Big Buttons

Problem

You are a contestant on a popular new game show and are playing for the grand prize!

There are two big buttons, a red one and a black one. You will make a sequence of exactly **N** button presses.

There are lots of different sequences of presses you could make, but there are **P** forbidden prefixes, each of length no greater than **N**. If you make a sequence of presses which begins with *any* of the forbidden sequences, you will not win the grand prize. It is fine for your sequence to contain one or more forbidden prefixes as long as they do not appear at the start of your sequence.

A *winning* sequence must consist of exactly **N** button presses and must not begin with one of the forbidden prefixes. How many different winning sequences are there?

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow. Each test case starts with a line containing two integers **N** and **P**, as described above. Then, there are **P** more lines, each of which contains a string of between 1 and **N** characters, inclusive, describing one of the forbidden sequences of presses. An `R` represents pressing the red button, whereas a `B` represents pressing the black button.

Output

For each test case, output one line containing `Case #x: y`, where `x` is the test case number (starting from 1) and `y` is the number of winning sequences, as desribed above.

Limits

$1 \le T \le 100$.
Time limit: 20 seconds per test set.
Memory limit: 1 GB.
$1 \le P \le \min(2^N, 100)$.
Each forbidden prefix is between 1 and **N** characters long, inclusive.
No two forbidden prefixes will be the same.

Test set 1

$1 \le N \le 10$.

Test set 2

$1 \le N \le 50$.

Sample

Input	Output
4	
3 2	
BBB	
RB	
5 1	
R	
4 3	Case #1: 5
R	Case #2: 16
B	Case #3: 0
RBRB	Case #4: 1125556309458944
50 5	
BRBRBBBRBRRRBBB	
BRBRBRRRBRRRBRB	
BBBRBBBRBRRRBBB	
BRBRBRRRBRRRB	
BRBRBBBRBBBRB	

Note that the last Sample case would not appear in the Small dataset.

In the first case, you must make a sequence of 3 presses. There are 8 possible sequences of three presses, but some of them will cause you to lose the game. They are listed below:

- RBB. This is forbidden since it starts with the first forbidden sequence (RB).
- RBR. This is forbidden since it starts with the first forbidden sequence (RB).
- BBB. This is forbidden since it starts with the second forbidden sequence (BBB).

Thus, there are only 5 winning sequences.

In the second case, you must make a sequence of 5 presses. There is only one forbidden sequence, which is R. This means that the first press must be B, and the next 4 presses can be either button. This gives a total of 16 different button presses.

In the third case, you must make a sequence of 4 presses. There are three forbidden sequences, but since every possible sequence begins with either R (the first forbidden sequence) or B (the second forbidden sequence), there are no winning sequences. So the answer is 0.