Recursion - II

Foundation Course on Data Structures & Algorithm - Part I

Love Babbar • Lesson 20 • May 26, 2022

→ Question:-

total no of ways to make total amount

int coins[] = {1, 2}

Total Amount = 4

10-20 min

2-5 min

4 → 1, 1, 1, 1

→ 1, 1, 2

→ 2, 2

3 ways

3, 1

Wrong

↓ Yes or No

H/W

↓

YT [Rec playlist]

Codehelp

81% → 86%

① Adobe OA [intern]

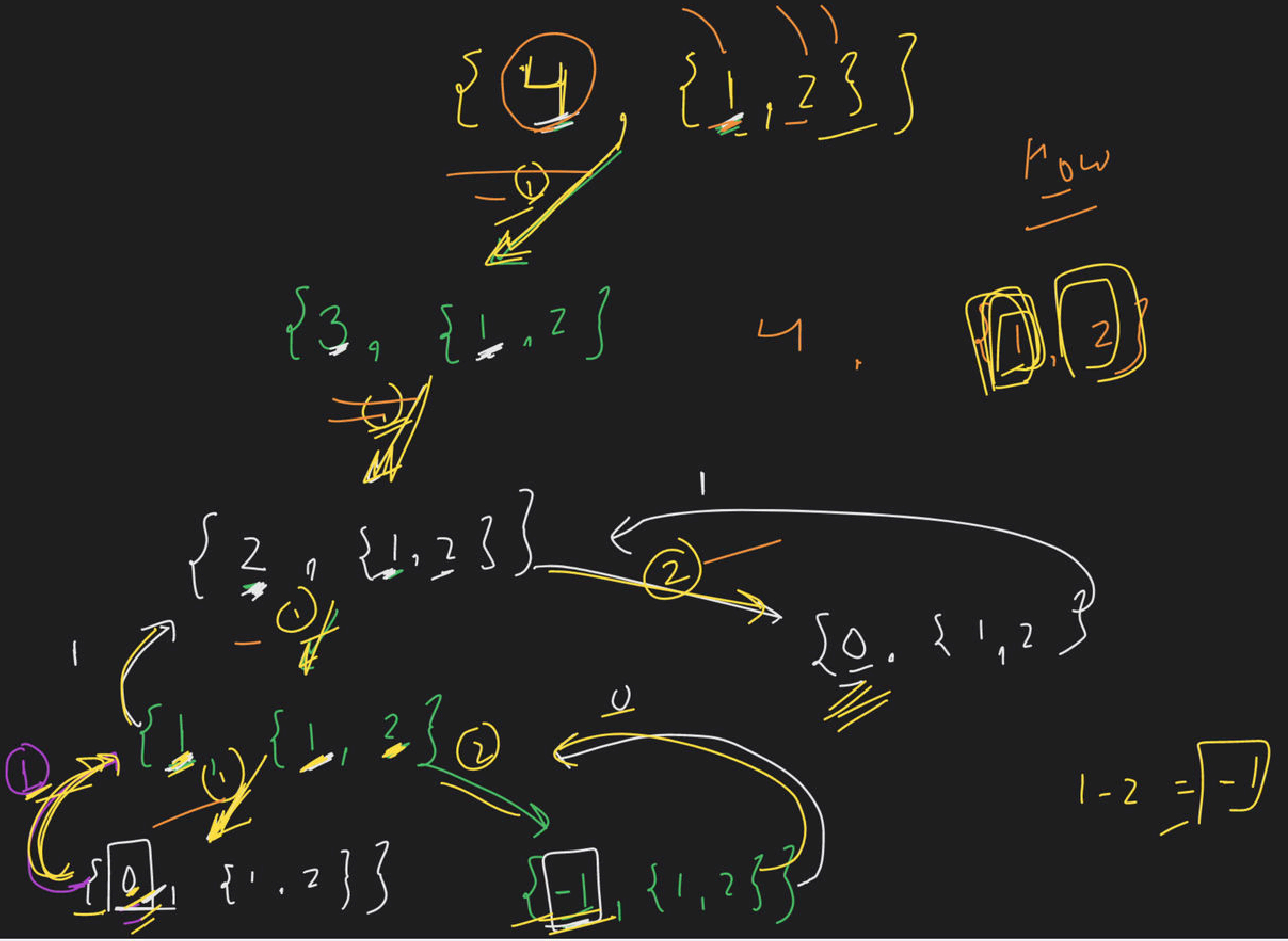
② Amazon (off-campus)

③ Amazon ↳ On-campus [Ro 4]

