

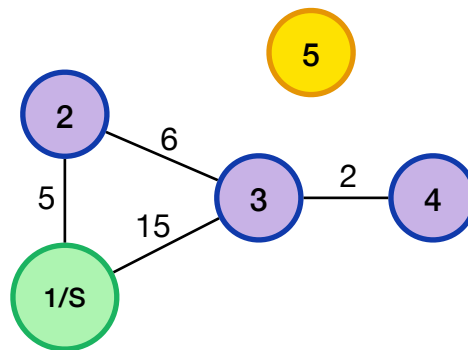
Dijkstra: shortest reach 2

<https://www.hackerrank.com/challenges/dijkstrashortreach/problem>

Given an undirected graph and a starting node, determine the lengths of the shortest paths from the starting node to all other nodes in the graph. If a node is unreachable, its distance is -1 . Nodes will be numbered consecutively from 1 to n , and edges will have varying distances or lengths.

For example, consider the following graph of 5 nodes:

Begin	End	Weight
1	2	5
2	3	6
3	4	2
1	3	15



Starting at node 1, the shortest path to 2 is direct and distance 5. Going from 1 to 3, there are two paths: $1 \rightarrow 2 \rightarrow 3$ at a distance of $5 + 6 = 11$ or $1 \rightarrow 3$ at a distance of 15. Choose the shortest path, 11. From 1 to 4, choose the shortest path through 3 and extend it:

$1 \rightarrow 2 \rightarrow 3 \rightarrow 4$ for a distance of $11 + 2 = 13$. There is no route to node 5, so the distance is -1 .

The distances to all nodes in increasing node order, omitting the starting node, are 5 11 13 -1 .

Function Description

Complete the `shortestReach` function in the editor below. It should return an array of integers that represent the shortest distance to each node from the start node in ascending order of node number.

`shortestReach` has the following parameter(s):

- n : the number of nodes in the graph
- `edges`: a 2D array of integers where each `edges[i]` consists of three integers that represent the start and end nodes of an edge, followed by its length
- `s`: the start node number

Input Format

The first line contains t , the number of test cases.

Each test case is as follows:

- The first line contains two space-separated integers n and m , the number of nodes and edges in the graph.
- Each of the next m lines contains three space-separated integers x , y , and r , the beginning and ending nodes of an edge, and the length of the edge.
- The last line of each test case has an integer s , denoting the starting position.

Constraints

- $1 \leq t \leq 10$
- $2 \leq n \leq 3000$

- $1 \leq m \leq \frac{N \times (N - 1)}{2}$
- $1 \leq x, y, s \leq N$
- $1 \leq r \leq 10^5$

If there are edges between the same pair of nodes with different weights, they are to be considered as is, like multiple edges.

Output Format

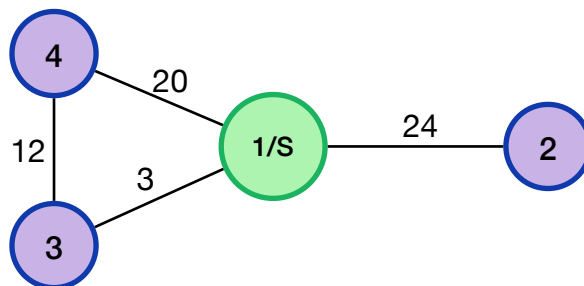
For each of the t test cases, print a single line consisting $n - 1$ space separated integers denoting the shortest distance to the $n - 1$ nodes from starting position s in increasing order of their labels, excluding s .

For unreachable nodes, print -1 .

Sample Input	Sample Output
<pre> 1 4 4 1 2 24 1 4 20 3 1 3 4 3 12 1 </pre>	<pre> 24 3 15 </pre>

Explanation

The graph given in the test case is shown as :



The lines are weighted edges where weight denotes the length of the edge.

The shortest paths followed for the three nodes 2, 3 and 4 are as follows :

$1/S \rightarrow 2$ – Shortest Path Value : 24

$1/S \rightarrow 3$ – Shortest Path Value : 3

$1/S \rightarrow 3 \rightarrow 4$ – Shortest Path Value : 15