

## Chapter 3

### DESIGN AND METHODOLOGY

#### Research Design

The research design of the study is Descriptive and Developmental. For the descriptive method, gathering of data used the ISO 25010 evaluation tool which measures the functional suitability, performance efficiency, usability, compatibility, reliability, security, maintainability, portability. The participants of the study are the IT experts, admin, employee and customers. To identify the average of the gathered data is to use statistical treatment of data. For the developmental, the modified waterfall was used to develop the system.

#### Research Respondents

To conduct a testing of the system the proponent has 25 participants, and these includes:

Participants	No. Of Respondents	Percentage (%)
IT Experts	10	40%
Admin	1	4%
Employee	4	16%
Potential Customers	10	40%
<b>Total</b>	<b>25</b>	<b>100%</b>

a. 10 IT experts will conduct comprehensive functional testing to verify that all features, such as reservation scheduling, service selection, payment processing, and customer management. They will be the one to evaluate if the proponent system meets the objective of the study.

b. 1 Admin will meticulously evaluate the Germ Busters-Bacolod Cleaning and Sanitizing Services Reservation and Management System to ensure its optimal performance and user experience.

c. 4 Employee of Germ Busters-Bacolod, we will evaluate the Cleaning and Sanitizing Services Reservation and Management System to ensure its efficiency and effectiveness in streamlining the operations.

d. 10 Potential Customers will evaluate the Cleaning and Sanitizing Services Reservation and Management System to assess its functionalities. By providing feedback, the customers will aim to contribute to the improvement of the system and enhance the overall customer experience of the system.

## Sampling Technique

In this study the proponent used the cluster sampling, the population is divided into groups (clusters), and then a random sample of clusters is selected. All members of the selected clusters are then included in the sample. This is useful when it's difficult or expensive to list all members of the population individually.

## Data Gathering Instrument

In data gathering the proponent used the ISO 25010: 2011 Software Quality Model Questionnaire. The questionnaire consisted of statements aimed at measuring the functional suitability, performance efficiency, usability, compatibility, reliability, security, maintainability, portability in system entitled "Germ Busters-Bacolod Cleaning and Sanitizing Reservation and Management System."

## Data Gathering Procedure

The data gathering procedure is the proponent will evaluate through ISO 25010 and are the It Experts, Admin of the company, employee, and customers that measures the Functional Suitability, Performance Efficiency, Usability, Compatibility, Reliability, Security, Maintainability, Portability of the system. The proponent will use a printed hard copy of ISO 25010 and google form to evaluate in the chosen participants.

## Validity of Research Instrument

The research instrument that will be utilized in this study is the ISO 25010. There is

no need to conduct a validity test since the instrument is standardized.

## Reliability of the Questionnaire

Reliability test was not conducted because the research instrument is already standardized and have undergone several reliability tests.

## Analysis / Statistical Treatment of Data Average Mean

An overall evaluation of the chosen participant of the proponent perceptions was computed using the average mean. A statistical technique known as the average mean was used to calculate an overall. One way to compute the average mean would be to divide the total number of measurements ( $\sum x_i$ ) by the total number of samples. The mean was computed using the formula  $\bar{x} = \sum x_i / n$ . The average mean, which reflects the overall evaluation of users' experiences. The proponent will use ISO 25010 that will measure the functional suitability, performance efficiency, usability, compatibility, reliability, security, maintainability, portability of the system. The average mean, as calculated by summing all measurements and dividing by the total number of measurements, provides a numerical representation of the central tendency of the data. In the context of user evaluations, a higher average mean indicates a more positive overall perception of the

system. The proponent will also use a Likert-scale to measure the positive outcome of evaluation of the system.

