

The Project_PART2_67308301 folder consists of the following CLP files:

- **Dataset Other Part1** : It consists of the dataset provided in the beginning(when the project was assigned). This is also the dataset with which the 1st part of the project was run.
 - **Part1 Other** : The code for the first part of the project. This now contains the proper report also, which was not running accurately in the 1st part previously. It should be run on Dataset_Other_Part1.
 - **Dataset Other Part2** : It consists of the dataset provided in the beginning(when the project was assigned). This is also the dataset with which the 1st part of the project was run.
 - **PART 2 CODE** : The code for the second part of the project. This should be run on Dataset_Other_Part2, Dataset1_Part2, Dataset2_Part2, Dataset3_Part2. It contains the report also, from which an idea can be formed of the improvements tried in the 2nd part from the 1st part.
 - **Dataset1 Part1** : One(Sample) of the three datasets provided by Professor this time. This is for execution of the code for the 1st part of the project.
 - **Dataset1 Part2** : One(Sample) of the three datasets provided by Professor this time. This is for execution of the code for the 2nd part of the project.
 - **Dataset2 Part1** : Second of the three datasets provided by Professor this time. This is for execution of the code for the 1st part of the project.
 - **Dataset2 Part2** : Second of the three datasets provided by Professor this time. This is for execution of the code for the 2nd part of the project.
 - **Dataset3 Part2** : Third of the three datasets provided by Professor this time. This is for execution of the code for the 2nd part of the project.
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- **Note:** Code for Part1 of the project and that for Part2 of the project have some different variable names and slots for which datasets for Part1 and Part2 have been separated.
 - In order to run the 2nd part of the project, PART_2_CODE should be run with Dataset1_Part2, Dataset2_Part2, Dataset3_Part2. It can also be run on Dataset_Other_Part2 which is the original dataset provided during the 1st part of the project.

- In order to run the 1st part of the project, Part1_Other should be run with Dataset_Other_Part1, Dataset1_Part1 and Dataset2_Part1.

CLIPS version 6.24 has been used.

The rules for the 2nd part of the project has been written with the strategy as below:

When a new package arrives at a particular city and an idle truck is present in that city itself with available space \geq to the size of the package at that instant, the package is assigned to the truck.

When a new package arrives at a particular city and a non-empty truck is present in that city itself with available space \geq to the size of the package at that instant, the package is assigned to the truck.

When a new package arrives at a particular city and no truck is present in that city itself with available space \geq to the size of the package at that instant, the nearest idle truck with available space \geq to the size of the package is dispatched to pick that package.

When a new package arrives at a particular city and no idle truck is present in any of the cities, then the package is placed in a queue.

When an idle truck has been dispatched and is going to pick up a package, it travels directly from its current location to the arrival city of the package without taking into consideration each intermediate city.

When a truck, carrying some packages, is travelling to the destination of a package, at each intermediate city, the truck checks if there is any package which has just arrived or if there is any package in queue in that city. In such a case, the package is picked up by the truck if its available space \geq to the size of the package.

When a truck is carrying multiple packages, precedence is given to the package picked up by the truck first and in first come first served basis.

By running Dataset1_Part2 on PART_2_CODE,
Dataset1_Part2_output_dribble dribble file is generated.

By running Dataset2_Part2 on PART_2_CODE,
Dataset2_Part2_output_dribble dribble file is generated.

By running Dataset3_Part2 on PART_2_CODE,
Dataset3_Part2_output_dribble dribble file is generated.

By running Dataset_Other_Part1 on Part1_Other,
Dataset_Other_Part1_output_dribble dribble file is generated.

By running Dataset_Other_Part2 on PART_2_CODE,
Dataset_Other_Part2_output_dribble dribble file is generated.

We see from the dribble files that the “AVERAGE WAIT TIME FOR PACKAGES” decreases in the 2nd part. Also, in the 2nd part, all the trucks are being used unlike the 1st part where two trucks were not used. The “NON DELIVERY TRAVEL TIME” also reduces in the 2nd part. These improvements were expected as the trucks do not have to return to Orlando in the 2nd part of the project and also because the options for picking up a package has increased in this case.

The general templates used for the 2nd part of the project are :

- 1) Package – This represents package information and has the below slots
 - (slot package_number)
 - (slot depart_city)
 - (slot delivery_city)
 - (slot package_size)
 - (slot order_arrival_time)
 - (slot expackage_delivery_time)
 - (slot pick_up_time)
 - (slot package_delivery_time)
 - (slot delivery-delayed-by)

- (slot delivery-status)
- (slot wait_time)
- (slot status)
- (slot picked-up-by)

2) Truck – This represents truck information and has the below slots

- (slot truck_number)
- (slot current_city)
- (multislot destination_city)
- (slot action)
- (slot wait_time)
- (slot busy_time)
- (slot event_time)
- (slot available-space)
- (slot space_occupied)
- (slot current_package)
- (slot tot_space_occupied)
- (slot non_del_time)
- (slot del_time)
- (multislot packages-being-carried)

3) Cheapest_paths – This has one slot for the start vertex and another multislot for neighboring cities and is used to find the cheapest paths between directly connected cities. It has the below slots

- (slot start_city)
- (multislot neighboring_cities)

4) Route - This stores information about the shortest route between any two cities, denoting all the cities that fall between them in the route and has the below slots

- (slot start_node)
- (slot end_node)
- (slot time)
- (multislot intermediate_cities)

5) **AVG_PACKAGE_REPORT** – This stores information about the packages in order to generate the average package report in the end. It has the following slots

(slot tot_wait_time)

(slot packs_delivered_ontime)

(slot late-package-counter)

(slot late_time)