

## 题目 F. Mod

To train your ability to calculate huge numerical values, *Irelia* requires you to perform  $n$  operations. Let  $a_i$  denote the result produced by the  $i$ -th operation.

Each operation is one of the following four forms:

- =  $v$ : assign  $a_i = v$ .
- +  $j$   $k$ : assign  $a_i = a_j + a_k$ .
- \*  $j$   $k$ : assign  $a_i = a_j \times a_k$ .
- ^  $j$   $k$ : assign  $a_i = a_j^{a_k}$ .

After each operation, output the value of  $a_i$  modulo  $m$ .

**Please note that** the modulo operation is only applied to the answer, and the actual value of  $a_i$  may be huge.

### 输入格式

There is only one test case in each test file.

The first line contains two integers  $n$  and  $m$  ( $1 \leq n \leq 201307$ ,  $2 \leq m \leq 10^9$ ), representing the number of operations and the modulus.

In the next  $n$  lines, each contains an operation. For the  $i$ -th line, it starts with a character  $op$  ( $op \in \{=, +, *, ^\}$ ). If  $op$  is "=", it is followed by an integer  $v$  ( $1 \leq v \leq 10^9$ ). Otherwise,  $op$  is followed by two integers  $j$  and  $k$  ( $1 \leq j, k < i$ ).

### 输出格式

After each operation, output the value of  $a_i$  modulo  $m$ .

### 样例

standard input	standard output
4 201307	1
= 1	2
+ 1 1	4
* 2 2	256
^ 3 3	
6 8	5
= 5	2
+ 1 1	0
^ 2 1	0
^ 2 2	0
= 8	1
= 9	