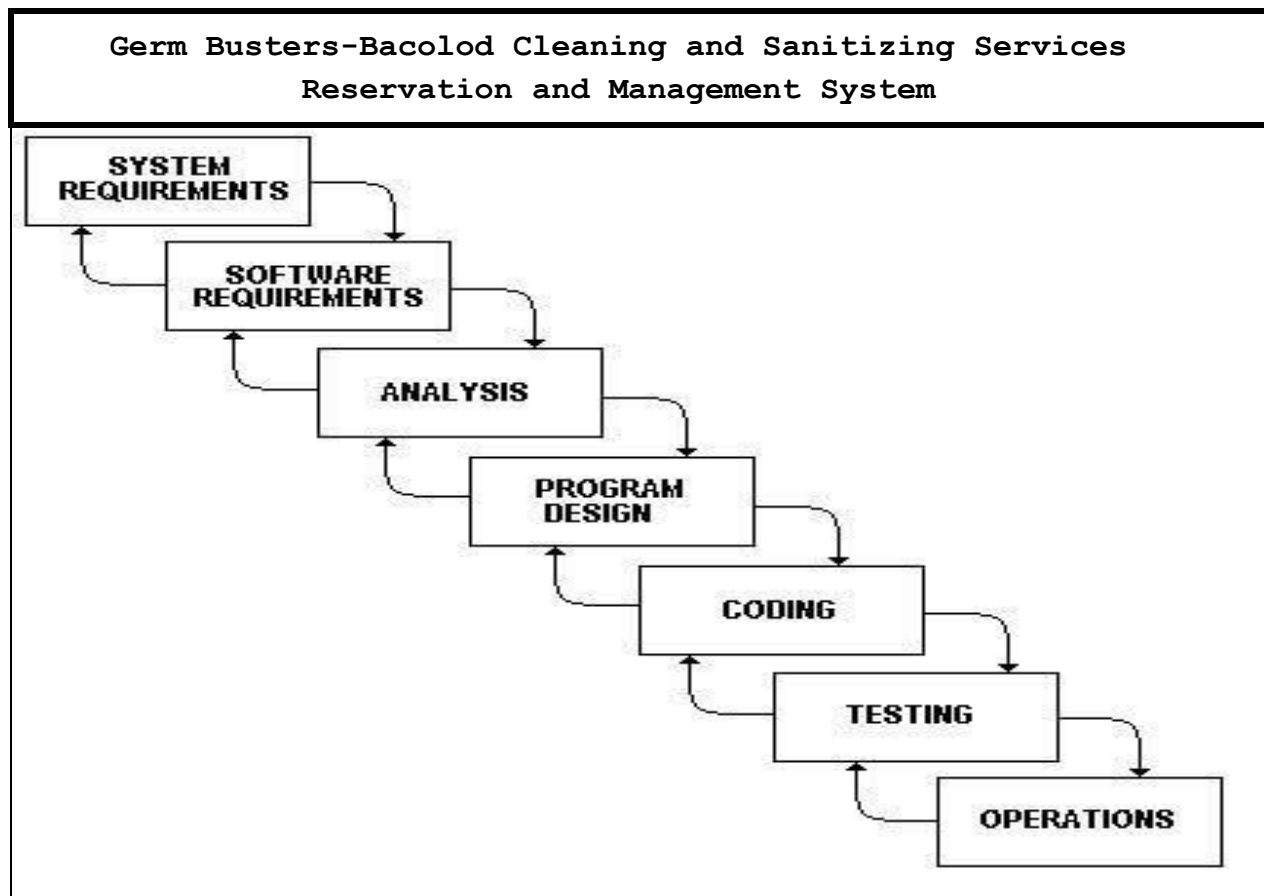
Code	Interpretation	Description
5	Excellent	4.51 - 5.00. The system is complete and fully functional.
4	Very Good	3.51 - 4.50. The system is complete and functional.
3	Good	2.51 - 3.50 The system is somewhat complete and functional.
2	Poor	1.51 - 2.50. The system is incomplete and somewhat functional.
1	Very Poor	1.50 - below. The system is incomplete and nonfunctional.

### System Development Method

The proponent had chosen the Modified Waterfall Model of Life Cycle Development for its nature that the proponents can go back to the previous stage of the cycle and check if ever theirs an error occurred in the present making of the proposed study. Unlike, the other model of Life

Cycle Development, it is helpful because in checking the status of the proposed study by checking it from the start until the present phase of the. It allows the proponent to create and update a great feature of development before the system should be created. This model will present the flow and process of the system. The whole system development of the system can be stabilized and change the process of the system cycle. It is the guide of the proponent for the changing the whole process and deployment of the system to give the admin and customers a good presentation and the knowledge to understand the system and its functionalities.

**Figure 1. Modified Waterfall Model**



The following are the phases of the Waterfall Method that the researchers utilized in this study:

## Phase 1: System Requirements

During this phase, the gathering of information and data about Germ Buster Bacolod Cleaning and Sanitizing Services Reservation and Management System, collection of requirements is needed by the proponent to identify the issues and problem of the Germs Buster Bacolod Cleaning and Sanitizing Services.

## Phase 2: Software Requirements

In this phase, focused on identifying the essential features, functionalities, and technologies required to create a reservation process for customers and efficient management tools for the company. By carefully considering these requirements, the proponent can ensure the system meets the specific needs of Germ Buster Bacolod Cleaning and Sanitizing Services.

