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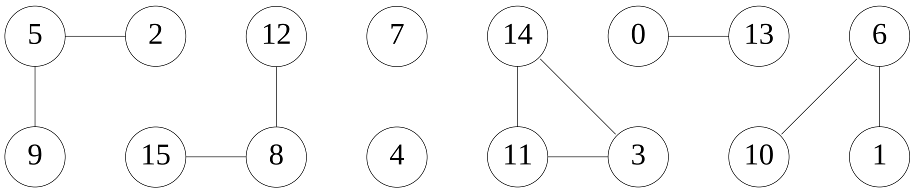
Subgraph isomorphism — P57656_en

Tercer Concurs de Programació de la UPC - Semifinal (2005-09-14)

Given an undirected graph $G = (V, E)$, where V is a set of vertices and E is a set of edges, a connected component of G is a maximal connected subgraph of G. In other words, every two vertices x and y of V belong to the same connected component if and only if there is a path from x to y. In the example below there are 7 connected components.



Given two undirected (sub)graphs $G_1 = (V_1, E_1)$ and $G_2 = (V_2, E_2)$, G_1 and G_2 are said to be isomorphic if and only if there exists a bijection $f : V_1 \to V_2$ such that for every $x, y \in V_1$, $\{x, y\} \in E_1 \Leftrightarrow \{f(x), f(y)\} \in E_2$. In the example above, the connected component with vertices $\{5, 2, 9\}$ is isomorphic to exactly two connected components: those with vertices $\{12, 15, 8\}$ and $\{6, 10, 1\}$.

Write a program such that, for every given undirected graph G, computes the number of pairs (not counting order) of connected components of G that are isomorphic. For instance, the result for the graph above is 4: $\{5, 2, 9\}$ with $\{12, 15, 8\}$, $\{5, 2, 9\}$ with $\{6, 10, 1\}$, $\{12, 15, 8\}$ with $\{6, 10, 1\}$, and $\{7\}$ with $\{4\}$.

Input

Input consists of several graph descriptions. Each one begins with the number of vertices n and the number of edges m. Follow m pairs of different numbers, each between 0 and $n - 1$. You can assume $1 \le n \le 10000$. No edges are repeated. Every given connected component has at most 6 vertices.

Output

For every graph, print the number of connected components that are pairwise isomorphic.

Sample input

```
16 10
5 2 5 9 12 8 14 11 14 3 0 13 6 10 6 1 15 8 11 3
101 0
```

Sample output

```
4
5050
```

Problem information

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