

SOFTWARE DESIGN SPECIFICATION..

SMART DUSTBIN *SYSTEM*

GROUP 19 MEMBERS:

- *PIYUSH AGARWAL (IIT2020012)*
- *MAYUKH BISWAS (IIT2020042)*
- *TARUN DABI (IIT2020045)*
- *ANKIT JHA (IIT2020049)*
- *RISHABH SINGAL (IIT2020078)*

Table Of Content

1. Introduction

1. Purpose of this document
2. Scope of the development project
3. Definitions, acronyms, and abbreviations
4. References
5. Overview of document

2. Conceptual Architecture/Architecture Diagram

1. Overview of modules / components
2. Structure and relationships
3. User interface Issues

3. Logical Architecture

1. Data Flow Diagram
2. Use Case
3. Class Diagram
4. Sequence Diagram
5. State Diagram

The Software Design Specification

1. Introduction

The Software Design Document is a document to provide documentation which will be used to aid in software development by providing the details for how the software should be built.

Within the Software Design Document are narrative and graphical documentation of the software design for the project including use case models, sequence diagrams, collaboration models, object behavior models, and other supporting requirement information.

1.1 Purpose of this document

This document will define the design of our web application on occupancy dustbin management system. It contains specific information about the expected input, output, components, and functions. The interaction between the components to meet the desired requirements are outlined in detailed figures at the end of the document.

1.2 Scope of the development project

We describe what features are in the scope of the application and what are not in the scope of the application to be developed.

In Scope:

- a. A GUI web Application for smart dustbin management system for managing the waste of CC3 building .
- b. Admin can see the condition of all the dustbins using the ultrasonic sensor and the moisture sensor by taking a look at the database.
- c. Admin can keep track of progress of van drivers using the number of complaints against any particular van driver.

Out of Scope:

a. Switching ON/OFF the electrical devices.

1.3 Definitions, acronyms, and abbreviations

Acronyms and Abbreviations:

1. "Occupancy Monitoring system" - app name.

Definitions:

1. Buildings - CC3 etc.

2. "Smart Dustbin System" – A web application for effective management of dustbin systems in the CC3 building .

1.4 References

1.4.1 R. S. Pressman, Software Engineering: A Practitioner's Approach, 5th Ed, McGraw-Hill, 2001.

1.4.2 IEEE SDS template

1.5 Overview of document

This SDS is divided into seven sections with various sub-sections. The sections of the Software

Design Document are

1. **Introduction:** describes about the document, purpose, scope of development project

definitions and abbreviations used in the document.

2. **Conceptual Architecture/Architecture Diagram:** describes the overview of components,

modules, structure and relationships and user interface issues.

3. **Logical Architecture:** describes Logical Architecture Description and Components.

4. **Execution Architecture:** defines the runtime environment, processes, deployment view.

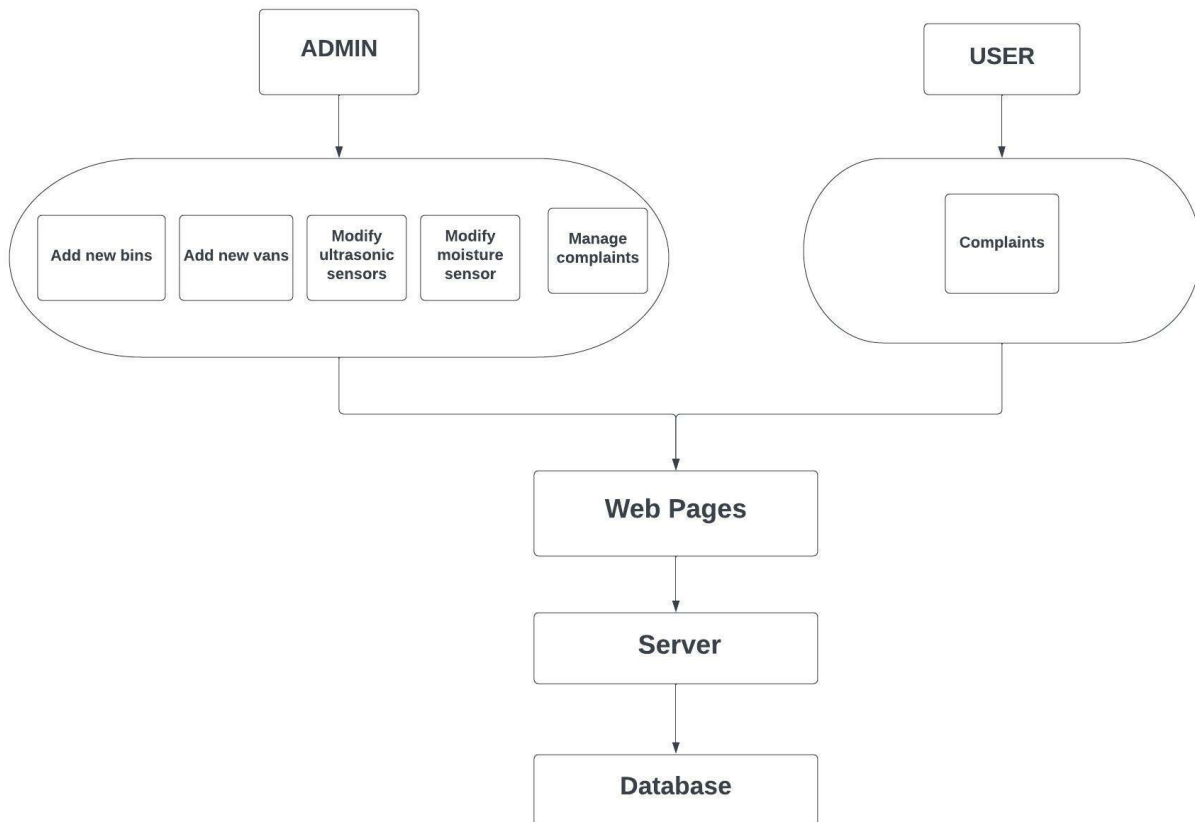
5. **Design Decisions and Trade-offs:** describes the decisions taken along with the reason as

to why they were chosen over other alternatives.