④ G.S

⑤ B- OA

DP



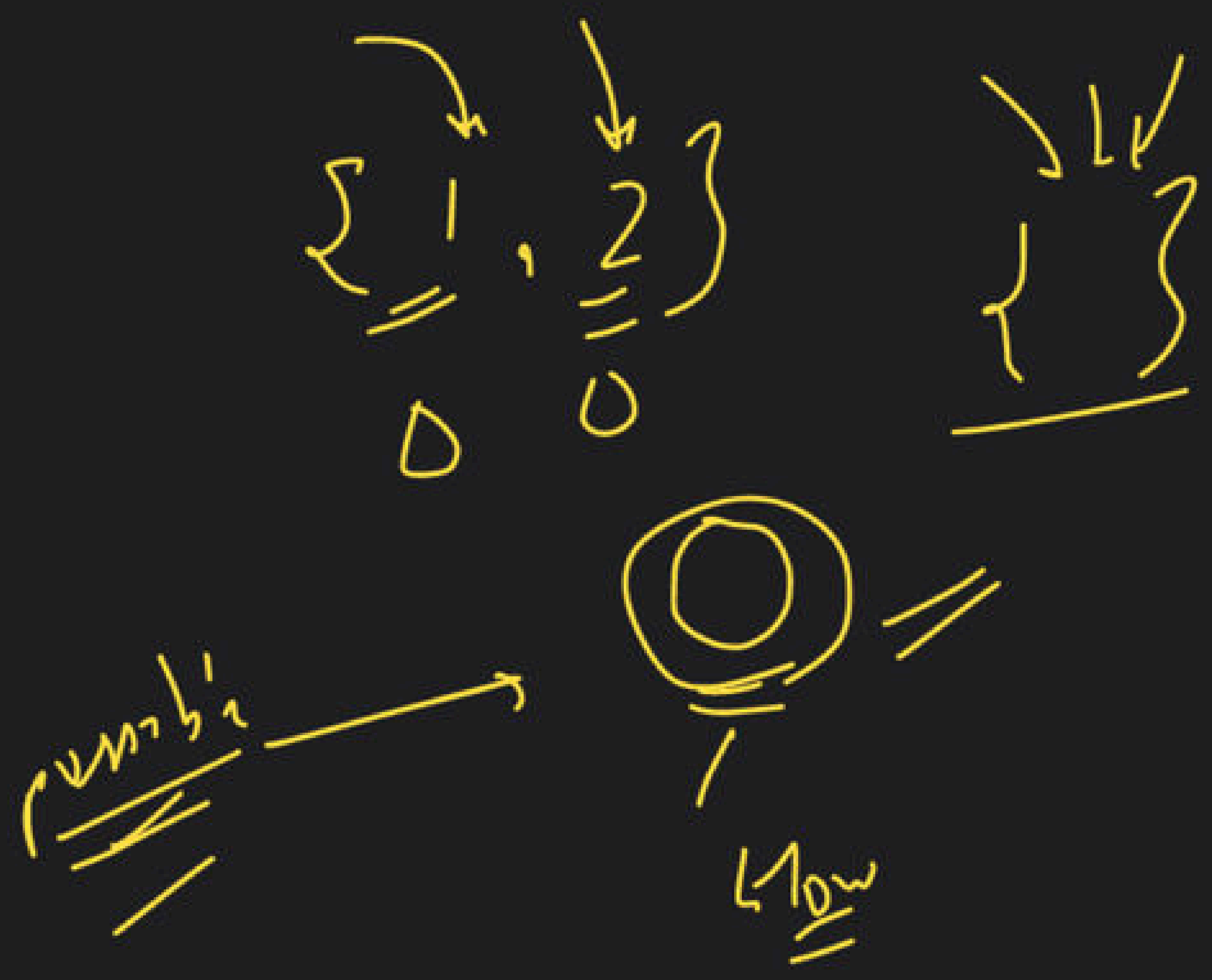
I→T

D→F

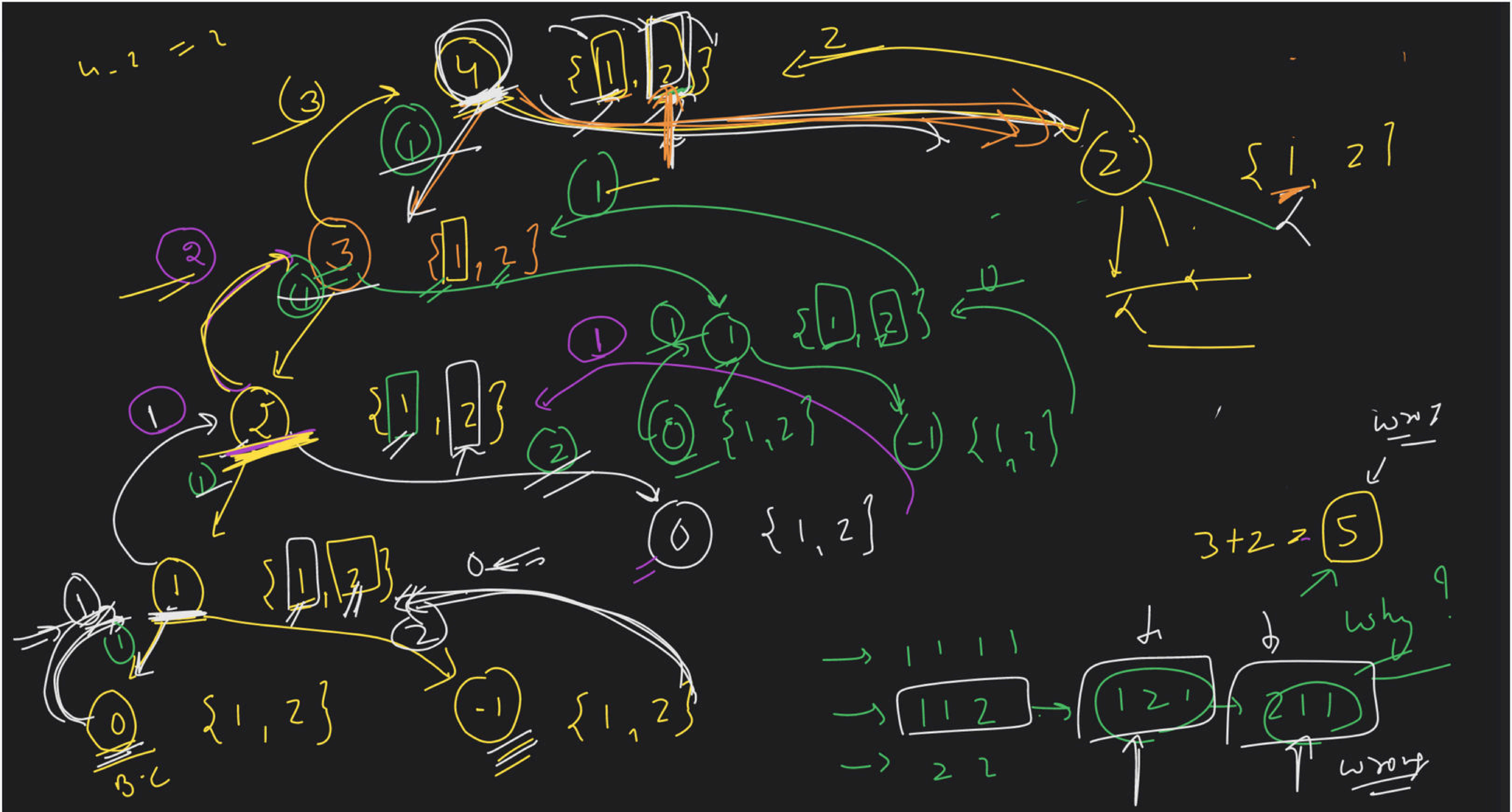
-ve

B.C

0



```
0 : 1

if (amount == 0)
    return 1;

if (n < 0)
    return 0;
```



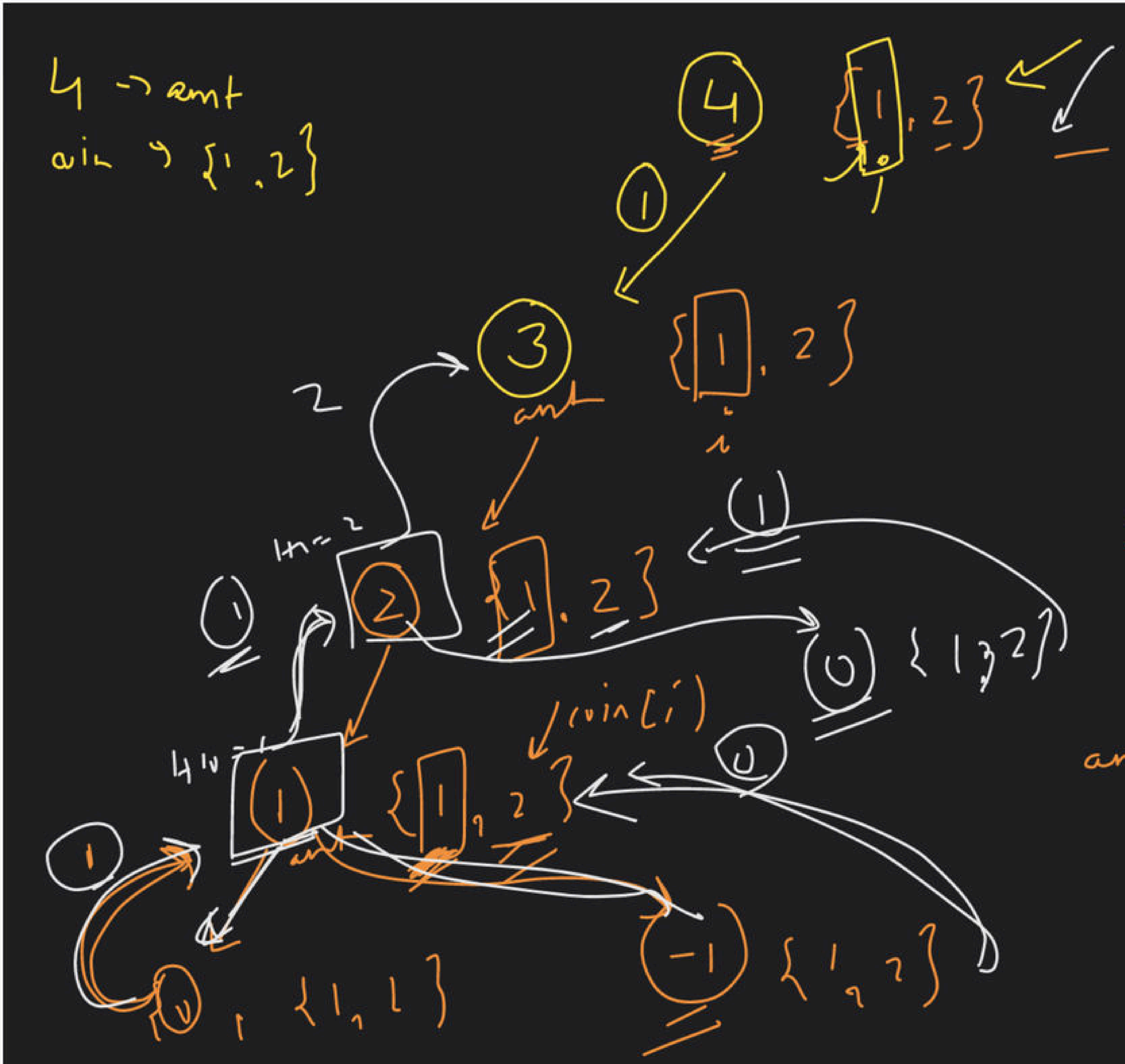
n = 2
4
{1, 2}
2
2
{1, 2}
3
{1, 2}
1
2
1
1
{1, 2}
0
1
1
2
{1, 2}
1
2
0
{1, 2}
-1
{1, 2}
0
{1, 2}
1
1
{1, 2}
0
2
0
{1, 2}
-1
{1, 2}
B.C
wrong
3+2 = 5
why ?
1 1 1 1
1 1 2
1 2 1
2 1 1
2 2
wrong

B.C

```
{
        if (amount == 0)
                return 1;

        if (amount < 0)
                return 0;
        int ways = 0;
    for (int i = 0; i < n; i++)
        {
                ways += solve(
                                        R.C
            }
} return ways
```

4 -> amt

coin -> {1, 2}



amt = 4

coin[i] = 1

4 - 1 = $\boxed{3}$

amt - coin[1]

3 - 1 = 2

amt - coin(i)

1 - 2 = -1

2 - 2 - 0

```
{1,2} 2 4
int solve(coin, n, amt)
{
    if (amt == 0) -
        return 1;
    if (amt < 0) -
        return 0;
    int ways = 0;
    ~~for (i 0 -> <n)~~
    {
        ways += solve(coin,
                      n,
                      amt - coin[i])
    }
    return ways;
}
```