## Phase 3: Analysis

In this phase, the proponent analyzes the problem of the Germ Buster Bacolod Cleaning and Sanitizing Services by gathering the data and start the whole study and system design and development.

## Phase 4: Program Design

In this phase, the proponents recognize on what are the essential features and design to be use and the process and functionalities needed to finish

the system so that the system design can be understood by the users. The system also needed to be described as detailed, and operations that will satisfy functional requirements

## Phase 5: Coding

After the requirements and design phase the proponents construct the system based on the gathered data and information. All the processes, functionalities and flows of the system are tested to see if the system will be an efficient tool for the company who will use the said system. The proponent uses Html, CSS, PHP, JavaScript and React-Native for the programming languages and for the database the proponent used MySQL.

## Phase 6: Testing

In this phase the proponent chooses IT experts, Admin, and Employees of the proponent beneficiary in user testing to identify the lack of the System.

## Phase 7: Operation

In this phase, the operation of the system requires ongoing maintenance to address bugs, fix security vulnerabilities, and potentially incorporate new features based on user feedback or changing market requirements.

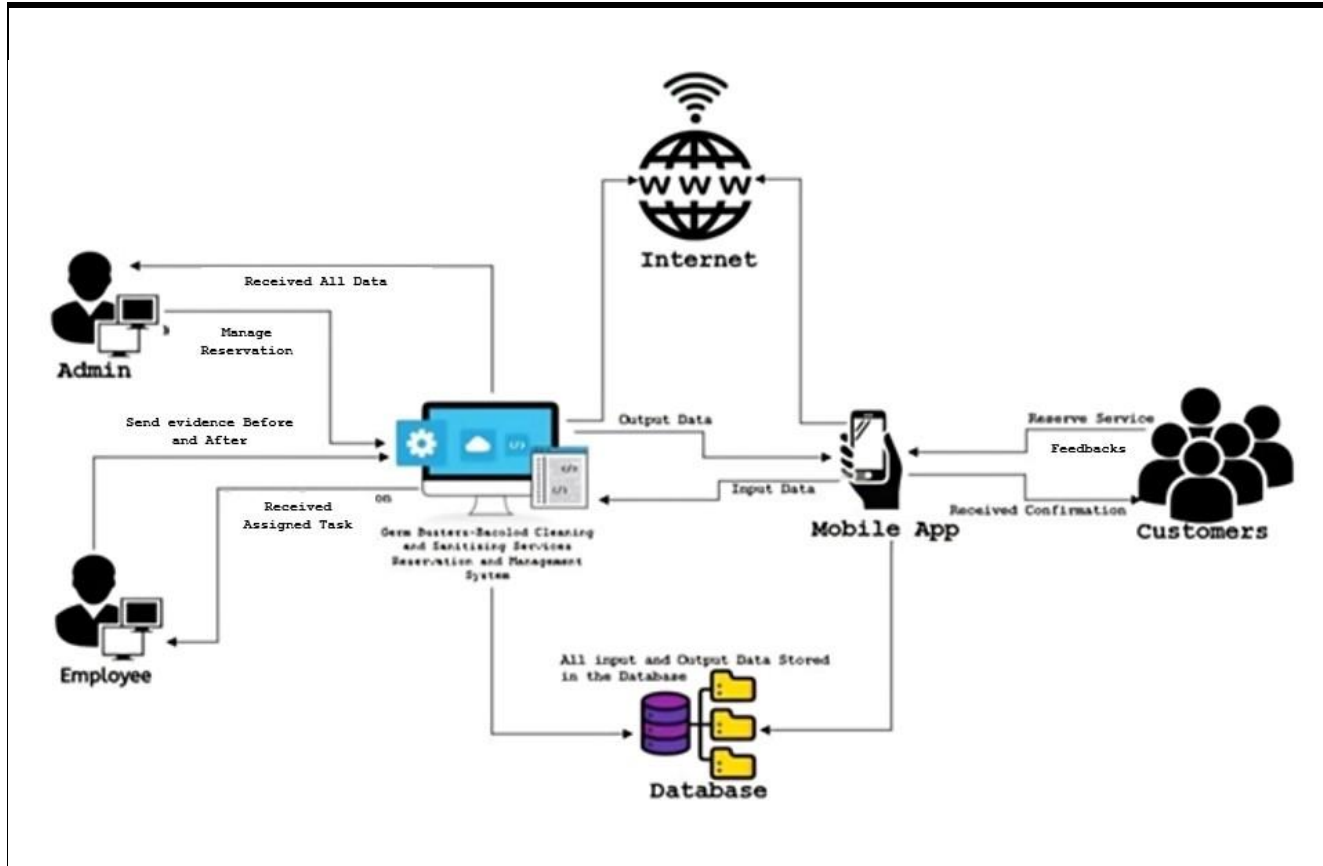


## Operational Framework of the Study

The operational framework of the study is when the customers reserve an available service in the mobile application of the system, the data will input in the admins web application and the admin will confirm if that specific service is available after, confirming of the customer reserve services. The admin will assign an employee to do the task. The employee must do a documentation of the before and after evidence of the establishment that they clean. If all the tasked are finish by the employee the customer will send a payment and will give feedback if they are satisfied in the service. All the input and output data will automatically be stored on the database of the system.

