Logistic network is playing an increasing role in modern life. For road-based freight transportation company, how to reduce operating costs is their long-term consideration; while delivery duration often means better quality of service for customers.
In order to improve the service quality and decrease the cost of the transportation, nodes are usually not fully connected. In a typical logistic network, there exist two types of nodes: the hubs and the non-hubs. The hubs serve as consolidation, switching, and transshipment of the freight, while the non-hubs serve as the terminal of the network.
This kind of network structure consisting of hubs and non-hubs is called Hub-and-Spoke Logistics Network. For a given logistics network, the total number of all nodes is usually fixed, it is quite challenging to consider the number and location of hubs so that the entire network obtains optimal performance.
We model this hub location process and solve this model to **get the best location of hubs** in this project.

The description of the model is shown as follows briefly:

1. Every non-hub is connected to only one hub.
2. The connections between hubs are full.

The expression of the model is:

$$\min \sum_{i\in N-H}\sum_{k\in H} c_{ik}O_i x_{ki} + \sum_{i\in H}\sum_{j\in H}\sum_{k\in N} \alpha c_{ij} f_{ij}^{k} +$$
$$\sum_{i\in N-H}\sum_{k\in H} c_{ij}D_i x_{ik} + \sum_{j\in H} FH_j x_{jj} + \beta \max_{i\in N j\in H}\{T_{ij}\}$$

In which, α represents the proportion of fixed hub cost in the total cost and β represents the proportion of time of transportation.
And we try to use the genetic algorithm to get the location of hubs which makes the value of the above expression smallest.