

ITMOx: I2CPx How to win coding competitions: secrets of champions

Help



▶ How To?

Week 1

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▼ Week 4

Algorithms on **Graphs**

4th Week **Problems**

due Dec 4, 2016 22:00 **CET**

4th Week

Problems: Training

Week 5

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Shortest Paths and Their Friends

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Shortest Paths and Their Friends

2.0/2.0 points (graded)

Input file:	path.in
Output file:	path.out
Time limit:	2 seconds
Memory limit:	256 megabytes

You are given a weighted oriented graph, and a vertex s in it. For every vertex u, find the length of the shortest path from s to u.

Input

The first line of the input file contains N, M and S – these are the number of vertices, the number of edges, and the index of the vertex s correspondingly ($2 \le N \le 2000$, $1 \le M \le 5000$, $1 \le S \le N$). The next M lines contain the edge descriptions. Every edge is described by its source vertex, target vertex, and its weight. A weight of an edge is an integer not exceeding 10¹⁵ by its absolute value.

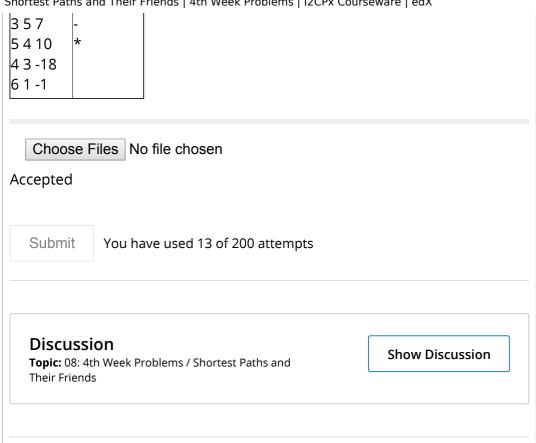
Vertex indices are one-based. The graph may contain multiple edges between the same ordered pair of vertices, as well as loops.

Output

Output N lines. The i-th line should contain the length of the shortest path from s to the vertex with the index i. If there is no path from s to this vertex, output "*". If there is no shortest path from s to this vertex, output "-".

Example

path.in	path.out
671	0
1 2 10	10
2 3 5	-
1 3 100	-



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