6_早上好YTP - Good Morning YTP

(25 分)
(子任務1: 9分, 子任務2: 16 分)

問題敘述

早上好YTP

現在我有一棵Treap

我很喜歡這棵Treap

但是

Link-Cut-Tree

比Treap

Link-Cut

Link-Cut-Tree

我最喜歡

所以...現在是刻資結時間

準備 1 2 3

兩個禮拜以後

Link-Cut-Tree ×3

不要忘記

不要錯過

記得去YTP刻Link-Cut-Tree

因為非常好資結

操作非常好

差不多一樣Treap

再見

經過上面的敘述，相信你已經相當了解這道題的內容。

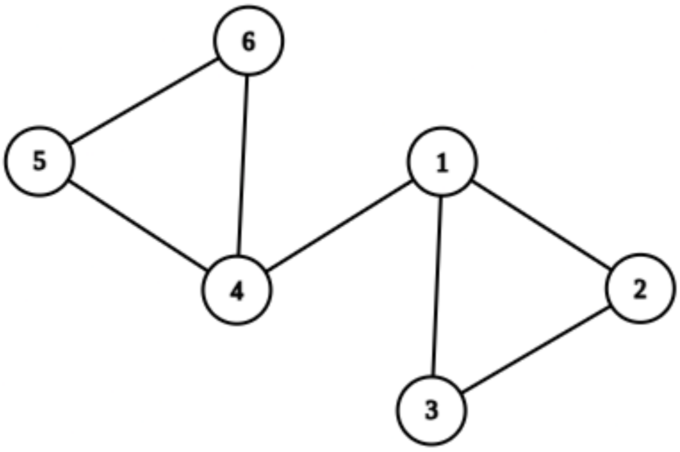
如果還沒也不用擔心，請閱讀下方的敘述。

有一張N個點的圖，一開始有0條邊。

現在請你依序加入M條邊，每加完一條邊請輸出當前圖中的橋的數量。

(保證不會有重複的邊，也不會有自環)

> 在圖論中，如果刪掉某條邊可以增加這張圖的連通塊數，這條邊就被稱作橋。



以這張圖為例(1, 4)是一座橋，因為刪掉這條邊後整張圖的連通塊數變多了。

輸入格式

第一行包含兩個整數N, M，代表有幾個節點跟共要加入幾條邊。

接下來的M行，每行有兩個整數x, y，代表加入一條連接點x跟點y的邊。

輸出格式

請輸出M行，第i行包含一個整數x，代表當前i條邊都加入圖中後，圖中有幾條邊是橋。

資料範圍

- $1 \le N, M \le 200000$
- $1 \le M \le N(N-1)/2$
- $1 \le x, y \le N$

子任務1 (9分) 的子測資中，保證前$N-1$條邊會是$(i, i+1)$的形式，但不保證出現的順序。

輸入範例 1

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

輸出範例 1

```
1
2
0
```

輸入範例 2

```
5 4
1 2
2 3
3 4
4 5
```

輸出範例 2

```
1
2
3
4
```

輸入範例 3

```
10 21
6 1
5 1
3 7
7 10
5 6
3 6
4 6
8 1
5 7
```

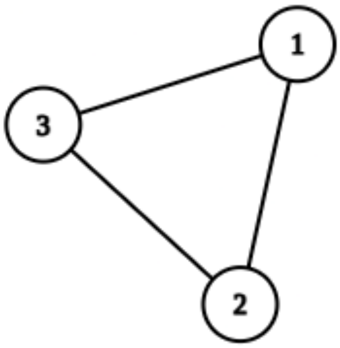
```
8 5
1 10
1 3
2 6
5 10
3 9
9 2
7 8
9 4
7 2
10 6
5 3
```

輸出範例 3

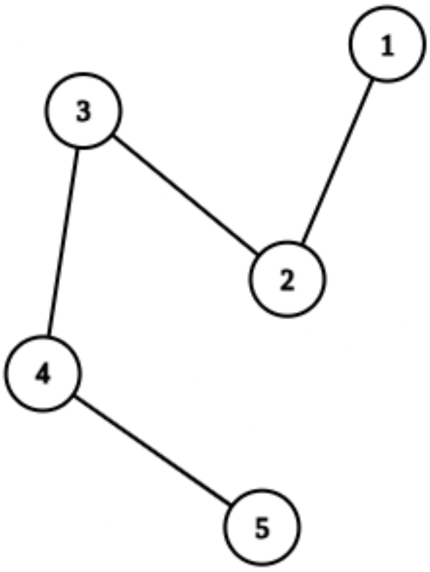
```
1
2
3
4
2
3
4
5
3
2
1
1
2
2
3
1
1
0
0
0
0
```

範例說明

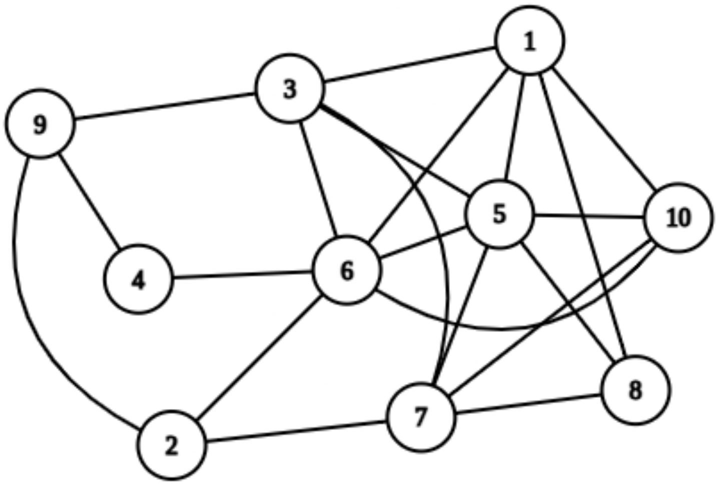
在輸入範例1中，加入第3條邊後所有邊都在環上，故沒有一條邊是橋。



在輸入範例2中，在任何時刻這張圖上都沒有環，故所有邊都是橋。



輸入範例3的圖：



6_Good Morning YTP

(25 points)