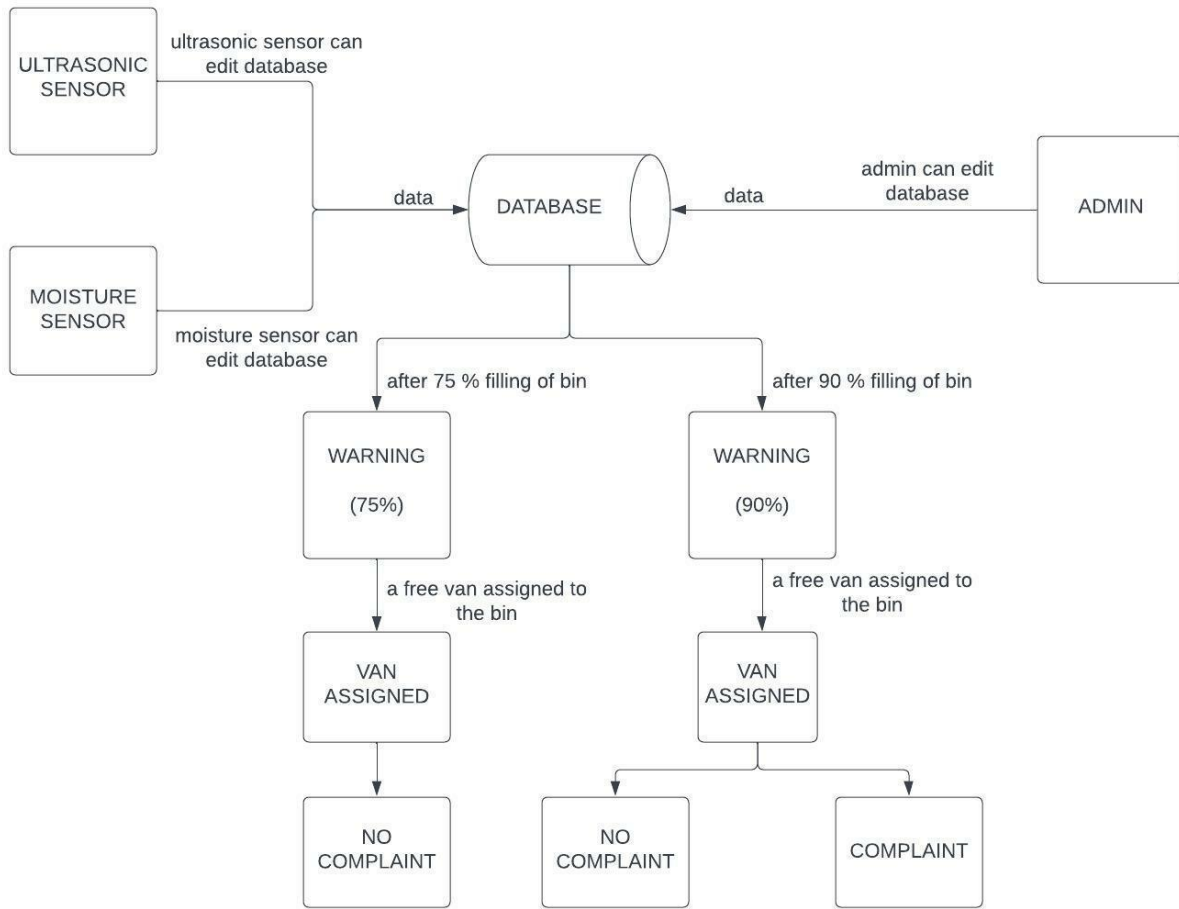
6. **Pseudocode for components:** describes pseudocode, as the name indicates.
7. **Appendices:** describes subsidiary matter if any

