BLUE YONDER'S NEXT-GEN OPTIMIZED DELIVERY ECOSYSTEM

Output Format:

`Scenario1` contains 2 output files `CostReport.csv` and `DronePath.csv` containing cost report and drone path respectively. Since there were no delivery failures in this scenario, there are only 2 output files.

`Scenario2` contains 4 output files `CostReport1A.csv`, `CostReport1B.csv`, `DronePath1A.csv` and `DronePath1B.csv` containing cost reports and drone paths respectively. Since Complexity 3 is being handled, CostReport1A and DronePath1A will be the original plan whereas CostReport1B and DronePath1B will be the replan after cancellation.

`Scenario3` contains 4 output files `CostReport1A.csv`, `CostReport1B.csv`, `DronePath1A.csv` and `DronePath1B.csv` containing cost reports and drone paths respectively. Since Complexity 3 is being handled, CostReport1A and DronePath1A will be the original plan whereas CostReport1B and DronePath1B will be the replan after cancellation.

Our solution takes care of the base solution and all three complexity levels (1+2+3).

In all the 3 scenarios, we are able to deliver all the demands.

Assumptions:

Here are some of the assumptions we took based on our observations of the test data. This assumption holds on the data provided.

Assumption 1: Round trips to the demand location should be possible to each of the demand locations without using any Recharge Stations.

Assumption 2: There is no demand location such that it is directly above or below any of the No-Fly Zones in the future datasets.

Assumption 3: There are no No-Fly Zones on the ground.

Assumption 4: We can dynamically decide which drone should belong to which warehouse at the end of the day. In the case of multiple days, if a particular drone belongs to Warehouse 1 on day 1, it can belong to Warehouse 2 on the next day.

Approach: (Brief explanation of our approach)

We use a First Come First Serve approach to satisfy each of the demands ordered on Delivery From. Each drone satisfies one demand and returns to the warehouse.

Complexity #1: No-Fly Zones

We first go through the ground (z=0) to the given (x,y) coordinates and then go above from z = 0 to the given z coordinate. And take the same path on the reverse journey. (This holds because of Assumption 2 and 3)

Complexity #2: Multiple warehouses

In the beginning, we take all the drones that belong to no particular warehouse and then allocate each drone to the warehouse based on the model. (This holds because of Assumption 4)

Complexity #3: Dynamic Replanning

To handle Dynamic Re-planning of Delivery Failure, we see weather after the dropping the demand, whether it is a failure or not. If yes, then we bring the payload back to the warehouse.