

VIETNAM NATIONAL UNIVERSITY, HO CHI MINH CITY
UNIVERSITY OF TECHNOLOGY



Software Engineering CC05

Report Task 1 (Semester 221)

GROUP Ồ DỀ

Lecturer: Trương Tuấn Anh

Student's name	Student's ID
Nguyễn Xuân Bách	2052864
Nguyễn Thanh Bảo Danh	2052416
Trần Quang Kiệt	2052563
Trần Trung Nguyên	2052196
Mai Minh Nhật	2053295

HO CHI MINH CITY, September 2022

Task 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?

IDENTIFY THE CONTEXT OF THE PROJECT

Urban waste management is one of the several significant problems faced by many countries, especially developing countries. Urban Waste Collection aid (UWC) 2.0 is a system which aims to improve efficiency of garbage collecting by providing many tools for back officers to view collectors and janitors' work calendar, vehicles' status and assign tasks, vehicles to collectors and janitors. Collectors and janitors are able to view their tasks in detail and communicate with other collectors, janitors and back officers.

WHO ARE THE RELEVANT STAKEHOLDERS?

- Organization X
- Service provider Y
- Back officers
- Collectors
- Janitors

WHAT ARE THEIR CURRENT NEEDS?

Stakeholders	Needs
Organization X	Developers and appropriate tools to create the UWC 2.0 system.
Service provider Y	The new UWC 2.0 system to improve efficiency of garbage collecting.
Back officers	Information about collectors and janitors, their work calendar. Information about vehicles and their technical details. A way to view MCPs' status.

	<p>A way to assign work calendar and tasks to collectors and janitors.</p> <p>A way to create routes for collectors.</p> <p>A way to send messages to collectors and janitors.</p>
Collectors	<p>Overview of their work calendars, daily and weekly tasks.</p> <p>A way to view their assigned vehicle and route.</p> <p>A way to view MCPs' status.</p>
Janitors	<p>Overview of their work calendars, daily and weekly tasks.</p> <p>A way to view their assigned vehicle, areas and MCPs.</p> <p>A way to view MCPs' status.</p>

WHAT COULD BE THEIR CURRENT PROBLEM?

Stakeholders	Problems
Organization X	<p>UWC 2.0 Task Manage is expected to be interoperable with UWC 1.0. This may present a challenge for the organization due to the gap in technology between the two versions.</p> <p>UWC 2.0 should be able to handle real-time data from at least 1000 MCPs at the moment and 10000 MCPs in five years. Organization X's workforce may not be well-equipped to deal with such a requirement.</p>
Service provider Y	<p>Their current garbage collecting service is inefficient which may lead to complaints from the government. The government may opt for other providers' service in that case.</p>
Back officers	<p>Lack of control regarding the work schedule of collectors and janitors.</p>

	<p>Inability to communicate with collectors and janitors in a timely manner.</p> <p>Inability to be updated on the status of MCPs. Route-planning for collectors may be done slowly due to the outdated system.</p>
Collectors	<p>Inability to view their daily and weekly tasks.</p> <p>Inability to communicate with other collectors, janitors and back officers.</p> <p>Inability to be notified if their assigned MCP is full.</p> <p>Inability to check in/out tasks.</p>
Janitors	<p>Inability to view their daily and weekly tasks.</p> <p>Inability to communicate with other collectors, janitors and back officers.</p> <p>Inability to be notified if their assigned MCP is full.</p> <p>Inability to check in/out tasks.</p>

IN YOUR OPINION, WHAT BENEFITS UWC 2.0 WILL BE FOR EACH STAKEHOLDER?

Stakeholders	Benefits
Organization X	<p>This project will be a source of revenue for the company.</p> <p>The company's reputation will be boosted if they successfully create the new system satisfying the requirements.</p>
Service provider Y	<p>Their garbage collecting service's efficiency will increase. They may be able to expand their area of operation.</p>
Back officers	<p>They will be able to view and assign collectors and janitors' work schedule.</p> <p>They will be updated on the status of MCPs.</p> <p>They can communicate with collectors and janitors in a</p>

	<p>timely manner if changes are made to the schedule.</p> <p>They will spend less time creating routes for collectors because of the new system's capability.</p>
Collectors	<p>They will have an overview of their daily and weekly tasks.</p> <p>They can view their tasks in detail.</p> <p>They can communicate with other collectors, janitors and back officers.</p> <p>They can be notified of changes in their schedule quickly.</p> <p>They can be notified if their assigned MCP is full.</p> <p>They can check in/out tasks.</p>
Janitors	<p>They will have an overview of their daily and weekly tasks.</p> <p>They can view their tasks in detail.</p> <p>They can communicate with other collectors, janitors and back officers.</p> <p>They can be notified of changes in their schedule quickly.</p> <p>They can be notified if their assigned MCP is full.</p> <p>They can check in/out tasks.</p>

Task 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.

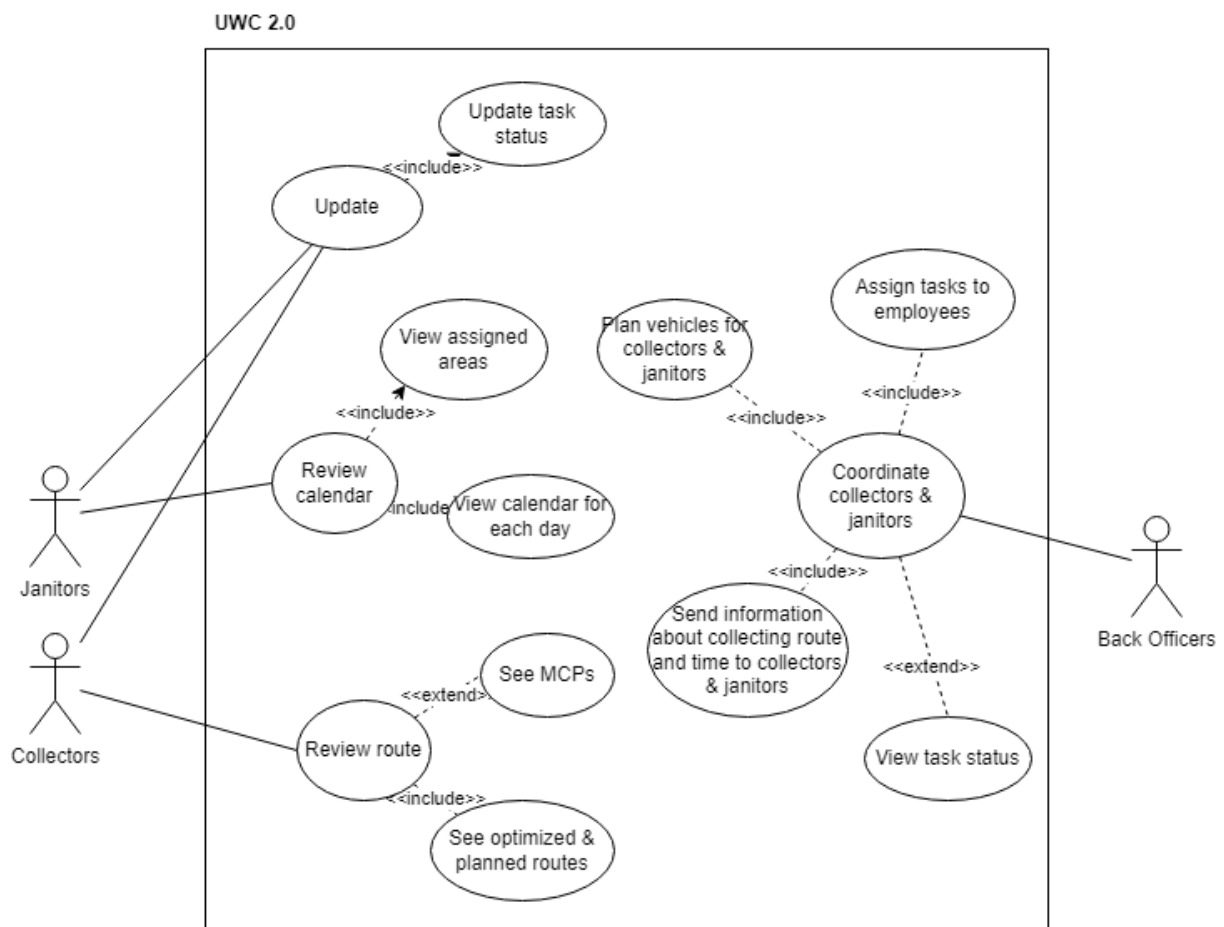
FUNCTIONAL & NON-FUNCTIONAL REQUIREMENTS

Category	Requirements
Functional <i>What should be included?</i>	<p>Back officers are able to:</p> <ol style="list-style-type: none"> 1. See an overview of janitors and collectors 2. See an overview of vehicles and their technical details 3. See an overview of all Major Collecting Points (<i>MCP</i>) and their current status (<i>capacity</i>) 4. Assign vehicles to janitors and collectors 5. Assign janitors and collectors to MCP 6. Create a route for each collector 7. Send messages to collectors and janitors <p>Collectors and janitors are able to:</p> <ol style="list-style-type: none"> 1. See an overview of their calendar 2. See a detailed view of their task on a daily and weekly basis 3. Send messages to other collectors & janitors and back officers 4. Check-in and check-out 5. Be notified about the MCPs if they are fully loaded <p>All users are able to:</p> <ol style="list-style-type: none"> 1. Switch between English and Vietnamese (<i>in the future</i>)

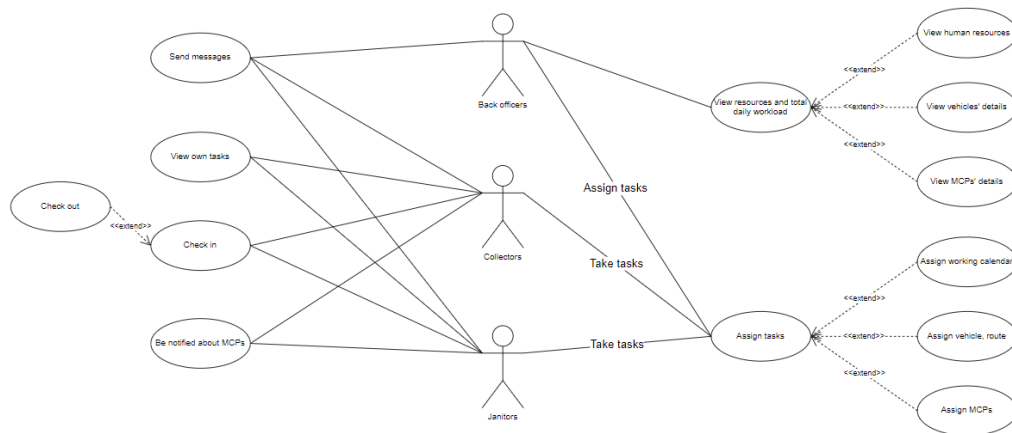
Non-functional
How should it perform?

- Information of MCPs are updated every 15 minutes
- Information of MCPs are available 95% of their operating time
- Assigned collector route is optimized for best fuel consumption and travel distance
- All important task information should be displayed in a dashboard
- The system should be able to handle real-time data from at least 1000 MCPs (*at the moment*)
- The system should be able to scale up in the next 5 years to handle real-time data from 10.000 MCPs
- Current users of existing UWC 1.0 are able to transition to UWC 2.0 without having to register again or lose data

USE-CASE DIAGRAM



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



Use Case Name	View resources and total daily workload
Use Case Overview	Description of all available human resources, vehicles, and all MCPs that need to be cleaned.
Actor(s)	Back officers
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Resources and workload” button
Steps	<ol style="list-style-type: none"> 1. Open website of UWC 2.0 2. Login as a back officers 3. View “Resources and Workload”
Post Conditions	Contents of resources (human, vehicles) in detail and the work which has to be done will be showed on the screen
Exception Flow	The viewer is not back officers, then screen pop up a view that notices the viewer cannot view this content.

Use Case Name	View human resources
Use Case Overview	Description of all janitors, collector and their status (in-work, available)
Actor(s)	Back officers
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Resources and workload” button
Steps	1. Open website of UWC 2.0 2. Login as a back officers 3. View “Resources and Workload”
Post Conditions	Contents of resources (human, vehicles) in detail and the work which has to be done will be showed on the screen
Exception Flow	The viewer is not back officers, then screen pop up a view that notices the viewer cannot view this content.

Use Case Name	View vehicles’ details
Use Case Overview	Description of all vehicles with status (in-use, available)
Actor(s)	Back officers
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Resources and workload” button

Steps	1. Open website of UWC 2.0 2. Login as a back officers 3. View “Resources and Workload”
Post Conditions	Contents of resources (human, vehicles) in detail and the work which has to be done will be showed on the screen
Exception Flow	The viewer is not back officers, then screen pop up a view that notices the viewer cannot view this content.

Use Case Name	View MCPs’ details
Use Case Overview	Description of all MCPs, including address and quantity of waste to be collected
Actor(s)	Back officers
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Resources and workload” button
Steps	1. Open website of UWC 2.0 2. Login as a back officers 3. View “Resources and Workload”
Post Conditions	Contents of resources (human, vehicles) in detail and the work which has to be done will be showed on the screen
Exception Flow	The viewer is not back officers, then screen pop up a view that notices the viewer cannot view this content.

Use Case Name	Assign tasks
Use Case Overview	Description of all tasks (MCPs to be collected, at what time, by which vehicle)
Actor(s)	Back officers, janitors, collectors
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Tasks” button
Steps	<ol style="list-style-type: none"> 1. Open website of UWC 2.0 2. Login 3. Click “Tasks”
Post Conditions	<ol style="list-style-type: none"> 1. For back officers, the system shows the tasks of each janitor and collector after the tasks being assigned 2. For janitors and collectors, the system shows the vehicle, MCPs, working route, and calendar that was assigned to each of them.
Exception Flow	If a collector or janitor is not assigned for any task, the system prints “Your task will be assigned soon!”

Use Case Name	Assign working calendar
Use Case Overview	Description of all working time to be assigned to collectors janitors
Actor(s)	Back officers

Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Tasks” button
Steps	<ol style="list-style-type: none"> 1. Open website of UWC 2.0 2. Login as a back officers 3. Click “Tasks”
Post Conditions	After assigning working time to a worker, back officers can see the working time of that worker
Exception Flow	None

Use Case Name	Assign vehicle, route
Use Case Overview	Description of all vehicles and routes to be assigned to collectors janitors
Actor(s)	Back officers
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Tasks” button
Steps	<ol style="list-style-type: none"> 1. Open website of UWC 2.0 2. Login as a back officers 3. Click “Tasks”
Post Conditions	After assigning vehicle and route to a worker, back officers can see the working vehicle and route of that worker

Exception Flow	If the vehicle's status is in-use (already assigned to another collector), the system request the back officer to assign another vehicle.
----------------	---

Use Case Name	Assign MCPs
Use Case Overview	Description of all MCPs, including the total waste that needs to be collected at each MCP
Actor(s)	Back officers
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of "Tasks" button
Steps	<ol style="list-style-type: none"> 1. Open website of UWC 2.0 2. Login as a back officers 3. Click "Tasks"
Post Conditions	After assigning MCP to a worker, back officers can see the MCP of that worker
Exception Flow	None

Use Case Name	View own tasks
Use Case Overview	Description of tasks of each janitor and collector

Actor(s)	Janitors, collectors
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Tasks” button
Steps	<ol style="list-style-type: none"> 1. Open website of UWC 2.0 2. Login as a janitor or a collector 3. Click “Tasks”
Post Conditions	The janitor or collector can view their tasks (MCPs they have to visit, the vehicle they use, and the route they follow)
Exception Flow	If a collector or janitor is not assigned for any task, the system prints “Your task will be assigned soon!”

Use Case Name	Send messages
Use Case Overview	Tool to chat with each others
Actor(s)	Back officers, janitors, collectors
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Chat” button
Steps	<ol style="list-style-type: none"> 1. Open website of UWC 2.0 2. Login 3. Click “Chat”

Post Conditions	After person 1 sends a message to person 2, the message will appear in the inbox between person 1 and person 2, and person 2 will be notified.
Exception Flow	If the message size is big, the system requests the sender to rewrite the message in a smaller size.

Use Case Name	Be notified about the MCPs
Use Case Overview	Notification if the MCPs are fully loaded
Actor(s)	Janitors, collectors
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Chat” button
Steps	<ol style="list-style-type: none"> 1. Open website of UWC 2.0 2. Login as a janitor or a collector 3. Click “Chat”
Post Conditions	If the MCPs are fully loaded, the notification will be sent to janitors and collectors as a message by bot.
Exception Flow	None

Use Case Name	Check in
---------------	----------

Use Case Overview	Check in daily for work
Actor(s)	Janitors, collectors
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Check-in” button
Steps	<ol style="list-style-type: none"> 1. Open website of UWC 2.0 2. Login as a janitor or a collector 3. Click “Tasks” 4. Click “Check-in”
Post Conditions	The system confirms the worker has checked in successfully, then the “Check-out” button appears (“Check-in button disappears) for the worker to check out after work
Exception Flow	None

Use Case Name	Check out
Use Case Overview	Check out daily after work
Actor(s)	Janitors, collectors
Preconditions	Website is available, Database is available, Internet
Trigger	Selection of “Check-out” button
Steps	<ol style="list-style-type: none"> 1. Open website of UWC 2.0 2. Login as a janitor or a collector

	<p>3. Click “Tasks”</p> <p>4. Click “Check-in”</p> <p>5. Click “Check-out”</p>
Post Conditions	The system confirms the worker has checked out successfully, then the “Check-out” button disappears.
Exception Flow	None