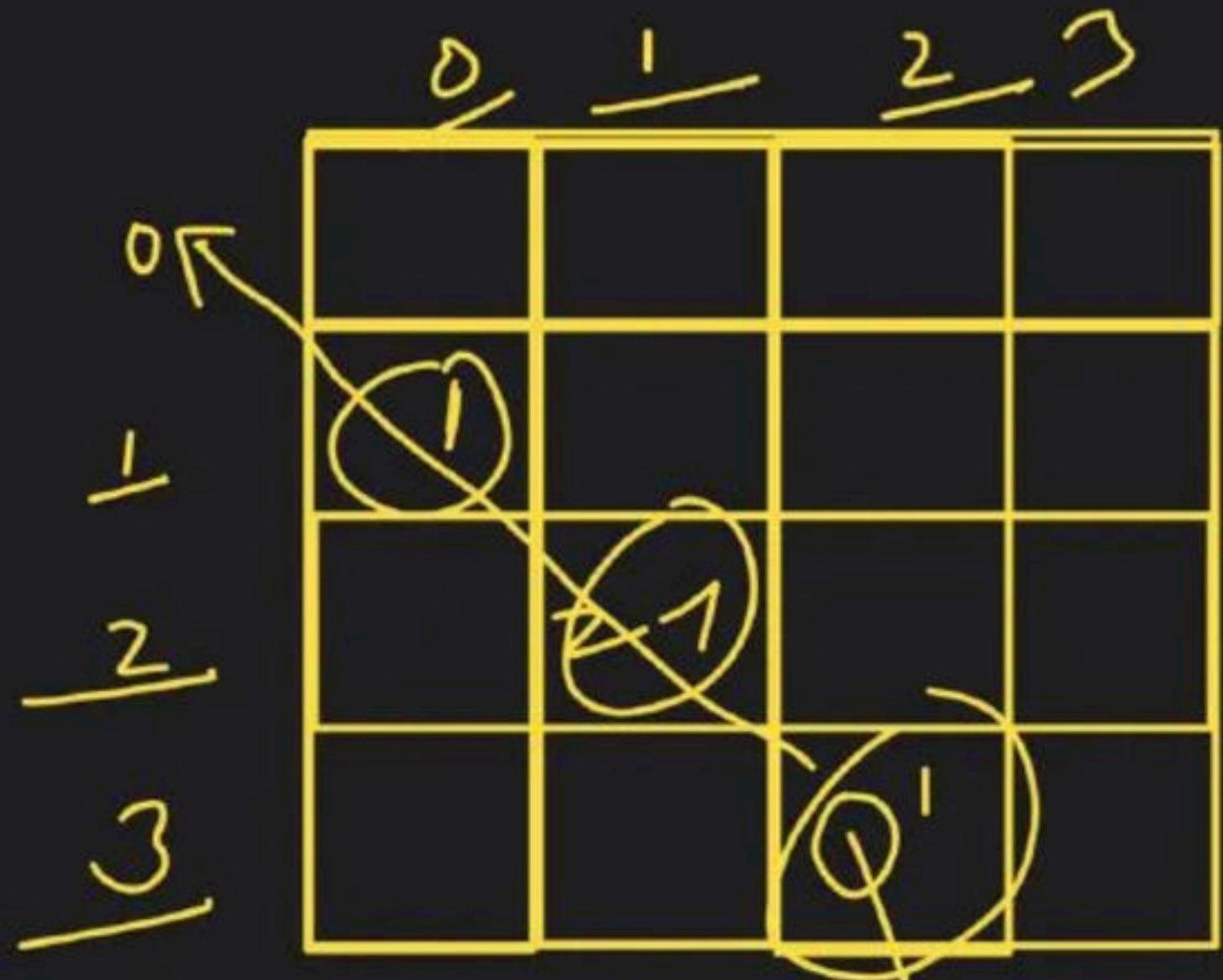
mob

Lower Diagonal

map < rowcol \rightarrow boolean >

Upper Diagonal

1 - 0



map ($\text{row} \rightarrow \text{bool}$)

