<STUDENT MANAGEMENT SYSTEM >

(Project)

Project Number

GROUP 11

Submitted To:

SADAF NAEEM

Project Team

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1. Abstract

The Student Management System is designed to help educational institutions or individually a student to manage student information more easily and efficiently.
Currently, many schools and colleges use manual or outdated systems to track student data, which can be slow, prone to mistakes, and hard to update. This project aims to create a digital solution that makes managing student records, attendance, grades, and other important information simpler and more accurate.
The system will be a web-based application that allows administrators to register students or a student to register him to specific institute, monitor their attendance, track their academic progress. Teachers will be able to update grades and communicate with students through the platform. The key features of this system will include:

- Student registration and management
- Attendance tracking
- Academic performance tracking (grades, assignments, etc.)
- Communication tools for students and staff

The project will involve designing the building the system, testing its functionality to ensure it works properly, and then making it available for educational institutions to use. Through this project, we will gain practical experience in web development, while providing a helpful tool for students in schools and colleges.

2. Problem Statement

Many educational institutions still use manual or outdated digital systems to manage student data, leading to inefficiencies, errors, and difficulties in accessing or updating information. This creates challenges in tracking attendance, grades, and student progress. The Student Management System aims to provide a digital, improve accuracy, and enhance communication within the institution.

3. Propose Solution

The proposed solution is a web-based Student Management System that centralizes student data, allowing administrators to register students, track attendance, and record academic performance. It will streamline communication between students, teachers, and staff, reduce manual errors, and improve efficiency.

4. Stakeholders

Primary Stakeholders:

- **Students**: Directly use the system to view grades, attendance, and schedules.
- **Teachers**: Input and manage student data (grades, attendance).

School Administrators: Oversee system usage, manage user access, and generate reports.

Secondary Stakeholders:

- **Parents/Guardians**: Monitor their child's academic progress and attendance.
- **IT Support Team**: Maintain the system, ensure security, and resolve technical issues.

5. Project Scope

The scope of the Student Management System includes the development of the following key modules:

1. **Student Registration Module**: This module will allow administrators to register new students and manage their personal and academic information.
2. **Attendance Management Module**: Teachers will be able to mark student attendance and generate reports on attendance trends.
3. **Academic Performance Module**: This module will enable teachers to input and track student grades, assignments, and other academic records.
4. **Communication Module**: A communication platform will be integrated to allow interaction between students, teachers, and administrators for announcements and queries.

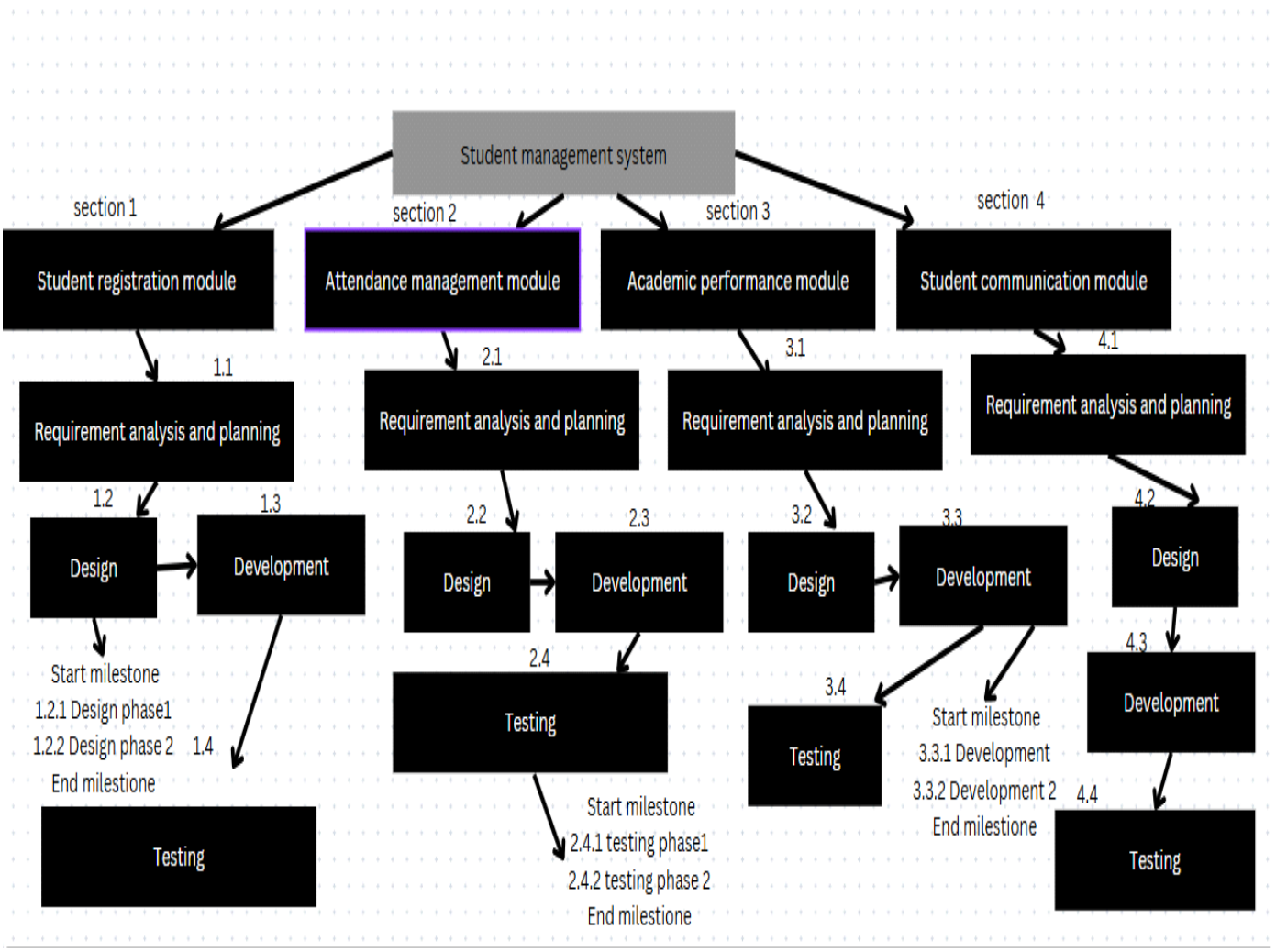
6.Tools & Technology

The tools and technologies will be used to develop the Student Management System is Java.

7.References

1. https://www.researchgate.net
2. https://github.com
3. https://www.w3schools.com

- **Work Breakdown Structure**



Cross-module Dependencies:

- The **Student Registration Module** provides the foundational student data for both the **Attendance Management Module** and the **Academic Performance Module**. These modules depend on the registration data for identifying and tracking students.
- The **Communication Module** may depend on the **Student Registration Module** to ensure the correct users (students, teachers, administrators) are connected through the platform.

- **Gantt Chart**

https://docs.google.com/spreadsheets/d/1oL_gt-_qv_B0wQMRie_BCpmhwxii-Rls/edit?usp=drive_link&ouid=116986655345324507149&rtpof=true&sd=true

- **link to excel sheet for Gantt chart**

NOTE:

- You may attach the excel sheet link in the 3rd section or submit it separately along with word file.

6. Requirements Analysis:

In the **Requirements Analysis** phase, we gather, define, and analyze the needs of the system in order to ensure it meets the business objectives and user expectations. Various elicitation techniques were employed to understand the system requirements thoroughly. These include:

- **Interviews with stakeholders**: Discussing with key users (students, teachers, administrators, and IT support) to understand their needs and challenges.
- **Questionnaires and Surveys**: Collecting information from end users (students and staff) about their preferences and expectations from the system.
- **Document Analysis**: Reviewing existing documents like student records, grades, and attendance systems.
- **Observation**: Understanding the current manual or outdated systems by observing user workflows and identifying inefficiencies

1) Business Requirements:

The **business requirements** identify the rules, constraints, and objectives that the system must meet to benefit the institution.