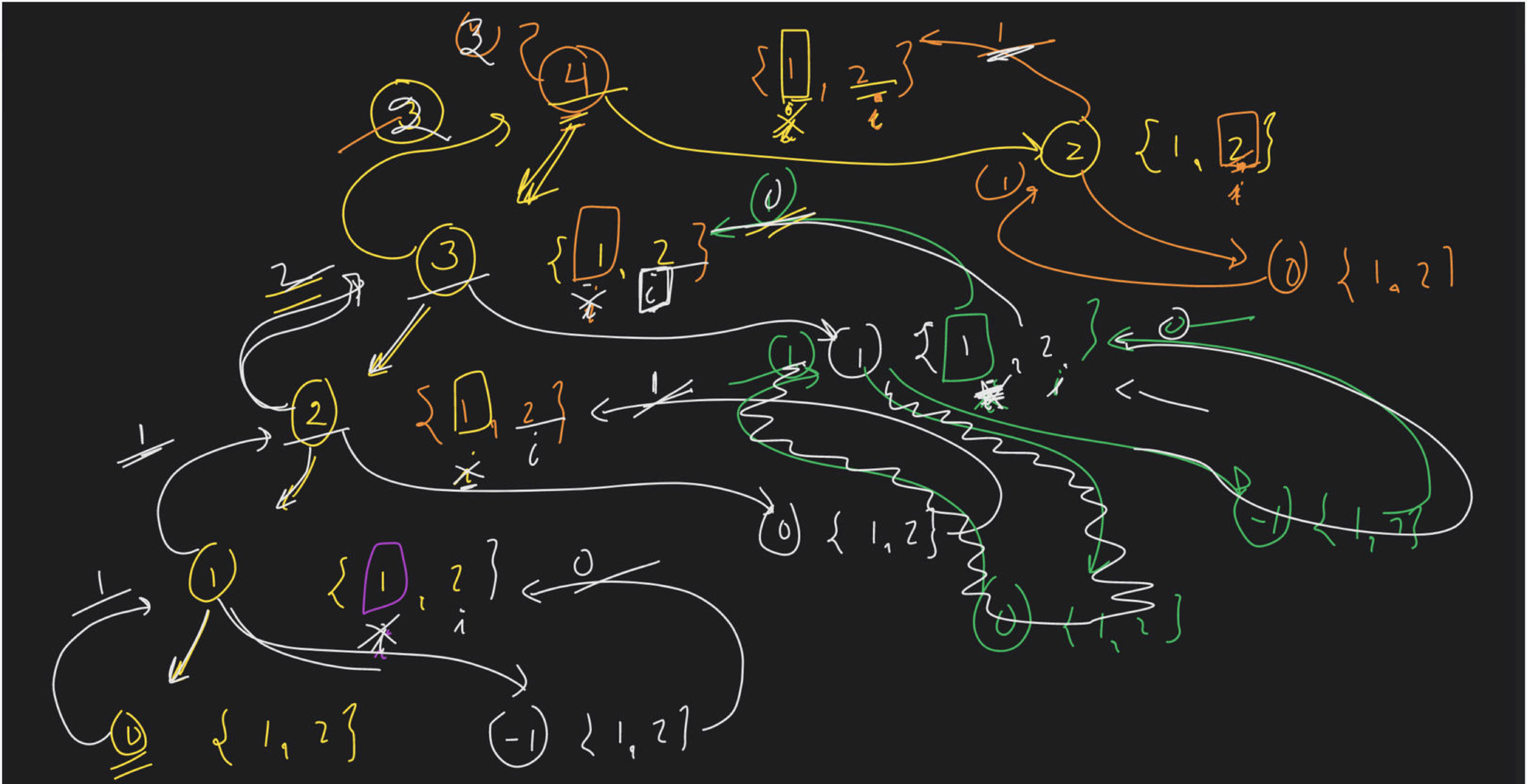
{1, 2}

(4) → {1, 2}, ... }

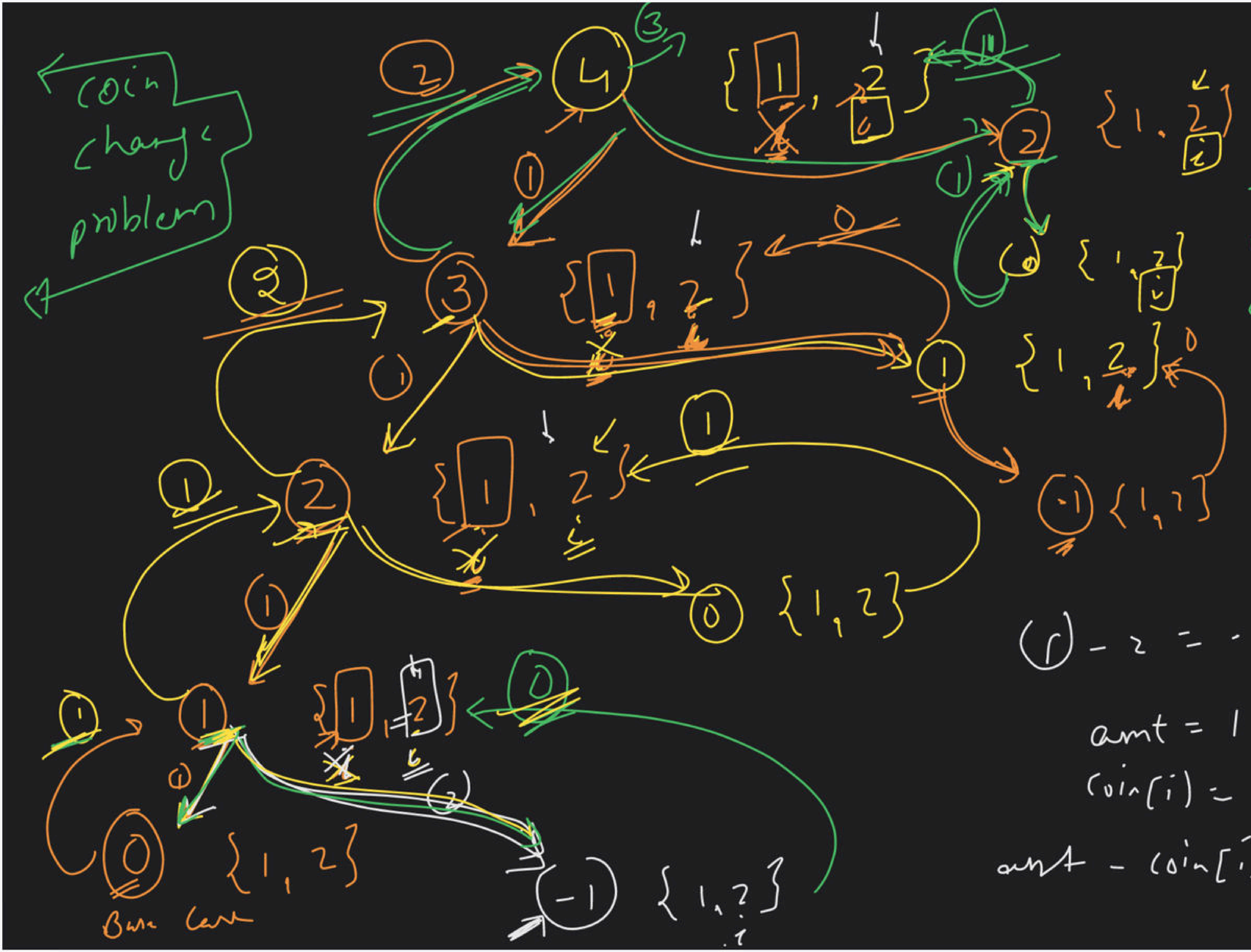
(4) → no. of ways to create 4 using 1 + no. of ways to create using 2 + 1.

for ( )

ways = ways + R.C


4
3
2
1
0
-1
{1, 2}
{1, 2}
{1, 2}
{1, 2}
{1, 2}
{1, 2}
{1, 2}
{1, 2}
{1, 2}
{1, 2}
{1, 2, i}
i
i
i
i
1
2
1
0
1
0
1
0
0
1
2
3

coin change problem



total no. of ways to create (4) = 2+1 = 3

total no. of ways to create (1) = 1 + 0 = (1)

total no. of ways to create (2) = 1+1 = (2)

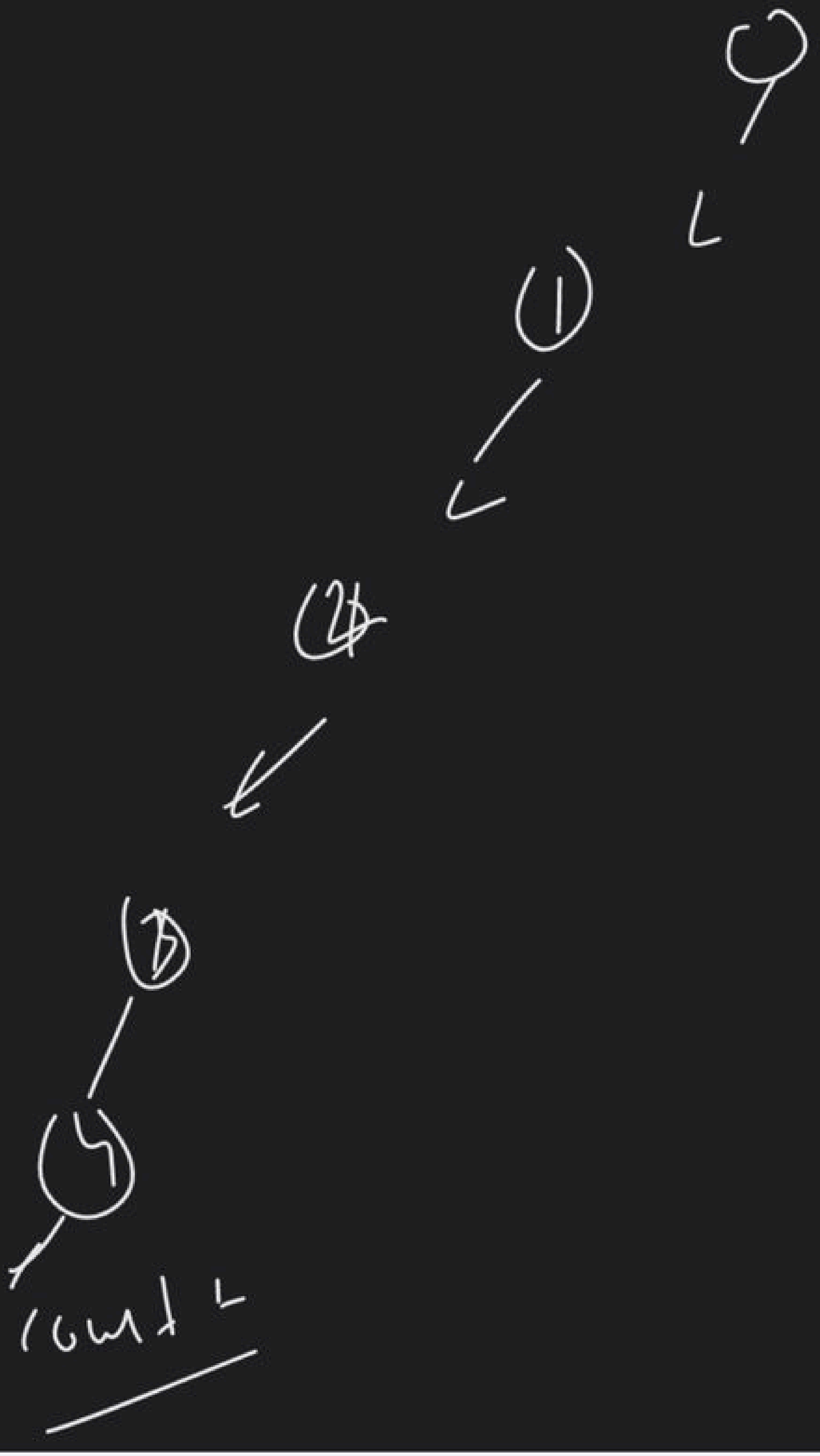
total no. of ways to create 3 = 2+0 = 2

(1) - 2 = -1

amt = 1

coin[i] = 2

amt - coin[i] = 1-2 = (-1)



galat

→ 1 1 2
1 2 1
2 1 1 } → galat

1.Thr

correct

→ index ko track karlijo

→ Optimal Game Strategy : [Hard]

