INF2001
Introduction to Software Engineering

SINGAPORE INSTITUTE OF TECHNOLOGY

Milestone 2:

Software Design Specifications

for

Musikee School

Prepared by: P11, Team 3

Team's Name: ***Agile Avengers***

Clement Wu	**2200480**
Gabriel Chen Hong	**2200592**
Muhammad Taufiq Bin Ismail	**2200653**
Muhammad Farhan Bin Ismail	**2200526**
Jason Yeo Joon Kiat	**2000475**
Khairul Nizam Bin Abdul Rashid	**2201088**

Lab Group: P11-3

Github handle: *INF2001*

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1 Introduction

<Provide a brief introduction to your project, the intended purpose of the project, the impact of the project, and a brief overview of what the reader will find in this section. You can use the concise project description you have created to identify your nouns for your problem statement as a starting point and expand from there.>

1.1 Product Scope Changes

*<Provide a short description of the **changes in** software scope (Compared to M1)*
TO DO: 1-2 paragraphs describing the **change in** scope of the product.

In comparison to M1's report, the team has made changes to the specifications and updated it in 2 main aspects. Firstly, software safety requirements were updated for non-functional requirements 14 to 18 respectively. Previously, the feedback that was stated in the M1 report highlighted the need for a third person's perspective from the system's standpoint when stating the requirements. Therefore, the team has obliged and rewritten the requirements specifications for the 5 requirements. Please refer to Section 2 for more details.

We have also improved and clarified our use case descriptions for the project. Previously, the use case descriptions were not well written in general, specifically the main success scenarios and the alternative scenarios. The team has rewritten all 16 of the use case descriptions, including extra details to provide more clarity on each of the use cases to aid in our creation of the diagrams required for the M2 submission. In terms of diagrams, the Component Diagram, the UML Class Diagram, and the Sequence Diagrams were done up and amended for the M2 submission.

2 Changes in Requirements

*<Only include the **new** and **changes** to requirements from M1 (including requirements you have removed). If the requirements affect your use case diagram, include your updated use case diagram in this section and your updated use case descriptions in the appendix.*

Please describe all changes and new additions. >

1. Amendment was made to the Use Case Description (Refer to 5 Appendix A - Updated Use Case Descriptions), use case diagrams remained unchanged.

2. Amendment was made to the Non-functional Requirement specifically the sub section on Safety & Security Requirements

   New:

   - NFR14: The system shall utilize AES-128 encryption for all transmitted and received data.
   - NFR15: The system shall ensure that the creation and deletion of user accounts are exclusively carried out by IT administrators.
   - NFR16: The system must handle data pertaining to teachers, managers, and students in compliance with the Personal Data Protection Act (PDPA).
   - NFR17: The system shall employ SHA-3 encryption for all data related to IT administrators, teachers, managers, and students stored in the database.
   - NFR18: The system must mask the initial four digits of the National Registration Identity Card (NRIC), e.g., XXXX431H.

3 Software Design

*<Describe and justify your design and concept rationale. Include your **class diagram** to have your complete entity, control and boundary classes. If your class diagram is too big, include only the interesting classes in this section, you can put your complete Class Diagram in Annex 6>*

3.1 UML Class Diagram

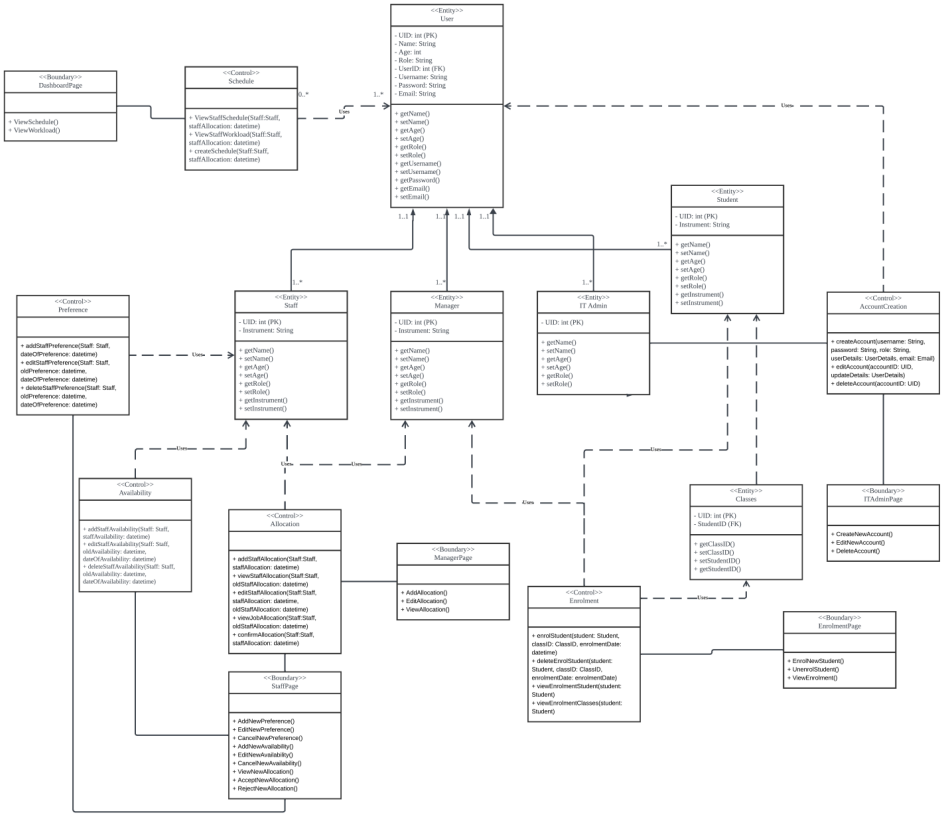

Figure 1 - Overall UML Class Diagram

Description of the UML Diagram:

The UML class diagram represents the system's architectural blueprint, displaying different entities alongside their attributes, operations, and the relationships between them. The diagram focuses on the static structure of the system. It comprises of components such as:

Entities: These include User, Student, Manager, IT Admin, and Staff. Each entity has attributes such as UID, Name, Age, and respective operations or methods.

Boundary Elements: Represents the interfaces of the system, such as DashboardPage, Enrollment, and StaffPage.

Control Elements: Handles specific system tasks like Schedule, Preference, Availability, and Account Creation.

These 3 elements will make up the ECB (Entity-Control-Boundary) Model and also plays into the MVC (Model-View-Control) Model as well. These models ensures that each entity does its own functions such as the boundary entity being the class to display the pages while the control entity handles the backend logic.

Justification for the Creation of the UML Diagram:

Visualization: The class UML diagram provides a clear visual representation of the system's structure, which allows the client to understand system's design without understanding or looking into the code.

Improved Communication: The diagram helps to ease communication among team members and between the technical team and non-technical clients. This ensures that everyone has a unified understanding of the system's design and functionality.

Design Efficiency: Before performing the actual coding, the diagram serves as a blueprint. This design effort can help identify potential issues or inefficiencies, which allows them to be addressed early in the software development cycle, reducing potential extra costs.

Documentation: The diagram also acts as a reference document. New team members or clients can refer to the diagram to understand the system's architecture, speeding up onboarding processes and facilitating maintenance tasks.

Enhances Problem Solving: By externalizing the system's architecture visually, potential problems or areas of improvement become more evident. This proactive identification can save time and resources.