- **BR-01:** The system should allow administrators to register and manage student information (personal details, academic records).
- **BR-02:** Teachers should be able to mark and monitor attendance accurately. The system must handle late, excused, and unexcused absences.
- **BR-03:** The system should facilitate tracking of student grades, assignments, exams, and other assessments, providing both teachers and students with real-time academic progress.
- **BR-04:** The system should generate reports on student performance, attendance, and academic trends, aiding in decision-making.
- **BR-05:** The system must support messaging and notifications for updates about attendance, grades, and announcements between students, teachers, and administrators.

2) User Requirements

The **user requirements** outline the expectations of all stakeholders (students, teachers, administrators, and IT support).

Primary Stakeholders:

- **UR-01 (Students):** I shall be able to register for courses and view my personal and academic information.
- **UR-02 (Students):** I shall be able to view my grades, assignments, and exam results.
- **UR-03 (Students):** I shall be able to track my attendance.
- **UR-04 (Students):** I shall be able to receive notifications and announcements regarding academic matters.
- **UR-05 (Teachers):** I shall be able to add and update grades for my students.
- **UR-06 (Teachers):** I shall be able to mark student attendance for each class session.
- **UR-07 (Teachers):** I shall be able to view student progress and generate performance reports.
- **UR-08 (Teachers):** I shall be able to communicate with students via messaging (e.g., send feedback, updates).
- **UR-09 (Administrators):** I shall be able to register new students and manage their accounts.
- **UR-10 (Administrators):** I shall be able to manage user accounts and permissions for different users (students, teachers, IT support).
- **UR-11 (Administrators):** I shall be able to generate system-wide reports on attendance, grades, and performance.

- **UR-12 (Administrators):** I shall be able to ensure the overall functionality of the platform, monitoring errors and performing maintenance.

Secondary Stakeholders:

- **UR-13 (Parents/Guardians):** I shall be able to view my child's attendance, grades, and academic progress.
- **UR-14 (Parents/Guardians):** I shall be able to receive notifications and alerts regarding my child's performance and attendance.

3- Functional Requirements

• **FR-01 (Student Registration Module)**: The system must allow administrators to register new students by entering their personal and academic details.

• **FR-02 (Student Registration Module)**: The system must provide options for students to self-register with administrator approval.

• **FR-03 (Student Registration Module)**: The system must automatically generate student IDs and assign courses.

• **FR-04 (Attendance Management Module)**: The system must enable teachers to mark attendance for each class session.

• **FR-05 (Attendance Management Module)**: The system must track daily attendance and store records (late, excused, or unexcused).

• **FR-06 (Attendance Management Module)**: The system must provide summary reports of attendance trends for each student.

• **FR-07 (Academic Performance Module)**: The system must allow teachers to input grades and assign marks to assignments, quizzes, and exams.

• **FR-08 (Academic Performance Module)**: The system must enable students to view their grades and academic history.

• FR-**09 (Academic Performance Module - Add Grades):** The system shall allow teachers to add grades for student assignments, quizzes, and exams.

• FR-**10 (Academic Performance Module - View Grades):** The system shall allow teachers to view grades for student assignments, quizzes, and exams.

• FR-**11 (Communication Module):** The system shall allow teachers to send a one-time message to students about upcoming assignments.

- FR-**12 (Communication Module):** The system shall display a message on the student's dashboard when a new assignment is posted.

- FR-**13 (Communication Module):** The system shall allow teachers to post class-related announcements that students can view on their dashboard.

4.) Non-Functional Requirements

Non-functional requirements define the system's qualities, such as performance, security, and reliability. Here are a few identified **non-functional requirements** for the system:

- **NFR-01 (Performance)**: The system must handle at least 1000 concurrent users without significant degradation in performance.

- **NFR-02 (Performance)**: Page load times must not exceed 2 seconds during normal usage.

- **NFR-03 (Availability)**: The system must be available 99.9% of the time during working hours.

- **NFR-04 (Availability)**: The system must schedule regular daily backups to ensure no data is lost.

7. References

- W3Schools, https://www.w3schools.com.

- ResearchGate, https://www.researchgate.net.

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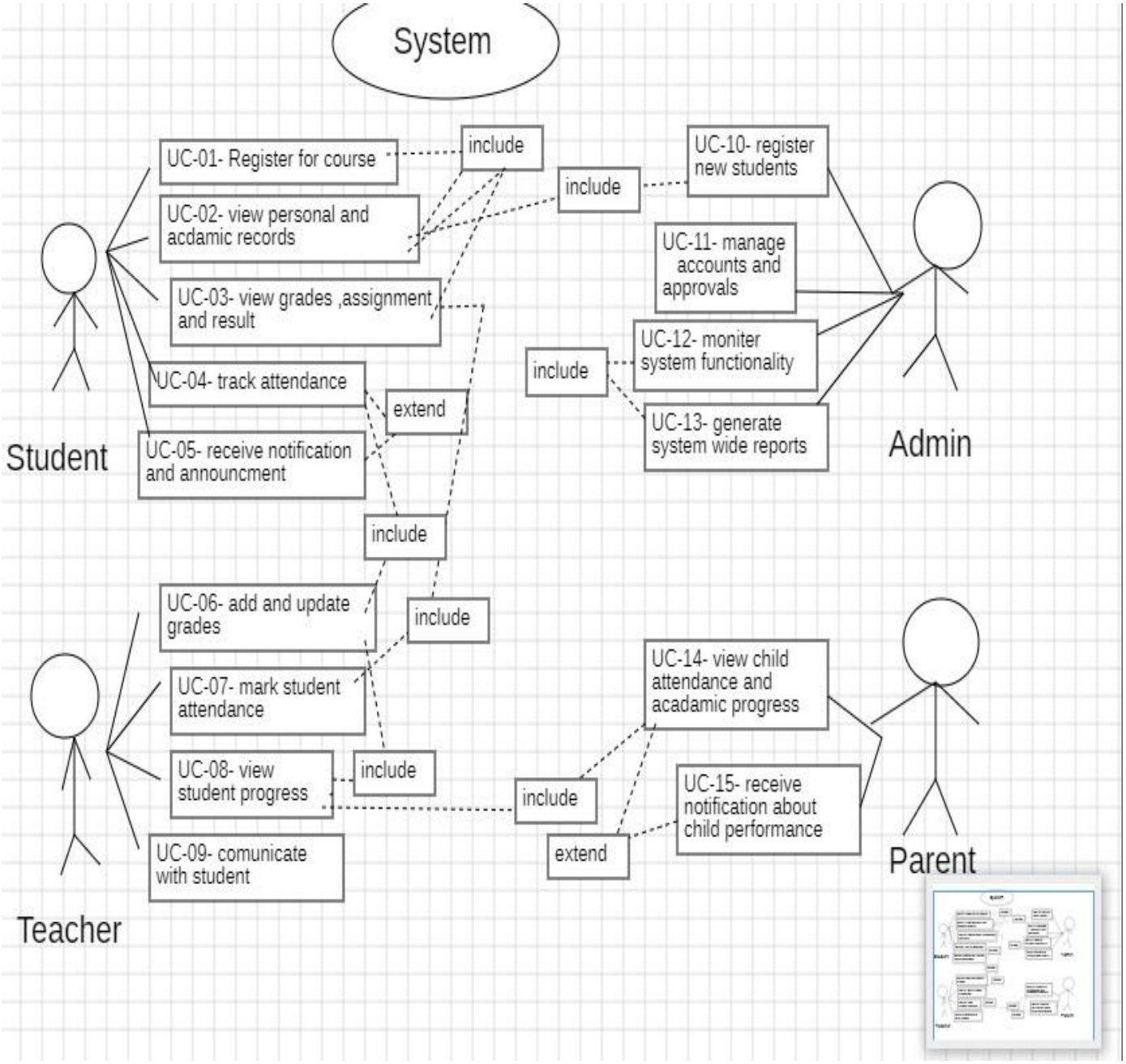


