SCSJ2203: Software Engineering

System Documentation

Staff Attendance System

Version 1.0

[PR 2 - Chap1 and 2]

Date: 30/5/2021

School of Computing, Faculty of Engineering

Prepared by: Group 9

Revision Page

a. **Overview**

In this system documentation version 1.0, there are two parts involved: The introduction and specific requirements. In the introduction parts, we briefly explain the purpose of this project and our scope. While for the particular requirements, we are going deeper on how the system will work by providing the system features details.

b. **Target Audience**

The system documentation version 1.0 is dispensing for the stakeholders and the person involved throughout the system's implementation.

c. **Project Team Members**

Name	**Role**	**Task**	**Status**
Nursyahidatul Asyiqin binti Yusof	Senior software engineer	1.1, 1.2 and 2.1.1 UC004, UC009 and UC010.	Completed
Nurul Syamira binti Amat Jifri	Software engineer	1.3, 2.1.1 and 2.3 UC003 and UC008	Completed
PG Khairil Qayyiz bin PG Putra	Software Manager	2.1.2, 2.1.3 and 2.4 UC001 and UC005	Completed
Qudri Ameer bin Mohd Safiee	Senior programmer	2.1.3, 2.1.4 and 2.5 UC006 and UC007	Completed
All	-	Domain model and state machine	Completed

d. **Version Control History**

Version	**Primary Author(s)**	**Description of Version**	**Date Completed**
Version 1.0	Nursyahidatul Asyiqin (Leader PR1)	Completed Chapter 1 and 2	30/05/2021

Table of Contents

1. Introduction

1.1 Purpose

System documentation describes the build-up system that will help people involved in the system's implementation and the person who will use the system. Based on Mcdonald (2017), “system documentation is information about an as-built solution and acts as a reference for future maintenance or update efforts”. Furthermore, altexsoft (2020) explains that system documentation represents an overview for the engineers and stakeholders to understand the underlying system. Therefore, the information that the system will describe in this documentation will help build the strategy and define all the necessary actions to improve the system.

1.2 Scope

The software product is a staff attendance system. This system will be a fully computerized, upgraded attendance system with better tracking from the previous system, TCMS V3, and provide the finalized report of the staff's attendance. The objective of this system is to provide various functions to ease the user's task. In particular, the scheme aims to enhance the arrangement of detailed attendance documentation and helps the principal monitor the staff performance faster. Furthermore, the staff attendance system will allow staff to view and request their attendance status and upload an excuse letter. While for clerks, the system will generate, filter search for faster-searching details, and modify the details. The goal of the system implementation is to help users solve the problem regarding attendance.

1.3 Definitions, Acronyms and Abbreviation

1. TCMS V3 - powerful time and attendance device
2. DB - database
3. UC - use case

1.4 **References**

McDonal, K. (2017, October 12). *System Documentation.* kbp media. [Retrieved from] https://www.kbp.media/system-documentation

altexsoft (2020, December 01). *Technical Documentation in Software Development: Types, Best Practices, and Tools*. [Retrieved from] https://www.altexsoft.com/blog/business/technical-documentation-in-software-development-types-best-practices-and-tools

fingerprint: Card Access Control And Time Attendance Solutions: FingerTec Worldwide. Fingerprint | Card Access Control And Time Attendance Solution: FingerTec Worldwide, (n.d.). [Retrieved from] https://www.fingertec.com/softwareupdate/TCMSV3/

1.5 **Overview**

This staff attendance system documentation is organized in the following specific requirements, which include the details user, hardware, software and communication interfaces, system features, performance, design constraints and software system attributes.

2. Specific Requirements

2.1 External Interface Requirements

2.1.1 User Interfaces

All the interfaces should have the same design and theme, consistent and easier for users to learn and use. The requirements were taken from stakeholders so that the specific details that need to be inserted in the system will not be left out. A more detailed requirements on all the pages are explained below:

A. Logical characteristics

User interface for fingerprint hardware

1. Fingerprint scanner

   The system used a biometric fingerprint scanner to use thermal sensor types to detect and collect the digital image of a fingerprint surface. As a result, the performance of the fingerprint recognition system was highly accurate, around 99 percent of the time and could read less than 5 seconds.

2. Green right tick symbol

   On the fingerprint scanner screen, a green coloured right tick symbol will appear after the system verified the staff's fingerprint. The symbol is displayed with a message "Fingerprint approved".

3. Red cross symbol

   If the system could not verify the staff's fingerprint, a red coloured cross symbol will be displayed with a message "Fingerprint not recognised, please try again".

4. Time and date

   At the fingerprint right side screen, there is a date and time display to ensure that users alert with the time they scan and integrate the system reader scanner with date and time to be stored in the database.

User interface for staff attendance system

1. Login/Logout

   A page consists of a simple textbox for a user to insert: username/ID and password.

2. Homepage

   The homepage is different based on the person who login into the system. It was separated into three parts: staff, principal, and clerk. The homepage choices button for a staff consisting of status, upload, and summary. While for clerks it has notified, generates a report, and modifies with an extra textbox at the header to search for staff details as a filter search function. Lastly, for principal, the homepage has a view report and filter search function.

3. Profile

   The profile page consists of the details submitted by each staff member in the school organization. At the top of the page, a profile picture is displayed. Following the staff information such as full name, identification number, staff position, staff identification number, home address, telephone number, subjects and other information.

4. Notifications

   The notifications page will be displayed at the sidebar of the page after the user clicks on the hamburger menu at the right top of the page. On this layout, notifications for the user will be displayed from the newest at the top of the page then downwards to the oldest.

5. Menu interface

   viewAttendanceStatus - In this interface, it will display the status of staff's own attendance when they click the chosen date. If the status is green, it means there is nothing for staff to do more since all the action is done. Otherwise, it will display the red color and need action from staff, such as uploading an excuse letter or maybe due to the lateness.

uploadExcuseLetter - A page consisting of a submission section where staff can upload their excuse letter and the clerk or principal can view the submission. For the page, it includes a submit button, edit submission button and a text box for reference to others.

requestAttendanceSummary - A page that firstly displays the choices of month to choose. It then proceeds to the next page showing a full summary attendance for the selected month. Then a user had an option to view, print or save the report by clicking the button.

viewReport - This interface consists of a header where the user can input a keyword to view which or whose report it is. Then, below the header, it will display the report, and the user has an option whether to view, print, or save the report. Next, a button on the main side consists of a button to view the full report for the month. It will generate the current monthly report of the overall staff attendance system and a calendar diagram to choose which month to view.

notifyStaff - This page allows the user to send notifications to the staff as a reminder regarding their attendance performance. There is a search box to input the staff's name that needs to be notified. Next, there are the warning options checkboxes to be ticked by the user of being late or absent for a specific period. After the box, there is a button named "Notify" to start notify the staff chosen.

generateReport - This interface consists of a header where the user can input a keyword to generate which or whose attendance report it is. Then, a page will display the choices of months to generate the report. Then, the user had an option to choose the directory location to save the generated report.

filterSearch - This interface consists of a search box with input field and suggestions drop-down list of a few related categories. The user can search on any keyword to do the searching. Other than that, the user can choose any of the categories to narrow their findings on the attendance report. Then, the page will show the details on the attendance report following the matching search. If there is no matching search, the searching can be done again.

modifyStaffDetails - This page will begin displaying the staff list, and the user will need to choose on the list to start modifying. After completing to modify the details, the user had an option to confirm the modifications or cancel which is to keep modifying. Then, the currently modified staff details are updated.

maintainSystem - This interface allows the technician in duty to perform the annual maintenance or any required maintenance on the system.

B. Optimized interface and description on how system appear to user

1. Staff homepage

Staff

Staff can view their attendance status manually, and if their status is stated incomplete, the staff will be notified and a specific action could be taken. Besides, staff can upload their excuse letter and the system has a textbox for staff to make any remarks. The uploading time for staff is about 1-2 minutes only because staff can upload their file from desktop to the database. Lastly, staff can request to view their attendance summary in a month. All of this function could be learned in less than 30 minutes since the interface is really minimal and easy to use.

Principal

The principal can view the staff attendance report based on the chosen month for the whole staff or for a specific staff only.

Technician

The technician can manage the database according to the stakeholder's meet including providing technical support, and performing updates and modifications.

2. Clerk homepage

The clerk can notify staff of a warning regarding their attendance performance such as being late or absent for some times. Next, the clerk can generate an attendance report from the system to the local directory. Then, they can filter search to narrow the findings to view the attendance report of staff. Last but not least, the clerk can modify staff details that may need to be updated to be stored in the system.

2.1.2 **Hardware Interfaces**

Staff attendance system requires a fingerprint scanner device to scan the staff attendance. Other than that, the staff attendance system is a system provided in the school portal. This is supported by multiple hardware or devices that have a working operating system with stable internet browsers. The system also has a server database located on a network server which stores and receives data used for the system.

2.1.3 **Software Interfaces**

1) Name: Database

Mnemonic: MySQL

Version: 8.1

Source: MySQL

Description: MySQL uses as the database of the system to store the staff's attendance information, attendance report and summary report.

2) Name: Operating System

Mnemonic: Windows 10

Source: Linux Kernel

Description: For the best support for the software to run at desktop.

3) Name: Programming Language

Mnemonic: JavaScript ES6

Source: JavaScript

Description: Being used to create the software system.

2.1.4 **Communication Interfaces**

The staff attendance system requires a stable network protocols to complete the functionality of the whole structure including the fingerprint scanners and the system portal. Any of the working network protocols such as 3G and 4G connection is required to allow the use of The Hypertext Transfer Protocol (HTTP) which will be used to construct several parts of the application system.