3.1.1 Interesting Classes In UML

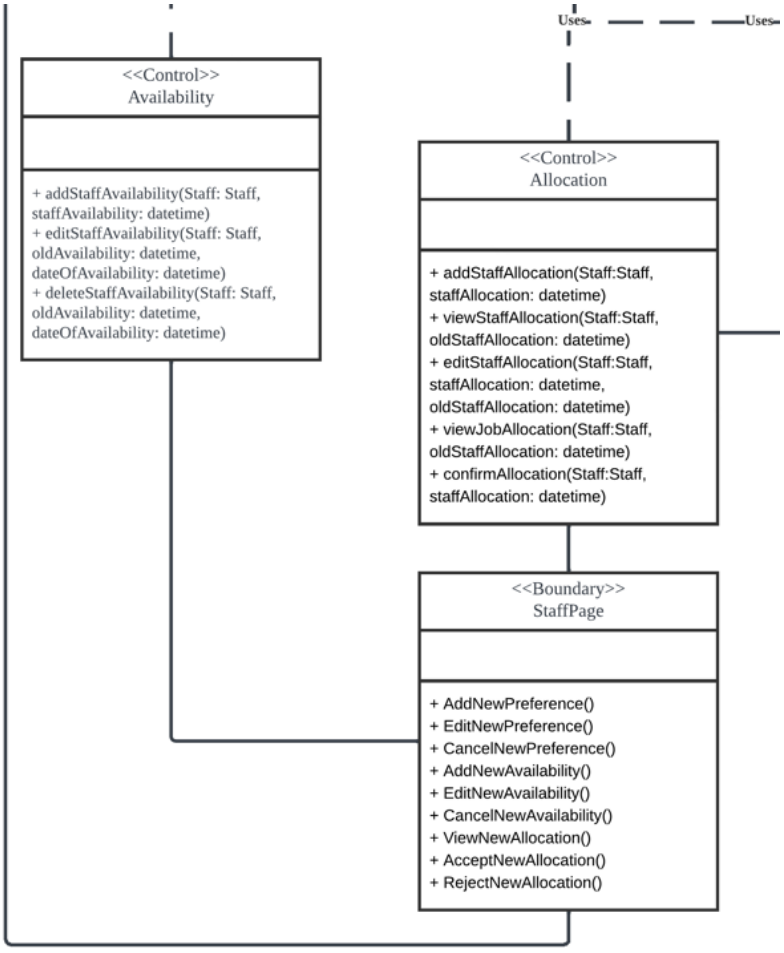

Figure 2 – Snapshot of Class Diagram showing StaffPage Boundary, Allocation Control and Availability Control Classes

Inside the diagram, the StaffPage boundary component contains two control entities: Allocation and Availability. The StaffPage is then tasked with calling and managing these two control entities to streamline their functionalities.

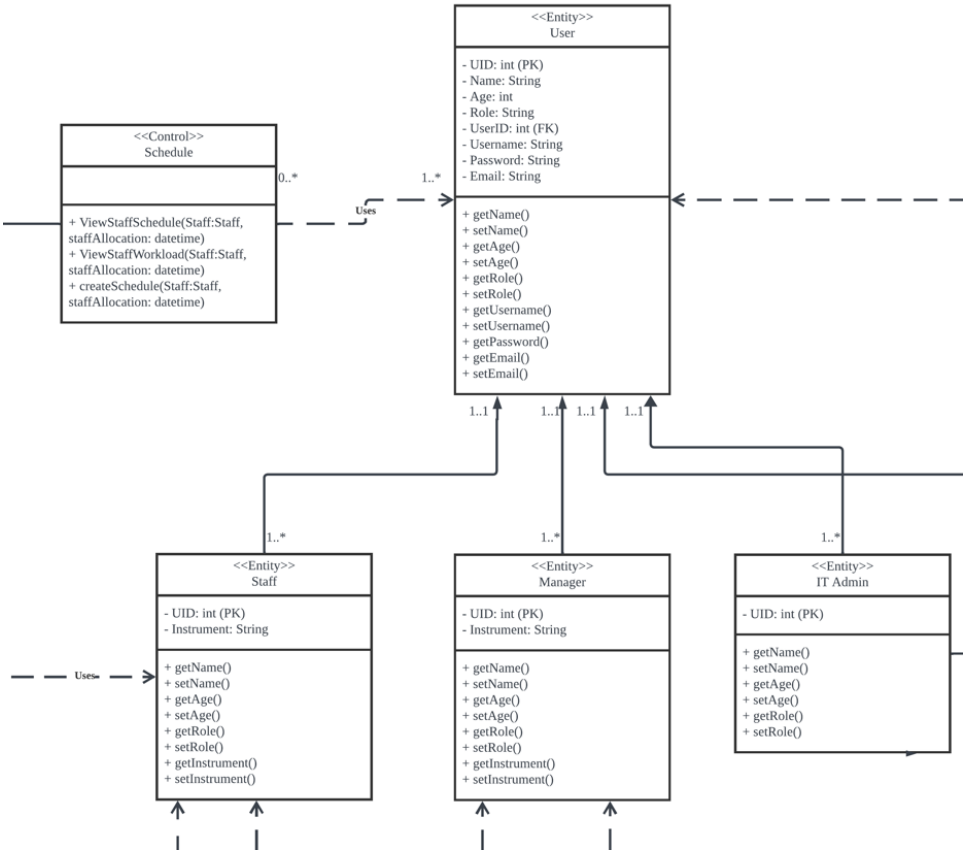

Figure 3 – Snapshot of Class Diagram showing classes related to User Entity

The User entity class demonstrates object-oriented principles. It demonstrates inheritance by acting as a parent class to three subclasses: Staff, Manager, and IT Administrator. This hierarchical structure allows for the efficient sharing of common attributes and methods, while also facilitating specialization for each user role.

3.2 Component Diagram

*You should use the **component diagram** to illustrate how the overall design of certain parts of the project comes together as one.>*

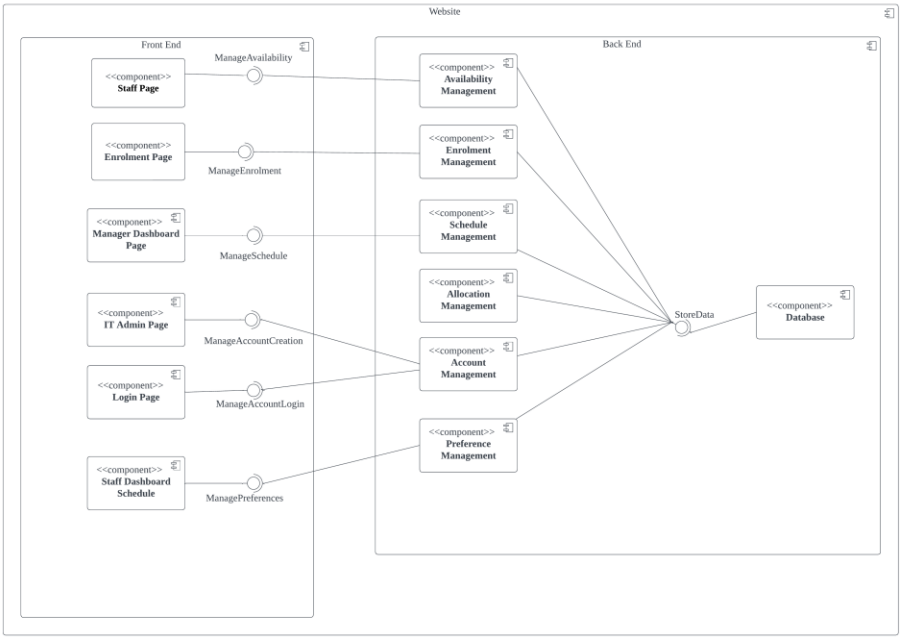

Figure 4 – Overall Component Diagram

The team has made use of the component diagram as it helps to facilitates the integration of the entire project as one. Firstly, the system provides different dashboards tailored to specific roles - Staff, Manager, IT Admin, and the Staff where appropriate front facing interfaces will be displayed to the users based on their various roles. We have also designed the system for intuitive data flow. For instance, when a staff updates their availability via the availability management, it feeds into the 'Availability Management' component, which thus then stores the data into the database itself. This data can then be accessed by the 'Schedule Management' component to adjust schedules accordingly.

Database centralization was also done where all the data would be stored in a share central database, which ensures consistency, reliability, and the ability to scale as the user base grows. This would then play into the 'StoreData' component where every action, be it managing availability, enrolling courses, or adjust schedules, would make use of the 'StoreData' component. This then plays back into the central database where it ensures the latest information is available across all staff working in Musikee.

Taking into consideration that the school has plans to expand the company' business, new components can be added without disrupting the existing architecture. For example, if in the future there's a need to introduce a module for special music workshops or masterclasses, it can be integrated effortlessly as each component, from 'AvailabilityManagement' to 'PreferenceManagement', is

designed to function autonomously while integrating seamlessly with others. This modularity not only simplifies debugging and maintenance but also allows for scalable expansions.