$i = 0$

$j = n-1$

max amount

→ arr[] = { $\overset{i}{20}$, $\overset{i+1}{30}$, 2 , 2 , $\overset{j-1}{2}$, $\overset{j}{\cancel{10}}$ }

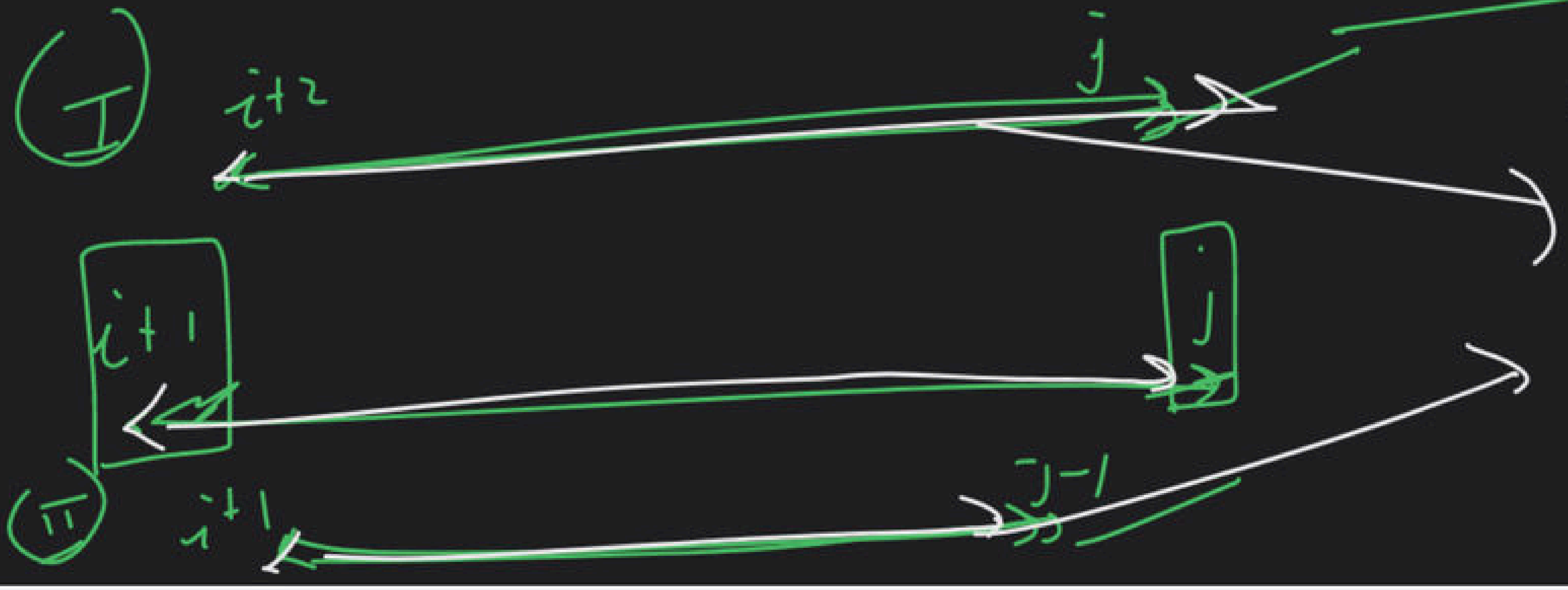
Player 1 → aap

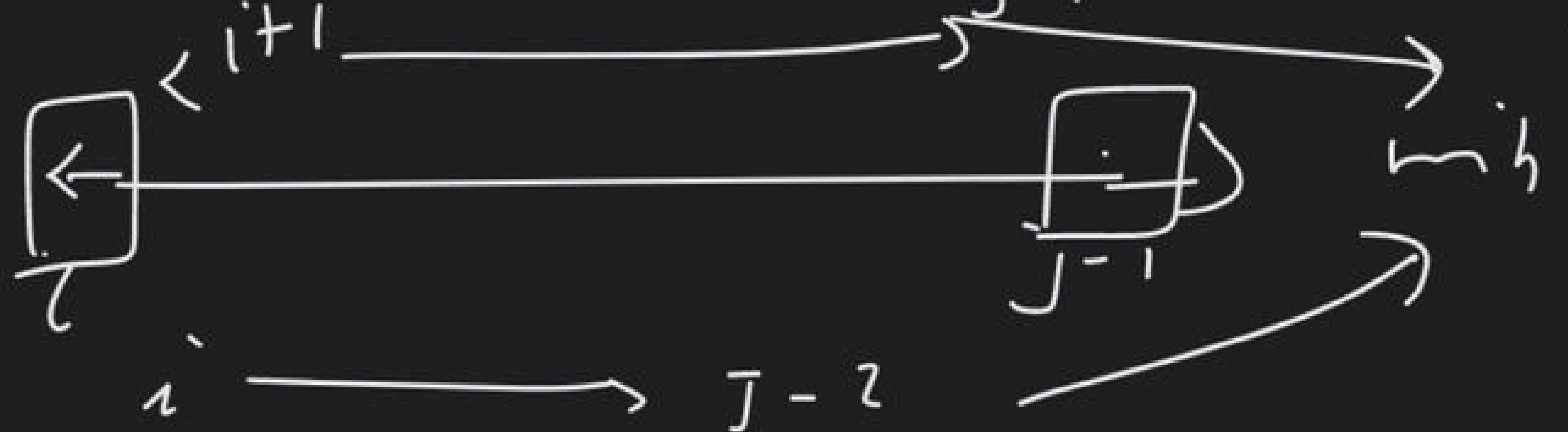
Player 2 → ~~Babbar~~

Recursion

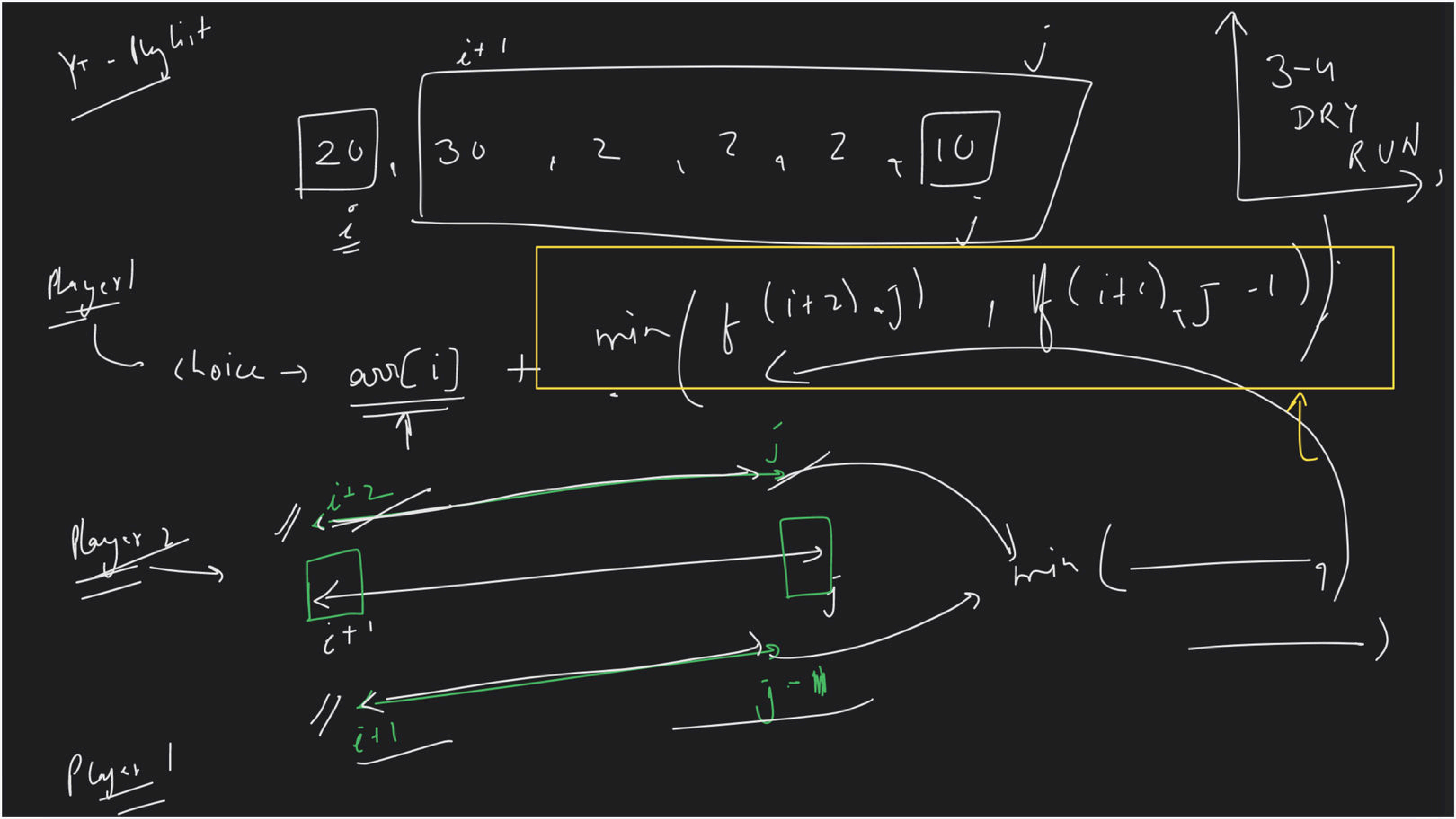
$$\text{choice1} = arr[i] + \min\big(f(i+2,\ j),\ f(i+1,\ j-1)\big)$$

