Chapter III

METHODOLOGY

This chapter presents the outline of the study. The different methods and procedures were explained to further justify and understand the data information gathered for the development of system. Different diagrams are presented for easily visualizing the flow of the proposed project.

Development Method

"e-BCRQueiosk: A Municipality of Baco Civil Registry Online Transaction with Queueing Kiosk" will use the System Development Life Cycle (SDLC) which has a series of phases that serves as guide during the development to produce an efficient and high-quality system. This project will use Agile Model, which process may be modified in a repeated manner to enable corrective measurement of system's flaws in an early stage of development. The flow of development process is clearly displayed to its phases which are requirements, design, development, testing, deployment, and review. The research followed the following phases.

Figure 2. Agile Model

Requirements

In this phase, researchers conducted interviews and observations according to the problem that needed to be resolved to the target client. Researchers developed the objectives and plans of the project that served as the foundation to produce a desired output of the system at the end of the study.

Design

During this phase, researchers began designing the hardware and software of the system according to the requirements of the client and users. Developers thoroughly planned and implemented trial and error to meet the desired output of the user interface.

Development

During this phase, researchers started the coding process for the functionality of the system through Visual Studio Text Editor Application and used PhpMyAdmin as the administrator tool for the database, wherein the database served as the storage of the date inputted by the user.

Testing

In this phase, researchers executed the pre-deployment of the system for trial and error just to see if the device was properly functioning.

Deployment

In this phase, iterations of the project after the testing process were utilized in order to analyze and improve the design and functionality which needed more improvements to meet the project objectives. Researchers constantly made consultations to the office of the client to asked for any iterations and approval of the progress of the project.

Review

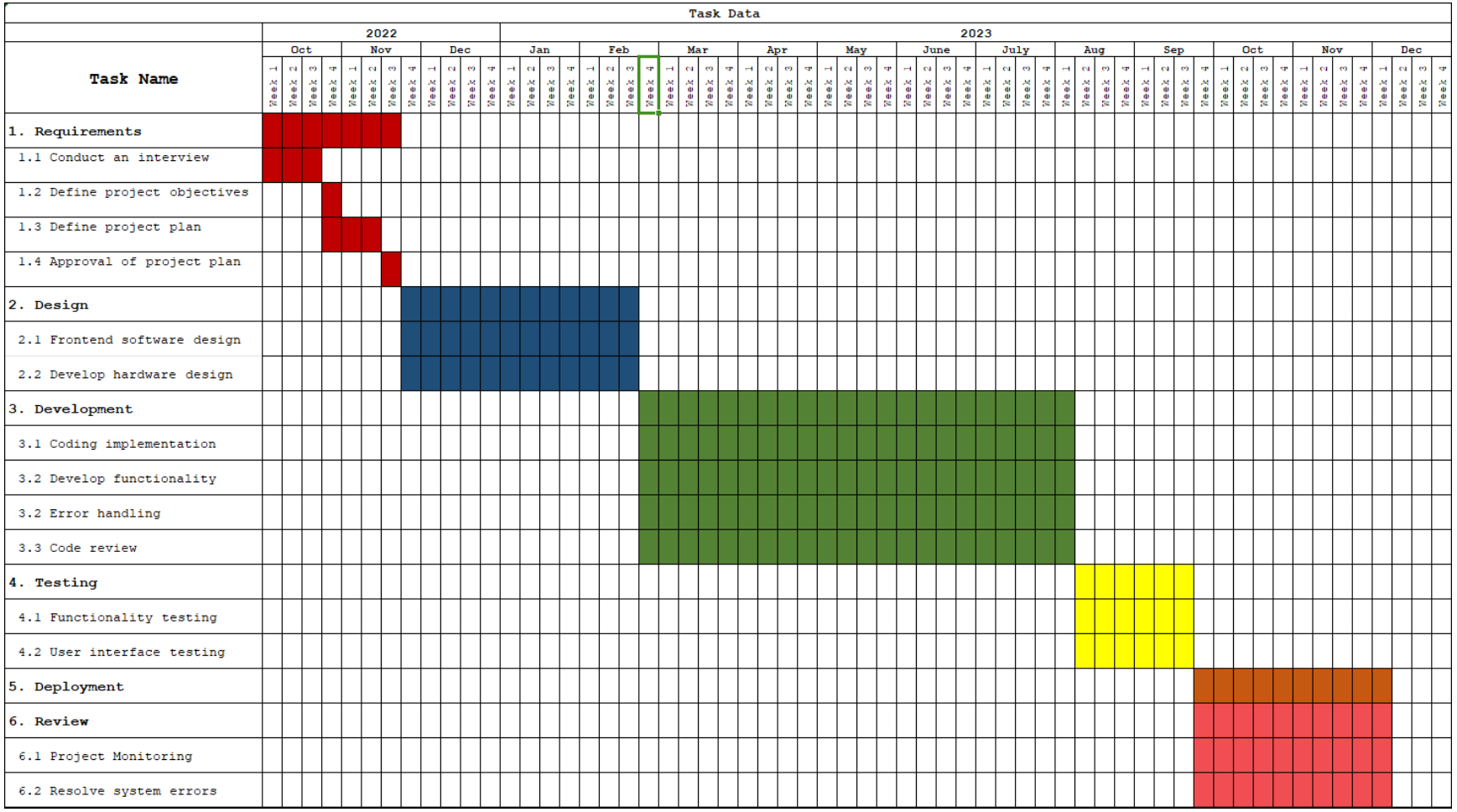
In this phase, researchers must maintain the functionality of the system during deployment to maintain its performance. Also, researchers will