If you cannot view the component diagram here, kindly check the file “Diagrams.pdf” in the submission folder

3.3 Sequence Diagram

*<Include **2 sequence diagrams** to explain the flow of your **2 prominent use cases**. Remember to add them with your explanation.>*

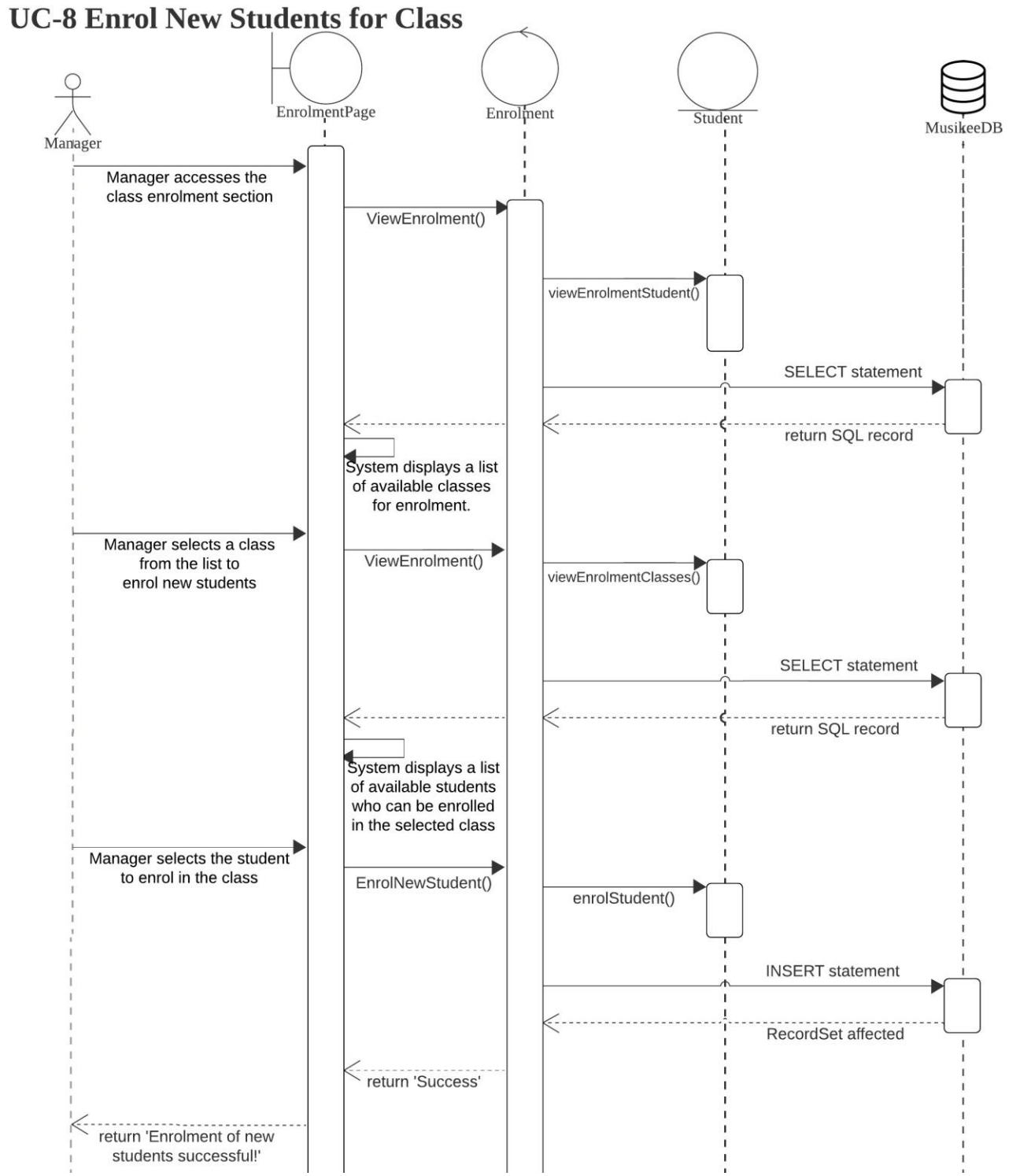

Figure 5 – Sequence Diagram for UC-8 Main Flow

In the "UC-8 Enrol New Students for Class" sequence diagram, the communication and flow of information between the system components are depicted through a series of significant messages. The initial interaction begins when the Manager accesses the enrollment section, sending a ViewEnrolment() message to the Enrolment control. This message prompts the system to retrieve a list of available classes for enrollment from the MusikeeDB database, subsequently displaying them on the EnrolmentPage. This two-step data flow is highlighted by the subsequent SQL SELECT statement, resulting in the message: "System displays a list of available classes for enrollment."

Once a specific class is selected by the Manager, another ViewEnrolment() message is sent to the system. This prompts the retrieval and display of a roster of students who are available to be enrolled in the chosen class. This is evidenced by the following SQL SELECT statement. The outcome is articulated by the message: "System displays a list of available students who can be enrolled in the selected class."

The enrollment action itself is marked by the EnrolNewStudent() message from the EnrolmentPage to the Enrolment control. This instigates an SQL INSERT statement into the MusikeeDB, symbolizing the actual addition of a student to the class. The successful culmination of this action results in the feedback message: "return 'Success'".

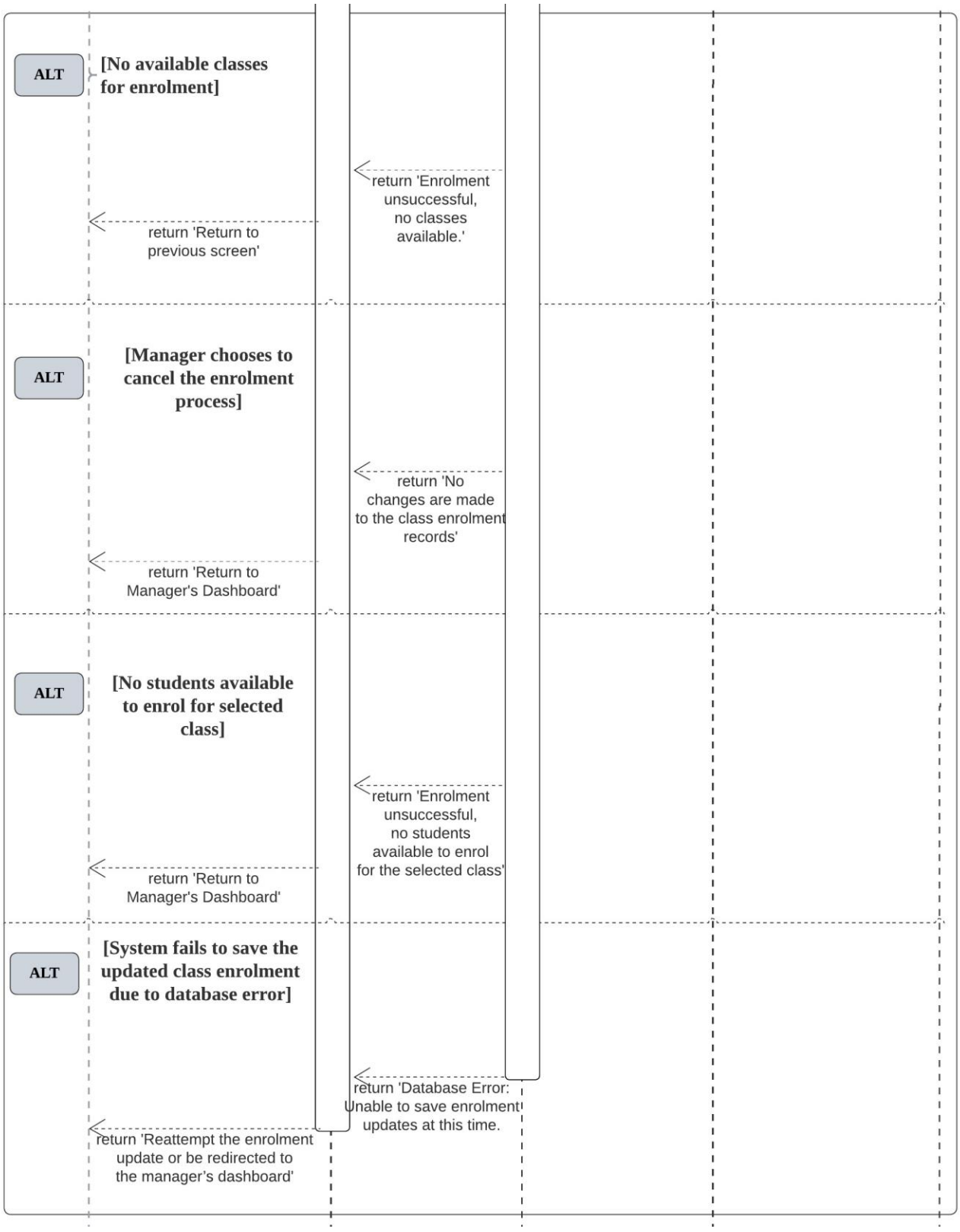

Figure 6 – Sequence Diagram for UC-8 Alternate Flow

However, the sequence diagram also highlights possible alternative paths, each with its distinct messages. For instances where no classes are available for enrollment, the system communicates the message: "return 'Enrollment unsuccessful, no classes available.'" Similarly, if there are no students available for the selected class, the conveyed message reads: "return 'Enrollment unsuccessful, no students available to enroll for the selected class.'" Moreover, should the system encounter any database error during the enrollment update, a critical message is displayed: "return 'Database Error: Unable to save enrollment updates at this time.'"

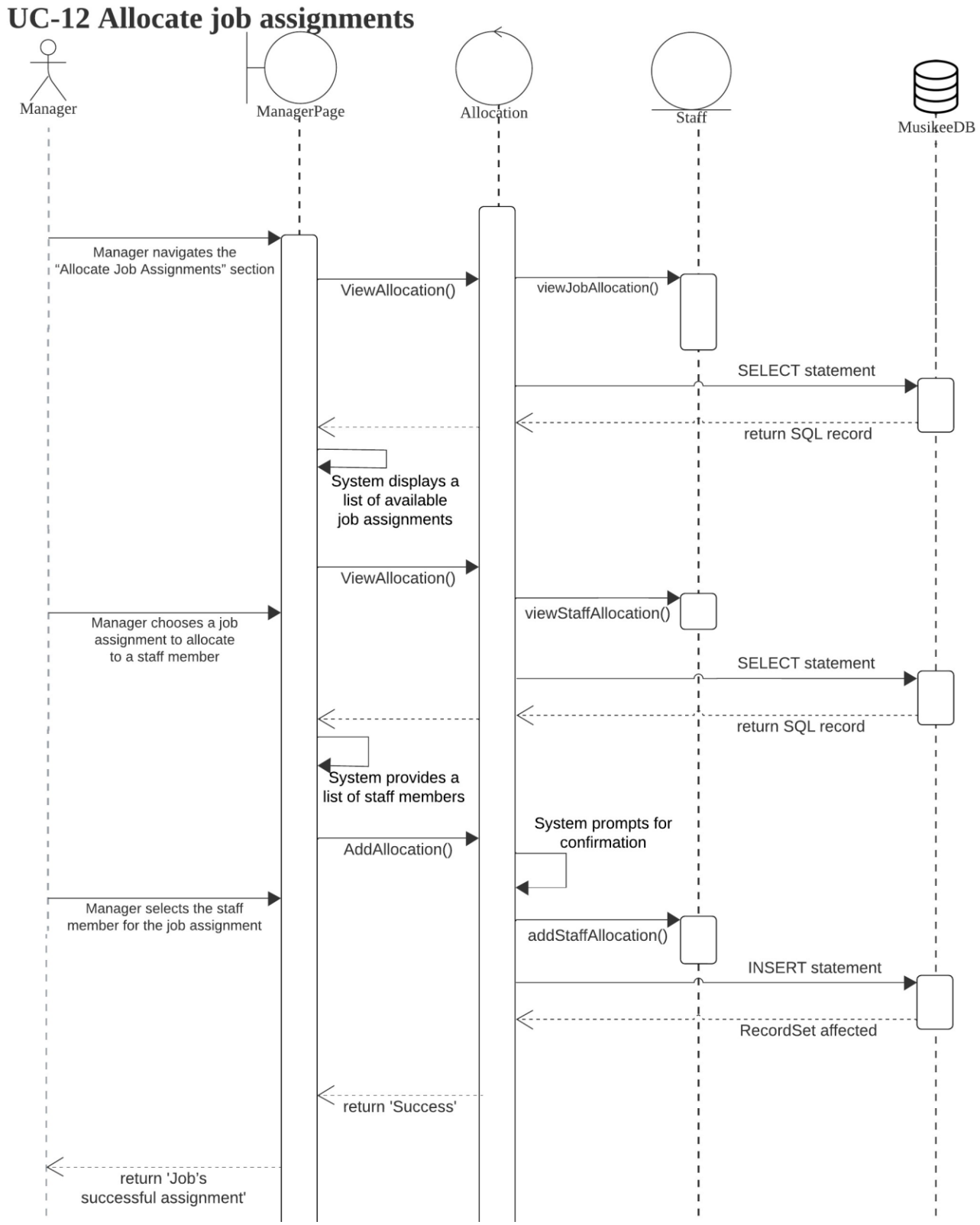

Figure 7 – Sequence Diagram for UC-12 Main Flow

The "Allocate Job Assignments" functionality, denoted as UC-12, facilitates the assignment of specific jobs to staff members by a Manager. The process is initiated when a Manager navigates to the "Allocate Job Assignments" section within the ManagerPage. Upon selection, the system triggers the ViewAllocation() operation, leading the Allocation component to retrieve available job assignments through the viewJobAllocation() message. This action communicates with the database, MusikeeDB, via an SQL SELECT. As a result, the system displays a list of available job assignments for the Manager.

The Manager then selects a desired job assignment for allocation and proceeds to choose a specific staff member. This action prompts the system to retrieve a list of available staff members via the viewStaffAllocation() message, which also communicates with the MusikeeDB using another SQL SELECT statement. Once the Manager has made a selection, they proceed to the AddAllocation() phase, where the system seeks confirmation before finalizing the job assignment. After the Manager's confirmation, the addStaffAllocation() message is dispatched, leading to the database interaction through the SQL INSERT statement. Following a successful database update, the system provides feedback to the Manager, indicating a successful job assignment.

