# 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  $s_1, s_2, ..., s_m$  — 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 ( $1 \le l \le i \le r \le |w|$ ) such that the substring  $w[l \dots r]$  equals one of the elements  $s_1, s_2, ..., s_m$  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 100000009.

#### Input

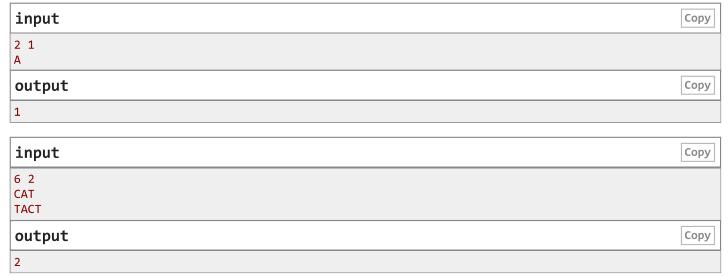
First line contains two integer numbers n and m ( $1 \le n \le 1000$ ,  $1 \le m \le 10$ ) — the length of the string and the number of sequences in the collection correspondently.

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**



## 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).

