



USACO 2023 FEBRUARY CONTEST, PLATINUM PROBLEM 2. PROBLEM SETTING

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English (en) ▾

****Note: The memory limit for this problem is 512MB, twice the default.****

Farmer John created N ($1 \leq N \leq 10^5$) problems. He then recruited M ($1 \leq M \leq 20$) test-solvers, each of which rated every problem as "easy" or "hard."

His goal is now to create a problemset arranged in increasing order of difficulty, consisting of some subset of his N problems arranged in some order. There must exist no pair of problems such that some test-solver thinks the problem later in the order is easy but the problem earlier in the order is hard.

Count the number of distinct nonempty problemsets he can form, modulo $10^9 + 7$.

INPUT FORMAT (input arrives from the terminal / stdin):

The first line contains N and M .

The next M lines each contain a string of length N . The i th character of this string is E if the test-solver thinks the i th problem is easy, or H otherwise.

OUTPUT FORMAT (print output to the terminal / stdout):

The number of distinct problemsets FJ can form, modulo $10^9 + 7$.

SAMPLE INPUT:

```
3 1
EHE
```

SAMPLE OUTPUT:

```
9
```

The nine possible problemsets are as follows:

```
[1]
[1,2]
[1,3]
[1,3,2]
[2]
[3]
[3,1]
[3,2]
[3,1,2]
```

Note that the order of the problems within the problemset matters.

SAMPLE INPUT:

```
10 6
EHEEEHHEEH
EHHHEEHHHE
EHEHEHEEHH
HEHEEEHEEE
HHEHEEEHEE
```

EHHEEEEEEHE

SAMPLE OUTPUT:

33

SCORING:

- Inputs 3-4: $M = 1$
- Inputs 5-14: $M \leq 16$
- Inputs 15-22: No additional constraints.

Problem credits: Benjamin Qi

Contest has ended. No further submissions allowed.