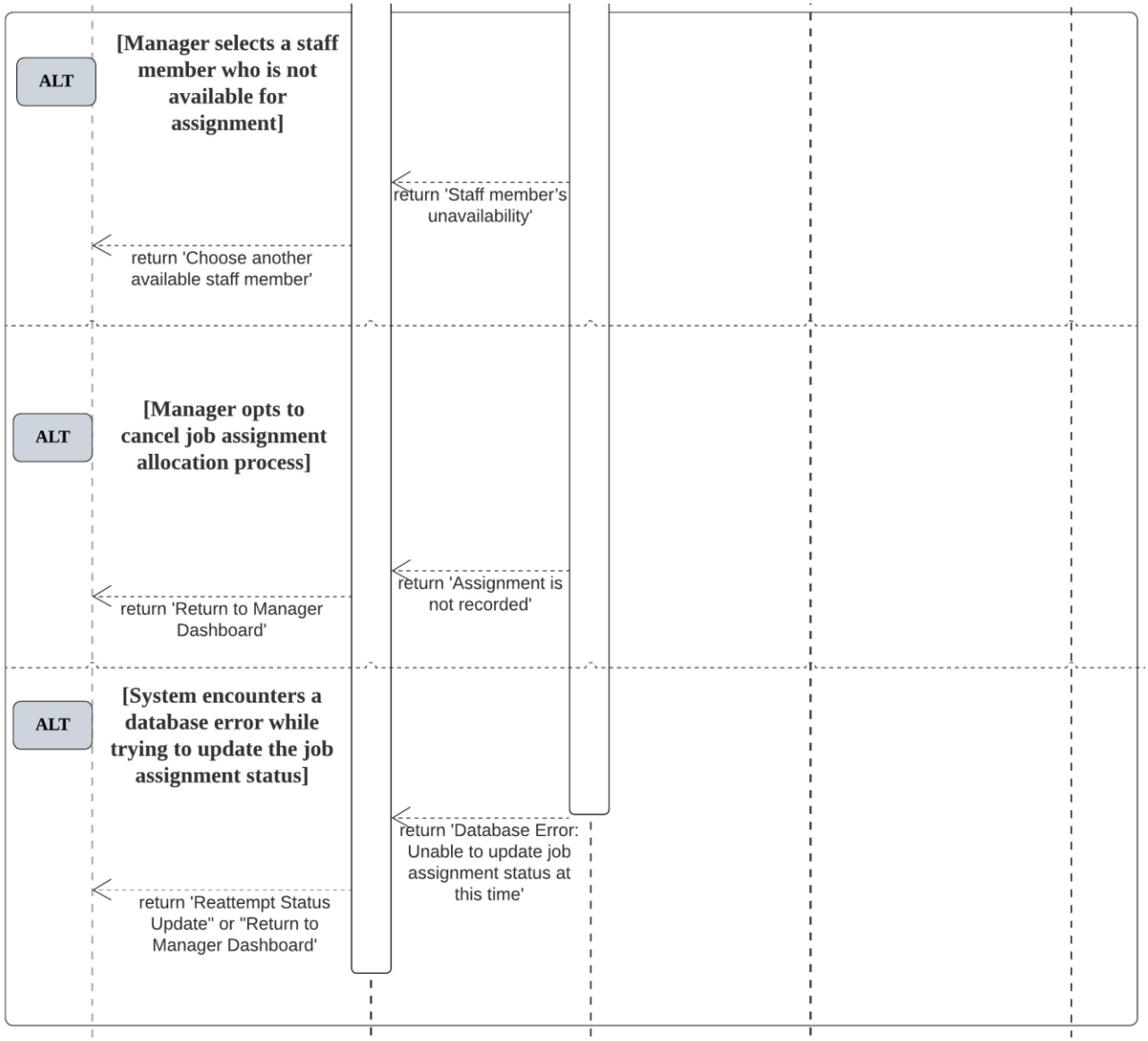

Figure 8 - Sequence Diagram for UC-12 Alternate Flow

However, there are alternative scenarios in the allocation process. If the Manager opts to cancel the job assignment, the system ensures no assignment is recorded and offers a pathway back to the Manager Dashboard. In scenarios where the Manager selects an unavailable staff member, the system promptly notifies the Manager of the staff member's unavailability, prompting a different selection. Lastly, in the unlikely event of a database error during the job assignment update, the system highlights the error and provides the Manager with options to either retry the operation or return to the Dashboard.

In summary, the sequence diagrams for UC-8 and UC-12 provide a visual representation of the systematic flow and communication within the system for two critical operations: student enrollment and job allocation. The UC-8 diagram elucidates the enrollment process, highlighting the system's interactions with the MusikeeDB database to retrieve and display class and student data, culminating in the enrollment action. Conversely, the UC-12 diagram delves into the managerial task of job

allocation, depicting the step-by-step procedure from viewing available job assignments to the conclusive job assignment action. Both diagrams underscore the primary process flow while also shedding light on potential alternative paths, ensuring a comprehensive understanding of these use cases.

4 Updated Project Plan

<Include your Gantt Chart here. You do not need to recalculate and include your new estimation>

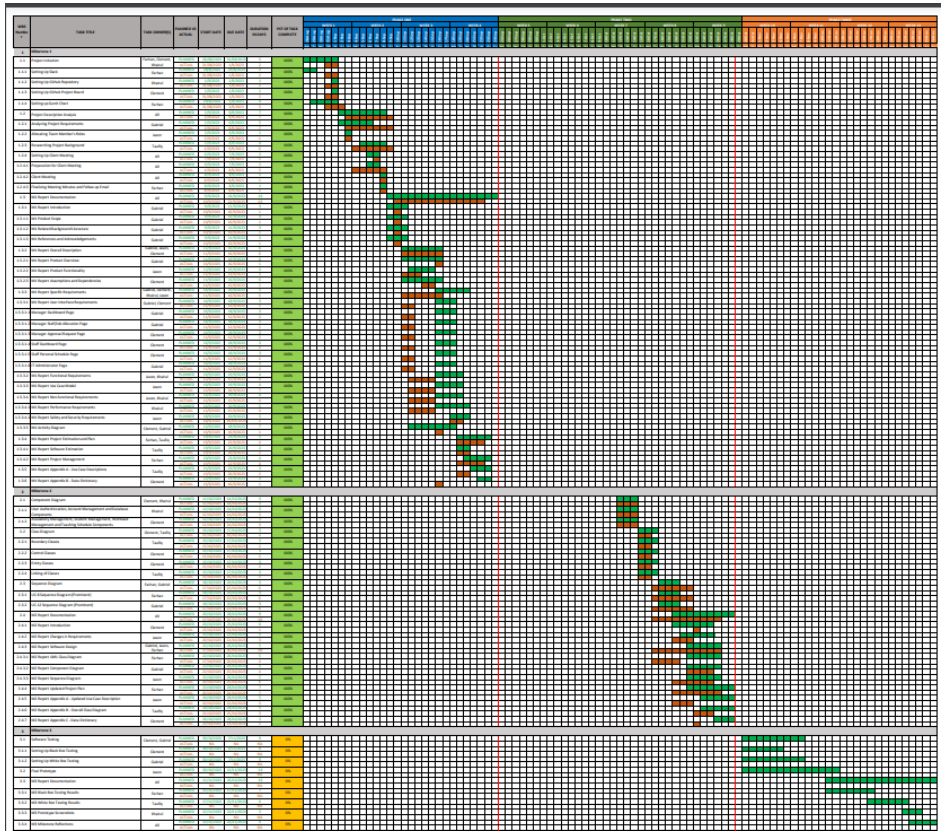

Figure 9 – Gantt Chart showing the schedule for Milestone 1, Milestone 2 and Milestone 3

If you cannot view the class diagram here, kindly check the file “M2_Gantt_Chart.pdf” in the submission folder.

5 Appendix A – Updated Use Case Descriptions

Use Case ID:	UC-1
Use Case Name:	**Create New User Account**
Description:	IT Administrator can create a new user account for newly recruited staff.
Primary Actor:	IT Administrator
Preconditions:	IT Administrator is authenticated, logged in, on the IT Administrator web page and has selected Create New User Account option.
Postconditions:	Main: A new user account has been successfully created and a confirmation message is displayed. The database is updated to register the new user account, and the connection is subsequently closed. 3a. user account creation form cannot be submitted. 5a. No new user account is created/added and the IT Administrator has been informed of the error.
Main Success Scenarios:	1. IT Administrator navigates to the “Create New User Account” section. 2. System displays the account creation form 3. IT Administrator enters the new staff member’s name, contact number, address, date of birth, NRIC and password 4. IT Administrator submits the form to request account creation 5. System validates the provided user account details 6. System creates the new user account 7. System displays a confirmation message, “User account created successfully.” 8. IT Administrator is notified of the successful account creation 9. IT Administrator closes the confirmation message
Alternative Scenarios:	3a. IT Administrator provides incorrect or incomplete account details. 3a1. System displays an error message explaining the specific error. 5a. System encounters an issue during account creation, such as database error or a duplicate nric 5a1. System displays an error message explaining the specific error. 5a2. IT Administrator has the option to either retry or navigate back to the IT Administrator web page.
Priority	High

