Assignment 1: Greedy heuristics

# Problem description

A set of nodes is described by position on a plane (x and y coordinates) and a cost. The goal is to form a Hamiltonian cycle with 50% of the nodes selected in such a way that minimizes the total cost. The total cost is calculated as a sum of distances needed to be traversed in order to move from one node to the other and the cost associated with a visited node. The distance between two nodes is calculated as Euclidean distance rounded mathematically to an integer.

The approach to solving the problem will consist of three greedy heuristics methods:

* random solution,
* nearest neighbour method,
* greedy cycle method.

Data are given as a 3-column table where the first column indicates the x coordinate, the second column indicates the y coordinate and the third column indicates the node’s cost. Each table row corresponds to a single node. In this task, there are two sources of data - two CSV files, each consisting of 200 rows (200 nodes).

For each method, the solution will be calculated starting from each node, so in all for each data source and for each method, 200 solutions will be calculated.

# Algorithms

## Random solution

In a random solution, the next node is chosen randomly from the remaining nodes. When 50% of nodes will be chosen, the path from the last node to the first will be generated to close the cycle.