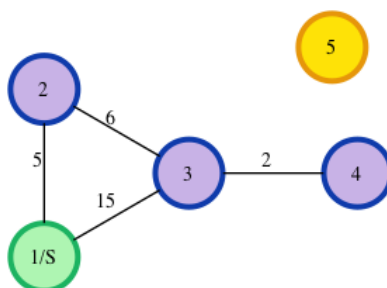


# Dijkstra: Shortest Reach 2

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
3 1/S 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

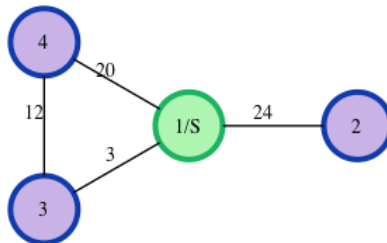
```
1
4 4
1 2 24
1 4 20
3 1 3
4 3 12
1
```

### Sample Output

```
24 3 15
```

### 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->2** - Shortest Path Value : **24**

**1/S->3** - Shortest Path Value : **3**

**1/S->3->4** - Shortest Path Value : **15**