TASK 1:

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?

The context of this project: The Organization X is contracted to develop an information management system called UWC 2.0 in order to improve efficiency of garbage collection of Service provider Y. The main users for the system are workers from Company Y, consisting of Back Officers, Collectors and Janitors. The old system lacks many fundamental functionalities demanded by the user such as calculating the efficient route for the collector, notifying the collector/janitor when the MCPs are full, and sending messages between users with low delay-time …etc… The new system is expected to bring to the users their demanded functionalities.

The relevant stakeholders:

- Service provider Y's IT staff: install and maintain the system
- Back officers: who operate a central system to create work calendar, coordinate front collectors and janitors
  responsible for assigning vehicles & routes and janitors & collectors to MCPs,
- Collectors: drive vehicles to take garbage at the MCPs
- Janitors: collect garbage in their assigned areas and deliver to the MCPs

Current needs:

- Service provider Y's IT staff:
  - + A system that can import and use existing data from UWC 1.0
  - + A 2.0 system that can work together with the version 1.0 when necessary
  - + A system that can manage at least 1000 MCPs at any moment
- Back officers:
  - + A way to keep track of subordinates **&** create work calendar for subordinates **&** create route for each collector
  - + A way to control vehicles **&** assign vehicles for collectors
  - + A way to control MCPs **&** assign MCPs to janitors and collectors
  - + A way to communicate to collectors and janitors
- Janitors / Collectors:
  - + A way to know their weekly/daily work both in overview and detail level

    + A way to know the MCPs that they are responsible for, notified when MCPs are fully loaded
    + A way to communicate with other workers
    + A way to check in / check out tasks

Possible current problems:

- Service provider Y's IT staff:
    + If the system is overloaded/crashes, what protocol can they use to meet the requirements of MCPs' capacity information and maintain communication with janitors, collectors & back officers until the system recovers ?
    + How can they verify that the janitors, collectors and back officers have fulfilled all of their daily tasks successfully and truthfully ?
- Back officers:
    + When one or more collectors in an assigned route have their excused/unexcused absence, how can the system reroute the other collectors so that the original plan can still be carried out? If not, can the system ensure that every MCPs is visited at least once at the end of the day ?
    + When one or more janitors have their excused/unexcused absence, how can they make sure that the MCPs' garbage amount is still enough for the original route to remain efficient ?
    + When one or more MCPs are unavailable for a period of time, how can they reroute collectors so that at the end of the day, every MCPs is visited at least once ?
    + How can they ensure that the janitors & collectors are able to be notified of changes in their schedule/route and adapt accordingly in a timely manner in emergencies ?
- Collectors:
    + How can the system ensure that every collector is given a vehicle for their work shift if one or more vehicles break down/are under maintenance ?
    + If one or more officers have their excused/unexcused absence, how can the system ensure that the day-to-day operation of collectors remains unaffected ?
- Janitors:
    + If one or more officers have their excused/unexcused absence, how can the system ensure that the day-to-day operation of janitors remains unaffected ?

    + Can the system ensure that every janitor available at MCPs has at least 1 troller at all times? If one or more trollers are unavailable, how can we make sure that the efficiency of waste collection on that day is still guaranteed ?

<u>UWC 2.0 will be able to bring each stakeholders:</u>

- Service provider Y's IT staff:
    + An improved system that satisfies the requirements and works together with the existing system.
- Back officers:
    + An application that can show overview of janitors and collectors, their work calendar.
    + An application that can show overview of vehicles and their technical details (weight, capacity, fuel consumptions, etc).
    + An application that can show overview of all MCPs and information about their capacity.
    + An application that provides a way to assign vehicles to janitors and collectors.
    + An application that provides a way to assign janitors and collectors to MCPs (task).
    + An application that creates a route for each collector.
    + An application that helps to send messages to collectors and janitors.
- Collectors/Janitors:
    + An application that can show overview and daily/weekly basis of their work calendar.
    + An application that helps to communicate with collectors, other janitors and back officers.
    + An application that helps to check in / check out tasks.
    + An application that notifies about the MCPs if they are fully loaded.

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:

- For back-officers:
    + Have an overview of janitors and collectors, their work calendar & create route for collector (fuel and distance optimized)
    + Have an overview of vehicles and their technical details (weight, capacity, fuel consumptions, etc) & assign vehicles to janitors and collectors
    + Have an overview of all MCPs and information about their capacity.
    + Be able to send messages
- For collectors/janitors:
    + Have an overview of their work calendar
    + Have a detailed view of their task on a daily and weekly basis. All important information should be displayed in one view (without scrolling down).
    + Be able to communicate with collectors, janitors and back officers.
    + Be notified about the MCPs if they are fully loaded
    + Check in and check out task every day

Nonfunctional requirements:

- The new system should be able to import and use existing data from UWC 1.0
- 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
- Be able to use in Vietnamese now and in English in 5 years
- Information should be updated from MCPs every 15 minutes with the availability of at least 95% of their operating time & assign janitors and collectors to MCPs
- The messages should be communicated in a real-time manner with delay less than 1 second. (a page for chatbox)
- Assigned route is optimized in terms of fuel consumption and travel distance.
- All important information of janitors and collectors should be displayed in one view (without scrolling down).

Unclear requirements:

- It is expected that the Task Management to be interoperable with the UWC 1.0 as much as possible (vague meaning: interoperable… as much as possible)

1.3: Describe the use-case using a table format

Name	Assign Vehicles
Description	The Back Officer assigns collectors with their names and IDs to vehicles. This is done at the page of vehicles. The system will show the Back Officer a list of vehicles, the Officer then chooses which vehicle he wants to assign the collector to. After the Officer chooses a vehicle, the system then shows a list of available collectors for that vehicle. After the Officer chooses the collector to assign to that vehicle, the system will let the Back Officer know if the assignment is successful or not by the availability of the vehicles and collectors.
Actor	Back Officer
Trigger	The Back Officer indicates that he wants to assign a vehicle to a worker.
Preconditions	1. The user is authenticated. 2. The user is authorized as a Back Officer. 3. The system has access to the vehicle's database. 4. The user did choose a vehicle on which he/she wants to assign the collector.
Postconditions	1. The system also updates the status of collectors according to the vehicle and notify the collector.
Normal flow	1. System shows a list of collectors. 2. User chooses available collectors to assign to the vehicle. 3. System update status for the vehicle with the chosen collector. 4. The system will notify the Back Officer when the work is done successfully.

Name	Assign MCPs
Description	The Back Officer assigns collectors/janitors with their

	names and IDs to MCPs. This is done at the page of MCPs. The system will show the Back Officer a list of MCPs, the Officer then chooses which MCP he wants to assign the collector/janitor to. After the Officer chooses a MCP, the system then shows a list of available collectors/janitors for that MCP. After the Officer chooses the collector/janitor to assign to that MCP, the system will let the Back Officer know if the assignment is successful or not by the availability of the MCPs and collectors/janitors.
Actor	Back Officer
Trigger	The Back Officer indicates that he wants to assign a janitor and a collector to a vehicle.
Preconditions	1. The user is authenticated. 2. The user is authorized as a Back Officer. 3. The system has access to the MCPs' database. 4. The user did choose an MCP on which he/she wants to assign the collector and janitor.
Postconditions	1. The system also updates the status of collectors/janitors according to the MCP and notify the collector.
Normal flow	1. System shows the list of collectors and janitors. 2. User assigns available collectors and janitors to the MCPs. 3. System update status for the collectors and janitors and MCPs. 4. The user has chosen a MCP to assign a collector and a janitor to. 5. The system will notify the Back Officer when the work is done.