CS246F24: Artificial Intelligence
Quiz 3

Name: _____
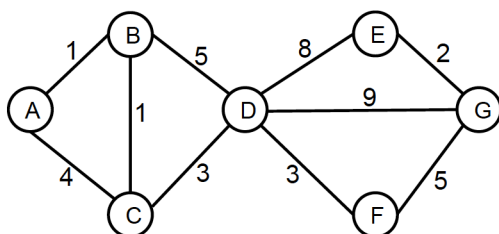
Node	h_1	h_2
A	9.5	10
B	9	12
C	8	5
D	7	3
E	4	1
F	4	4.5
G	0	0

Consider the state space graph shown above. A is the start state and G is the goal state. The costs for each edge are shown on the graph. Each edge can be traversed in both directions.

1. (70 pts) For each of the following **graph** search strategies (do not answer for tree search), write the path it would return. Use lexicographical ordering for tie breaking. You must draw the search tree corresponding to the graph search. Also, show the state of the data structure after every push and pop operation. Also, show the state of the closed set.

   (a) Uniform cost search

   (b) A* search with heuristic h_1

   (c) A* search with heuristic h_2

   Are h_1 and h_2 admissible? Are h_1 and h_2 consistent?

2. (30 pts) Heuristic function properties: Suppose you are completing the new heuristic function h_3 shown below. All the values are fixed except $h_3(B)$.

Node	A	B	C	D	E	F	G
h_3	10	?	9	7	1.5	4.5	0

For each of the following conditions, write the set of values that are possible for $h_3(B)$. For example, to denote all non-negative numbers, write $[0, \infty]$, to denote the empty set, write $\varnothing$, and so on. (Note: We are looking for a range here)

   (a) (10 pts) What values of $h_3(B)$ make h_3 admissible?

   (b) (20 pts) What values of $h_3(B)$ make h_3 consistent?