determine and fix the errors that may occur during the period of time.

Gantt Chart

The plan and target date were presented on the gantt chart. All the development stages up to the completion of project were documented in this chart. This helps the researchers to know the deadlines needed to accomplish and show breakthroughs of various tasks.

Table 1. Gantt Chart



Legend: Colored Box - Completed/ Done

Table 1 shows the whole process of developing e-BCRQueiosk: A Municipality of Baco Civil Registry Office Online Transaction with Queueing Kiosk. It displayed the various tasks and marks as completed on its certain date. Researchers will be keep informed to the progress of the development that will help not to miss out steps and differentiate tasks from the amount of time took to complete the project.

Requirements Specification

In order to use the proposed project to its fullest potential, the user must understand how it works. This includes learning about the software and hardware materials used, such as the website for e-governance, the Android tablet, and the thermal printer for the queueing kiosk device. Having a good understanding of each of these components of the project will allow the user to better utilize the project.

Functional Requirements

Functional Requirements are an important part of the software development process. They define the functions and processes that the software must perform in order to meet the needs of its users. They are the key to ensuring that the software will meet the standards it’s designed for, and that the user experience will be satisfactory. Functional requirements provide a detailed

description of the behavior of the system in response to inputs, outputs, and expected results. This level of detail is necessary to ensure that the system has a strong foundation for its performance. By ensuring that all aspects of the system are identified and specified in the functional requirements, developers can guarantee that the system will be successful. The features and description of the proposed project e-BCRQueiosk will be:

Table 2. Functional Requirements

Features	**Description**
Android Tablet	It is a touchpad screen attached on the kiosk that user will select transaction that need to be process.
Thermal Printer	The kiosk will release a queueing ticket number through thermal printer. This will serve as a reference for the process that needs to be done by the user.

User Interface

The project e-BCRQueiosk: A Municipality of Baco Civil Registry Office Online Transaction with Queueing Kiosk is a customer service system for a civil registry request of documents transaction that involves both clients and staff interaction. The system utilizes a kiosk display, monitored by the admin, to log and process client transactions. Before the system was built, the designers used the SketchUp application to create a mock-up of the project. This allowed them to make sure the final product had a pleasing overall look before actually building it.

