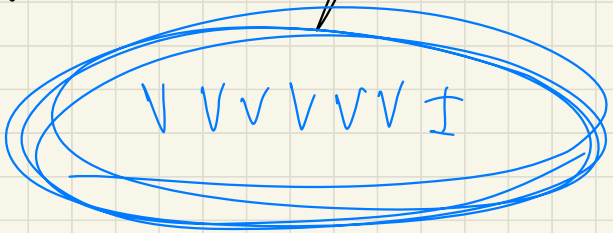
Cyclic Sort:

0	1	2	3	4
3	5	2	1	4

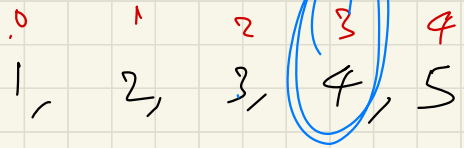
✡ When given nos. from range 1, N ⟹ Use cyclic sort.



0	1	2	3	4
3	5	2	1	4

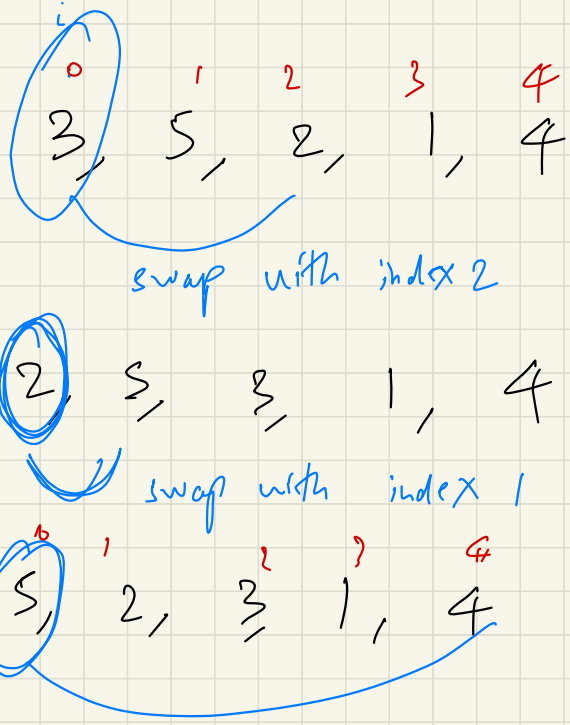
N = 5

After Sorting:



index = value - 1

Why? Because index val starts from 0.



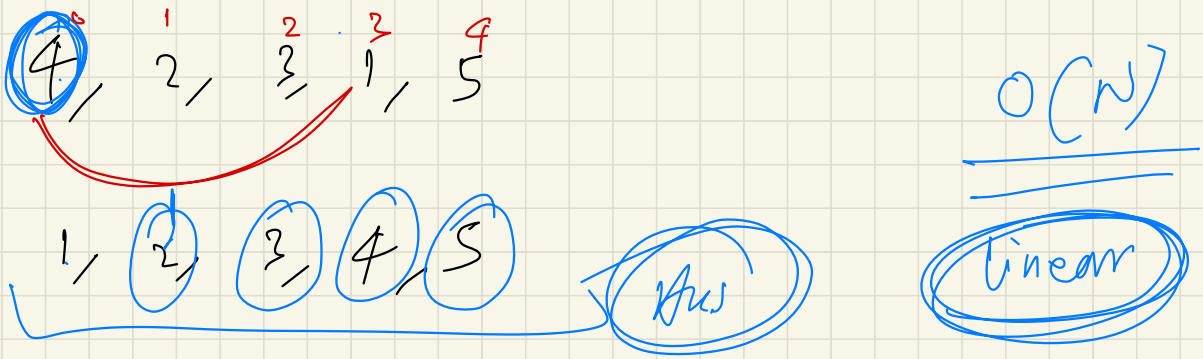
Worst case example:

