The Bottom of a Graph - POJ 2553

https://vjudge.net/problem/POJ-2553

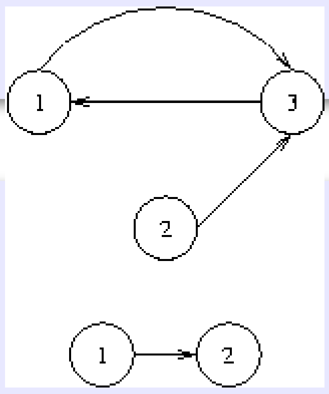
We will use the following (standard) definitions from graph theory. Let V be a nonempty and finite set, its elements being called vertices (or nodes). Let E be a subset of the Cartesian product $V×V$, its elements being called edges. Then $G=(V,E)$ is called a directed graph.
Let n be a positive integer, and let $p=(e_1,\ldots,e_n)$ be a sequence of length n of edges $e_i∈E$ such that $e_i=(v_i,v_{i+1})$ for a sequence of vertices $(v_1,\ldots,v_{n+1})$. Then p is called a path from vertex v_1 to vertex v_{n+1} in G and we say that v_{n+1} is reachable from v_1, writing $(v_1→v_{n+1})$.
Here are some new definitions. A node v in a graph $G=(V,E)$ is called a sink, if for every node w in G that is reachable from v, v is also reachable from w. The bottom of a graph is the subset of all nodes that are sinks, i.e., $bottom(G)=\{v∈V|∀w∈V:(v→w)⇒(w→v)\}$. You have to calculate the bottom of certain graphs.

Input

The input contains several test cases, each of which corresponds to a directed graph G. Each test case starts with an integer number v, denoting the number of vertices of $G=(V,E)$, where the vertices will be identified by the integer numbers in the set $V=\{1,\ldots,v\}$. You may assume that $1<=v<=5000$. That is followed by a non-negative integer e and, thereafter, e pairs of vertex identifiers $v_1,w_1,\ldots,v_e,w_e$ with the meaning that $(v_i,w_i)∈E$. There are no edges other than specified by these pairs. The last test case is followed by a zero.

Output

For each test case output the bottom of the specified graph on a single line. To this end, print the numbers of all nodes that are sinks in sorted order separated by a single space character. If the bottom is empty, print an empty line.



Sample Input

```
3 3
1 3 2 3 3 1
2 1
1 2
0
```

Sample Output

```
1 3
2
```