Date: 22nd Jan 22

1. All Repeating Except one! → All numbers are present twice Except one.

Find that one number →

Array → 6 1 3 7 2 4 3 2 7 6 1

0 1 2 3 4 5 6 7 8 9 10

1. All Repeating Except One
2. All Repeating Except Two
3. One Repeating And One Missing
4. All Repeating Three Times Except One

Mon to Fri } 9-12 D.S.

Sat Sun } 9-12 S.D.

XOR

$a \wedge 1 = \sim a$

$a \wedge 0 = a$

A	B	A ∧ B
0	0	0
0	1	1
1	0	1
1	1	0

Num1 = x

Num2 = x.

num1 ∧ num2 = x ∧ x = 0

Associative

$x \wedge y \wedge z = x \wedge (y \wedge z)$

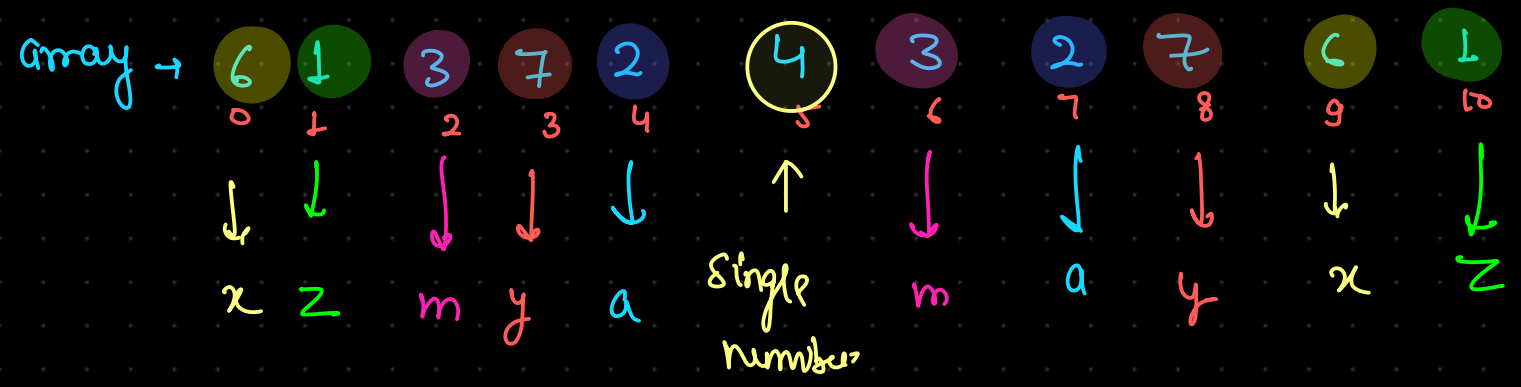
$= (x \wedge y) \wedge z$

Commutative.