**Figure 2. Operational Framework**

<p><b>Germ Busters-Bacolod Cleaning and Sanitizing Services Reservation and Management System</b></p>
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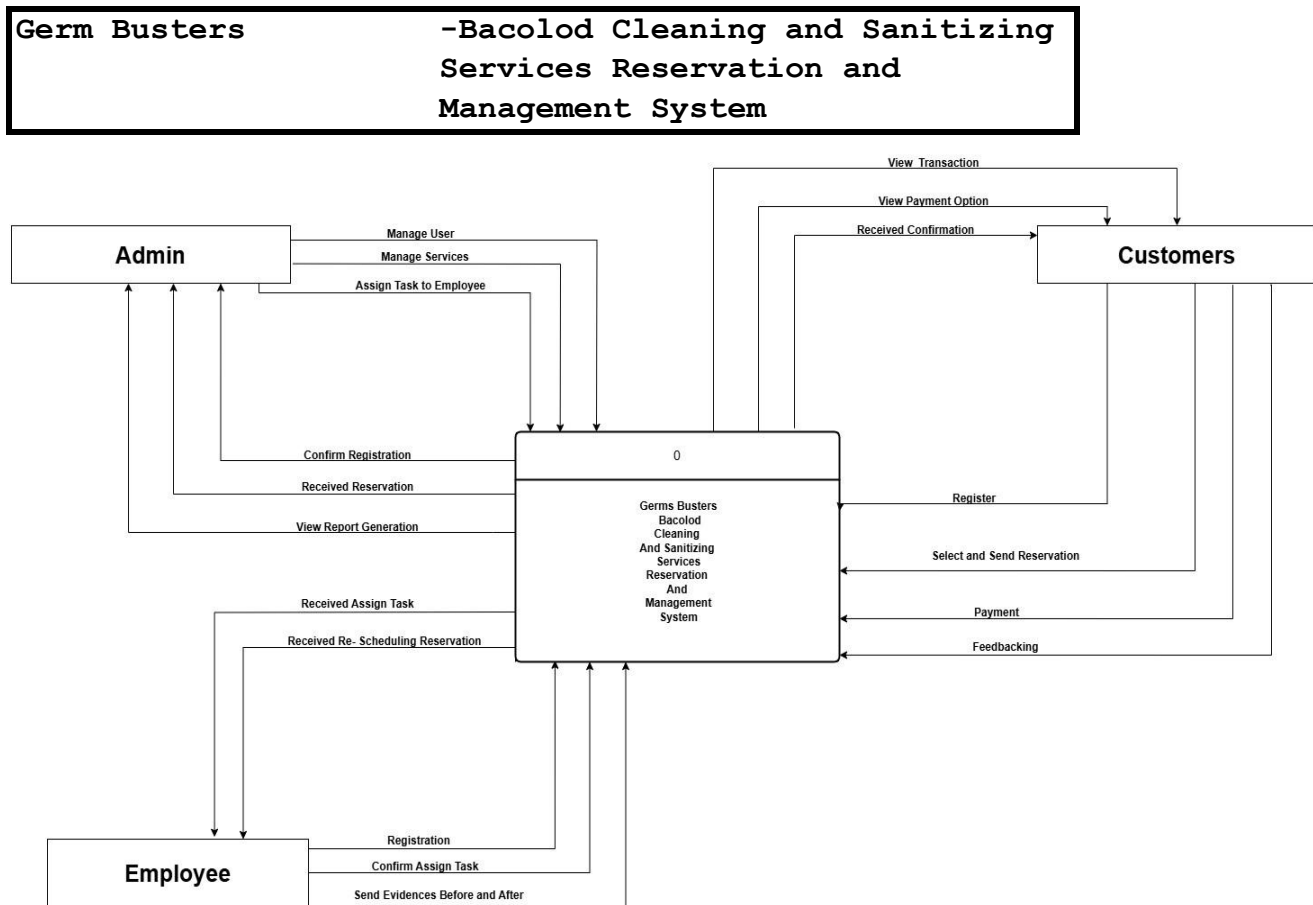


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## Context Data Flow Diagram

The Context data flow of the study consist of the admin, employee and the customers. The admin will be the one who manage the reservation, view the reservation and manage the users and services in the system. The customer can send the reservation, view the reservation, received confirmation from the admin and employee, can be notified if task has been assigned. The employee of the company will also receive the reservation confirm the reservation and send evidence before and after of the assigned task.