4 swaps made

+ 5 swaps made

$= (N-1) + N$

$= (2N-1)$ swaps

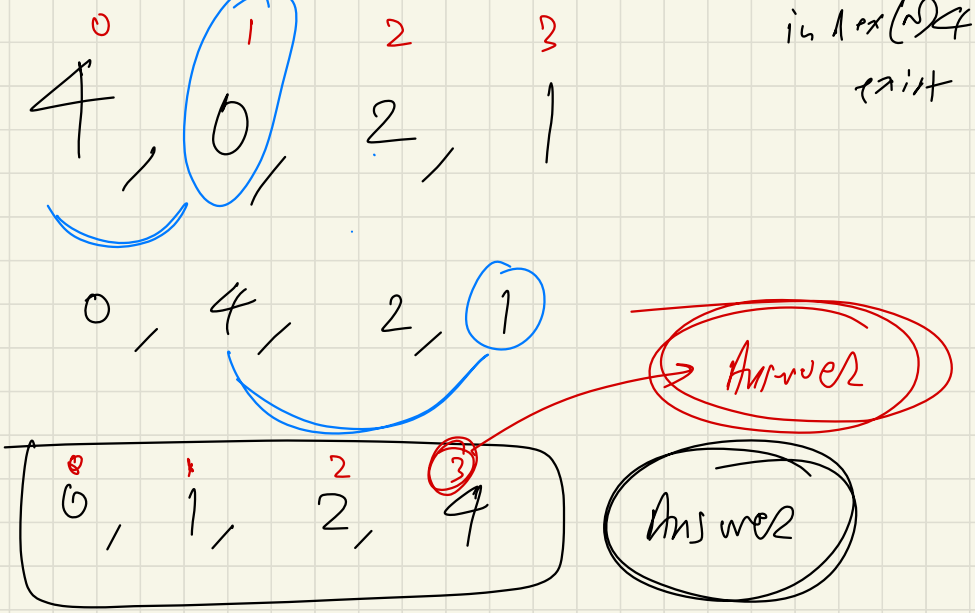


Q1 N nos from 0 till N ⟹ Total there will be N+1 nos.

Ex: N = 4 , arr = [4, 0, 2, 1]

[0, 1, 2, 3, 4] ⟹ Here you can see that in sorted version, element == index

0 1 2 3 4
0, 1, 2, 3, 4



index 4 does not exist ? Ignore

Case 2 : When N is not there in array !

N = 4 arr = [1, 0, 3, 2] ⟹ [0, 1, 2, 3]

Ans = -1

Tips: If range ⇒ [0, N]

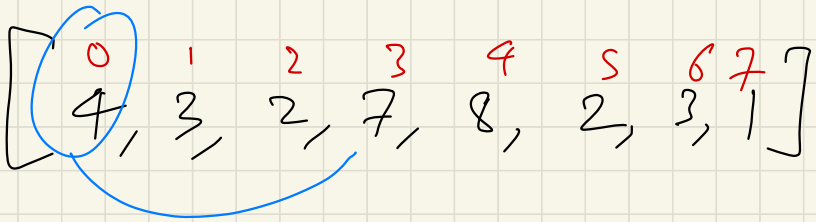
* every element will be at index = value

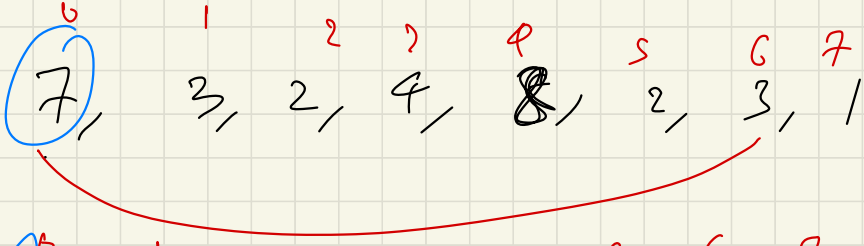
If range ⇒ [1, N]

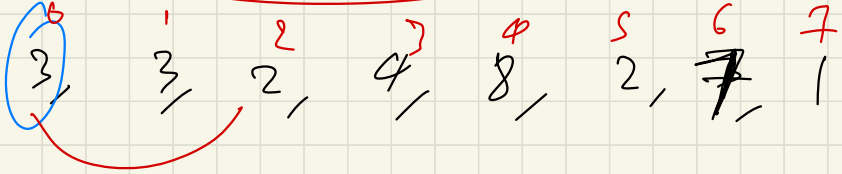
* every element will be at index = value - 1