Figure 3. User Interface

Figure 3 shows the interface of Queueing Kiosk. The model design was made using the SketchUp application. All of the details were strategically planned and well

implemented. The design was passed and checked by the users and critics.

Hardware Interface

The hardware interface stage is an important phase in the development of a proposed project. It involves determining what hardware components will be used to create the project and how they will interact with each other. This includes researching and selecting the components, understanding their functions and capabilities, and how they will need to be connected and configured for the project to work. It also involves creating a detailed description of each component, including the type of connection, the signals required, any software drivers, and other settings that may need to be configured. This stage also involves determining any safety precautions and relevant regulations that need to be taken into consideration when using and configuring the components. Once all of this is completed, the hardware interface can be tested and verified to ensure it is functioning as expected.

Software Interface

The software interface is constituted by the connection of the components, tools, libraries, and integrated components that have been specified in any

given development project. This project utilizes the Websites under the language of PHP and made by CodeIgniter 4 Framework.

Security Requirements

The security requirements is the insurance of the security of the project, researchers assessed the security needs and created a system that requires the use of a unique key to access the project. This key is only available to the admin, and other users are not allowed to access the project. To further secure the project, the researchers also make sure to keep it clean and dry, and they lock it to prevent any unauthorized access. Furthermore, only authorized personnel are allowed to log into the system as some information must remain confidential. In this way, the project is well protected and secure.

Technical Background

The technical background provides insight into the technical details of the project and allows for a better understanding of the project requirements. This includes outlining the hardware and software requirements for the project, as well as any specific technical details that need to be considered. This information can help developers to

create a more accurate plan for the project, and to ensure that all requirements are met.

Hardware Specifications

Software specifications refer to the technical requirements that must be met in order for the software to run properly. These specifications may include the system requirements, such as the type of operating system, memory, storage, and processor requirements, as well as the software requirements, such as the version, compatibility, and other features. Knowing the minimum and recommended specifications of certain software is essential in order for users to use them without any errors or issues. It is important to make sure that the software is compatible with the system and has the necessary features to accomplish the tasks that the user needs to perform. Furthermore, the user should be aware of any updates or patches that may be necessary to ensure that the software remains up-to-date and functioning correctly.

Software Specifications

This method provides a way for software products to interact with hardware components by providing a hardware interface. This interface defines the logical and physical characteristics of each interface, allowing

the software product to communicate with the hardware component. This means that the device is easy to use for the users because of its user-friendly characteristic and they do not need to worry about the function of the hardware device as long as the admin can have the skills to help.

System Analysis and Design

The researchers determined the differences between a manual and an automated methodology. It highlights that systems that operate automatically are more convenient and secure to perform rather than manual processes. It is more efficient and high degree of technological competence of assisting users for providing public services.

System Overview

The project developers planned and built detailed structure on how the Municipal Civil Registry Office of Baco Online Transaction with Queueing Kiosk will process. This allows Baco users to inquire about transactions of government services in a two-way process which are online and walk-in. This will result in improved information access and transaction processing efficiency. An online transaction wherein users of Baco who have created an account can use the website system. The system is hosted on a website platform that requires

an internet connection to be accessed by the administrator and users. As they navigate the website Local Civil Registry Office and clients are able to select the specific sector based on the service they need. Also, a walk-in transaction which is a queueing kiosk to easily minimize the overall waiting time for all operations. This will help them to guarantee that their orders and requests are processed fairly and successfully. All users must do is log in to the queueing system first and they need to choose what purposes they demand to accomplish in the Municipality then a waiting number ticket will release in the system that will serve as a reference for the process that needs to be done.

System Architecture

In this section, system architecture was designed to define the flow and behavior of system's functionalities to execute its high-quality performance. This covers the formal illustration and description of the project structure.

