CA336 – Assignment 2

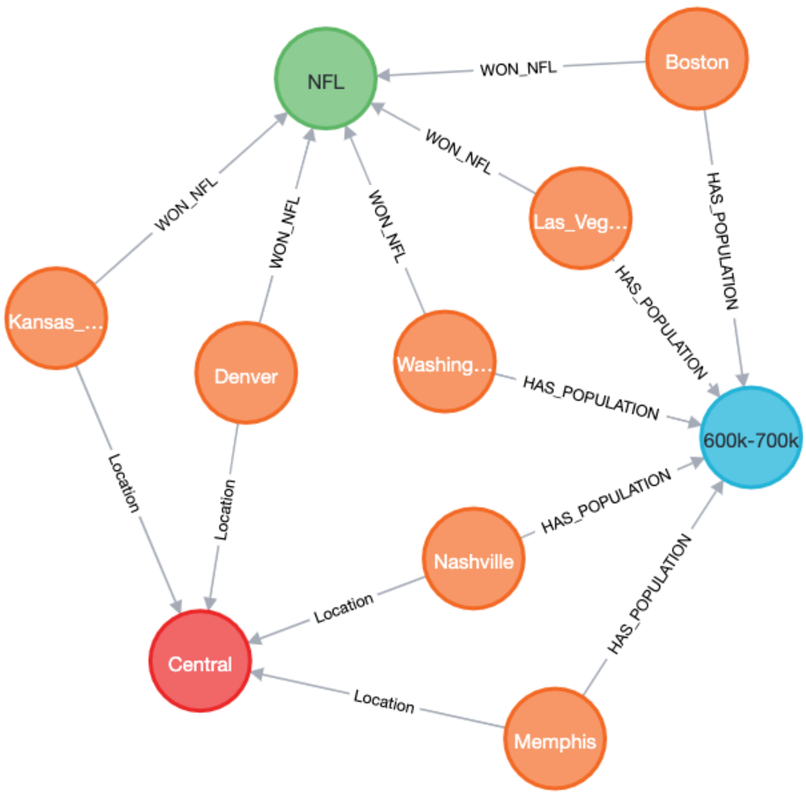
Graph Search [20 marks]

Answer all 3 Questions

Student Name: Ronan Kelly

Student ID: 21374881

PART 1. (4 marks) Draw your Graph & Nominate you're A,B,C



Instructions: Replace this with a subset of your graph (8-10 nodes, relationships, weights etc.) and identify A, B and C in your graphs (from roughly the same area).

Figure 1: [*Graph Name + 1 line description*]

American Sports Connections

This is a subset of my graph showing the link between Cities who have won the Super bowl from the Central region and have population between 600k-700k.

A – Kansas City

B – Boston

C – Memphis

(For all questions, A is your starting node)

PART 2 (7 marks)

(a) Why did you select that starting node?
(b) Why is it important in your graph?
(c) Use the Minimum Spanning Tree. What problem are you trying to solve? What is it about the minimum spanning tree that suits your problem?
(d) Would the SSSP algorithm be better (or worse) for your approach? Explain your answer.
(e) Using Neo4j, call gds.alpha.spanningTree (be sure to set: orientation: 'UNDIRECTED') and click the 'Text' tab to display your results: screen grab or copy-and-paste the results into the slot for figure 3.

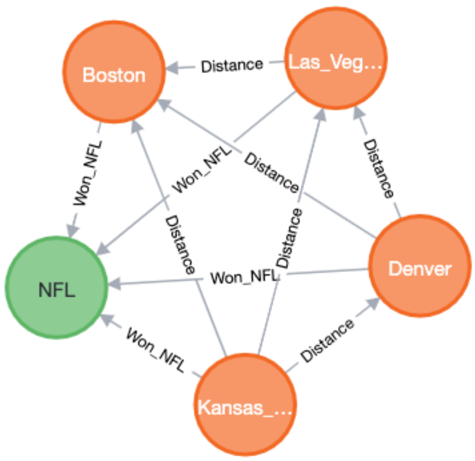
(a) I selected Kansas City as my starting node as its somewhat isolated from other city nodes making it good for analysis and traversal.
(b) As a specific node it wasn't necessarily important however, as a whole it allowed for analysis between the nodes as it doesn't link directly to any of the other cities.
(c) The problem the minimum spanning tree solves is linking 2 cities within the US by either sporting success, location or population. The minimum spanning tree algorithm efficiently connects these cities based on these factors.
(d) The SSSP algorithm would be better for my approach as it provides the most efficient route between the 2 cities I select based on the weights provided.

Figure 2. [*place some caption here*]

City	Destination	Cost
"Kansas_City"	"Central"	7.0
"Central"	"Nashville"	7.0
"Kansas_City"	"NFL"	3.0
"NFL"	"Denver"	3.0
"NFL"	"Washington_DC"	3.0
"Washington_DC"	"600k-700k"	4.0
"600k-700k"	"Memphis"	3.0
"NFL"	"Las_Vegas"	3.0
"NFL"	"Boston"	6.0

PART 3 (9 marks)

(a) Create (manually draw) a sub-graph of your graph with only the first 5 nodes (include A and *either* B or C). Insert a new (weighted) relationship where any of the nodes is unconnected. You should create a single connected graph.



I linked the

(b) Starting from the A node, compute the shortest path from this node <u>to all other nodes</u>. In the process, create a table like that shown on slide 3.47. If you cannot find a symbol for infinity, use INF instead.

			1st from A	2nd From A to B to next	3rd from A to C to next	4th from A to D to next	5th from A to E to next
Kansas_City (A)	inf	0	0	0	0	0	0
NFL (B)	inf	Inf	3	3	3	3	3
Las_Vegas (C)	inf	Inf	1350	6	6	6	6
Denver (D)	inf	Inf	605	6	6	6	6
Boston (E)	inf	inf	1432	9	9	9	9