TASK 1: REQUIREMENT ELICITATION

1. CONTEXT OF PROJECT

1.1 STAKEHOLDERS:

Internal stakeholders are people whose interest in a company comes through a direct relationship, such as employment, ownership, or investment. External stakeholders are those who do not directly work with a company but are affected somehow by the actions and outcomes of the business.

- **External: The parties or groups that are not a part of the organization, but gets affected by its activities**
  1. Government
  2. Citizen of nearby area
  3. Private Sweeper
  4. Citizen paying for service
  5. Service provider Y

- **Internal: The individual and parties that are the part of the organization**
  1. Back officers
  2. Collectors
  3. Janitors
  4. Organization X

1.2 CURRENT PROBLEMS OF URBAN WASTE MANAGEMENT: (POSSIBILITIES)

- **Waste management**

Urban waste collected at temporary disposal are not separated between organic and non-organic waste => No training about waste management

Temporary dumps usually are not well-managed => Create population and health risk for local communities.

Private Sweepers usually use old technology to collect and dispose waste, they do not obtain modern and efficient technology to properly dispose waste.

- **Organization:**

Back officer:

Lack information about type of vehicles and MCPS => Do not know how to assign task for janitors and collectors.

Collectors and Janitors:

Need to learn to use multiple different platforms to perform their task correctly (Calendar to see work shifts, Map to see the proper route, etc, …) => More time training. Unable to get access to emergencies immediately, have to make a call and remember who are their supervisors.

Unable to focus on their specialization, have to be cautious for everything (is MCP full, which route is the most efficient, …)

Unable to get access to the necessary information and have to make requests for everything.

1.3 CURRENT NEED OF STAKEHOLDERS:

Citizen: Need better waste management. Get informed about waste collection calendar to properly classify trash and dumps. Need healthier environment where trash is not around.

Government: Need better waste management. Trash dumps are well-managed => Waste do not contaminate water and land source. More modern and green technology to process waste.

Back officer: Information about janitors and collectors, their work calendar. Have an overview of vehicles and their technical details (weight, capacity, fuel consumptions, etc)

Have an overview of all MCPs and information about their capacity. Information should be updated from MCPs every 15 minutes with the availability of at least 95% of their operating time

Map of area (include traffic information, route, distance and fuel consumption) to properly locate MVP and send collectors, janitors.

Ability to contact collectors and janitors for emergency.

Collectors and Janitors: Information about their work shifts (include time, location and MVP they are assigned to). Have a detail view of their task on a daily and weekly basic. All important information should be displayed in one view (without scrolling down).

Be able to communicate with collectors, other janitors and back officers. The messages should be communicated in a real-time manner with delay less than 1 second

Collectors: Route to get to their destinations. Information about their vehicles (max capacity, fuel consumption, …). Type of their MCPs and contact info of janitors who are responsible for their MCPS. Notified if the MVPS is fully loaded

Janitors: Map of their assigned area. Notified if the MVPS is fully loaded. Route to get to their MVPS and information of family (waste type, …) they are going to collect.

1.4 BENEFITS

Citizen: Better waste management. Trash is collected on same schedule and location => Easier to keep track.

Government: Better waste management. Trash dumps are well-managed. Better environment where trash is handled with utmost care.

Back officer: Can easily keep track of collectors and janitors work calendars. Can easily obtain information about different kinds of vehicle, route and MCPS => Easier to assign work calendars and proper vehicles for collectors and janitors.

Can immediately contact with collectors and janitors => Keep them informed about emergency or sudden change of route because of traffic problems.

Collectors and Janitors: Can keep track of their work shift easily, can focus on their specializations without caring too much about external information. Can get access to their work information directly => Need less training on how to use the platform => Less thing to remember and work on.

Be able to communicate with collectors, other janitors and back officers to inform about emergencies and get notified about sudden change of plans immediately.

2. REQUIREMENTS INDENTIFY AND USE-CASE FOR WHOLE SYSTEM

2.1 Identify Requirements

> *"In reality, the distinction between different types of requirements is not as clearcut as these simple definitions suggest. A user requirement concerned with security, such as a statement limiting access to authorized users, may appear to be a nonfunctional requirement."*
>
> (Software Engineering _ Ian Sommerville)

As the book has stated, there is no clear distinction between function and non-function requirement hence our below specifications are based mainly on our intuition, knowledge and experience.

- **Function requirements**

As a back officer, a collector and a janitor, I want a **Chat box** so that I can contact to the others.

