At the end of the Middle Ages, quite a few universities throughout Europe have already been founded. The new term has just begun, so there are a lot of freshmen around. Not everyone has been lucky to be admitted to her/his desired university. As a result, many couples are now living in separate towns.

Of course, they try to see each other as often as they can. To facilitate this, the students have negotiated a deal with the coachmen. Instead of paying the regular price for a ride from one town to another, the price is determined by drawing a random integer between 1 and R inclusive, all numbers being equally likely. Unfortunately, this process repeats itself a few times whenever there is no direct connection between the towns a couple lives in. That makes the total cost of a journey quite unpredictable.

Help the couples determine the probability that one of them can afford a one-way trip to the other one. Given the number of towns and a list of direct connections, your program is supposed to process a list of couples. For each couple, you know their budget and where they live. Of course, they will always choose a route with the least expected price. Such a route exists between any two towns.

Input

The rst line contains the number of test cases that follow.

Each test case begins with a line that holds the number N of towns ($1 \leq N \leq 100$) followed by the maximum price R of a single ticket ($1 \leq R \leq 30$). The following N lines contain N characters each. The j-th character in the i-th line of these is "`Y`" if there is a direct connection between towns i and j, but "`N`" otherwise. The j-th character in the i-th line is always the same as the the i-th character in the j-th line. The j-th character in the j-th line is always "`N`".

Each test case goes on with the number C of couples on a line by itself ($1 \leq C \leq 1000$). Then for each couple there is a line that holds three integers a, b, and m. These numbers state that one of them lives in town a, the other one in town b ($1 \leq a, b \leq N, a \neq b$), and the amount of money they can spend is m ($1 \leq m \leq 10000$).

Output

For each test case, print one line containing the word "`Case`", a single space, and its serial number (starting with 1 for the rst test case). Then, output one line for each couple in this test case containing the probability that they can afford a one-way journey according to the rules above. Your answer is allowed to differ from the exact result by at most 0.001. Print a blank line after each test case.

Sample Input

```
2
3 4
NYY
YNY
YYN
1
1 3 1
4 7
NYNN
YNYN
NYNY
NNYN
2
1 3 10
1 4 10
```

Sample Output

```
Case 1
0.250000

Case 2
0.795918
0.341108
```