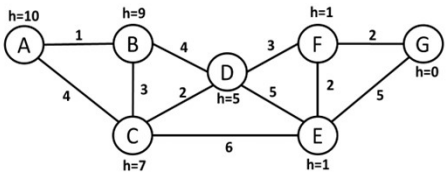
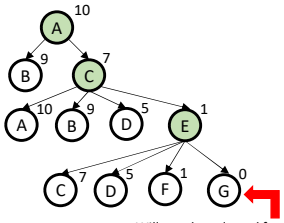
CS4103 Quiz-1
Solutions for questions on problem solving

Q1.



Greedy Best First Search



Search Tree

Will now be selected from the priority queue and it's a goal!

Path: A→ C→ E→G
Path cost: 4 + 6 + 5=15

Green indicates explored nodes;
White indicates nodes waiting in the priority queue;
Values indicate f(n)=h(n);

Uniform Cost Search

L=[A(0)]
E=[]

L=[B(1), C(4)]
E=[A]

L=[C(4),D(5)]
E=[A,B]

L=[D(5),E(10)]
E=[A,B,C]

L=[F(8),E(10)]
E=[A,B,C,D]

L=[E(10),G(10)]
E=[A,B,C,D,F]

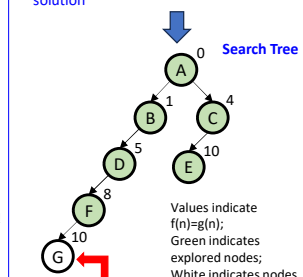
L=[G(10)]
E=[A,B,C,D,F,E]

L=[] →G(10) Goal found!
E[A,B,C,D,F,E]

Path: A→ B→ D→F→G
Path cost: 10

OR
you can **simply draw the *search tree* generated by the UCS algorithm**, to get the solution

Search Tree

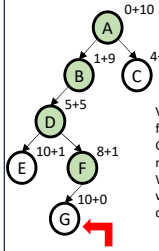


Will now be selected from the priority queue and it's a goal!

Values indicate f(n)=g(n);
Green indicates explored nodes;
White indicates nodes waiting in the priority queue;

A* (graph search)

Search Tree

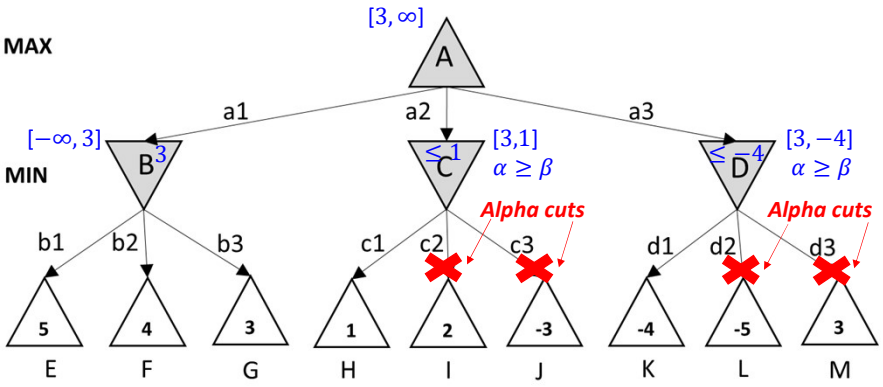


Values indicate f(n)=g(n)+h(n);
Green indicates explored nodes;
White indicates nodes waiting in the priority queue;

Will now be selected from the priority queue and it's a goal!

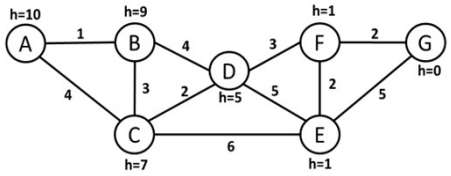
Path: A→ B→ D→F→G
Path cost: 10

Q2.



No Beta cut here

Q4.



Which node/variable should we select first to assign a value?

In the beginning (when no variable is assigned any value), each of them will have legal domain size to be 3 (i.e. {red, green, blue}). To break the tie, we'll apply degree heuristic. Accordingly, we can select either C or D or E

Suppose, in a partial assignment, node C has red color and node D has green color, i.e., the current assignment is: {C=red, D=green}. Then, the variables will have the following legal domain values:
A: {green, blue}, B: {blue}, E: {blue}, F: {red, blue}, G: {red, green, blue}
Hence, there is a tie between B and E with respect to MRV. In order to break the tie, we'll apply degree heuristic, and accordingly, the algorithm will proceed with assigning value to Node E