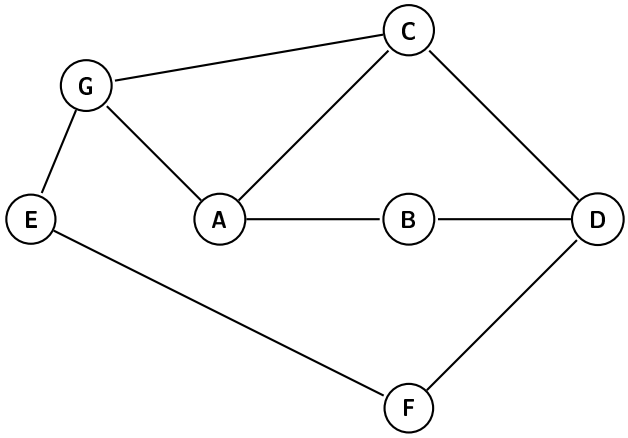
Data Structures and Algorithms

Workshop 7 – Graph practice

Question 1. Use breadth-first search to explore the graph, starting from node B. In the initialization step of the algorithm, you add node B to a queue of nodes to process next, and mark it explored (all other nodes are unexplored). Then you go into the first iteration of the main loop. You repeatedly iterate the main loop until the whole graph is explored. Fill the grid below with the results **after the specified iterations of the main loop**.



Please list the explored nodes in alphabetical order and the queue in the appropriate order specified by the algorithm.

Iteration 1:

Explored nodes	A	B	D				
Queue	A	D					

Iteration 2:

Explored nodes	A	B	C	D	G		
Queue	D	C	G				

Iteration 3:

Explored nodes	A	B	C	D	F	G	
Queue	C	G	F				

Iteration 4:

Explored nodes	A	B	C	D	F	G	
Queue	G	F					

Finish the algorithm, and report the following:

Nodes in order of exploration	B	A	D	C	G	F	E	

Node	A	B	C	D	E	F	G
Shortest distance from B	1	0	2	1	3	2	2

Notice that in terms of the order of visiting nodes, this is just one possible correct solution – there are others. This depends on whether you first go to A or D from B.

Similarly following the algorithm steps in the second problem, the order of exploration could be (for example):

Nodes in order of exploration	E	D	C	F	A	B