

Problem F. Pattern Matching

Input file: *standard input*
Output file: *standard output*
Time limit: 2 seconds
Memory limit: 256 mebibytes

Rikka has n sets S_1, S_2, \dots, S_n consisting of lowercase English letters. A pattern $p_1 p_2 \dots p_m$ of length m is said to match the sets if there exists an index i such that all the following conditions hold: $p_1 \in S_i$, $p_2 \in S_{i+1}$, \dots , $p_m \in S_{i+m-1}$.

Initially, all sets are empty. Rikka has prepared some operations to make with the sets. Each operation has the form “add character c into set i ”. Each round, Rikka will choose a random operation with equal probability and apply it. A single operation may be chosen and applied more than once.

Find the expected number of rounds until the pattern $p_1 p_2 \dots p_m$ matches the sets.

Input

The first line contains an integer T which denotes the number of test cases ($1 \leq T \leq 5$).

For each test case, the first line contains two integers n and m ($1 \leq m \leq n \leq 30$).

The i -th of the following n lines contains a string t_i consisting of lowercase English letters. Each letter $t_{i,j}$ denotes an operation which adds this letter into set i . Each of these strings is non-empty and contains every possible letter at most once.

The last line of each test case contains the pattern: a string $p_1 p_2 \dots p_m$ consisting of lowercase English letters.

Output

For each test case, if the pattern will never match the sets, output “-1”. Otherwise, output the integer $(p \cdot q^{-1}) \bmod 998\,244\,353$, where $\frac{p}{q}$ is the expected number of rounds.

Examples

standard input	standard output
1 1 1 ab a	2
1 3 2 acb cb ab cb	915057330

Note

For the first sample test case, the expectation is $\frac{1}{2} \cdot 1 + \frac{1}{2^2} \cdot 2 + \dots = 2$.