Explanation
CSE221
Assignment 06

Task 1: In this task, dijkstra algorithm is used to find the shortest paths of all nodes from the start node of a directed weighted graph. In the dijkstra function, we used a priority queue to store the nodes and its current distance from start. To eliminate the shortest distance from pq, we used heap data structure. Inside while loop, we selected the shortest path and placed in the distance dictionary. We also stored a nodes previous node in prev dictionary.

Task 2: This task is almost same as Task 1, but we used dijkstra method twice for the two nodes given in input file. These two nodes are the start nodes. We stored the shortest distances in two different dictionaries. Then we checked if there is

any common nodes in both distance dictionaries with proper values. Then we find out the total distance of that node for distance 1 and 2. We also find out the distance differences of both dictionaries for that node. Then we find out the minimum total distance and minimum difference of distance for all common nodes as this is the given condition. Then for the selected node, we find that which start will take longer time. And that is our output.

Task 3: This time, a modified dijkstra function is used. This time, we find out the maximum between distance from start to u (node) and the local distance of v from u. Then we add it with priority queue with v (neighbour node) and continue the loop. And finally we check if the distance is still infinity or not. If it is 'infinity, then we return 'Impossible' or the distance value.