

Traffic Drones - Full stack Exercise

Scenario:

There are two automatic drones that fly around London and report on traffic conditions. When a drone flies over a tube station, it assesses what the traffic condition is like in the area, and reports on it.

Task:

Write a simulation that has one dispatcher and two drones. Each drone should "move" independently on different threads. The dispatcher should send the coordinates to each drone detailing where the drone's next position should be. The dispatcher should also be responsible for terminating the program. When the drone receives a new coordinate, it moves, checks if there is a tube station in the area, and if so, reports on the traffic conditions there. The data should be accessible and reusable to other components.

The simulation will be part of a traffic monitoring tool. Therefore, there is a need to have a web application where you can control the system and track the traffic reports. The user needs to be able to start and shutdown the system at any given time and monitor the generated reports. At the end of the simulation the app should provide a summary with the entire traffic report highlighting the traffic conditions average of the zone.

Notes:

- The drones have limited memory, so they can only consume ten points at a time.
- The simulation should finish @ 08:10, where the drones will receive a "SHUTDOWN" signal.
- The two drones have IDs 6043 and 5937. There is a file containing their lat/lon points for their routes. The csv file layout is drone id,latitude,longitude,time
- There is also a file with the lat/lon points for London tube stations. station,lat,lon
- Traffic reports should have the following format:
 - Drone ID
 - Time
 - Speed
 - Conditions of Traffic (HEAVY, LIGHT, MODERATE). This can be chosen randomly.
- Any critical failure in the system should be noticeable for the user
- The user can start just one simulation at the same time

Remarks:

1. Assume that the drones follow a straight line between each point, travelling at constant speed.
2. Disregard the fact that the start time is not in synch. The dispatcher can start pumping data as soon as it has read the files.
3. A nearby station should be less than 350 meters from the drone's position.

Deliverable:

1. The assignment should be delivered as a webapp that allows the user to start the simulation, shut it down and load the generated reports. The communication between drones and dispatcher should be available on the console or log file.
2. This is a fairly open assignment in terms of how you structure the solution both frontend and backend sides. You will be judged on the overall quality of the code (simplicity, presentation, performance).