

Breadth First Search: Shortest Reach

Problem Statement

Given an undirected graph consisting of N nodes (labelled 1 to N) where a specific given node S represents the start position and an edge between any two nodes is of length 6 units in the graph.

It is required to calculate the shortest distance from start position (Node S) to all of the other nodes in the graph.

Note 1: If a node is unreachable, the distance is assumed as -1 .

Note 2: The length of each edge in the graph is 6 units.

Input Format

The first line contains T , denoting the number of test cases.

First line of each test case has two integers N , denoting the number of nodes in the graph and M , denoting the number of edges in the graph.

The next M lines each consist of two space separated integers x y , where x and y denote the two nodes between which the edge exists.

The last line of a testcase has an integer S , denoting the starting position.

Constraints

$$1 \leq T \leq 10$$

$$2 \leq N \leq 1000$$

$$1 \leq M \leq \frac{N \times (N-1)}{2}$$

$$1 \leq x, y, S \leq N$$

Output Format

For each of T test cases, print a single line consisting of $N - 1$ space separated integers, denoting the shortest distances of the $N-1$ nodes from starting position S .

For unreachable nodes, print -1 .

Sample Input

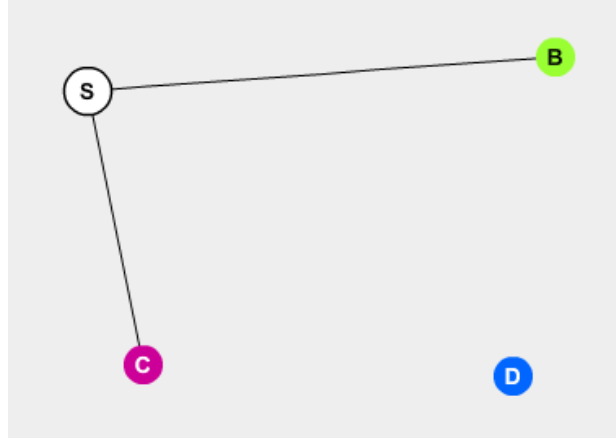
```
1
4 2
1 2
1 3
1
```

Sample Output

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6 6 -1
```

Explanation

The graph given in the test case is shown as :



S denotes the node 1 in the test case and B,C and D denote 2,3 and 4. Since S is the starting node and the shortest distances from it are (1 edge, 1 edge, Infinity) to the nodes B,C and D (2,3 and 4) respectively.

Node D is unreachable, hence -1 is printed (not Infinity).