

# DMPG '18 S4 - Mimi and Prize

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A tree is a connected graph with  $N$  nodes and  $N - 1$  edges. An interesting property of trees is that there exists *exactly 1 path* between any two nodes.

As the top CS student in her year, Mimi's ICS teacher awards her a tree at graduation. The tree's nodes are labelled  $1, 2, \dots, N$ , and the  $i$ th node has a value,  $A_i$ . However, having scored only half a percentage point lower than her, you decide to contest this prize!

The teacher arranges a code-off on this tree: you are to determine the number of ordered pairs  $\langle u, v \rangle$  such that the values on the path match the parity of the index. Specifically, if you took the path starting from  $u$  and ending at  $v$  and wrote it into an array with  $A_u$  as the first element and  $A_v$  as the last, then the  $j^{\text{th}}$  value of this array must be congruent to  $j \bmod 2$ , for every  $j$  from 1 to the size of the array. Note that this array is **1-indexed**.

Can you solve this problem and claim the title of top ICS student?

## Constraints

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For all subtasks,  $1 \leq A_i \leq 10^9$

### Subtask 1 [10%]

$1 \leq N \leq 500$

### Subtask 2 [10%]

$1 \leq N \leq 2\,000$

### Subtask 3 [80%]

$1 \leq N \leq 200\,000$

## Input Specification

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The first line of input will contain  $N$ , the number of nodes in the tree.

The next line of input will contain  $N$  space separated integers,  $A_1, A_2, \dots, A_N$ .

The next  $N - 1$  lines of input will each contain a pair of integers,  $a_i, b_i$ , indicating that there is an edge between  $a_i$  and  $b_i$ .

## Output Specification

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A single integer, the number of ordered pairs which satisfy the given condition.

## Sample Input

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

## Sample Output

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8
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