2. Conceptual Architecture/Architecture

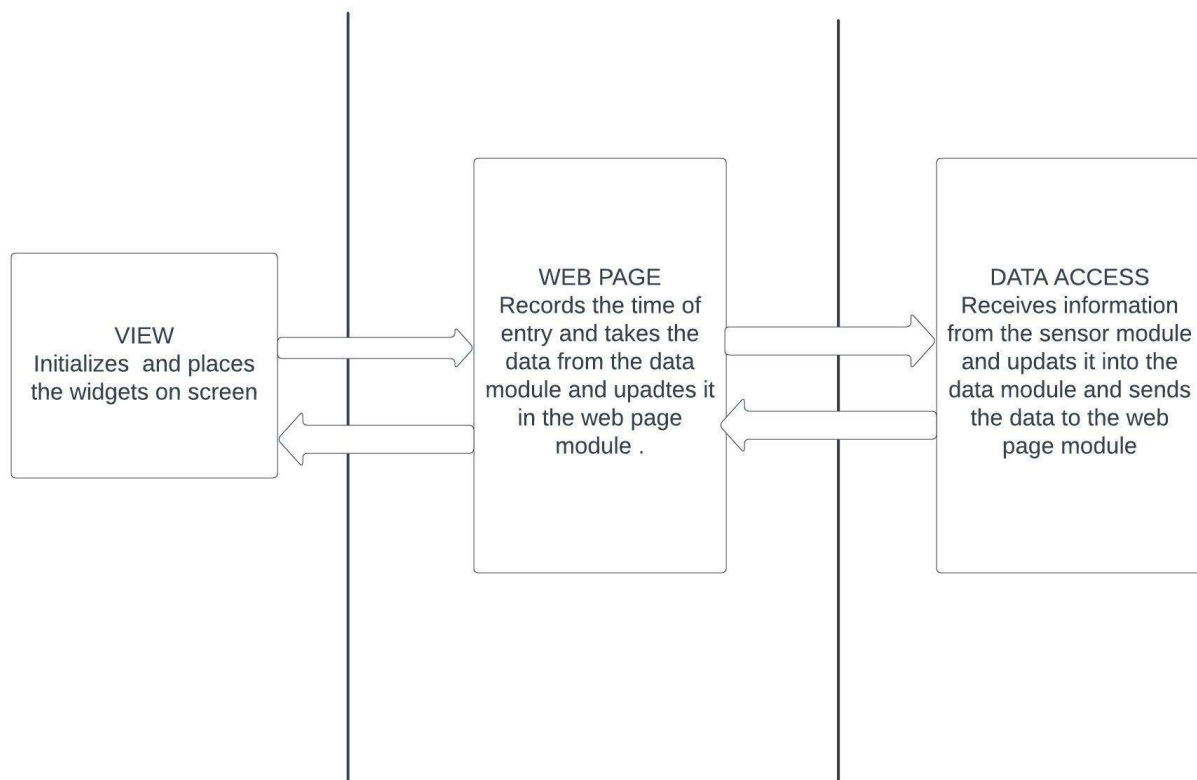
2.1.1 Architectural Diagram - 1



2.1.2 Architectural Diagram - 2



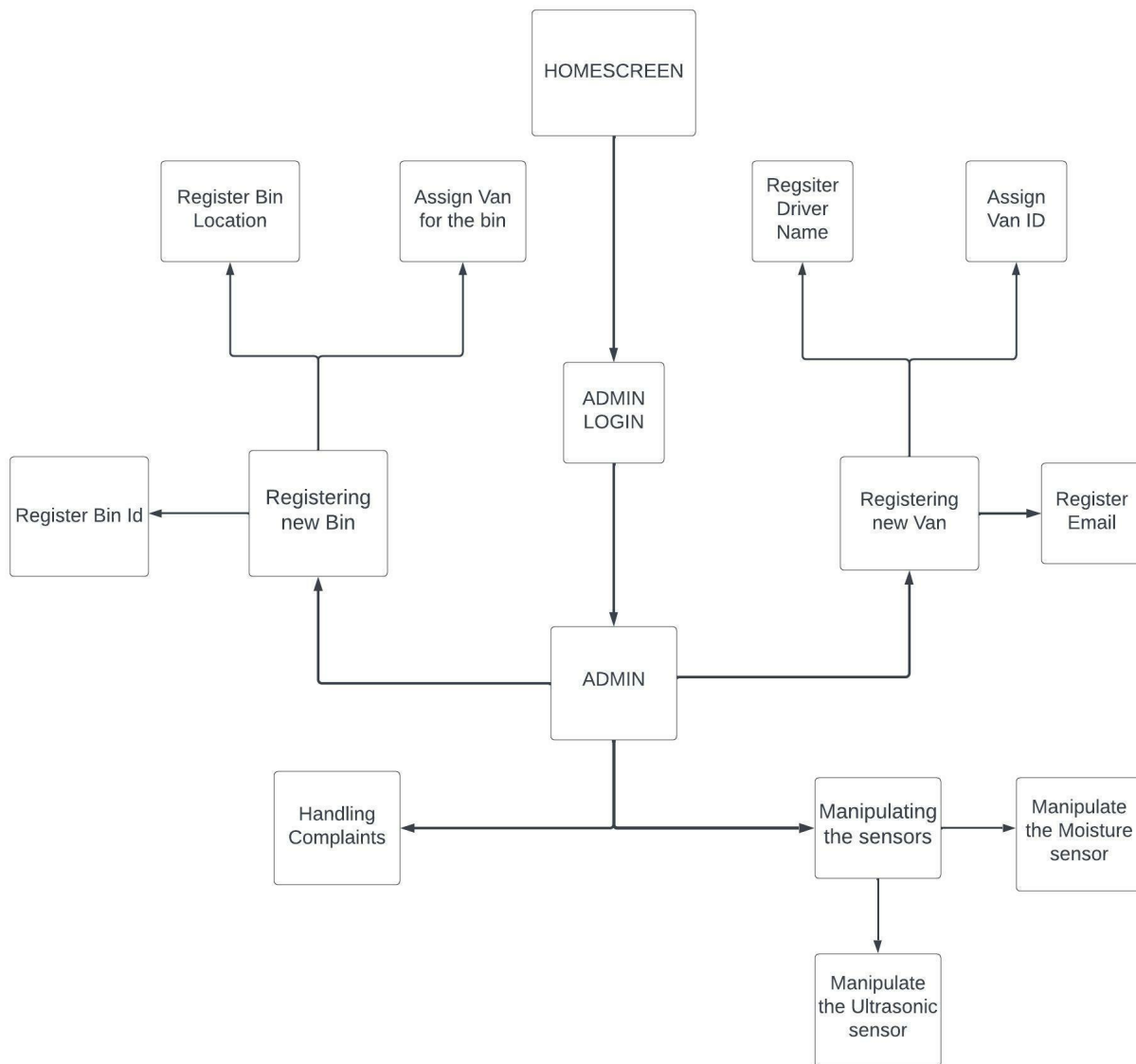
2.2 Overview of modules / components



NOTE:

The horizontal lines represent the separation of modules.

2.2.1 User's/Admin's Side



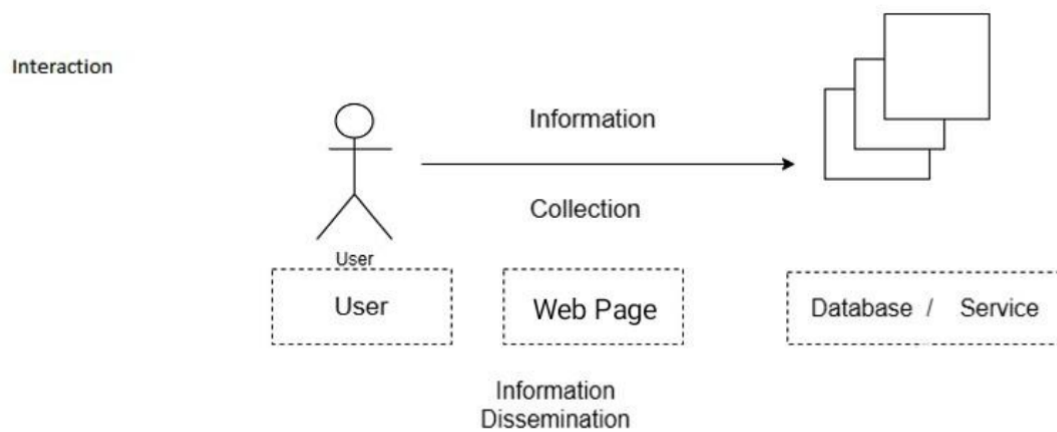
2.3 User interface issues

Smart Dustbin System-

Only the admin can do all the important changes in the database and manipulate the sensors. Admin will login in the application with the help of password . New dustbins will be registered in the system with their id, location , dimensions and one of the vans will be assigned to that dustbin . New vans with their name , van id and mail id will also be registered.

