# E. Inna and Binary Logic

time limit per test: 3 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Inna is fed up with jokes about female logic. So she started using binary logic instead.

Inna has an array of $n$ elements $a_1[1], a_1[2], ..., a_1[n]$. Girl likes to train in her binary logic, so she does an exercise consisting of $n$ stages: on the first stage Inna writes out all numbers from array $a_1$, on the $i$-th $(i \geq 2)$ stage girl writes all elements of array $a_i$, which consists of $n - i + 1$ integers; the $k$-th integer of array $a_i$ is defined as follows: $a_i[k] = a_{i-1}[k]\ AND\ a_{i-1}[k+1]$. Here AND is bit-wise binary logical operation.

Dima decided to check Inna's skill. He asks Inna to change array, perform the exercise and say the sum of all elements she wrote out during the current exercise.

Help Inna to answer the questions!

## Input

The first line contains two integers $n$ and $m$ $(1 \leq n, m \leq 10^5)$ — size of array $a_1$ and number of Dima's questions. Next line contains $n$ integers $a_1[1], a_1[2], ..., a_1[n]$ $(0 \leq a_i \leq 10^5)$ — initial array elements.

Each of next $m$ lines contains two integers — Dima's question description. Each question consists of two integers $p_i, v_i$ $(1 \leq p_i \leq n; 0 \leq v_i \leq 10^5)$. For this question Inna should make $a_1[p_i]$ equals $v_i$, and then perform the exercise. Please, note that changes are saved from question to question.

## Output

For each question print Inna's answer on a single line.

### Examples

| input |
| --- |
| 3 4<br>1 1 1<br>1 1<br>2 2<br>3 2<br>1 2 |

| output |
| --- |
| 6<br>4<br>7<br>12 |