Use case Scenarios

UC-01: Register a student

ID and Name	UC-1: Register a student
Created By	Tafseer ul Hassan
Date Created	1/10/2025
Primary Actor	Student
Secondary Actors	Administrator
Description	A student provides their personal details, selects desired courses, and submits the registration request. The system validates the details, checks course availability, and completes the registration process by updating the student and course records in the system.
Trigger	The student initiates the process by accessing the registration system.
Preconditions	1. The student must have a valid account. 2. The registration system is online. 3. Course catalog and schedule are available.
Postconditions	1. The student's registration details are stored in the system. 2. The student receives a confirmation of their registered courses.
Normal Flow	1. The student logs into the registration system. 2. The student provides their personal and contact information, if required. 3. The system displays the list of available courses. 4. The student selects courses and adds them to their registration list. 5. The system validates prerequisites and checks course availability. 6. The student reviews and confirms their selected courses. 7. The system finalizes the registration, updates the student record, and notifies the student.
Alternative Flows	**Course Not Available:** 1. The system notifies the student if a selected course is full or unavailable. 2. The student selects an alternative course or removes it from the list. 3. The process continues from step 5 in the normal flow. **Missing Prerequisites:** 1. The system notifies the student if they lack the required prerequisites for a course. 2. The student selects a different course or resolves the prerequisite issue with the registrar. 3. The process continues from step 5 in the normal flow.
Exceptions	1. **Invalid Student Account:** The system denies access if the student's credentials are invalid.
	2. **System Downtime:** The system displays a message that the registration is temporarily unavailable.
Priority	High
Frequency of Use	Approximately 1000 registrations per semester during peak periods.

Business Rules	1. A student cannot register for more than 18 credits per semester. 2. Prerequisites must be met for advanced courses.
Other Information	The system should allow real-time updates to course availability and display conflicts in the student's schedule.
Assumptions	1. All students have access to the internet and a valid email address. 2. Students understand the registration process and deadlines.

UC-02: View Personal or Academic Information

ID and Name	UC-2: View Personal and Academic Information
Created By	Tafseer ul Hassan
Date Created	1/10/2025
Primary Actor	Student
Secondary Actors	Administrator
Description	A student views their personal information (such as name, address, contact details) and academic information (such as course history, grades, and GPA). The system retrieves and displays the information stored in the academic records database.
Trigger	The student initiates the process by accessing the personal and academic information section in the system.
Preconditions	1. The student must have a valid account. 2. The system must be online. 3. The student must have existing records in the database.
Postconditions	1. The requested personal and academic information is displayed to the student. 2. The system logs the information access event.
Normal Flow	1. The student logs into the system. 2. The student navigates to the personal and academic information section. 3. The system retrieves the student's personal and academic records from the database. 4. The system displays the retrieved information in an organized format. 5. The student reviews the information.
Alternative Flows	. **Information Not Available:** 1. The system notifies the student if some information (e.g., grades for the current semester) is not yet available. 2. The student is directed back to the main menu or allowed to view other available information.
Exceptions	1. **Invalid Student Account:** The system denies access if the student's credentials are invalid. 2. **System Downtime:** The system displays a message that the information is temporarily unavailable.
Priority	Medium

Frequency of Use	Frequently accessed by students, especially at the beginning or end of semesters.
Business Rules	1. Only authenticated students can access their own personal and academic information. 2. Academic records cannot be modified by the student.
Other Information	The system should ensure data accuracy and use secure methods to retrieve and display sensitive information.
Assumptions	1. All students have access to the internet and a valid login. 2. Academic and personal information is up-to-date and accurate.

Use case 03: View Grades, Assignments, Result

ID and Name	UC-3: View Grades, Assignments, and Results
Created By	Tafseer ul Hassan
Date Created	1/10/2025
Primary Actor	Student
Secondary Actors	Teacher, Administrator
Description	A student views their grades, assignment statuses, and final results for enrolled courses. The system retrieves the required data from the academic records database and displays it in a clear, organized manner.
Trigger	The student initiates the process by selecting the "Grades, Assignments, and Results" section in the system.
Preconditions	1. The student must have a valid account. 2. The system must be online. 3. The student must be enrolled in at least one course. 4. Grades and assignment data must exist in the database.
Postconditions	1. The requested grades, assignment statuses, and results are displayed to the student. 2. The system logs the access event for security and auditing purposes.
Normal Flow	1. The student logs into the system. 2. The student navigates to the "Grades, Assignments, and Results" section. 3. The system retrieves the student's grades, assignment statuses, and final results from the database. 4. The system displays the retrieved data in an organized and user-friendly format. 5. The student reviews the grades, assignment statuses, and results.
Alternative Flows	**Some Data Not Available:** 1. If some information (e.g., results for an ongoing course) is unavailable, the system notifies the student. 2. The student is directed back to the main menu or allowed to view other available information.

Exceptions	1. **Invalid Student Account:** The system denies access if the student's credentials are invalid. 2. **System Downtime:** The system displays a message that grades, assignments, or results are temporarily unavailable.
Priority	Medium
Frequency of Use	Frequently accessed by students, especially after assignments are graded or final results are published.
Business Rules	1. Only authenticated students can access their grades, assignment statuses, and results. 2. Grades and results cannot be modified by the student. 3. Teachers are responsible for updating grades and assignment statuses in the system.
Other Information	The system should ensure data accuracy and security during retrieval and display to maintain student privacy and prevent unauthorized access.
Assumptions	1. All students have access to the internet and a valid login. 2. Grades, assignments, and results data are accurate and up-to-date.

Use case 04: Track attendance

ID and Name	UC-4: Track attendance
Created By	Eman Fatima
Date Created	1/10/2025
Primary Actor	Student
Secondary Actors	Teacher, Administrator
Description	A student views their attendance record, including the dates of attendance and absences, for their enrolled courses. The system retrieves the attendance data from the attendance database and displays it.
Trigger	The student initiates the process by selecting the "Track Attendance" section in the system.
Preconditions	1. The student must have a valid account. 2. The system must be online. 3. Attendance records must exist in the database.
Postconditions	1. The requested attendance record is displayed to the student. 2. The system logs the attendance access event.
Normal Flow	1. The student logs into the system. 2. The student navigates to the "Track Attendance" section. 3. The system retrieves the student's attendance records from the database. 4. The system displays the attendance data, including dates of presence and absence, in an organized format. 5. The student reviews the attendance record.

Alternative Flows	**Some Attendance Data Not Available:** 1. If attendance data for specific dates is unavailable, the system notifies the student. 2. The student is directed back to the main menu or allowed to view other available information.
Exceptions	1. **Invalid Student Account:** The system denies access if the student's credentials are invalid. 2. **System Downtime:** The system displays a message that attendance data is temporarily unavailable.
Priority	Medium
Frequency of Use	Frequently accessed by students, especially during the semester to monitor attendance requirements.
Business Rules	1. Only authenticated students can access their grades, assignment statuses, and results.
	2. Grades and results cannot be modified by the student. 3. Teachers are responsible for updating grades and assignment statuses in the system.
Other Information	The system should ensure data accuracy and security during retrieval and display to maintain student privacy and prevent unauthorized access.
Assumptions	1. All students have access to the internet and a valid login. 2. Attendance data is accurate and up-to-date.

Use case 05: Receive notification and Announcement

ID and Name	UC-5: Receive notification and announcement
Created By	Eman Fatima
Date Created	1/10/2025
Primary Actor	Student
Secondary Actors	Teacher, Administrator
Description	A student receives notifications and announcements, such as important updates, event reminders, and academic deadlines. The system delivers these notifications based on predefined triggers or manual input from teachers or administrators.
Trigger	The system sends a notification or announcement when a predefined event occurs, or a teacher/administrator manually issues one.
Preconditions	1. The student must have a valid account. 2. The system must be online. 3. Notifications and announcements must exist in the system database.
Postconditions	1. The student receives the notification or announcement. 2. The system logs the delivery event for auditing purposes.