ans

vector

<vector<string>> ans

l answer

row →

|row| → row + |o|

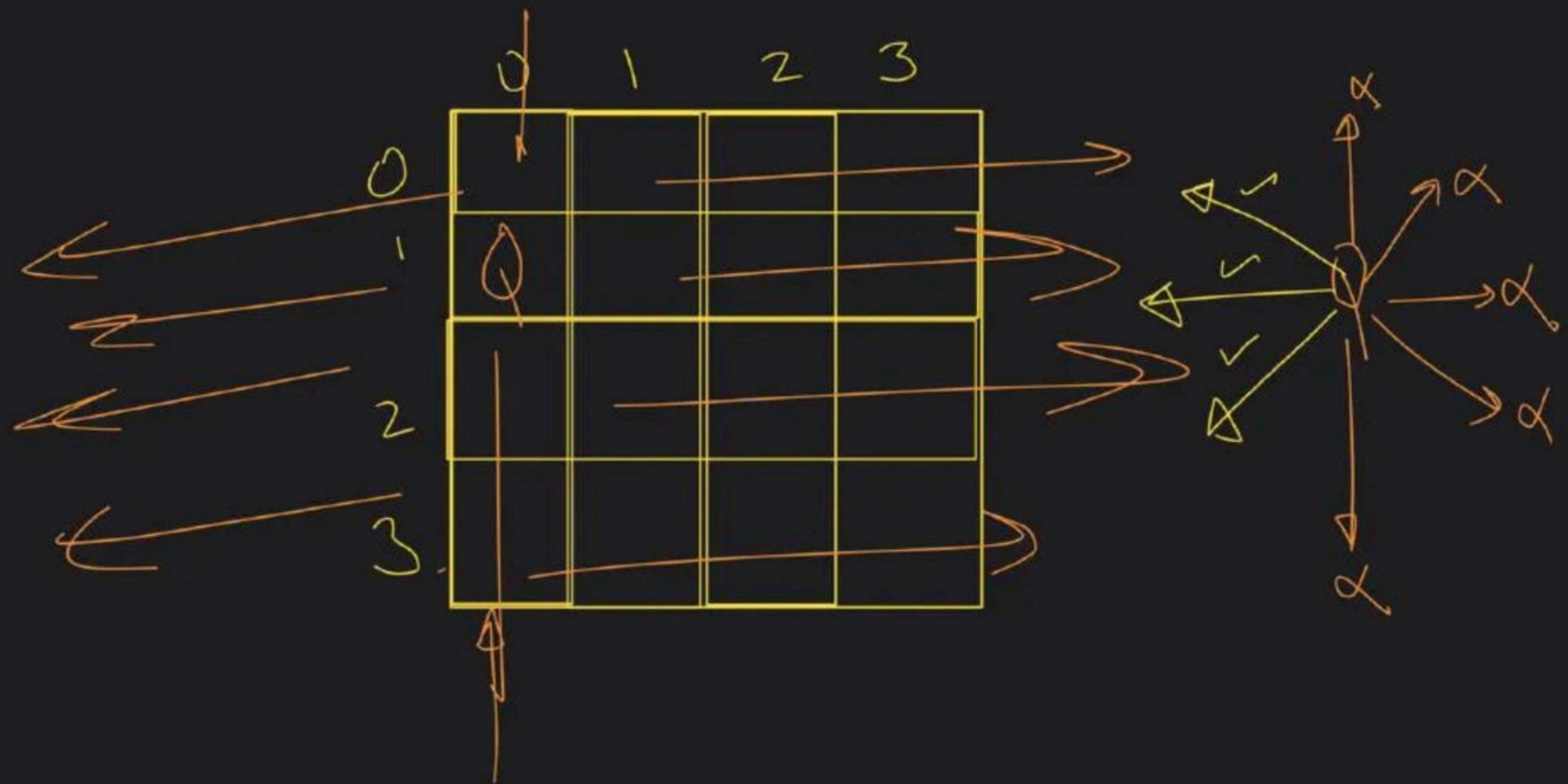