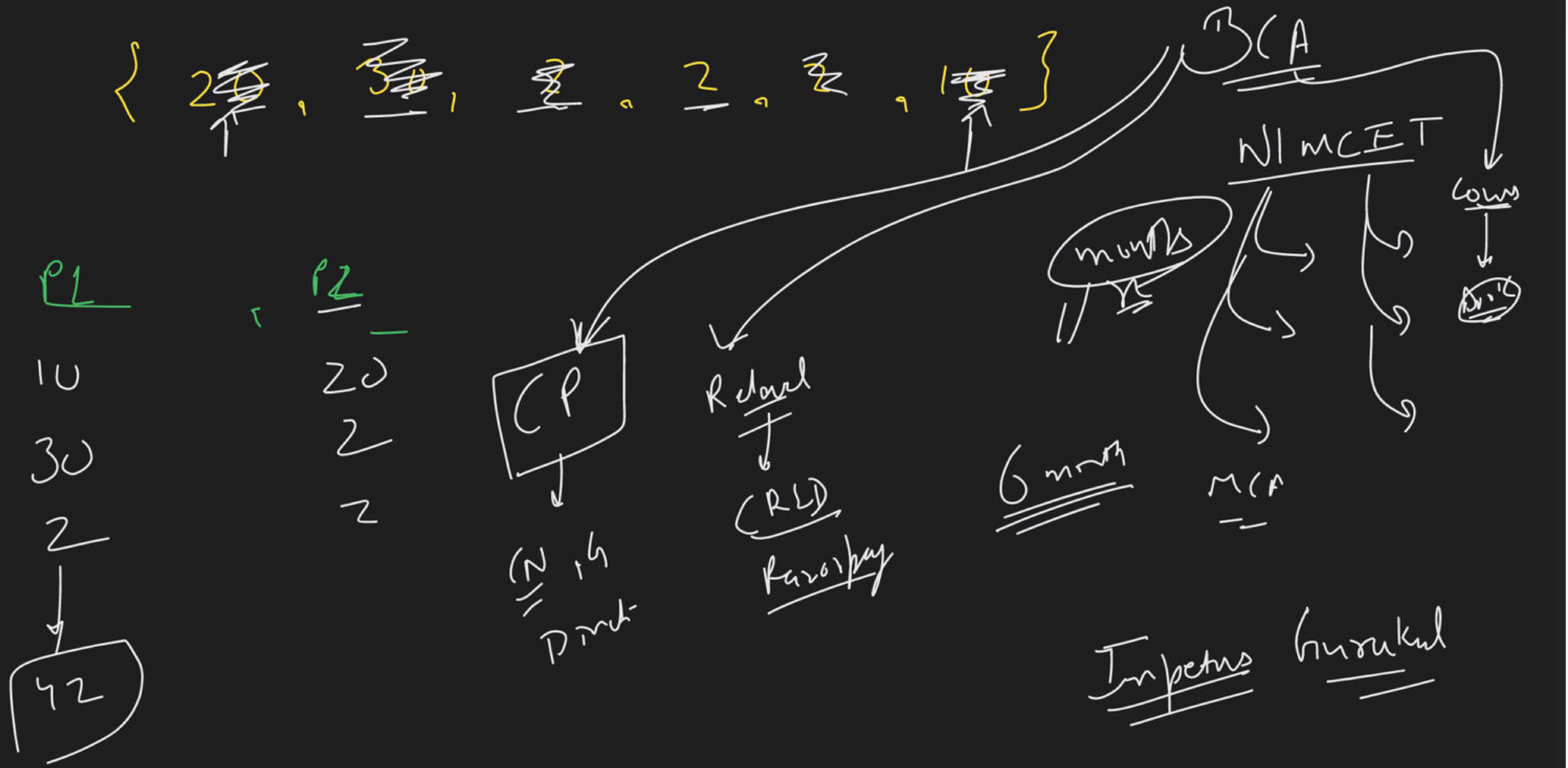
$$\text{choice2} = arr[j] + \min\big(f(i+1,\ j-1),\ f(i,\ j-2)\big)$$





```
return;
________ max (choice1 , choice2 )

code-

        solve ( arr______ , i______ , j )
        if ( i > j )
                return 0;

        int choice1 = __________________
        int choice2 = ____________

        int ans = max (choice1 , choice1 )
                return ans;
```


YT - Playlist
20 , 30 , 2 , 2 , 2 , 10
i
i+1
j
j
3-4
DRY
RUN
Player1
choice → arr[i] + min(f(i+2, j) , f(i+1, j-1))
Player 2
i+2
j
i+1
j
min(,)
i+1
j-1
Player 1



{ 20, 30, 2, 2, 2, 10 }

P1 , P2

10 20

30 2

2 2

42

CP

CN, 14

Direct

Referral

CRED

Razorpay

BCA

NIMCET

Cons

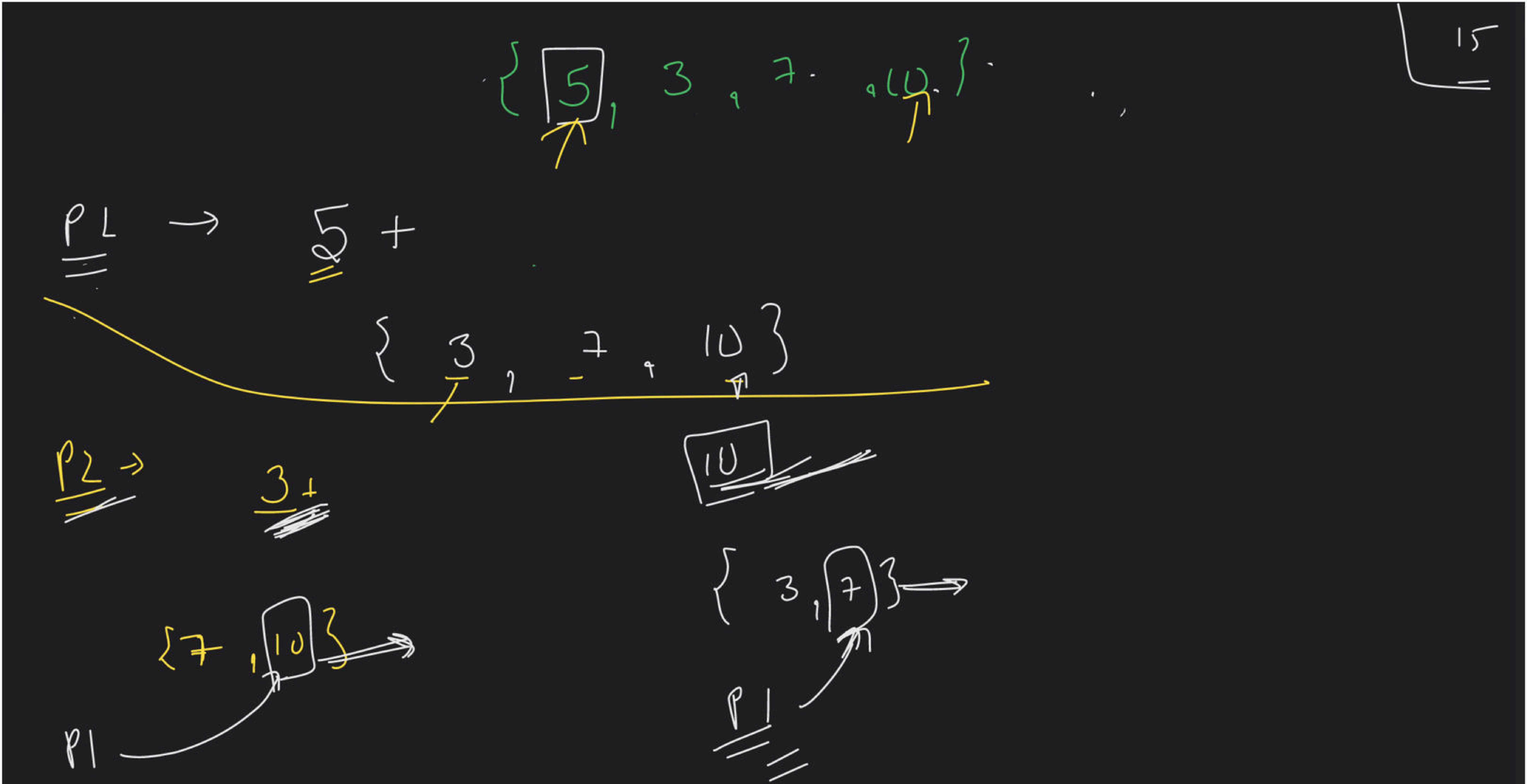
[illegible]

