Competitive Programming SS23

Submit until end of contest

Problem: xorduck (1.0 second timelimit)

Note: This is a problem that is harder to solve than usual. Solve the other problems first before spending too much time on this one.

After returning from her skiing trip to Mars, Zoe is back home with her pet duck *Dag*. Dag loves to run around in complete undirected graphs, like the one Zoe built yesterday. However, it is not complete yet, as she did not complete the part where she puts a non-negative integer on every edge.

Dag is very picky. She would be extraordinarily disturbed, should the integers on all edges not xor to zero. Furthermore, Dag will select a subgraph as her home. A pet duck home obviously should include as few edges as possible, to still be able to reach all nodes without leaving the home. Moreover, the sum of the integers on the home's edges should be as small as possible.

Zoe is wondering how to finish the graph to make Dag's home as nice as possible.

Input The first line contains $2 \leq n \leq 10^5$ and $0 \leq m \leq \min\left(2 \cdot 10^5, \frac{n^2-n}{2} - 1\right)$, the number of nodes and the number of edges that already have integers. The following m lines each contain u, v and w, the two nodes of an assigned edge ($1 \leq u, v \leq n$ and $u \neq v$) and the integer on the edge $0 \leq w < 2^{30}$.

Output Print the minimum sum of integers Dag's home could have, if you can finish the graph however you want.

Sample input

```
4 4
1 2 7
2 4 15
3 1 14
4 3 14
```

Sample output

```
15
```

```
5 6
2 4 11
1 4 7
5 3 10
2 3 14
3 4 8
2 1 6
```

```
6
```

```
6 6
5 2 4
6 4 1
4 3 7
5 4 10
5 3 1
3 6 15
```

```
0
```