[C1] Cult of Wah! (150 pts)

Time Limit: 1s
Memory Limit: 512MB

Problem Description

Seeker Blanc has done it once again! On orders from the King, she has infiltrated the notorious Order of the Crooked Tentacle, known as the Tentacult within the court. Her goal was to ascertain whether they are involved with NELOC or not. While infiltrating the cult, she was able to retrieve a document from their headquarters, in large part thanks to his footsteps being drowned out by the cultists repeated chants of "Wah!"

Figure 1: Artistic rendition of one of the leaders of The Cult of Wah!

Sadly however, the document contains a message S that is encrypted. Luckily one of Blanc's associates is an expert in encrypting messages, and she determines that the cult most likely uses Caesar's cipher for their messages. This cipher works by substituting each letter with in the message with the letter X steps away from it in the alphabet. So for example, with $X = 3$, A becomes D, B becomes E, and so forth. In case the shift takes you beyond the letter Z it will wrap around back to A so at $X = 3$, Y becomes B and Z becomes C.

In order to decode this message, Blanc must identify what value of X was used by the cult. Luckily, she has a list of N words which she is sure will show up in the decoded message. (This list may or may not include the cultists creepy high-pitched chanting of "Wah!"). We denote each word i in this list as w_i. She must use this information to identify the smallest possible value of X such that the decoded message contains all the words from the list, if it can be found.

Input Specification

Input will begin with an integer T denoting the number of test cases. T test cases follow.

Each test case begins with an integer N denoting the list of words guaranteed to be in the decoded message. The following line contains the N words separated by spaces. This is then followed by a single line containing the encrypted message.

Output Specification

For each test case, output a line containing the smallest value of X (from 1 to 26) such that all known words are present in the decoded message. In the case that no such X can be found, output -1.

Constraints

$1 \leq T \leq 10$
$1 \leq N \leq 20$
Length of w_i is at least 1 and at most 50
Length S is at least 1 and at most 1500
w_i consists of only lowercase English letters
S consists of only lowercase English letters and spaces

Sample Input

```
2
2
wah umu
bhv zdk xpx
1
aaa
bbb ccc ddd
```

Sample Output

```
3
1
```

Explanation

For the first test case, using $X = 3$ the decoded message is "yes wah umu" which contains all the words guaranteed to be in the decoded message. As for the second test case, it is possible to decode each word in the message as "aaa" using shifts of 1, 2, and 3 respectively. Since we only want the smallest possible value of X, the answer is 1.