VIETNAM NATIONAL UNIVERSITY, HO CHI MINH CITY
UNIVERSITY OF TECHNOLOGY
FACULTY OF COMPUTER SCIENCE AND ENGINEERING

SOFTWARE ENGINEERING (CO3001)

Assignment

Urban waste collection aid UWC 2.0

Task 1: Requirement elicitation

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1.1 Identify the context of this project. Who are relevant stakeholders? What are their current needs? What could be their current problem? In your opinion, what benefits UWC 2.0 will be for each stakeholder?

Some of the relevant stakeholders of the system:

- *Organization X's system manager:* IT staff who operate and maintain the system (website or server engineer).
- *Service provider Y's supervisor:* oversee all operations to ensure that the system runs smoothly.
- *Back officers:* operate a central system to create calendars, coordinate, and send messages to collectors and janitors.
- *Collectors and janitors:* receive tasks and check in/out tasks, send and receive messages.

Their current needs

Waste management and collection are more economical and practical.

Their current problems could be

- Solid waste management is costly and ineffective
- Operational inefficiencies of services
- Limited utilization of recycling activities
- Inadequate management of non-industrial hazardous waste
- Inadequate landfill disposal
- Inadequate service coverage

Benefits UWC 2.0 will be for each stakeholder:

UWC 2.0 helps:

- Service provider Y supervisor to easily keep track of employees.
- Back officers to be able to assign tasks, have an overview of the workers and send/receive messages from other employees.
- Collectors and janitors to be well-informed about their tasks and routes.

1.2 Describe all functional and non-functional requirements that can be inferred from the project description. Draw a use-case diagram for the whole system

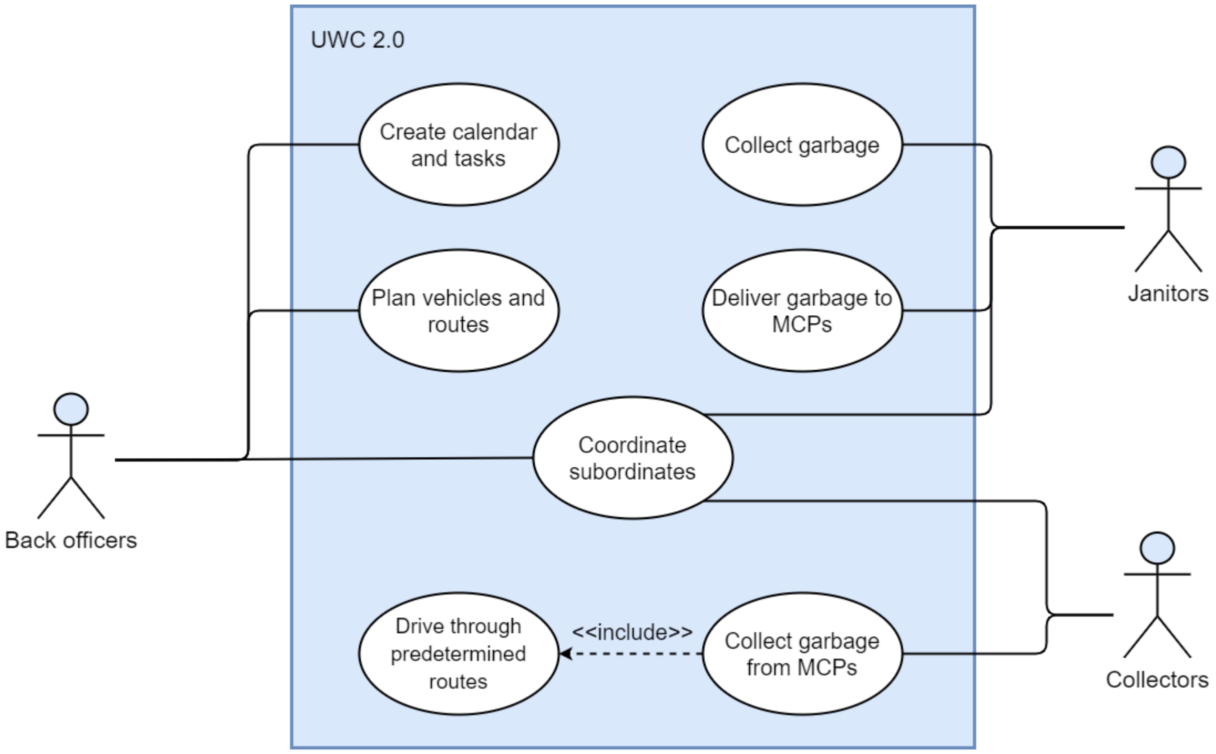
Functional requirements

- The system should run every day for each back officer, janitor, and collector working that day.
- Service Provider Y manager shall be able to search for data about back officers, janitors, and collectors.
- The system should have a log-in function and a database to store all of the accounts' information.
- Back officers shall be able to search for information about collectors and janitors, information and the capacity of MCPs.
- Back officers shall be able to create and check collectors' and janitors' calendars.
- Back officers shall be able to search for vehicles and their technical details.
- The system should have a function for the back officers to create and assign routes for the collectors based on vehicles' data.
- Allow communication between back officers, collectors, and janitors (Realtime messages, Mails, etc).
- Janitors and collectors shall be able to check their working routine, task, and availability of MCPs.
- Have a task management system that helps janitors and collectors view their tasks.
- The system should have a report function for users to inform the problems to system managers.

