Green University of Bangladesh
Department of Computer Science and Engineering (CSE)
Faculty of Sciences and Engineering
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LAB REPORT NO #07
Course Title: Integrated Design Project 1
Course Code: CSE 324
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Lab Experiment Name: Advanced Vehicle Tracking System: UML sequence Diagram.

Student Detail

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Lab Report Status

Marks: …… **Signature:.....**
Comments:..... **Date:.....**

Introduction

A UML Sequence Diagram illustrates the order of interactions between objects or components in a system over time. It is used to model how objects collaborate to accomplish a specific function or task. In the case of the AVTS (Advanced AI-driven Vehicle Tracking System), the sequence diagram helps to visualize the sequence of messages exchanged between various system components such as the user, vehicle sensors, and the fare calculation system.

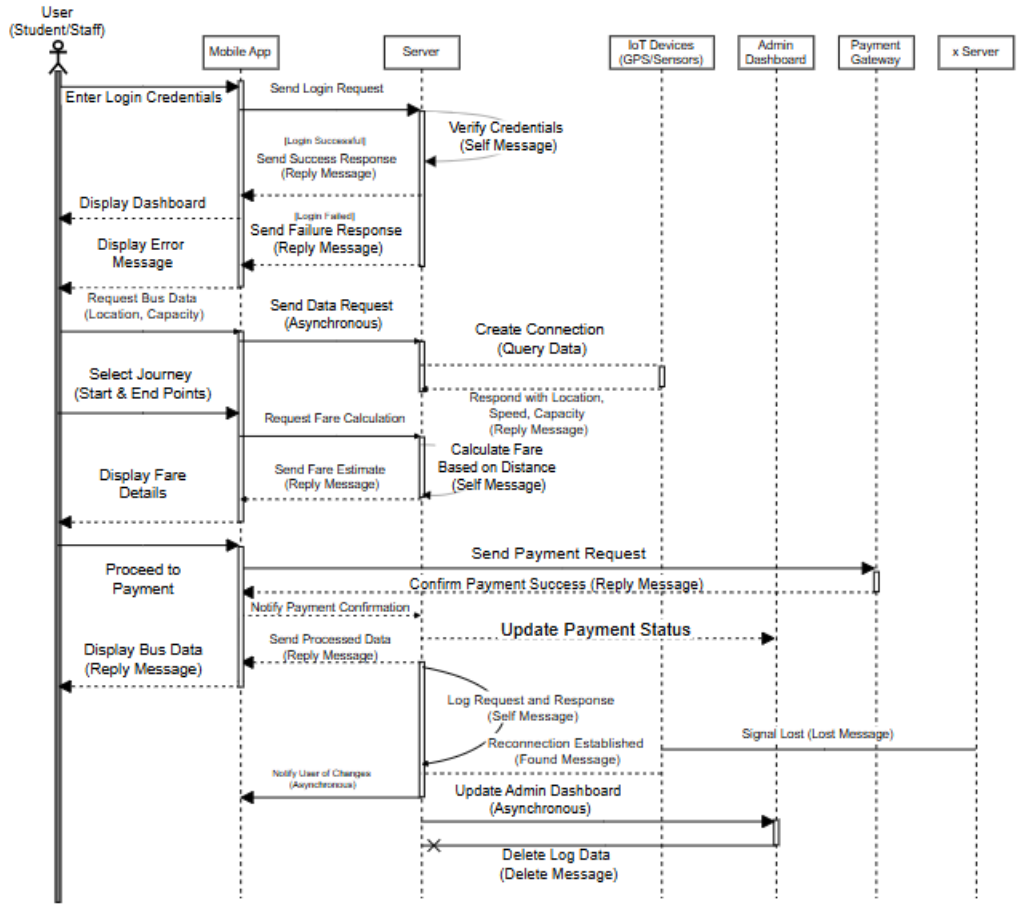
Components of a UML Sequence Diagram

1. **Objects/Actors**: Represent participants in the interaction (e.g., User, Vehicle, Server).
2. **Lifelines**: Vertical dashed lines representing the existence of an object or actor over time.
3. **Messages**: Horizontal arrows indicating communication between objects (e.g., method calls, data passing).
4. **Activation Bars**: Rectangles on lifelines showing when an object is active and processing a message.
5. **Return Messages**: Dotted arrows showing the return of data or response from a previous message.
6. **Alt/Opt Frames**: Optional elements used to represent conditional or alternative behaviors in the sequence.

UML Sequence Diagram

In the AVTS context, we have an interaction between a **Customer** and the **Vehicle Tracking System**. The customer requests real-time vehicle tracking, and the system responds by fetching the latest data from the **Vehicle Sensor** and displaying it. The diagram also models the interaction between the **Fare Calculation** system and the customer when calculating the fare for a journey.

Figure 1: UML Sequence Diagram



Discussion

Creating the UML Sequence Diagram involved identifying key interactions in the AVTS system. The primary challenge was defining the exact sequence of messages between multiple objects, especially when the customer interacts with different components like the vehicle sensor and fare calculator. Another issue was ensuring proper timing of messages and activations, which sometimes led to confusion about the order of operations.