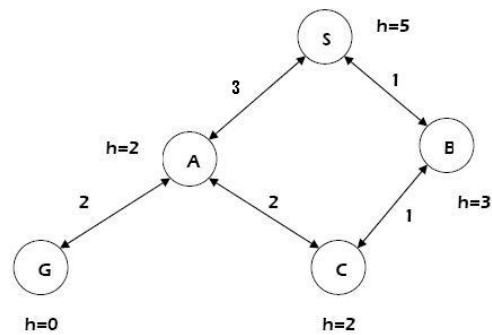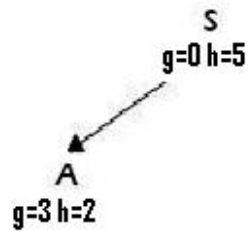6. (30 pts) Consider the graph below to be searched (starting at S and ending at G). Link/edge costs are shown as well as heuristic estimates at the states. You may not need all the information for every search.

a) (6 pts) Draw the **complete search tree** for this graph. Label each node in the tree with the cost of the path to that node and the heuristic cost at that node.

Answer:

b) (16 pts) For each of the searches below, just give a list of node names (state name, length of path) drawn from the tree above. When you need to refer to a node, use the name of the corresponding state and length of that path. To help you the first few sequence of nodes expanded by each of the search is given.

(b1) (4 pts) Perform a depth-first search. Assume children of a state are ordered in alphabetical order. Show the sequence of nodes that are expanded by the search.

Answer: (S 0), (A 3)

(b2) (4 pts) Perform a Greedy Best-First search. Show the sequence of nodes that are expanded by the search.

Answer: (S 0 h=5)

(b3) (4 pts) Perform a Uniform Cost Search. Show the sequence of nodes that are expanded by the search.

Answer: (S 0), (B 1)

(b4) (4 pts) Perform an A* search. Show the sequence of nodes that are expanded by the search.

Answer: (S 0 0+5), (B 1 1+3)

c) (4 pts) Is the heuristic in the above example **admissible**? Briefly justify your answer.

Answer:

d) (4 pts) Is the heuristic in the above example **consistent** (or monotonic)? Briefly justify your answer.

Answer: