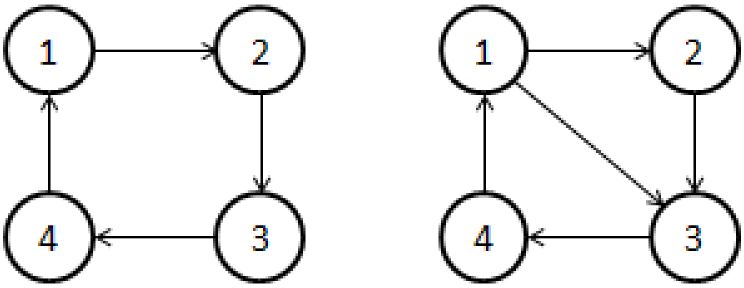
12935 Graph Guessing

There is a strongly-connected graph (i.e. you can reach any node from any other node) with n nodes and m edges. I will choose some of the edges to make another strongly connected graph. Your task is to guess that graph. Too difficult, right? Don't worry, you only need to guess k edges. If all the edges exist in my graph, you win. I promise that from all possible graphs, the answer will be chosen uniformly. **The original graph will not have self-loops or duplicated edges**.

You already have a guess, but you are a bit unsure. Why not write a program to calculate the probability you win? For example, if $n = 4$, $m = 5$, the original graph has 5 edges: $1 \to 2$, $2 \to 3$, $3 \to 4$, $4 \to 1$, $1 \to 3$, there are only two possible answers:



If $k = 2$, the best way is to guess edge $1 \to 2$ and $2 \to 3$ (or $1 \to 2$ and $3 \to 4$ etc.) which will guarantee a win. But if you would like to risk by guessing edges $1 \to 3$ and $2 \to 3$, the probability you win is 0.5.

Input

There will be at most 10 test cases. Each case begins with two integers n, m ($3 \leq n \leq 15$, $2 \leq m \leq 50$). Each of the following m lines contains two different integers u, v ($1 \leq u, v \leq n$), that means $u \to v$ is in the original graph. Edges are numbered 1 to m in the same order they appear in the input. The last line begins with an integer k ($1 \leq k \leq m$) and k different integers, the edges you guess.

Output

For each test case, print the case number and the probability you win. Absolute error of 10^{-4} is allowed.

Sample Input

```
4 5
1 2
2 3
3 4
4 1
1 3
2 1 2
4 5
1 2
2 3
3 4
```

```
4 1
1 3
2 5 2
```

Sample Output

```
Case 1: 1.0000
Case 2: 0.5000
```