As a back officers, I want a **Calendar** so that I can assign the tasks for collectors and janitors, the route for collectors, the MCPs for the collectors and the janitors.

As a collector and a janitor, I want a **Calendar** so that I can see my tasks in daily and week basic and check in/ check out my work in any time.

As a back officer, I want a **Vehicle management** so that I can know the details of the vehicles (weight, capacity, fuel consumptions, in-use, etc) and assign vehicle for the collectors.

As a back officer, a collector and a janitor, I want a MCPs management system with a map so that I can design the route, keep up with the MCPs state and be notified if the MCPs are fully loaded.

- **Non-function requirements:**

As a back officer, I want **efficiency** so that the system can handle real-time data from at least 1000 MCPs at the moment and 10.000 MCPs in five years.

The system **interfaces** should be in Vietnamese, with a button to switch to English.

As a user, I want **high-speed** so that the messages can be communicated in a real-time manner with delay less than 1 second.

The information should be updated from MCPs every 15 minutes with the **availability of at least 95%** of their operating time.

2.2 Use-case Diagram:

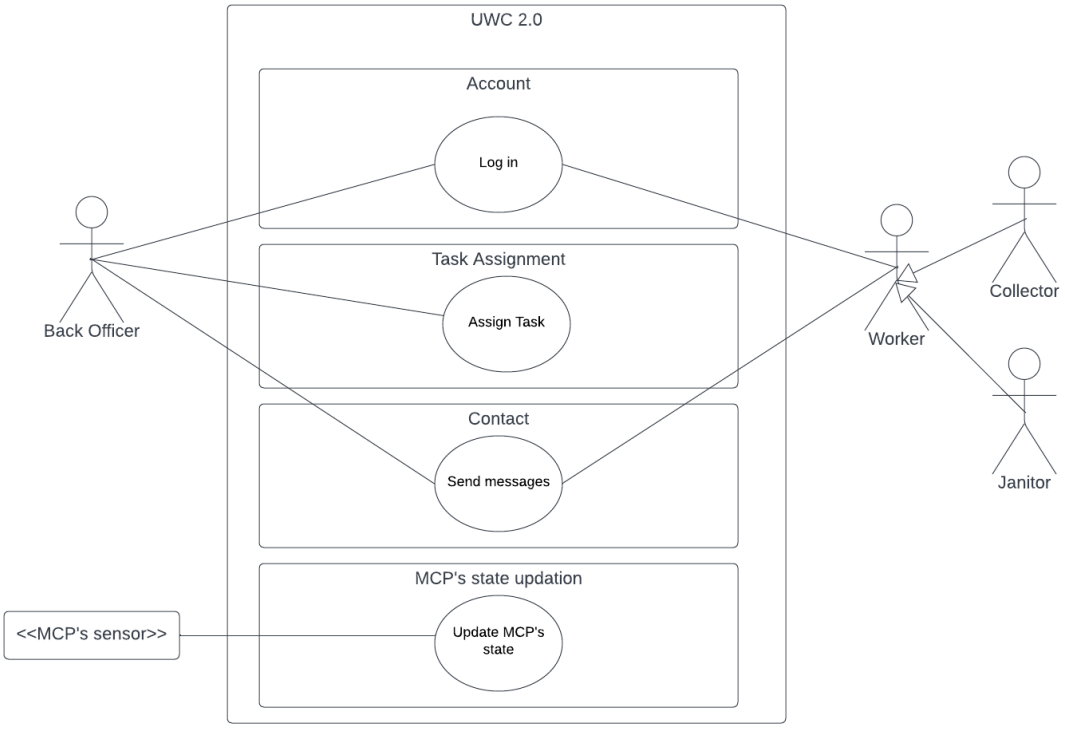

Figure 2.1: Use-case Diagram for the whole system

As you can see in the use-case diagram, we divide our program into **5** main parts:

1. **Log in:** In this part, we will allow users (Workers and Back Officer) to log in their accounts to verify their identities. There are restricted parts for different users, therefore, this log in part will help improving security and help us to protect private personal information.
2. **MCP's state update:** In this part, each MCP will have a sensor, when it is full or empty, the sensors will send data back to the system.
3. **Task Assignment Module:** This part will help the Back Officers to assign and then update the necessary information about tasks/calendars, … for the workers. This part will be analyzed further below in Part 3.
4. **Contact:** Last but not least, this part will help both Workers and Back Officers to communicate with each other in case of emergency. This attribute will help to enhance communication and solidarity among peers in work.

