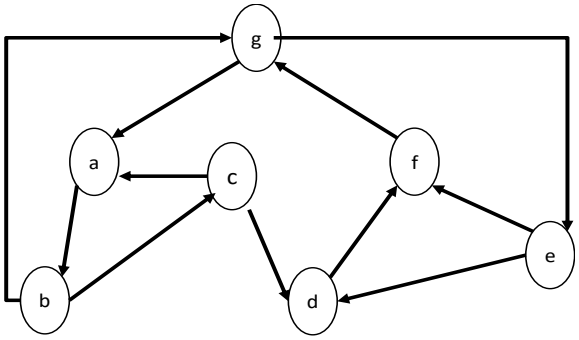
Module IN2002—Data Structures and Algorithms
Answers to Exercise Sheet 9

1. You are given a graph below. Please answer items a and b.



a) What is the order in which the various nodes are visited using breadth first traversal, starting at node “a”?

b) What is the order in which the various nodes are visited using depth first traversal, starting at node “a”?

2. The knight is a chess piece that can move only in L shaped patterns, jumping two squares horizontally and one square vertically, or two squares vertically and one horizontally. This means that in one move, the knight—shown as an X in the table below—can move to any of the squares marked by an O:

		O		O			
	O				O		
			X				
	O				O		
		O		O			

Now consider a knight on a board composed of the following 3 x 4 squares:

A	b	c	d
E	f	g	h
I	j	k	l

a) Show using adjacency lists the possible moves the knight can make in the 3X4 board.

b) Show the possible moves of the knight as a simple graph (i.e., showing positions a, b, ... l as vertices, and the possible moves as edges). You may want to move the vertices around to make the graph clearer.

c) Use Dijkstra's shortest path algorithm to find the lowest number of moves from a to b.
   i. Convert the simple graph into a weighted graph. Consider the number of moves; what weight should you assign to each edge?

   ii. The initial state of arrays toBeChecked, currDist and predecessor is:

	a	b	c	D	e	f	g	h	i	j	k	l
toBeChecked		x	x	X	x	x	x	x	x	x	x	x
currDist	0											
predecessor												

Show the state of arrays toBeChecked, currDist and predecessor after each iteration of Dijkstra's algorithm. You may stop when a shortest path has been found from a to b.