2.2 System Features

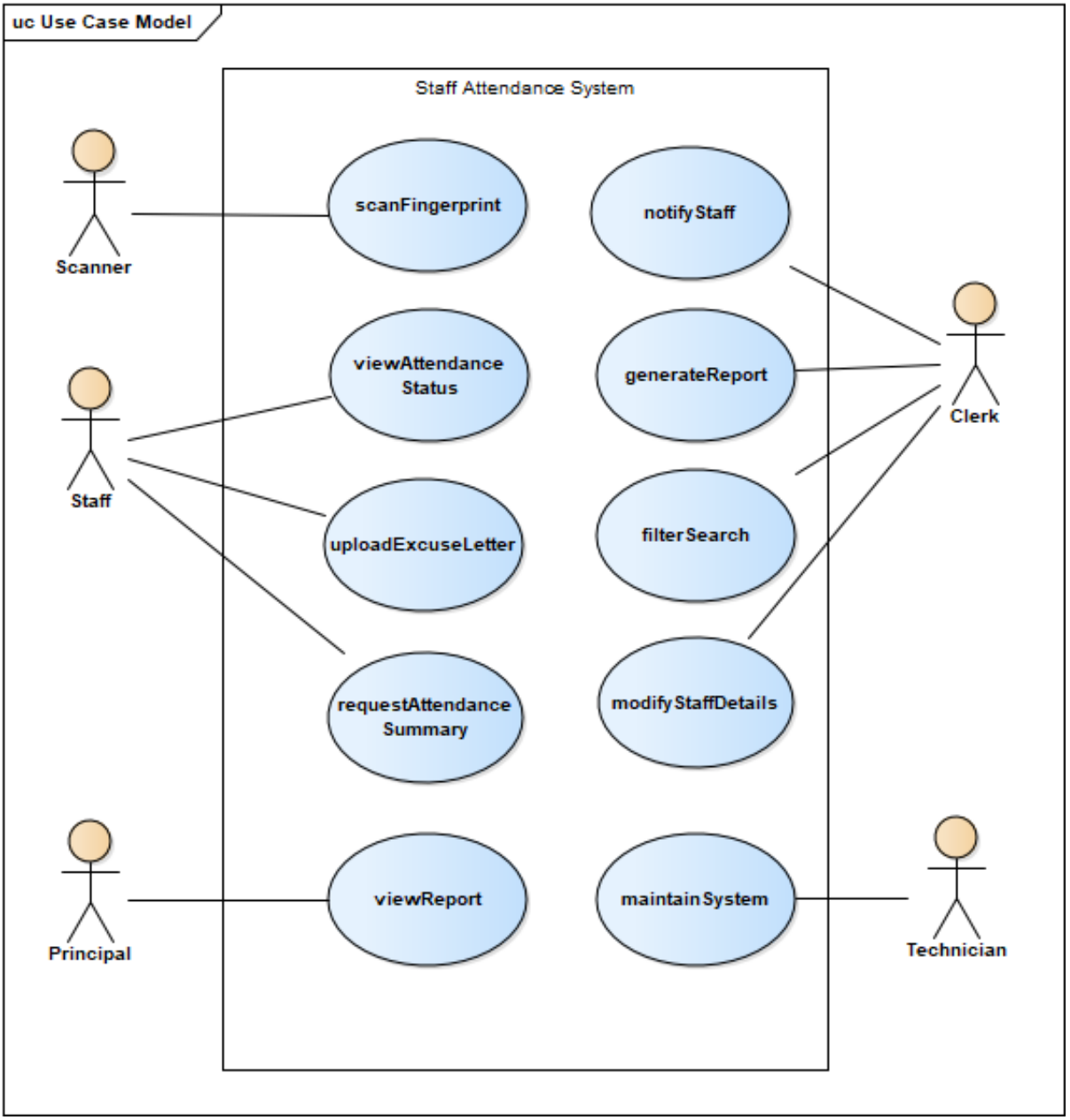

Figure 2.1: Use Case Diagram for Staff Attendance system

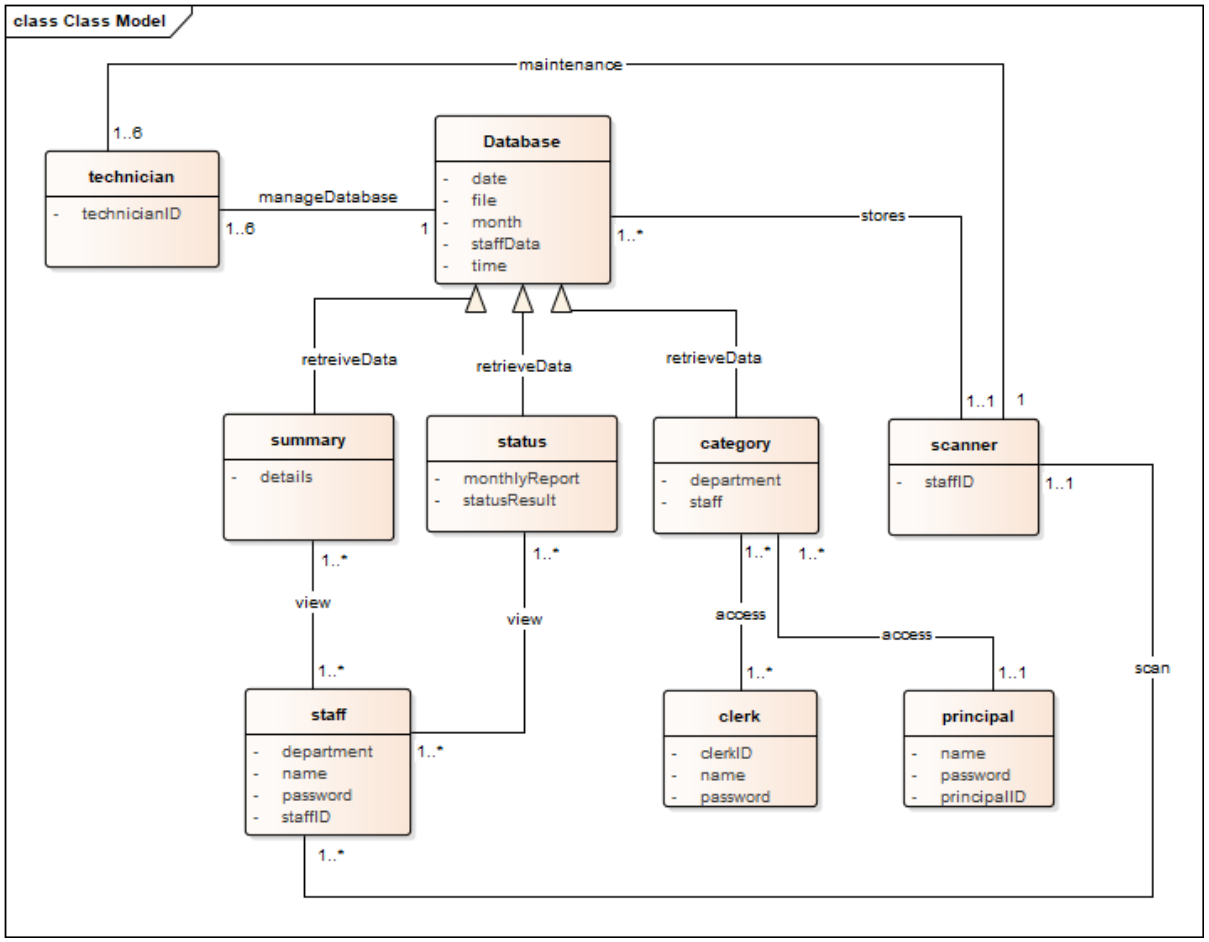

Figure 2.2: Domain Model for Staff Attendance System

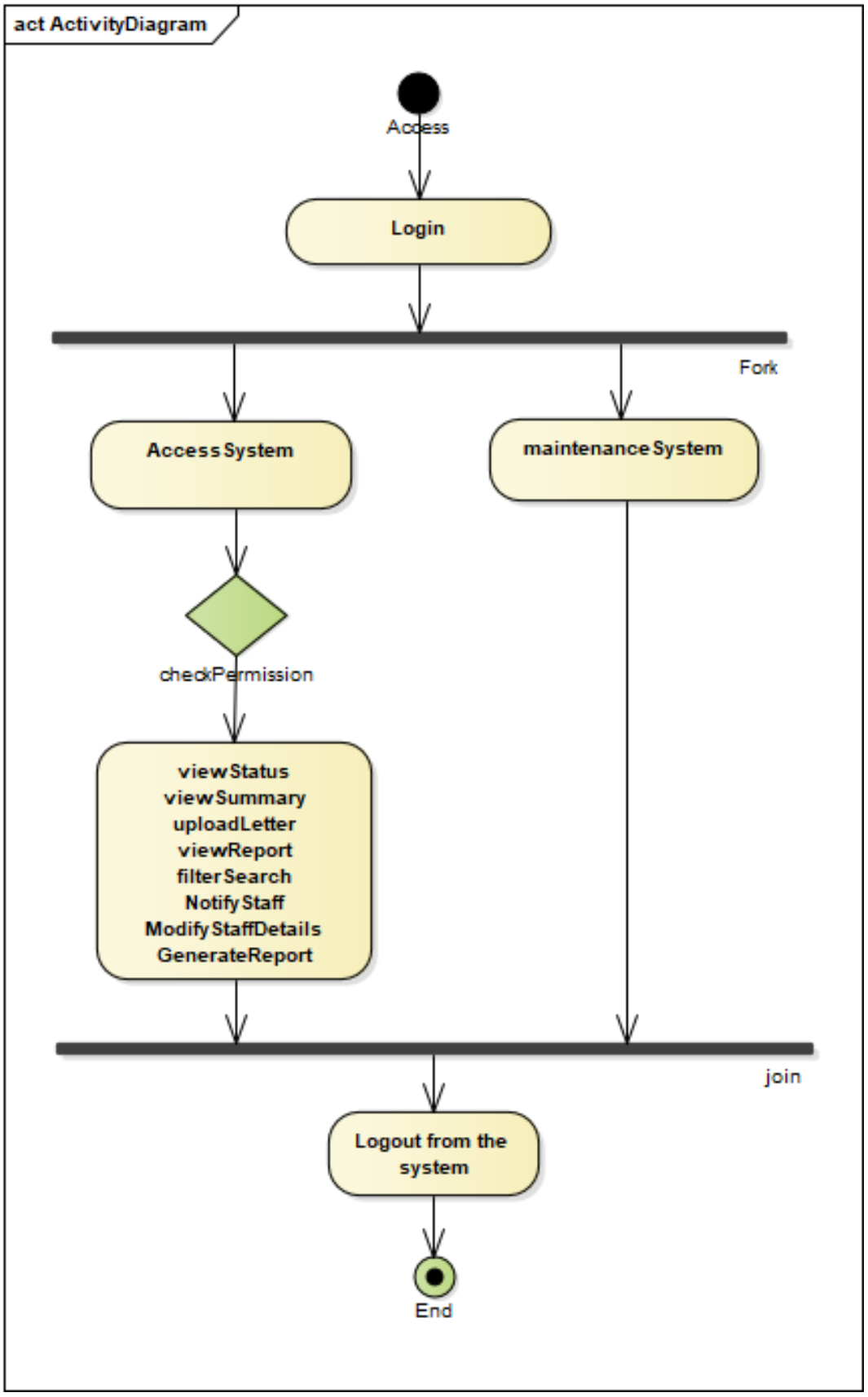

Figure 2.3: State Machine Diagram for Staff Attendance System

2.2.1 UC001: Use Case scanFingerprint

Table 2.1: Use Case Description for scanFingerprint

Use case: scanFingerprint
ID: UC001
Actors: Scanner Device
Preconditions: Activate the scanner device
Flow of events: 1. The scanner device is being activated. 2. A red light on the scanner will appear. 3. The staff will scan their fingerprints for attendance. 4. The device will display fingerprint accepted Alternate: *4a*. Alternate 5. The attendance will be recorded
Postconditions: Attendance recorded
Alternative flow 1: 1. The device will display unrecognize fingerprint
Postconditions: Display error on the screen
Exception flow (if any):

