

Problem Q

Quall[e]? Quale?

If you speak German, you should know the first word in the title. If you speak Italian, you should know the second one :)

Why I use these two words? Because I don't have better choices :(I want my problems' titles to start with A, B, C, etc. This is problem Q so it has to begin with the letter Q.

Sometimes it's difficult. Each problem title has to tell people something about the problem itself, so it can't be arbitrary. If I can't find a suitable title in English, I have to try other languages like Chinese (for example, see the last three problems in Rujia Liu's Present 5 ^_^).

Here is an example.

No	English	French	Chinese
1	A	B	C
2	D	–	B
3	C	B	–
4	E	–	E
5	C	A	–

The title of problem 1 in English starts with A, and the French version starts with B. The Chinese title of problem 1 starts with C. A hyphen means "N/A", so problem 2 doesn't have a French version.

One possible combination is (note that each problem should be used exactly once):

Problem A	Problem 1 in English
Problem B	Problem 3 in French
Problem C	Problem 5 in English
Problem D	Problem 2 in English
Problem E	Problem 4 in Chinese

Could you tell me all the possible language combinations? For each combination, all the languages in it must be used (i.e. You can't say the combination is {English, Chinese} if none of the problems actually used the Chinese version).

Input

The first line contains the number of test cases T ($T \leq 500$). Each test case begins with two integers n, m ($3 \leq n \leq 26$, $1 \leq m \leq 5$), the number of problems and the number of languages. The next n lines contains the table containing the first m upper-case letters or '–'. The j -th column in the i -th row in the table is the first letter of the title in the j -th language. A special character '–' means that version does not exist.

Output

For each test case, print all possible combinations in a single line. Each combination is a string of languages used (languages are labeled 1 to m) in increasing order. Shorter combinations should come first. Combinations of the same length should be sorted in increasing order. If the problemset cannot be made, print -1.

Sample Input

```
4
5 3
ABC
D-B
CB-
E-E
CA-
3 2
AB
C-
-C
4 4
-A--
BB--
--CC
--D-
3 4
AAAA
BBBB
CCCC
```

Output for the Sample Input

```
Case 1: 12 123
Case 2: -1
Case 3: 23 123 234 1234
Case 4: 1 2 3 4 12 13 14 23 24 34 123 124 134 234
```

Notes

The judge input for this problem is randomly generated, so don't worry if your algorithm might fail on some deliberately hand-crafted test cases.

Rujia Liu's Present 6: Happy 30th Birthday to Myself
Special thanks: Yubin Wang