Equations

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

There is an array A of n positive integers, and m equations of the form **A[x]** ***op*** **A[y]** $=$ **z**, where x and y represent the positions in A, $op \in \{+, -, *\}$ and z is a given integer which may differ for each equation.

However, as all the numbers in A are missing, you have to find out that array and print them out.

If there are multiple arrays that do not break any equation, you just have to print out the number of valid arrays mod $(10^9 + 7)$.

Input

The first line of the input file contains an integer T $(1 \leq T \leq 25)$, describing the number of test cases.

For each test case, the first line contains two integers n, m $(1 \leq n \leq 10^4, 1 \leq m \leq 10^6)$ described above, followed by m lines.

Each of the following m lines contains one string of the form **x*P*y=z** without any space (x, y, z are numbers and P is a character, $1 \leq x, y \leq n$, $P \in \{+, -, *\}$, $0 \leq z \leq 10^6$) representing one equation **A[x]** ***P*** **A[y]** $=$ **z** described above.

There are no more than 5 test cases that $m \geq 10^5$.

You may need to read the sample inputs for the detail.

Output

You should output exactly T lines.

For each test case, print **Case** x**:** d (x represents the order of test case, and d represents the number of solution mod $(10^9 + 7)$, using $d = -1$ to represent infinite) first.

Then if the array is unique, output n numbers after d describing that array separated by exactly one space.

You should notice that there is only one line for one case.

Example

standard input	standard output
4 3 2 1+2=3 1*3=9 4 3 1+2=10 2+3=3 1+4=9 2 2 1+2=3 1-2=3 3 2 1+2=4 1*3=9	Case 1: 1 1 2 9 Case 2: 1 8 2 1 1 Case 3: 0 Case 4: 2

Note

- Sample 1:

  Equations:

  - $A[1] + A[2] = 3$
  - $A[1] \times A[3] = 9$

  There is only one solution: $A[1] = 1, A[2] = 2, A[3] = 9$.

- Sample 3:

  Equations:

  - $A[1] + A[2] = 3$
  - $A[1] - A[2] = 3$

  There is no solution for array A.

- Sample 4:

  Equations:

  - $A[1] + A[2] = 4$
  - $A[1] \times A[3] = 9$

  There is two solutions:$(A[1] = 1, A[2] = 3, A[3] = 9)$ and $(A[1] = 3, A[2] = 1, A[3] = 3)$.