


# Problem I

## Tourists

**Problem ID:** tourists  
**CPU Time limit:** 3 seconds  
**Memory limit:** 1024 MB

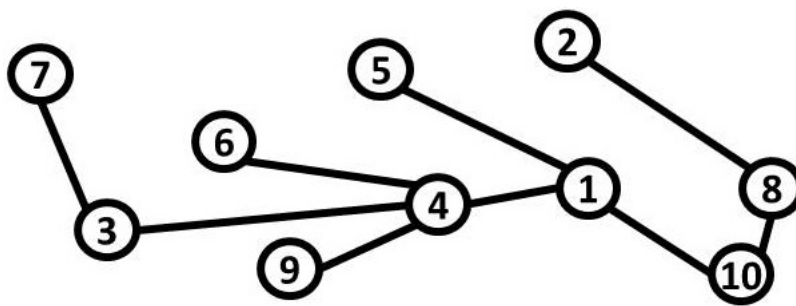
**Source:** North American  
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In Tree City, there are  $n$  tourist attractions uniquely labeled 1 to  $n$ . The attractions are connected by a set of  $n - 1$  bidirectional roads in such a way that a tourist can get from any attraction to any other using some path of roads.

You are a member of the Tree City planning committee. After much research into tourism, your committee has discovered a very interesting fact about tourists: they LOVE number theory! A tourist who visits an attraction with label  $x$  will then visit another attraction with label  $y$  if  $y > x$  and  $y$  is a multiple of  $x$ . Moreover, if the two attractions are not directly connected by a road the tourist will necessarily visit all of the attractions on the path connecting  $x$  and  $y$ , even if they aren't multiples of  $x$ . The number of attractions visited includes  $x$  and  $y$  themselves. Call this the *length* of a path.

Consider this city map:



Here are all the paths that tourists might take, with the lengths for each:

$1 \rightarrow 2 = 4, 1 \rightarrow 3 = 3, 1 \rightarrow 4 = 2, 1 \rightarrow 5 = 2, 1 \rightarrow 6 = 3, 1 \rightarrow 7 = 4,$   
 $1 \rightarrow 8 = 3, 1 \rightarrow 9 = 3, 1 \rightarrow 10 = 2, 2 \rightarrow 4 = 5, 2 \rightarrow 6 = 6, 2 \rightarrow 8 = 2,$   
 $2 \rightarrow 10 = 3, 3 \rightarrow 6 = 3, 3 \rightarrow 9 = 3, 4 \rightarrow 8 = 4, 5 \rightarrow 10 = 3$

To take advantage of this phenomenon of tourist behavior, the committee would like to determine the number of attractions on paths from an attraction  $x$  to an attraction  $y$  such that  $y > x$  and  $y$  is a multiple of  $x$ . You are to compute the **sum** of the lengths of all such paths. For the example above, this is:  
 $4 + 3 + 2 + 2 + 3 + 4 + 3 + 3 + 2 + 5 + 6 + 2 + 3 + 3 + 3 + 4 + 3 = 55$ .

### Input

Each input will consist of a single test case. Note that your program may be run multiple times on different inputs. The first line of input will consist of an integer  $n$  ( $2 \leq n \leq 200\,000$ ) indicating the number of attractions. Each of the following  $n - 1$  lines will consist of a pair of space-separated integers  $i$  and  $j$  ( $1 \leq i < j \leq n$ ), denoting that attraction  $i$  and attraction  $j$  are directly connected by a road. It is guaranteed that the set of attractions is connected.

### Output

Output a single integer, which is the sum of the lengths of all paths between two attractions  $x$  and  $y$  such that  $y > x$  and  $y$  is a multiple of  $x$ .

#### Sample Input 1

```
10
3 4
3 7
1 4
4 6
1 10
8 10
2 8
1 5
4 9
```

#### Sample Output 1

```
55
```

