

Name:

ID:

1. Consider the state space graph at figure 1. 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. There are two heuristics h_1 and h_2 . Now answer the following questions:

(a) What are the possible paths returned by each of these search-strategies? In case of ties, follow the alphabetical order. Use graph-searches (avoid repeated states) for all the cases except the last one. [5]

- Depth First Search
- Breadth First Search
- Uniform Cost Search
- A* search with h_1
- A* search with h_2 without saving visited states (tree-search version).

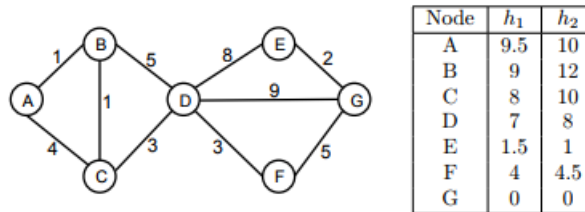


Figure 1: State-space graph for question 1

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- (b) Consider the same state-space graph. Suppose you are completing a 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 \emptyset , and so on.

- i. What values of $h_3(B)$ make h_3 admissible?
[2]
- ii. What values of $h_3(B)$ make h_3 consistent?
[1.5]
- iii. What values of $h_3(B)$ will cause A* graph search to expand node A , then node C , then node B , then node D in order?
[1.5]