# 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 $w[l \ldots r]$ 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 $1000000009$.

## 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

| input | Copy |
|---|---|
| 2 1<br>A | |

| output | Copy |
|---|---|
| 1 | |

| input | Copy |
|---|---|
| 6 2<br>CAT<br>TACT | |

| output | Copy |
|---|---|
| 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).