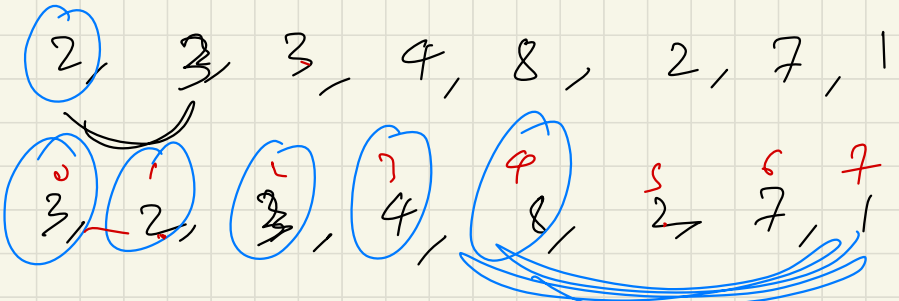
Q2 : Code

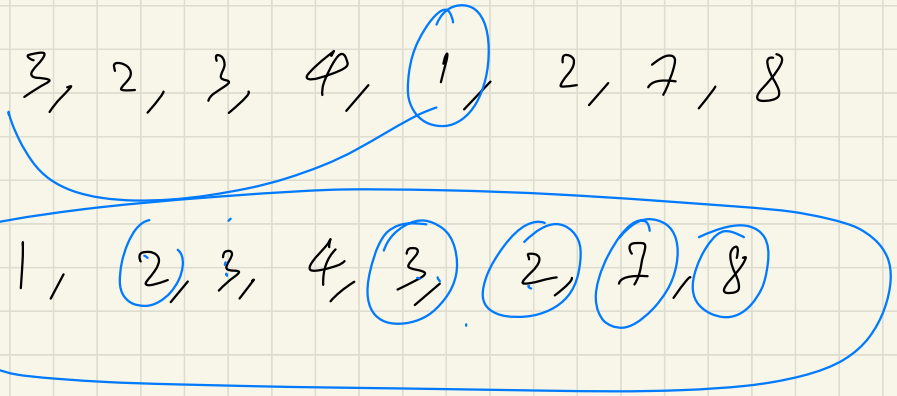
N = 8


0 1 2 3 4 5 6 7
4, 3, 2, 7, 8, 2, 3, 1


0 1 2 3 4 5 6 7
7, 3, 2, 4, 8, 2, 3, 1


0 1 2 3 4 5 6 7
3, 3, 2, 4, 8, 2, 7, 1


