CCO '03 P4 - Constrained Permutations

Time limit: 1.0s **Memory limit:** 16M

Canadian Computing Competition: 2003 Stage 2, Day 2, Problem 1

A *permutation* on the numbers $1, 2, \ldots, n$ is a linear ordering of the numbers. For example, there are 6 permutations of the numbers $1, 2, 3$. They are 123, 132, 213, 231, 312 and 321. Another way to think of it is removing n disks numbered 1 to n from a bag (without replacement) and recording the order in which they were drawn out.

Mathematicians (and other smart people) write down that there are $n! = n \times (n-1) \ldots 3 \times 2 \times 1$ permutations of the numbers $1, \ldots, n$. We call this "n factorial."

For this problem, you will be given an integer n $(1 \leq n \leq 9)$ and a series of k $(k \geq 0)$ constraints on the ordering of the numbers. That is, you will be given k pairs (x, y) indicating that x must come before y in the permutation.

You are to output the number of permutations which satisfy all constraints.

Input Specification

Your input will be $k + 2$ lines. The first line will contain the number n. The second line will contain the integer k, indicating the number of constraints. The remaining k lines will be pairs of distinct integers which are in the range $1, \ldots, n$.

Output Specification

Your output will be one integer, indicating the number of permutations of $1, \ldots, n$ which satisfy the k constraints.

Sample Input 1

```
3
2
1 2
2 3
```

Sample Output 1

```
1
```

Sample Input 2

```
4
2
1 2
2 1
```

Sample Output 2

```
0
```

Sample Input 3

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

Sample Output 3

```
4
```