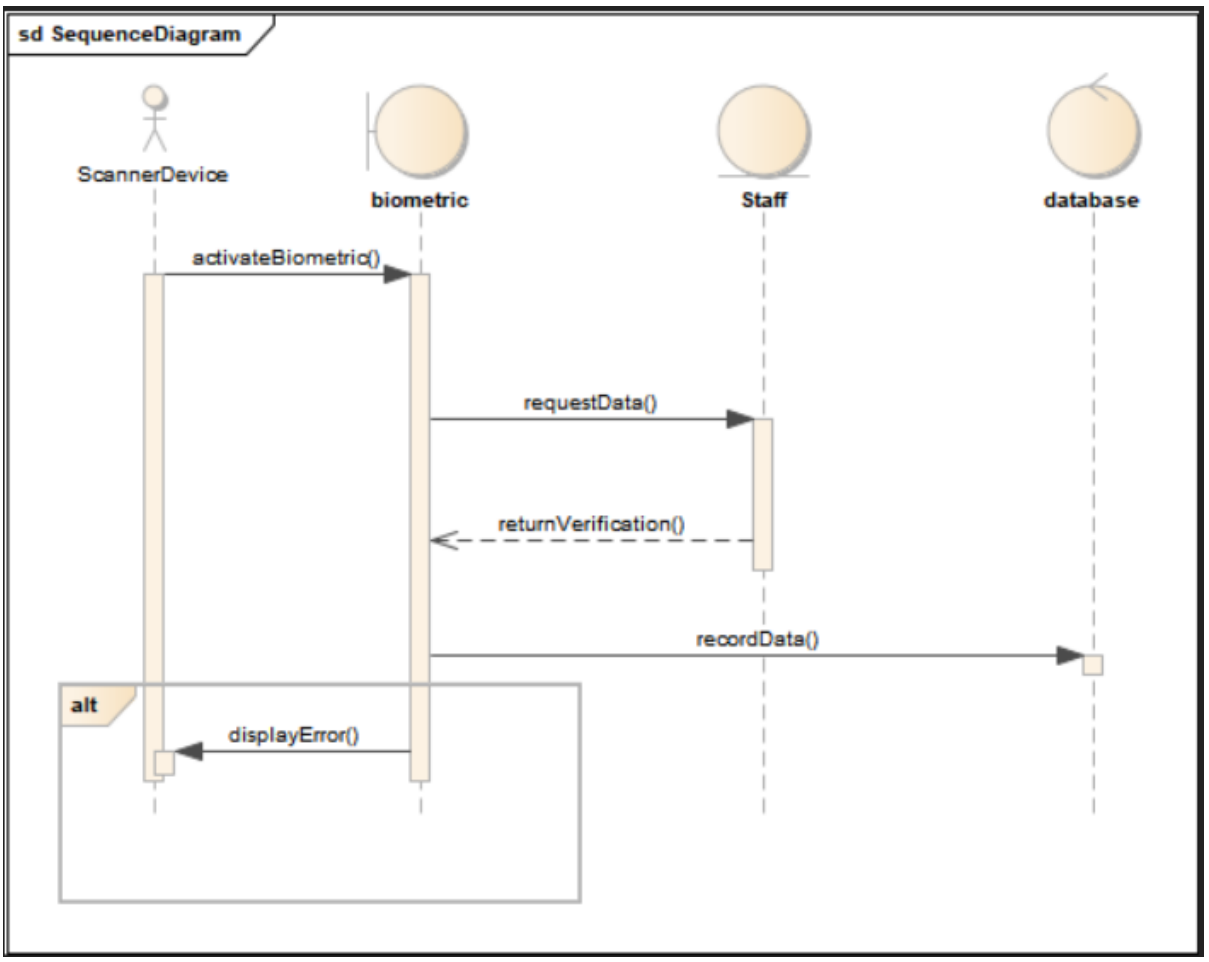

Figure 2.4: Sequence Diagram for scanFingerprint

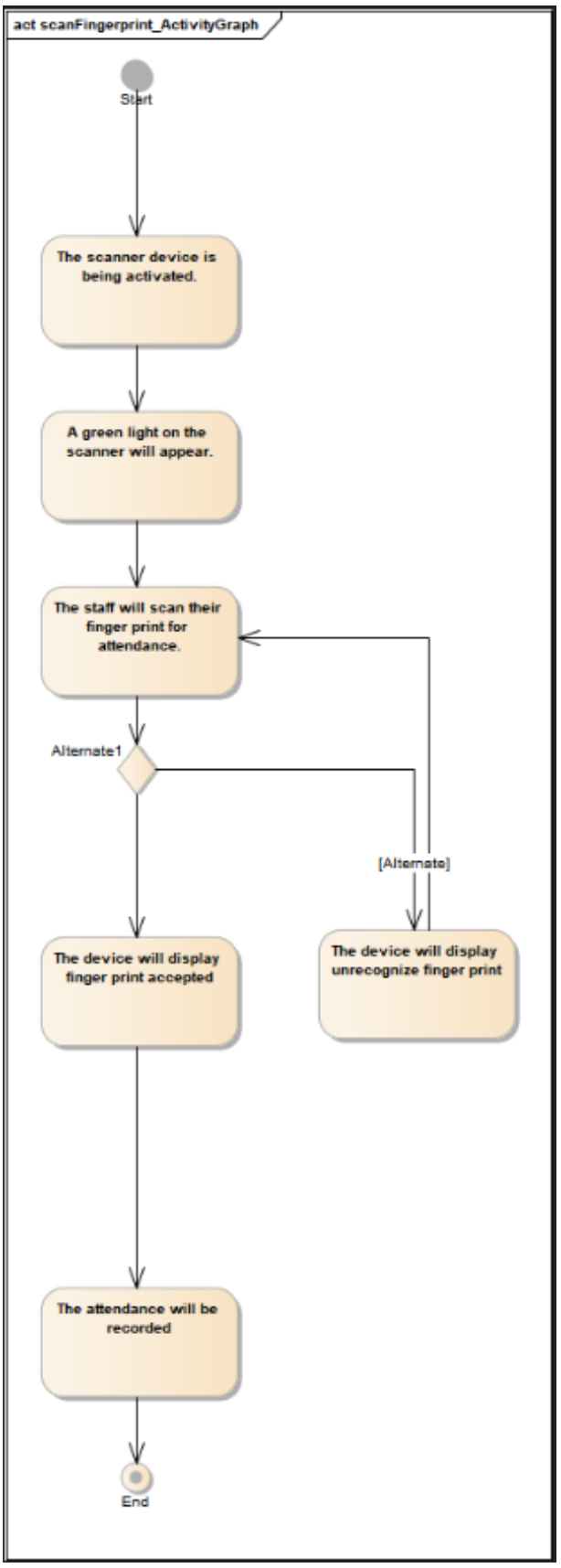

Figure 2.5: Activity Diagram for scanFingerprint

2.2.2 UC002: Use Case viewAttendanceStatus

Table 2.2: Use Case Description for viewAttendanceStatus

Use case: viewAttendanceStatus
ID: UC002
Actors: Staff
Preconditions: Access the system
Flow of events: Basic Path. Basic Path 1. The staff access the attendance system Uses: 2. The staff select the view attendance option Uses: 3. The staff choose date Uses: 4. System display the attendance status Uses: Alternate: 4a. Alternate Path
Postconditions: View the attendance status
Alternative flow 1: Alternate. Alternate Path 1. System display error message Uses:
Postconditions: View the attendance status
Exception flow (if any):