Normal Flow	1. A notification or announcement is created by the system, teacher, or administrator. 2. The system delivers the notification or announcement to the student's account or device. 3. The student logs into the system or checks their device and views the notification/announcement. 4. The student acknowledges or takes appropriate action based on the notification/announcement.
Alternative Flows	**Notification Delivery Delay:** 1. If the notification cannot be delivered immediately (e.g., due to network issues), the system retries delivery at regular intervals. 2. The student is notified about the delay, if possible.
Exceptions	1. **Invalid Student Account:** Notifications cannot be delivered if the student's account is invalid. 2. **System Downtime:** Notifications and announcements cannot be sent or received during system downtime.
Priority	High
Frequency of Use	Frequently used during active semesters, especially when important events, deadlines, or changes occur.
Business Rules	1. Notifications and announcements must only be sent to relevant students. 2. Sensitive announcements should be marked private and encrypted during delivery.
Other Information	The system should use secure channels (e.g., email, app notifications) to deliver notifications and announcements to prevent unauthorized access.
Assumptions	1. Students actively check their accounts or devices for notifications. 2. The system maintains accurate and up-to-date records for relevant announcements.

Use case 06: Add and update grades

ID and Name	UC-6: Add and update grades
Created By	Eman Fatima
Date Created	1/10/2025
Primary Actor	Teacher
Secondary Actors	Administrator
Description	A teacher adds or updates grades for students based on their performance in assignments, quizzes, exams, and other assessments. The system stores the grades in the academic records database.
Trigger	The teacher initiates the process by selecting the "Add or Update Grades" section in the system.
Preconditions	1. The teacher must have a valid account. 2. The system must be online. 3. The teacher must be assigned to at least one course with enrolled students.

Postconditions	1. The grades are added or updated in the system. 2. The system logs the grade modification event for auditing purposes.
Normal Flow	1. The teacher logs into the system. 2. The teacher navigates to the "Add or Update Grades" section. 3. The teacher selects a course and a specific student. 4. The teacher enters or updates grades for assignments, quizzes, or exams. 5. The system validates and stores the updated grades in the database. 6. The teacher reviews the changes and confirms the submission.
Alternative Flows	**Invalid Grade Format:** 1. If the entered grade format is invalid, the system notifies the teacher. 2. The teacher re-enters the grade in the correct format.
Exceptions	1. **Unauthorized Access:** The system denies access if the teacher is not authorized to modify grades for a specific course or student. 2. **System Downtime:** The system displays a message that grade modification is temporarily unavailable.
Priority	high
Frequency of Use	Frequently accessed by teachers, especially after grading assignments, quizzes, or exams.
Business Rules	1. Only authorized teachers can add or update grades for students in their assigned courses. 2. Grade changes must be logged for auditing and transparency.
Other Information	The system should ensure secure and accurate storage of grades to prevent unauthorized modifications.
Assumptions	1. Teachers have access to a valid login and internet connection.
	2. The entered grades are accurate and comply with the grading policy.

Use Case 07: Mark student Attendance

ID and Name	UC-7: Mark student attendance
Created By	Fatima Shamshad
Date Created	1/10/2025
Primary Actor	Teacher
Secondary Actors	Administrator
Description	A teacher marks attendance for students in their assigned classes. The system stores attendance records in the academic database for future reference.
Trigger	The teacher initiates the process by selecting the "Mark Attendance" section in the system.

Preconditions	1. The teacher must have a valid account. 2. The system must be online. 3. The teacher must be assigned to at least one course with enrolled students.
Postconditions	1. The attendance records are updated in the system. 2. The system logs the attendance entry event for auditing purposes.
Normal Flow	1. The teacher logs into the system. 2. The teacher navigates to the "Mark Attendance" section. 3. The teacher selects a course and the date for attendance. 4. The teacher marks attendance (e.g., present, absent, late) for student. 5. The system validates and stores the attendance records in the database. 6. The teacher reviews the attendance entries and confirms the submission.
Alternative Flows	**Invalid Input:** 1. If invalid input (e.g., invalid date format) is entered, the system notifies the teacher. 2. The teacher re-enters the information in the correct format.
Exceptions	1. **Unauthorized Access:** The system denies access if the teacher is not authorized to mark attendance for a specific course or date. 2. **System Downtime:** The system displays a message that attendance marking is temporarily unavailable.
Priority	High
Frequency of Use	Frequently accessed by teachers, especially at the start of each class or session.
Business Rules	1. Only authorized teachers can mark attendance for students in their assigned courses. 2. Attendance modifications must be logged for auditing and transparency.
Other Information	The system should ensure secure and accurate storage of attendance records to prevent unauthorized modifications.
Assumptions	1. Teachers have access to a valid login and internet connection. 2. Attendance entries are accurate and comply with the institution's attendance policies.

Use Case 08: View Student Progress

ID and Name	UC-8: View student Progress
Created By	Fatima Shamshad
Date Created	1/10/2025
Primary Actor	Teacher
Secondary Actors	Administrator, Student
Description	A teacher views a student’s academic progress, including grades, attendance, and overall performance in assigned courses. The system displays the data from the academic records database.
Trigger	The teacher initiates the process by selecting the "View Student Progress" section in the system.

Preconditions	1. The teacher must have a valid account. 2. The system must be online. 3. The teacher must be assigned to at least one course with enrolled students.
Postconditions	1. The teacher successfully views the student's progress report. 2. The system logs the report viewing event for auditing purposes.
Normal Flow	1. The teacher logs into the system. 2. The teacher navigates to the "View Student Progress" section. 3. The teacher selects a course and a specific student. 4. The system retrieves the selected student's academic data, including grades and attendance. 5. The teacher reviews the displayed progress report.
Alternative Flows	**No Data Found:** 1. If no data is found for the selected student, the system notifies the teacher. 2. The teacher verifies the selected student or course and retries.
Exceptions	1. **Unauthorized Access:** The system denies access if the teacher is not authorized to view the progress of a specific student. 2. **System Downtime:** The system displays a message that the progress report viewing feature is temporarily unavailable.
Priority	High
Frequency of Use	Frequently accessed by teachers and occasionally by administrators and students to review academic performance.
Business Rules	1. Only authorized teachers can view progress reports for students in their assigned courses. 2. Viewing actions must be logged for auditing and transparency.
Other Information	The system should ensure secure and accurate retrieval of progress data to prevent unauthorized access or manipulation.
Assumptions	1. Teachers have access to a valid login and internet connection. 2. The data displayed is accurate and up-to-date.

Use Case 09: Communicate with Students

ID and Name	UC-9: Communicate with Students
Created By	Fatima Shamshad
Date Created	1/10/2025
Primary Actor	Teacher
Secondary Actors	Administrator, Student
Description	A teacher communicates with students via the system, either through messages or announcements, to provide course updates, reminders, or feedback. The system stores the communication records.
Trigger	The teacher initiates the process by selecting the "Communicate with Students" section in the system.

Preconditions	1. The teacher must have a valid account. 2. The system must be online. 3. The teacher must be assigned to at least one course with enrolled students.
Postconditions	1. The communication is sent to the selected students. 2. The system logs the communication event for auditing purposes.
Normal Flow	1. The teacher logs into the system. 2. The teacher navigates to the "Communicate with Students" section. 3. The teacher selects a course and the students to communicate with. 4. The teacher writes a message or announcement. 5. The system validates and sends the communication to the selected students. 6. The teacher reviews the sent communication and confirms the submission.
Alternative Flows	**Invalid Message Format:** 1. If the message format is invalid (e.g., exceeds character limit), the system notifies the teacher. 2. The teacher re-enters the message in the correct format.
Exceptions	1. **Unauthorized Access:** The system denies access if the teacher is not authorized to communicate with specific students. 2. **System Downtime:** The system displays a message that the communication feature is temporarily unavailable.
Priority	High
Frequency of Use	Frequently used by teachers to send course updates, reminders, and feedback to students.
Business Rules	1. Only authorized teachers can communicate with students in their assigned courses. 2. Communication must be logged for auditing and transparency.
Other Information	The system should ensure secure and accurate storage of communication records to prevent unauthorized access or modifications.
Assumptions	1. Teachers have access to a valid login and internet connection. 2. Students have access to the communication system and can receive messages or announcements.

Use Case 10:

ID and Name	UC-10: Register new student
Created By	Shanza Iftikhar
Date Created	1/10/2025
Primary Actor	Administrator
Secondary Actors	Student
Description	The administrator registers new students into the system by entering their personal and academic details. The system creates a student record and assigns them to appropriate courses.

