D. Arenas of Samarkand (samarkand)

Time limit: 2.0 seconds
Memory limit: 256 MiB

In the ancient lands of Samarkand, a vast web of fortified territories is linked by historic trade trails. Each territory is defended by a guardian possessing a certain level of wisdom and military strength. You serve as a Lead Commander under the authority of the **House of Wisdom**, tasked with the strategic expansion of influence across these intellectual outposts.

The regional map is structured as an undirected connected graph containing N arenas (vertices) and M trails (edges). Each arena i ($1 \le i \le N$) is initially controlled by a guardian with a power level of a_i. You begin your campaign at arena 1, possessing an initial power level of $p = a_1$.

To achieve your goal, you must navigate the network via the trails and secure every single arena. You may revisit arenas multiple times, but a guardian is only challenged upon your first arrival at their arena.

Combat Mechanics: When you arrive at an unvisited arena i ($i \neq 1$), an intellectual duel initiates:

- If your current power $p \ge a_i$, you overcome the guardian instantly without suffering any losses. Your power remains p.
- If your current power $p < a_i$, you must engage in repeated debates and trials until you succeed. You will endure exactly $\lfloor a_i/p \rfloor$ defeats. After these experiences, your understanding deepens, and your power level permanently increases to exactly a_i.

Determine the absolute minimum total number of defeats you must endure to successfully secure all arenas in Samarkand.

Input

The first line contains two integers N and M — representing the number of arenas and the number of trails, respectively.

The second line contains N integers: $a_1, a_2, \ldots, a_N$, where a_i denotes the initial power of the guardian controlling arena i.

The next M lines each contain two integers u and v, representing a bidirectional trail connecting arena u and arena v.

Output

Output a single integer representing the minimum possible number of total defeats required to secure every arena.

Constraints

- $2 \le N \le 2 \cdot 10^5$
- $N - 1 \le M \le 4 \cdot 10^5$
- $1 \le a_i \le 10^{18}$

- The graph is guaranteed to be connected.

Scoring

- **Subtask 1 (14 points):** The graph forms a single simple path (a line graph). $M = N-1$. For the i. edge $1 \leq i < N$, $u_i = i, v_i = i+1$.
- **Subtask 2 (15 points):** $N, M \leq 2000$
- **Subtask 3 (19 points):** $N \leq 2000$
- **Subtask 4 (24 points):** For each edge that connects arena u and arena v, $min(a_u, a_v)*2 > max(a_u, a_v)$.
- **Subtask 5 (28 points):** No additional constraints.

Examples

standard input	standard output
4 3 5 12 2 20 1 2 1 3 2 4	3
5 4 3 10 20 4 5 1 2 2 3 1 4 4 5	5

Explanation

Example 1: You start at arena 1 with power $p = 5$.

1. Move to arena 3. Since $p = 5 \geq a_3 = 2$, you win instantly. Defeats: 0. Power remains 5.
2. Move back to 1, then to arena 2. Here $p = 5 < a_2 = 12$. You suffer $\lfloor 12/5 \rfloor = 2$ defeats. Your power becomes 12.
3. Move to arena 4. Since $p = 12 < a_4 = 20$, you suffer $\lfloor 20/12 \rfloor = 1$ defeat. Your power becomes 20.

Total defeats: $0 + 2 + 1 = 3$.

Example 2: You start at arena 1 with power $p = 3$. If you choose the path $1 \to 4 \to 5 \to 2 \to 3$, you will face guardians of power 4, 5, 10, and 20 sequentially, taking $1 + 1 + 2 + 2 = 6$ defeats.

However, an optimal strategy is:

1. Move directly to arena 2. You face the 10-power guardian with 3 power. Defeats: $\lfloor 10/3 \rfloor = 3$. Power becomes 10.
2. Move to arena 3. Face the 20-power guardian with 10 power. Defeats: $\lfloor 20/10 \rfloor = 2$. Power becomes 20.

3. Return to arena 1, then visit arenas 4 and 5. With a power of 20, you instantly conquer both (power 4 and 5) without any defeats.

Total defeats using this optimal strategy: $3 + 2 + 0 + 0 = 5$.