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CLASS: KRG-(1B)

Question : f(X,Y) define the no. of different bits in the bit representation of X and Y. Given an array of N positive integers

Approach

for each bit position

① Count how many no. have that bit = 1
call it count①

② Remaining numbers having bit = 0
count = n - count1

Now
every pair where
• one no has that bit 1 and one with 0
contributes 1 to answer.

Number of such pairs :- count1 x count0

```
for (bit = 0 to bit < 32)
    count1 = 0

for (i = 0 to i < n)
    if (nums[i] & (1 << bit))
        count1++;

y
count0 = n - count1;
```

ans += count1 * count0;

}

return ans % 2;

Time complexity

$O(32 \times n) = O(n)$

Formula used :-

$$\sum_{n=0}^{31} (count1 \times count0)$$

for [1, 3, 5]

we need three bits

∴ for bit 1

count

1 → 0
3 → 1
5 → 0

count1 = 1
count0 = 2
total = 2

bit 0 (1 → 1, 3 → 0, 5 → 1) count1 = 2, count0 = 0, total = 0

for bit 2

1 → 0
3 → 0
5 → 1

count1 = 1
count0 = 2
total 2.

~~for bit 3~~

∴ 0 + 2 + 2 → 4 × 2 → 8 % 2

(for all pairs)

(i, j) ≠ (j, i)