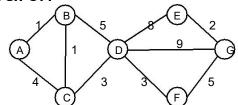
Homework 1 Due:23:59 May. 21th

Q1. Search



Node	h ₁	h ₂
Α	9.5	10
В	9	12
С	8	10
D	7	8
E	1.5	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. Note that the heuristic h_1 is consistent but the heuristic h_2 is not consistent.

(a) Possible paths returned

For each of the following graph search strategies (do not answer for tree search), mark which, if any, of the listed paths it could return. Note that for some search strategies the speci c path returned might depend on tie-breaking behavior. In any such cases, make sure to mark all paths that could be returned under some tie-breaking scheme.

Search Algorithm	A-B-D-G	A-C-D-G	A-B-C-D-F-G
Depth rst search			
Breadth rst search			
Uniform cost search			
A* search with heuristic h ₁			
A* search with heuristic h ₂			

(b) Heuristic function properties

Suppose you are completing the new heuristic function h₃ shown below. All the values are xed except h₃(B).

Node	Α	В	С	D	Е	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, 1], to denote the empty set, write ?, and so on.

- (i) What values of h₃(B) make h₃ admissible?
- (ii) What values of h₃(B) make h₃ consistent?
- (iii) What values of h₃(B) will cause A* graph search to expand node A, then node C, then node B, then node D in order?