



USACO 2020 JANUARY CONTEST, SILVER PROBLEM 3. WORMHOLE SORT

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English (en) ▼

Farmer John's cows have grown tired of his daily request that they sort themselves before leaving the barn each morning. They have just completed their PhDs in quantum physics, and are ready to speed things up a bit.

This morning, as usual, Farmer John's N cows ($1 \leq N \leq 10^5$), conveniently numbered $1 \dots N$, are scattered throughout the barn at N distinct locations, also numbered $1 \dots N$, such that cow i is at location p_i . But this morning there are also M wormholes ($1 \leq M \leq 10^5$), numbered $1 \dots M$, where wormhole i bidirectionally connects location a_i with location b_i , and has a width w_i ($1 \leq a_i, b_i \leq N, a_i \neq b_i, 1 \leq w_i \leq 10^9$).

At any point in time, two cows located at opposite ends of a wormhole may choose to simultaneously swap places through the wormhole. The cows must perform such swaps until cow i is at location i for $1 \leq i \leq N$.

The cows are not eager to get squished by the wormholes. Help them maximize the width of the least wide wormhole which they must use to sort themselves. It is guaranteed that it is possible for the cows to sort themselves.

SCORING:

- Test cases 3-5 satisfy $N, M \leq 1000$.
- Test cases 6-10 satisfy no additional constraints.

INPUT FORMAT (file wormsort.in):

The first line contains two integers, N and M .

The second line contains the N integers p_1, p_2, \dots, p_N . It is guaranteed that p is a permutation of $1 \dots N$.

For each i between 1 and M , line $i + 2$ contains the integers a_i, b_i , and w_i .

OUTPUT FORMAT (file wormsort.out):

A single integer: the maximum minimal wormhole width which a cow must squish itself into during the sorting process. If the cows do not need any wormholes to sort themselves, output -1 .

SAMPLE INPUT:

```
4 4
3 2 1 4
1 2 9
1 3 7
2 3 10
2 4 3
```

SAMPLE OUTPUT:

9

Here is one possible way to sort the cows using only wormholes of width at least 9:

- Cow 1 and cow 2 swap positions using the third wormhole.
- Cow 1 and cow 3 swap positions using the first wormhole.
- Cow 2 and cow 3 swap positions using the third wormhole.

SAMPLE INPUT:

```
4 1
1 2 3 4
4 2 13
```

SAMPLE OUTPUT:

-1

No wormholes are needed to sort the cows.

Problem credits: Dhruv Rohatgi

Contest has ended. No further submissions allowed.
