Ruqaiah and the Circular Naseej

Ruqaiah loves Artmatics, a science that study both math and art!

On Eid, Ruqaiah was gifted a beautiful circular Naseej (woven design) that has N holes, numbered from 0 to $N-1$, arranged evenly around a circle. Along with it, she received M colorful strings. Each string has a color C_i and connects two holes A_i and B_i directly.

When two strings intersect inside the circle, they form a beautiful pattern, and their interaction contributes to the overall Artmatic value. The Artmatic value of a Naseej is defined as the sum of $C_i \oplus C_j$ for all unordered pairs of strings (i, j) that intersect.

Ruqaiah wants to know the total Artmatic value of her Naseej. Can you help her calculate it?

The $\oplus$ *(exclusive OR)* operation compares two integers bit by bit and returns 1 where the bits differ, and 0 where they are the same. For example, $5 \oplus 3 = 6$ because $101 \oplus 011 = 110$ in binary.

Implementation details

For C++:

```
long long artmatic_value(int N, int M, std::vector<int> A,
    std::vector<int> B, std::vector<int> C);
```

For Python:

```
def artmatic_value(N: int, M: int,
    A: list[int], B: list[int], C: list[int]) -> int
```

- `N`: the number of holes in the circular Naseej.
- `M`: the number of strings.
- `A`: an array of size M, where A_i is one endpoint of the i-th string.
- `B`: an array of size M, where B_i is the other endpoint of the i-th string.
- `C`: an array of size M, where C_i is the color of the i-th string.
- This procedure returns a single integer: The Artmatic value --- the sum of $C_i \oplus C_j$ over all intersecting string pairs.

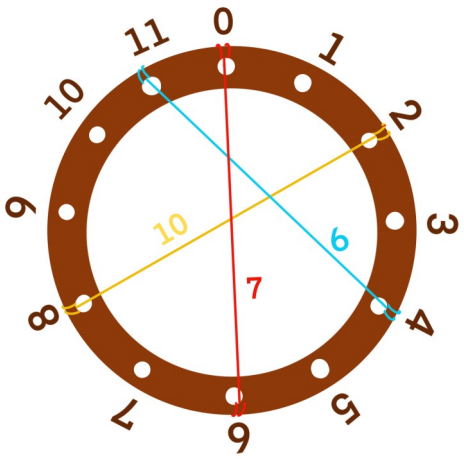
Examples

Example 1

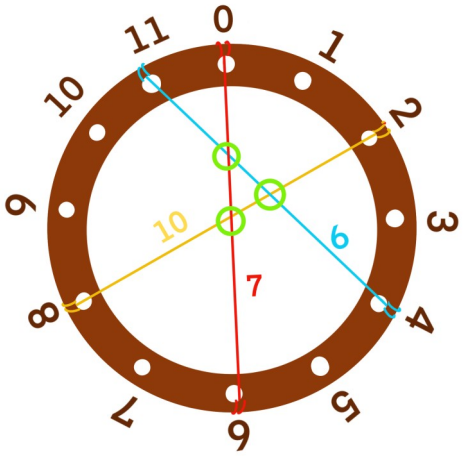
```
N = 12
M = 3
A = {0, 2, 4}
B = {6, 8, 11}
C = {7, 6, 10}
```

The answer is 26.

Here is the input:



In the photo below, we can see that all strings intersect, The Artmatic value = $(7 \oplus 10) + (6 \oplus 10) + (6 \oplus 7) = 13 + 12 + 1 = 26$.



Constraints

- $1 \leq N \leq 2 \cdot 10^5$
- $1 \leq M \leq 2 \cdot 10^5$
- $0 \leq A_i, B_i < N$

- $1 \leq C_i \leq 10^9$
- The input guarantees that no string connects the same hole to itself, and no two strings share the same endpoints

Subtasks

1. For any two pair of strings (i, j), it holds that $A_i < B_i < A_j < B_j$ (5 points).
2. $M = 2$ (5 points).
3. $M \leq 1000$ (20 points).
4. All $C_i \in 0, 1$ (20 points).
5. No Additional Constraints (50 points).

Sample grader

line 1: N M

lines 2 to $M + 1$: A_i B_i C_i