Graph Summaries

Problem	Submissions	Leaderboard	Discussions

For your birthday this year, your eccentric uncle has gifted you an undirected, unweighted simple graph! When it comes time to write thank-you notes to your uncle, you want to show him that you've actually examined the graph, and want to include some details about the graph in your note.

To show that you have a high level understanding of the graph, be sure to tell your uncle the number of connected components in the graph. To show him that you've really looked at one area closely, you also want to tell him the number of nodes reachable from his favorite start node S by taking a path of at most P edges.

Grading

Correctness & Efficiency: 80%

- Passes 7 test cases: 80%

- Passes 5 to 6 test cases: 60%

- Passes 3 to 4 test cases: 40%

- Passes 1 to 2 test cases: 20%

- Passes 0 test cases: 0%

Code Quality: 20%

Input Format

The input will contain a single test case.

The test case begins with a line with four space separated integers, $N\ M\ S\ P$, the number of nodes, the number of edges, the start node, and the furthest distance to examine from the start node respectively. Then M lines follow, each representing a single edge. Those lines have two space separated integers, U, V. This means that an edge connects nodes U and V.

Constraints

$1 \leq N \leq 100,000$

$0 \leq M \leq min(200,000, N*(N-1))$
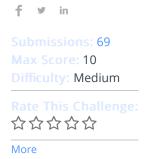
$1 \leq U, V, S \leq N$

$0 \leq P \leq 200,000$

U is not equal to V There is never more than 1 edge between the same pair of nodes

Output Format

Print 2 space separated integers. The first integer is the number of connected components in the gift graph. The second integer is

the number of nodes reachable from your uncle's favorite start node by taking at most P edges.

Sample Input 0

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

Sample Output 0

```
1 3
```

Explanation 0

The graph has just one component. All 3 nodes are reachable from node 1.

Sample Input 1

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

Sample Output 1

```
2 4
```

Explanation 1

The graph has two components (2 and 6 are by themselves). 3 is connected to 1, 5, and 4, so there are 4 nodes reachable from 3 using at most 1 edge.

Current Buffer (saved locally, editable)

C++

```cpp
#include <cmath>
#include <cstdio>
#include <vector>
#include <iostream>
#include <algorithm>
using namespace std;


int main() {
    /* Enter your code here. Read input from STDIN. Print output to STDOUT */
    return 0;
}
```

Line: 1 Col: 1

Upload Code as File

☐ **Test against custom input**

Run Code   Submit Code