



Princeton Computer Science Contest 2021

Problem 10: Drop the Bass II [HackerRank]

By Henry Tang

Note this problem is different from Drop the Bass I, and you do not need to have read that problem to solve this one.

Despite the promise of the electric net strategy proposed in Battling the Bass I, the government of Otalium deems it to be too expensive and not effective enough at controlling the population of smallmouth bass. Instead, they propose an alternative biological control mechanism: the introduction of muskellunge, predators of the smallmouth bass, into the freshwater ecosystem. Any amount of muskellunge will be able to easily reduce the population of bass in the same body of water to 0. However, muskellunge are unable to withstand the currents from rivers. Thus, they can only feed on bass within the calmer water of lakes.

The lakes are labelled from 1 to n . Remember that the smallmouth bass are migrating from lake 1 to lake n through various rivers. Muskellunge cannot travel through rivers and can only stay in lakes. Find the minimum number of lakes in Otalium where muskellunge should be introduced, in order to prevent any smallmouth bass from reaching lake n . Due to other environmental hazards, muskellunge cannot be introduced into lake 1 or lake n .

Input

The first line contains two integers n and m , the number of lakes and the number of rivers. The next m lines contain two integers a and b , indicating a **directed** river (current only flows in one direction) between lakes a and b . Note that there could be a river where currents flow in both directions.

Output

A single integer, indicating the minimum number of lakes where muskellunge should be introduced.

Constraints

You can assume that $1 \leq n \leq 10^5$ and that $1 \leq m \leq 10^5$. You can also assume that there will never be an edge from lake 1 to lake n .

See the next page for an example.

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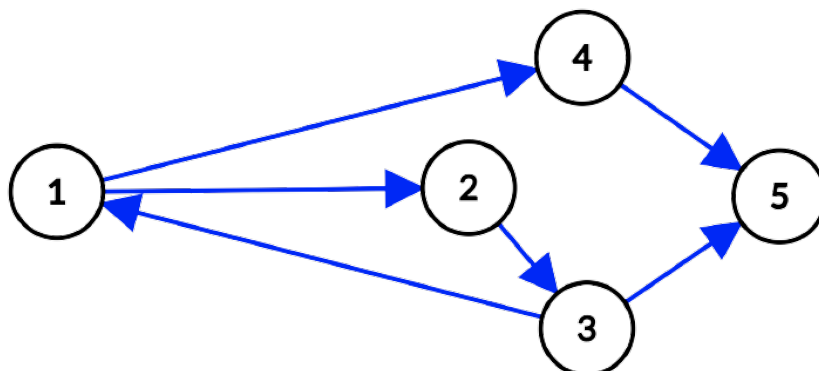
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Example 0



Input:

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5 6
1 2
2 3
3 1
3 5
1 4
4 5

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Output:

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2

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Explanation: We must place muskellunge in lake 4, since there is a path going from lake 1 to lake 5 that only goes through lake 4. From there, we can see that it suffices either to put muskellunge in lake 3 or lake 4, so the minimum number of lakes must infuse with muskellunge is 2.

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