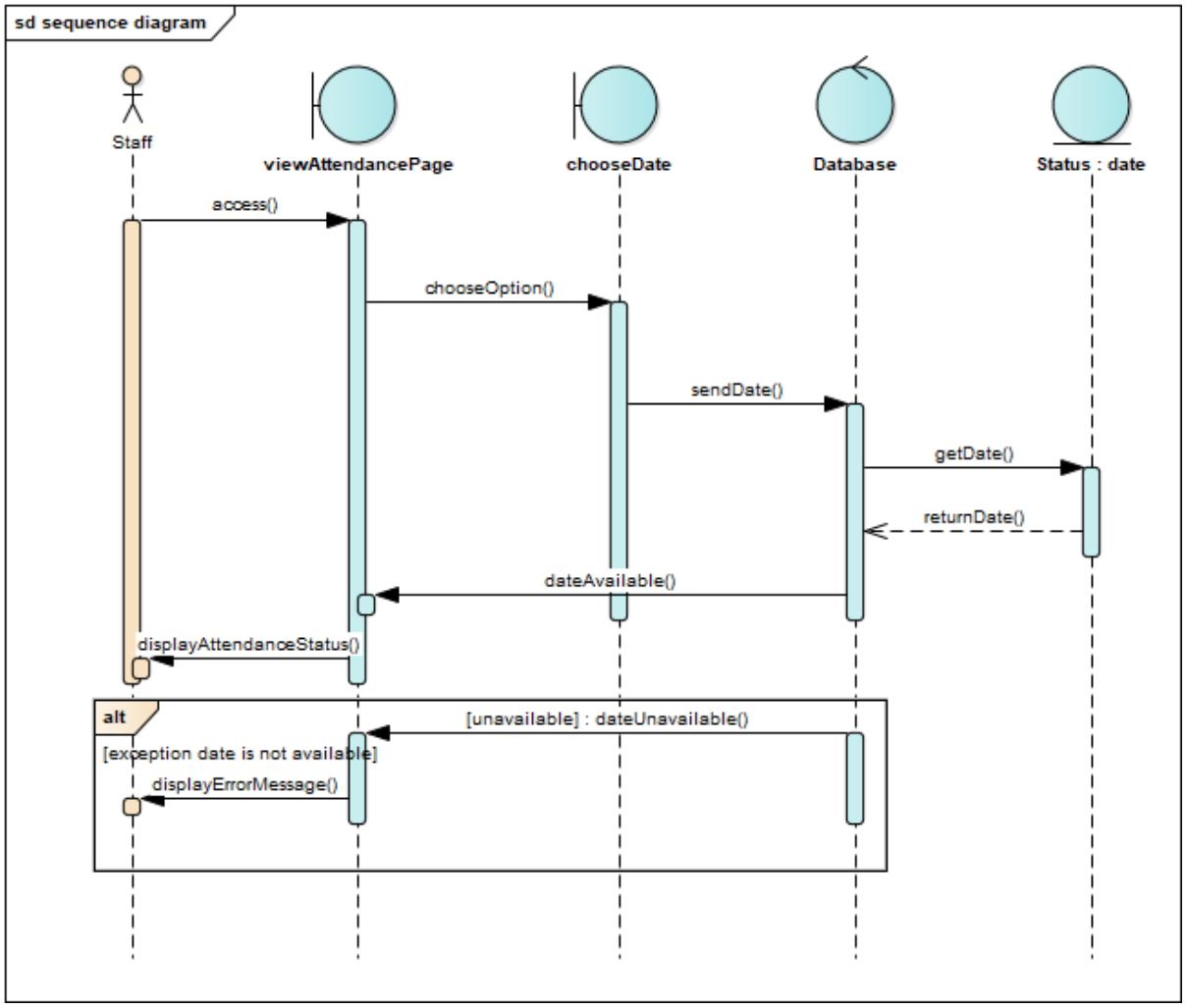

Figure 2.6: Sequence Diagram for viewAttendanceStatus

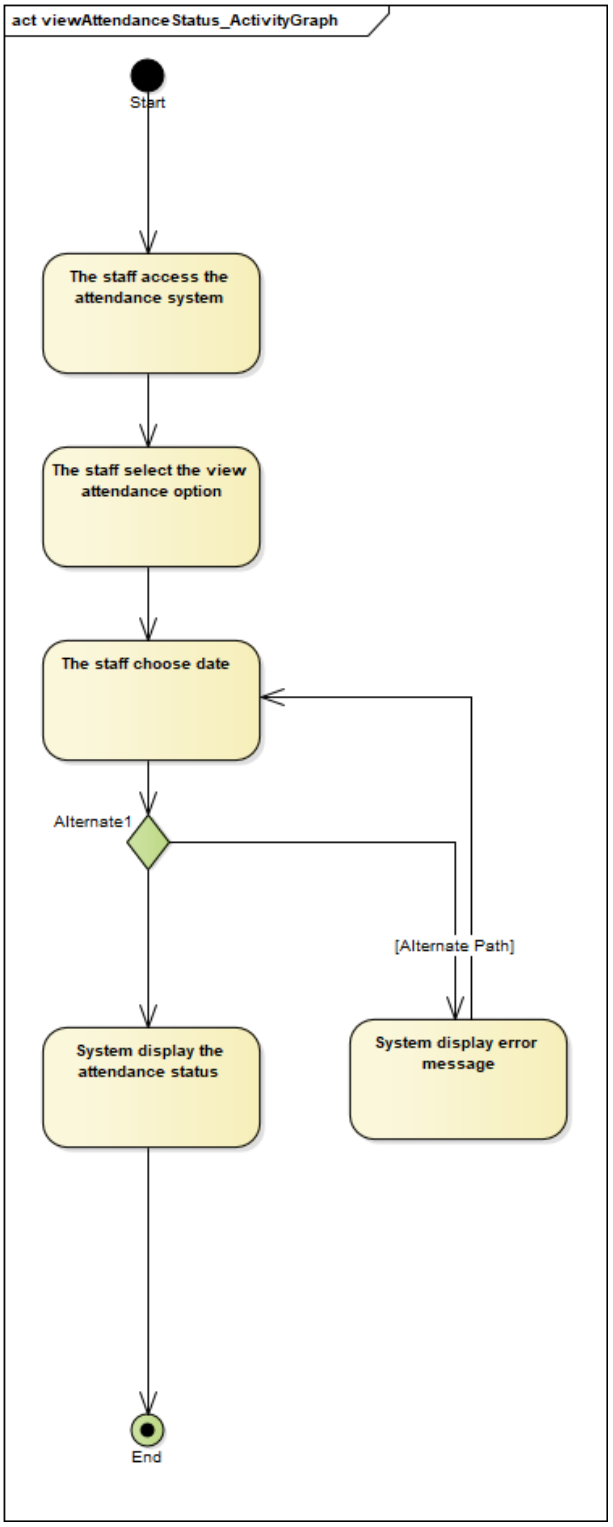

Figure 2.7: Activity Diagram for viewAttendanceStatus

2.2.3 UC003: Use Case uploadExcuseLetter

Table 2.3: Use Case Description for uploadExcuseLetter

Use case: uploadExcuseLetter
ID: UC003
Actors: Staff
Preconditions: Access the system
Flow of events: Basic Path. Basic Path 1. The staff access the system 2. The staff selects "Upload Excuse Letter" option 3. The staff selects a file/directory from computer 4. The staff clicks "Upload" button 5. The staff write a name on "Subject" field for the uploaded file as a reference Alternate: 5a. Reupload / Choose another file 6. The file is uploaded successfully
Postconditions: The file of excuse letter is uploaded in the system
Alternative flow 1: Alternate. Reupload / Choose another file 1. The file could not be uploaded
Postconditions: The file of excuse letter is uploaded in the system
Exception flow (if any):

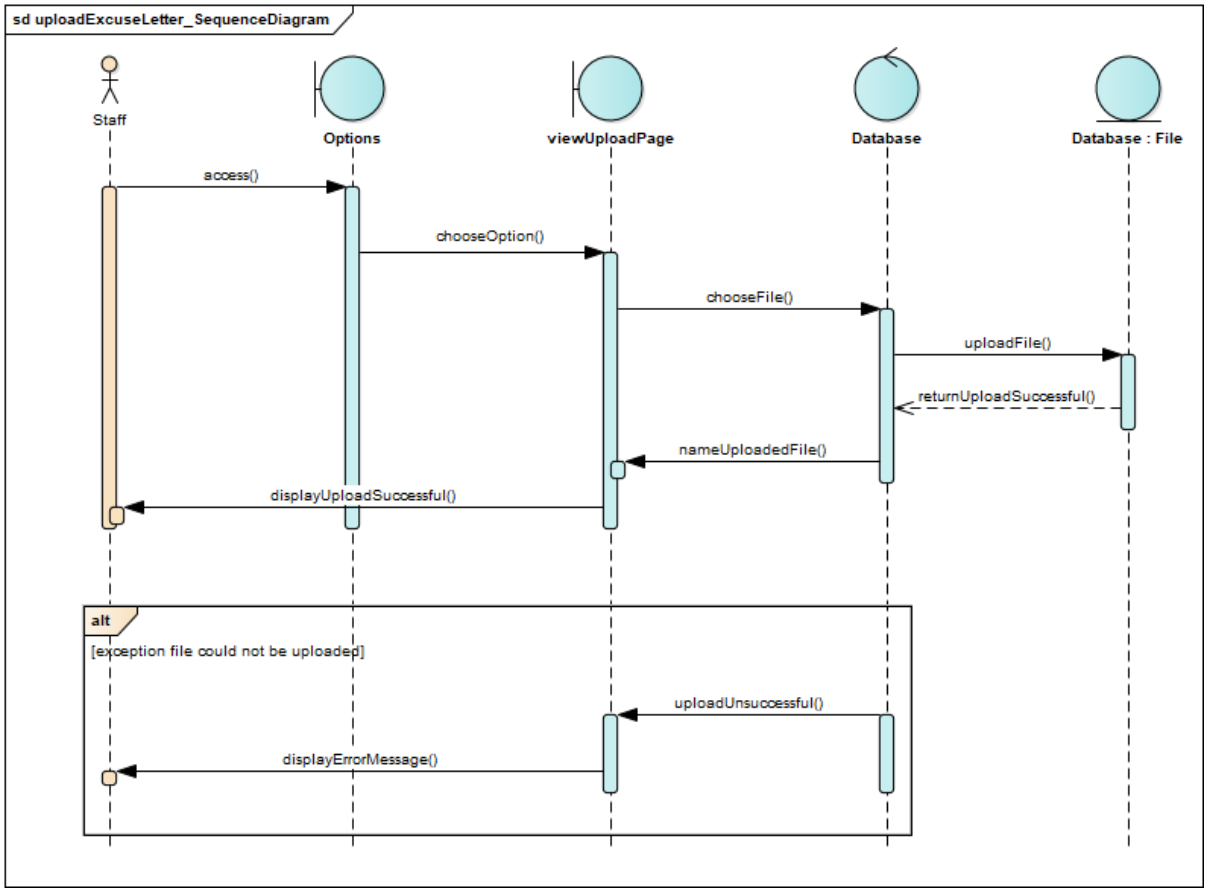

Figure 2.8: Sequence Diagram for uploadExcuseLetter

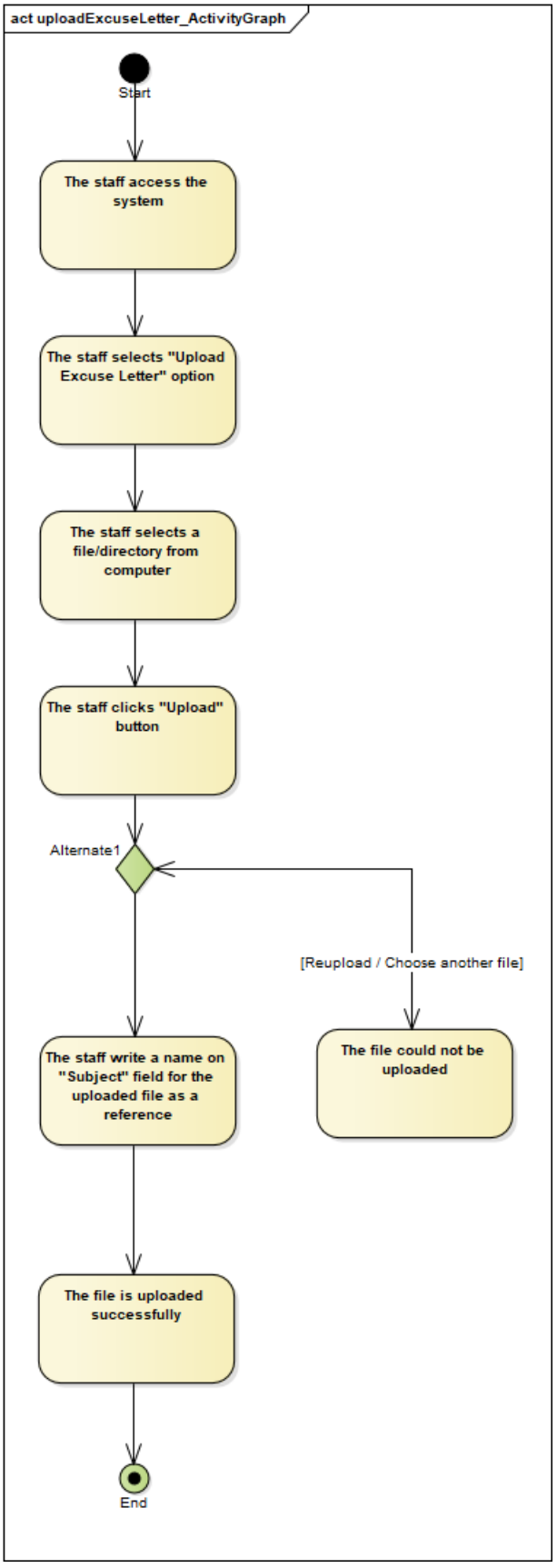

Figure 2.9: Activity Diagram for uploadExcuseLetter

2.2.4 UC004: Use Case requestAttendanceSummary

Table 2.4: Use Case Description for requestAttendanceSummary

Use case: requestAttendanceSummary
ID: UC004
Actors: Staff
Preconditions: Access the system
Flow of events: Basic Path. Basic Path 1. The staff access the system Uses: 2. The staff select the request attendance summary option Uses: 3. The staff choose month Uses: 4. System display the attendance summary Uses: Alternate: 4a. Choose another available month
Postconditions: View the attendance summary
Alternative flow 1: Alternate. Choose another available month 1. system display error message Uses:
Postconditions: View the attendance summary
Exception flow (if any):