Figure 3. Context Data  
Flow Diagram



## Data Flow Diagram

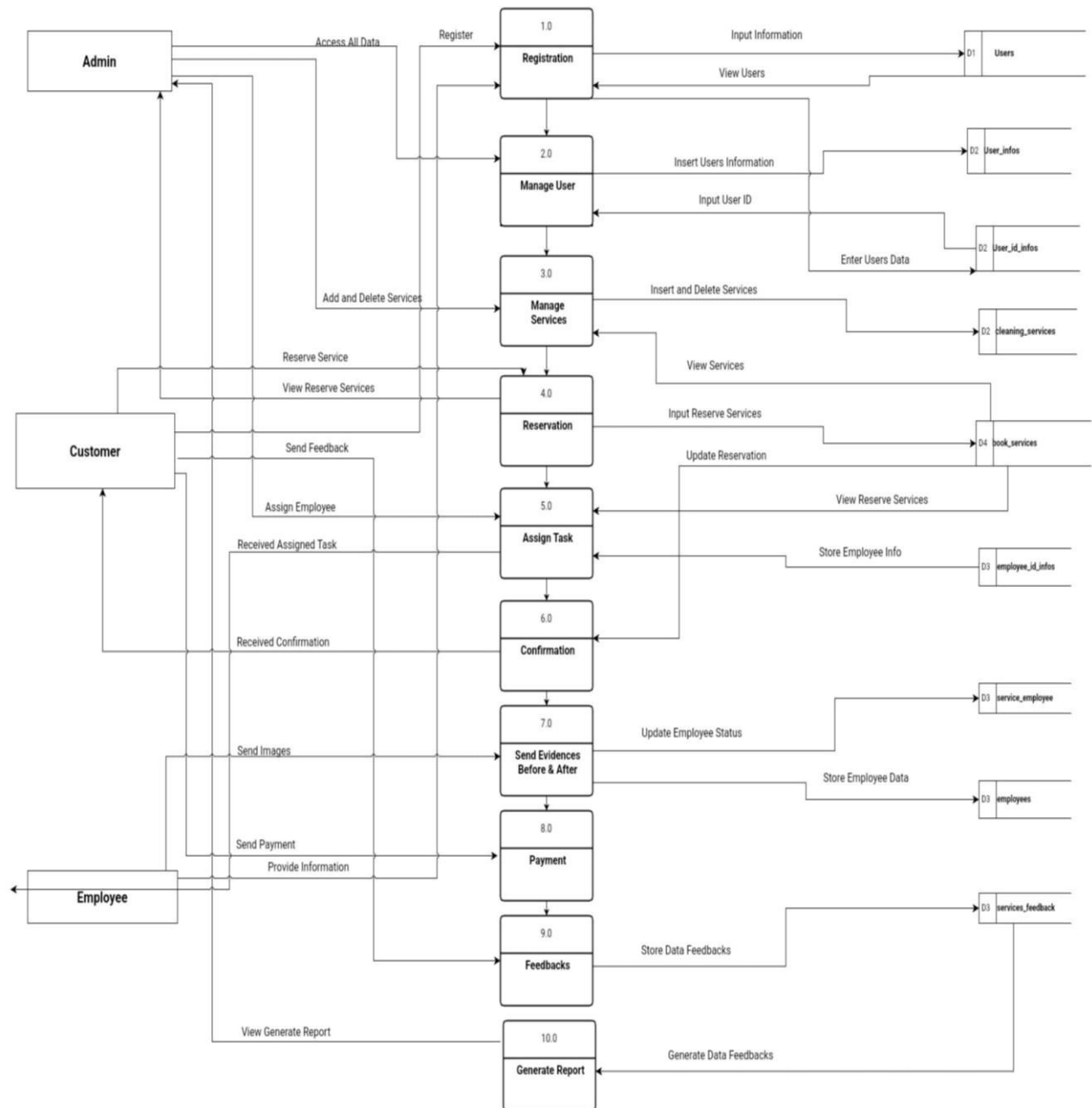
The Germs Buster Cleaning and Sanitizing Services Reservation and Management System data flow involves a streamlined process between the admin, employees, and customers. Customers submit service requests through the system, which the admin receives and reviews. Based on the request details and employee availability, the admin

assigns the task to an appropriate employee. This assignment notification is then sent to the designated employee, who can access and manage the task details within the system. Throughout the process, the system tracks and updates the status of each task, ensuring efficient communication and coordination between all parties involved. This automated data flow eliminates manual processes, reduces potential errors, and enhances overall operational efficiency.

