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Dijkstra: Shortest Reach 2

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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, you have the following graph of 5 nodes:

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

If we start 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. We choose the shortest path, 11. From 1 to 4, we 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.

If we print the distances to all of the nodes in increasing node order and omitting the starting node, we print `5 11 13 -1`.

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

$1 \leq t \leq 10$
$2 \leq n \leq 3000$
$1 \leq m \leq \frac{N*(N-1)}{2}$
$1 \leq x, y, s \leq N$
$1 \leq r \leq 10^5$

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

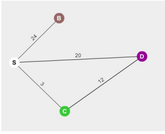
```
1
4 4
1 2 24
1 4 20
3 1 3
4 3 12
1
```

Sample Output

```
24 3 15
```

Explanation

The graph given in the test case is shown as :



- The straight line is a weighted edge, denoting length of edge between the corresponding nodes.
- The nodes S,B,C and D denote the obvious node 1,2,3 and 4 in the test case.

The shortest paths followed for the three nodes B,C and D are as follows :

S->B - Shortest Path Value : 24

S->C - Shortest Path Value : 3

S->C->D - Shortest Path Value : 15

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Current Buffer (saved locally, editable) PHP

```php
<?php

// Complete the shortestReach function below.
function shortestReach($n, $edges, $s) {
    $sOrigem = 0;
    $sConglado = $s;
    $m = count($edges);
    $jumps = $n * $m;
    for($i=0; $i < $m; $i++) {
    //definição de trechos, pontos e distancias
    if(!isset($edges[$i][1])){
        $trajetos[$edges[$i][0].'_0']['distance'] = -1;
        $trajetos[$edges[$i][0].'_0']['verified'] = 1;
    }else $trajetos[$edges[$i][0].'_'.$edges[$i][1]]['distance'] = $edges[$i][2];
    $pontos[] = $edges[$i][0];
    $pontos[] = $edges[$i][1];
    }
    $idPercurso = 1;
    $pontos = array_unique($pontos);
    sort($pontos);
    //contrução dos percursos.
    $jumpsVerify = 0;
    //Montando todos os percursos possíveis.
    do {
      //Construindo todos os trajetos possíveis do percuso.
      do {
        $registry = 0;
        $verify = 0;
        //Percorrendo todos os pontos existentes do percurso.
        foreach ($pontos as $value){
          //procurando os trajetos cadastrados
          if (isset($trajetos[$s.'_'.$value])
            && !isset($trajetos[$s.'_'.$value]['verified'])
            && $s != $sOrigem){
              $rotaDefault = $rota = $s.'_'.$value;
              $registry = 1;
          } elseif (isset($trajetos[$value.'_'.$s])
            && !isset($trajetos[$value.'_'.$s]['verified'])
            && $value != $sOrigem) {
              $rota = $value.'_'.$s;
              $rotaDefault = $s.'_'.$value;
              $registry = 1;
          } else $registry = 0;
          if ($registry) {
              $idPercursoFracao = $idPercurso;
            if ($sOrigem){
              $percursoFracao[$idPercursoFracao] = $percurso[$idPercurso];
              $idPercurso++;
              $percurso[$idPercurso] = $percursoFracao[$idPercursoFracao];
            }
            //registrando da existencia do trecho.
            $trajetos[$rota]['verified'] = 1;
            //adicionando da distancia do trecho ao percurso.
            if (!isset($percurso[$idPercurso]['distance']))
                $percurso[$idPercurso]= array('distance'=>0);
            $percurso[$idPercurso]['distance'] += $trajetos[$rota]['distance'];
            //recuperando a origem e o destino do trecho.
            $startEnd = explode('_', $rotaDefault);
            //atualizando dos pontos percurso A -> B -> C ==> A -> C
            if (empty($percurso[$idPercurso]['start']))
                $percurso[$idPercurso]['start'] = $startEnd[0];
            $percurso[$idPercurso]['finally'] = $startEnd[1];
            //concatenando os trechos percorridos da rota.
            if (!isset($percurso[$idPercurso]['route']))
                $percurso[$idPercurso]['route'] = null;
            $percurso[$idPercurso]['route'] .= $rota.',';
            $s = $startEnd[1];
            $registry = 0;
            $sOrigem = $sConglado;
            break;
          }
          $verify++;
          //Montando todos os percursos possíveis.
          $jumpsVerify++;
        }
      //Verificando os trajetos já traçados.
      } while ($verify < $n);
      //Retornando o valor inicial de $s.
      $s = $sConglado;
      //Determinando $sOrigem como 0 novamente.
      $sOrigem = 0;
      // Incrementando $idPercurso.
      $idPercurso++;
      //Efetuando a verificação dos saltos, que são as vezes que o código percorre as possibilidades de nós.
    } while ($jumpsVerify <= $jumps);
    //Deletando os percursos maiores que apareceram com ['start'] e ['finally'] iguais.
    for($i = 1;$i <= count($percurso); $i++){
      for($j = 1;$j <= count($percurso); $j++){
        if($percurso[$i]['start'] == $percurso[$j]['start']
          && $percurso[$i]['finally'] == $percurso[$j]['finally']
          && $percurso[$i]['distance'] > $percurso[$j]['distance'])
            $percurso[$i]['deleted'] = true;
      }
    }
    //imprimindo o resultado ($result).
    for($i = 1;$i <= count($percurso); $i++)
      if (!isset($percurso[$i]['deleted']))
        $result[] = $percurso[$i]['distance'];
      return $result;
}

$fptr = fopen(getenv("OUTPUT_PATH"), "w");

$stdin = fopen("php://stdin", "r");

fscanf($stdin, "%d\n", $t);

for ($t_itr = 0; $t_itr < $t; $t_itr++) {
    fscanf($stdin, "%[^\n]\n", $nm_temp);
    $nm = explode(' ', $nm_temp);

    $n = intval($nm[0]);

    $m = intval($nm[1]);

    $edges = array();

    for ($i = 0; $i < $m; $i++) {
        fscanf($stdin, "%[^\n]\n", $edges_temp);
        $edges[] = array_map('intval', preg_split('/ /', $edges_temp, -1, PREG_SPLIT_NO_EMPTY));
    }

    fscanf($stdin, "%d\n", $s);

    $result = shortestReach($n, $edges, $s);

    fwrite($fptr, implode(" ", $result) . "\n");
}

fclose($stdin);
fclose($fptr);
```

Line: 101 Col: 1

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Wrong Answer

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✔ Test Case #0	✖ Test Case #1	✖ Test Case #2
⏱ Test Case #3	⏱ Test Case #4	⚠ Test Case #5
⏱ Test Case #6	⚠ Test Case #7	

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