Trigger	The administrator initiates the process by selecting the "Register New Students" section in the system.
Preconditions	1. The administrator must have a valid account. 2. The system must be online. 3. The administrator must have permissions to register new students.
Postconditions	1. The new student is successfully registered in the system. 2. The system logs the registration event for auditing purposes.
Normal Flow	1. The administrator logs into the system. 2. The administrator navigates to the "Register New Students" section. 3. The administrator enters the student's personal details (name, date of birth, contact information, etc.). 4. The administrator selects the appropriate courses for the student. 5. The system validates and stores the student's data in the database. 6. The system generates a unique student ID and assigns it to the student. 7. The administrator reviews and confirms the registration.
Alternative Flows	**Invalid Input:** 1. If any required field is missing or incorrect, the system notifies the administrator. 2. The administrator re-enters the correct details.
Exceptions	1. **Unauthorized Access:** The system denies access if the administrator is not authorized to register new students. 2. **System Downtime:** The system displays a message that the registration feature is temporarily unavailable.
Priority	High
Frequency of Use	Occasionally used by administrators when enrolling new students.
Business Rules	1. Only authorized administrators can register new students. 2. Student records must be logged for auditing and transparency.
Other Information	The system should ensure secure and accurate storage of student data to prevent unauthorized access or modifications.
Assumptions	1. Administrators have access to a valid login and internet connection. 2. The system's course offerings and student data are up-to-date and accurate.

Use Case 11: Manage Accounts and Approvals

ID and Name	UC-11: Manage Accounts and Approvals
Created By	Shanza Iftikhar
Date Created	1/10/2025
Primary Actor	Administrator
Secondary Actors	Teacher, Student

Description	The administrator manages user accounts (teachers, students, and other staff) and approves or denies requests for access to the system. The system stores the account data and approval statuses.
Trigger	The administrator initiates the process by selecting the "Manage Accounts and Approvals" section in the system.
Preconditions	1. The administrator must have a valid account. 2. The system must be online. 3. The administrator must have permissions to manage accounts and approvals.
Postconditions	1. User accounts are created, updated, or deleted as needed. 2. Account approval statuses are updated. 3. The system logs account modifications for auditing purposes.
Normal Flow	1. The administrator logs into the system. 2. The administrator navigates to the "Manage Accounts and Approvals" section. 3. The administrator reviews the list of pending account requests. 4. The administrator approves or denies the account requests. 5. The administrator can create, update, or delete user accounts as necessary. 6. The system validates and processes the changes. 7. The administrator reviews and confirms the changes.
Alternative Flows	**Invalid Account Information:** 1. If any required account information is missing or invalid, the system notifies the administrator. 2. The administrator re-enters the correct information.
Exceptions	1. **Unauthorized Access:** The system denies access if the administrator is not authorized to manage accounts. 2. **System Downtime:** The system displays a message that account management is temporarily unavailable.
Priority	High
Frequency of Use	Occasionally used by administrators to create, update, and approve user accounts.
Business Rules	1. Only authorized administrators can manage user accounts, approvals. 2. Account modifications and approvals must be logged for auditing and transparency.
Other Information	The system should ensure secure and accurate storage of account data to prevent unauthorized access or modifications.
Assumptions	1. Administrators have access to a valid login and internet connection.
	2. The system is integrated with user verification methods (e.g., email confirmation).

Use Case 12: Monitor System Functionality

ID and Name	UC-12: Monitor System Functionality
Created By	Shanza Iftikhar

Date Created	1/10/2025
Primary Actor	Administrator
Secondary Actors	System
Description	The administrator monitors the overall functionality of the system, ensuring that all features are working as expected, identifying issues, and addressing system performance or security concerns.
Trigger	The administrator initiates the process by selecting the "Monitor System Functionality" section in the system or receives an automated alert about system performance.
Preconditions	1. The administrator must have a valid account. 2. The system must be online and accessible. 3. The administrator must have permissions to monitor system functionality.
Postconditions	1. System functionality is monitored, and issues are identified. 2. Performance or security concerns are addressed or escalated. 3. The system logs monitoring events for auditing purposes.
Normal Flow	1. The administrator logs into the system. 2. The administrator navigates to the "Monitor System Functionality" . 3. The administrator views system health metrics, logs, and alerts. 4. The administrator identifies any issues with system performance or functionality. 5. The administrator takes corrective actions (e.g., restarting services, addressing security concerns) or escalates issues as needed. 6. The system updates log with the monitoring activities and any actions taken.
Alternative Flows	**System Alert Notifications:** 1. If the system generates an alert for a performance issue or error, the administrator reviews the alert and takes appropriate action.
Exceptions	1. **Unauthorized Access:** The system denies access if the administrator is not authorized to monitor system functionality. 2. **System Downtime:** The system displays a message that monitoring functionality is temporarily unavailable.
Priority	High
Frequency of Use	Periodically used by administrators, especially when system performance needs to be assessed or when issues arise.
Business Rules	1. Only authorized administrators can monitor system functionality. 2. Monitoring actions must be logged for auditing and transparency.
Other Information	The system should provide real-time performance monitoring tools and automated alerts for critical issues.
Assumptions	1. Administrators have access to a valid login and internet connection. 2. The system has built-in monitoring tools or integrates with external monitoring systems.

Use Case 13: Generate System Wide Reports

ID and Name	UC-13: Generate System Wide Reports

Created By	Abeera Ijaz
Date Created	1/10/2025
Primary Actor	Administrator
Secondary Actors	Teacher, Manager System
Description	The administrator generates and reviews system-wide reports, including performance, usage, and security data. These reports provide insights into system operations and assist in decision-making.
Trigger	The administrator initiates the process by selecting the "System Wide Reports" section in the system.
Preconditions	1. The administrator must have a valid account. 2. The system must be online. 3. The administrator must have permission to generate system-wide reports.
Postconditions	1. The system generates the requested reports. 2. The system logs the report generation event for auditing purposes.
Normal Flow	1. The administrator logs into the system. 2. The administrator navigates to the "System Wide Reports" section. 3. The administrator selects the type of report to generate (e.g., usage statistics, system performance, security logs). 4. The system processes the request and generates the selected report. 5. The administrator reviews the report data. 6. The administrator exports or shares the report as needed.
Alternative Flows	**Invalid Report Parameters:** 1. If invalid parameters are entered (e.g., incorrect date range), the system notifies the administrator. 2. The administrator corrects the input and regenerates the report.
Exceptions	1. **Unauthorized Access:** The system denies access if the administrator is not authorized to generate system-wide reports. 2. **System Downtime:** The system displays a message that report generation is temporarily unavailable.
Priority	High
Frequency of Use	Occasionally used by administrators to gain insights into system health, performance, and security.
Business Rules	1. Only authorized administrators can generate system-wide reports. 2. Report generation must be logged for auditing and transparency.
Other Information	The system should provide various filtering and customization options to generate specific reports based on user needs.
Assumptions	1. Administrators have access to a valid login and internet connection. 2. The system has the necessary data available for generating reports.

Use Case 14: View Child Attendance and Academic Progress

ID and Name	UC-14: View Child Attendance and Academic Progress
Created By	Abeera Ijaz
Date Created	1/10/2025
Primary Actor	Parent
Secondary Actors	Administrator, Teacher
Description	Parents or guardians view their child's attendance records and academic progress, including grades, performance in assignments, and overall standing in courses.
Trigger	The parent/guardian initiates the process by selecting the "View Attendance and Academic Progress" section in the system.
Preconditions	1. The parent/guardian must have a valid account. 2. The system must be online. 3. The child must be registered in the system and linked to the account.
Postconditions	1. The system displays the requested attendance and academic progress details. 2. The system logs the viewing activity for auditing purposes.
Normal Flow	1. The parent/guardian logs into the system. 2. The parent navigates to the "View Attendance and Academic Progress. 3. The parent selects their child's profile. 4. The system retrieves and displays the child's attendance and academic progress details, including grades and performance summaries. 5. The parent reviews the information.
Alternative Flows	**No Data Available:** 1. If attendance or academic data is missing for the selected child, the system notifies the parent/guardian. 2. The parent contacts the school administration for clarification.
Exceptions	1. **Unauthorized Access:** The system denies access if the parent/guardian is not authorized to view the selected child's information. 2. **System Downtime:** The system displays a message that the feature is temporarily unavailable.
Priority	High
Frequency of Use	Frequently used by parents/guardians, especially during midterms, end-of term periods, or when monitoring performance closely.
Business Rules	1. Only authorized parents/guardians linked to a student's account can view the child's attendance and academic progress. 2. All data retrievals must be logged for auditing and transparency.
Other Information	The system should provide detailed attendance summaries, grade breakdowns, and performance insights to assist parents in understanding their child's progress.

