

Subcubes

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 256 megabytes

Vasya has an array of 2^n elements indexed by binary n -digit strings. Initially the array is filled with zeros. Then he did the following operation m times: he chose a template (which is a string of zeros, ones and question marks) and assigned the same value to all elements which indices satisfied the template. Now he wants to find the sum of all elements in the array. Help him.

Input

The first line of input contains two integers n and m ($1 \leq n, m \leq 32$).

Each of the next m lines contain a string s and an integer q — the template and the value for the current operation ($0 \leq q \leq 10^9$).

Output

Print the answer to the problem.

Examples

standard input	standard output
3 2 ?0? 2 1?? 3	16