Task 5: Ellipticity

In the distant future, Computing Power improves thousandfold, but cryptography standards remain stagnant. Nowadays, even Elliptic Curve Encryption can be cracked in a matter of minutes. Thus was gone the age where people sent information to one another through the internet, and a new industry was born; the physical transport of data.

You are a courier at Hammond Industries, which specializes in sending information between cities. An important part of your job is speed, as hackers are constantly targeting your network-connected GPS and Scooter in an attempt to steal the data you carry.

Obviously, this dystopian world is split into multiple sanctuaries that are not easily traversed by foot. Your map indicates that there are ***N*** cities and ***M*** bidirectional guidance lines, with the **i**th line taking ***t*** microseconds to travel. Your depot is located at city 1, and today you wish to deliver to city ***N*** by traveling along the guidance lines.

Each city has a Hacker Rating System, or HRS, (perhaps factoring things like server power, number of hackers and an absence of White Hat Hackers), given as a positive integer. This affects the security of your carried data, and we assume that the resulting security is equal to the median of the Hacker Ranking System among all cities passed along the journey (including nodes 1 and ***N***).

The higher the HRS, the more secure the data is.

Luckily for our calculations, no matter how we travel, even if taking guidance lines more than once, we must travel through an even number of them to pass from city 1 to city ***N***. Aligning with company beliefs, you must deliver to your client in the shortest amount of time possible, and you must also maximize the security to this constraint. Corporate believes that speed is everything so the first constraint is more important. Your task is to find the shortest time as well as determine the maximum security of data across all paths in the shortest time possible.

*Recall that the median is the middle number of a sorted list, hence the median of {1, 3, 6, 9, 11} is the 3rd position, 6.

Input format

Your program must read from standard input

The first line contains 2 integers ***N*** and ***M*** .

The next line contains ***N*** integers a1 ... aN , where ai is the Hacker Rating System of the ith city.

M lines follow, the ith line contains 3 integers u_i v_i t_i describing a guidance line between cities u_i and v_i taking t_i microseconds to travel.

Output format

Output two space-separated integers, the time needed to deliver the data and the maximum security.

Constraints

The maximum execution time on each instance is 1.0s. Your program will be tested on sets of input instances that satisfy the following limits:

- $3 \leq N \leq 10^5$
- $N - 1 \leq M \leq 2 \times 10^5$
- $1 \leq a_i \leq 10^9$
- $1 \leq u_i, v_i \leq N$
- $1 \leq t_i \leq 104$
- There is always a feasible path between 2 cities that meets the requirements
- City ***N*** cannot be reached with from City 1 with an odd number of guidance lines

Subtask	Marks	Additional Limits
1	20	$a_i = 1$
2	20	$M = N - 1$
3	10	$a_i \leq 5$
4	20	$t_i = 1$ $N \leq 200$
5	30	No further restrictions

Sample Testcase 1

This testcase is valid for subtask 2 and 5.

Input	Output
3 2 3 1 4 1 2 15 2 3 92	107 3

Explanation

Only 1 path is feasible here, 1 → 2 → 3, and this path has a median HRS of 3.

Sample Testcase 2

This testcase is valid for subtask 3, 4 and 5.

Input	Output
8 10 1 1 1 1 2 2 2 2 1 2 1 1 3 1 2 4 1 4 3 1 4 5 1 4 7 1 8 5 1 8 7 1 6 2 1 6 7 1	4 2

Explanation

The most optimal path is 1 → 2 → 6 → 7 → 8.

By choosing this route, the set of HRS is {1, 1, 2, 2, 2}, which has a median of 2, the highest possible.

Sample Testcase 3

This testcase is valid for subtask 5.

Input	Output
7 8 1 2 3 4 5 6 7 1 2 1 1 4 3 3 2 1 3 4 1	11 5

3 6 100 5 4 1 5 6 1 6 7 6	

Explanation

There are 2 paths that take the equal shortest time.

Path 1: 1 → 2 → 3 → 4 → 5 → 6 → 7

Path 2: 1 → 4 → 5 → 6 → 7

Both take 11 microseconds to travel, but involve different HRS ratings.

Path 1 HRS: {1, 2, 3, 4, 5, 6, 7}

Path 2 HRS: {1, 4, 5, 6, 7}

The median of path 1 is 4, whereas path 2 has a median of 5. Hence path 2 is the more optimal path.