

Contest Duration: 2025-09-27(Sat) 22:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250927T2100&p1=248>) - 2025-09-27(Sat) 23:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250927T2240&p1=248>) (local time) (100 minutes)

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G - Sum of Min of XOR

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Time Limit: 2.5 sec / Memory Limit: 1024 MiB

Score : 575 points

Problem Statement

You are given positive integers N , M and a sequence of non-negative integers $A = (A_1, A_2, \dots, A_N)$ of length N .

Find $\sum_{x=0}^{M-1} \min_{1 \leq i \leq N} (x \oplus A_i)$.

Here, $x \oplus A_i$ represents the bitwise XOR of x and A_i .

► What is bitwise XOR operation?

Constraints

- $1 \leq N \leq 2 \times 10^5$
- $1 \leq M \leq 10^9$
- $0 \leq A_i \leq 10^9$
- All input values are integers.

Input

The input is given from Standard Input in the following format:

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N	M		
A_1	A_2	\dots	A_N

Output

Output the answer.

Sample Input 1

Copy

2	4
1	2

Copy

Sample Output 1

Copy

2

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- When $x = 0$: $x \oplus A_1 = 1$, $x \oplus A_2 = 2$, so $\min_{1 \leq i \leq N} (x \oplus A_i) = 1$.
- When $x = 1$: $x \oplus A_1 = 0$, $x \oplus A_2 = 3$, so $\min_{1 \leq i \leq N} (x \oplus A_i) = 0$.
- When $x = 2$: $x \oplus A_1 = 3$, $x \oplus A_2 = 0$, so $\min_{1 \leq i \leq N} (x \oplus A_i) = 0$.
- When $x = 3$: $x \oplus A_1 = 2$, $x \oplus A_2 = 1$, so $\min_{1 \leq i \leq N} (x \oplus A_i) = 1$.

Therefore, output $1 + 0 + 0 + 1 = 2$.

Sample Input 2

Copy

6	5				
0	1	2	3	4	5

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Sample Output 2

Copy

0

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Sample Input 3

Copy

10	8762								
347	883	264	816	533	306	190	880	624	279

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Sample Output 3

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34912221

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