“Static Void” and Anomalies

A research ship “Static Void” entered a new sector of space. In the sector scanners detected anomalies which “Static Void” needs to analyze.

There are *N* anomalies in the sector numbered for 1 to N. Anomalies are entangled by *N-1* energy lines. All anomalies are **Active** initially.

Anomalies *x* and *y* are *entangled* if there exists an energy line that connects them. Anomalies *X* and *Y* are *transitively entangled* if and only if there exists an **Active** anomaly *K* such that anomaly *X* and *K* are entangled, and anomalies *K* and *Y* are entangled (see picture below)

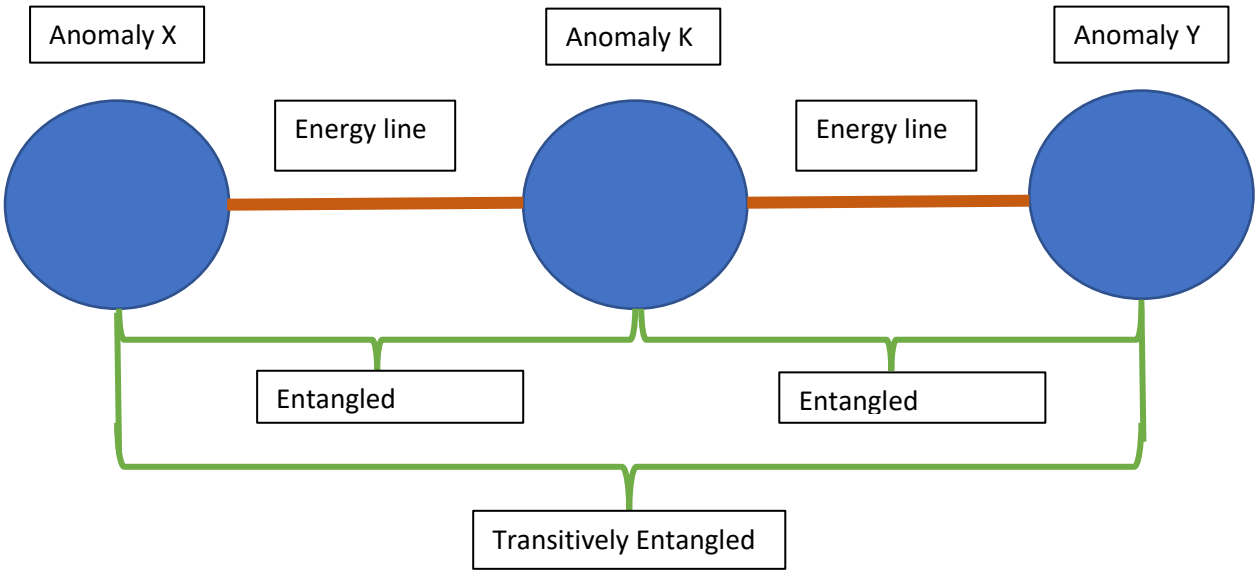
To investigate anomaly “Static Void” should firstly break through the potential barrier of the anomaly using laser. Anomaly *X* has a barrier with strength B_x. Laser should have power that is equal to or higher than B_x.

When laser breaks through potential barrier of anomaly it becomes **Faded** and emits energy so that anomalies that are *entangled* or *transitively entangled* to the anomaly have their barriers strength increased by 1.

“Static Void” starts by choosing an anomaly to analyze first. The strength of its barrier should be less than or equal to the power of the laser. After it “Static Void” repeatedly chooses the next anomaly to analyze until all anomalies are analyzed. Ship can move to anomaly *X* if and only if next conditions are met:

1. Anomaly *X* is **Active**. Meaning, it is not analyzed yet
2. Anomaly *X* is entangled with at least one **Faded** anomaly
3. Strength of barrier of anomaly *X* is less than or equal to the laser power

Calculate the minimum power of laser of “Static Void” required to analyze all the anomalies



Input

First line: one integer *N* **(1** ≤ N ≤ 3 · 10^5)

Second line: *N* integers B_1, B_2, B_3....B_N. **(-**10^9 ≤ B ≤ 10^9)

Each of the next n – 1 lines: 2 integers *U (**1** ≤ U ≤ N)* and *V (**1** ≤ V ≤ N), V ≠ U*, meaning that there is an energy line that makes anomalies *U* and *V* entangled.

Output

One integer – minimum power of "Static Void" laser required to analyze all anomalies

Example:

5

1 2 7 6 7

1 5

5 3

3 4

2 4

Output: 8