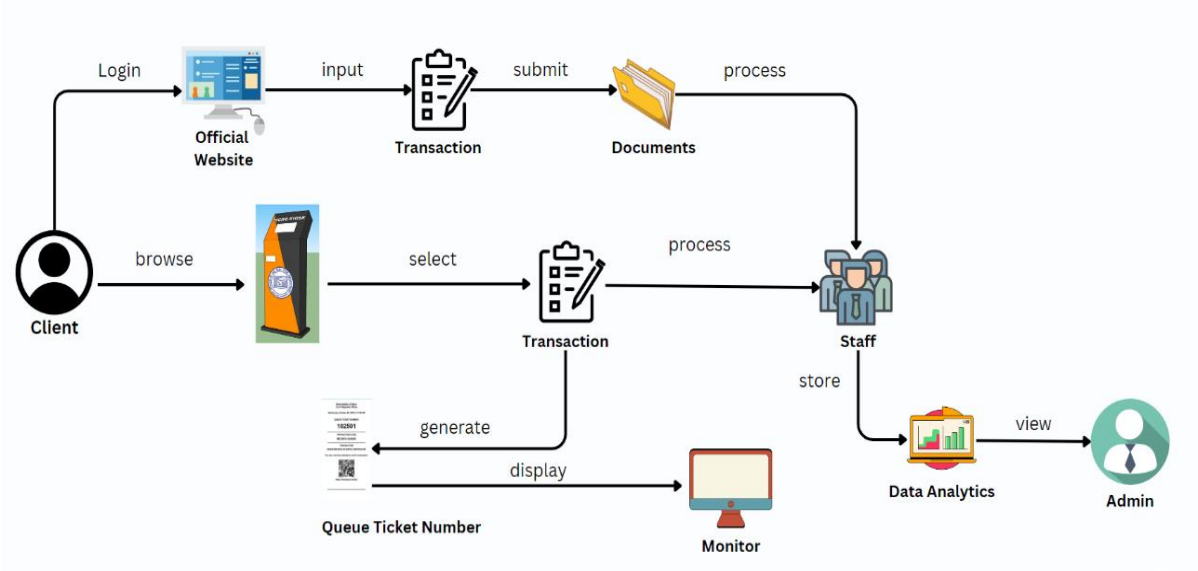


Figure 4. System Architecture

Figure 4 shows the system architecture of the development of the e-BCRQueiosk: A Municipality of Baco Civil Registry Office Online Transaction with Queueing Kiosk. It displays the flow and how does the system works.The researchers show that the internet is needed in order to access the website by both client, staff, and admin to proceed for intended transactions. A study pertains to online and walk-in process of transactions for the Municipality of Baco. In queueing kiosk system, it releases queue ticket number as a reference of clients's transactions needed to be process. The monitor displays the queue number of clients from queueing kiosk.

Use Case Diagram

In this section, the use case diagram summarizes the high-level functions and a graphic representation that depicts the relationship between the system and users, it is how does the

system work within interactions of the actors. The diagram will help the researchers to identify and organize the functionality of the entire project.

Figure 5. Use Case Diagram

Figure 5 shows the use case of the admin, staff, and the client. This shows the overall usage of the website and device. The figure on the upper left shows that admin can add and manage staff, view the statistical data and transaction history, and set the appointment calendar. The staff can manage the client request of transaction. The client enables to process transactions online and select from queueing kiosk.

Activity Diagram

This section shows the start of the initial state and end of the final state in order to provide the intended activities of the project.

