Contour Multiplication

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

There is a sequence of length 2^N given by $A_0, A_1, \ldots, A_{2^N-1}$. Initially, $A_0 = A_1 = \cdots = A_{2^N-1} = 1$.

You will perform K operations. In the i-th operation, for each j (where $0 \leq j < 2^N$) such that $\mathrm{popcount}(j \oplus C_i) = D_i$, replace A_j with $(A_j \times X_i) \bmod M$.

Determine the values of $A_0, A_1, \ldots, A_{2^N-1}$ after performing all the operations.

Input

The input is given from Standard Input in the following format:

$$
\begin{array}{l}
N\ M\ K \\
C_1\ D_1\ X_1 \\
C_2\ D_2\ X_2 \\
\vdots \\
C_M\ D_M\ X_M
\end{array}
$$

- All input values are integers.
- $1 \leq N \leq 18$
- $2 \leq M \leq 10^9$
- $1 \leq K \leq 5 \times 10^5$
- $0 \leq C_i < 2^N$
- $1 \leq D_i \leq N$
- $2 \leq X_i \leq 10^9$

Output

Output the values of $A_0, A_1, \ldots, A_{2^N-1}$ in a single line, separated by spaces, after performing all the operations.

Examples

standard input	standard output
3 100 2 0 2 4 3 0 25	1 1 1 0 1 4 4 1
4 998244353 7 0 2 4 3 0 25 9 4 37 4 1 16 6 3 8 1 4 68 13 3 97	1552 8 1 9700 1 64 229696 1 8 4 388 8 64 8 68 1