

Problem E. Strange Keyboard

Input file: **standard input**
Output file: **standard output**
Time limit: 1.5 seconds
Memory limit: 512 megabytes

You have a strange keyboard with N regular keys and one backspace key. You start with an empty string. At any instant, you can press any of the $N + 1$ keys. Pressing the i -th regular key appends the string S_i to the current string, and pressing the backspace key does nothing if the current string has length $< K$, and otherwise deletes the last K characters of the current string.

You want to form a string T . Is it possible to do so? If it is possible, what is the minimum number of key-presses required?

Input

The first line contains Q , the number of test cases. Then the test cases follow.

The first line of each test case contains N and K , the number of regular keys, and the number of characters deleted by the backspace key.

i -th of the next N lines contains S_i , the string corresponding to the i -th regular key.

The last line of the testcase contains the string T to be formed.

Constraints

- $1 \leq Q \leq 100$
- $1 \leq N \leq 10^6$
- $1 \leq K \leq 5000$
- The sum of the lengths of all the strings S_i over all the testcases doesn't exceed 10^6
- The sum of the length of T over all the testcases doesn't exceed 5000.
- Strings S_i and T contain English lowercase letters only.

Output

For each testcase:

If it is impossible to form the string T , print -1 on a new line.

Else, print the minimum number of key presses required to form the string T , on a new line.

Example

standard input	standard output
2	3
2 3	-1
defgh	
abc	
abcde	
1 1	
a	
b	



Note

In the first testcase, we can do the following:

1. Press the second regular key. After this, we get **abc**.
2. Press the first regular key. We now have **abcdefgh**.
3. Press the backspace key. We now have **abcde** as required.

In the second testcase, it is impossible to form the required string.