Figure 4: Data Flow Diagram

**Germ Busters-Bacolod Cleaning and Sanitizing Services**

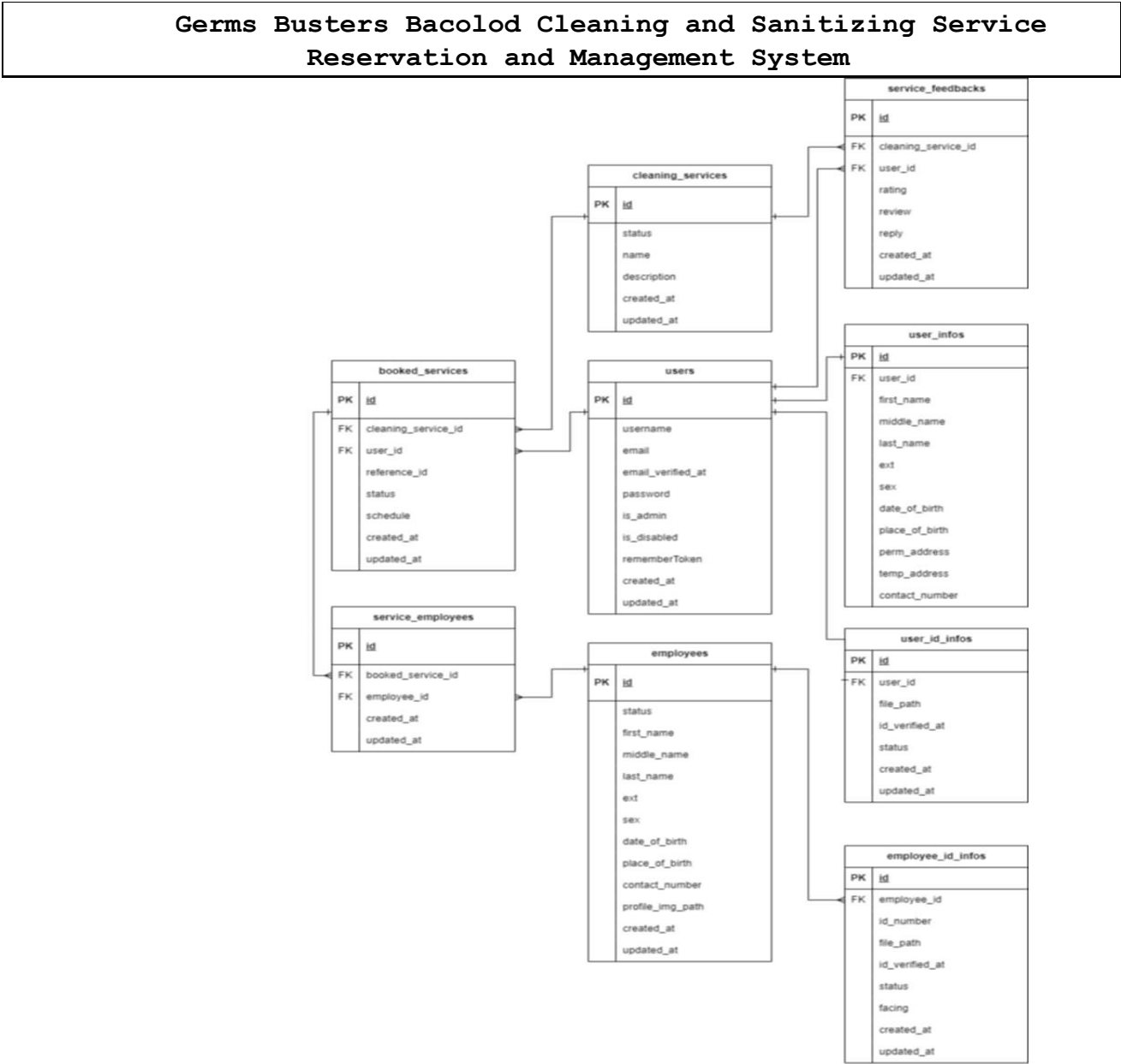
## Reservation and Management System



## Entity Relationship Diagram

The entity relationship diagram of Germs Buster Bacolod Cleaning and Sanitizing Reservation and Management depicts the data and information inputted in the database. This is where the data

can be identified its relationship to the functions in the system. **Figure 5: Entity Relationship Diagram**



### Use Case Diagram

This use case diagram illustrates the interactions between the admin, employees, and customers within the Germes Buster Cleaning and

Sanitizing Services Reservation and Management System.

