1720. Decode XORed Array

Sol

```
class Solution(object):
    def decode(self, encoded, first):
        list1=[]
        list1.append(first)   # First element of list
        element=first
        for i in range(0,len(encoded)):
            element=element ^encoded[i]
            list1.append(element)
        return list1
```

Time O(N)

Explanation:

operator	Description	Syntax
&	Bitwise AND	x & y
|	Bitwise OR	x | y
~	Bitwise NOT	~x
^	Bitwise XOR	x^y
>>	Bitwise Right shift	x>>
<<	" left "	x<<

Inverse of XOR is XOR itself.

encoded given [1, 2, 3]   arr = [1, x, y, z]

$\boxed{1 = arr[0] \wedge x = 1 \wedge x}$

2 = ~~arr~~ x ^ y

3 = y ^ z

see   1 = 1 ^ x

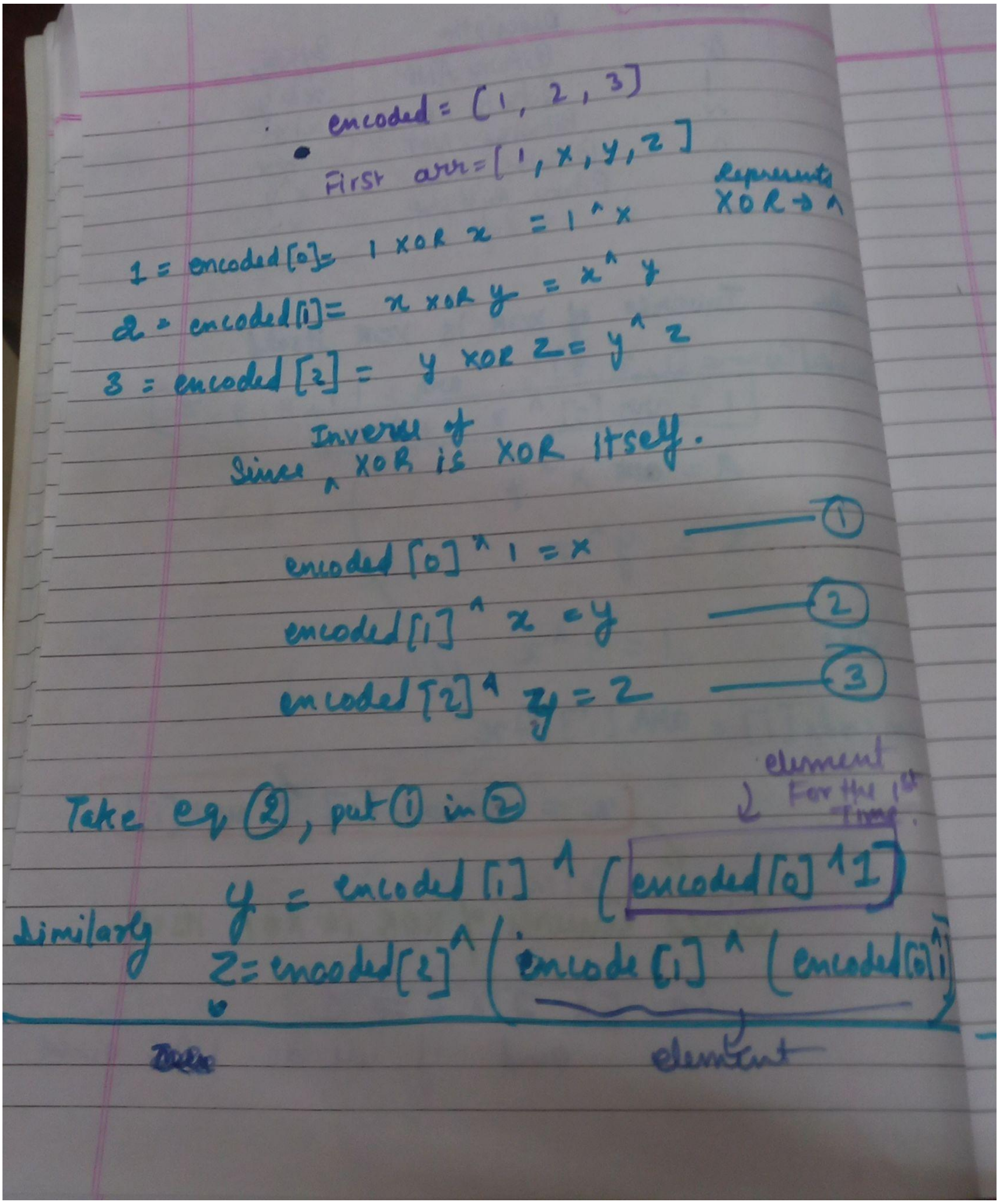
encode[i] = arr[i] ^ x

$\boxed{x = encode[i] \wedge arr[i]}$

Since inverse of XOR is XOR itself.

ie Ex 7 ^ 6 = 1

and if we do 1 ^ 6 gives 7



encoded = [1, 2, 3]

- First arr = [1, x, y, z]

Represents XOR → ^

1 = encoded[0] = 1 XOR x = 1 ^ x

2 = encoded[1] = x XOR y = x ^ y

3 = encoded[2] = y XOR z = y ^ z

Since Inverse of XOR is XOR itself.

encoded[0] ^ 1 = x ——— (1)

encoded[1] ^ x = y ——— (2)

encoded[2] ^ ~~z~~y = z ——— (3)

Take eq (2), put (1) in (2)

element For the 1st Time.

$$y = \text{encoded}[1] \wedge (\boxed{\text{encoded}[0] \wedge 1})$$

Similarly

$$z = \text{encoded}[2] \wedge \underbrace{(\text{encode}[1] \wedge (\text{encoded}[0] \wedge 1))}_{\text{element}}$$

[illegible]