✏️ Practice Arena

Practice problems aimed to improve your coding skills.

📂 PRACTICE-02_SCAN-PRINT

📂 PRACTICE-03_TYPES

📂 LAB-PRAC-02_SCAN-PRINT

📂 LAB-PRAC-01

📂 PRACTICE-04_COND

📂 BONUS-PRAC-02

📂 LAB-PRAC-03_TYPES

📂 PRACTICE-05_COND-LOOPS

📂 LAB-PRAC-04_COND

📂 LAB-PRAC-05_CONDLOOPS

📂 PRACTICE-07_LOOPS-ARR

📂 LAB-PRAC-06_LOOPS

📂 LAB-PRAC-07_LOOPS-ARR

📂 LABEXAM-PRAC-01_MIDSEM

📂 PRACTICE-09_PTR-MAT

📂 LAB-PRAC-08_ARR-STR

📂 PRACTICE-10_MAT-FUN

📂 LAB-PRAC-09_PTR-MAT

📂 LAB-PRAC-10_MAT-FUN

   ❓ Stack

   ❓ The Prutor Editor

   ❓ Finding your identity

   ❓ Queue

   ❓ The Prutor Editor Part II

   ❓ Only Ones

   ❓ Graphs

   ❓ How Mr C actually does Math

   ❓ The Hidden Positives and Negatives

   ❓ How Prutor Manages Memory

   ❓ Message in the Matrix

   ❓ The Hidden Key

📂 PRACTICE-11_FUN-PTR

📂 LAB-PRAC-11_FUN-PTR

📂 LAB-PRAC-12_FUN-STRUC

📂 LABEXAM-PRAC-02_ENDSEM

📂 LAB-PRAC-13_STRUC-NUM

📂 LAB-PRAC-14_SORT-MISC

Graphs

LAB-PRAC-10_MAT-FUN

Graphs [20 marks]

Problem Statement
Graphs are an integral component of computer science. The entire internet is basically one giant graph. Social networking websites like Facebook and Instagram are also, at their core, enormous graphs. A graph has nodes (also called vertices) and connections between nodes. In you have a Facebook account, you are a node in the FB graph and have connections to all your "friends" on FB. Nodes on a graph can communicate with each other.

In the first line of the input, you will be given the number of nodes in the graph as a strictly positive integer n. Nodes in the graph will be index from 0, 1, ... n-1. In the next lines, we will give you a list of nodes which sent messages (imagine an FB chat message) to other nodes. Thus, in each subsequent line, you will be given two non-negative integers i and j. This will imply that node i sent node j a message. The list will end when we give you i and j as -1.

In your output, you have to print four quantities

1. The number of nodes that did not send any messages at all
2. The number of nodes that did not receive any messages at all
3. The node that sent the most messages. If there are many such nodes, use the index of the node with smallest index.
4. The node that received the most messages. If there are many such nodes, use the index of the node with smallest index.

Caution

1. Nodes may send messages to themselves
2. One or more nodes may send no messages at all
3. See below on how to format your output. Be careful about spelling, case, and spaces.
4. Be careful about extra/missing lines and extra/missing spaces in your output.

HINTS:

1. You can use a 2D array to maintain the count of which node sent messages to which node and how many messages were sent.
2. If there are n nodes, then you can maintain an n x n array graph where graph[i][j] can store how many messages has node i sent to node j and graph[j][i] can store how many messages has node j sent to node i.

EXAMPLE:
INPUT
5
1 0

2 0
3 0
4 0
1 2
1 3
1 4
2 4
-1 -1

OUTPUT:
1 NODES SENT NO MESSAGES
1 NODES RECEIVED NO MESSAGES
MAX 4 MESSAGES SENT BY NODE 1
MAX 4 MESSAGES RECEIVED BY NODE 0

Explanation: Node 0 did not send any messages whereas node 1 did not receive any messages. Node 1 sent the maximum messages (4 messages) whereas node 0 received maximum messages (4 messages).

Grading Scheme:
Total marks: **[20 Points]**

There will be partial grading in this question. There are four lines in your output. Printing each line correctly, in the correct order, carries 25% weightage. Each visible test case is worth 2 points and each hidden test case is worth 4 points. There are 2 visible and 4 hidden test cases.

Please remember, however, that when you press Submit/Evaluate, you will get a green bar only if all parts of your answer are correct. Thus, if your answer is only partly correct, Prutor will say that you have not passed that test case completely, but when we do autograding afterwards, you will get partial marks.

🍴 Start Solving! (/editor/practice/6203)