Breadth First Search: Shortest Reach

Consider an undirected graph consisting of n nodes where each node is labeled from 1 to n and the edge between any two nodes is always of length 6. We define node s to be the starting position for a BFS.

Given q queries in the form of a graph and some starting node, s, perform each query by calculating the shortest distance from starting node to all the other nodes in the graph. Then print a single line of $n-1$ space-separated integers listing node 's shortest distance to each of the $n-1$ other nodes (ordered sequentially by node number); if s is disconnected from a node, print -1 as the distance to that node.

Input Format

The first line contains an integer, q, denoting the number of queries. The subsequent lines describe each query in the following format:

- The first line contains two space-separated integers describing the respective values of n (the number of nodes) and m (the number of edges) in the graph.
- Each line i of the m subsequent lines contains two space-separated integers u and v, describing an edge connecting node u to node v.
- The last line contains a single integer, s, denoting the index of the starting node.

Constraints

- $1 \le q \le 10$
- $2 \le n \le 1000$
- $1 \le m \le n(n-1)2 1 \le m \le 2n(n-1)$
- $1 \le u,v,s \le n 1 \le u,v,s \le n$

Output Format

For each of the q queries, print a single line of $n-1$ space-separated integers denoting the shortest distances to each of the $n-1$ other nodes from starting position s. These distances should be listed sequentially by node number (i.e., $1,2,...,n 1,2,...,n$), but should *not* include node s. If some node is unreachable from s, print -1 as the distance to that node.

Sample test

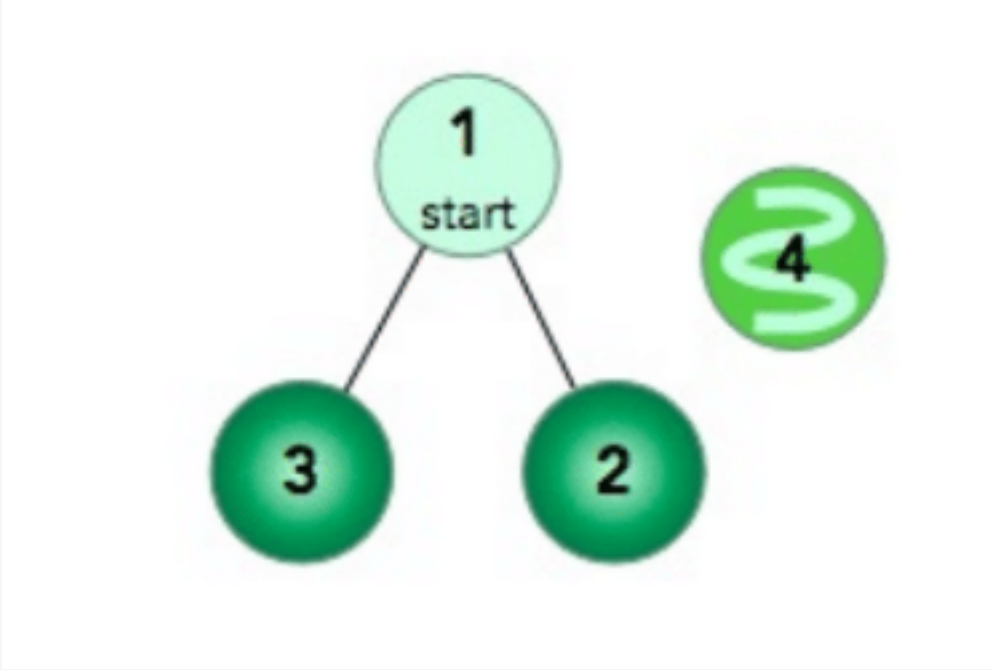
inputcopy
2 4 2 1 2 1 3 1 3 1 2 3 2
outputcopy

```
6 6 -1 -1 6
```

Explanation for sample test

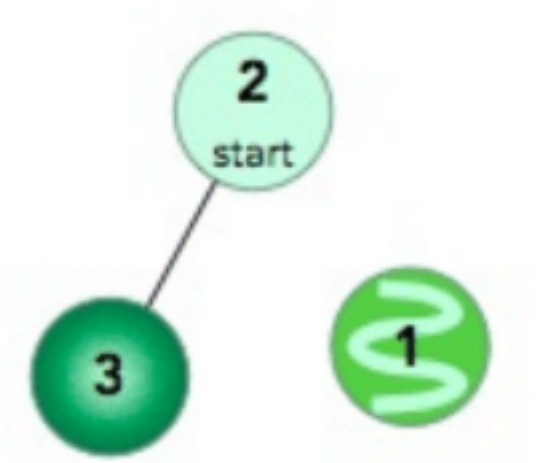
We perform the following two queries:

1. The given graph can be represented as:



Where our start node, s, is node 1. The shortest distances from s to the other nodes are one edge to node 2, one edge to node 3, and an infinite distance to node 4 (which it's not connected to). We then print node 1's distance to nodes 2, 3, and 4 (respectively) as a single line of space-separated integers: `6, 6, -1`.

2. The given graph can be represented as:



Where our start node, *ss*, is node 22. There is only one edge here, so node 11 is unreachable from node 22 and node 33 has one edge connecting it to node 22. We then print node 22's distance to nodes 11 and 33 (respectively) as a single line of space-separated integers: `-1 6`.