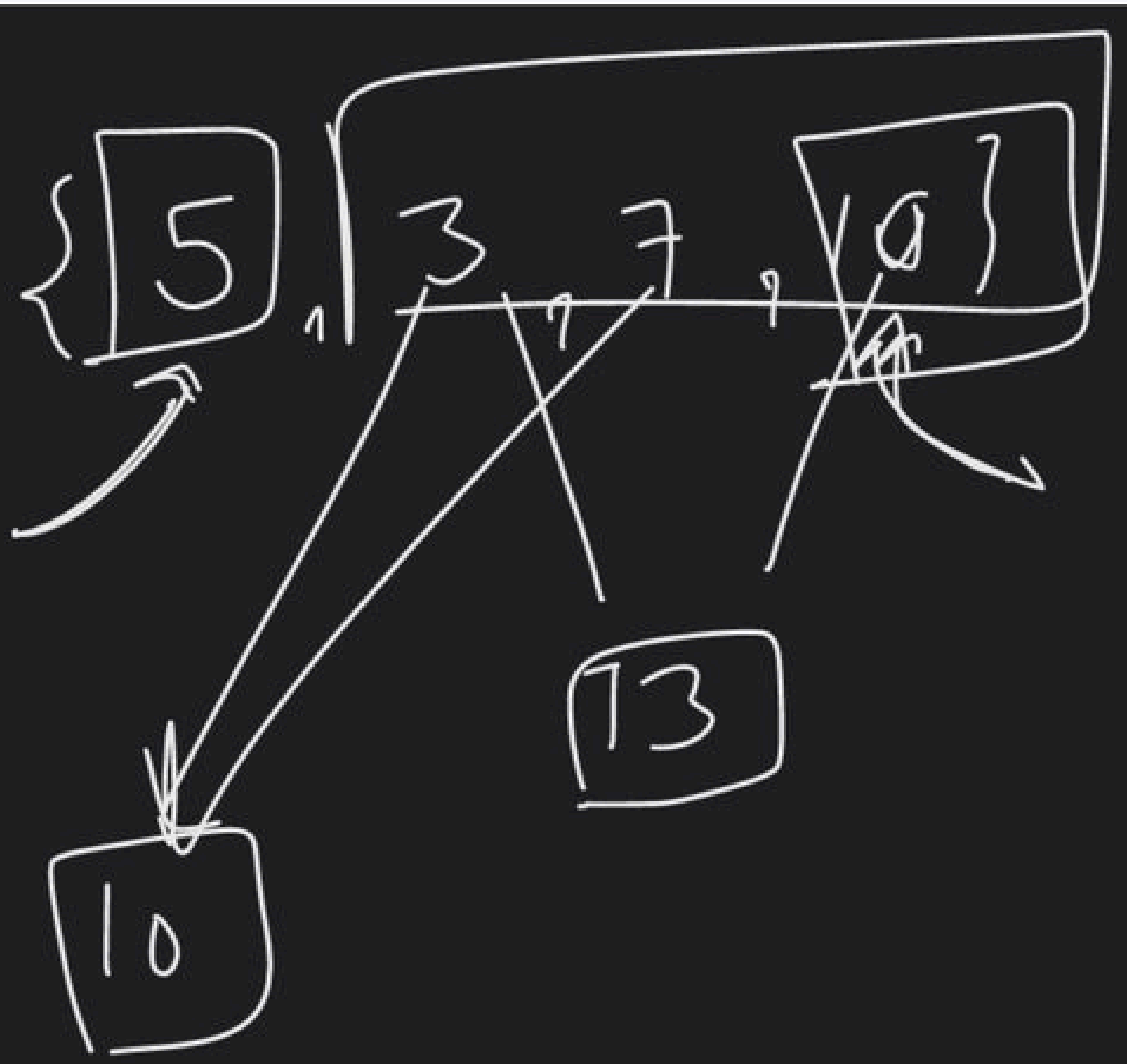
months

6 month

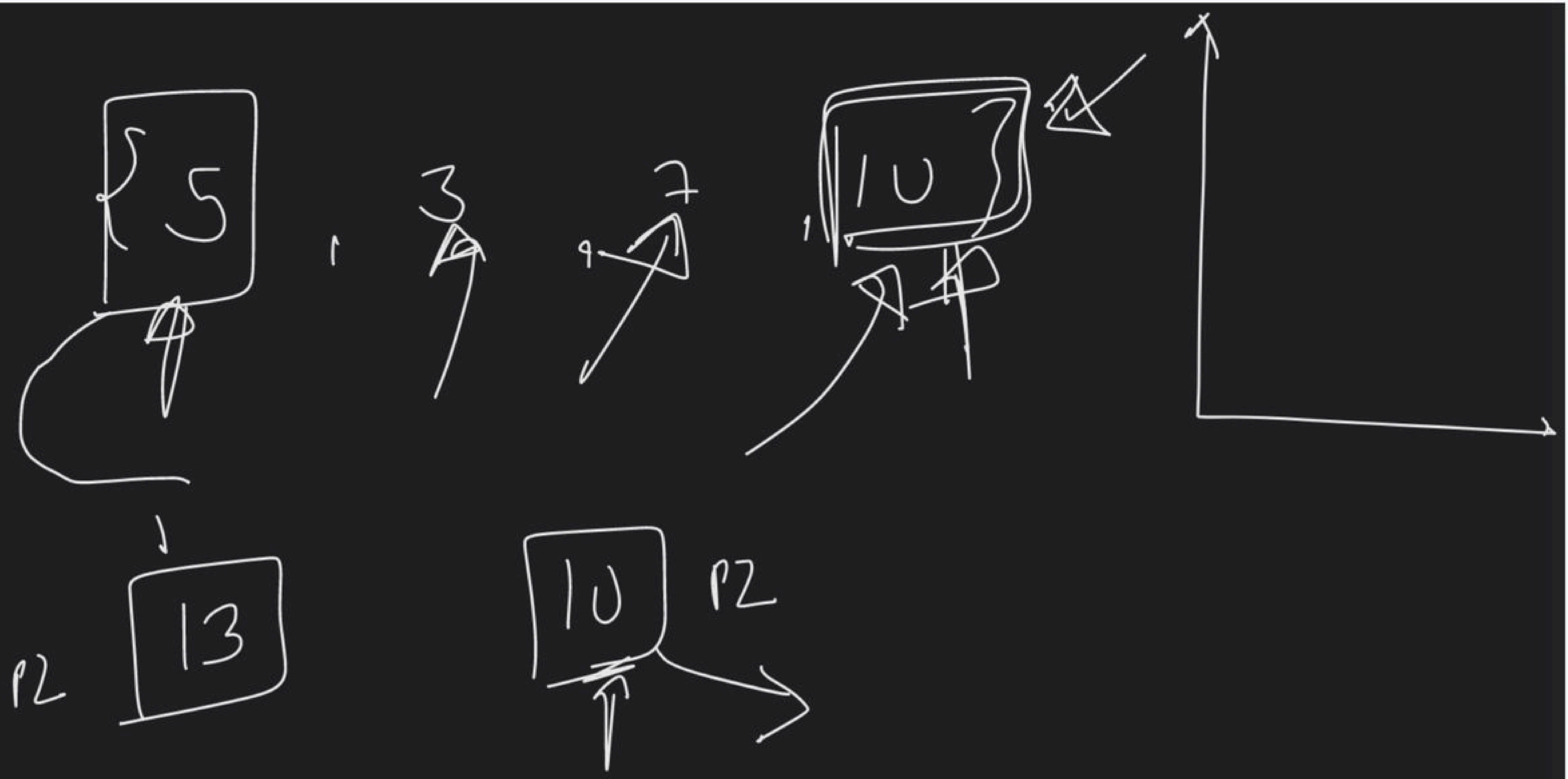
MCA

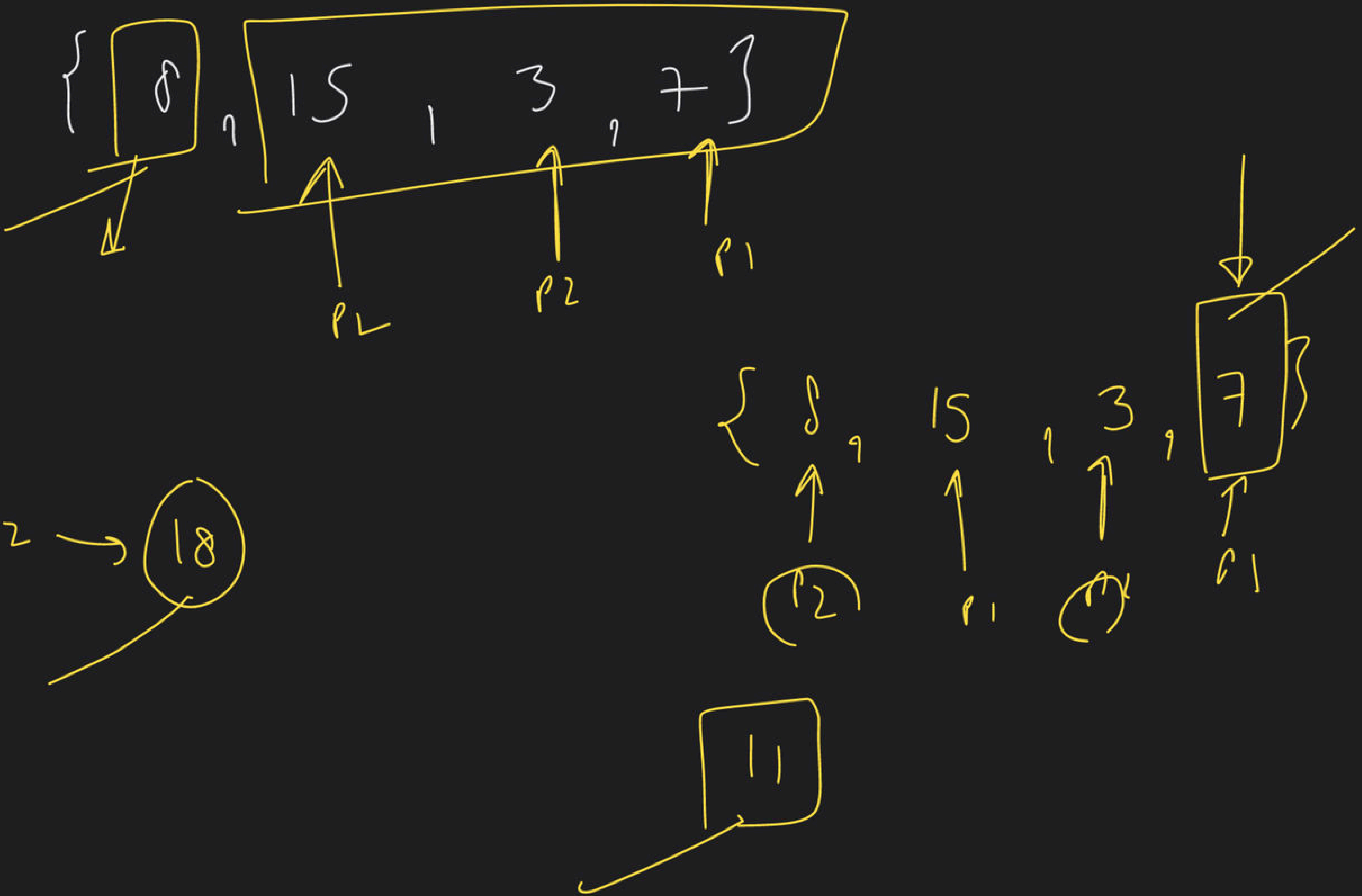
Impetus Gurukul

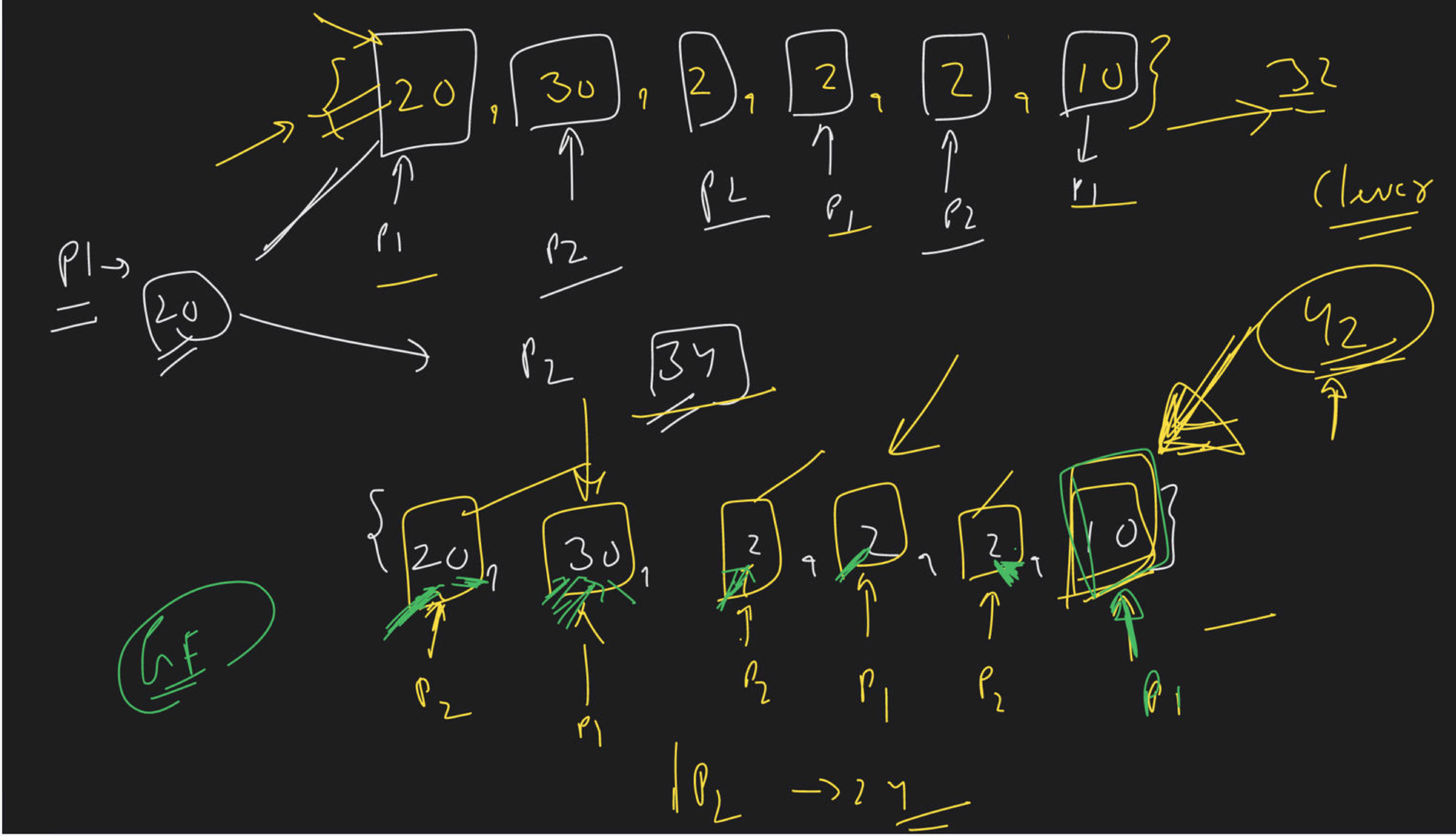

{5, 3, 7, 10}
15
P1 → 5 +
{3, 7, 10}
P2 → 3 +
10
{7, 10}
P1
{3, 7}
