Breadth First Search

(bfs.cpp/c)

Time Limit： 1 sec ， Memory Limit： 131072 KB

Write a program which reads an directed graph $G = (V, E)$, and finds the shortest distance from vertex 1 to each vertex (the number of edges in the shortest path). Vertices are identified by IDs $1, 2, \ldots n$.

Input (bfs.in)

In the first line, an integer n denoting the number of vertices, is given. In the next n lines, adjacent lists of vertex u are given in the following format:

$u\ k\ v_1\ v_2\ \ldots\ v_k$

u is ID of the vertex and k denotes its degree.v_i are IDs of vertices adjacent to u.

Constraints

- $1 \leq n \leq 100$

Output (bfs.out)

For each vertex u, print id and d in a line. id is ID of vertex u and d is the distance from vertex 1 to vertex u. If there are no path from vertex 1 to vertex u, print -1 as the shortest distance. Print in order of IDs.

Sample Input 1

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

Sample Output 1

```
1 0
2 1
```

```
3 2
4 1
```