COMP 2019 Workbook Exercises Week 1 – Uninformed Search – Solution

1) BFS with early stopping (i.e. stopping when a goal state is added to the frontier) visits in this order: A,B,C,D,F,M. The path found is A-B-M-L with cost 17.

The above solution assumes that nodes are visited strictly in alphabetic order *within each level*.

If the node ordering is relaxed a little, such that the successors *of each node* are visited in alphabetic order, then the following sequence is obtained: A,B,C,D,**M**. This variant is usually easier to implement, as the frontier does not need to be organised in levels and sorted.

Without early stopping (i.e. stopping when a goal node is retrieved from the frontier), BFS visits in this order: A,B,C,D,F,M,G,H,L (or A,B,C,D,**M,F**,G,H,L when not using the alphabetic order). The path and costs are the same as above.

2) UCS visits: A,C,B,D,M,H,I,J,K,L.
The path found is A-B-M-L with cost 17.

3) DFS visits: A,B,D,G,B,D,G,…
DFS will not find a solution.

If we amend DFS to avoid loops by recognizing states that are on the current path, DFS visits A,B,D,G,H,I,J,K,M,L.
The path found is A-B-D-H-M-L with cost 26.

4) Iterative deepening DFS visits:
A;
A,B,C;
A,B,D,M,C,F;
A,B,D,G,H,M,H,L

The path found is A-B-M-L with cost 17.