P1



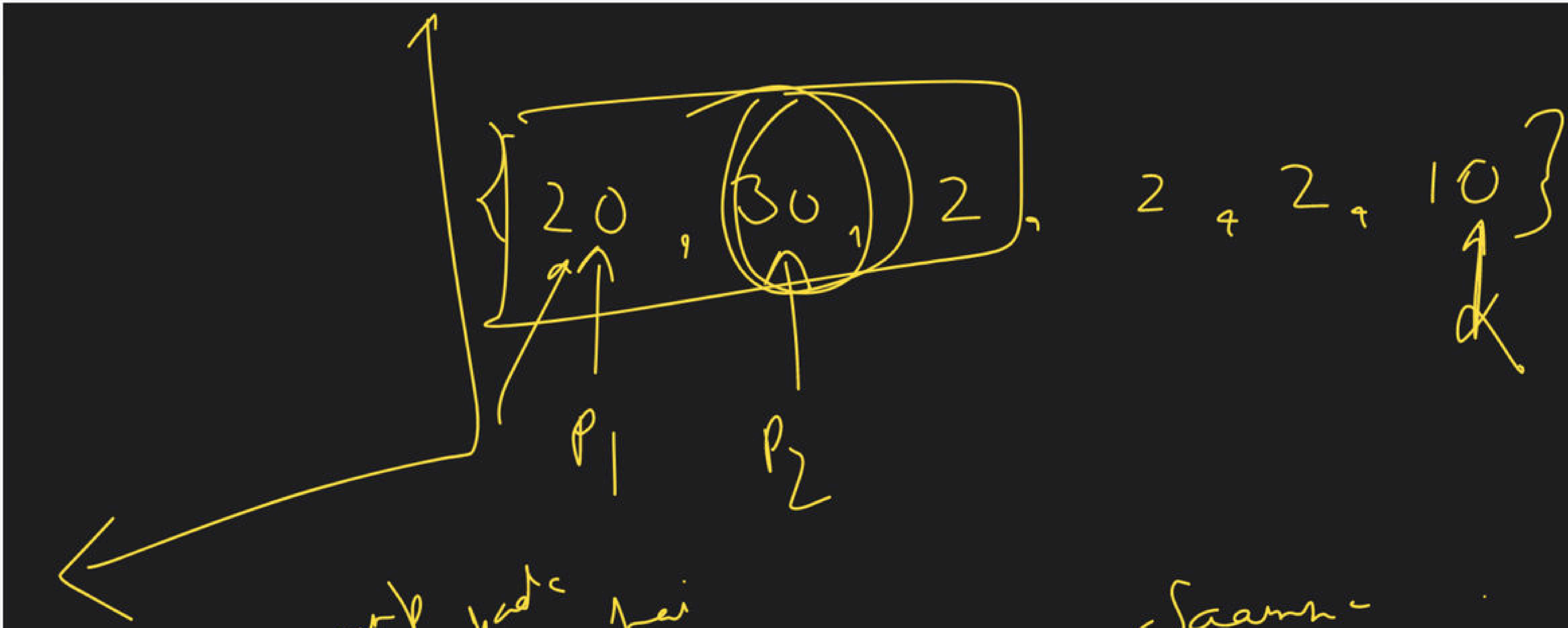
why ?


{5
3
7
10}
13
P2
10
P2


{8, 15, 3, 7}
p1
p2
p1
p1→
p2 → 18
{8, 15, 3, 7}
p2
p1
p1
p1
11



{20, 30, 2, 2, 2, 10}
P1
P2
P2
P1
P2
P1
32
Clever
P1 → 20
P2
34
42
{20, 30, 2, 2, 2, 10}
P2
P1
P2
P1
P2
P1
GF
P2 → 24