3. Logical Architecture

3.1 Data Flow Diagram:



3.2 Use Case Diagram:

USE CASE DIAGRAM

```
graph TD
    User((USER))
    System((SYSTEM))

    UC1((Registration of new bin))
    UC2((Registration of new van))
    UC3((Configure the sensors))
    UC4((View details))
    UC5((Monitoring the dustbins))

    UC1 -.-> UC2
    UC1 -.-> UC3
    UC2 -.-> UC3
    UC3 -.-> UC4
    UC4 -.-> UC5
    UC5 -.-> UC4
    UC5 -.-> UC3

    UC1 -.-> UC1_1((Bin ID automated, fixed))
    UC1 -.-> UC1_2((Location))
    UC1 -.-> UC1_3((Dimensions Fixed))
    UC1 -.-> UC1_4((Show Available van details))
    UC1 -.-> UC1_5((Save Bin Profile))

    UC2 -.-> UC2_1((Driver Name))
    UC2 -.-> UC2_2((Van ID))
    UC2 -.-> UC2_3((Driver Email))
    UC2 -.-> UC2_4((Save Van Profile))

    UC3 -.-> UC3_1((Configure the ultra-sonic sensor))
    UC3 -.-> UC3_2((Configure the moisture sensor))
    UC3 -.-> UC3_3((Feed the values to dustbin overview))
    UC3 -.-> UC3_4((Identify wet or dry garbage))

    UC4 -.-> UC4_1((Dustbin Overview))
    UC4 -.-> UC4_2((Van Details))

    UC5 -.-> UC5_1((Auto-segregate the critically filled dustbins))
    UC5 -.-> UC5_2((Create a log report of the dustbins when monitoring is stopped))
    UC5 -.-> UC5_3((Automatically register complaint when critically filled dustbin not cleared))

    UC4_1 -.-> UC4_1_1((Bin ID))
    UC4_1 -.-> UC4_1_2((Bin Location))
    UC4_1 -.-> UC4_1_3((Alert on 75% filling))
    UC4_1 -.-> UC4_1_4((Alert on critically filled))
    UC4_1 -.-> UC4_1_5((Last emptied))

    UC4_2 -.-> UC4_2_1((Details of Van assigned))

    UC5_1 -.-> UC5_1_1((Alert on critically filled))
    UC5_1 -.-> UC5_1_2((Last emptied))
    UC5_1 -.-> UC5_1_3((Create a log report of the dustbins when monitoring is stopped))

    UC5_2 -.-> UC5_2_1((Alert on critically filled))
    UC5_2 -.-> UC5_2_2((Last emptied))
    UC5_2 -.-> UC5_2_3((Create a log report of the dustbins when monitoring is stopped))

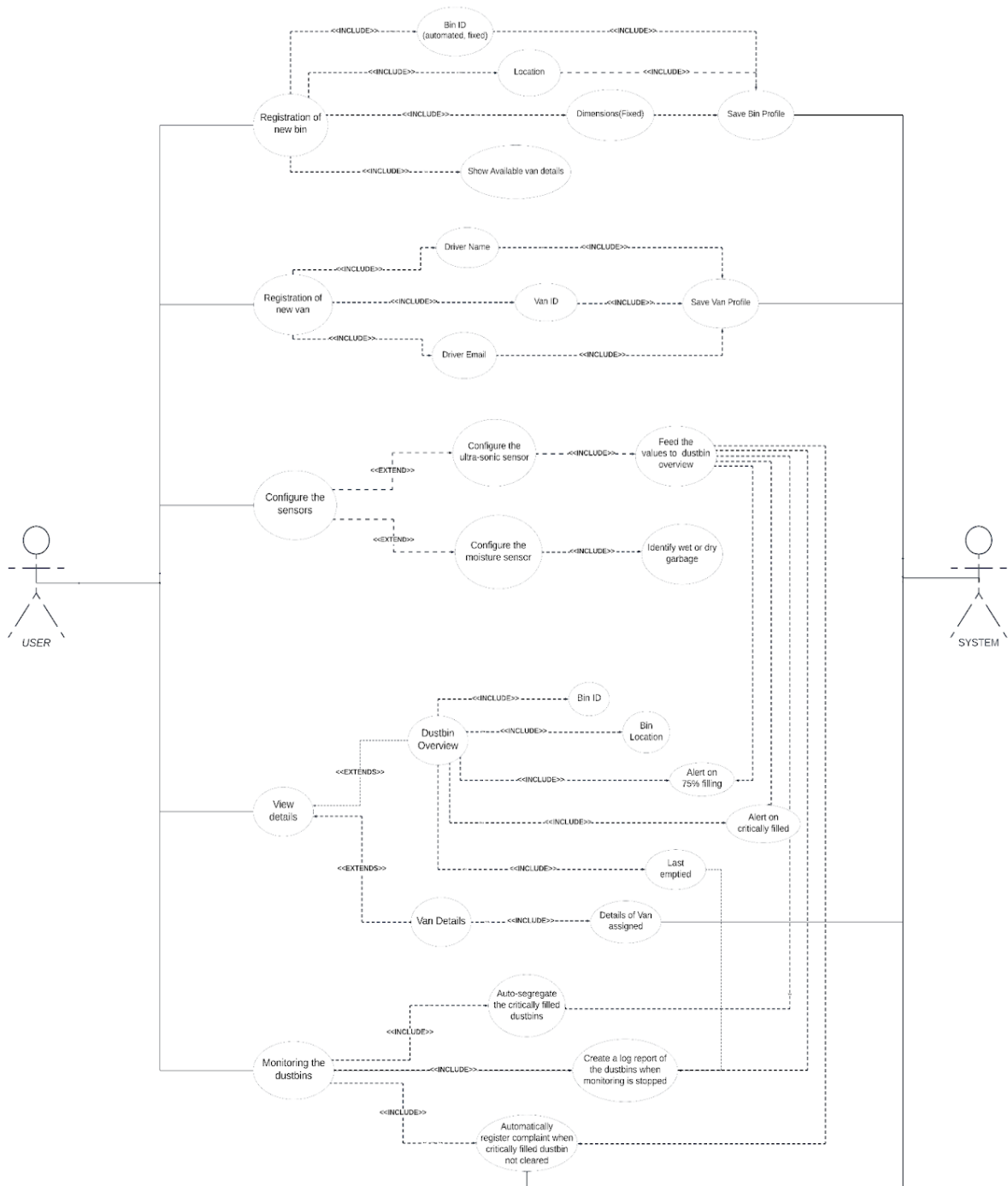
    UC5_3 -.-> UC5_3_1((Alert on critically filled))
    UC5_3 -.-> UC5_3_2((Last emptied))
    UC5_3 -.-> UC5_3_3((Create a log report of the dustbins when monitoring is stopped))
```

