Truck Loading and Routing Project Description

The following exercise will be structured around 2 use cases; customer understanding and truck loading problem.

Use Case

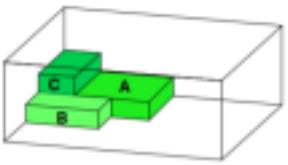
[redacted] being a leading B2B e-commerce company is focusing on the logistics, mainly warehousing of the products as well as delivering them to the customers. The 2 main processes that happen in the warehouse are;

- The inbound process; where trucks bring items from wholesalers and sort them in the warehouse.
- The outbound process; where the orders are loaded to the trucks and then delivered to the customers.

Each day the warehouse receives a set of orders from different customers (of different locations), the warehouse agents collect the items of each order and then the loading supervisor estimates which orders will fit the truck capacity with the optimum route. Accordingly, the order items are loaded to the truck and delivered to the customer locations.
Each customer has a different purchasing behavior and in order to avoid customer churn and increase customer loyalty, certain personalized promotions are offered to the customers, so once the order is delivered and received to the customer, a promotion is applied with a certain discount amount.

Task Description: Truck Loading and Routing
As part of the growth team, you will focus on enhancing the outbound process and so you will be required to automate the *truck loading problem* and create a model that: - Selects the set of orders that will optimize the truck volume capacity as well as optimizing the shortest route. i.e., load Order1, Order3 and Order5 to truck_2 and Order2, Order4 to truck_1, where those 2 runs maximize each truck volume capacity and minimize the travelled distance.

- Each Order is composed of a set of items with dimensions (*l,w,h*) -
  Each truck of dimensions (*L,W,H*) has to be filled with a set of orders. -
  Load all the orders in the *orders dataset* to the trucks.
- Same truck can be used multiple times on different runs.



As seen in the above picture, item A, item B and item C are loaded to the truck, other items should be added to maximize the truck capacity.

(Breakdown the problem into phases, where each phase can be considered a deliverable)

Expected:

- Model script
- Presentation of 5 slides containing problem statement, insightful visuals, model outputs, overall recommendations

For above make sure to:

- Formulate and state the problem.
- Mention the business success criteria and model KPIs.
- Verify data quality issues.
- Visualize only the important insights.
- State any assumptions or constraints.
- Mention the methodologies you are following.