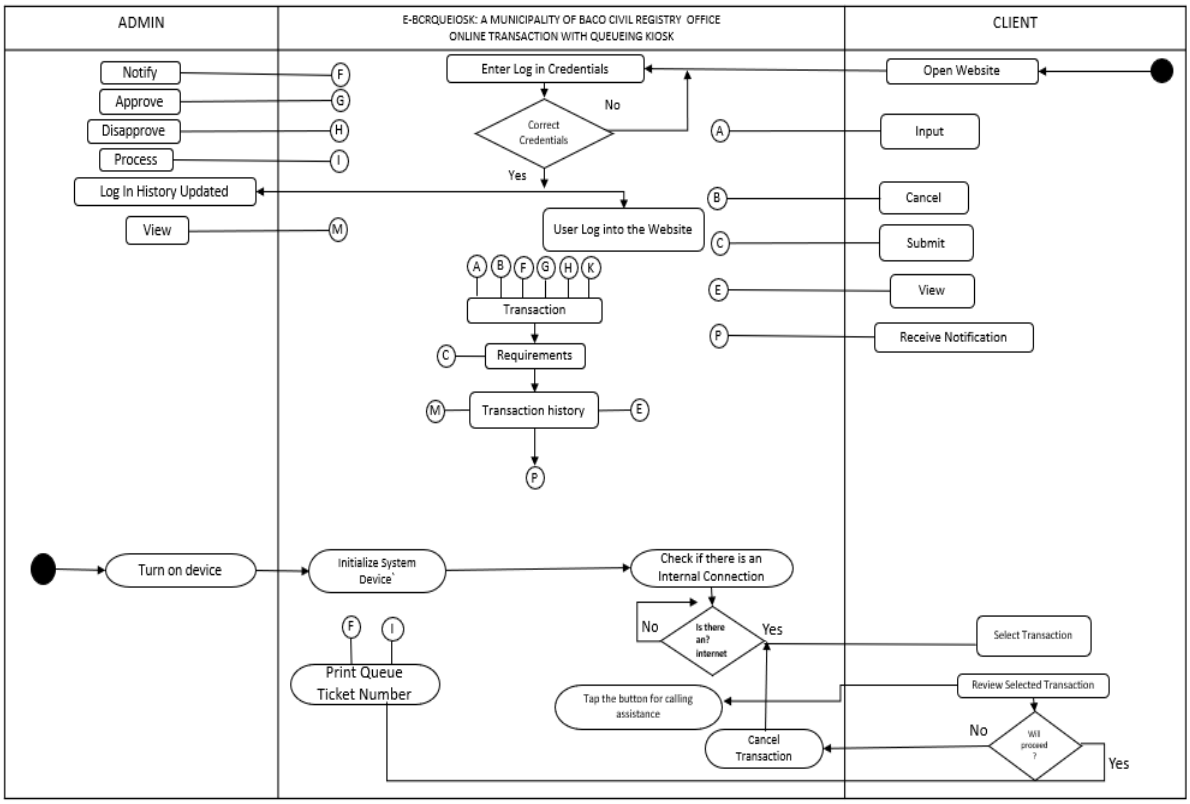


Figure 6. Activity Diagram

Figure 6 shows an activity diagram of the e-BCRQueiosk. This diagram illustrates the various activities that can be undertaken by both the admin and users of the website. The diagram helps to illustrate how the website works and the different roles of the admin and members. Each step in the process should be clearly defined and documented in order to ensure the successful implementation of the project.

Data Flow Diagram (DFD)

This section shows the description of the different diagrams of how the data is processed within the system.

Context Diagram

This section shows the interaction of the project between the actors and external factors.

