Problem B

Some of the people living in your town own a cat, a dog, or a horse, but nobody owns two animals (there might be people who do not own any animal). You are given a series of clues of form "The person A owns/does not own a dog" and "If a person A owns a cat, a person B owns a dog, ..., then the person C owns/does not own a horse". Determine whether an assignment of animals to people that is consistent with these clues exists.

Input and output

The input consists of several scenarios. The first line of each scenario contains two integers n and m, where $n, m \leq 10^6$, giving the number of people and the number of clues. Each of the m following lines describes a clue; each of them is of form $p_1\ a_1\ \ldots p_t\ a_t\ h\ p\ a$, where $0 \leq t \leq 10$, $p_i, p \in \{1, \ldots, n\}$ are person numbers, $a_i, a \in \{\texttt{C}, \texttt{D}, \texttt{H}\}$ identifies an animal, and $h \in \{0, 1\}$. The meaning of this clue is "If p_1 owns a_1, ..., p_t owns a_t, then p owns (if $h = 1$) / does not own (if $h = 0$) a." If $t = 0$, the conditional part of this clue is omitted. You can assume p_1, ..., p_t and p are pairwise different.

For each scenario, output a line containing 1 if an assignment of animals to people consistent with the clues exists, 0 otherwise.

Example

Input:

```
3 4
1 1 C
1 C 0 2 H
1 C 1 3 D
1 C 3 D 1 2 D
3 4
1 1 C
1 C 0 2 H
1 C 1 3 D
1 C 3 D 1 2 H
```

Output:

```
1
0
```