up ↓ → row - |o|

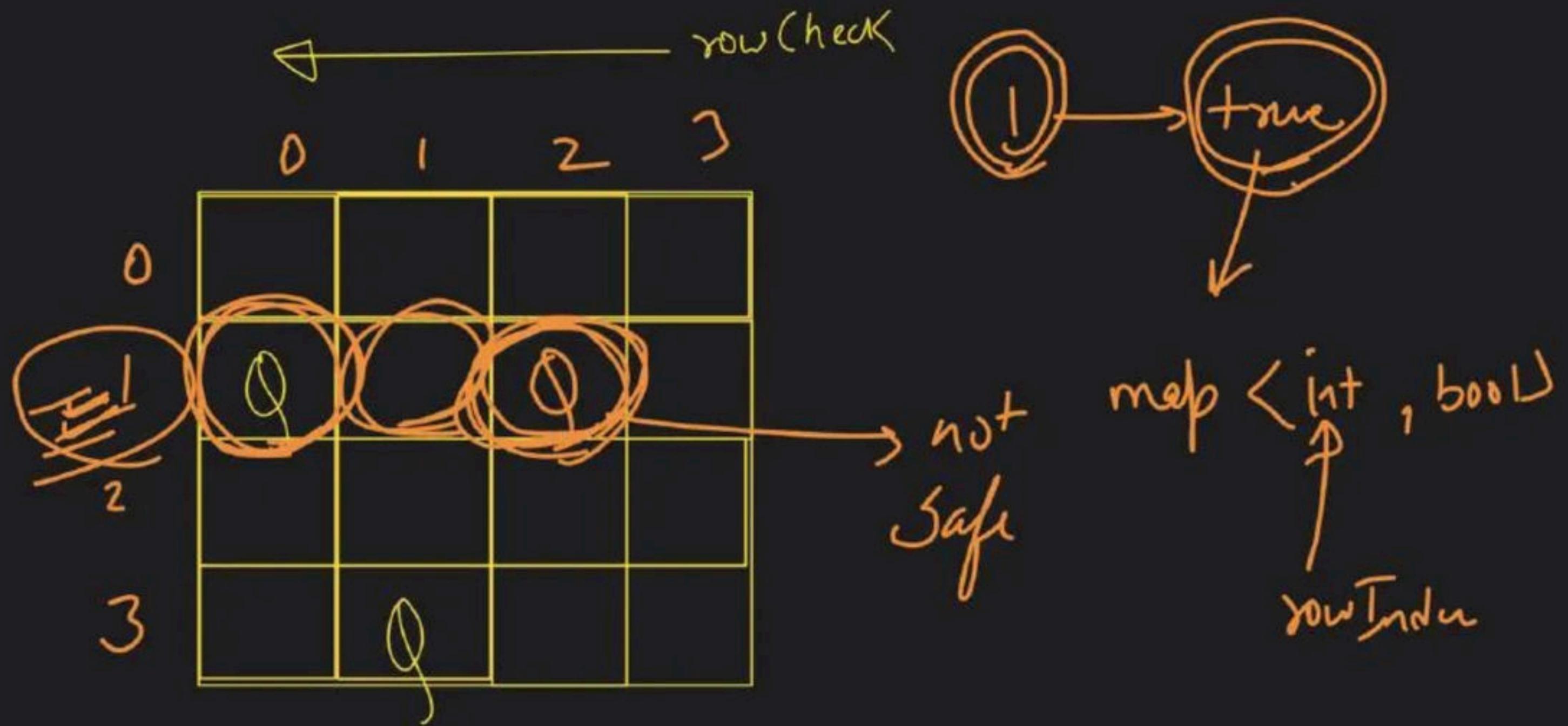
board

.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.