The diagram illustrates the functional requirements for a waste management system, involving a USER and a SYSTEM. The main use cases are:

- Registration of new bin**: Includes Bin ID (automated, fixed), Location, Dimensions (Fixed), Show Available van details, and Save Bin Profile.
- Registration of new van**: Includes Driver Name, Van ID, Driver Email, and Save Van Profile.
- Configure the sensors**: Includes Configure the ultra-sonic sensor, Configure the moisture sensor, Feed the values to dustbin overview, and Identify wet or dry garbage.
- View details**: Includes Dustbin Overview and Van Details.
- Monitoring the dustbins**: Includes Auto-segregate the critically filled dustbins, Create a log report of the dustbins when monitoring is stopped, and Automatically register complaint when critically filled dustbin not cleared.

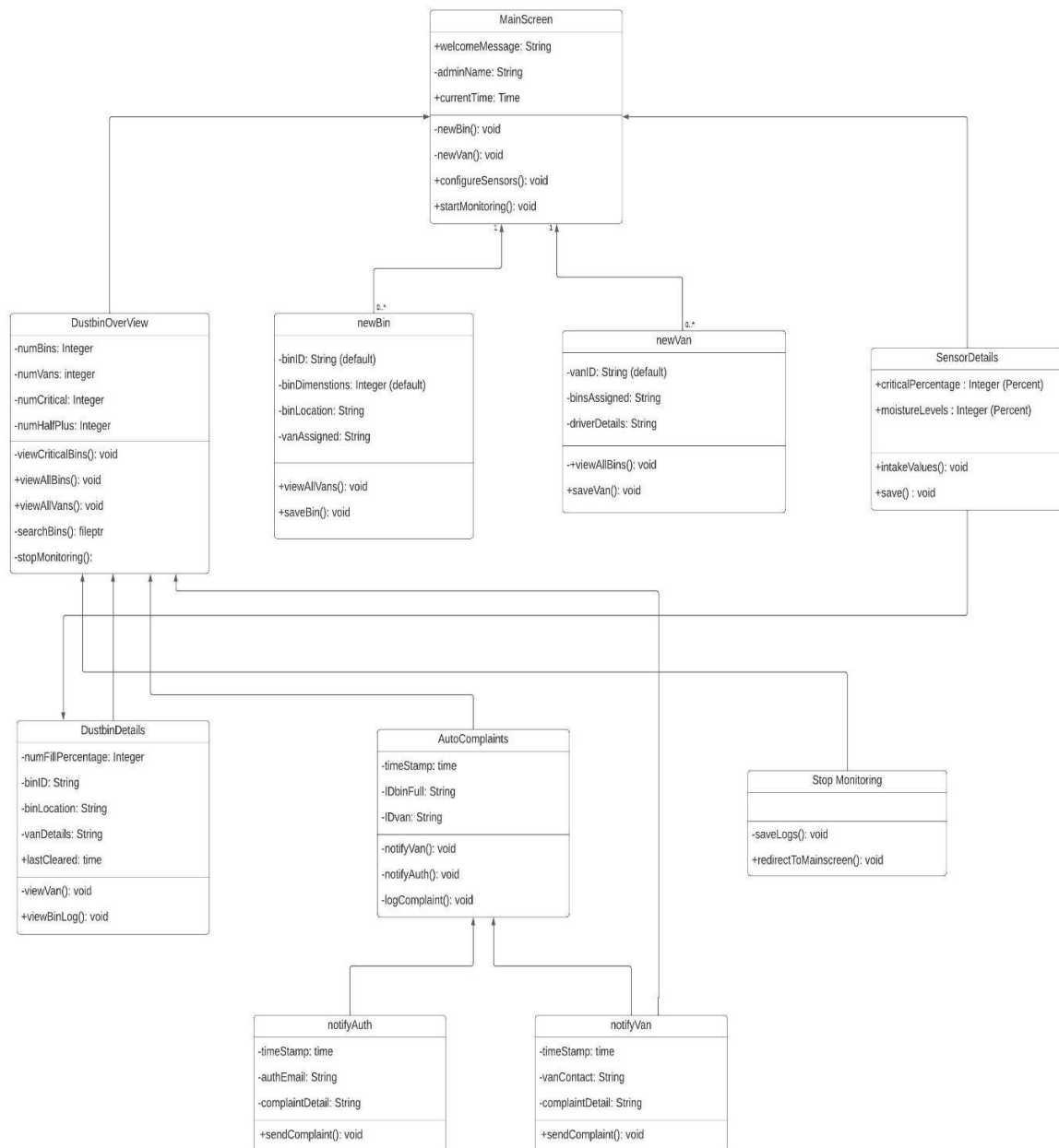
Sub-use cases and relationships:

- Dustbin Overview** (extended by View details) includes Bin ID, Bin Location, Alert on 75% filling, Alert on critically filled, and Last emptied.
- Van Details** (extended by View details) includes Details of Van assigned.
- Auto-segregate the critically filled dustbins** (extended by Monitoring the dustbins) includes Alert on critically filled, Last emptied, and Create a log report of the dustbins when monitoring is stopped.
- Create a log report of the dustbins when monitoring is stopped** (extended by Monitoring the dustbins) includes Alert on critically filled, Last emptied, and Automatically register complaint when critically filled dustbin not cleared.
- Automatically register complaint when critically filled dustbin not cleared** (extended by Monitoring the dustbins) includes Alert on critically filled, Last emptied, and Create a log report of the dustbins when monitoring is stopped.



