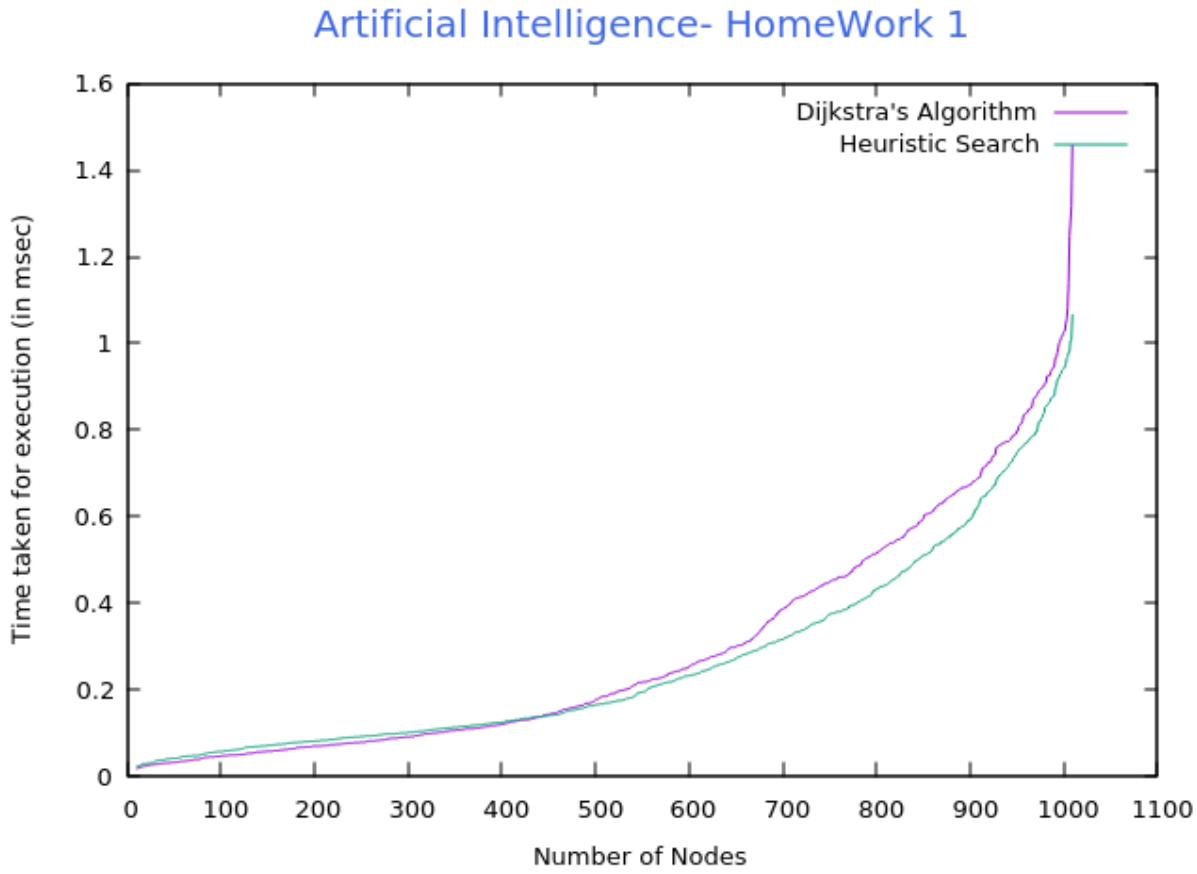
This homework 1 is an implementation of the comparison between the shortest path algorithm(Dijkstra's Algorithm) and a heuristic search algorithm which improves upon the original algorithm.

The "game" is represented in the game class and is basically a graph consisting of vertices and edges and is represented using an adjacency list.

The adjacency list itself is represented using a list of a pair array from the STL class library. The graph is represented by the game class and the naive shortest path search algorithm (Dijkstra's algorithm) is also represented in the game class.

The heuristic search algorithm is represented in the heuristic class and this algorithm is an improvement to the Dijkstra's algorithm where instead of search exhaustively all the nodes for finding the shortest path to the destination node, we search only those nodes that are present in the direction that are on the way of the destination node from the source node. The comparison chart is given below, the program is run 1010 times and is plotted against time to measure performance between the heuristic and Dijkstra's algorithm.



As is clearly observable, the performance in heuristic algorithm is better when compared to Dijkstra's algorithm and has a lower curve increase rate when plotted against time.