

Marching in the Corporate Parade

input file: parade.in

The Airport Corporate March is held every year and the employees of First International Travel (FIT) march in the parade. But FIT is a very structured company and does not want fraternization between supervisors and the people they supervise, so the employees march in numerous separate groups. The rules for marching in the parade are:

1. A supervisor must march in a group in front of the group(s) with his or her subordinates (If A is the supervisor of B, then B is the subordinate of A).
2. You can march in a group with others if none of the others are your subordinates or supervisors. There is no order assumed in a group.

The rules for supervision are:

1. An employee can have zero or more supervisors
2. An employee cannot be the supervisor of himself
3. If A is a supervisor of B and B is a supervisor of C, then A is a supervisor of C.

A lineup for the parade consists of an ordering of individuals and groups. For example, if 1 and 2 are supervisors of 3 and 3 is the supervisor of 4 and 5, then the possible parade lineups are:

1	2	1	2	12	12	1	2	12
2	1	2	1	3	3	2	1	3
3	3	3	3	4	5	3	3	45
4	4	5	5	5	4	45	45	
5	5	4	4					

Note that the group 12 is considered the same group as 21 since there is no order within a group.

Input

The input will consist of one or more data sets. The first line of each data set will be a single integer n , $0 \leq n \leq 10$, the number of employees to march in the parade. A data set with 0 employees represents the end of input and should not be processed.

There will then be one or more lines with one pair of integers per line, a and b , $1 \leq a \leq n$, $1 \leq b \leq n$, indicating employee a is the direct supervisor of employee b . The numbers will be separated by at least one space. You may assume the data is logical (so, for example, you will not have both 1 2 and 2 1 in the same data set). The last pair will be 0 0 and should not be processed.

Output

For each data set, print the number of the data set (starting at 1) and the number of possible parade line-ups. Follow the format in the sample output below.

Sample input

```
5
1 3
2 3
3 4
3 5
0 0
2
0 0
0
```

Sample output (corresponding to the sample input)

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Data set 1: 9 possibilities
Data set 2: 3 possibilities
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