

I. Web islands

Time limit: 1s

Memory limit: 1536 MB

For a given set of web pages, we want to find largest subsets such that from every page in a subset you can follow links to any other page in the same subset.

Input

On the first line, there are two numbers, number of the pages N , and total number of links M . Pages are numbered from 0 up to $N-1$. On lines 2 up to $M+1$, there are two numbers per line. The first is the source page and the second is the target page of a link.

Output

On N lines there is a component ID for every single page. The component ID is the smallest page index on the component.

Example**Input :**

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

Output :

```
0
0
2
```