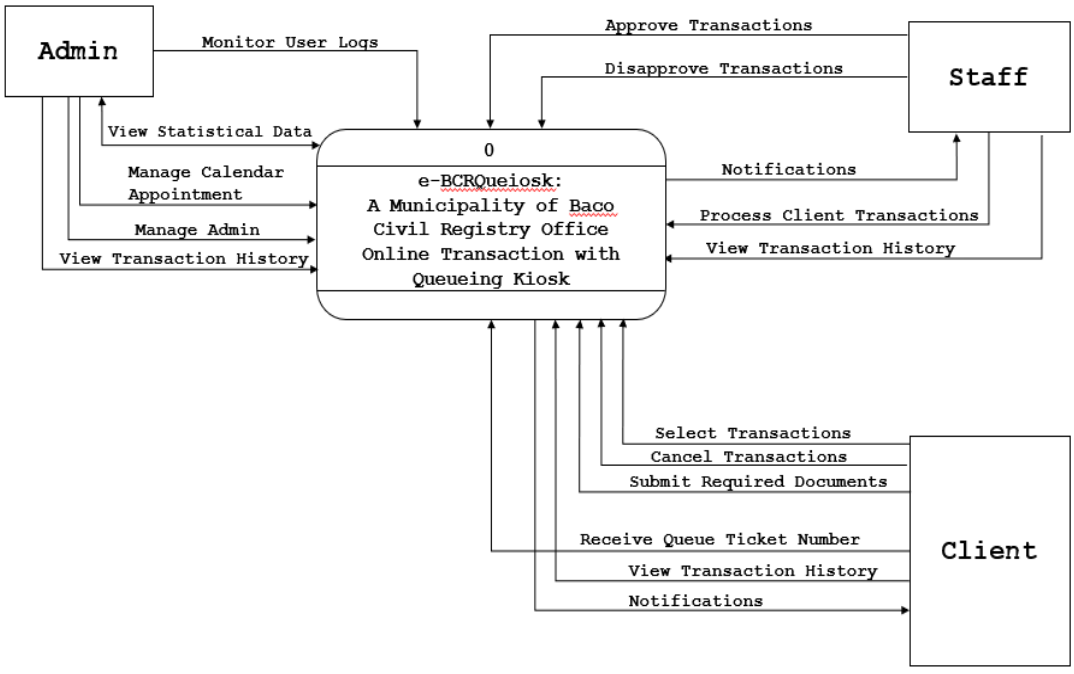


Figure 7. Context Diagram

Figure 7 context diagram is a visual representation of a system and the factors that depicts a boundary line between the system and its environment, with arrows pointing to the various entities that helps to identify the various inputs and outputs of the system, allowing for better understanding and analysis. Additionally, it helps to identify the potential areas of risk, as well as the different sources of information that feed into the system.

Diagram 0

This section shows Diagram 0 which is commonly known as an exploded view of the context diagram that shows the detailed process of how the project works.