2, 3, 3, 4, 8, 2, 7, 1
0 1 2 3 4 5 6 7
3, 2, 3, 4, 8, 2, 7, 1

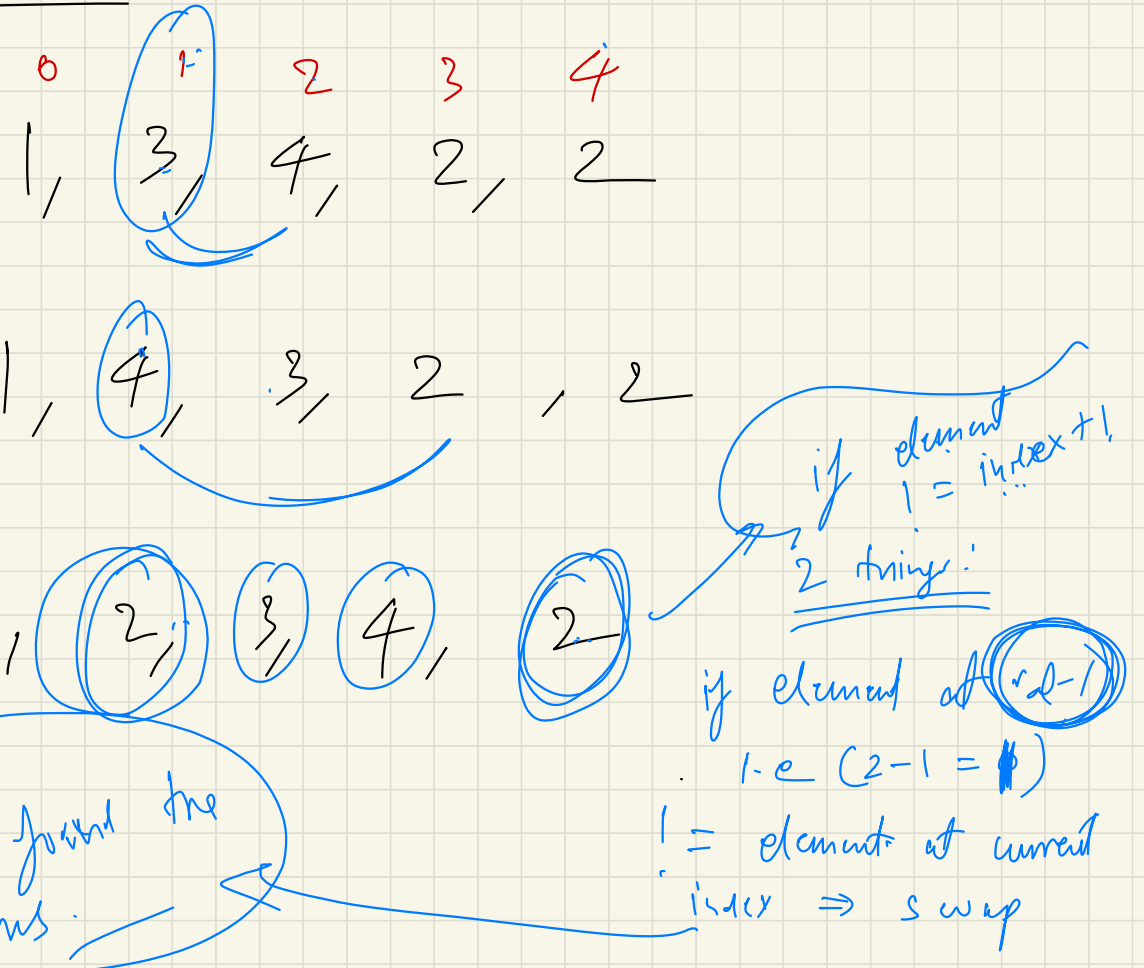


0 1 2 3 4 5 6 7

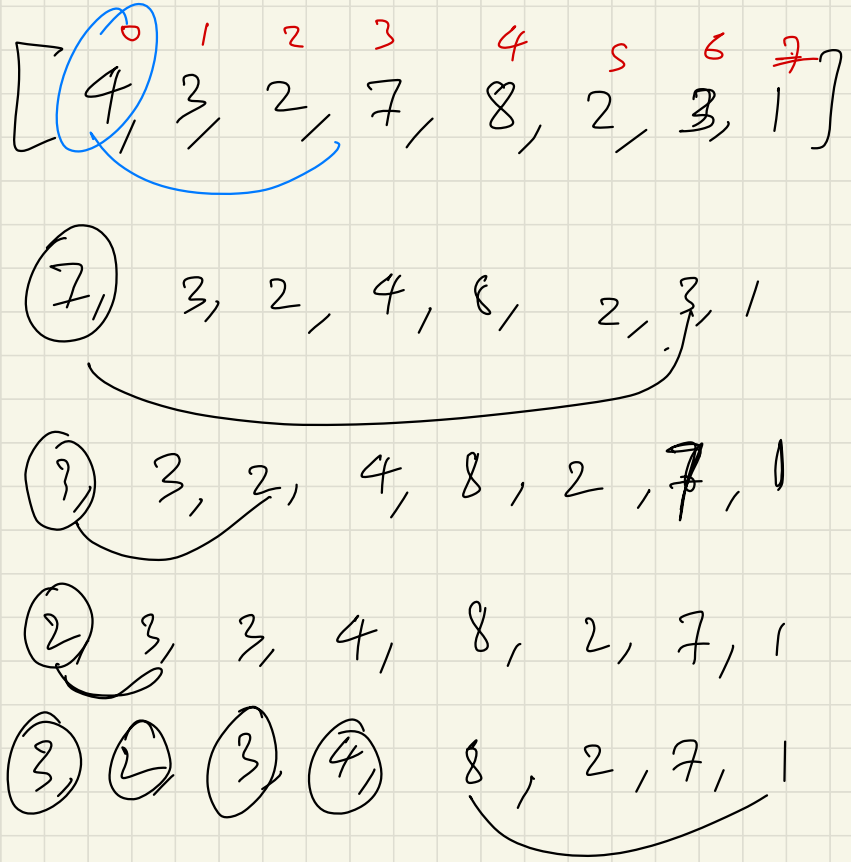
1, 2, 3, 4, 3, 2, 7, 8

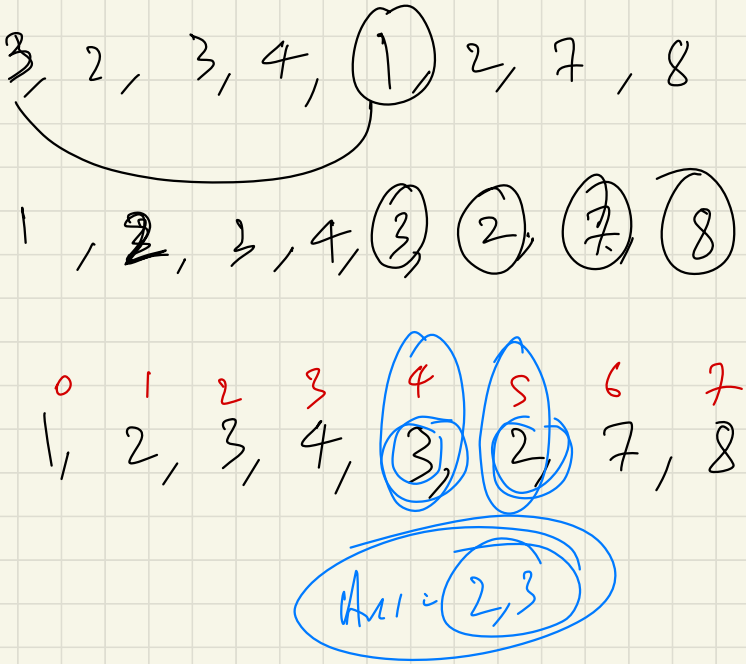