Use Case ID:	UC-2
Use Case Name:	**Add New Work Availabilities**
Description:	Staff, primarily teachers, can indicate their work availabilities for future jobs assignments.
Primary Actor:	Staff (Teacher)
Preconditions:	Staff is authenticated, logged in, on the Staff Dashboard web page and has selected the Add New Work Availability option.
Postconditions:	Main: The system has recorded a new work availability, and the user is notified of the successful addition. The database is updated to include the new work availabilities, and the connection is subsequently closed. 3a: No new work availability is added, and any data entered during the process is discarded. 5a: No new work availability is added, and the staff has been informed of the error.
Main Success Scenarios:	1. Staff navigates to the My Schedule section 2. System displays a form with dates for specifying work availabilities 3. Staff selects one or more dates and their corresponding times 4. Staff submits the form 5. System validates the work schedule details (selected date and time) and records the new work availabilities 6. System displays a confirmation message indicating the successful addition of new work availabilities 7. Staff completes the add new work availabilities schedule process, returning to the Staff Dashboard
Alternative Scenarios:	3a. Cancellation of Work Availability Addition. 3a1: Staff selects the 'Cancel' option 3a2: System discards any entered data 3a3: System redirects staff to the Staff Dashboard web page 5a. Error while adding a new work availability. 5a1. System displays a specific error notification, e.g., "Technical Error, unable to create a new work availability record" or "Validation Failed.". 5a2. System provides options for the staff to either retry the process or navigate back to the Staff Dashboard web page.
Priority:	High

Use Case ID:	UC-3
Use Case Name:	**Edit Existing Work Availabilities**
Description:	Staff can amend their existing work availabilities.
Primary Actor:	Staff (Teacher)
Preconditions:	Staff is authenticated, logged in, on the Staff Dashboard web page and has selected the Edit Existing Work Availability option. Staff must have added a work availability request before edit can commence.
Postconditions:	Main: Staff has successfully edited their existing work availability record. The database is updated to reflect the changes in existing work availabilities, and the connection is subsequently closed. 3a. No changes made to existing work availability and any data entered during the process is discarded. 6a. No changes made to the existing work availability, and the staff has been informed of the error.
Main Success Scenarios:	1. Staff navigates to the My Schedule section 2. System displays a list of the staff's existing work availability records in a tabular format. 3. Staff select which work availability they want to edit. 4. Staff makes the necessary changes (adjust time slot). 5. Staff confirms and submits the changes. 6. System updates the work availability record. 7. System displays a confirmation message; Work availability updated successfully 8. Staff completes edit existing work availability schedule process, returning to the Staff Dashboard
Alternative Scenarios:	3a. Cancellation of editing work availability record. 3a1. Staff selects the Cancel option 3a2. System discards any entered data 3a3. System redirects staff to the Staff Dashboard web page 6a. Encounters an issue while trying to update the work availability record. 6a1. System displays a specific error notification, Technical Error, unable to update an existing work availability record. 6a2. System provides options for the staff to either retry the process or navigate back to the Staff Dashboard web page.
Priority:	Medium

Use Case ID:	UC-4
Use Case Name:	**View Weekly Job Assignments**
Description:	Staff (Teacher) can view their weekly job assignments
Primary Actor:	Staff (Teacher)
Preconditions:	Staff is authenticated, logged in, on the Staff Dashboard web page. The system has the current week's job assignment data for the staff.
Postconditions:	Main: Staff successfully view their weekly job assignments for the current week on the dashboard. No update is required in the database for viewing weekly job assignments, and the connection is subsequently closed. The database is updated to register the new user account, and the connection is subsequently closed." 2a. The weekly job assignments are not displayed to the Staff on the dashboard. 2b. The staff dashboard will not display any job assignments for the week.
Main Success Scenarios:	1. Staff navigates to the Dashboard section 2. System retrieves and displays the weekly job assignment details (Music class name, date, and time of the class, studio number, and list of student names enrolled)
Alternative Scenarios:	2a. Fails to retrieve or display the weekly job assignments 2a1. System displays an error message. "Unable to load weekly job assignments. Please try again later. 2b. No job assignments are available for the current week. 2b1. System displays a message: 'No job assignments for this week
Priority:	Medium

Use Case ID:	UC-5
Use Case Name:	**View Overall Workload for the Month**
Description:	Staff can view their overall workload for the entire month
Primary Actor:	Staff (Teacher)
Preconditions:	Staff is authenticated, logged in, on the Staff Dashboard web page. The system has the staff's overall workload data for the month.
Postconditions:	Main: Staff can successfully view their overall workload for the month. No update is required in the database for viewing overall workload for the month, and the connection is subsequently closed 2a. The overall workload for the month is not displayed to the Staff on the dashboard. 2b. The staff dashboard will not display the overall workload for the month.
Main Success Scenarios:	1. Staff navigates to the Dashboard section 2. System retrieves and displays the overall workload for the month details (name of class, date, and time of the class, studio number used, and list

	of student names enrolled) and a progress bar showing current hours worked, total hours assigned, and maximum hours allowed
Alternative Scenarios:	2a. Fails to retrieve or display overall workload for the month 2a1. System displays an error message. Unable to load overall workload for the month. Please try again later. 2b. No workload data is available for the selected month. 2b1. System displays a message: No workload data for this month.
Priority:	Medium

Use Case ID:	UC-6
Use Case Name:	**Choose Job Preference**
Description:	Staff can select their job preference
Primary Actor:	Staff (Teacher)
Preconditions:	Staff is authenticated, logged in, on the Staff Dashboard web page. Manager has allocated job assignments to staff.
Postconditions:	Main: Staff has successfully choose their job preference. The database is updated to record the selected job preferences, and the connection is subsequently closed. 3a. Staff's job preference remains unchanged, no changes to the list of available job preferences/assignments. 5a. Staff's job preference is not recorded.
Main Success Scenarios:	1. Staff navigates to the calendar widget on the Dashboard section. 2. System retrieves and displays a list of available job preferences/assignments (Class name, date, and time of the class,) 3. Staff selects their preferred job preference. 4. Staff confirms their selections. 5. System records the staff's job preference. 6. System provides the staff with a confirmation message indicating the selection of job preference have been recorded. 7. Staff completes Choose Job Preference process and is redirected to the Staff Dashboard.
Alternative Scenarios:	3a. Cancellation of job preference selection. 3a1. Staff selects the Cancel option 3a2. System discards any entered data 3a3.System displays a message: Job preference selection process has been cancelled. 3a4. Staff is redirected to the Staff Dashboard web page 5a. Error recording the staff's job preference. 5a1. System displays a specific error notification, Technical Error, unable to record job preference selection. 5a2. System provides options for the staff to either retry the process or navigate back to the Staff Dashboard web page..
Priority:	High

Use Case ID:	UC-7
Use Case Name:	**Reject Job Assignments**
Description:	Staff can reject their allocated job assignments
Primary Actor:	Staff (Teacher)
Preconditions:	Staff is authenticated, logged in, and on the staff personal schedule page. Manager has allocated job assignments to staff.
Postconditions:	Main: Staff has successfully rejected the job assignment(s). The database is updated to indicate that the status of the job assignment has been rejected, and the connection is subsequently closed. 4a. No changes to job assignment status. 7a. Job assignment status remains unchanged
Main Success Scenarios:	1. Staff navigates to the My Schedule section 2. System retrieves and displays the weekly job assignments for the staff 3. Staff identifies and selects which job assignment(s) they wish to reject 4. System prompts the staff to confirm their rejection. 5. System displays a message to notify staff to discuss the jobs with their manager before proceeding with the rejection 6. Staff confirms the rejection. 7. System updates the job assignment status to Rejected 8. System displays a confirmation message to the staff indicating that their rejection of the job assignment was successful. 9. Staff completes Reject Job Assignments process and is redirected to the Staff Dashboard.
Alternative Scenarios:	4a. Cancellation of job assignments rejection 4a1. Staff selects the Cancel option 4a2. System discard changes and Job assignment status remains unchanged. 4a3. System displays a message: Reject job assignment process has been cancelled. 4a4. Staff is redirected to the Staff Dashboard web page. 7a. Error while updating job assignment status 7a1. System displays a specific error notification, Technical Error, unable to update job assignment status. 7a2. System provides options for the staff to either retry the process or navigate back to the Staff Dashboard web page..
Priority:	High