vector<string>

temp



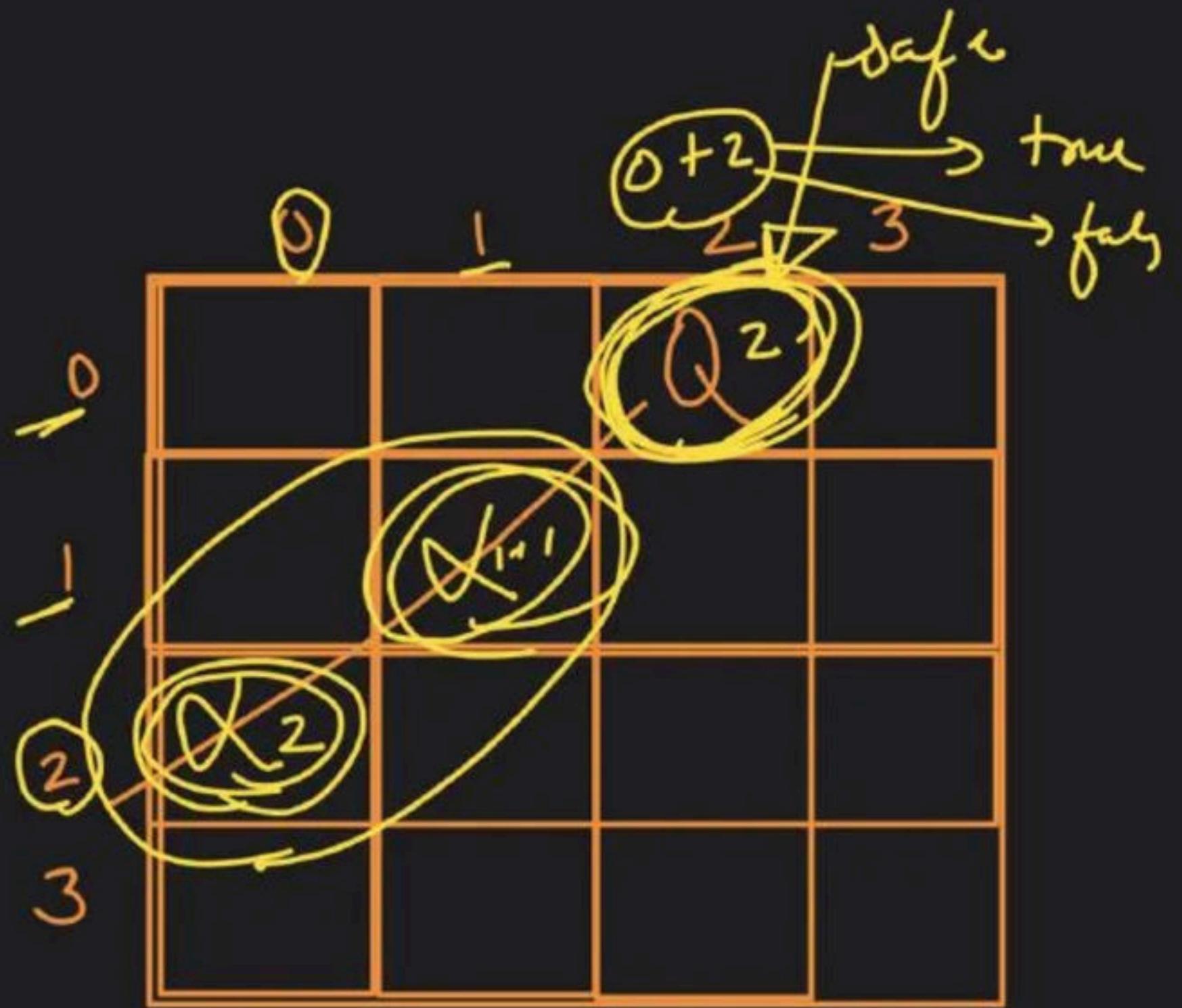


lower Diagn0

rowIndex + width

$i+j \rightarrow \text{bool}$

`map <int, bool>`

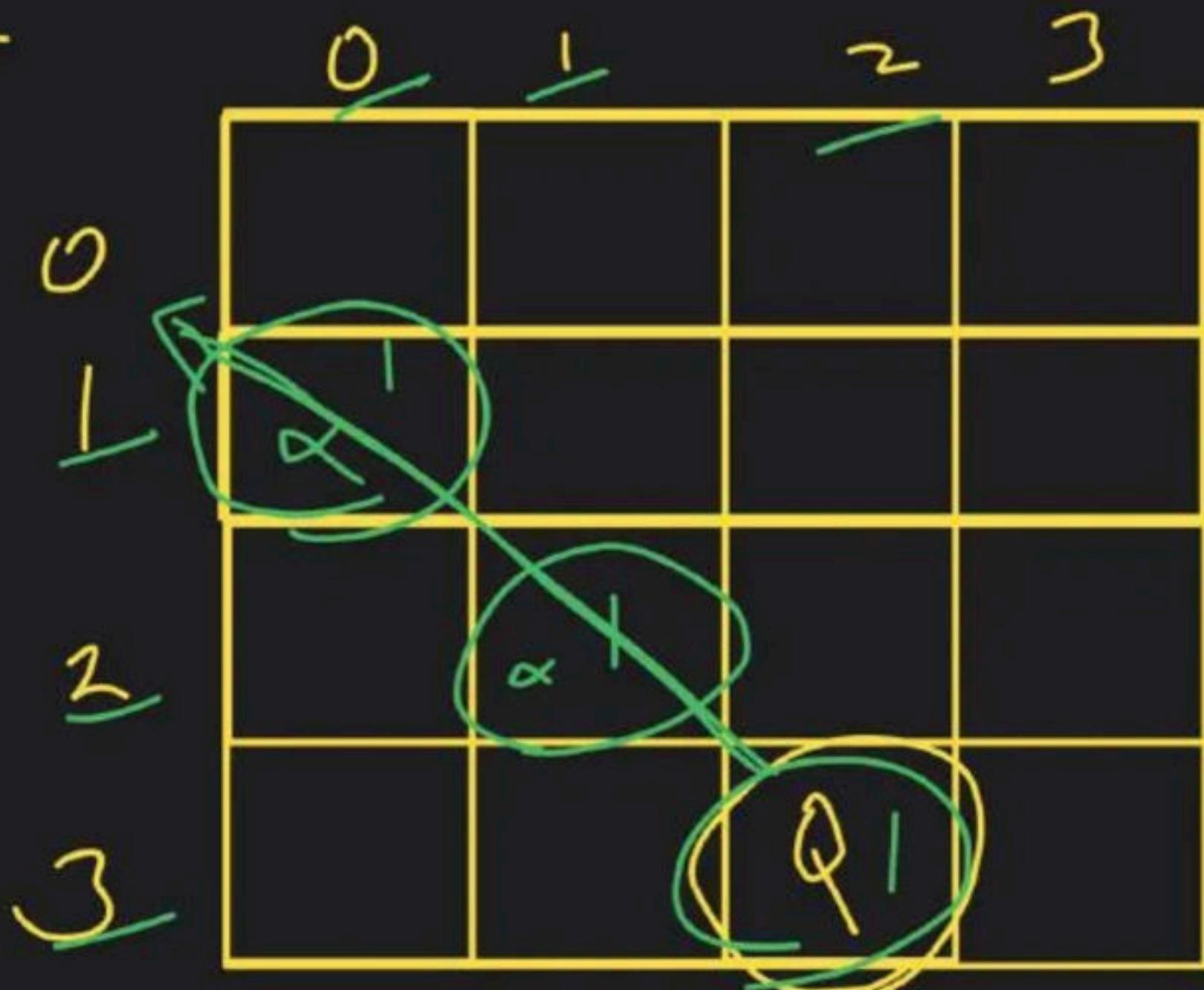


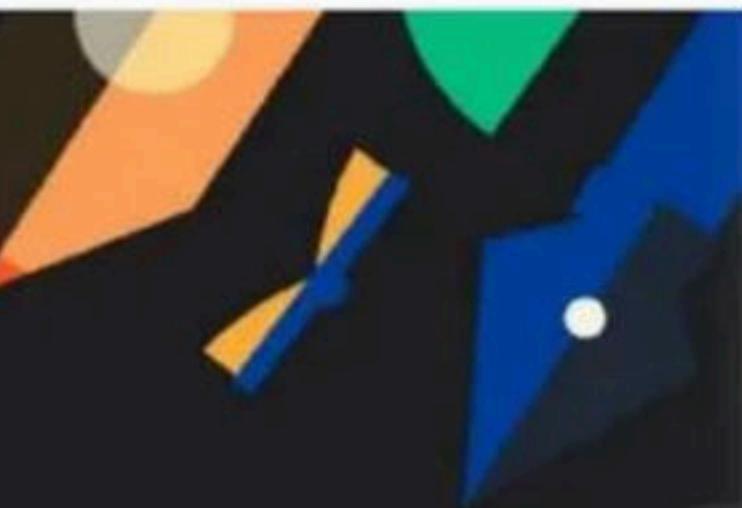
