Hamming Distances

Time limit: *5000 ms*
Memory limit: *256 MB*

You are given an array A of N non-negative integers and integer M. All elements in A are less than 2^M.

For each i from 1 to N and x from 0 to M find the number of indices j such that $1 \leq j < i$ and Hamming distance between binary representations of numbers A_i and A_j is equal to x.

Standard input

The first line contains two integers N and M.

The second line contains N integers representing the elements of A.

Standard output

For each i from 1 to N print a separate line containing $M + 1$ numbers: answer for $x = 0, 1 \ldots M$.

Constraints and notes

- $1 \leq N \leq 2 \cdot 10^5$
- $1 \leq M \leq 16$
- $0 \leq A_i < 2^M$

Input	Output
4 2 0 1 2 3	0 0 0 0 1 0 0 1 1 0 2 1
4 2 0 1 1 0	0 0 0 0 1 0 1 1 0 1 2 0