USA Computing Olympiad

Overview

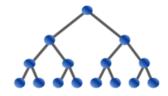
TRAINING

CONTESTS

HISTORY

STAFF

Resources



USACO 2023 DECEMBER CONTEST, GOLD PROBLEM 2. MINIMUM LONGEST TRIP

Return to Problem List

Contest has ended.

Submitted; Results below show the outcome for each judge test case																							
4	k		*		*		*		*		*		*		*		*		*		*		*
1 14	4.1mb 8ms	2	14.1mb 7ms	3	14.1mb 7ms	4	14.1mb 7ms	5	33.2mb 466ms	6	33.4mb 479ms	7	29.6mb 315ms	8	29.6mb 330ms	9	14.4mb 13ms	10	14.4mb 13ms	11	32.9mb 464ms	12	32.9mb 464ms
1					*		*		*		*		*		*		*		*				
				13	32.9mb 463ms	14	32.9mb 464ms	15	32.4mb 499ms	16	33.2mb 431ms	17	33.2mb 446ms	18	33.2mb 431ms	19	32.9mb 425ms	20	32.9mb 420ms				

English (en) 💠

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

A *trip* of length k starting at town x_0 is a sequence of towns x_0, x_1, \ldots, x_k , such that there is a road from town x_i to town x_{i+1} for all $0 \le i < k$. 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 (pipe 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 (pipe stdout):

Output N lines. The ith 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

0 0 1 10 1 5 2 12 In the following explanation, we let $a_i \stackrel{l_i}{\to} b_i$ represent the road from a_i to b_i with label l_i . There are several trips starting from vertex 4, including $4 \stackrel{4}{\rightarrow} 3 \stackrel{5}{\rightarrow} 1$, $4 \stackrel{1}{\rightarrow} 1$, and $4 \stackrel{2}{\rightarrow} 2 \stackrel{10}{\rightarrow} 1$. Of these trips, $4 \stackrel{4}{\rightarrow} 3 \stackrel{5}{\rightarrow} 1$ and $4\stackrel{2}{\to}2\stackrel{10}{\to}1$ 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: $N, M \le 5000$ • Inputs 11-20: No additional constraints.

Contest has ended. No further submissions allowed.

Problem credits: Claire Zhang and Spencer Compton

Previous Submissions:

SAMPLE OUTPUT:

Sun, Dec 17, 2023 02:39:43 EST (C++11)