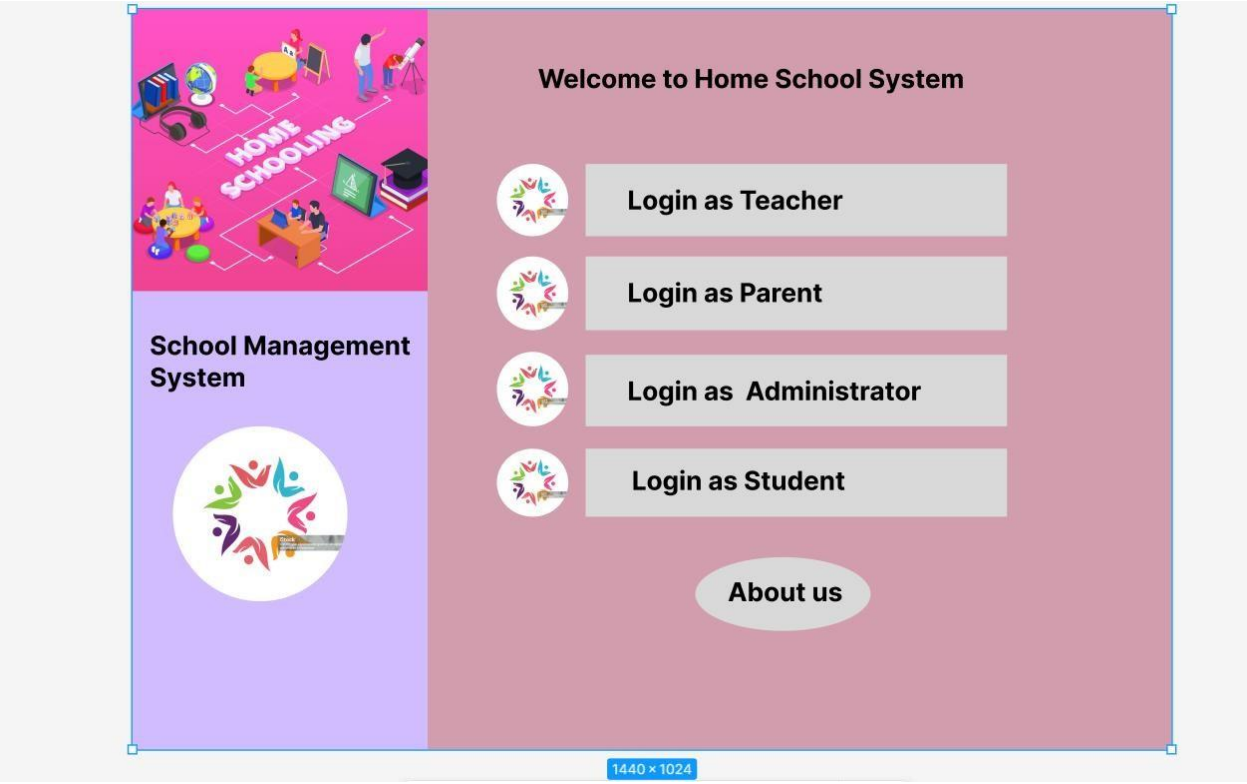
Assumptions	1. Parents/guardians have access to a valid login and internet connection. 2. The system maintains up-to-date attendance and academic records for all students.

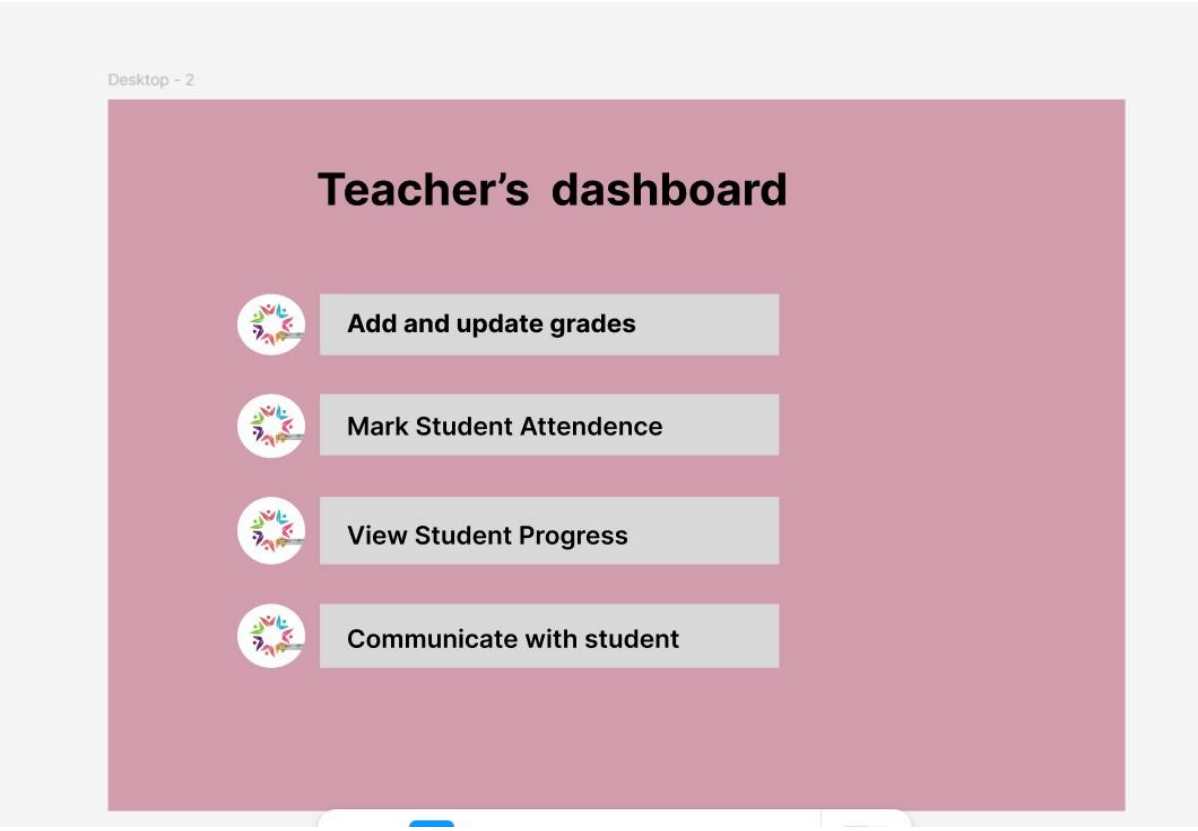
Use Case 15: Receive Notifications about Child Performance

ID and Name	UC-15: Receive Notifications about Child Performance
Created By	Abeera Ijaz
Date Created	1/10/2025
Primary Actor	Parent
Secondary Actors	Administrator, Teacher
Description	The system sends notifications to parents/guardians about their child's performance in academics, attendance, and other areas of concern or achievement. Notifications may include grades, attendance irregularities, or milestones reached.
Trigger	The system automatically generates notifications based on predefined triggers (e.g., low grades, attendance below a threshold, or academic achievements).
Preconditions	1. The parent/guardian must have a valid account linked to their child profile. 2. The system must be online. 3. Notification settings must be configured for the parent/guardian.
Postconditions	1. The parent/guardian receives the notification about their performance. 2. The system logs the notification delivery event for auditing purposes.
Normal Flow	1. The system identifies an event or condition (e.g., low grades, perfect attendance) that triggers a notification. 2. The system generates the notification containing relevant details (e.g., subject, issue, or achievement). 3. The system sends the notification to the parent/guardian through the selected communication channel (e.g., email, SMS, mobile app). 4. The parent/guardian reviews the notification.
Alternative Flows	**Notification Delivery Failure:** 1. If the notification cannot be delivered (e.g., invalid contact details), the system logs the failure and prompts the parent/guardian to update their contact information.
Exceptions	1. **Unauthorized Access:** Notifications are not sent if the parent/guardian is not authorized to receive information about the selected child. 2. **System Downtime:** The system queues the notifications and delivers them once the service is restored.
Priority	High
Frequency of Use	Frequently used during key academic periods or when specific performance thresholds are met.

