

IE 517 Project

Solving the Traveling Salesman Problem with Profits

In this project, you are going to solve the traveling salesperson problem with profits (TSPP) where the salesperson collects some profit for visiting each customer. As opposed to the classical TSP, there is no requirement to visit all the customers. The objective of TSPP is to determine the best subset of customers to be visited so as to maximize the total net profit, which is equal to the total profit earned from visited customers less the total cost of the tour. The latter can be taken as the total length of the tour calculated as the Euclidean distance.

There are three data sets (eil51,eil76, eil101) given in the Excel file called “dataset-TSPP.xls”. It contains three data sets with low and high customer profits as well as the coordinates of the customer locations. The first customer indexed by “0” is the depot location, i.e., the salesperson starts its tour from this location. Therefore, the number of customers is equal to 50, 75, and 100 for eil51,eil76, and eil101 respectively. Hence, the input data consists of the customer locations and the profits associated with each customer. Please round all the Euclidean distances to two decimal points. The net profit should also be rounded to two decimal points.

I would like to remind you the following points which you should consider when you submit your homework. It will consists of two parts: your code and report. First, your code must be clear and you should define the following using comment lines in the code: variables names and their purpose, function names and their purpose. For example, you should write “X is the assignment variable”, “CompObj calculates the objective value”, etc. Or, you can use a function name that is self explanatory e.g., ApplyMove.

In the report part, you have to mention which heuristic/metaheuristic your are using, the solution representation (encoding), and all other relevant details related to your solution. You can use the following table for the output of your solutions. A single Excel table will contain the best solutions you have for each of 6 instances. You have to include the depot in the third and fourth columns. The first row is just an example.

Instance	Best Objective Value	No. of customers visited	Sequence of customers visited	CPU Time (s)
eil51-LP	100	10	1,2,3,4,5,6,7,8,9,10	150
eil51-HP				
eil76-LP				
eil76-HP				
eil101-LP				
eil101-HP				