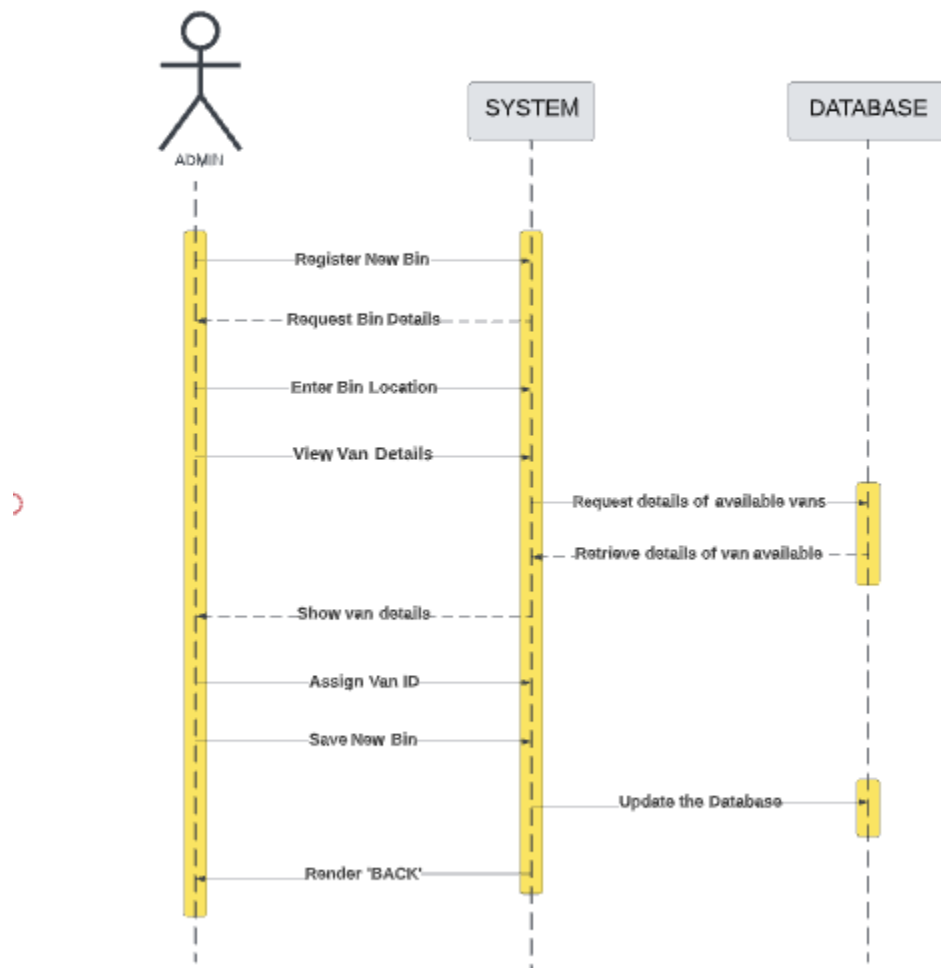
3.3 CLASS DIAGRAM

CLASS DIAGRAM

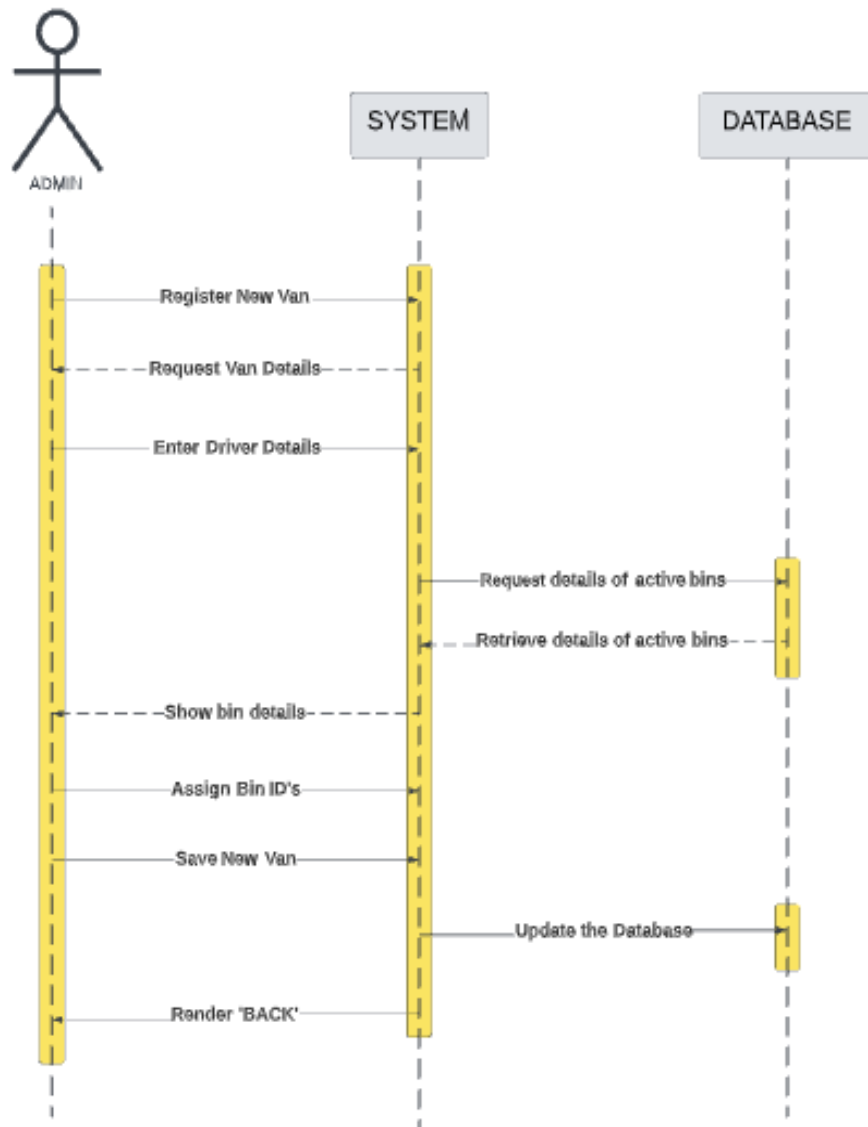


3.4 Sequence Diagram

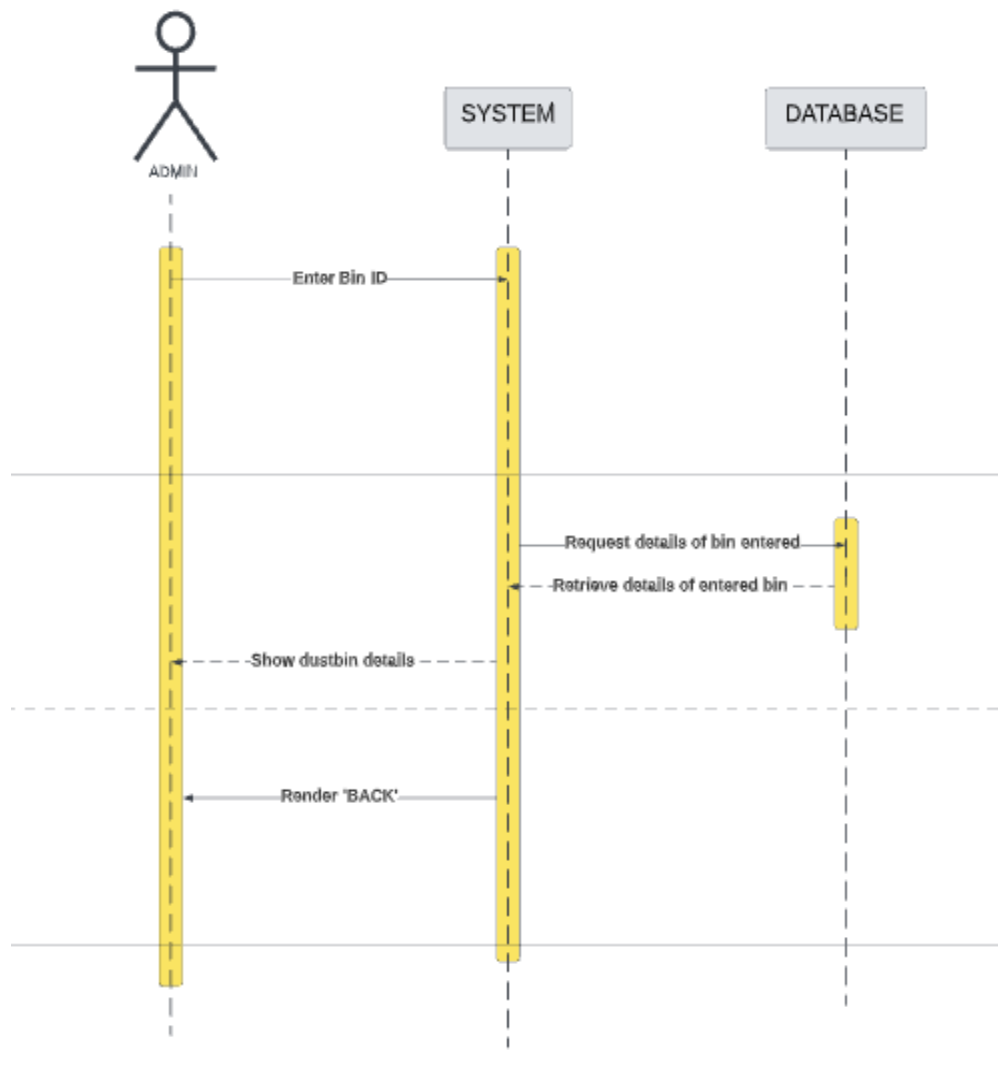