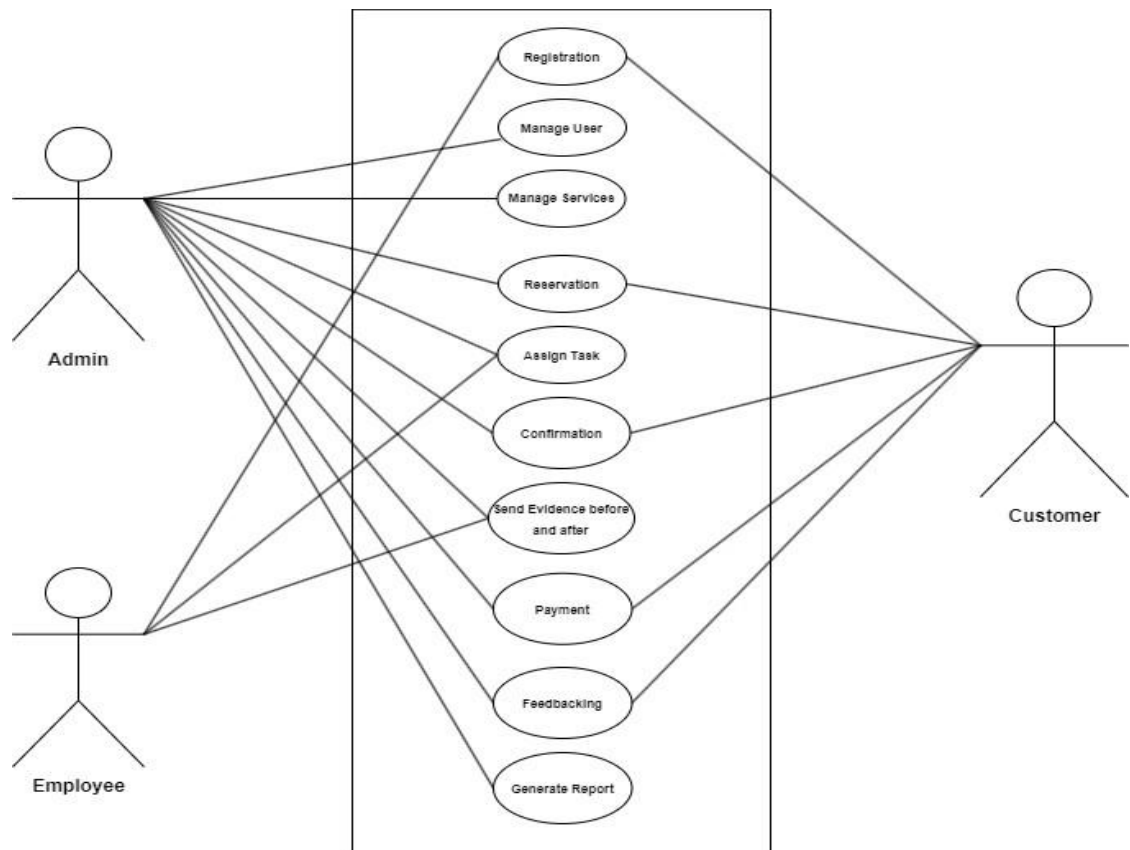
The admin can login, manage users, and assign tasks to employees.

Employees can login; view assigned tasks and update their status. Customers can register, book services, and view their service history. The system serves as the central hub for these interactions, facilitating efficient communication and task management.

**Figure 6: Use Case Diagram**

**Germ Busters-Bacolod Cleaning and Sanitizing**

**Services Reservation and Management System**



## Data Dictionary

Consisting of the list of tables in the database, the minimum and maximum record of data and the field type of tables.

**Table 1.**

### Booked Services Table

It is a specific table that stores information about administrative users who have privileged access to a system and application.

Field Name	Field Type	Length	Description
cleaning_service_id	int	11	Cleaning Service Id
user_id	int		User Id
reference_id	int		Reference Id
status	text		Status
schedule	date		Schedule
created_at	time		Created at
updated_at	time		Updated at

**Table 2.**

### Service Employees Table

The personal information of the user in the system.

