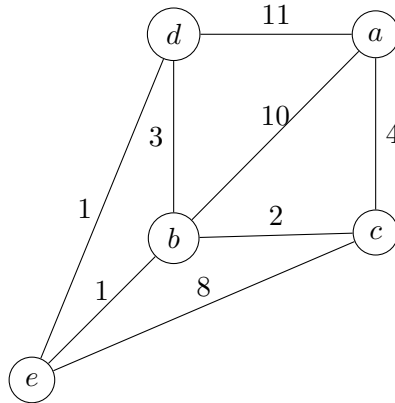


**Algorithms Worksheet 4**

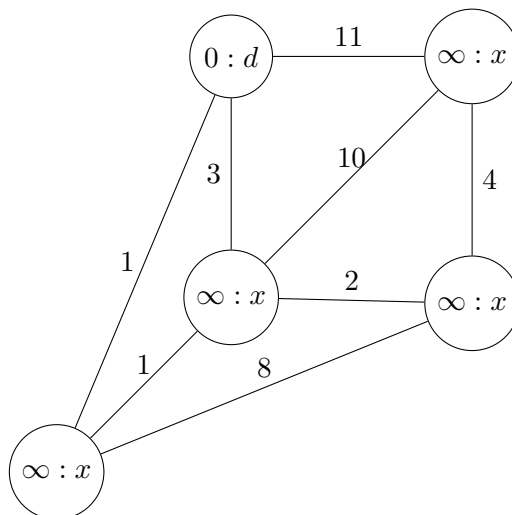
This week there are two question each worth four marks, there are two marks for attendance.

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

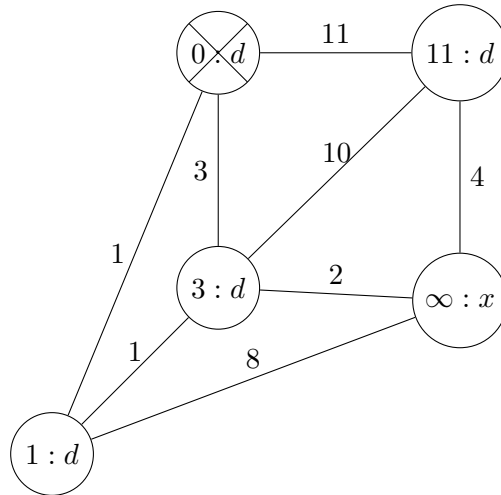


Solution:

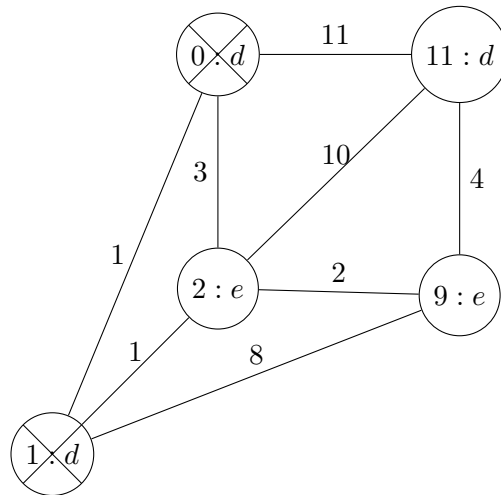
Set the distances as  $\infty$  except the first node, the  $x$  shows there is no preceding node.



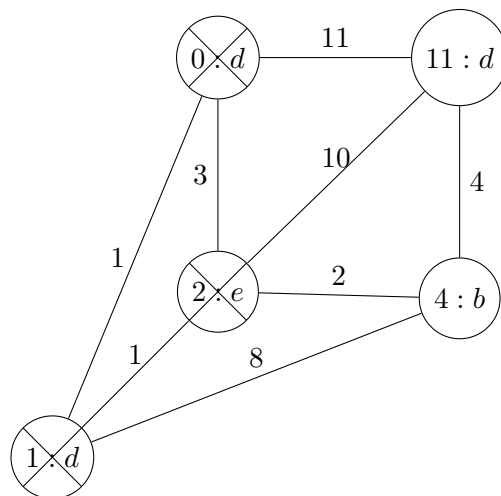
Update the nodes adjacent to the starting node:



Take the lowest distance node and update that:

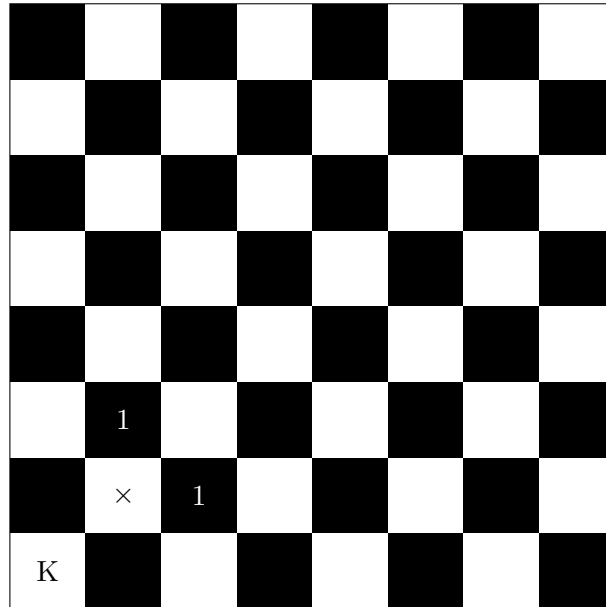


And again



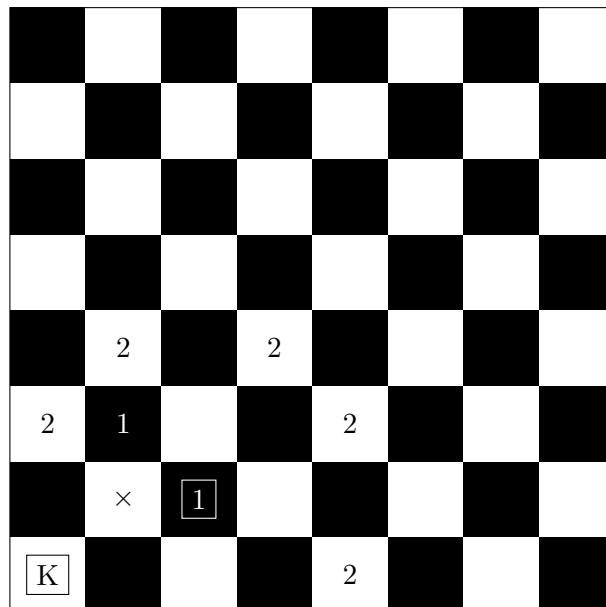
Since the target node is the lowest available node the algorithm stops and, following back the route is *debc*.

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  $\times$ ?

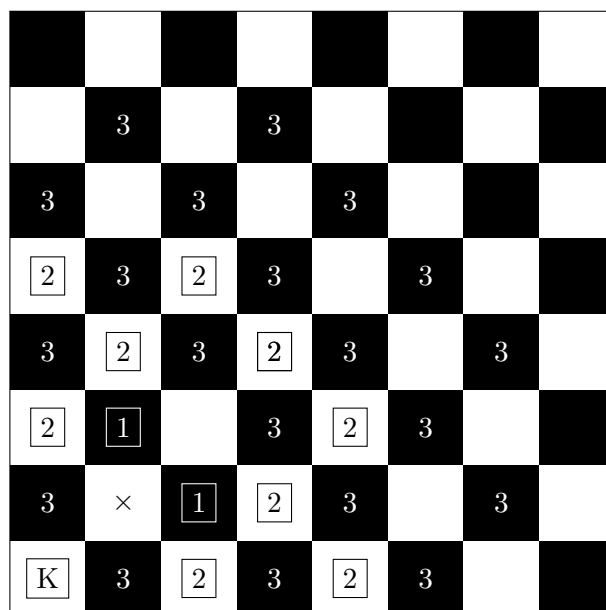


Solution:

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  $\times$  this go, so let's deal with all the '2' squares straight away.



The next move will reach the  $\times$  so the answer is four.