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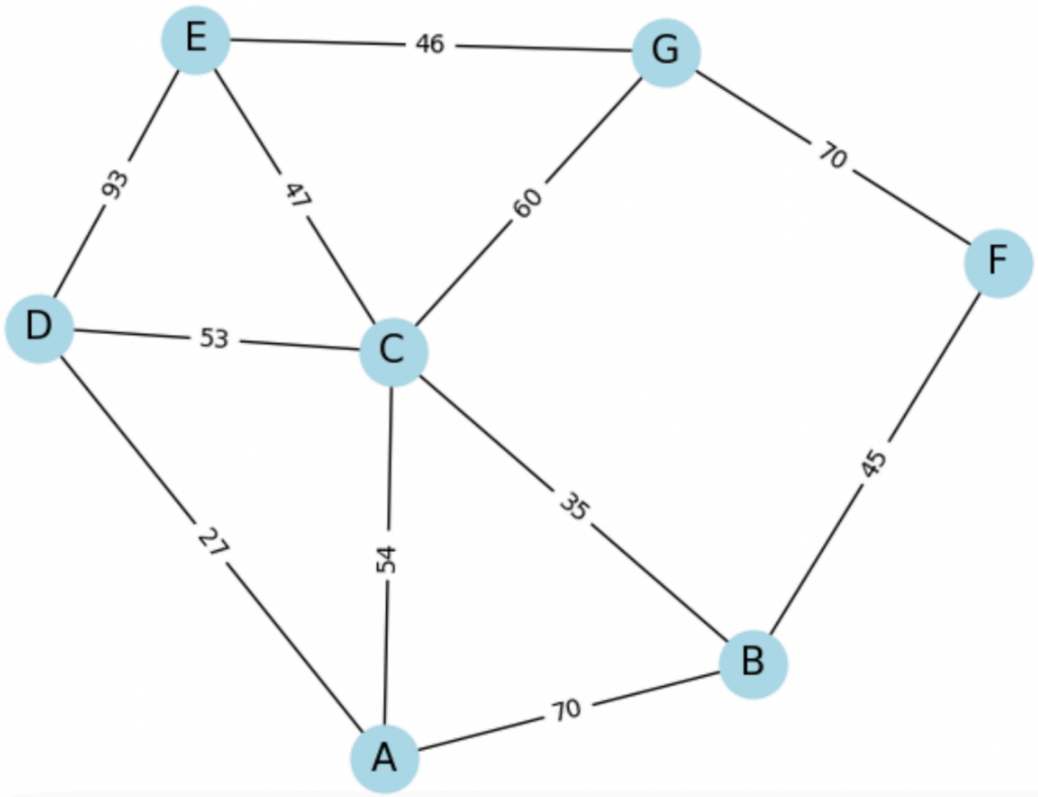
This ICA is focused on searching on a Graph.

- Use the Djisktra and A* Algorithm to find the best path from A (DC) to G (Richmond).
  - show list visited and unvisited vertices



Node-City	Heuristics (H(n))
A - Washington DC	97
B - Culpeper, VA	71
C - Fredericksburg, VA	46
D - Waldorf, MD	80
E - Tappahannock, VA	41
F - Charlotesville, VA	66
G - Richmond	0

Dijkstra's

Current Node: initialization

unvisited
{A, B, C, D, E, F, G}

Visited
{ }

A: 0
B: ∞
C: ∞
D: ∞
E: ∞
F: ∞
G: ∞

A*

current node: initialization

unvisited: {A, B, C, D, E, F, G}

visited: { }

A G
B
C
D
E
F

Dijkstra's Algorithm

Current node: A

A: 0
B: 0+70=70
C: 0+54=54
D: 0+27=27 ★
E: ∞
F: ∞
G: ∞

unvisited: {B, C, D, E, F, G}
visited: {A}

Current node: D

A 0
B 70
C 54 (no update needed) ★
D 27
E 27+93=120
F ∞
G ∞

unvisited: {B, C, E, F, G}
visited: {A, D}

Current node: C

A 0
B 70 (no updates needed) ★
C 54
D 27
E 54+47=101
F ∞
G 54+60=114

unvisited: {B, E, F, G}
visited: {A, D, C}

Current node: B

A 0
B 70
C 54 (no updates needed)
D 27
E 101 ★
F 70+45=115
G 114

visited: {A, D, C, B}
unvisited: {E, F, G}

Current node E

A 0
B 70
C 54
D 27
E 101
F 115
G 114 (no updates) ★

unvisited: {F, G}
visited: {A, D, C, B, E}

Current node: G

A 0
B 70
C 54
D 27
E 101
F 115 (no updates) ★
G 114

unvisited: {F}
visited: {A, D, C, B, E, G}

Current node F

A	0
B	70
C	54
D	27
E	101
F	115
G	114

Visited
{A, D, C, B, E, G, F}

unvisited
{}

Best Path from A (DC) to G (Richmond) is

{A, C, G}

which has a ~~total cost~~ of 114

A* Algorithm:

Current node A
g(A) = 0, h(A) = 97, f(A) = 97

Neighbors of A
- B g(B) = 70, h(B) = 71, f(B) = 70+71 = 141
- C g(C) = 54, h(C) = 46, f(C) = 100
- D g(D) = 27, h(D) = 80, f(D) = 107

visited {A}

unvisited
{B, C, D, E, F, G}

Current Node of C
- B f(B) = 141 (no update)
- E g(E) = 54+47 = 101, h(E) = 41, f(E) = 101+41 = 142
- G g(G) = 54+60 = 114, h(G) = 0, f(G) = 114

visited {A, C}
unvisited
{B, D, E, F, G}

Current Node: G
- G, f(G) = 114

Target Reached!
visited {A, C, G}
unvisited {B, D, E, F}

A* Result:
The shortest path from A to G is {A, C, G} w/ total cost of 114.