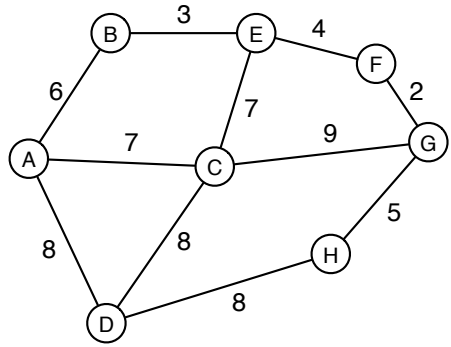
5. (a) Consider the state space shown below, in which the arcs represent the legal successors of a node. Arcs are bi-directional and are labelled with the cost of performing the corresponding action. The start state is **A** and the goal is **F**. Suppose that you are given a heuristic, h_1, defined by the following table.

Node	A	B	C	D	E	F	G	H
h_1	12	7	4	12	4	0	1	6



For each of the following search methods, show the resulting search tree, list the sequence in which nodes are removed from the queue, and state how many nodes are expanded. You should also state the route found and its associated cost. Assume that nodes are inserted into the queue in alphabetical order. When expanding a node, do not generate its parent.

i. Uniform cost search [5]

ii. Greedy best-first search [4]

iii. A* search [5]

(b) Now suppose you are given another heuristic, h_2, defined by the following table.

Node	A	B	C	D	E	F	G	H
h_2	12	7	4	12	7	0	5	8

i. Use A* to determine a route from **A** to **F** using h_2 as the heuristic, showing your search tree and giving the sequence of nodes expanded. State the route found and its associated cost. [3]

ii. For the above problem, which is the better heuristic, h_1 or h_2, and why? [2]

(c) Briefly outline alternative procedures for how you might determine heuristics for a problem, and how you might combine multiple heuristics into a single useful heuristic. [6]