5, 6 Ans

Q3 Amazon / Microsoft



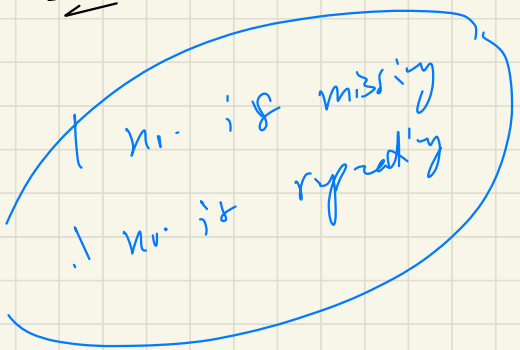
Q:

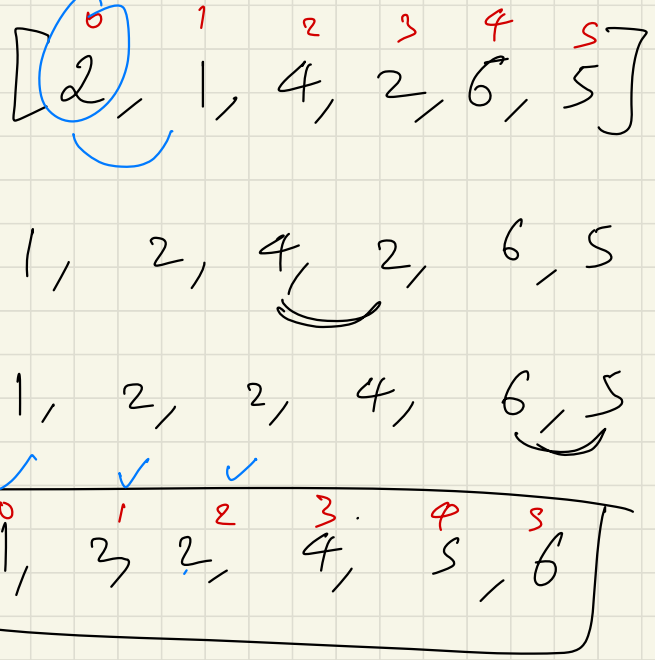



3, 2, 3, 4, 1, 2, 7, 8
1, 2, 3, 4, 3, 2, 7, 8
0 1 2 3 4 5 6 7
1, 2, 3, 4, 3, 2, 7, 8
Ans = 2,3

