

C. Genetic engineering

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

"Multidimensional spaces are completely out of style these days, unlike genetics problems" — thought physicist Woll and changed his subject of study to bioinformatics. Analysing results of sequencing he faced the following problem concerning DNA sequences. We will further think of a DNA sequence as an arbitrary string of uppercase letters "A", "C", "G" and "T" (of course, this is a simplified interpretation).

Let w be a long DNA sequence and s_1, s_2, \dots, s_m — collection of short DNA sequences. Let us say that the collection *filters* w iff w can be covered with the sequences from the collection. Certainly, substrings corresponding to the different positions of the string may intersect or even cover each other. More formally: denote by $|w|$ the length of w , let symbols of w be numbered from 1 to $|w|$. Then for each position i in w there exist pair of indices l, r ($1 \leq l \leq i \leq r \leq |w|$) such that the substring $w[l \dots r]$ equals one of the elements s_1, s_2, \dots, s_m of the collection.

Woll wants to calculate the number of DNA sequences of a given length filtered by a given collection, but he doesn't know how to deal with it. Help him! Your task is to find the number of different DNA sequences of length n filtered by the collection $\{s_i\}$.

Answer may appear very large, so output it modulo 1000000009.

Input

First line contains two integer numbers n and m ($1 \leq n \leq 1000$, $1 \leq m \leq 10$) — the length of the string and the number of sequences in the collection correspondently.

Next m lines contain the collection sequences s_i , one per line. Each s_i is a nonempty string of length not greater than 10. All the strings consist of uppercase letters "A", "C", "G", "T". The collection may contain identical strings.

Output

Output should contain a single integer — the number of strings filtered by the collection modulo 1000000009 ($10^9 + 9$).

Examples

input
2 1 A
output
1

input
6 2 CAT TACT
output
2

Note

In the first sample, a string has to be filtered by "A". Clearly, there is only one such string: "AA".

In the second sample, there exist exactly two different strings satisfying the condition (see the pictures below).