Problem C
Cactus Connectivity
Time limit: 2 seconds

You are interested in the topic of graphs and their properties. In this problem, we assume that all graphs are simple undirected graphs, meaning there is at most one edge connecting any pair of vertices and each edge connects different vertices.

A *simple cycle* of a graph is a sequence of three or more **distinct** vertices $(v_1, v_2, \ldots, v_c)$ such that there exists an edge connecting vertices v_i and v_{i+1} for each $1 \leq i < c$ and there also exists an edge connecting vertices v_1 and v_c. For a simple cycle $(v_1, v_2, \ldots, v_c)$, its *edge set* is defined as $\{(v_1, v_2), (v_2, v_3), \ldots, (v_{c-1}, v_c), (v_c, v_1)\}$, where (v_i, v_j) represents an edge connecting vertices v_i and v_j. Two simple cycles are the same if they share the same edge set.

A graph is a *cactus* if any two distinct simple cycles share at most one common vertex. For example, Figure C.1 illustrates three graphs. Graph X is a cactus since the two simple cycles $(1, 2, 3)$ and $(3, 4, 5)$ only share vertex 3 as the common vertex. Note that the sequence of vertices $(1, 2, 3, 4, 5, 3)$ does not form a simple cycle since vertex 3 appears twice. Also, the simple cycle $(2, 3, 1)$ is the same simple cycle as the simple cycle $(1, 2, 3)$. Meanwhile, graph Y is not a cactus since the two simple cycles $(1, 2, 4)$ and $(2, 3, 4)$ share vertices 2 and 4 as the common vertices. Graph Z is a cactus since there is only one simple cycle.

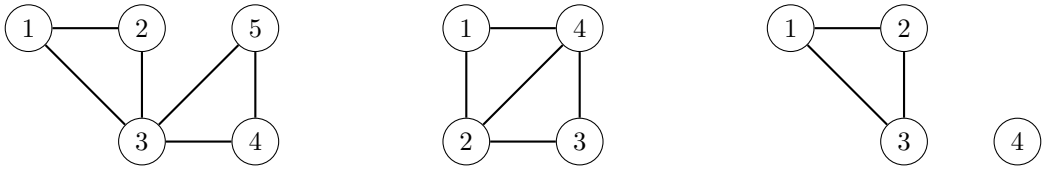


Figure C.1: Graphs X and Z are cactii. Graph Y is not a cactus.

A graph is *connected* if there is a path connecting every pair of vertices. In particular, a graph with one vertex is connected.

For any positive integer k, a graph is *k-edge-connected* if, for any set of fewer than k edges, removing those edges leaves the graph connected. In particular, all connected graphs are 1-edge-connected. For example, graph Y in Figure C.1 is 1-edge-connected and 2-edge-connected, but not 3-edge-connected, since removing both edges incident to vertex 1 does not leave the graph connected.

A graph H is a *supergraph* of a graph G if H can be obtained by adding zero or more vertices and edges to G without removing any vertices and edges from G. Note that two graphs are the same if they have the same set of vertices and the same set of edges. For example, in Figure C.1 above, graph X is a supergraph of graph Z, while graph Y is not a supergraph of graph Z since it is missing the edge connecting vertices 1 and 3.

The *connectivity value* of a graph G is the smallest positive integer k such that, for any k-edge-connected graph H that is a supergraph of G, removing all the edges of G from H keeps H connected. For example, in Figure C.1 above, graph X is a 2-edge-connected supergraph of graph Z, and removing all the edges of Z from X leaves vertices 1 and 2 disconnected from the rest, as illustrated by Figure C.2 below. Therefore, the connectivity value of Z is more than 2. It can be shown that the connectivity value of Z is 3.

You are given a *cactus* with n vertices and m edges, where the vertices are numbered from 1 to n and the edges are 1

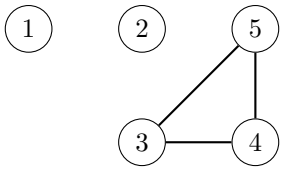


Figure C.2: Removing the edges of graph Z from graph X

to m. Edge i connects vertices u_i and v_i. You are required to compute the connectivity value of the cactus.

Input

The first line of input contains two integers n and m ($1 \leq n \leq 100\,000; 0 \leq m \leq 200\,000$). The i-th of the next m lines contains two integers u_i and v_i ($1 \leq u_i < v_i \leq n$). The input represents a cactus with at most one edge connecting any pair of vertices.

Output

Output the connectivity value of the given graph.

Sample Input #1	Sample Output #1
4 3 1 2 2 3 1 3	3

Explanation for the sample input/output #1

This corresponds to graph Z from the problem description.

Sample Input #2	Sample Output #2
3 0	1

Explanation for the sample input/output #2

Any 1-edge-connected supergraph is a connected graph. Since the given graph has no edges, removing all the edges of the given graph from a connected graph keeps the graph connected.