Upper Diagonal

rowIndex - (0) Index

i-j

map < int, bool >





DnC && Backtracking Class - 4

Special class

→ Sudoku Solver

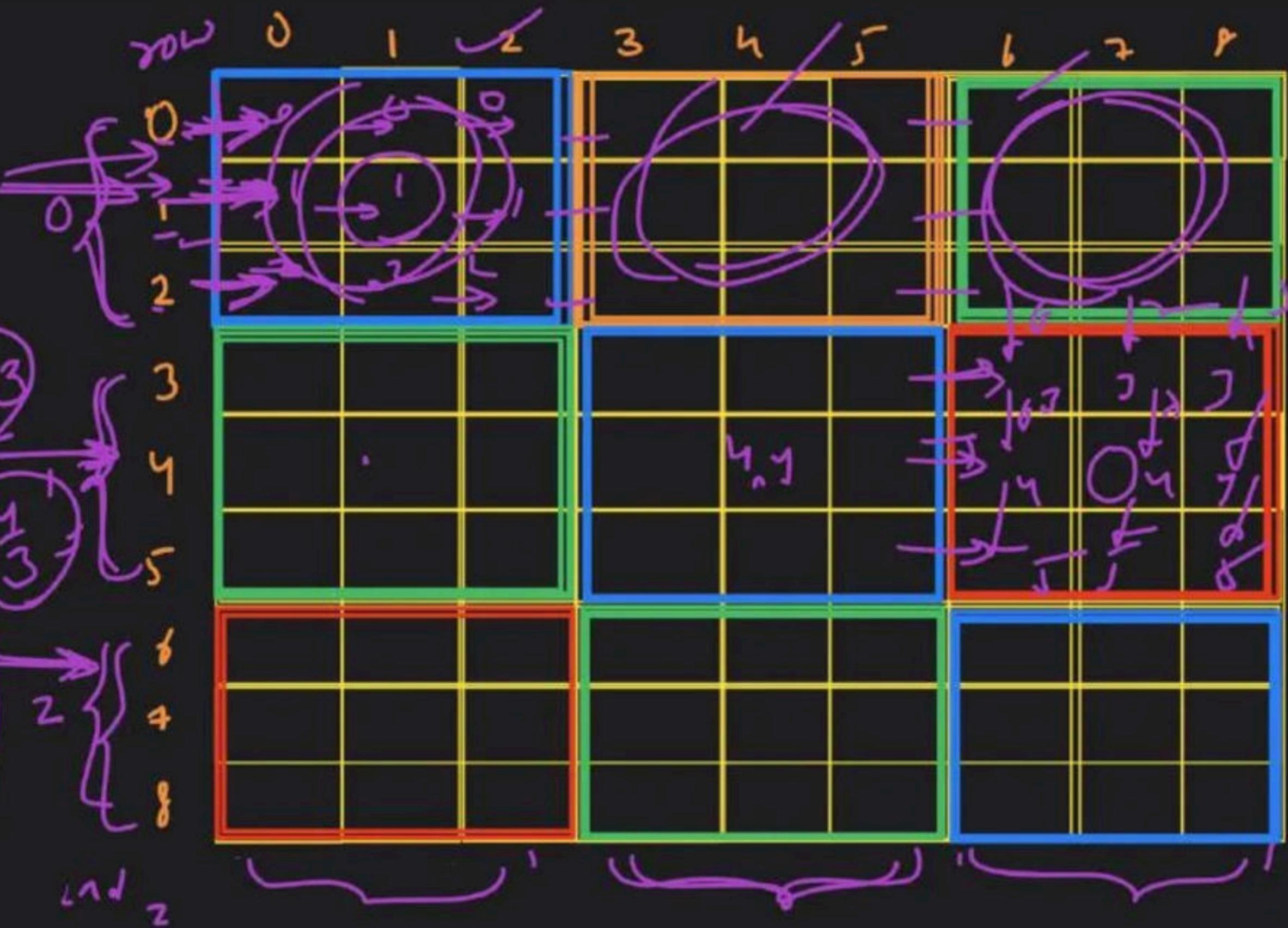
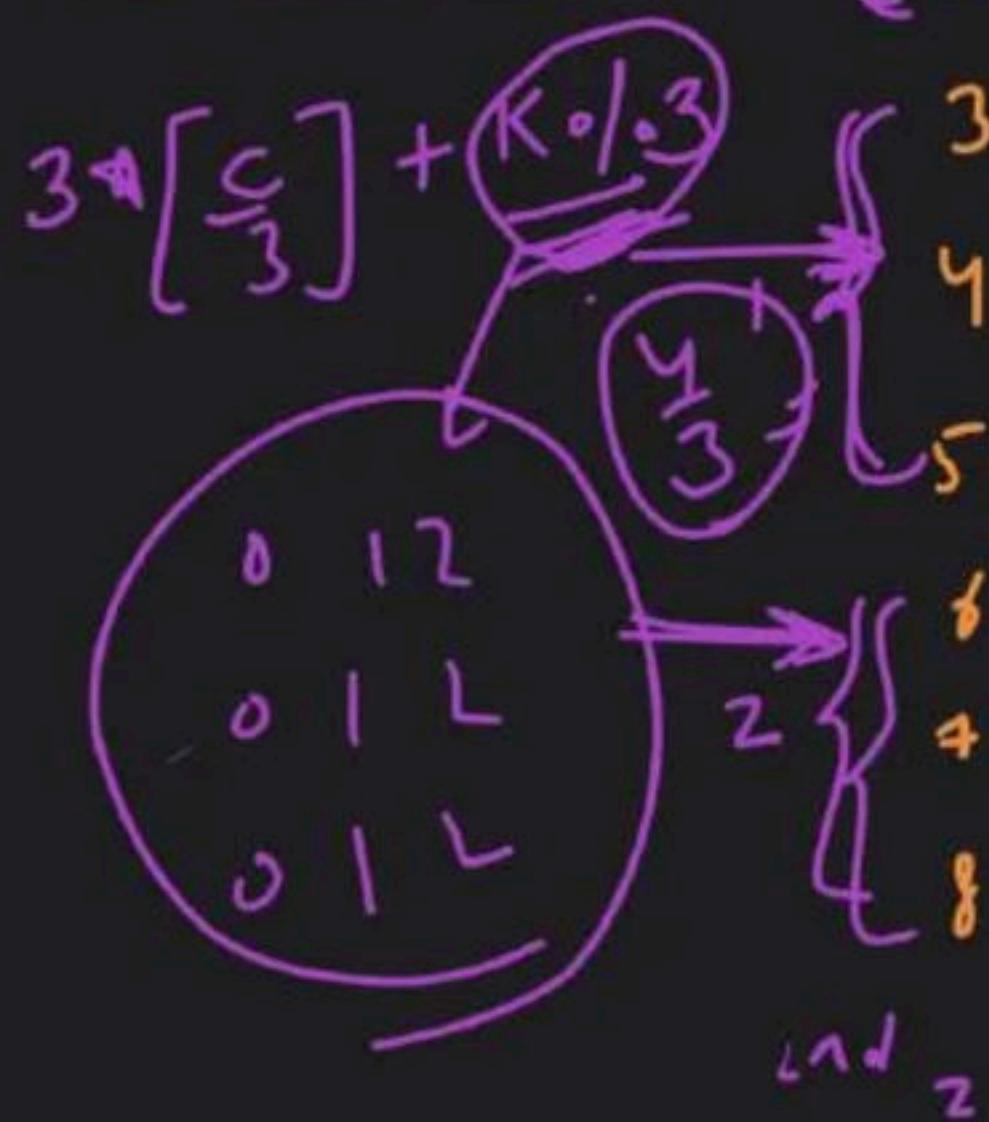
1 2 3 4 5 6 7 8 9



1 2 3 4 5 6 7 8 9



$$3 \star \left[\frac{r}{3} \right] + K \cdot \frac{1}{3}$$



board

$$\left[3 \star \left(\frac{r}{3} \right) + \frac{K}{3} \right] \left[3 \star \left(\frac{c}{3} \right) + \lfloor K/3 \rfloor \right]$$

