

F. Mahmoud and Ehab and yet another xor task

time limit per test: 1 second
memory limit per test: 512 megabytes

Ehab has an array a of n integers. He likes the [bitwise-xor operation](#) and he likes to bother Mahmoud so he came up with a problem. He gave Mahmoud q queries. In each of them, he gave Mahmoud 2 integers l and x , and asked him to find the number of subsequences of the first l elements of the array such that their bitwise-xor sum is x . Can you help Mahmoud answer the queries?

A subsequence can contain elements that are not neighboring.

Input

The first line contains integers n and q ($1 \leq n, q \leq 10^5$), the number of elements in the array and the number of queries.

The next line contains n integers a_1, a_2, \dots, a_n ($0 \leq a_i < 2^{20}$), the elements of the array.

The next q lines, each contains integers l and x ($1 \leq l \leq n, 0 \leq x < 2^{20}$), representing the queries.

Output

For each query, output its answer modulo $10^9 + 7$ in a newline.

Examples

input

Copy

5 5
0 1 2 3 4
4 3
2 0
3 7
5 7
5 8

output

Copy

4
2
0
4
0

input

Copy

3 2
1 1 1
3 1
2 0

output

Copy

4
2

Note

The bitwise-xor sum of the empty set is 0 and the bitwise-xor sum of a set containing one element is that element itself.

Codeforces Round 473 (Div. 2)

Finished

Practice



→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++20 13.2 (64 bit, win

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
284483419	Oct/05/2024 19:28	Accepted
284483115	Oct/05/2024 19:26	Accepted

→ Problem tags

bitmasks dp math matrices *2400

No tag edit access

→ Contest materials

Announcement (en)

Tutorial (en)