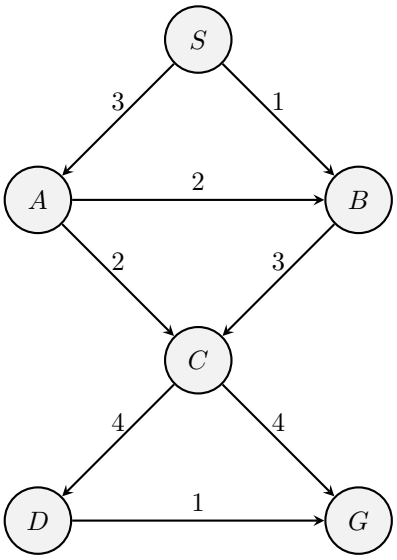
Quiz 1
Total marks: 10
Student ID: _____ **Duration: 30 minutes** CSE422

You have to use the designated spaces for your answers. No extra pages will be provided.

Problem 1: A* Search (8 points)

Run A* graph search on the following graph. The labels on the edges are action costs, and heuristic values h for the states are given to the right. S is the start state, and G is the only goal state. If there are ties on the fringe, break them in alphabetical order.



State	S	A	B	C	D	G
h(State)	7	5	7	4	1	0

(a) Fill in the table with the contents of the fringe (which should contain node and f-value pairs), and the closed set (which should contain states that have been expanded) for every iteration. The first one is done for you.

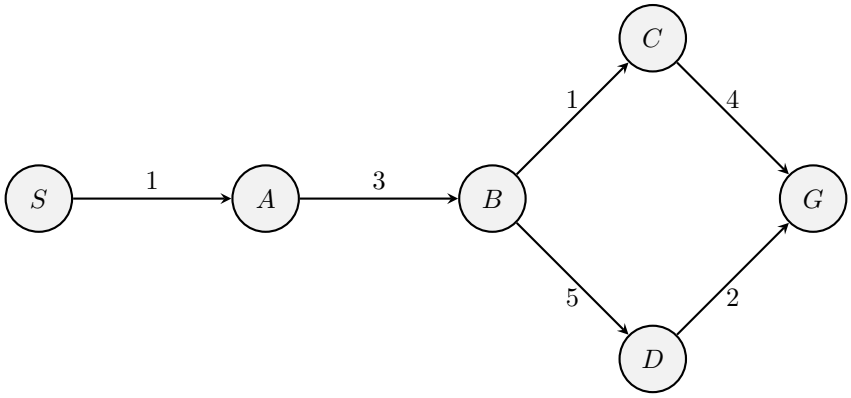
Iteration	Fringe	Closed Set
1	$S(7)$	
2	S→A (8), S→B (8)	S
3	S→A→B (12), S→A→C (9), S→B (8)	S, A
4	S→A→B (12), S→A→C (9), S→B→C (8)	S, A, B
5	S→A→B (12), S→A→C (9), S→B→C→D (9), S→B→C→G (8)	S, A, B, C
6	S→A→B (12), S→A→C (9) S→B→C→D (9)	S, A, B, C

(b) What path is returned? S → B → C → G

Problem 2: Making a Heuristic Consistent (2 points)

Take a look at the state space graph below along with heuristic values for each state. Notice that the heuristic is not consistent. Find a single state along with a range of possible values so that replacing the heuristic value of that state with a value from the range makes the heuristic consistent. The start state is S, and G is the only goal state.

State: B, Range: 2 $\leq h \leq$ 3.



State	S	A	B	C	D	G
h(State)	6	5	1	2	0	0

Intentionally left blank. Feel free to use this space to do scratch work.