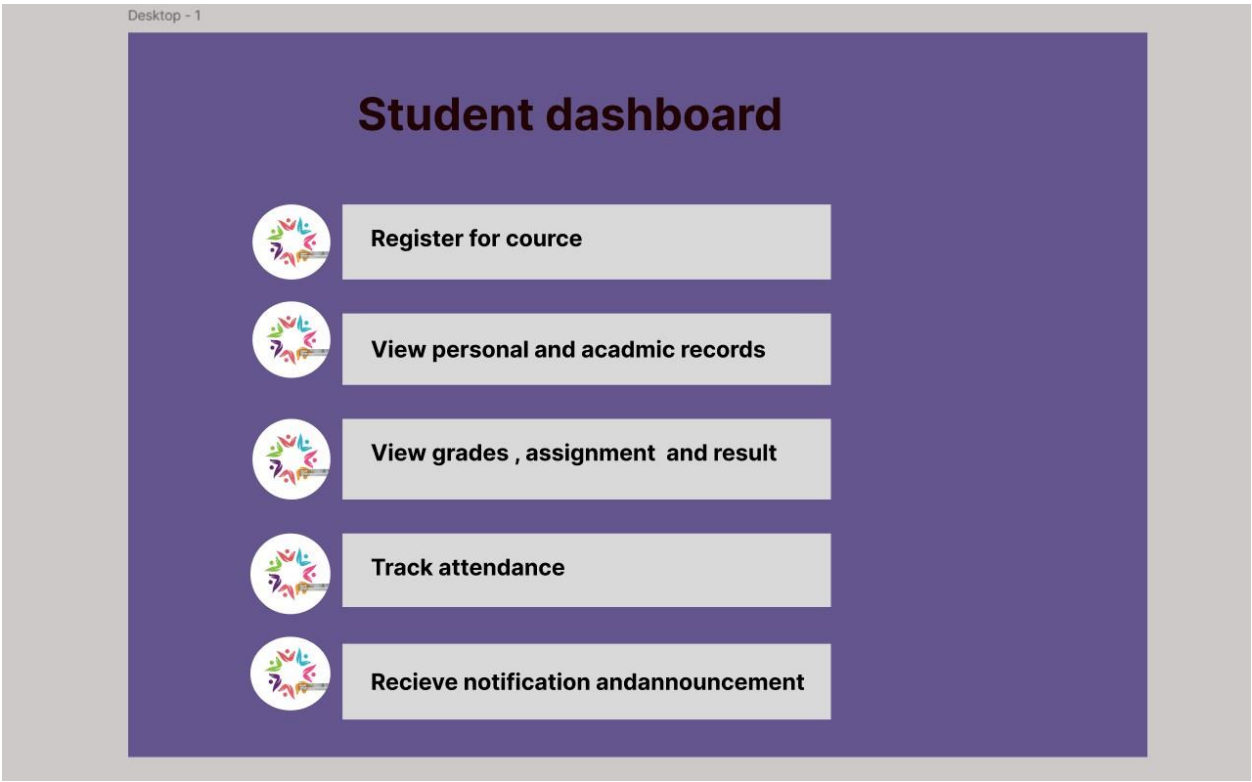
Business Rules	1. Notifications are sent only to authorized parents/guardians linked profile. 2. Notification logs must be maintained for auditing and transparency.
Other Information	The system should support multiple notification channels (e.g., email, SMS, mobile app) and allow parents to customize the types of notifications they want to receive.
Assumptions	1. Parents/guardians have provided valid and up-to-date contact information. 2. The system has accurate performance and attendance data for all students.