3×3 checkmark

. 2. 3. 1. 3

353

$(y_1, y_2) \rightarrow I want$
 \downarrow
 $y_1 \in \text{cat}(y_1, y_2)$

① find start pt. of

$$\gamma = i + 3$$
$$\zeta = j + 3$$

$$\begin{pmatrix} 3, 3 \\ 3, 4 \end{pmatrix}$$

$$(3, 4)$$

$\beta[i][j]$

$\{, \}$, $\forall \rightarrow \exists, \cdot$

for (i = 0 , < 3)
 for (j = 0 , < 3)
 $\Sigma - (\Sigma \cdot 1 \cdot 3) - 1 (\Sigma - 2) = 3$

$$\begin{array}{c} 0 \\ 1 \\ 4 \end{array})$$

$$\begin{array}{c} 6 \\ \leftarrow 6 \\ 3, 6 \end{array}$$

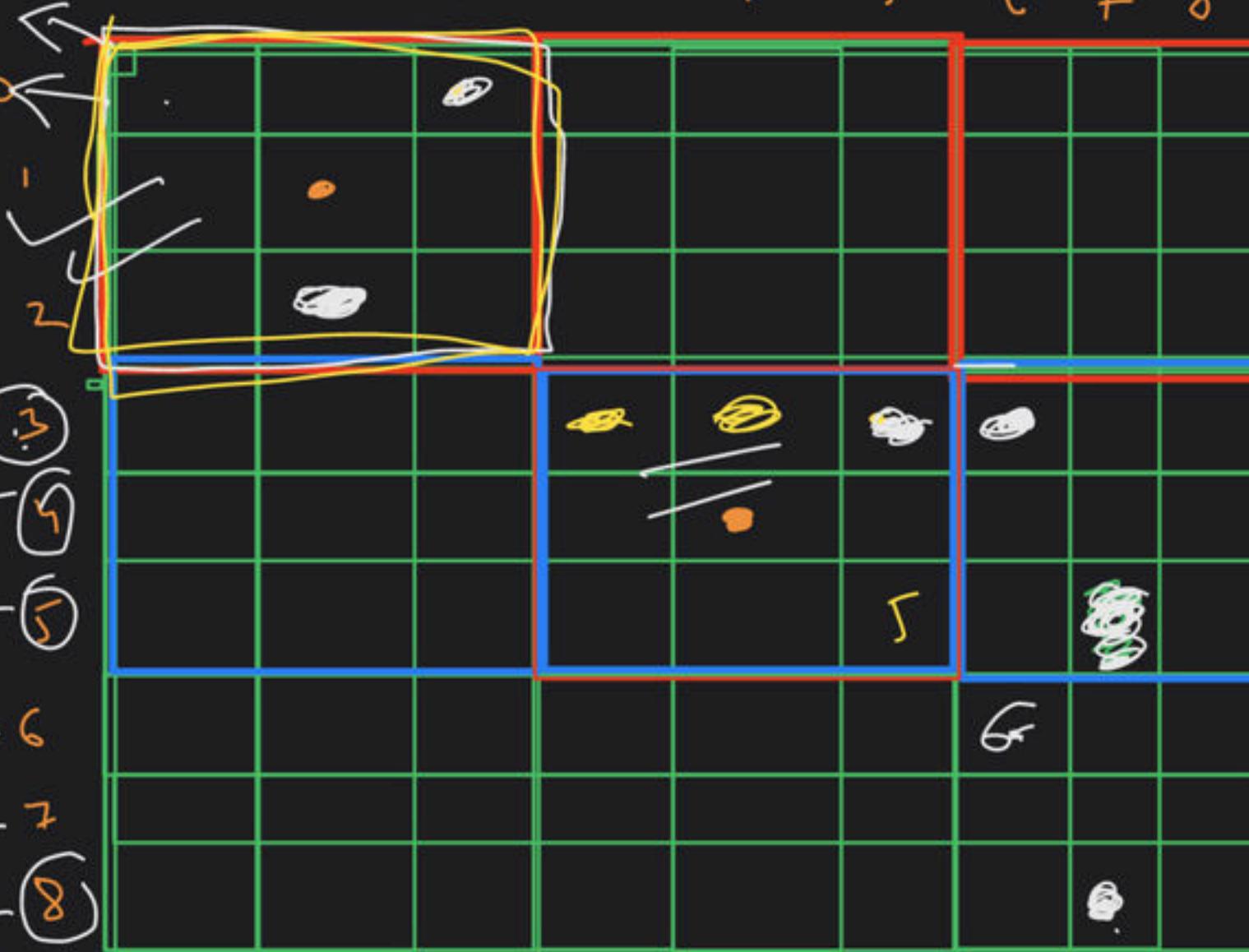
$$z = z - (z \cdot 1) \cdot y$$

10 B

6

15

，9) 3/



[3, 5]