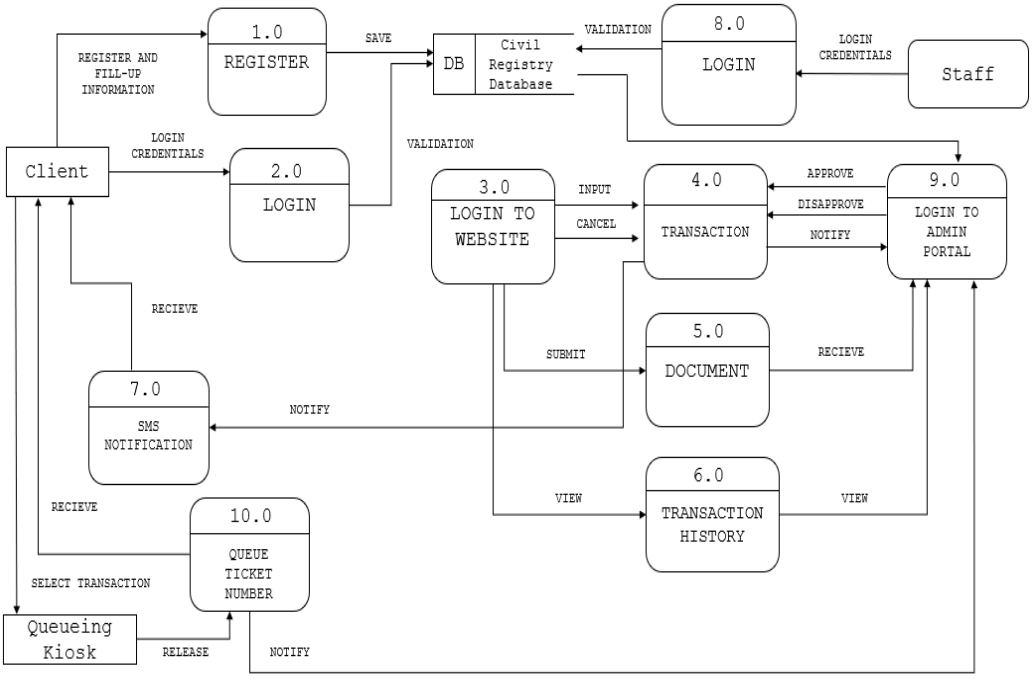


Figure 8. Diagram 0

Figure 8 illustrates the sequence of the steps an administrator needs to take to perform their duties. This includes managing client's transactions such as approving, processing, and cancelling transactions. By following these steps, the admin can select the appropriate functions and use the system as needed. The system allows the admin to know the usage of the system and make the most of its features.

Database Schema

Designing the system involved creating a blueprint of the entities, attributes, and relationships that are part of the system. This design phase provided a comprehensive overview of the entities within the system and the attributes that can be used to describe the data. It helps to ensure that the system is well organized and can effectively store and process the data for the study.