3. TASK ASSIGNMENT MODULE USE-CASE DIAGRAM AND TABLE

3.1 Use-case diagram

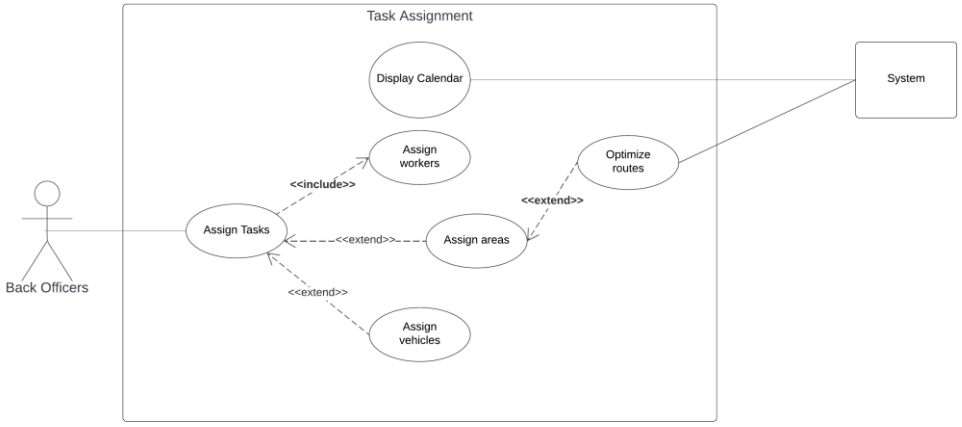

Figure 3.1: Use-case diagram of Task Assignment Module

3.2 Use-case Table

Use-case name	Display calendar
Actors	System
Trigger Condition	Back officers click the log-in button on the screen.
Description	System displays the calendar on the screen.
Pre-Conditions	Back officers log in successfully to the web.
Post-Conditions	Calendar information is shown.
Main Flow	1. System display the calendar to the screen.
Exception	
Alternative flow	At step 1, there may have Internet corruption. If that situation occurs, a notification will display and request users to refresh the page in order to re-access

Use-case name	Assign vehicle
Actors	Back officers
Trigger Condition	The worker is chosen to be a collector.
Description	Back officer assigns 1 vehicle to the collector.
Pre-Conditions	There is at least 1 available vehicle on that day.
Post-Conditions	The collector is assigned to 1 vehicle.
Main Flow	1. System shows a selection list of available vehicles on that day. 2. Back officer chooses 1 vehicle from the list.
Exception	At step 1, if the list of available vehicles is empty, the system will send an alert to the back officer instead.
Alternative flow	

Use-case name	Assign worker
Actors	Back officers
Trigger Condition	Back officers are on the “Add assign" page.
Description	Back officer chooses 1 free worker for the task.
Pre-Conditions	There is at least 1 free worker and the Internet is accessible.
Post-Conditions	Back officer chooses 1 free worker.
Main Flow	1. System shows a selection list of free workers on that day. 2. Back officer chooses 1 worker in the list.
Exception	At step 1, if the list is empty, the system will send an alert to the back officer instead.
Alternative flow	

Use-case name	Assign tasks
Actors	Back officer
Trigger Condition	Back officers click 1 date in the calendar and then click "Add new assignment" on the Day Page.
Description	Back officers assign 1 task for a date in the calendar.
Pre-Conditions	Database is available and Internet is accessible.
Post-Conditions	Back officers create a new assignment.
Main Flow	1. System move to "Add assign" page.
Exception	
Alternative flow	

Use-case name	Optimize route
Actors	System
Trigger Condition	The worker is chosen to be collector.
Description	System make optimal route which go through all MCPs in chosen area.
Pre-Conditions	Chosen area(s).
Post-Conditions	A route is optimized and assigned to the task.
Main Flow	1. System optimizes 1 route from MCPs' positions in the chosen area(s).
Exception	
Alternative flow	

Use-case name	Assign area
Actors	Back Officers
Trigger Condition	Back officer identified the type of worker and is on "Assign area" page.
Description	Back officer assigned area(s) to a task - worker.
Pre-Conditions	The list of areas is not empty.
Post-Conditions	At least 1 area is assigned to the task.
Main Flow	1. + If the worker is a janitor, the system displays a selection list of areas. + If the worker is a collector, the system displays a selection list of unassigned areas. 2. + If the worker is a janitor, back officer chooses 1 area. + If the worker is a collector, back officer chooses 1 or more areas.
Exception	At step 1, if the worker is a collector and the list of unassigned areas is empty, system will send an alert to back officer.
Alternative flow	

END OF REPORT