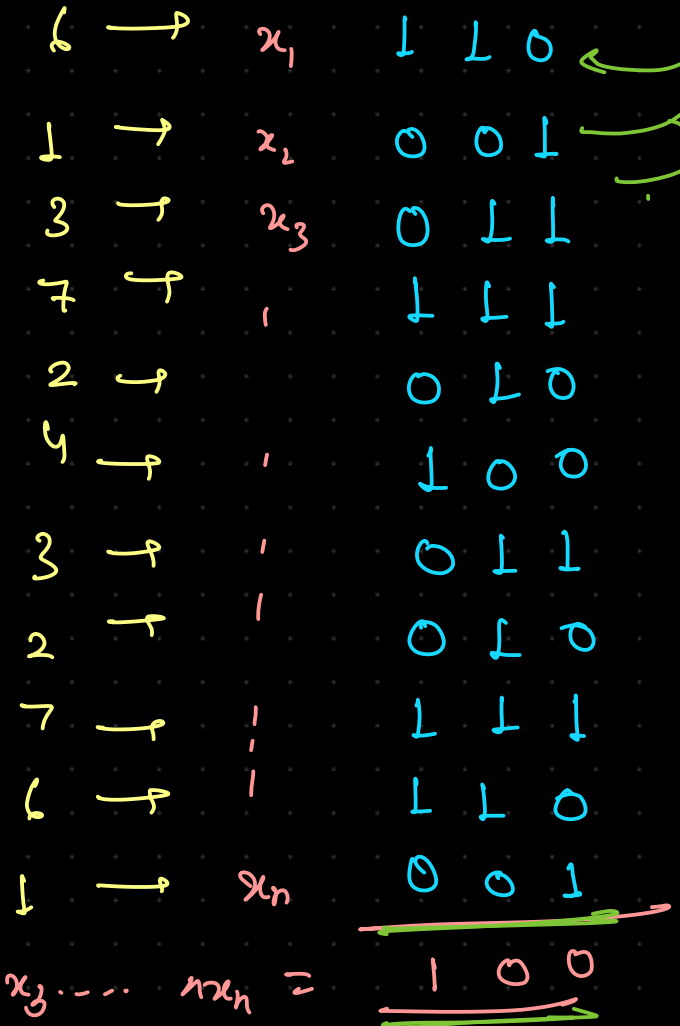
$x \wedge y = y \wedge x$

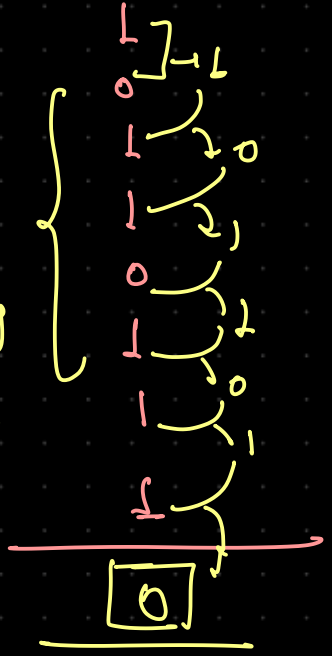
$x \wedge 0 = x$

↳ all bits are 0



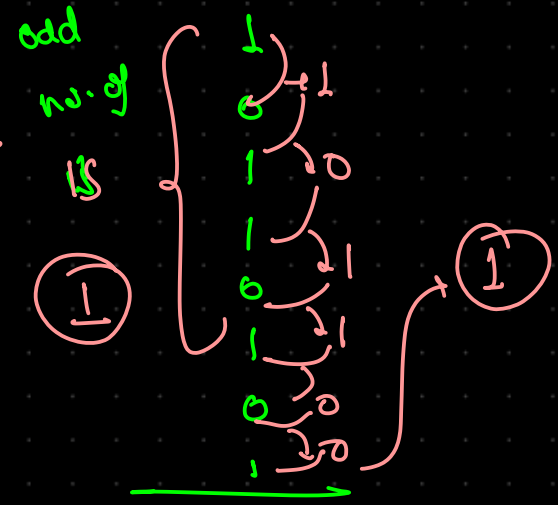
$x \wedge x = 0$ $y \wedge y = 0$ $m \wedge m = 0$ $z \wedge z = 0$ $a \wedge a = 0$





XOR → If no. of 1 is odd then Result is ⇒ 1

If no. of 1 is Even Result is 0.



All Repeating Except two Number:

array → 36, 50, 24, 56, 31, 24, 42, 50

36 →	100100 x_1 →	1 0 0 1 0 0
50 →	110010 x_2 →	1 1 0 0 1 0
24 →	011000 x_3 →	0 1 1 0 0 0
56 →	111000 →	1 1 1 0 0 0
36 →	100100 →	1 0 0 1 0 0
24 →	011000 →	0 1 1 0 0 0
42 →	101010 →	1 0 1 0 1 0
50 →	110010 x_n →	1 1 0 0 1 0
	$x_1 \wedge x_2 \wedge x_3 \dots \wedge x_n$ =	0 1 0 0 1 0 → 18