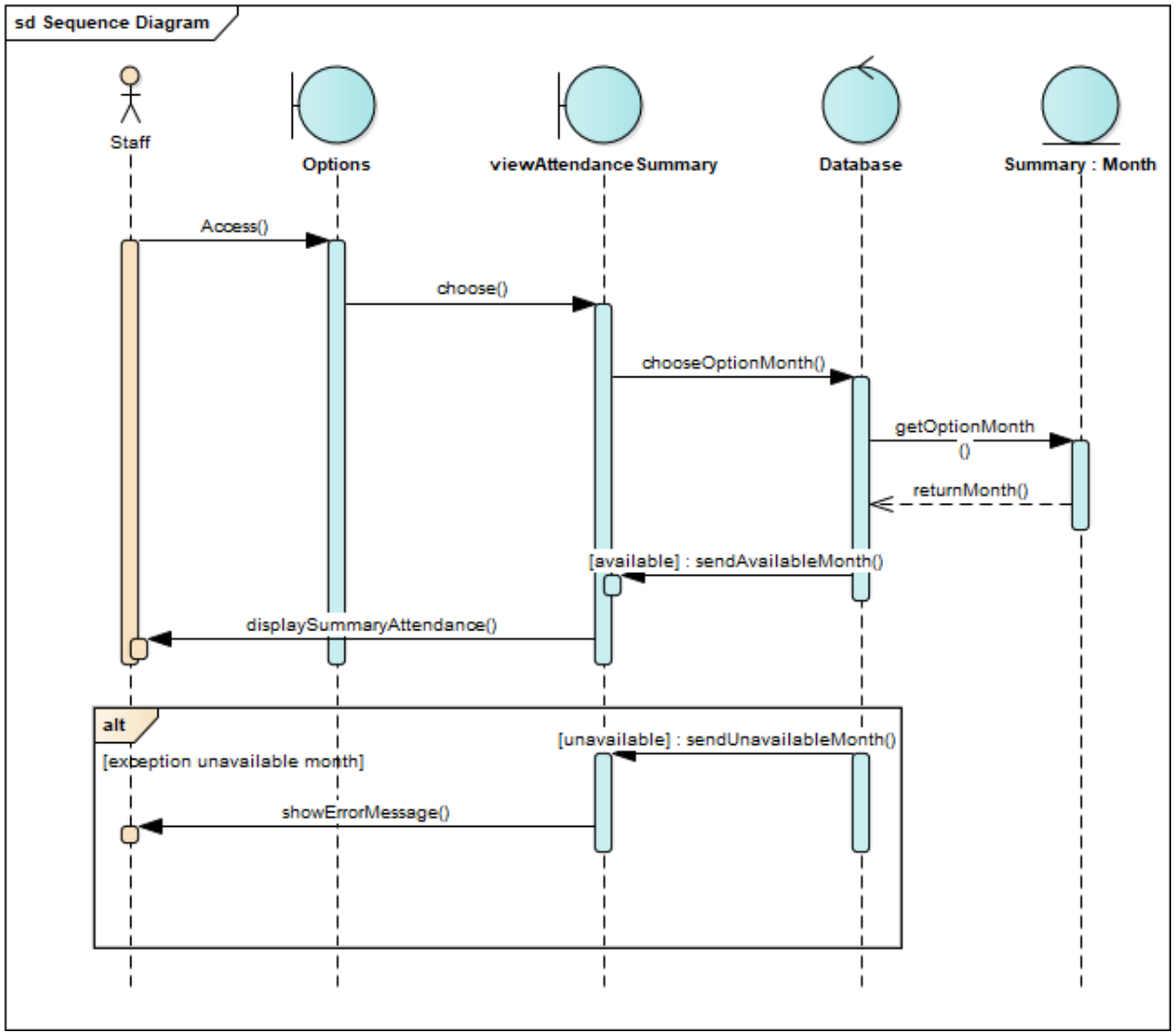

Figure 2.10: Sequence Diagram for requestAttendanceSummary

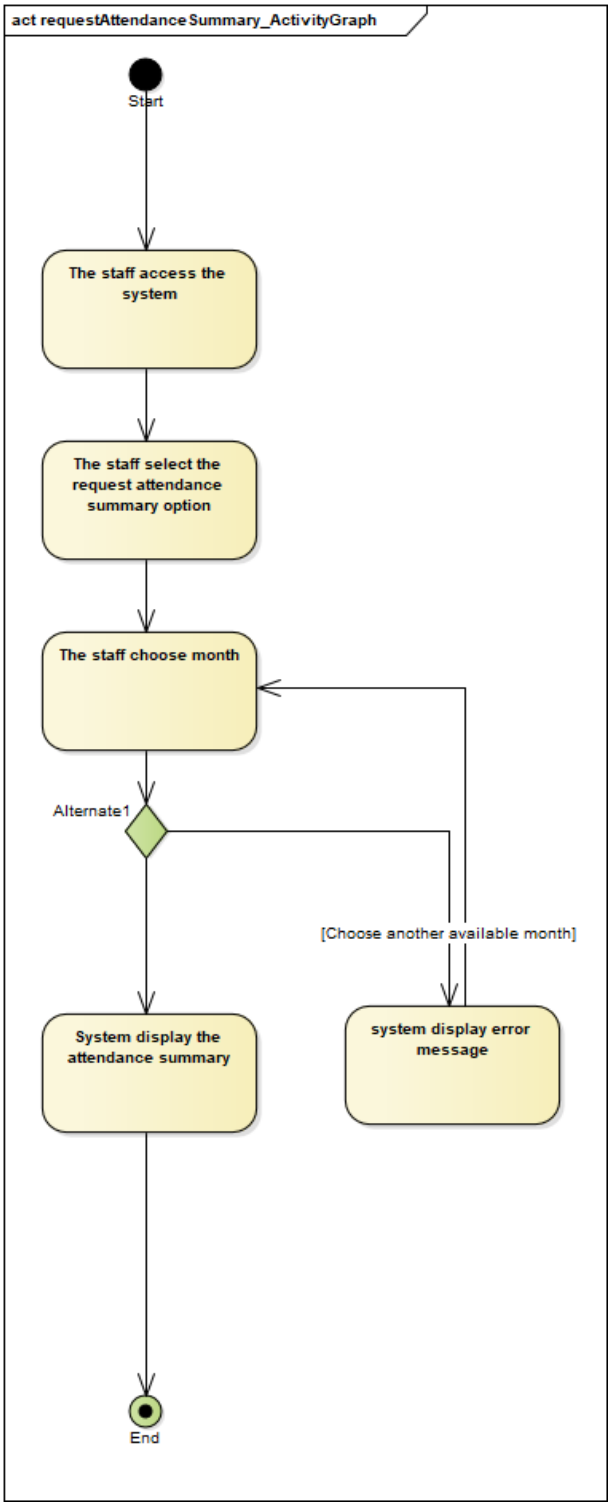

Figure 2.11: Activity Diagram for requestAttendanceSummary

2.2.5 **UC005: Use Case viewReport**

Table 2.5: Use Case Description for viewReport

Use case: viewReport
ID: UC005
Actors: Principal
Preconditions: Access the system
Flow of events: Basic Path. Basic Path 1. The principal will access the system. 2. The system will display a menu page. 3. The principal will select the attendance report option. 4. The principal will choose which month of attendance report 5. The system will display attendance reports for the chosen month.
Postconditions: View the attendance summary
Alternative flow 1: Alternate. Choose another available month 1. system display error message Uses:
Postconditions: The system displays an attendance report.
Exception flow (if any):

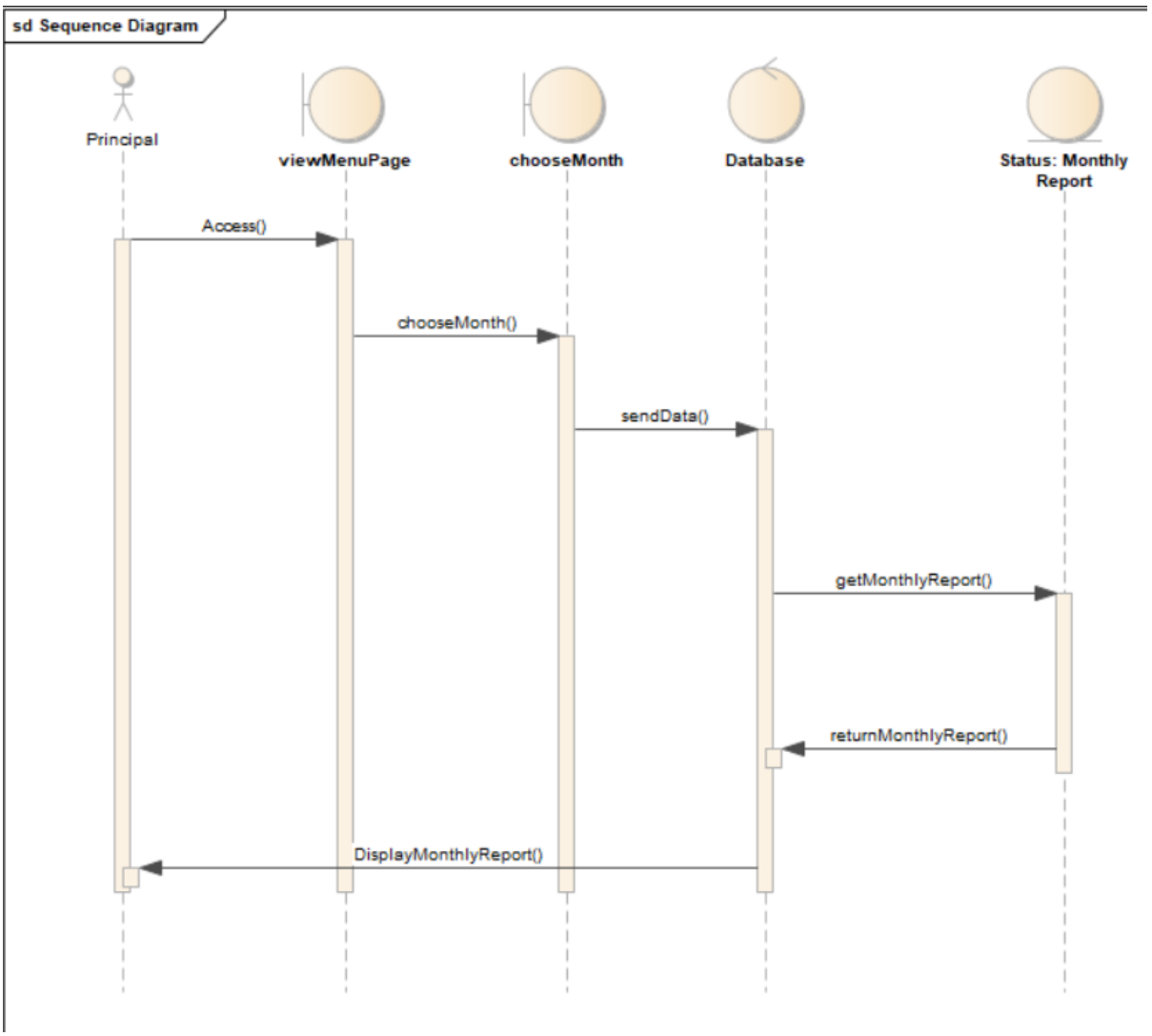

Figure 2.12: Sequence Diagram for viewReport

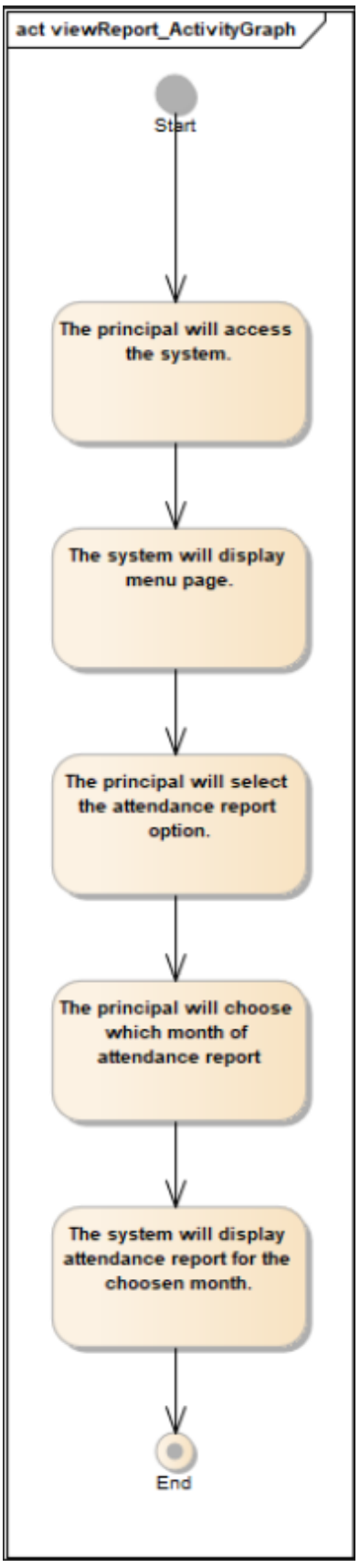

Figure 2.13: Activity Diagram for viewReport

2.2.6 UC006: Use Case notifyStaff

Table 2.6: Use Case Description for notifyStaff

Use case: notifyStaff
ID: UC006
Actors:Clerk
Preconditions:Access the system
Flow of events: 1.User access main page 2.System display all available option 3.User select "Notify Staff" option 4.System show the available list of staff to be notified 5.User select staff to be notified 6.System display message "Notify the staff?" 7.User select the "yes" option 8.System sends the notification to the staff
Postconditions: Notify the staff
Alternative flow 1: System display message "No staff to be notified"
Postconditions: Notify the staff
Exception flow (if any):

