DMOPC '18 Contest 3 P4 - Bob and English Class

Time limit: 1.0s **Memory limit:** 256M
Java: 2.5s

Bob's English class has been given a project which must be done in pairs. The class size, K, is even. Each pair needs to meet outside class to do the project.

The city which Bob and his classmates live in is a tree. It has N zones labelled $1, 2, \ldots, N$. There are $N-1$ roads so that one can travel from any zone to any other. The i^{th} road connects zones a_i and b_i and has distance d_i.

The i^{th} student lives in zone z_i. Bob defines the **cost** of a pair to be the distance between the zones of the two students in the pair. Bob is wondering what the total of the $\frac{K}{2}$ costs is. Since the pairs haven't been assigned yet, he wants to know the worst-case. That is, what is the maximum possible total of the costs?

Constraints

K is even
$1 \leq z_i \leq N$
$1 \leq a_i, b_i \leq N$
$1 \leq d_i \leq 1\,000$

Subtask 1 [10%]

$a_i = i, b_i = i+1$ for all $i = 1, 2, \ldots, N-1$
$2 \leq K \leq 200\,000$
$2 \leq N \leq 200\,000$

Subtask 2 [20%]

$2 \leq K \leq 10$
$2 \leq N \leq 200\,000$

Subtask 3 [30%]

$2 \leq K \leq 70$
$2 \leq N \leq 70$

Subtask 4 [40%]

$2 \leq K \leq 200\,000$
$2 \leq N \leq 200\,000$

Input Specification

The first line contains two space-separated integers, K and N.
The next line contains K space-separated integers, $z_1, z_2, \ldots, z_K$.
The next $N-1$ lines each contain three space-separated integers, a_i, b_i, d_i, the description of i^{th} road.

Output Specification

Output a single integer, the maximum possible total.

Sample Input 1

```
8 4
2 2 2 2 1 2 2 2
1 2 7
1 3 3
1 4 1
```

Sample Output 1

```
7
```

Explanation for Sample 1

The pairs of students $(1, 5), (2, 6), (3, 7), (4, 8)$ give costs $0, 0, 7, 0$. The total is 7 which is the maximum possible.

Sample Input 2

```
8 8
1 2 3 4 5 6 7 8
1 4 2
2 4 7
3 4 7
4 5 1
5 6 2
6 7 3
7 8 4
```

Sample Output 2

```
36
```

Explanation for Sample 2

The pairs of students $(1, 8), (2, 7), (3, 6), (4, 5)$ give costs $12, 13, 10, 1$. The total is 36 which is the maximum possible.

Sample Input 3

```
10 5
1 1 1 1 1 5 5 5 5 5
1 2 1
2 3 1
3 4 1
4 5 1
```

Sample Output 3

```
20
```

Explanation for Sample 3

The pairs of students $(1, 6), (2, 7), (3, 8), (4, 9), (5, 10)$ give costs $4, 4, 4, 4, 4$. The total is 20 which is the maximum possible.