

IOI Training Camp 2013 – Test 2, 2 May, 2013

Meeting Point

Tom and Jerry have decided to call a truce and would like to sit down together for a nice chat. Their house is in the form of a graph, with N vertices labelled 0 to $N-1$, and M edges. Being restless, each minute they move from one node to an adjacent node, possibly revisiting earlier nodes. If they happen to be at an isolated node with no neighbours, they just stay at that node.

Count the number of node pairs (T, J) such that, when Tom starts from T and Jerry starts from J , it is possible for them to meet—that is, they both reach some node simultaneously.

When they move from node to node each minute, if they cross in opposite directions across the same edge, this does not count as meeting at a node.

Remember: They are allowed to revisit nodes while they move around.

Input format

- The first line consists of two space-separated integers N and M .
- The next M lines each contain two space-separated integers u and v , denoting that there is an edge between vertices u and v .

Output format

A single line: the number of pairs (T, J) for which, with Tom starting from T and Jerry starting from J , they can reach the same node at the same point of time.

Test data

- Subtask 1 (10 marks) : $1 \leq N \leq 10$, $0 \leq M \leq 10$
- Subtask 2 (15 marks) : $1 \leq N \leq 100$, $0 \leq M \leq 100$
- Subtask 3 (25 marks) : $1 \leq N \leq 1000$, $0 \leq M \leq 1000$
- Subtask 4 (50 marks) : $1 \leq N \leq 10^6$, $0 \leq M \leq 10^6$

Sample input 1

2 1
0 1

Sample input 2

4 3
0 1
1 2
2 0

Sample output 1

2

Sample output 2

10

Explanation

- First sample case: the options are (0,0) and (1,1). Note that (1,0) and (0,1) will always have Tom and Jerry oscillating, but never meeting.
- Second sample case, the options are (3,3) along with all (x, y) such that $0 \leq x, y \leq 2$.

Limits

- *Memory limit* : 128 MB
- *Time limit* : 4s