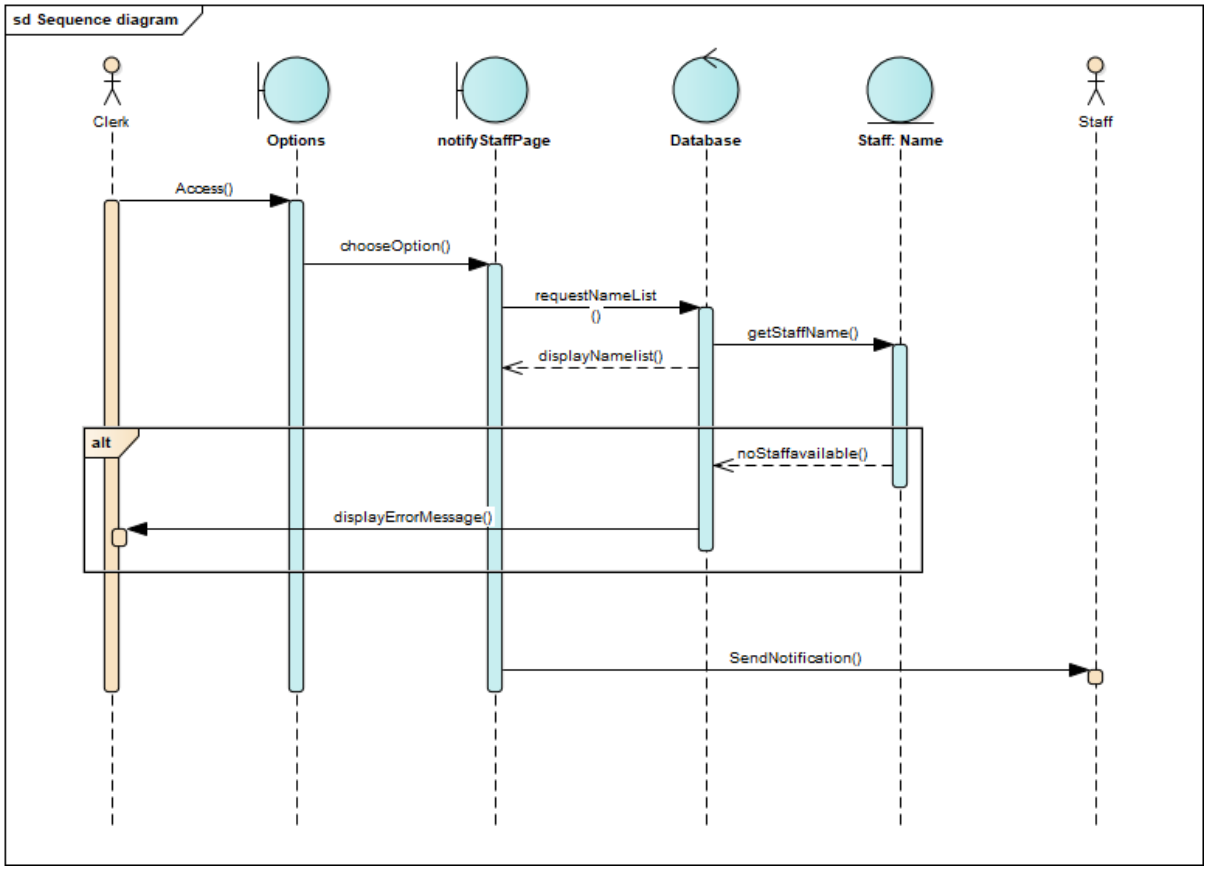

Figure 2.14: Sequence Diagram for notifyStaff

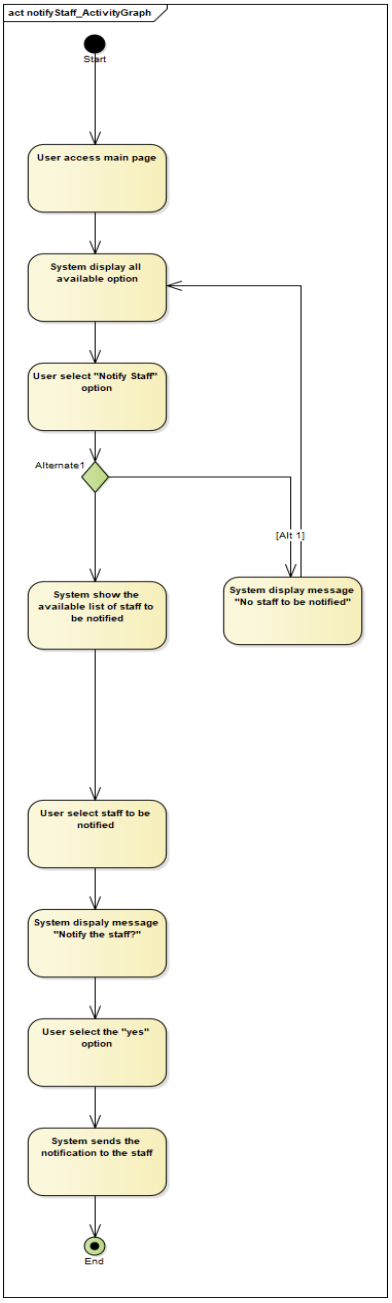

Figure 2.15: Activity Diagram for notifyStaff

2.2.7 UC007: Use Case generateReport

Table 2.7: Use Case Description for generateReport

Use case: generateReport
ID: UC007
Actors: Clerk
Preconditions: Access the system
Flow of events: 1.User access the system 2.System display menu option 3.User select generate report opinion 4.System display report summary range option 5.User select “for this month” option 6.System display view mode for the report 7.User select “Generate Report” 8.System generate report
Postconditions: Report generated
Alternative flow 1:
Postconditions: Report generated
Exception flow (if any):

