G - Count Simple Paths 2

Editorial (/contests/abc419/tasks/abc419_g/editorial)

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Time Limit: 4 sec / Memory Limit: 1024 MiB

Score : 600 points

Problem Statement

You are given a simple connected undirected graph with N vertices numbered 1 to N and M edges. The i-th edge connects vertices u_i and v_i.

For each $k = 1, 2, \ldots, N-1$, find the number of simple paths from vertex 1 to vertex N that contain exactly k edges.

Constraints

- $2 \leq N \leq 2 \times 10^5$
- $N - 1 \leq M \leq N + 20$
- $1 \leq u_i < v_i \leq N$
- The given graph is a simple connected undirected graph.
- All input values are integers.

Input

The input is given from Standard Input in the following format:

$$
\begin{array}{ll}
N & M \\
u_1 & v_1 \\
u_2 & v_2 \\
\vdots & \\
u_M & v_M
\end{array}
$$

Output

Output the answers in the following format:

$$
\mathrm{ans}_1 \quad \mathrm{ans}_2 \quad \ldots \quad \mathrm{ans}_{N-1}
$$

ans_i is the number of simple paths from vertex 1 to vertex N that contain exactly i edges.

Sample Input 1 Copy

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

Sample Output 1 Copy

Copy

```
0 1 2 1
```

For each $k = 1, 2, 3, 4$, the simple paths from vertex 1 to vertex 5 that contain exactly k edges are as follows.

- $k = 1$: None
- $k = 2$: $1 \to 3 \to 5$
- $k = 3$: $1 \to 2 \to 4 \to 5$ and $1 \to 3 \to 4 \to 5$
- $k = 4$: $1 \to 2 \to 4 \to 3 \to 5$

Sample Input 2 Copy

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```
11 15
1 2
1 3
2 3
3 4
3 5
4 5
5 6
5 7
6 7
7 8
7 9
8 9
9 10
9 11
10 11
```

Sample Output 2 Copy

```
0 0 0 0 1 5 10 10 5 1
```

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Sample Input 3 Copy

```
7 18
6 7
4 5
1 7
2 7
1 4
2 5
4 6
2 3
5 6
5 7
1 5
2 4
2 6
1 2
1 3
3 4
1 6
3 5
```

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Sample Output 3 Copy

```
1 3 11 29 50 42
```

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url=https%3A%2F%2Fatcoder.jp%2Fcontests%2Fabc419%2Ftasks%2Fabc419_g%3Flang%3Den&title=G%20-02)

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