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Sommersemester 2017

Woche 07 – (Adv.) Competitive Programming

Abgabe 05.06.2017 17:00 Uhr, über das Judge-Interface

Aufgabe 1 (mining)**.** (100 Points – 1 second timelimit)

We write the year 2300. Humanity has long discovered faster-than-light travel and has become a galactic empire under the name Human People Imperium. Energy and resource hungry as ever, the empire is expanding rapidly.

You are a high ranking military advisor, and are tasked with planning the defenses for a few new mining operations. Such an operation consists of a some star systems with hyperlanes between pairs of them. The lanes are set up so that you can reach every system from any other system in the operation, but not always directly. To cut costs, only the minimum number of lanes to achieve this will be used. The hyperlanes are set up in a way so that you can travel both directions without chancing collisions. Each star system also has an importance score assigned to it, to help you prioritize your defense setup.

For each operation, you have to select a set of star systems to place military outposts on. To make sure that you don't spend to much on defenses, you've been given a constraint by your superiors: You may not put outposts on two neighbouring systems.

You want to estimate how well you can protect each operation with this constraint in place. To do that, you make up a simple protection score to measure how well an operation is defended: You reduce a systems score based on how far away it is from the next outpost. If a system hosts an outposts, it is worth its full importance score. If you need to travel one hyperlane to the next outpost, it is worth only half, if you need to travel three its worth only a third, and so on. The score for an operation is simply the sum of these scores for each system.

Input The first line contains o ($0 \leq o \leq 10$), the number of operations. Each operation begins with a line containing s ($0 \leq s \leq 250000$), the number of star systems in the operation. The following s lines each contain an importance score i ($0 \leq i < 5000$) for the respective star system. After that follow $s-1$ lines containing the hyperlanes between the systems. Each lane consists of the indices a, b of the connected systems, with $0 \leq a, b < s$.

Output For each operation, print the maximum protection score if you adhere to the constraint, rounded down to the next integer.

Points There are three groups of test sets:

- *easy:* The first group of operations worth 20 points, you can assume that $s \leq 1000$.
- *medium:* For the second group worth 30 Points, you can assume that $s \leq 50000$.
- *hard:* For the third group worth 50 Points, there are also no additional assumptions.

Sample Input

```
1
3
10
50
10
1 2
0 1
```

Sample Output

```
60
```