Assignment

The programming assignment is done in groups of two students. John is a truck driver. He needs to deliver a truckload of packages to different destination cities. In each city other truck drivers can help transport part of the packages with their trucks. So nobody is required to solve the traveling salesman problem. Also, no truck is required to return to the starting city. Nevertheless, John has to pay for the distances the trucks travel, and he wants to find routes for himself and the helpers such that the total travel distance is minimized.

The problem can be formulated as a graph problem as follows: Given an undirected weighted graph, a starting vertex, and a set of destination vertices, find a subgraph of the graph that has the minimum cost and covers the starting vertex and all of the destination vertices.

For example consider the figure bellow, for graph (a), assume the starting vertex is 1, and the set of destination vertices is (5,6), then graph (b) shows a minimum covering tree. The total distance in this example is 1 + 6 + 4 = 11

Three input files are provided and should be used to test your program. For your convenience, the expect cost of the solution are also provided.

Each input file contains the size of the graph (`graph_size`), the starting vertex (`start`), the number of destinations (`n_dests`), an array of destination vertices (`dest`), the number of edges (`n_edges`), and three arrays that define the edge relation (there is a road between `from[i]` and `to[i]` with the distance `cost[i]`).

This assignment must be solved either using the `subcircuit(x)` or the `network_flow(arc, balance, flow)` constraint.

Task 1: write program that solves the optimization problem described above.