

HW #4

Homework exercises should be done individually (You should write the solution by yourself). Solutions must be prepared in python programming language and submitted electronically before **11.59 pm on Sunday, January 3**. No credit will be given to solutions obtained verbatim from the Internet or other sources. **To get full credit for each question, you need to provide a brief explanation of your codes and the efficiency analysis with comments.**

1. The airline companies organize their flights from an airport they serve to all possible destinations by considering the fact that the planes may take an emergency landing. So, the flights can only be arranged along predetermined routes between airports. Besides, the airlines companies have to ensure that all the airports in a planned flight will be no more than four links away from the airport that the company serves. Note that a planned flight can consist of multiple stops, and 'link' here refers to the flight from one stop to the next one.

Assume you are given a graph with the set of vertices (denoted by V) representing the airports, the set of edges (denoted by E) representing the flights between the airports, and the set of weights (denoted by W) representing the distance between the pair of adjacent airports. For a specific airline company, let A be the set of airports that the company serves. Your task is to develop an algorithm that calculates the shortest paths from a specific airport s to all other airports with restriction that the airports in a path cannot be more than four edges away from an airport in A .