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Description

Solution

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2285. Maximum Total Importance of Roads

Medium

184

6

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You are given an integer n denoting the number of cities in a country. The cities are numbered from 0 to $n - 1$.

You are also given a 2D integer array `roads` where `roads[i] = [ai, bi]` denotes that there exists a **bidirectional** road connecting cities a_i and b_i .

You need to assign each city with an integer value from 1 to n , where each value can only be used **once**. The **importance** of a road is then defined as the **sum** of the values of the two cities it connects.

Return the **maximum total importance** of all roads possible after assigning the values optimally.

Example 1:

```
graph TD; 0 --- 1; 0 --- 2; 1 --- 2; 1 --- 3; 2 --- 3; 2 --- 4; 3 --- 2;
```

Input: $n = 5$, `roads = [[0,1],[1,2],[2,3],[0,2],[1,3],[2,4]]`

Output: 43

Explanation: The figure above shows the country and the assigned values of `[2,4,5,3,1]`.

- The road $(0,1)$ has an importance of $2 + 4 = 6$.
- The road $(1,2)$ has an importance of $4 + 5 = 9$.
- The road $(2,3)$ has an importance of $5 + 3 = 8$.
- The road $(0,2)$ has an importance of $2 + 5 = 7$.
- The road $(1,3)$ has an importance of $4 + 3 = 7$.
- The road $(2,4)$ has an importance of $5 + 1 = 6$.

The total importance of all roads is $6 + 9 + 8 + 7 + 7 + 6 = 43$.

It can be shown that we cannot obtain a greater total importance than 43.

Example 2:

```
graph TD; 3 --- 0; 3 --- 1; 2 --- 4;
```

Input: $n = 5$, `roads = [[0,3],[2,4],[1,3]]`

Output: 20

Explanation: The figure above shows the country and the assigned values of `[4,3,2,5,1]`.

- The road $(0,3)$ has an importance of $4 + 5 = 9$.
- The road $(2,4)$ has an importance of $2 + 1 = 3$.
- The road $(1,3)$ has an importance of $3 + 5 = 8$.

The total importance of all roads is $9 + 3 + 8 = 20$.

It can be shown that we cannot obtain a greater total importance than 20.

Constraints:

- $2 \leq n \leq 5 \times 10^4$
- $1 \leq \text{roads.length} \leq 5 \times 10^4$
- $\text{roads}[i].\text{length} == 2$
- $0 \leq a_i, b_i \leq n - 1$
- $a_i \neq b_i$
- There are no duplicate roads.

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Yes

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```
class Solution {
    public long maximumImportance(int n, int[][] roads) {
    }
}
```

Problems

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