Description | Hints | Submissions | Discussions | Notes

Sum of Distances

[illegible]	1 sec	256000KB	100
Difficulty	Time Limit	Memory	Score

80/80 XP | 30/30

Description

You are given a tree consisting of *n* nodes. *d(u, v)* is the distance between nodes *u* and *v*, or number of edges in between the path connecting two nodes *u* and *v*. Your task is to find the sum of distances over all possible pairs of nodes.

Input Format

The first input line contains an integer *n*: the number of nodes. The nodes are numbered 1, 2, ..., *n*.

Then there are *n* − 1 lines describing the edges. Each line contains two integers *a* and *b*: there is an edge between nodes *a* and *b*.

Output Format

Print the sum as mentioned in the problem statement.

Constraints

$1 \le n \le 2 \times 10^5$

$1 \le a, b \le n$

Sample Input 1

Copy

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

Sample Output 1

Copy

C++14 | 00:00:00 | 12 px

```
            subtreez[root]+=subtreez[v];
          }
      }
}

int main(){
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
   cin>>n;
   g.resize(n+1);
   par.resize(n+1);
   subtreez.resize(n+1);
   for(int i=1;i<n;i++){
    int a,b;
    cin>>a>>b;
    g[a].emplace_back(b);
    g[b].emplace_back(a);
   }
   dfs(1,0);
   for(int i=1;i<=n;i++){
    ans+=1LL*subtreez[i]*(n-subtreez[i]);
   }
   cout<<ans;
    return 0;
}
```

Sample Tests | Manual Tests

Test Case 1

ACCEPTED

Console | Run on Sample