# **Final Project Report: Delivery Network Optimization**

## **1. Overview**

* Problem: Optimize a delivery company's network for the lowest delivery cost.
* Solutions:
  + Algorithm 1: Find the lowest cost path between two locations.
  + Algorithm 2: Build a minimum spanning tree from the hub.
  + Algorithm 3: Handle dynamic updates to the delivery network.

## **2. Algorithm Details**

* **Algorithm 1:** Dijkstra’s algorithm to find the shortest cost path.
* **Algorithm 2:** Prim’s algorithm to find MST (minimum spanning tree).
* **Algorithm 3:** Update graph edges, then rerun Prim’s algorithm.

## **3. Code Snippets with Comments**

* Paste in your Python code (nicely formatted) with explanations for each major block.

## **4. Test Cases and Results**

* Example Inputs (as given in the assignment)
* Outputs:
  + Algorithm 1 → correct path and cost
  + Algorithm 2 → correct MST and cost
  + Algorithm 3 → correct updated MST and cost

## **5. Challenges**

* Handling dynamic graph updates cleanly.
* Making sure Dijkstra's and Prim's algorithms run on different modified graphs without bugs.

## **6. Conclusions and Future Improvements**

* Success in optimizing delivery routes.
* Future improvements:
  + Handle directed graphs.
  + Improve performance for huge graphs (e.g., millions of nodes).