Design Document – Algorithm’s Group Project

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Part 1 – Aislinn

I did part one of the project, which was calculating the shortest paths between two inputted bus stops, returning the route taken and the cost of this bus route. I decided to adapt my code heavily from the Dijkstra Graph Algorithm from the Algorithms, Fourth Edition book written by Robert Sedgewick and Kevin Wayne. The reason I chose to implement the Dijkstra algorithm was because this algorithm finds the shortest path from ever node to ever other reachable node instead of finding the shortest path from one starting node to another starting node. Since we had to take in user input, we did not know which bus stop the user was going to input, therefore that is why I picked Dijkstra as my algorithm of choice. Another big advantage I saw with using Dijkstra algorithm was its low complexity, it was a lot easier to implement than a lot of other shortest path algorithms in my opinion. Also, I picked Dijkstra as its specialty is to calculate the shortest path in weighted graphs, which ours was. I was only stuck between one other algorithm, Floyd-Warshall and I began implementing it before I realised that Dijkstra was a better fit. The reason I turned away from Floyd-Warshall was upon research I found out that for a higher number of nodes, the Dijkstra’s algorithm was better and more efficient, also Floyd-Warshall had a higher time complexity. Overall, based off my research I decided that Dijkstra’s Algorithm was the better fit for me.