# COMP 2019 Workbook Exercises Week 3 – Heuristic Search

Specify in which order the states of the following graph would be expanded under each of the specified search strategies, starting in state A. Assume states are expanded in alphabetical order if there are multiple states to choose. The edge labels denote the true costs of moving between adjacent states. The goal is to find state L.
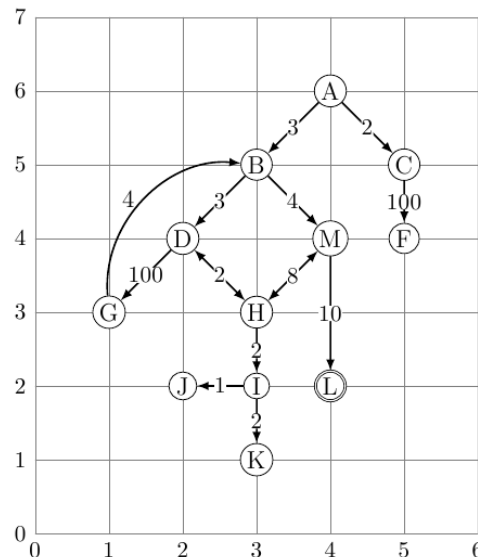
1) Choose a consistent heuristic function for A* suitable to the above search problem.
2) Calculate the estimated distances from states A,B,G to the goal state L.
3) Which path from A to L will A* find using the chosen heuristic function?
   In each step of the algorithm, state g(N), h(N), f(N), the Open and Closed lists, and which state is selected for expansion.
4) How many states will A* expand in the best and worst case (independent of the chosen heuristic function)?
5) What would be the perfect heuristic function? Why is it usually infeasible to construct it?
6) Which search strategy do you obtain if h(N)=0 for all N?
7) Given two consistent heuristic functions $h_1(N)$ and $h_2(N)=h_1(N)+1$ (for N not a goal state). Which heuristic will lead to A* expanding fewer nodes?