Algorithms Worksheet 3
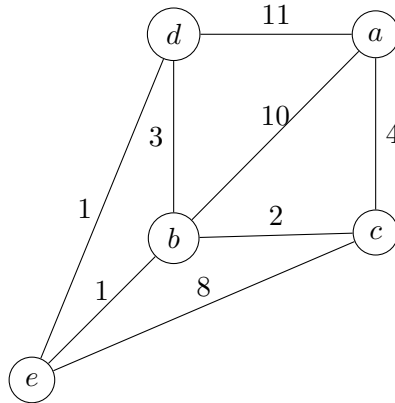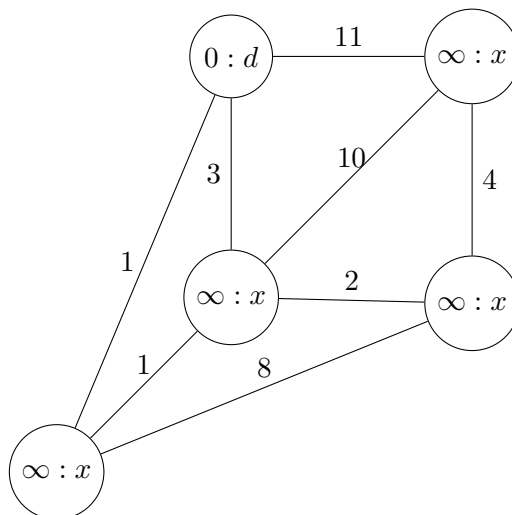
This week there are two question each worth four marks, there are two marks for attendance.

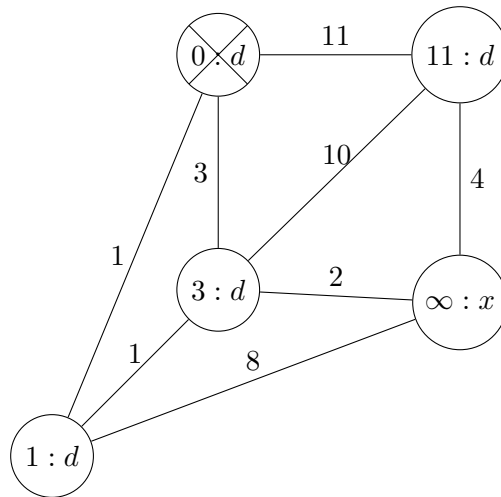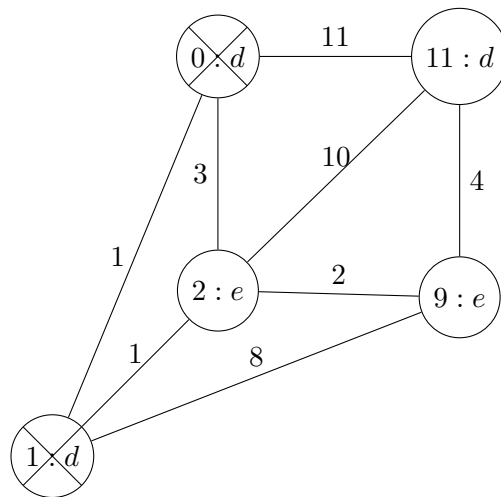1. Us Dijkstra's algorithm to find the shortest path from d to c in

Solution:

Set the distances as ∞ except the first node, the x shows there is no preceeding node.
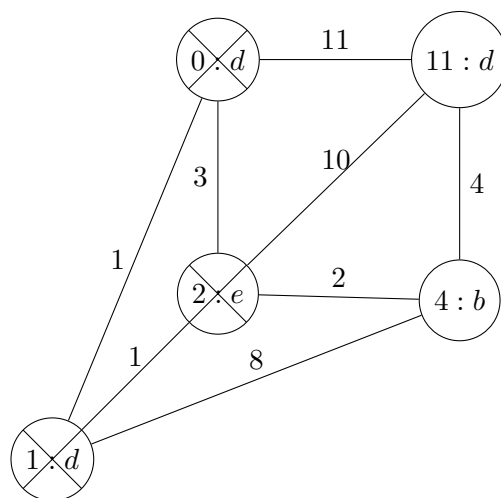

Update the nodes adjacent to the starting node:

Take the lowest distance node and update that:

And again

Since the target node is the lowest available node the algorithm stops and, following back the route is *debc*.