Use Case ID:	UC-8
Use Case Name:	**Enrol New Students for Class**
Description:	The manager can enrol new students for music class.
Primary Actor:	Manager
Preconditions:	Manager is authenticated, logged in, is on the Class Enrollment web page and has selected Enrol new students for class option.
Postconditions:	Main: Manager have successfully enrolled new students for class. The database is updated to enroll the new student in the specified class, and the connection is then closed. 2a. Manager is informed of the absence of available classes for enrolment. 3a. No changes are made to the class enrolment records. 4a. Manager is informed that there are no students available for the selected class. 6a. No enrolment changes are saved in the database.
Main Success Scenarios:	1. Manager navigates the Class Enrolment section 2. System displays a list of available classes for enrolment 3. Manager selects a class from the list to enrol new students 4. System displays a list of available students who can be enrolled in the selected class 5. Manager selects the student to enrol in the class 6. System updates the class enrolment based on the selected student 7. System provides a confirmation message to the manager indicating that the enrolment of student for the class was success 8. Manager is notified of the confirmation message and completes the enrolment process, returning to the manager's dashboard
Alternative Scenarios:	2a. No available classes for enrolment 2a1. System displays a message to inform the manager that no classes are available for enrolment. 2a2. Manager will be redirected to the manager's dashboard. 3a. Manager chooses to cancel the enrolment process 3a1. System ensures no change are made to the class enrolment records. 3a2. Manager will be redirected to the manager's dashboard. 4a. No students available to enrol for selected class 4a1. System displays a message to inform the manager that there are no students available to enrol for the selected class. 4a2. Manager will be redirected to the manager's dashboard. 6a. System fails to save the updated class enrolment due to database error 6a1: System presents an error notification to the manager, stating: "Database Error: Unable to save enrolment updates at this time." 6a2: Manager is given options by the system to either reattempt the enrolment update or be redirected to the manager's dashboard.
Priority:	High

Use Case ID:	UC-9
Use Case Name:	**Unenroll Existing Students from Class**
Description:	The manager can unenroll existing students from classes when they choose to stop attending.
Primary Actor:	Manager
Preconditions:	Manager is authenticated, logged in, is on the Class Withdrawal web page and has selected Unenroll existing students from class option. The database is updated to remove the student from the specified class, and the connection is then closed. Manager can only unenroll existing students.
Postconditions:	Main: Manager has successfully unenrolled existing students from class The students that are removed from the class list is saved into the database. Database is updated with the latest class roster and the connection is closed. 2a. No changes are made to the class roster records. 7a. No withdrawal changes to the class roster are saved in the database.
Main Success Scenarios:	1. Manager navigates the Class Withdrawal section 2. System displays a list of ongoing classes 3. Manager selects a class from which to unenroll students 4. System displays a list of currently enrolled students in the selected class 5. Manager selects the student(s) to unenroll from the class 6. Manager confirms the unenrollment 7. System updates the class roster by removing the selected student(s) 8. System confirms the successful unenrollment of the student(s) to the manager 9. Manager is notified of the confirmation message and completes the withdrawal process
Alternative Scenarios:	2a. Manager chooses to cancel the withdrawal process 2a1. System ensures no change are made to the class roster record. 2a2. Manager will be redirected to the manager's dashboard. 7a. System encounters an issue while trying to update the class roster database error 7a1: System presents an error notification to the manager, stating: "Database Error: Unable to update class roster at this time." 7a2: Manager is given options by the system to either reattempt the enrolment update or be redirected to the manager's dashboard.
Priority:	Medium

Use Case ID:	UC-10
Use Case Name:	**Create Teaching Schedule**
Description:	Manager can create teaching schedules for various music classes, effectively assigning staffs to time slots.
Primary Actor:	Manager
Preconditions:	• The system is operational and accessible • Manager must be logged into the system • Manager is assumed to already be in the Manager dashboard page • Music classes and teachers are pre-defined in the system
Postconditions:	Main: Manager successfully creates a teaching schedule A Teaching schedule has been created and is updated into the database Database is updated with the new teaching schedule and the connection is closed. 2a. Manager decided not to create the teaching schedule 3a. Manager is unable to create a teaching schedule 6a. No changes were reflected into the database
Main Success Scenarios:	1. Manager selects the “Create Teaching Schedule” option 2. System displays a calendar, time viewer and class selector for the manager to create the teaching schedule 3. Manager selects a date and time slot for the new schedule 4. Manager specifies the type of music class for the new schedule 5. Manager confirms the teaching schedule 6. System updates the teaching schedule 7. System provides a confirmation message to the manager indicating that the teaching schedule has been successfully created
Alternative Scenarios:	2a. Manager decides to cancel the action 2a1. Manager can return to the previous screen 3a. Manager selects an unavailable date or time slot 3a1. System displays an error message that time slot or date is unavailable 3a2. System prompts the manager to choose an alternative slot 6a. System fails to update the teaching schedule 6a1. System displays an error message that the schedule was not saved 6a2. Manager is prompted by the system to either retry or exit the screen.
Priority:	High

Use Case ID:	UC-11
Use Case Name:	**View Staff Workload**

Description:	Manager can view the workload of staff members
Primary Actor:	Manager
Preconditions:	• The system is operational and accessible • Manager must be logged into the system • Manager is assumed to already be in the Manager dashboard page
Postconditions:	Main: Manager can successfully view staff workload Database returns the staff workload information and the connection is closed. 2a. System is unable to return the requested information
Main Success Scenarios:	1. Manager selects the "View Staff Workload" option 2. System retrieves and displays a list of staff and their respective workload
Alternative Scenarios:	2a. System fails to retrieve staff workload data 2a1. System displays an error message that the system was not able to retrieve the staff workload data 2a2. Manager are prompted by the system to either retry or exit the screen.
Priority:	Medium

Use Case ID:	UC-12
Use Case Name:	**Allocate job assignments**
Description:	Manager can allocate job assignments for staff members
Primary Actor:	Manager
Preconditions:	Manager is authenticated, logged in, is on the Manage Staff web page and has selected Allocate Job Assignments option.
Postconditions:	Main: Manager have successfully allocated job assignments to staff. The job assignments have been allocated and is updated into the database Database is updated with the latest job assignments and the connection is closed. 5a. Job Assignment has not been allocated to the chosen staff due to their unavailability. 6a. No job assignment has been made, and manager has returned to their dashboard. 8a: Job assignment status has not been updated due to a database error, and manager is prompted to either reattempt or return to the dashboard.
Main Success Scenarios:	1. Manager navigates the "Allocate Job Assignments" section. 2. System displays a list of available job assignments. 3. Manger chooses a job assignment to allocate to a staff member. 4. System provides a list of staff members. 5. Manager selects the staff member for the job assignment. 6. System prompts for confirmation. 7. Manager confirms the job assignment allocation. 8. System updates the job assignment status.

	9. System displays a confirmation message indicating the job's successful assignment. 10. Manager acknowledges the confirmation and returns to their manager dashboard.
Alternative Scenarios:	5a. Manager selects a staff member who is not available for assignment. 5a1. System presents an error message indicating the staff member's unavailability. 5a2. System advises the manager to choose another available staff member. 6a. Manager opts to cancel job assignment allocation process 6a1. The system ensures that the assignment is not recorded. 6a2. Manager will be redirected to the manager's dashboard. 8a. System encounters a database error while trying to update the job assignment status. 8a1. System presents an error notification to the manager, stating: "Database Error: Unable to update job assignment status at this time. 8a2. Manager is offered two choices by the system: "Reattempt Status Update" or "Return to Manager Dashboard.
Priority:	High

Use Case ID:	UC-13
Use Case Name:	**View staff availability**
Description:	Manager can view the availability of staff members
Primary Actor:	Manager
Preconditions:	• The system is operational and accessible • Manager must be logged into the system • Manager is assumed to already be in the Manager Dashboard page
Postconditions:	Main: Manager can successfully view a list of staff availability Database returns the staff availability information and the connection is closed 2a. System displays an empty list 2b. The list of staffs is unable to be displayed.
Main Success Scenarios:	1. Manager selects the "View Staff Availability" option in the dashboard page 2. System displays a list of staff members that are available for the week/month
Alternative Scenarios:	2a. System displays an empty list 2a1. System returns a message to inform the Manager that there are no available staff members

	2a2. Manager can either return to previous page or do other things in the Dashboard page 2b. System fails to display a list of available staff members 2b1. System displays an error message stating that the system is unable to display a list of staff members 2b2. Manager are prompted by the system to either retry or exit the screen
Priority:	Medium

Use Case ID:	UC-14
Use Case Name:	**View top 3 staff with lowest workload**
Description:	Manager can view the top 3 staff with the lowest workload
Primary Actor:	Manager
Preconditions:	• The system is operational and accessible • Manager must be logged into the system • Manager is assumed to already be in the Manager Dashboard page
Postconditions:	Main: Manager can successfully view the top 3 staff with the lowest workload Database returns the information regarding the top 3 staff with the lowest workload and the connection is closed 2a. System fails to display the top 3 staff with the lowest workload
Main Success Scenarios:	1. Manager selects the “View top 3 staff with lowest workload” option 2. System displays the top 3 staff with the lowest workload
Alternative Scenarios:	2a. System fails to display the top 3 staff with the lowest workload 2a1. System displays an error message stating that the system is unable to display the top 3 staff with the lowest workload.