Non-functional requirements

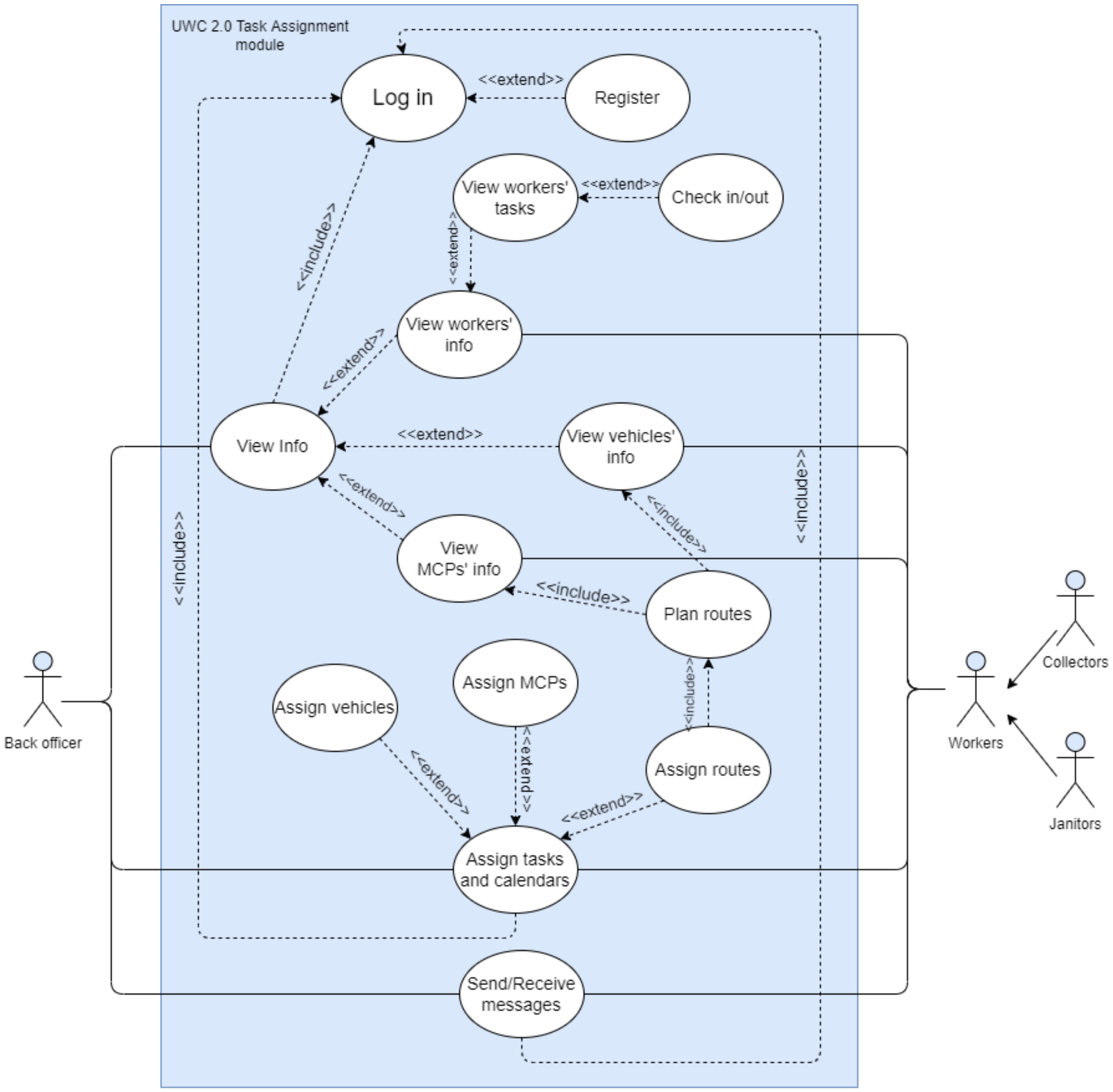
- The information should be updated from MCPs every 15 minutes with the availability of at least 95% of their operating time for back officers.
- Real-time messages between back officers, collectors, and janitors can't exceed 1 second of delay.
- Collectors and Janitors shall be able to have a detailed view of their tasks without scrolling down. All critical information should be displayed in one view
- The system should be able to handle real-time data from at least 1000 MCPs at the moment and 10.000 MCPs in five years.
- The system user interface should be displayed in Vietnamese, with an opportunity to switch to English in the future.

Use-case diagram



1.3 For the Task assignment module, draw its use-case diagram and describe the use-case using a table format

Use-case diagram



Use-case table

Use-case 1: Log in

Use-case name	Log in
Actors	Workers, Back officers
Description	Employees should log in to the system to store their stats for the superiors to keep track of the subordinates. In order to view information, assign tasks and calendars or send/receive messages from others, employees shall be able to gain access by logging in to the system.
Trigger	Actors indicate that they want to log in to the system
Pre-condition	- Actor’s account exists - Actor’s account is authorized - Actor’s device has an application and connects to the internet while logging in
Post-condition	- The actor successfully logs in
Normal Flow	1. User access to the system 2. User chooses a login and fills in username, password 3. The system verifies the credentials successfully and allows the user to access the application
Alternative Flow	2a. User chooses “Register” 2a1. Create a new account *Continue use-case 2-3*
Exception	3a. The system fails to verify the access and show the notification 3a1. Users decide to stop logging in. *End use-case* 3a2. Users choose “Register” *Come back to use-case 2a*

Use-case 2: View info

Use-case name	View info
Actors	Workers, Back officers
Description	As a back officer, I want to view all of the information about workers, vehicles, and MCPs in order to have an overview of my subordinates and assign tasks to them. As a worker, I can view and check in/out my tasks every day and have an overview of my assigned vehicles and collecting points.
Trigger	User indicates that he wants to view some information on the system
Pre-condition	- User logged in to the system. - The data that the user asked for is stored in the database of the system. - Users and the data they want to view have been authenticated.
Post-condition	- User successfully views the information
Normal Flow	1. Users access the system. 2. Users log in to the system. 3. Users choose what information to view from the system. 4. The system displays the information.
Alternative Flow	4a. The information that users looking for is not accurate or missing. 4a1. Users send a report of the problem to the system. 4a2. The system updates or sends an offer to the data owner to update the information. *End use-case*
Exception	2c. Users have not logged in to the system. 2c1. Users log in to the system. *Continue use-case 3-4*
Non-functional Requirements	NFR-1. The information of MCPs should be updated every 15 minutes with the availability of at least 95% of their operating time. NFR-2. The tasks of the workers should be displayed in one view.

Use-case 3: Assign tasks and calendars

Use-case name	Assign tasks and calendars
Actors	- Primary actor: Back officers - Secondary actor: Workers
Description	Back officers give information about tasks and calendars to workers so they can view and receive routes, MCPs, and vehicles.
Trigger	Back officers indicate that they want to assign tasks and calendars to workers.
Pre-condition	- Users have an account logged in to the system. - Tasks and calendars are authorized.
Post-condition	- Back officers successfully assign tasks and calendars to workers. - Workers get and be able to view their assigned tasks.
Normal Flow	1. Users access the system. 2. Users log in to their accounts. 3. Back officers start to assign tasks to their subordinates. 4. Workers receive notifications that tasks have been successfully assigned.
Alternative Flow	4a. Workers have not received any tasks 4a1. Back officers check if the tasks assigned are valid or not. 4a2. Back officers resend tasks. Workers check again and confirm that the given tasks are successfully received. *End use-case*
Exception	2c. Users have not logged in to the system. 2c1. Users log in to their accounts. *Continue use-case 3-4*

Use-case 4: Send/Receive messages

Use-case name	Send/Receive messages
Actors	Workers, Back officers
Description	- Sending/Receiving messages is a function that allows employees to send announcements to the subordinates immediately and check whether they have read the messages or not. Besides, workers can create groups for private conversations via this function.
Trigger	Users indicate that they want to send or view received messages.
Pre-condition	- Users own at least one smart device. - Users logged in to their accounts. - Users turned on notifications about new messages.
Post-condition	- Users know that their messages have been sent successfully and whether the receivers have read the message or not.
Normal Flow	1. Users access the system. 2. Users log in to their accounts. 3. Users text new messages and choose which accounts they want to send. 4. Users receive notifications that the messages were sent.
Alternative Flow	4a. The receivers have not received any message. 4a1. The receivers check their Internet connection and reload the mailbox. 4a2. The receivers read the message and confirm to the system that the messages were sent successfully. *End use-case*
Exception	2a. The users' session has expired. 2a1. Users log in to their accounts again. *Continue use-case 3-4*