Q

N = 6 :



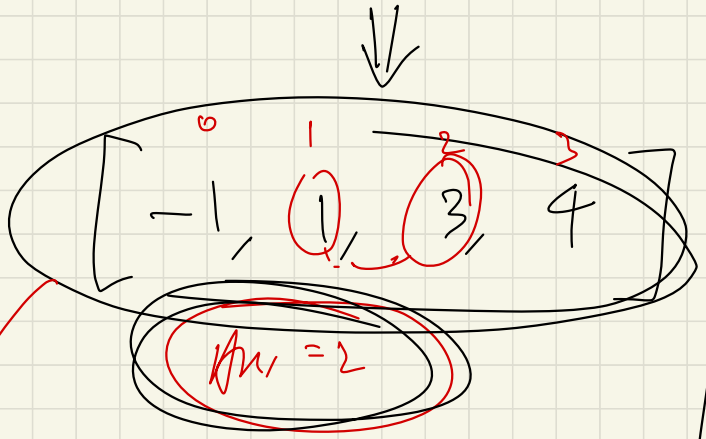


missing = index + 1

duplicate = no. at the missing index

Q Leetcode hard / Amazon:

3, 4, -1, 1



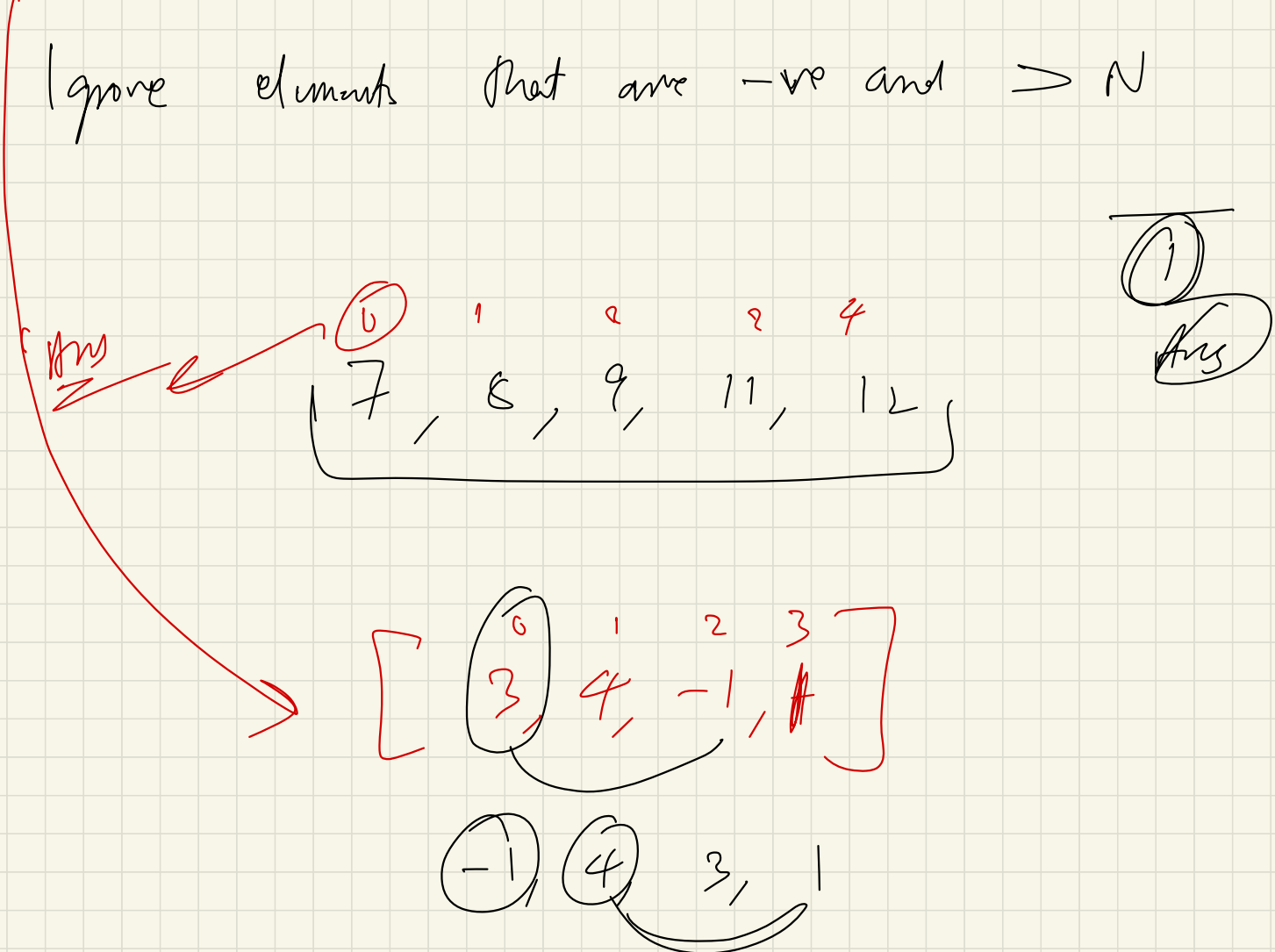
Note:

