Opti'tour Glossary

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Abstract—This document explanes the basic vocabulary and defines the key terms for this project.

Keywords—*Actors, Buisiness Rules, State Definitions*

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1. Definitions

Dispatcher

The dispatcher is responsible for managing the delivery operations. They load the city map, adjust the number of couriers, record delivery requests, and oversee all tours. When a tour cannot be computed for a courier, the dispatcher decides whether to assign another courier or to reject the request.

Courier

The courier represents the physical person performing deliveries by bicycle. Each courier has:

- a unique identifier,
- a name and a phone number,
- and a current location (generally the warehouse at departure).

Couriers are assigned one or several tours according to workload and Dispatcher's choices. In the system, the courier embodies the **executor of the generated route**.

City Map (called map)

The city map is the central element of the system. It models the **urban road network** as a graph: intersections are the nodes, and road segments are the edges that connect them. Each segment is directed and has a defined length and street name. This structure enables the system to determine routes between any two points in the city based on distance and estimated travel time. The map also contains the list of available couriers, delivery requests, and an adjacency structure used to compute optimal routes.

Intersection

An intersection represents a **precise geographical point** in the city.

Each intersection is identified by a unique number and defined by its latitude and longitude. Intersections serve as reference points for deliveries and as endpoints of road segments.

Road Segment

A road segment connects two intersections in one direction. It represents a **street portion** that couriers can travel through. Each segment contains:

- a starting intersection,
- a destination intersection,
- a length (in meters),
- a street name,
- and an estimated travel time based on the courier's constant speed (15 km/h).

These segments form the foundation for computing travel paths and travel durations between addresses.

Delivery Request

A delivery request corresponds to a **customer order**. It specifies:

- a pickup location,
- a delivery location,
- and the service times required at each stop (pickup and delivery).

These requests are received by the dispatcher and imported from XML files. Each one is later converted into a planned **delivery** integrated into a courier's tour.

Delivery

A delivery represents the **operational form** of a delivery request integrated into a tour. It connects concrete objects of the model:

- the pickup and delivery intersections,
- the courier assigned to perform the task,
- and the service times and planned departure hour.

Each delivery constitutes one step of a courier's route.

Tour

A tour corresponds to the **complete route** assigned to a courier. It gathers:

- all deliveries to be completed,
- the total travel distance and time,
- the total service time,
- and the start and end times of the journey.

Each tour starts and ends at the warehouse, by default at 8:00 a.m. Whenever a new delivery request is added, the system recalculates the tour to minimise the courier's return time to the warehouse.

2. Business Rules

1. All tours start at **8:00 a.m.** from the warehouse.
2. Couriers travel at a constant speed of **15 km/h**.
3. The system always seeks to **optimise the return time** to the warehouse.
4. For each request, the pickup location must be visited **before** its corresponding delivery location.
5. All tours begin and end at the **same warehouse**.
6. Each courier's tour is displayed on the map with all stops, addresses and arrival times.
7. If no valid route can be found for one courier, the system proposes another courier; if no solution exists, the request must be rejected.
8. Tours can be saved and restored at any time to continue planning later.

3. State Definitions

Feasible Tour
: A tour that satisfies all business rules: pickups before deliveries, all requests covered, and the courier can returns to the warehouse.

Infeasible Tour
: A tour that cannot satisfy one or more rules, for example: a courier cannot reach all addresses or the pickup/delivery order cannot be respected.

Rejected Request
: A delivery request that cannot be assigned to any courier. It is marked as rejected by the dispatcher.

Active Tour
: A tour currently being executed by a courier.

Completed Tour

A tour successfully executed by a courier, ending at the warehouse.