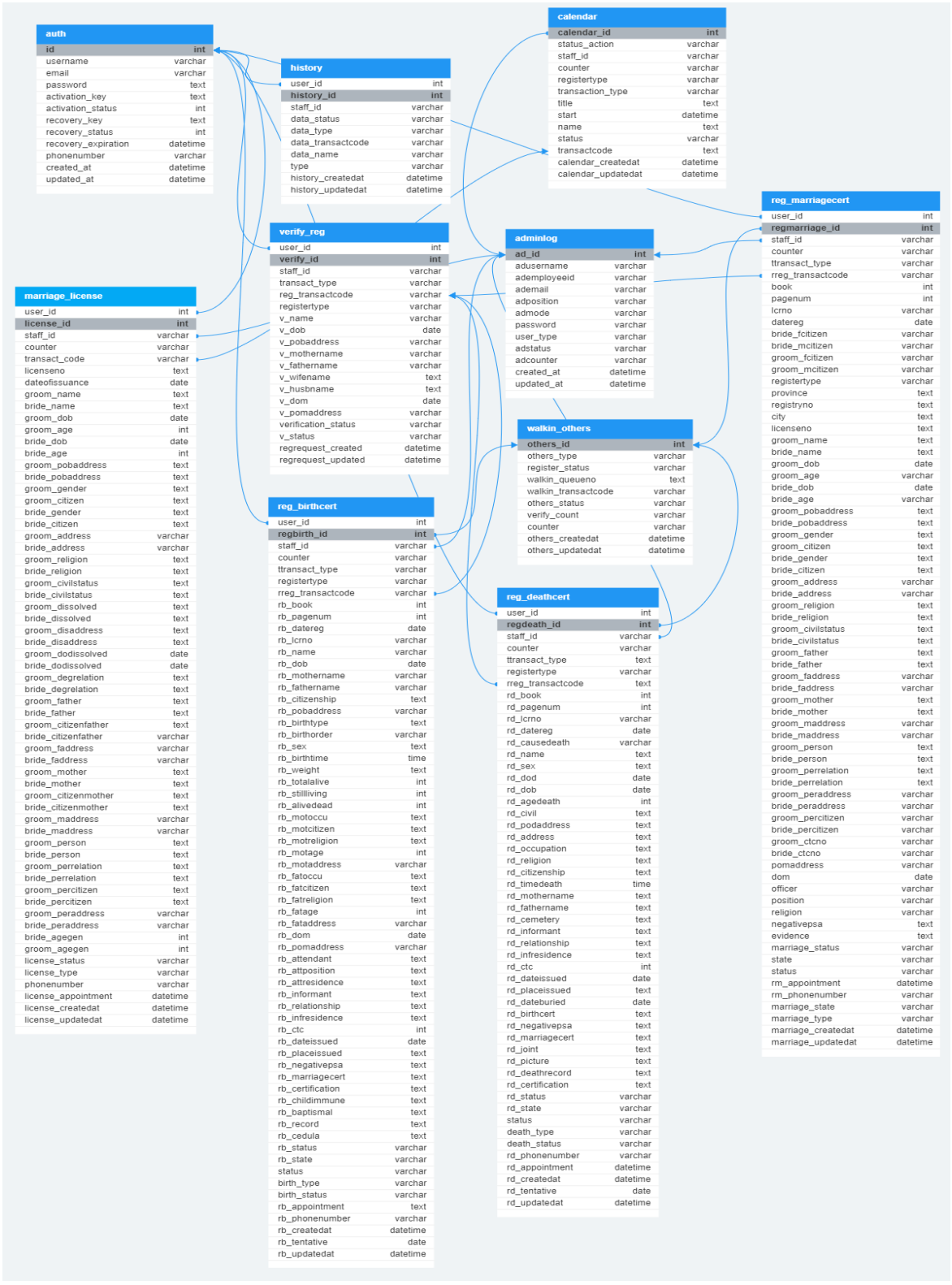


Figure 9. Database Schema

Testing and Evaluation

The testing and assessment of the "e-BCRQueiosk: A Municipality of Baco Civil Registry Office Online Transaction with Queueing Kiosk" project aimed to ensure that the project would meet the desired outcomes and assess the quality of the project. The objectives of the project also included identifying any potential risks associated with the execution of the project. To meet the researchers' expectations and accomplish the project's main goals, they tested the project multiple times to demonstrate its functionality to all users.

The performance of the project was evaluated using ISO 25010 criteria, which include functional suitability, reliability, performance efficiency, usability, security, compatibility, maintainability, and portability. This evaluation was done to ensure that the project meets all of its objectives and is capable of delivering the desired outcomes. The project was also tested in different scenarios to simulate real-world conditions. All of these tests were conducted to guarantee that the project would be able to meet its goals and provide a satisfactory user experience.

Likert Scale

Validated questionnaires were used and it is based on Likert Scale or a five-point scale to measure the

effectiveness and the functionality of the project. The Likert scale-type questionnaire was adopted.

Table 3: Likert Scale

Numerical Value	Statistical Limit	Verbal Description
5	4.50 – 4.99	Strongly Agree
4	3.50 – 4.49	Agree
3	2.50 – 3.49	Moderately
2	1.50 – 2.49	Disagree
1	1.00 – 1.49	Strongly Disagree

The researchers are required to distribute the validated questionnaires to acquire the needed evaluation of the respondents. Scale type of the questionnaires are 5 – Strongly Agree, 4 – Agree, 3 – Moderately, 2 – Disagree and 1 – Strongly Disagree.

Implementation Plan

The researchers prepared an implementation plan that outlines the steps necessary to transition individuals to the proposed system. The plan includes the handover of the system and its documentation. This plan will ensure that all participants have the necessary information and resources to implement the system successfully.

Table 4. Implementation Plan

Activities	No. of days to complete	Start Date	End Date
Meeting with Client and Project Adviser about Project Proposal	52 days	October 8, 2022	November 28, 2022
Project Development and Unit Testing	172 days	February 20, 2023	August 10, 2023
Project Deployment and Maintenance	99 days	September 11, 2023	November 17, 2023
System Evaluation	16 days	November 17, 2023	December 2, 2023

Table 4 indicates that the researchers has created an implementation plan. These individuals will hand over the project along with its documentation to the client to use as a guide for maintaining the project. If the project is implemented, the developers will plan to carry out several strategies to ensure the success of the project. These strategies could include regular maintenance and updates, as well as the implementation of additional features or bug fixes. The goal is to ensure that the project is successful and provides the best possible service to the users.