NOVA SCHOOL OF BUSINESS & ECONOMICS

2494 - COMPUTATIONAL THINKING & DATA SCIENCE

2021-22, Spring Semester

In-class Exercises

OPTIMIZATION PROBLEMS

A book salesperson, John Taylor, who lives in city A must visit once a month four customers located in cities B, C, D and E. His objective is to find the sequence of cities to visit in order to minimize its total distance traveled, assuring that he leaves city A, visits the other cities and goes back to the initial city, without repeating any city.

The following table gives the distances in kilometers among the different cities:

From | To	B	C	D	E
A	120	220	150	210
B		80	110	130
C			160	185
D				190

1. Write a Python program that given a number of cities ***n***, returns the sequence that minimizes the total distance traveled, by implementing the brute-force algorithm. Test your program with John's problem.

2. An heuristic that can be used to solve the salesperson's problem is the Nearest-Neighbor Heuristic. That is, starting in city 0 and then connecting it with the closest one. The just-added city is then linked to its nearest unlinked city (with ties broken arbitrarily). The process continues until all cites are visited. Test this heuristic with John's problem and compare the new solution with the optimal one found in a).