$x_1 \wedge x_2 \wedge \dots \wedge x_n$

0 1 0 0 1 0

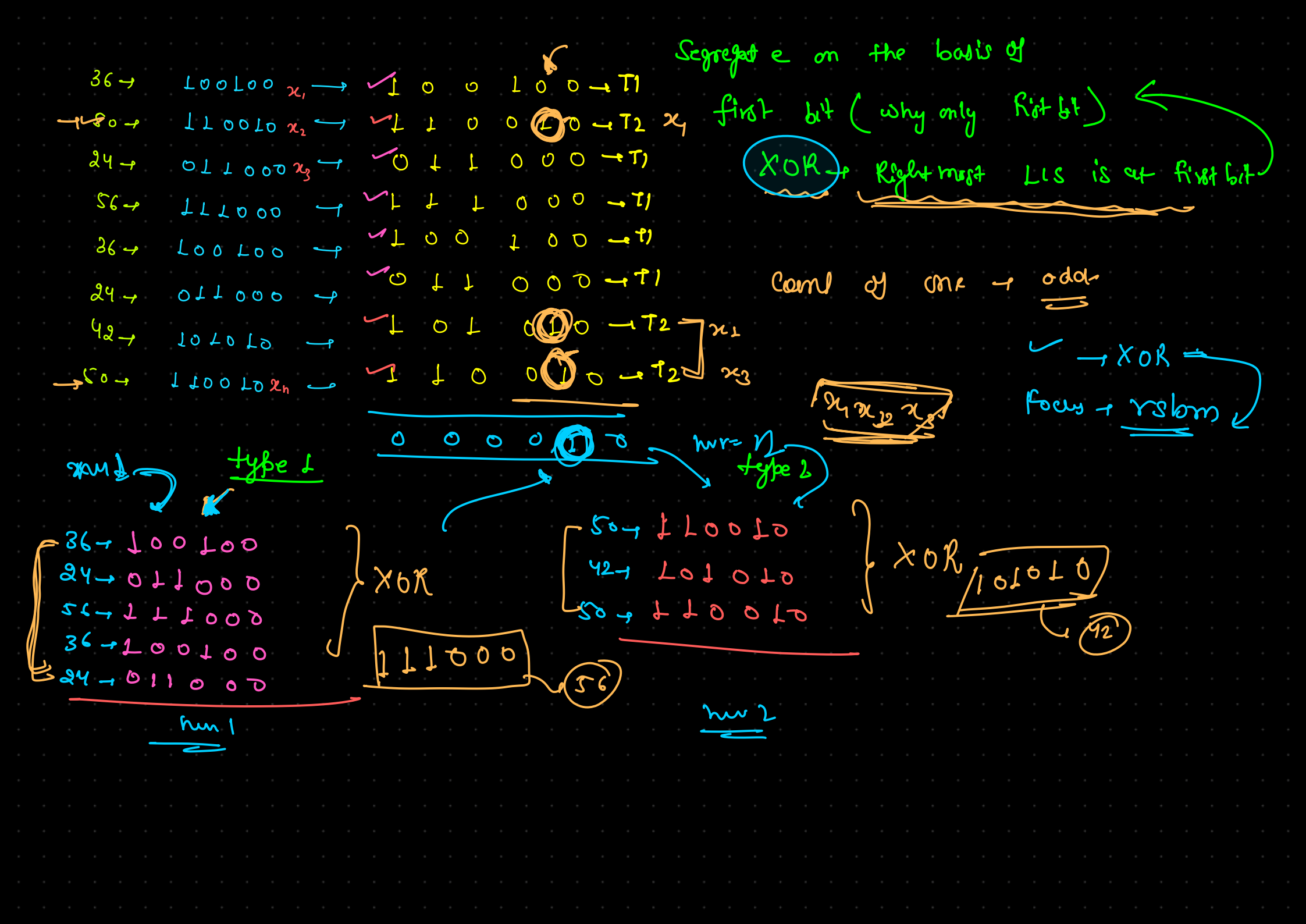
first on the right's of Zero

P1 (*) no. of 1's in second bit is Guaranted odd.

P2 (*) Total no. of element in array is even.