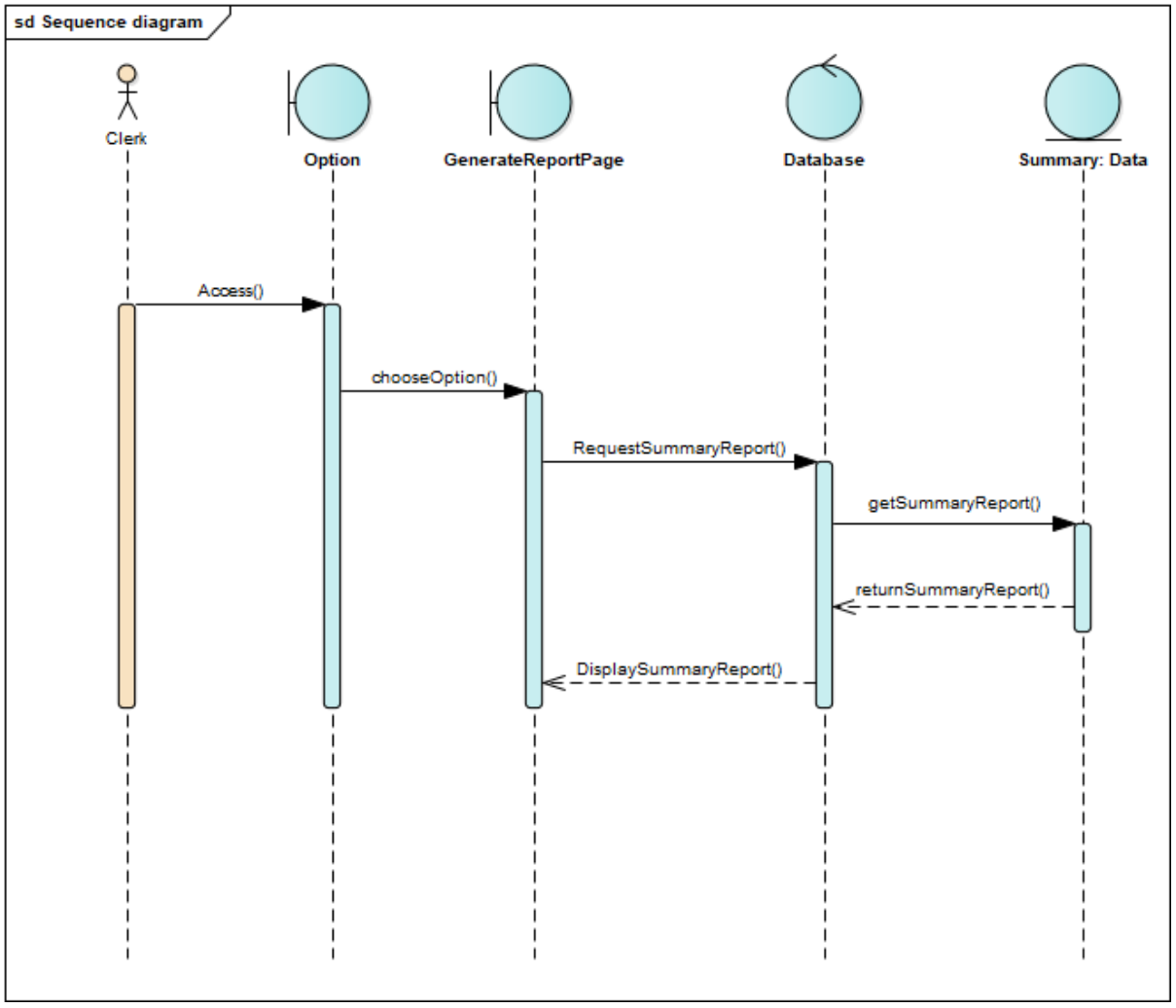

Figure 2.16: Sequence Diagram for generateReport

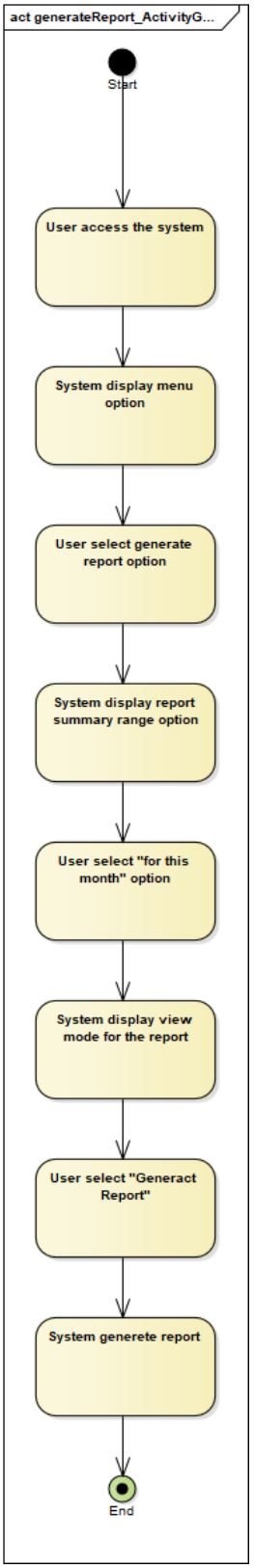

Figure 2.17: Activity Diagram for generateReport

2.2.8 UC008: Use Case filterSearch

Table 2.8: Use Case Description for filterSearch

Use case: filterSearch
ID: UC008
Actors: Clerk
Preconditions: Access the system
Flow of events: Basic Path. Basic Path 1. Access the system 2. The clerk chooses filter search on the attendance report option 3. The clerk chooses the category to access Alternate: 3a. Alternate path 4. The system displays the list of teachers
Postconditions: The attendance report is being accessed easily
Alternative flow 1: Alternate. Alternate path 1. The system displays no matching search
Postconditions: The attendance report is being accessed easily
Exception flow (if any):

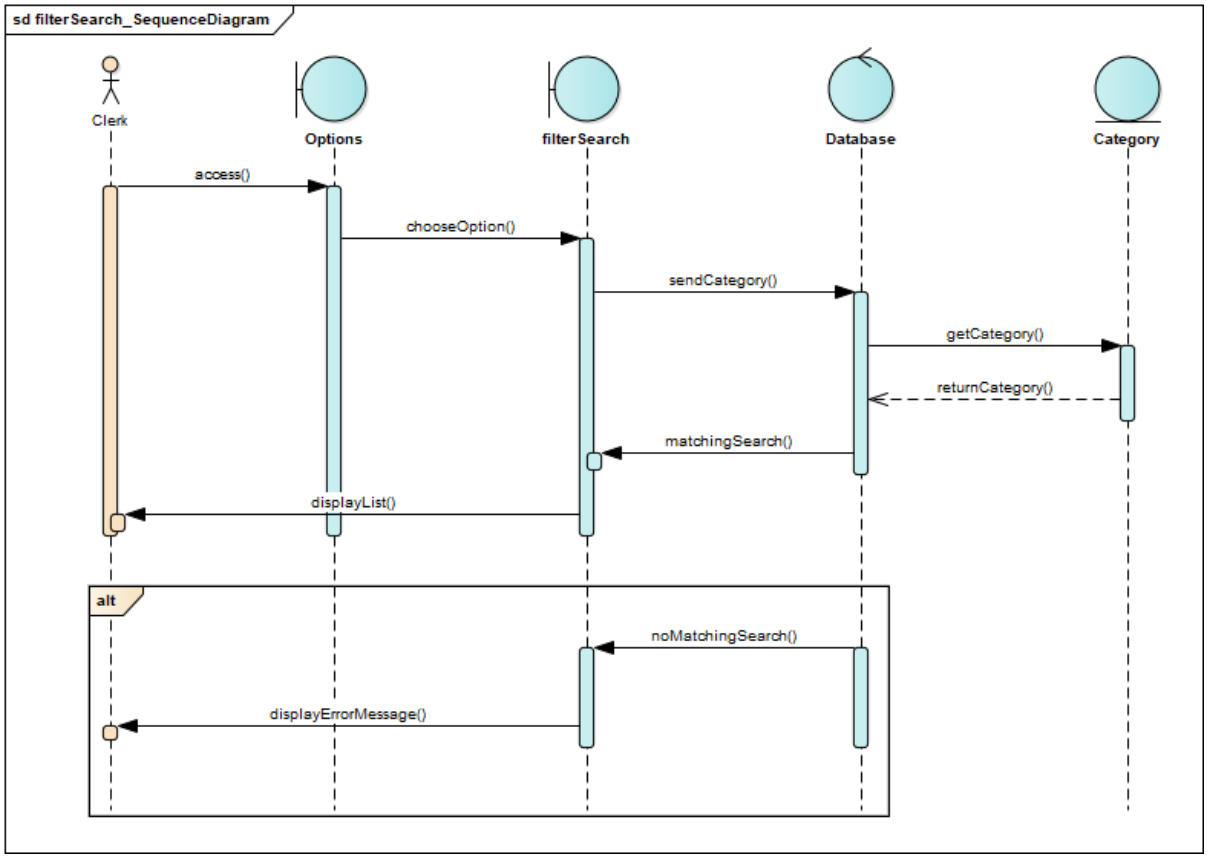

Figure 2.18: Sequence Diagram for filterSearch

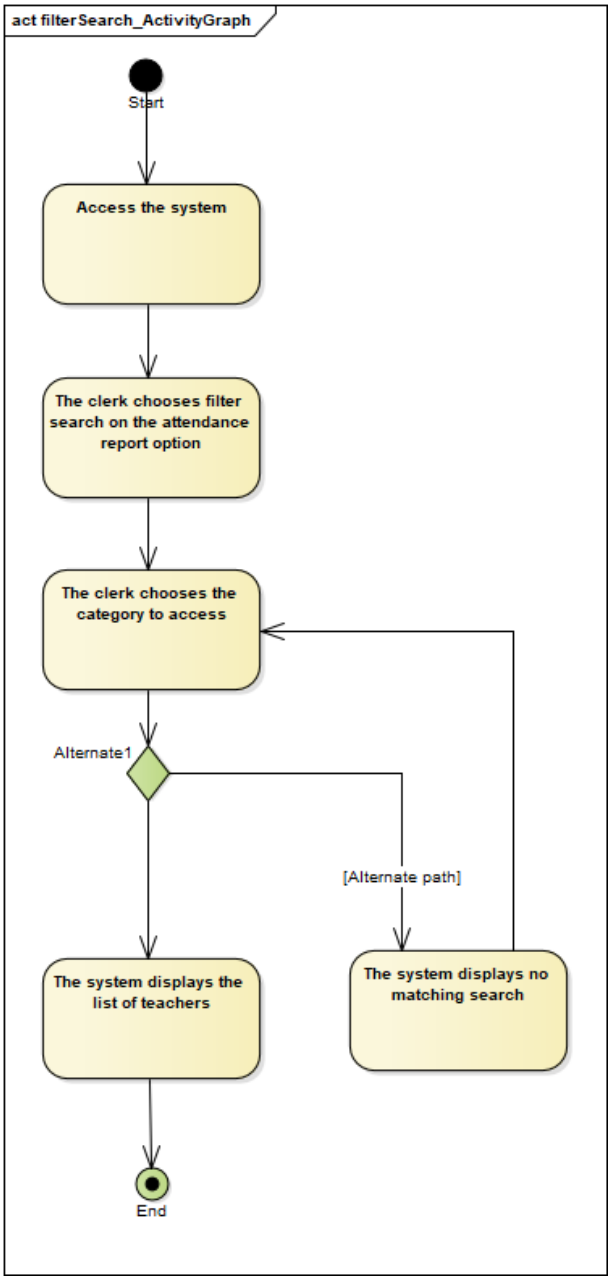

Figure 2.19: Activity Diagram for filterSearch

2.2.9 UC009: Use Case modifyStaffDetails

Table 2.9: Use Case Description for modifyStaffDetails

Use case: modifyStaffDetails
ID: UC009
Actors: Clerk
Preconditions: Access the system
Flow of events: Basic Path. Basic Path 1. The clerk access the system Uses: 2. The clerk choose modify staff details option Uses: 3. The clerk search for which staff details to update Uses: 4. System display current staff details Uses: Alternate: 4a.No matching search 5. Update the information name, date, phone, etc Uses: 6. System display new staff details Uses:
Postconditions: Updated staff details
Alternative flow 1: No matching search
Postconditions: Updated staff details
Exception flow (if any):