Field Name	Field Type	Length	Description
booked_service_id	int	11	Booked Service Id
employee_id	int	11	Employee Id



created_at	time	Created at
updated_at	time	Updated at

**Table 3.**

## User Table

The personal information of the user in the system.

Field Name	Field Type	Length	Description
userID	int	11	User ID
username	varchar	50	Username
email	varchar	255	Email
email_verified_at	varchar	100	Email Verified at varchar
password	string	255	Password
is_admin	int		Admin
is_disbled	int		Disabled
rememberToken	string	255	Remember Token
created_at	time		Created at
updated_at	time		Updated at

**Table 4.**

## Employee Table

The personal information of the employee in the database.

middle_name	varchar	100	Middle name
last_name	varchar	255	Lastname
ext	string	255	Extension
sex	string	255	Sex
date_of_birth	date		Date of Birth
place_of_birth	int		Place of Birth
contact_number	int		Contact Number
profile_img_path	string	255	Profile Image Path
created_at	time		Created at
updated_at	time		Updated at

Field Name	Field Type	Length	Description
employee_id	int	11	Employee ID
status	varchar	50	Status
first_name	varchar	255	First name

**Table 5.**

## Employee ID Table

This is where the reservation record stored, and the data of the available service can be book of the customers

Field Name	Field Type	Length	Description
employee_id			

	int	11	Employee ID
id_number	int	11	Id Number
file_path	string	255	File Path
id_verified_at	string	255	Id verified at
status	int	11	status
facing	varchar	255	Facing
created_at	time		Created at
updated_at	time		Updated at

**Table 6.**

### User ID Table

The stored availability of services that can customer reserve.

Field Name	Field Type	Length	Description
user_id	int	11	User Id
file_path	string	255	File Type
id_verified_at	string	255	Id Verified at
status	text		Status
created_at	time		Created at
updated_at	time		Updated at

**Table 7.**

### User Information Table

This is where the information of the customers payment.  
A financial transaction of the services booked.

Field Name	Field Type	Length	Description
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first_name	varchar	255	First name
middle_name	varchar	100	Middle name
last_name	varchar	255	Lastname
ext	string	255	Extension
sex	int		Sex
date_of_birth	varchar	255	Date of Birth
place_of_birth	varchar	255	Place of Birth
perm_address	varchar	255	Permanent Address
temp_address	varchar	255	Temporary Address
contact_number	int		Contact Number

**Table 8.**

## Cleaning Services Table

This is where the information of the customers payment.  
A financial transaction of the services booked.

Field Name	Field Type	Length	Description
status	int	11	Status
name	varchar	100	Name
description	text		Description
created_at	time		Created at
updated_at	time		Updated at

**Table 9.**

## Service Feedbacks Table

This is where the information of the customers payment.  
A financial transaction of the services booked.

Field Name	Field Type	Length	Description
cleaning_service_id	int	11	Cleaning Service Id
user_id	varchar	100	User Id
rating	text		Rating
review	text		Review
reply	textt		Reply
created_at	time		Created at
updated_at	time		Updated at

## Hardware and Software Requirements

### Hardware Requirements

To ensure smooth operations and efficient data handling the Germ Buster Bacolod Cleaning and Sanitizing Services Reservation and Management System this are the following minimum hardware requirement the proponent use in the study:

Hardware	Description
Personal Computer	<ul style="list-style-type: none"> <li>• At least 225 and up gigabits of storage to store data.</li> <li>• A database server to store all the system's data, like customer information, bookings, and cleaning staff details. This could be run on the same server as the web application or on a separate server for better performance.</li> <li>• A operating system to support the process of developing.</li> </ul>
Laptop	<ul style="list-style-type: none"> <li>• At least 225 gigabits and up of storage for backups.</li> <li>• Use for emergency purposes.</li> </ul>
Mobile Phone	<ul style="list-style-type: none"> <li>• Use for testing the mobile application.</li> <li>• Android or IOS</li> <li>• At least 128 gigabits of storage.</li> </ul>

## Software Requirements

The Software Requirements of Germ Busters Bacolod Cleaning and Sanitizing Services Reservation and Management System are the following:

Software	Description
Operating System	Microsoft Windows 11
Programming Tool	Python, Java, JavaScript, Sublime, VS Code
Database Server	MySQL
Web Server	Apache
Internet Browser	Firefox, Google, Microsoft Edge

# Gantt Chart

The proponent used Gantt Chart as the workflow of the system development and data gathering. The phases are involved in the workflow and every phase, there are duration which includes the date of system development and gathering of data. This visual representation facilitated efficient planning, monitoring, and tracking of progress, ensuring that the study stayed on schedule and met its deadlines of the assigned task of the proponent.