Sequence Diagram for Use Case 1 : Registration of a new bin



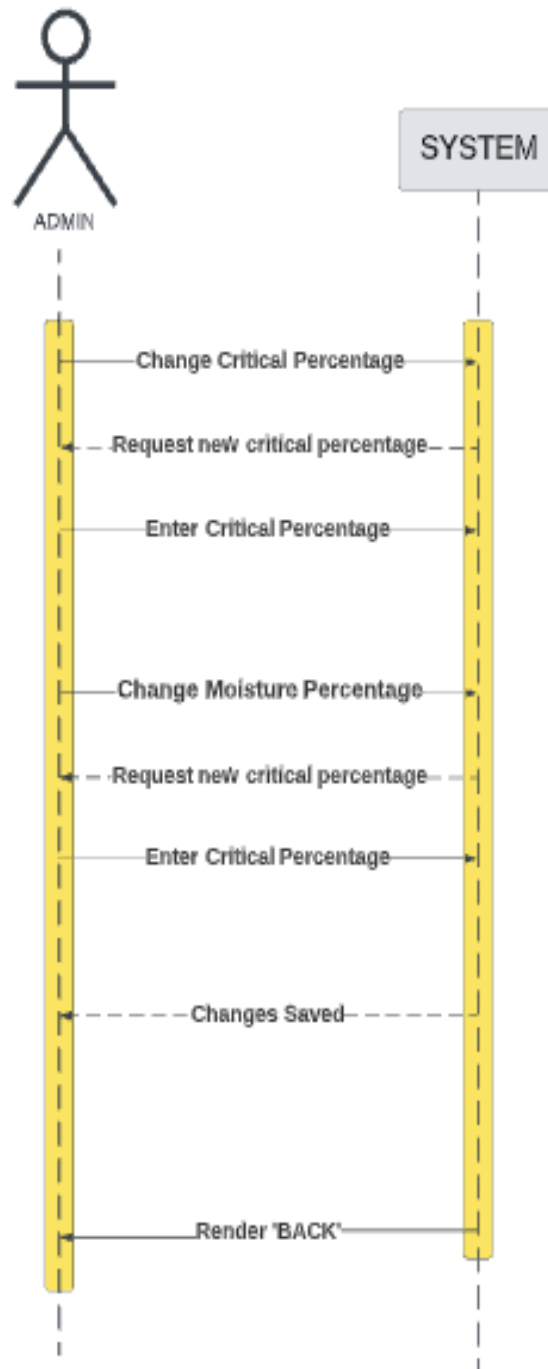
Sequence Diagram for Usecase 2 : Registration of a new Van