(*) from P1 and P2, there are two type of number in array, first which have 1's in second bit (first bit on the right's of zero), another is which have 0's in second bit.

right bit on the right's of number


Segregate on the basis of
first bit (why only first bit)
XOR → Rightmost LIS is of first bit
Cond of one → odd
→ XOR
focus → xslow
type 1
type 2
num 1
num 2
XOR
XOR
56
92

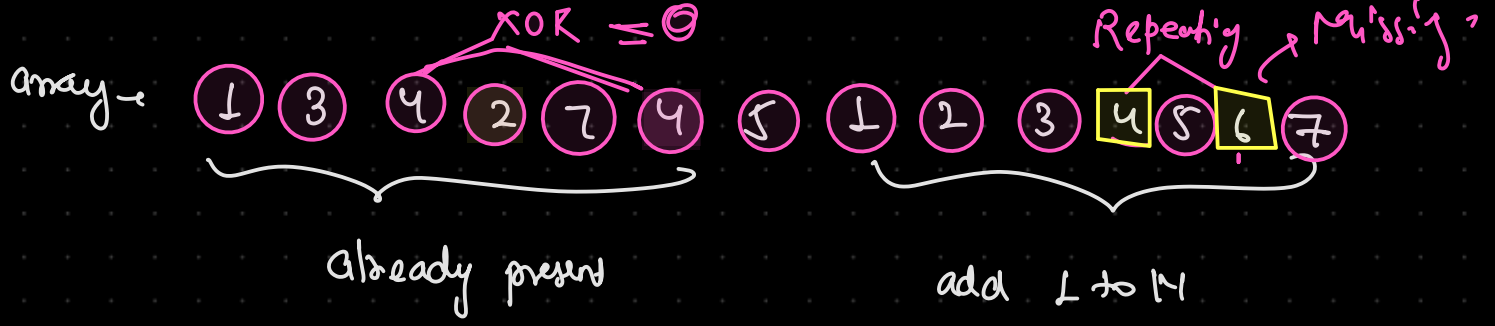
One Repeating and one Missing is →

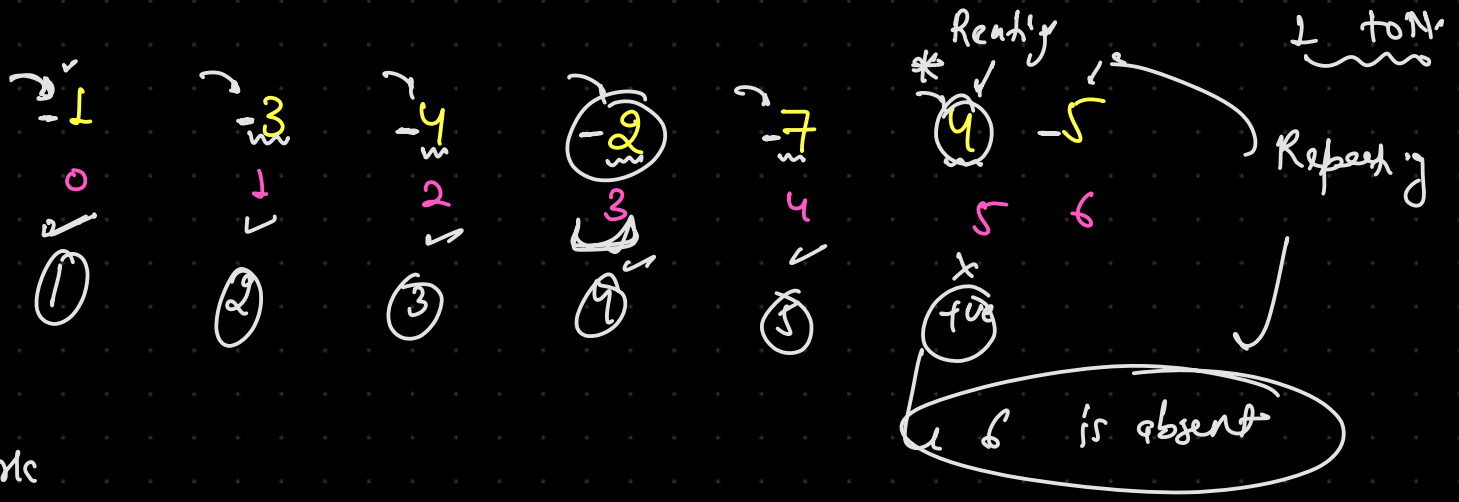
Tools → Conceptual building blocks.
- * bit Manipulation
- * Recursion and backtracking

1 to N → (1) All numbers are unique except one number.
(2) that Number is Repeating
(3) one number is Missing.

4 6 ← Missing.
↑
Repeating

Array → 1 3 4 2 7 4 5





travel and mark