# CS 2123 Data Structures
## Recitation 6
## Due Friday April 29

Difficulty ⋆⋆⋆ (out of 5)

1. (100 pts) Write a program to the shortest exit route from each room to the outside. You are given a floorplan that shows the rooms and the doors between rooms and between rooms and outside. 1 always denotes the outside.
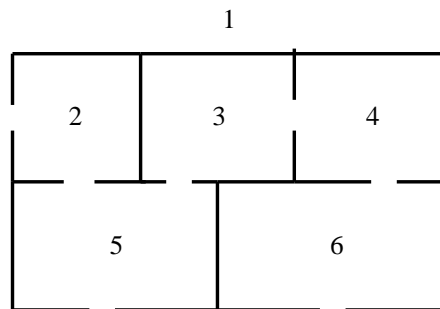


Figure 1: Floorplan

You can model the floorplan as a graph. Each room is a node of the graph and there is an edge between two rooms if there is a door that connects the rooms. Outside area is also considered a room. Graph corresponding to above floorplan is given below.
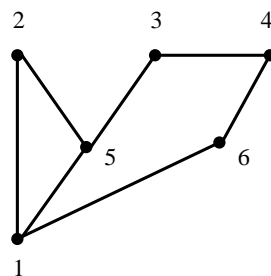


Figure 2: Graph representation

Write a program that reads a file representing a floorplan and outputs the shortest route from each room to outside. Shortest route is the route that has fewest number of doors from the room to the outside.

File format is as follows

```
numofvertices numofedges
edge1
edge2
....
```

First line of the file contains the number of vertices and number of edges. Each edge is listed on one line with source vertex and destination vertex. Vertices start at 1. Edges are undirected

and will be listed on the file once starting with the smallest vertex id. For example, for edges 2-5 and 5-2 the file will only have 2-5. But, you need to insert both to your adjacency list representation.

File for above graph is as follows

```
6 7
1 2
1 5
1 6
2 5
3 4
3 5
4 6
```

Sample output for above graph should be as follows

```
Shortest paths to outside
2: 2 -> 1
3: 3 -> 5 -> 1
4: 4 -> 6 -> 1
5: 5 -> 1
6: 6 -> 1
```

Use adjacency list representation to store the graph and test your program with different input files.

Test your program with different files.

*Submit your program electronically using the blackboard system. Only one member of the group should send it. List the name of the group members on the top of your submission.*