2. In chess a knight moves three squares in one cardinal direction followed by one square in a perpendicular direction. In the chess board below the knight is in the bottom left-hand position, the two squares that it can reach in one move are marked '1', what is the least number of moves that will take it to the square marked ×?
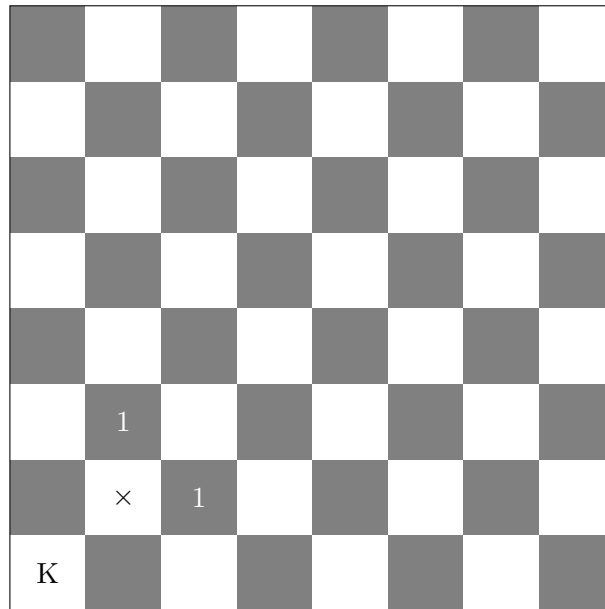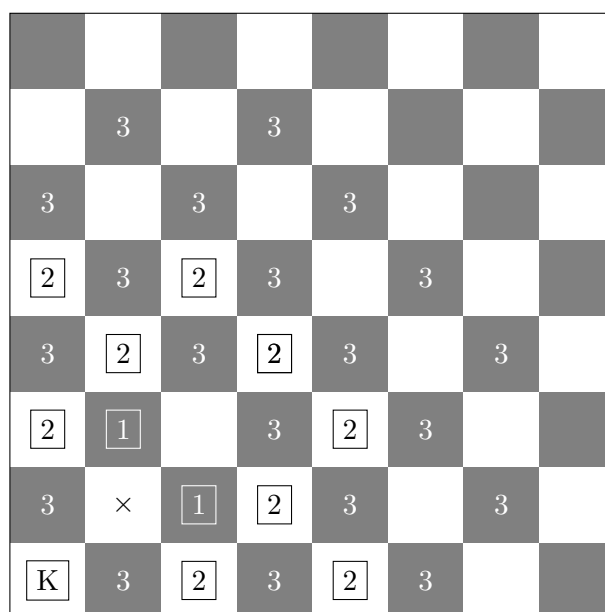
Solution:

This is just a version of Dijkstra's algorithm, do each node in turn and then cross if off, let's use a box to mark the crossed off nodes.
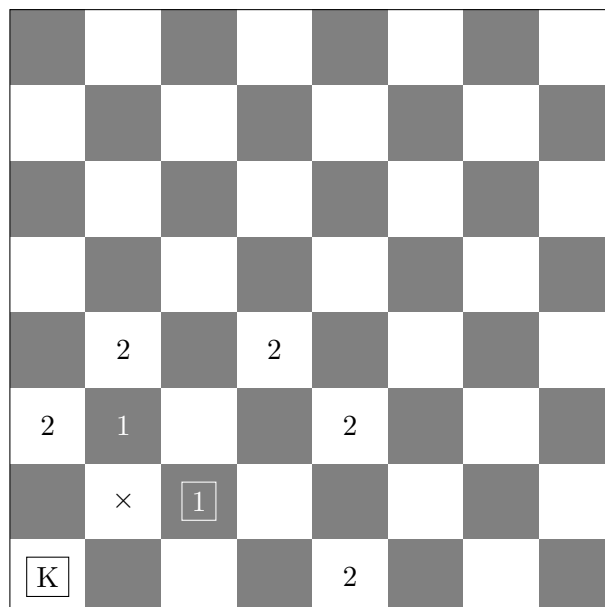
Now all the '3' squares are going to be black, so the knight can't reach the × this go, so let's deal with all the '2' squares straight away.

	3		3				
3		3		3			
2	3	2	3		3		
3	2	3	2	3		3	
2	1		3	2	3		
3	×	1	2	3		3	
K	3	2	3	2	3		

The next move will reach the × so the answer is four.