

# Problem 1615: Maximal Network Rank

## Problem Information

**Difficulty:** Medium

**Acceptance Rate:** 65.76%

**Paid Only:** No

**Tags:** Graph

## Problem Description

There is an infrastructure of  $n$  cities with some number of roads connecting these cities. Each  $\text{roads}[i] = [a_i, b_i]$  indicates that there is a bidirectional road between cities  $a_i$  and  $b_i$ .

The **network rank** of two different cities is defined as the total number of directly connected roads to either city. If a road is directly connected to both cities, it is only counted once.

The **maximal network rank** of the infrastructure is the **maximum network rank** of all pairs of different cities.

Given the integer  $n$  and the array `roads`, return the **maximal network rank** of the entire infrastructure.

**Example 1:**



**Input:**  $n = 4$ , `roads = [[0,1],[0,3],[1,2],[1,3]]` **Output:** 4 **Explanation:** The network rank of cities 0 and 1 is 4 as there are 4 roads that are connected to either 0 or 1. The road between 0 and 1 is only counted once.

**Example 2:**



**\*\*Input:\*\*** n = 5, roads = [[0,1],[0,3],[1,2],[1,3],[2,3],[2,4]] **\*\*Output:\*\*** 5 **\*\*Explanation:\*\*** There are 5 roads that are connected to cities 1 or 2.

**\*\*Example 3:\*\***

**\*\*Input:\*\*** n = 8, roads = [[0,1],[1,2],[2,3],[2,4],[5,6],[5,7]] **\*\*Output:\*\*** 5 **\*\*Explanation:\*\*** The network rank of 2 and 5 is 5. Notice that all the cities do not have to be connected.

**\*\*Constraints:\*\***

$2 \leq n \leq 100$   $0 \leq \text{roads.length} \leq n * (n - 1) / 2$   $\text{roads}[i].\text{length} == 2$   $0 \leq a_i, b_i \leq n - 1$   $a_i \neq b_i$  Each pair of cities has **at most one** road connecting them.

## Code Snippets

### C++:

```
class Solution {
public:
    int maximalNetworkRank(int n, vector<vector<int>>& roads) {

    }
};
```

### Java:

```
class Solution {
    public int maximalNetworkRank(int n, int[][] roads) {

    }
}
```

### Python3:

```
class Solution:
    def maximalNetworkRank(self, n: int, roads: List[List[int]]) -> int:
```