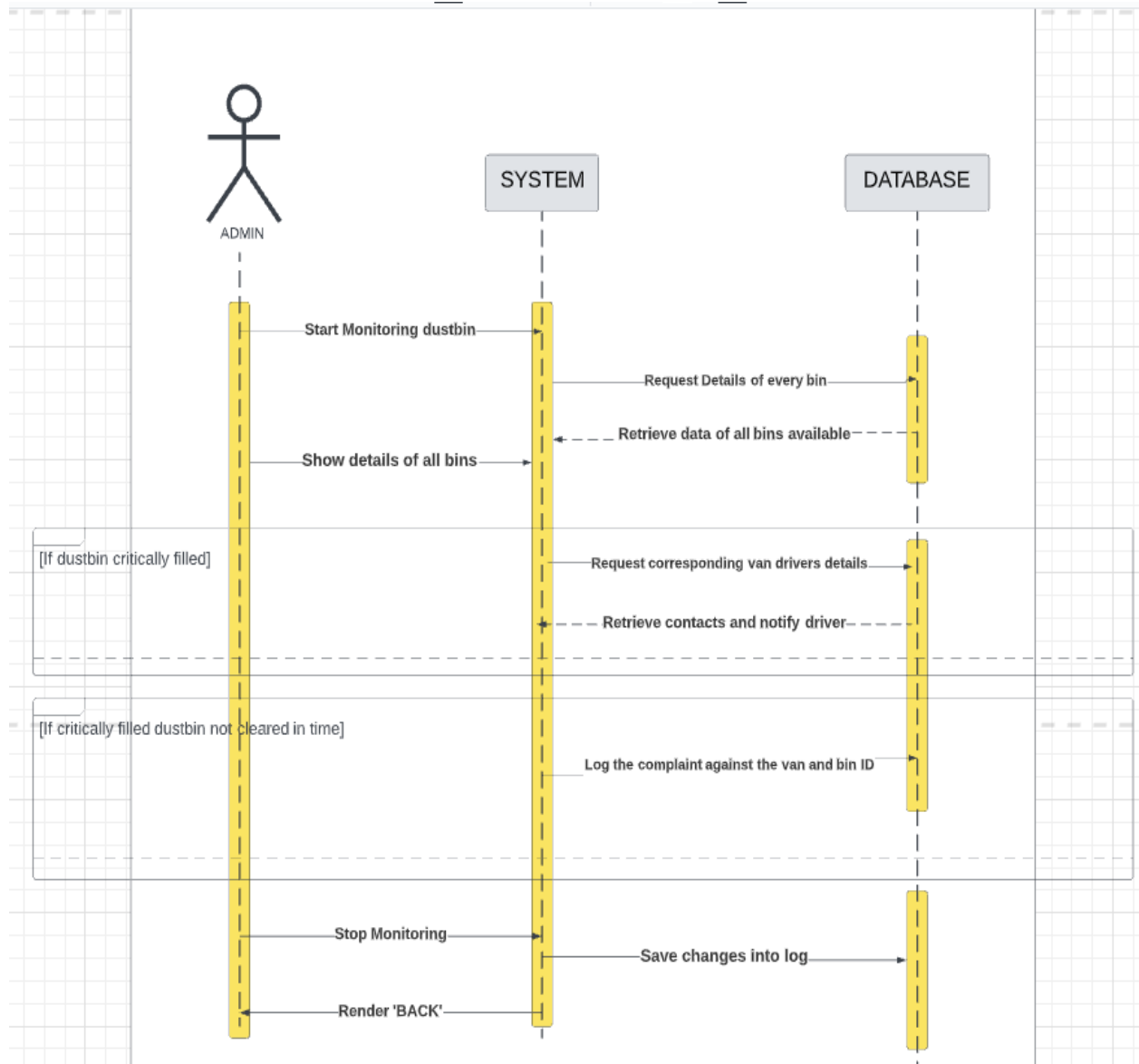
Sequence Diagram for Usecase 3 : View details of dustbin



Sequence Diagram for Use Case 4 : Configure the sensors

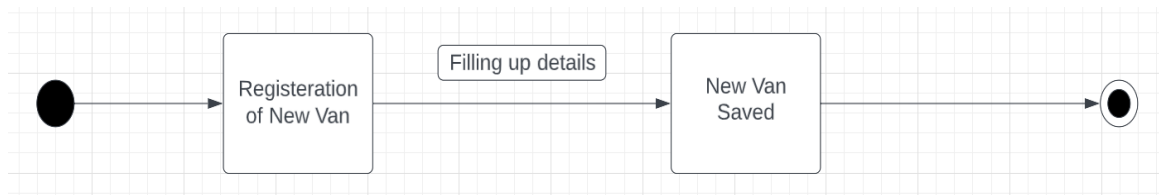


Sequence Diagram for Use Case 5 : Monitoring the sensors

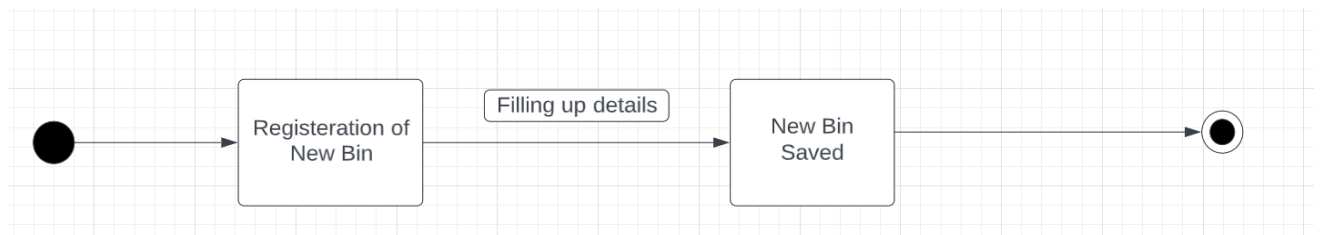


3.5 State Diagrams

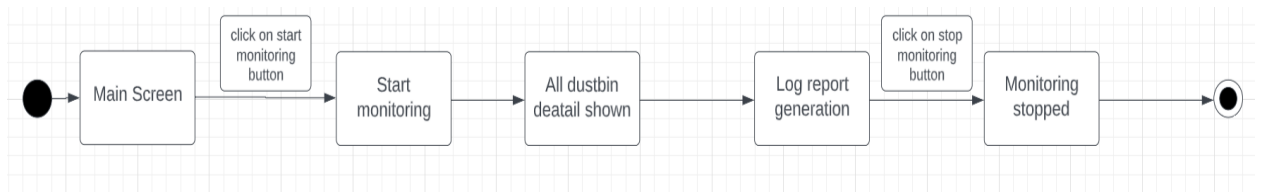
- **Registration of new van**



- **Registration of new Bin**



- **Monitoring**



- **Warning**