3 - (3% 3)



3 - 0



3



5 - (5% 3)



5 - 2 => 3

2 3

$2 \rightarrow^a_b \left\{ \begin{matrix} c \\ d \end{matrix} \right\}$ 3 choices

$\boxed{3 \downarrow 3}$

$2 | 9$

$\rightarrow 9$

$\rightarrow 9$ answer

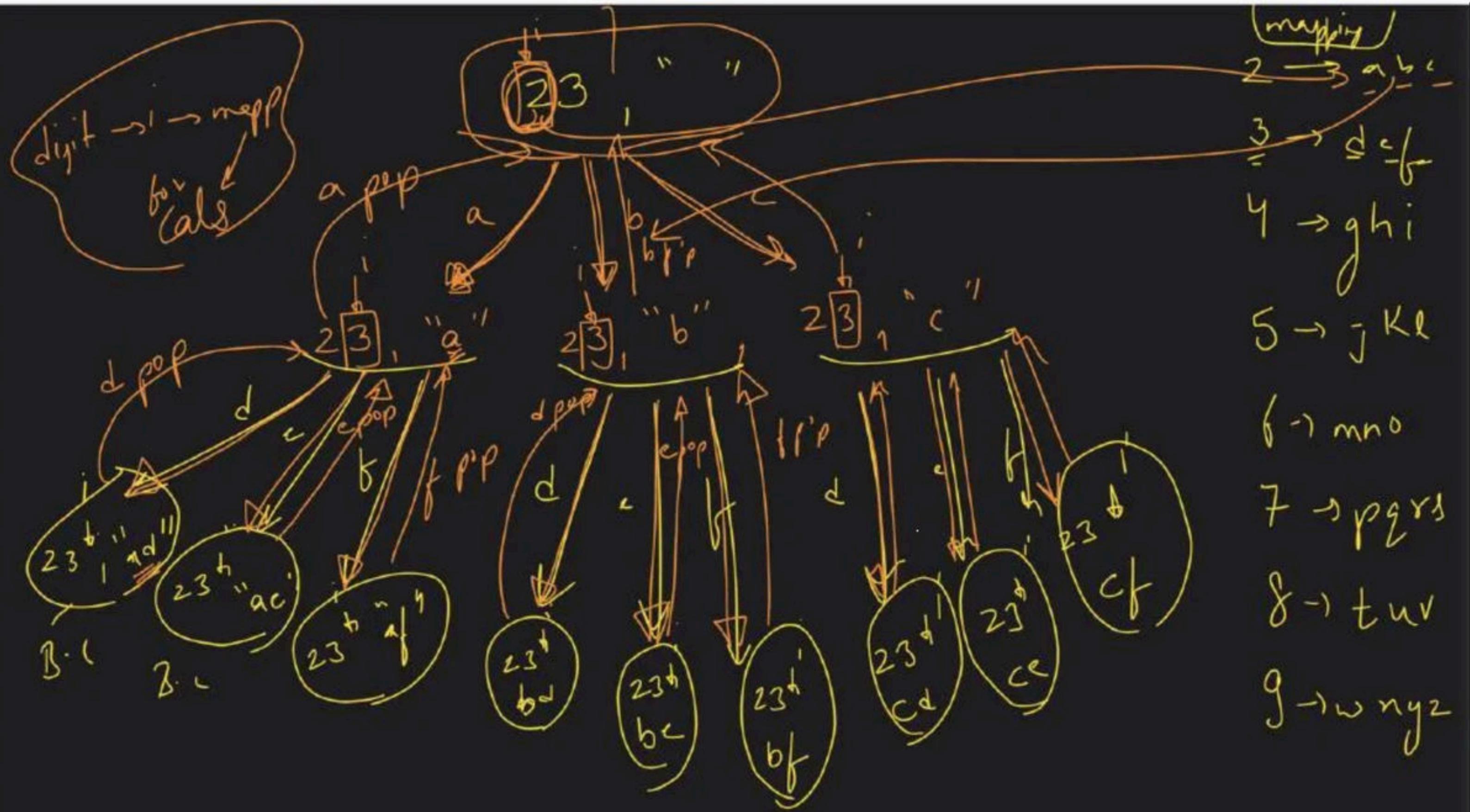
$3 \rightarrow^d_e \left\{ \begin{matrix} f \\ g \end{matrix} \right\}$ 3 choices

$\boxed{3 \downarrow 4}$

12

$2 \rightarrow^c_d \left\{ \begin{matrix} e \\ f \end{matrix} \right\}$

$9 \rightarrow^w_x \left\{ \begin{matrix} y \\ z \end{matrix} \right\}$ 7



LC-17)

Letter Comb. of

a phone no.