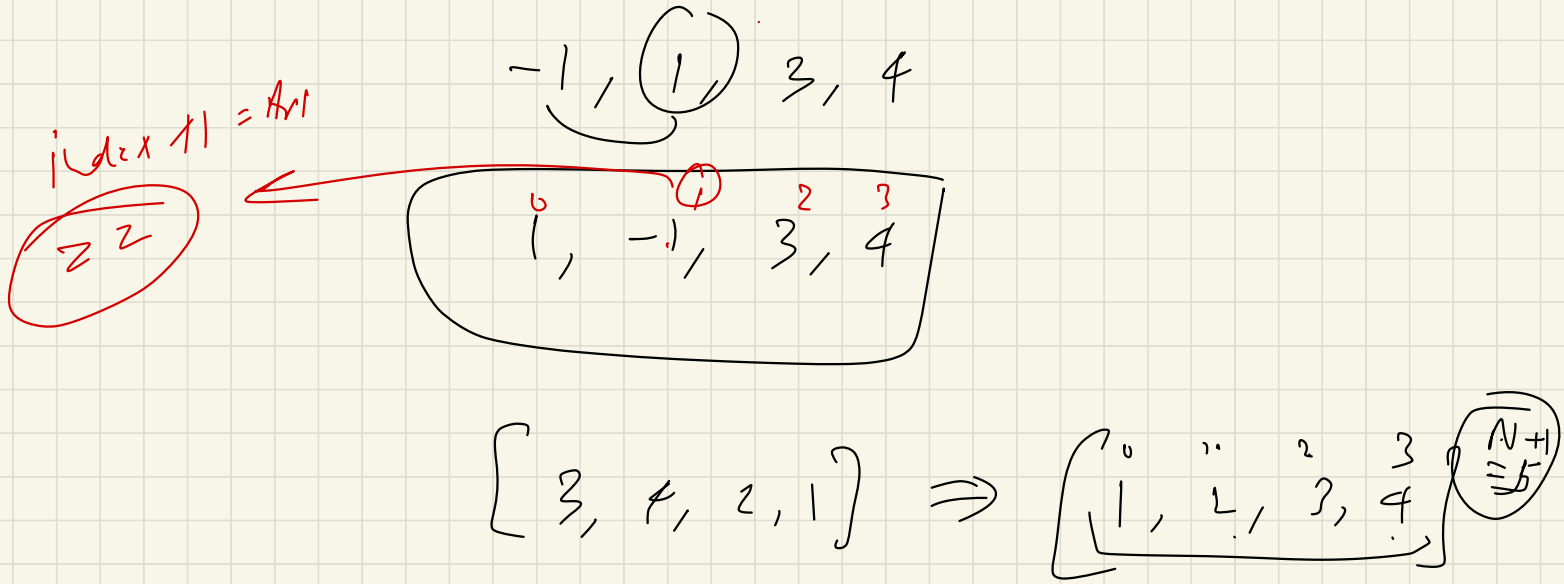
Ignore -ve as the ans are asked

* Start checking from 1.

[1, 2, 0] ⟶ [0, 1, 2] Ans = 3

Ignore elements that are -ve and > N




-1, 1, 3, 4
index 1 = Arr
2 2
0 1 2 3
1, -1, 3, 4
[3, 4, 2, 1]
0 1 2 3
1, 2, 3, 4
N+1