Before the game begins, each of n students writes down a unique string of length m consisting of only 'H' for head and 'T' for tail (any 2 students will not write the same string). Subsequently, when the game begins, a fair coin is flipped repeatedly until the last m flips matches one of the pre-written strings. Compute the probability of each student winning a prize.

Input

A number of of inputs (≤ 100) with the following format.

The first line has n, m. Next, we have n lines, each with a string of length m consisting of 'H' and 'T'.

Note that $1 \leq n, m \leq 300$.

Output

Print the probability of each student winning, one on each line. Round to 6 digits after decimal.

Sample Input

```
3 3
THT
TTH
HTT
```

Sample Output

```
0.333333
0.250000
0.416667
```