**Emergency Vehicle Allocation**



**DAA Project**

**Team Members**

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1. **Assumptions**
   1. **Designing Graph:**

* **Request Table**: It contains the data of below table in stored in the “list”.

|  |  |  |
| --- | --- | --- |
| Zip Code | Type | Count of Vehicles. |
| 64110 | 1 | 2 |
| 64110 | 2 | 3 |

* **Emergency Vehicle**: We store the data of emergency vehicle in the form of hash map.

Key – Vehicle ID

Value – Zip Code, Type, availability.

|  |  |  |  |
| --- | --- | --- | --- |
| Vehicle Id | Zip Code | Type | Availability |
| 1F | 64110 | 1 | 2 |

1. Vehicle Id – Unique ID for each vehicle.
2. Zip Code – Location zip code.
3. Type –

|  |  |
| --- | --- |
| 1 | Fire |
| 2 | Ambulance |
| 3 | Police |

1. Availability-

|  |  |
| --- | --- |
| 1 | Available |
| 0 | Not Available |

* **Distance**: This table consists of distance between two Zip Code.
* **Request Complete**: When the allocated vehicle is available then we add to this data.
  1. **Dijkstra’s Algorithm:**
* Dijkstra’s Algorithm is used to find the nearest available emergency Vehicle.
* 1. **Handling Multiple Vehicles:**
* To handle multiple requests at a time we are using creating the threads.
* StartMethod () – Count the available vehicle in the requested zip code or else we will use Dijkstra algorithm to find the nearest available vehicle.
* CompleteRequest () – When the request is complete, and the vehicle is available again we add the vehicle ID to the Request Complete data and automatically make the availability of vehicle in Emergency Vehicle as “1”.

1. **Algorithm**

**Input:** Emergency Vehicle type and count of vehicles available in the zip code.

**Output:** Allocated emergency vehicle by calculating the nearest available vehicles.

**Algorithm**:

Step 1:

Step 2:

Step 3:

Step 4:

1. **Time Complexity**

N – Number of Vehicles requested.

E – No. of zip codes present.

V – Distance

Time complexity = O(E\*N logV)

1. **References**
2. <https://github.com/marvinjason/dijkstra>
3. <https://en.wikipedia.org/wiki/Dijkstra%27s_algorithm>