

Contest Duration: 2025-04-12(Sat) 22:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250412T2100&p1=248>) - 2025-04-12(Sat) 23:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250412T2240&p1=248>) (local time) (100 minutes)

[Back to Home \(/home\)](/home)

[🏠 Top \(/contests/abc401\)](/contests/abc401)

[📋 Tasks \(/contests/abc401/tasks\)](/contests/abc401/tasks)

[❓ Clarifications \(/contests/abc401/clarifications\)](/contests/abc401/clarifications)

[📊 Results ▼](#)

[🏆 Standings \(/contests/abc401/standings\)](/contests/abc401/standings)

[🏆 Virtual Standings \(/contests/abc401/standings/virtual\)](/contests/abc401/standings/virtual)

[📖 Editorial \(/contests/abc401/editorial\)](/contests/abc401/editorial)

[💬 Discuss \(https://codeforces.com/blog/entry/141741\)](https://codeforces.com/blog/entry/141741)



F - Add One Edge 3

[Editorial \(/contests/abc401/tasks/abc401_f/editorial\)](/contests/abc401/tasks/abc401_f/editorial)



Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 500 points

Problem Statement

You are given two trees: tree 1 with N_1 vertices numbered 1 to N_1 , and tree 2 with N_2 vertices numbered 1 to N_2 . The i -th edge of tree 1 connects vertices $u_{1,i}$ and $v_{1,i}$ bidirectionally, and the i -th edge of tree 2 connects vertices $u_{2,i}$ and $v_{2,i}$ bidirectionally.

One can add a bidirectional edge between vertex i of tree 1 and vertex j of tree 2 to obtain a single tree. Let $f(i, j)$ be the diameter of this tree.

Find
$$\sum_{i=1}^{N_1} \sum_{j=1}^{N_2} f(i, j).$$

Here, the distance between two vertices of a tree is the minimum number of edges that must be used to move between them, and the diameter of a tree is the maximum distance between two vertices.

Constraints

- $1 \leq N_1, N_2 \leq 2 \times 10^5$
- $1 \leq u_{1,i}, v_{1,i} \leq N_1$
- $1 \leq u_{2,i}, v_{2,i} \leq N_2$
- Both given graphs are trees.
- All input values are integers.

2026-01-02 (Fri)
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Input

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

```
 $N_1$   
 $u_{1,1}$   $v_{1,1}$   
 $\vdots$   
 $u_{1,N_1-1}$   $v_{1,N_1-1}$   
 $N_2$   
 $u_{2,1}$   $v_{2,1}$   
 $\vdots$   
 $u_{2,N_2-1}$   $v_{2,N_2-1}$ 
```

Output

Print the answer.

Sample Input 1

[Copy](#)

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

[Copy](#)

Sample Output 1

[Copy](#)

```
39
```

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For example, one can connect vertex 2 of tree 1 and vertex 3 of tree 2 to obtain a tree of diameter 5. Thus, $f(2, 3)$ is 5.

The sum of $f(i, j)$ is 39.

Sample Input 2

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

Sample Output 2

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```
267
```

Copy

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