Problem C
Nightmare Brother

Your brother has a string S of length M with indices from 1 to M. You want to know exactly what string S is. To help you, he gives you N hints that might help you to figure out S. Hint i is represented by an integer X_i and a string T_i, indicating that the string T_i appears as a substring of S starting from index X_i of S. All the hints are unique, that is, there are no hints i and j such that $i \neq j$ while $X_i = X_j$ and $T_i = T_j$.

However, your brother is known to be mischievous and tells you that there might be **at most** one false hint among all N hints he has given, but he didn't tell you which.

A string S is a possible solution if and only if there exists a set of at least $N - 1$ hints (that are assumed to be true) where string S is the **only** string consistent with all of the hints in the set.

You would like to find a possible solution. If there is no possible solution, you should output `-1`. If there is more than one possible solution, you should output `-2`.

Input

Input begins with two integers N M ($1 \leq N \leq 100$; $1 \leq M \leq 100$) representing the number of hints and the length of the scary string, respectively. Each of the next N lines contains an integer and a string X_i T_i ($1 \leq X_i, |T_i|$; $X_i + |T_i| - 1 \leq M$) representing hint i. The string T_i consists of only uppercase characters. It is guaranteed that there are no hints i and j such that $i \neq j$ while $X_i = X_j$ and $T_i = T_j$.

Output

If there is exactly one possible solution as explained in the problem description above, then output the string S in a single line. If there is no possible solution, then output `-1` in a single line. If there is more than one possible solution, then output `-2` in a single line.

Sample Input #1

```
3 11
5 JAKARTA
1 ICPC
3 BINUS
```

Sample Output #1

```
ICPCJAKARTA
```

Explanation for the sample input/output #1

The only possible S is `ICPCJAKARTA` assuming hint 3 is false. If the false hint is assumed to be one of the others, then there is no string consistent with the other two hints. Similarly when no hint is assumed false.

Sample Input #2

```
3 9
6 EX
8 AM
1 FINAL
```

Sample Output #2

```
FINALEXAM
```

Explanation for the sample input/output #2

The only possible S is `FINALEXAM` assuming no hint is false. If any of the hints are assumed to be false, then there is more than one string consistent with the rest of the hints.

Sample Input #3

```
3 8
1 GRAD
5 UAL
6 ATE
```

Sample Output #3

```
-1
```

Explanation for the sample input/output #3

There is no possible solution.

- Assuming no hint is false: There is no string consistent with all the hints.
- Assuming hint 1 is false: There is no string consistent with the other two hints.
- Assuming hint 2 is false or hint 3 is false: There is more than one string consistent with the other two hints.

Sample Input #4

```
3 5
1 BIN
4 US
4 OM
```

Sample Output #4

```
-2
```

Explanation for the sample input/output #4

There are 2 possible solutions: `BINOM` (assuming hint 2 is false) and `BINUS` (assuming hint 3 is false).