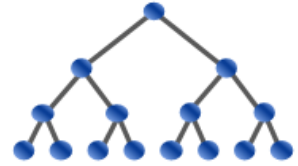


USA Computing Olympiad



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USACO 2023 DECEMBER CONTEST, GO

PROBLEM 2. MINIMUM LONGEST TRIP


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Contest has ended.

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 English (en) ▼

Bessie is going on a trip in Cowland, which has N ($2 \leq N \leq 2 \cdot 10^5$) towns numbered from 1 to N and M ($1 \leq M \leq 4 \cdot 10^5$) one-way roads. The i th road runs from town a_i to town b_i and has label l_i ($1 \leq a_i, b_i \leq N$, $1 \leq l_i \leq 10^9$).

A *trip* of length k starting at town x_0 is a sequence of towns x_0, x_1, \dots, x_k , such that there is a road from town x_i to town x_{i+1} for all $0 \leq i < k$. It is guaranteed that there are no trips of infinite length in Cowland, and that no two roads connect the same pair of towns.

For each town, Bessie wants to know the longest possible trip starting at it. For some starting towns, there are multiple longest trips - out of these, she prefers the trip with the lexicographically minimum sequence of road labels. A sequence is lexicographically smaller than another sequence of the same length if, at the first position in which they differ, the first sequence has a smaller element than the second sequence.

Output the length and sum of road labels of Bessie's preferred trip starting at each town.

INPUT FORMAT (input arrives from the terminal / stdin):

The first line contains N and M .

The next M lines each contain three integers a_i , b_i , and l_i , denoting a road from a_i to b_i with label l_i .

OUTPUT FORMAT (print output to the terminal / stdout):

Output N lines. The i th should contain two space-separated integers, the length and sum of road labels of Bessie's preferred trip starting at town i .

SAMPLE INPUT:

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

SAMPLE OUTPUT:

```
0 0
1 10
1 10
2 20
```

SAMPLE INPUT:

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

SAMPLE OUTPUT:

```
0 0
1 10

1 5
2 12
```

In the following explanation, we let $a_i \xrightarrow{l_i} b_i$ represent the road from a_i to b_i with label l_i .

There are several trips starting from vertex 4, including $4 \xrightarrow{4} 3 \xrightarrow{5} 1 \xrightarrow{4} 1$ and $4 \xrightarrow{2} 2 \xrightarrow{10} 1$. Of these trips, $4 \xrightarrow{4} 3 \xrightarrow{5} 1$ and

There are several trips starting from vertex 4, including $4 \rightarrow 2 \rightarrow 1$, $4 \rightarrow 3 \rightarrow 2 \rightarrow 1$, and $4 \rightarrow 2 \rightarrow 1$. Of these trips, $4 \rightarrow 2 \rightarrow 1$ and $4 \rightarrow 3 \rightarrow 2 \rightarrow 1$ are the longest. These trips each have length 2, and their road label sequences are $[4, 5]$ and $[2, 10]$, respectively. $[2, 10]$ is the lexicographically smaller sequence, and its sum is 12.

SAMPLE INPUT:

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

SAMPLE OUTPUT:

```
0 0
1 10
1 5
2 7
```

SAMPLE INPUT:

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

SAMPLE OUTPUT:

```
0 0
1 5
1 10
2 7
```

SCORING:

- Inputs 5-6: All labels are the same.
- Inputs 7-8: All labels are distinct.
- Inputs 9-10: $N, M \leq 5000$
- Inputs 11-20: No additional constraints.

Problem credits: Claire Zhang and Spencer Compton

Contest has ended. No further submissions allowed.