5 TC
Day
Run

3 scamp padi hai

Saamne

Jeewan

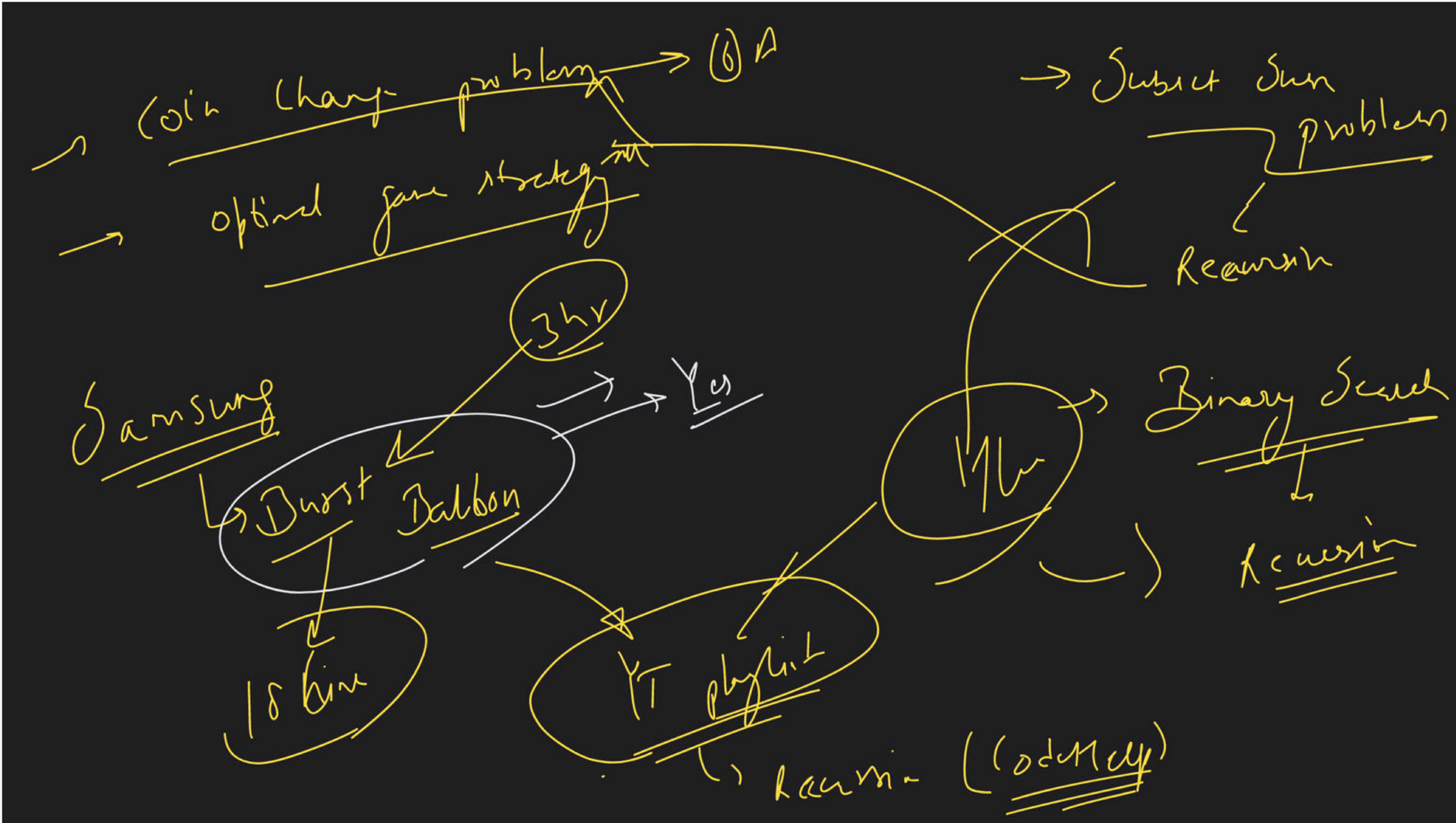
Life

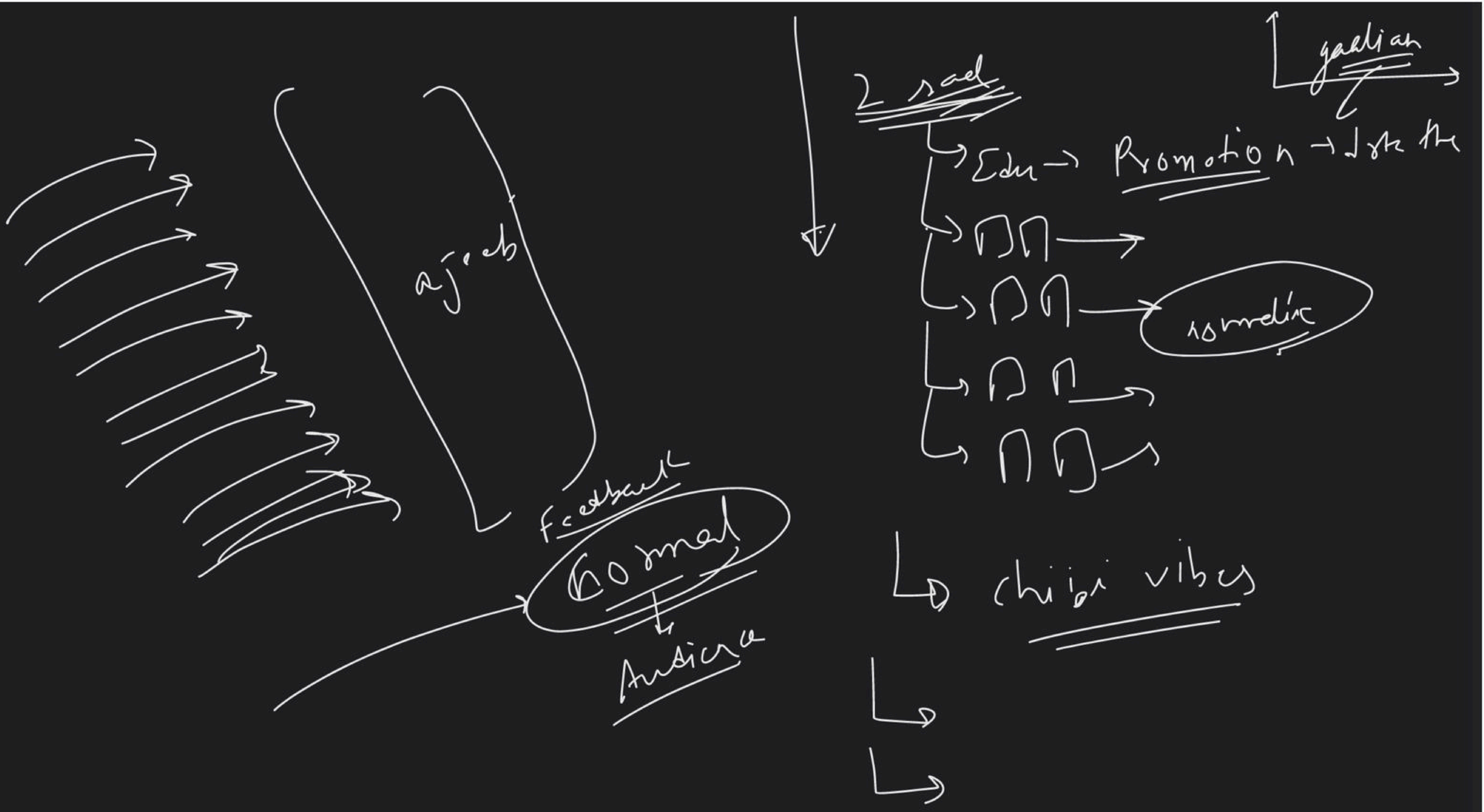
Good -> fun

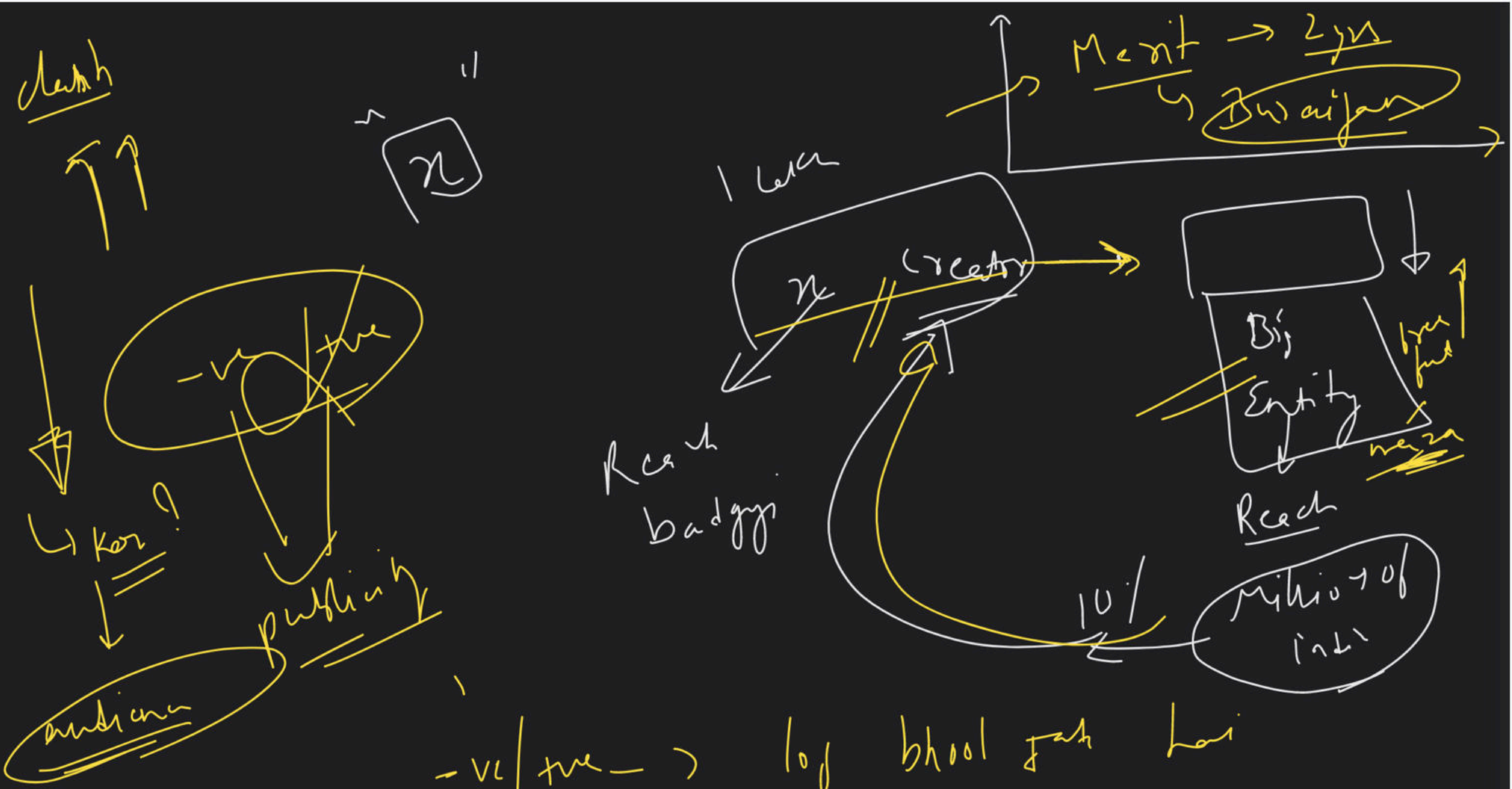
>5g.

yahi -> LinkedIn -> follow

twet


Coin change problem
OA
optimal game strategy
Subset Sum problem
Recursion
3hr
Samsung
Burst Balloon
Yes
1hr
Binary Search
Recursion
18 line
YT playlist
Recursion (Codehelp)


gaalian
2 saal
Edu →
Promotion → date the
comedic
chibi vibes
ajeeb
Feedback
Normal
Audience



-ve/+ve → log bhool jate hai

↳ → apni zindgi

Gf