(Subtask 1: 9 points, Subtask 2: 16 points)

Description

Good morning YTP

Now I have a Treap

I really like this Treap

But

Link-Cut-Tree

Compare to Treap

Link-Cut

Link-Cut-Tree

I like the most

So...it's time to code data structure

Get ready 1 2 3

After two weeks

Link-Cut-Tree ×3

Do not forget this

Do not miss this

Remember to participate YTP to code Link-Cut-Tree

Because it's a very good data structure

Its operations are very good

Almost the same as Treap

Goodbye

After reading the description above, you should already know what's the problem's content.

Not worry if you don't. Please read the description below.

There's a graph with N vertices.

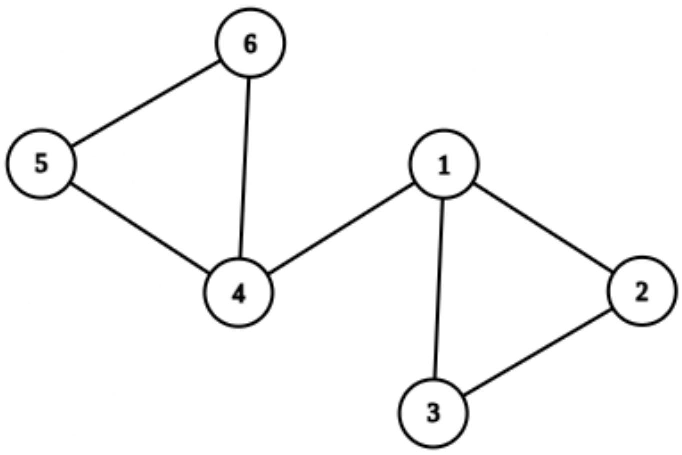
Initially, there's 0 edge in the graph.

Now you have to add M edges into the graph one by one.

After adding each edge, you should output the number of bridges in the graph.

(There's no duplicate edges or self-loop)

> In graph theory, a bridge is an edge of a graph whose deletion increases the graph's number of connected components.



Take this graph as example, (1, 4) is a bridge since after deleting this edge, the number of connected components in this graph have increased.

Input Format

First line contains two integers N, M, denote the number of vertices and the number of edges to be added respectively.

For the next M lines, each contains two integers x, y, denote the two endpoints of the edge to be added.

Output Format

Print M lines, the ith line contains one integer x, denote the number of bridges in the graph after first i edges are added to the graph.

Constraints

- $1 \leq N, M \leq 200000$
- $1 \leq M \leq N(N-1)/2$
- $1 \leq x, y \leq N$

For subtask 1 (9 points), it is guaranteed that the first $N-1$ edges would be in the form of $(i, i+1)$. (though its order may not be sorted)

Input Example 1

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

Output Example 1

```
1
2
0
```

Input Example 2

```
5 4
1 2
2 3
3 4
4 5
```

Output Example 2

```
1
2
3
4
```

Input Example 3

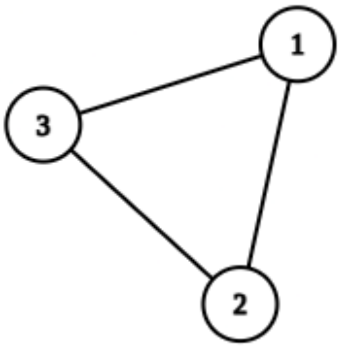
```
10 21
6 1
5 1
3 7
7 10
5 6
3 6
4 6
8 1
5 7
8 5
1 10
1 3
2 6
5 10
3 9
9 2
7 8
9 4
7 2
10 6
5 3
```

Output Example 3

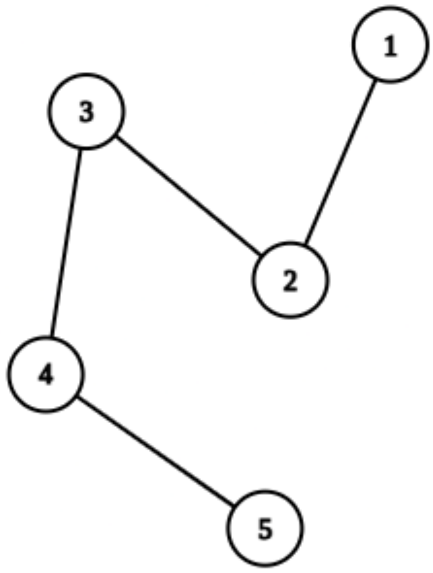
```
1
2
3
4
2
3
4
5
3
2
1
1
2
2
3
1
1
0
0
0
0
```

Example Explanation

In Input Example 1, after adding the third edge, every edge is on a cycle, therefore there's no bridge.



In Input Example 2, there's no cycle at any time, so every edge is a bridge.



The graph of Input Example 3: