2 Task 1.2

Question 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

Solution

2.1 Theoretical basis

2.1.1 Functional and nonfunctional requirements

- **Functional requirements:** statements of services the system should provide, how the system should react to certain inputs and what the system behavior should be.
- **Nonfunctional requirements:** describe the system's properties and constraints, such as its availability, response time, I/O device capability.

2.1.2 Use-case diagram

A UML use case diagram is the primary form of system/software requirements for a new software program underdeveloped. Use cases specify the expected behavior (what), and not the exact method of making it happen (how). Use cases represent only the functional requirements of a system.
Use-case diagram is used to:

- Specify the context of a system
- Capture the requirements of a system
- Validate a systems architecture
- Drive implementation and generate test cases
- Developed by analysts together with domain experts

Some basic concepts of use-case diagram includes:

- **Actor:** someone interacts with use case, named by noun, plays a role in the business, similar to concept of user (a user can play different roles).
- **Use case:** system function, named by verb/compound verb. Each Actor must be linked to a use case, while some use cases may not be linked to actors.
- **Communication links:** shows participation of an actor in a use case. Actors may be connected to use cases by associations.
- **Boundary of system:** potentially the entire system as defined in the requirements document.
- **Relationships:**

- **Include:** a use case is depicted as using the functionality of another use case
- **Extends:** indicates that a use case may include (subject to specified in the extension) the behavior specified by base use case.
- **Generalization:** a parent-child relationship between use cases.

2.2 Functional requirements

As a back officer, I would like a system that have two pages:

1. The first page displays the general information about the janitors and collectors such as their name, age, address and their availability at the moment on one side and the vehicles such as their name, models and their availability on the other side. There will also be a drag-and-drop mechanism for me to assign vehicles to team of collectors and janitors.

2. The second page displays the map of all roads and route that the collectors have to travel through to collect garbage. At each MCP, there will be a dropped-down menu for me to assign which collectors will collect at this point.

As a janitor/collector, I would like a system that has: A UI that is a calendar. For each day, it will show some texts on what I have to do that day. When I click on that day, it will detail information on what I have to do. Also, there is a button for me to check in the task and a button for me to report if I am not fit for the task. When I am finished with the task, it will also have a button for me to check out.

2.3 Nonfunctional requirements

- As back officers/janitors/collectors, we expect that the system will be available during normal working hours, with downtime during working hours not exceeding 10 seconds.

- As back officers/janitors/collectors, we expect that the system be able to handle information about 1000 MCPs at the moment and 10000 in five years.

- As back officers/janitors/collectors, we expect that the system's texts and controls be in Vietnamese, with an option to switch to English in the future.

- As Service provider Y, we expect UWC 2.0 to import and to use the existing data from UWC 1.0. We also expect that the Task Management Module from UWC 2.0 to be inter-operable with the Task Management Module from UWC 1.0 as much as possible.

- As a back officer, I would like the map of MCPs to display accurately every possible route leading to the MCPs so that I can assign the best one to the collectors. For each MCP, there should be at least one route to it.

- As a back officer/janitor/collector, I would like the messaging features to send my message the instant I send it, with a delay less than 1 second.

- As a back officer/janitor/collector, I would like the application to encrypt my personal data and messages for my privacy.

2.4 Use-case diagram for the whole system

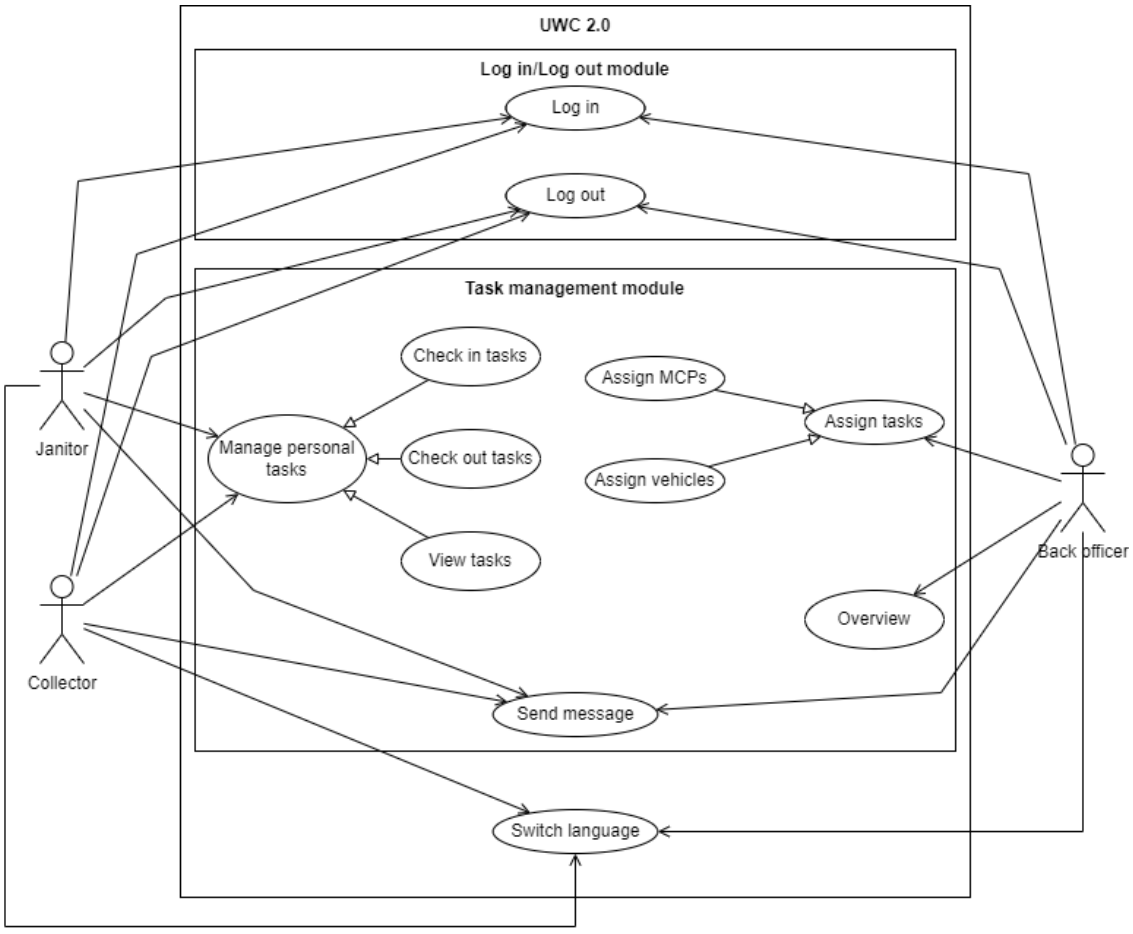

Figure 1: Use-case diagram of UWC 2.0