	2a2. Manager are prompted by the system to either retry or exit the screen
Priority:	Medium

Use Case ID:	UC-15
Use Case Name:	**View all staff with over 40 hours of jobs allocated**
Description:	Manager can view all staff members that have been allocated over 40 hours' worth of jobs
Primary Actor:	Manager
Preconditions:	• The system is operational and accessible • Manager must be logged into the system • Manager is assumed to already be in the Manager Dashboard page
Postconditions:	Main: Manager can successfully view all staff with over 40 hours of jobs allocated Database returns the information regarding staff with over 40 hours of job allocated and the connection is closed 2a. System fails to display the staff with over 40 hours of job allocated
Main Success Scenarios:	1. Manager selects the "View all staff with over 40 hours of jobs allocated" option 2. System displays a list of staff members with over 40 hours of jobs allocated
Alternative Scenarios:	2a. System fails to display the list of staff members with over 40 hours of jobs allocated 2a1. System displays an error message that the system is unable to display the list of staff members with over 40 hours of jobs allocated 2a2. Manager are prompted by the system to either retry or exit the screen
Priority:	High

Use Case ID:	UC-16
Use Case Name:	**Record System Data Request**
Description:	The Database Management System (DBMS) can record and process data requests from various system components and actors such as information retrieval, updates, or other data-related operations.
Primary Actor:	Database Management System
Preconditions:	• The DBMS is operational and ready to receive data requests • The relevant system components and actors initiates data requests. • The database is always ready to take on SQL requests.
Postconditions:	Main: DBMS successfully records system data request

	3a. Unauthorized data request 4a. Invalid data request 5a. DBMS fails to execute the request
Main Success Scenarios:	1. A system component or actor initiates a data request by sending a SQL request message to the DBMS 2. DBMS receives the request from the actor or system component 3. DBMS verifies its authenticity and authorization sent by the autor or system component. 4. If the authentication request is valid, DBMS will fulfill the request based on its needs (E.g., Retrieve data, update, etc.) 5. DBMS successfully executes the request sent by the actor or system component 6. DBMS sends a response message to the system component or actor indicating the outcome of the request (E.g., Data retrieve, update completed, etc.)
Alternative Scenarios:	3a. Unauthorized data request 3a1. DBMS generates an error response message about BAD Authorisation. 3a2. DBMS does not proceed with processing the request and sends back a response error message 4a. Invalid data request 4a1. Request fails to be processed by the DBMS 4a2. DBMS generates an error response message detailing the issue regarding issues on the SQL statement 5a. DBMS fails to execute the request 5a1. DBMS logs the failure 5a2. DBMS generates an error response message
Priority:	High

6 Appendix B - Overall Class Diagram

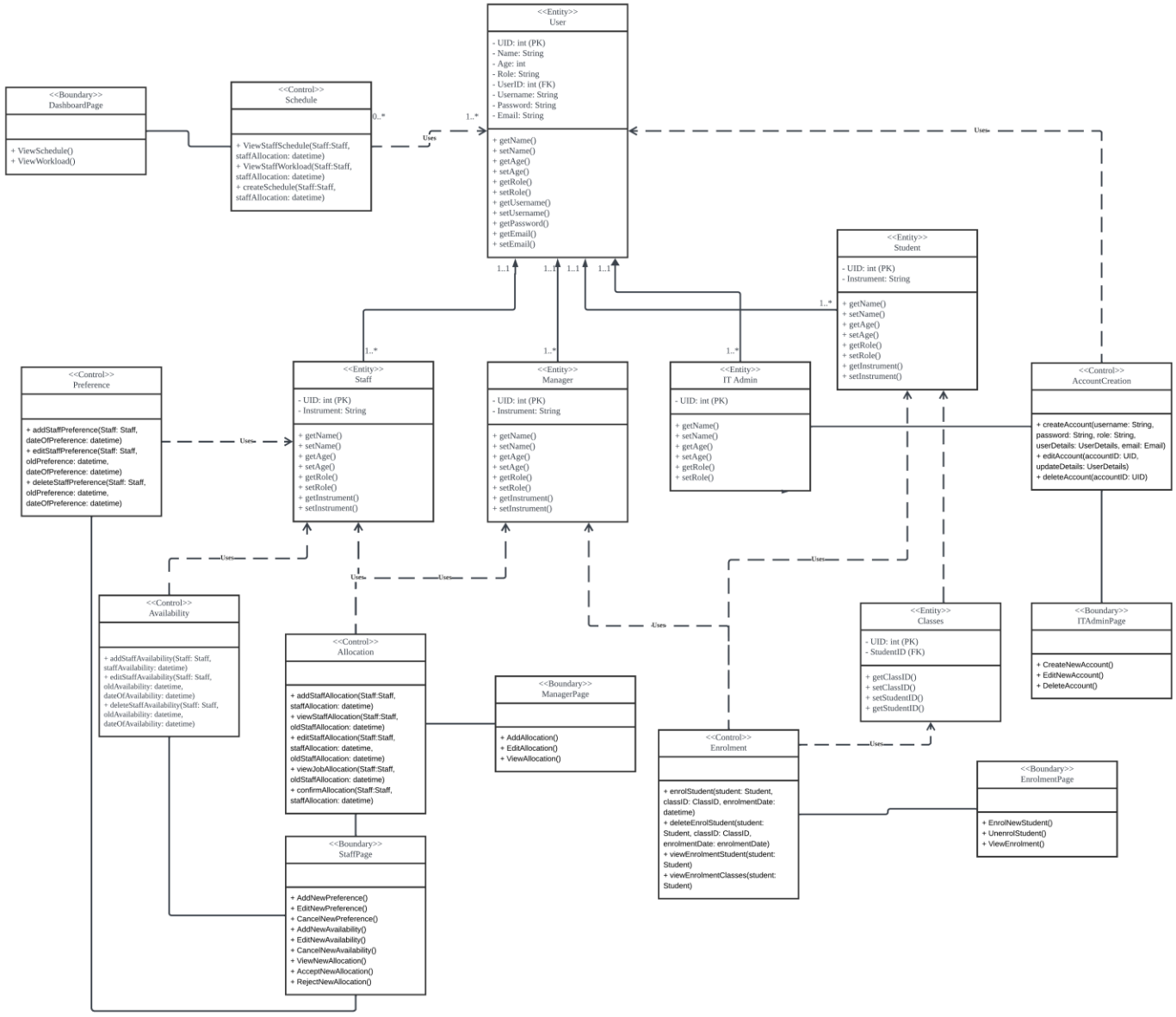

Figure 10 - Overall UML Class Diagram

If you cannot view the class diagram here, kindly check the file “Diagrams.pdf” in the submission folder

7 Appendix C – Data Dictionary

Glossary of Terms, Abbreviations and Acronyms

The document uses the following terms, abbreviations, and acronyms:

Term or Abbreviation	**Definition**
UML	Unified Modeling Language
Entities	Stereotype of a class that is specified
ECB	Entity Control Boundary
MVC	Model-View-Control
Component	Provides and consumes behavior through other components
Allocation	The workload that was allocated to the staff by the Manager
Availability	The availability of the staff to inform the Manager what days the staff is able to work.
Preference	The preference of the staff to inform the Manager what days the staff wishes to come work on.
DBMS	Database Management System