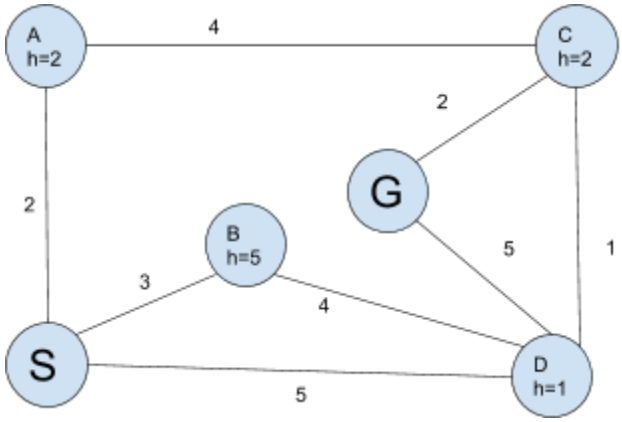
Homework 1

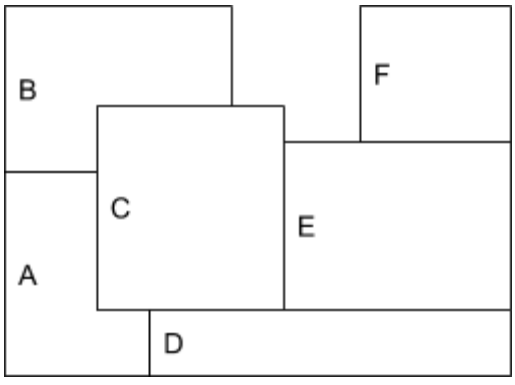
1. (50 pts) The agent starts from the start node, “S”, and the goal node is marked using “G”. Break ties alphabetically (e.g., B is visited before D). The edges are undirected, so the agent can go either way with the same cost.



Using each of the following methods, list the visited nodes (where order matters), and answer the returned path.

   a. (10 pts) BFS
   b. (10 pts) DFS
   c. (10 pts) Greedy search
   d. (10 pts) Uniform cost search
   e. (10 pts) A*

2. (50 pts) Given red, green, and blue colors, answer the following questions while avoiding coloring adjacent regions using the same color.



   a. (5 pts) Draw its constraint graph
   b. (10 pts) Formulate this map coloring problem as a constraint satisfaction problem (CSP).

c. (25 pts) Use naive backtracking search to compute a solution for the formulated CSP problem, and draw the visited nodes in a tree structure. Areas and colors are ordered alphabetically (blue is selected before green and red).
d. (5 pts) When it is known that A, B and F have the colors of green, blue, and red respectively, which area of the remaining variables is the most constrained variable?
e. (5 pts) When it is known that A, B and F have the colors of green, blue, and red, what color, as the least constraining value, should we pick for the region selected in the last question?