# F. Mahmoud and Ehab and yet another xor task

time limit per test: 1 second
memory limit per test: 512 megabytes
input: standard input
output: standard output

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 $q$ $(1 \le n, q \le 10^5)$, the number of elements in the array and the number of queries.

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

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

## Output

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

### Examples

| input |
| --- |
| 5 5<br>0 1 2 3 4<br>4 3<br>2 0<br>3 7<br>5 7<br>5 8 |

| output |
| --- |
| 4<br>2<br>0<br>4<br>0 |

| input |
| --- |
| 3 2<br>1 1 1<br>3 1<br>2 0 |

| output |
| --- |
| 4<br>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.