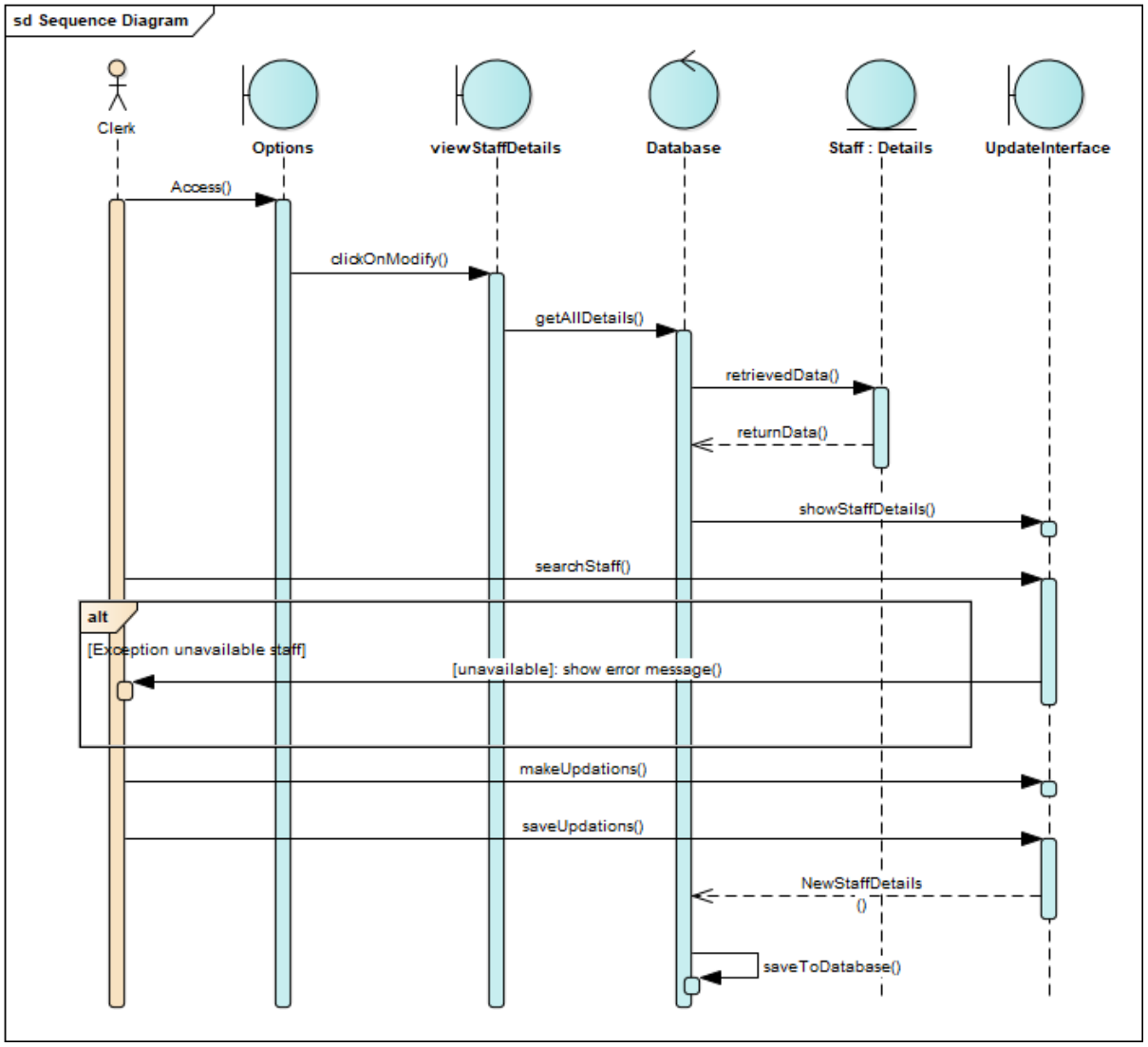

Figure 2.20: Sequence Diagram for modifyStaffDetails

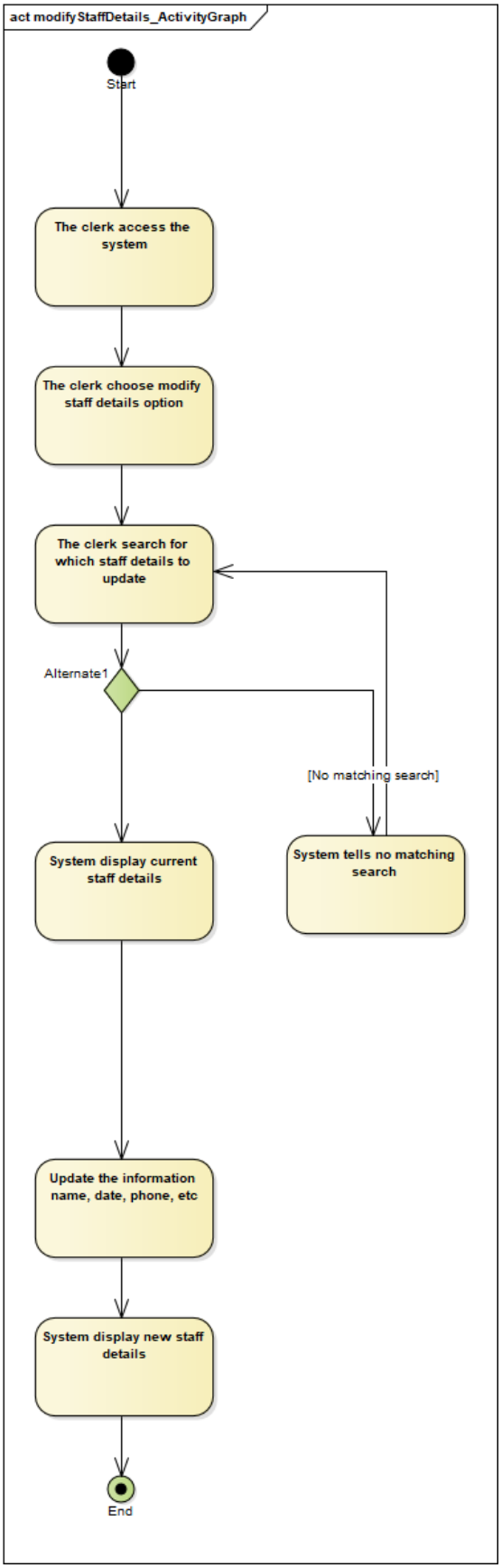

Figure 2.21: Activity Diagram for modifyStaffDetails

2.2.10 **UC010: Use Case maintainSystem**

Table 2.10: Use Case Description for maintainSystem

Use case: maintainSystem
ID: UC010
Actors: Technician
Preconditions: received bug complain from user
Flow of events: Basic Path. Basic Path 1. The user report bug of the system Uses: 2. The technician verifies the problem Uses: 3. The technician fixing the problem Uses: 4. The system update with new data Uses:
Postconditions: provide solution
Alternative flow :
Postconditions:
Exception flow (if any):

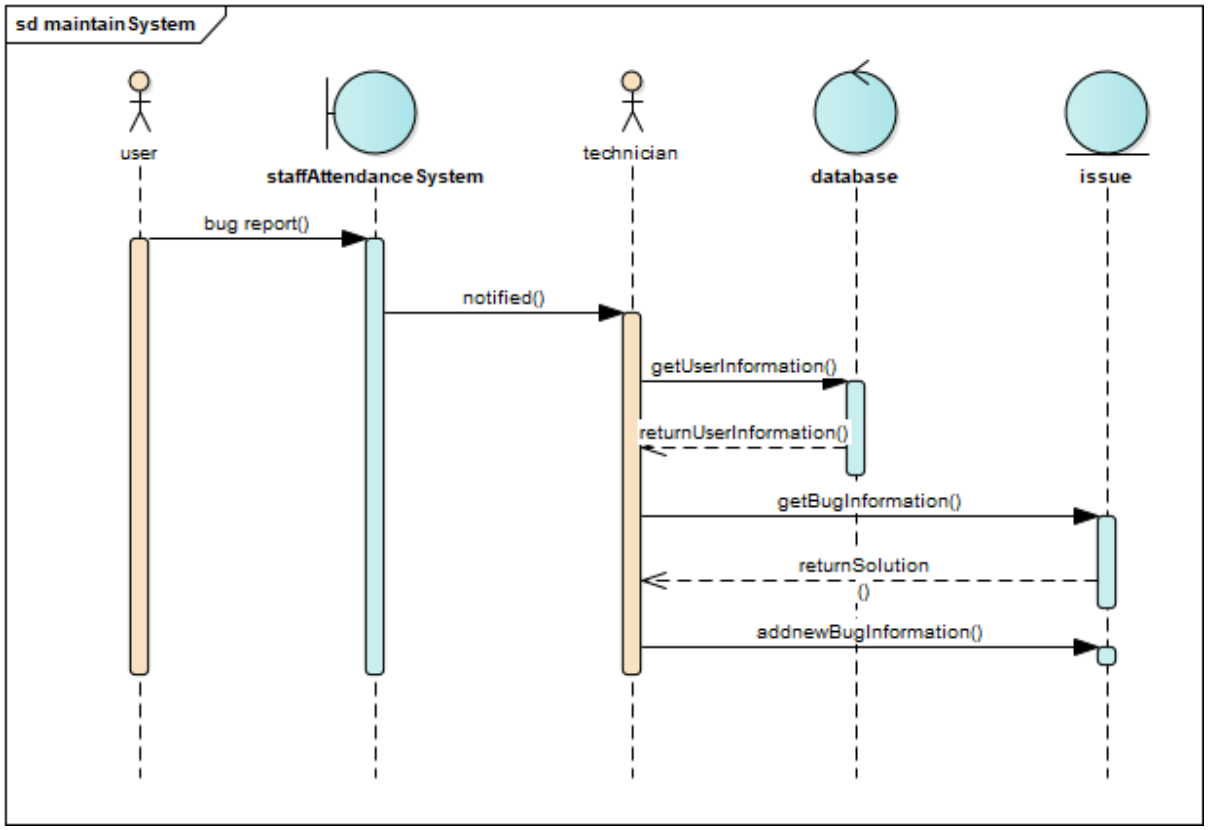

Figure 2.22: Sequence Diagram for maintainSystem

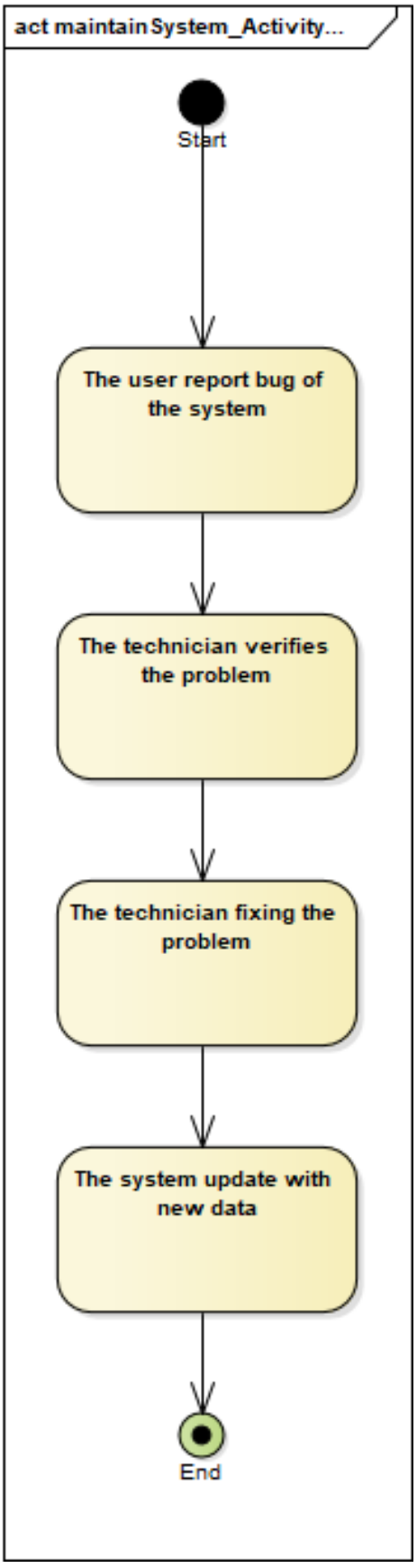

Figure 2.23: Activity Diagram for maintainSystem

2.3 Performance Requirements

The system should be able to scan and register the user fingerprint within 2 seconds and be able to load any task within 5 seconds. The system should be able to give an accurate time when scanning for attendance and be able to provide accurate and organized data of attendance records. The system should restrict access for each level of management and scan attendance for registered users only.

2.4 Design Constraints

This system is accessible over the internet and is best viewed on computers or laptops. Because it is not designed as an application, anyone with an internet browser can use it. It should be noted that the arrangement of each design will vary depending on the device utilized by the user. The color, font size, and purpose are all the same, after all.

2.5 Software System Attributes

To ensure that it is acceptable for educational purposes, the system must be minimalist. Furthermore, the system must take into account users over the age of 50 and ensure that it is not difficult to learn.

2.6 Other Requirements

Requirement	Condition	Description
Adaptability	System can be accessed in any browser	The whole system must be adaptable to any web browser.
Flexibility	System web pages	Users can access any of the web pages available without condition.
Security	Fingerprint	The user fingerprint must be highly correct since it is the core of this attendance system.
Maintainability	Loading page error	Whenever the system has an error such as cannot load the pages, the technicians will troubleshoot the problems.
satisfactions	User design satisfactions	The system must have a good interface that is suitable for target user age.
Reliability	Error-free	The system must not have any error that will prevent the system from working correctly.
Reusability	Data generated	The report generated by the clerk can be used repeatedly unless it is deleted from the database.
Usability	Files are available to download	The data and any important files that need to be saved on other platforms are available to download.