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Exercise Sheet 1

ACM Programming Challenges Lab

Exercise 1 – *BFS*

Description Compute the distances of all vertices from a given starting vertex using BFS (cf. slides).

Input The first line of the input contains c ($1 \leq c \leq 10$), the number of test cases. Each test case describes a graph and starts with one line containing two numbers n ($1 \leq n \leq 1K$), the number of vertices and m ($0 \leq m \leq n \cdot (n-1)/2$), the number of edges and v ($0 \leq v < n$), the starting vertex. The vertices are identified by the numbers $\{0, \ldots, n-1\}$. The next m lines contain two integers a_i, b_i, indicating that $\{a_i, b_i\}$ is an edge of the graph.

Output For each test case you should output one line containing the depth of the vertices ordered by increasing vertex labels. If a vertex cannot be reached, its depth is -1.

Sample input

```
2
5 4 0
0 1
0 2
2 3
2 4
4 1 2
2 3
```

Sample output

```
0 1 1 2 2
-1 -1 0 1
```