645. Set Mismatch

Set s contains all integers $\in [1..n]$

Set becomes array, one element is replaced with a dupe of another

(Ex) $[1, 1] \rightarrow$ Dupe: 1 $[1, 2, 2, 4] \rightarrow$ Dupe: 2

　　　　　Missing: 2　　　　　　　　　　　Missing: 3

◎ Array A XOR $[1..n]$ = Missing XOR Duplicate

Equivalent to

$x \& -x$ = Rightmost Set Bit

1:1	1:2	2:	1 0
2:2	2:3	3:	1 1
4:1	3:1		0 1
	4:2		

XOR of missing + duplicate = all bits set are different

① Divide all #'s from A + $[1..n]$ into 2 groups:

- Bit set $\rightarrow$ 1, 2, 2, 4 $\rightarrow$ <u>1</u>

　　　　　　　　1, 2, 3, 4 $\rightarrow$ 1, 3   (Missing)

- Bit not set $\rightarrow$ 1, 2, 2, 4 $\rightarrow$ 2, 2, 4 (Dupe)

　　　　　　　　1, 2, 3, 4 $\rightarrow$ 2, 4

This seperates Array A XOR $[1..n]$ = Missing XOR Duplicate

　Group Set Bit XOR Group Unset Bit = Missing XOR Duplicate

　　　　XOR of Group Set Bit = One of Missing/Dupe

　　　XOR of Group Unset Bit = One of Missing/Dupe