

Homework 2

Candy Piles

Ghita's son has n piles of candies, and he wants to combine them into one pile. He will choose two piles arbitrarily and combine them in one pile. He will continue to do so until only one pile is left. When he combines two piles he consumes energy equal to the size of the piles. That is to say: If he combines two piles of the size 3 and 5, the energy cost is 8. Your task : given the size of the n piles, calculate the minimum energy needed to combine all the piles.

Input data

In the file *candy.in* we can find:

- On the first line the number n , an integer
- On the second line, n integers representing the size of the piles

Output data

In the file *candy.out* output the minimum energy spent for pilling all the candy.

Example

candy.in	candy.out
4 5 9 6 3	45

Restrictions

- $0 < n \leq 100000$
- the size of each pile is no more than 100
- Maximum execution time 2 seconds

Apple Tree

Ghita has an apple tree with many apples on it. For simplicity, we consider the tree as a graph, the nodes indicating the root of the apple tree and the positions where the apples grow, and the edges indicating the branches of the tree. Ghita gives each apple a delicious value, for example, the apple with value 1 tastes a little well, while the apple with value -100 tastes terrible.

Now Ghita wants to cut a single branch and eat all the apples fallen off - If an apple is not connected to the root by branches, it will fall off. Ghita wants to know what the maximum value of the fallen apples is.

Note that Ghita's tree is not a normal tree; that is not all cuts will cause apples to fall.

Input data

In the file *apple.in* you can find:

- On the first line two integers N and M
- On the following M lines 2 integers A and B on each line, indicating a branch between apple A and B . ($1 \leq A, B \leq N$, $A \neq B$)
- The last line N numbers indicating how delicious each apple is. The delicious value of each apple is between -100 and 100. -100 for an awful tasting apple and 100 for the most delicious apple.
- All the nodes are numbered from 1 to N. The root is always node 1. There is at most one edge between any pair of nodes. And the graph is guaranteed to be connected.

Output data

In the file *apple.out* you can find:

- One number indicating the maximum total delicious value of the apples fallen off after one cut, or "No apple" if Ghita can't get any apples.

Example

apple.in	apple.out
3 2 1 2 2 3 100 10 -20	-10

*Node 1 is always the root, it cannot fall of.

Restrictions

- $1 \leq N \leq 10000$, $1 \leq M \leq 100000$
- Value of apples between -100 and 100
- Maximum execution time 1 second

Sending the solutions

The solutions should have a Readme file that should contain:

1. a short description of the algorithms you used,
2. the complexity of the algorithms (you must compute it)

Send the solutions in a .zip archive with the name HW_<number>_<name>_<group>.zip (e.g. HW_2_PopescuAndrei_1231E.zip) by email to: alexandru.daniel.mirea@gmail.com

The deadline for receiving the homework is 23rd of December 2013, at 23:59.

Rules for assignments: <http://adcfils.wordpress.com/assignments/>