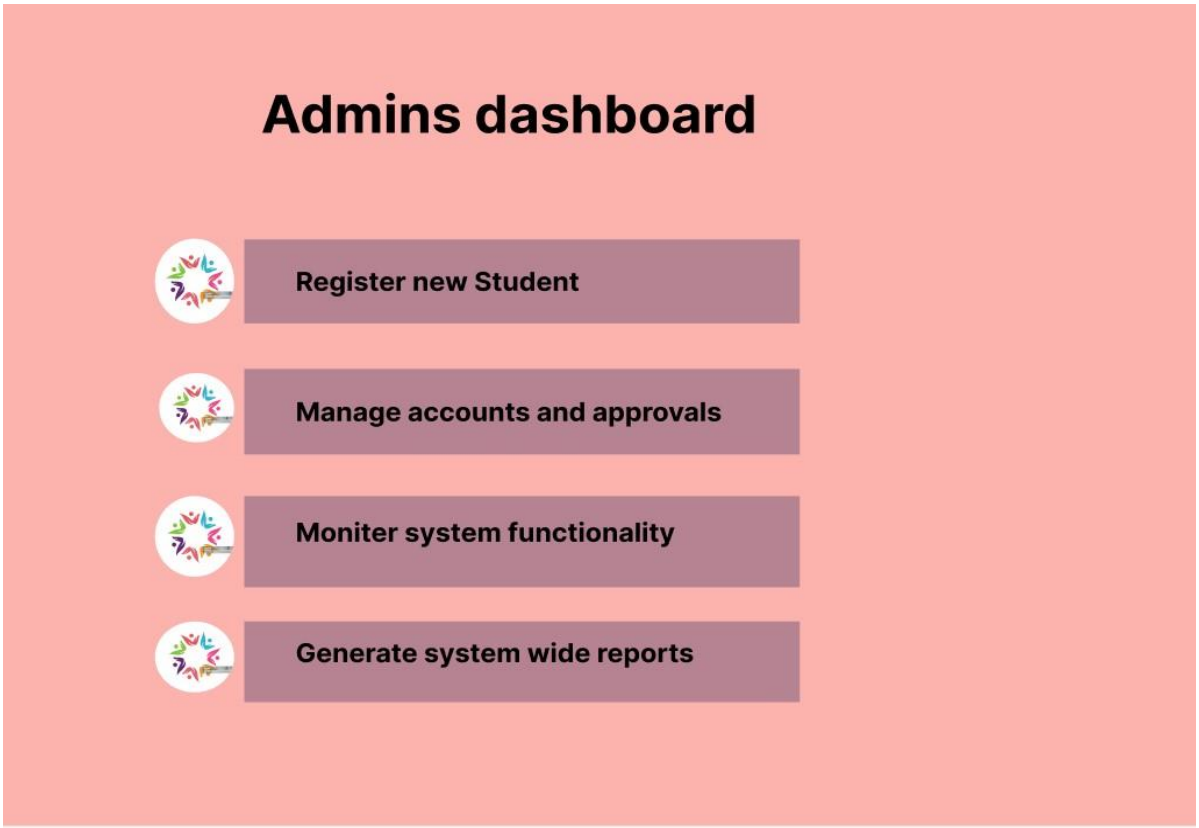
Prototype

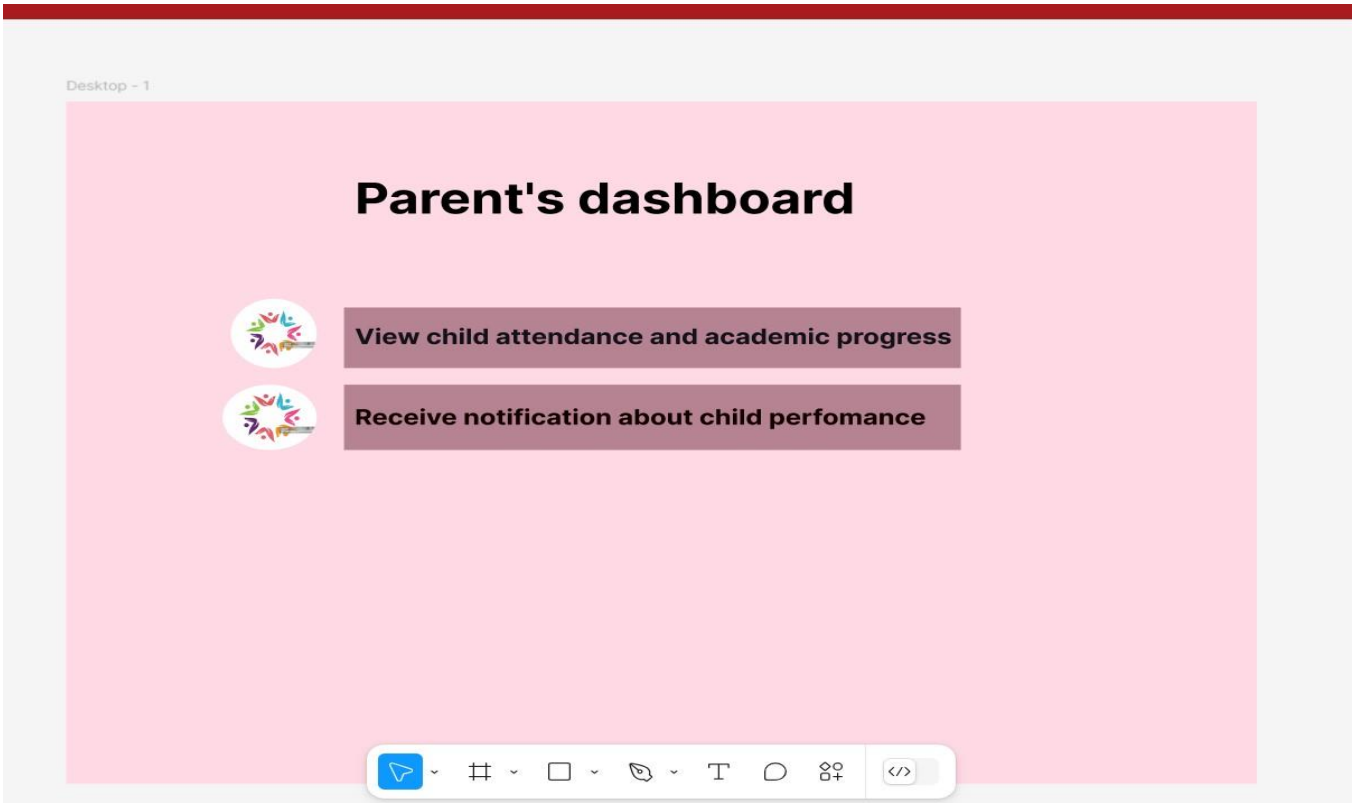

HOME SCHOOLING
School Management System
Welcome to Home School System
Login as Teacher
Login as Parent
Login as Administrator
Login as Student
About us
1440 × 1024


Desktop - 2
Teacher's dashboard
Add and update grades
Mark Student Attendence
View Student Progress
Communicate with student

Desktop - 1


Student dashboard
Register for cource
View personal and acadmic records
View grades , assignment and result
Track attendance
Recieve notification andannouncement


Admins dashboard
Register new Student
Manage accounts and approvals
Moniter system functionality
Generate system wide reports



Link Of Figma File For Prototype:

https://www.figma.com/proto/Oekv4mwwocWXck33GKOQLH/Untitled?node-id=1-62&t=m7DfrdwVEacH3WFB-1
https://www.figma.com/design/Oekv4mwwocWXck33GKOQLH/Untitled?node-id=195&t=eeRMd0VVxPTekQ2I-1

3. References

The proposed work references books such as *UML Distilled* by Martin Fowler and *Writing Effective Use Cases* by Alistair Cockburn for understanding UML and use case writing. Journals like *IEEE Software* and *ACM Communications* provided insights into best practices for use cases and prototyping. Websites like Visual Paradigm, UML and Rational Rose were consulted for practical guides and examples of use case diagrams and scenarios.

NOTE:

1. References section should be on a last page.
2. The proposal should be prepared jointly by all the group members.

8. Class Diagram

1. Student

- **Attributes:**
- Student-id: Unique identifier for the student (String).
- Name: Full name of the student (String).
- Email: Email address of the student (String).
- Phone: Phone number of the student (String).
- **Operations:**
- Register (): Registers a new student.
- View-Attendance (): Displays the student's attendance record.
- View-Grades (): Displays the student's grades for enrolled courses.
- Receive-Notification (): Receives notifications, potentially about course updates or assignments.

2. Enrollment

- **Attributes:**
- Student: A reference to a student object (association).
- Course: A reference to a Course object (association).
- **Operations:**
- Enroll (): Enrolls a student into a specific course.
- Drop (): Removes a student from a course.

3. Course

- **Attributes:**
- Course-ID: Unique identifier for the course (String).
- Course-Name: Name of the course (String).
- Teacher: A reference to a teacher object (association).
- **Operations:**
- Assign-Teacher (): Assigns a teacher to the course.
- Update-Course Info (): Updates the course information (e.g., name, description).

4. Attendance

- **Attributes:**
- Student: A reference to a student object (association).
- Date: Date of attendance (Date).
- Status: Whether the student was present or absent (String).
- **Operations:**
- Mark-Attendance (): Records the student's attendance for a specific date.

- Get-Attendance Report (): Generates a report of the student's attendance.

5. Grade

- **Attributes:**
- Student: A reference to a student object (association).
- Course: A reference to a Course object (association).
- Assignment-Marks: Marks obtained in assignments * exam Marks: Marks obtained in exams (Float).
- **Operations:**
- Calculate-Final Grade (): Computes the final grade based on assignment and exam marks.
- View-Grade Report (): Displays the student's grades for a specific course.

6. Teacher

- **Attributes:**
- Teacher-ID: Unique identifier for the teacher (String).
- Name: Full name of the teacher (String).
- Email: Email address of the teacher (String).
- **Operations:**
- Create-Course (): Creates a new course.
- Grade-Assignments (): Grades assignments submitted by students.

7. Administrator

- **Attributes:**
- Admin-ID**:** Serves as a unique identifier for each administrator, ensuring accountability and traceability.
- Name: Provides a way to identify the administrator in communications and reports.
- Email: Essential for communication with students and faculty.
- Role: Defines the specific responsibilities and permissions of the administrator within the system.
- **Behaviors:**
- Register-Student (): Facilitates the addition of new students to the system, ensuring proper management of student records.
- Manage-Accounts (): Allows the administrator to oversee user accounts, ensuring security and proper access levels.
- Generate-Reports (): Enables the creation of various reports for analysis and decision-making.
- Assign-Courses (): Empowers the administrator to allocate courses to teachers or students, streamlining course management.

8. Communication

- **Attributes:**
- Message -ID**:** Uniquely identifies each message, allowing for easy tracking and retrieval.
- Sender: Indicates who sent the message, which is crucial for accountability.
- Receiver: Identifies the recipient of the message, ensuring that communication reaches the intended audience.
- Message-Text: Contains the content of the message, which is the primary purpose of the communication.
- Times-tamp**:** Records when the message was sent, providing context for the communication.
- **Behaviors:**
- Send-Message **():** Allows users to send messages to others, facilitating communication within the system.
- Receive-Message (): Enables users to receive messages, ensuring they stay informed.
- View-Announcements (): Provides a way for users to access important announcements, keeping everyone updated on critical information.

➢ Rule of Thumb Application

- **Encapsulation**: Each class encapsulates its attributes and operations, ensuring that the internal state is protected and can only be modified through defined methods.
- **Single Responsibility Principle:** Each class has a specific responsibility, such as managing student information, course details, or attendance records.
- **Association Relationships**: Classes are interconnected through associations, allowing for a clear representation of how entities interact within the system.
- **Clear Naming Conventions**: Class and method names are descriptive, making it easier to understand their purpose and functionality. By applying Rule of thumb, we have identified the above classes their states and behaviors.

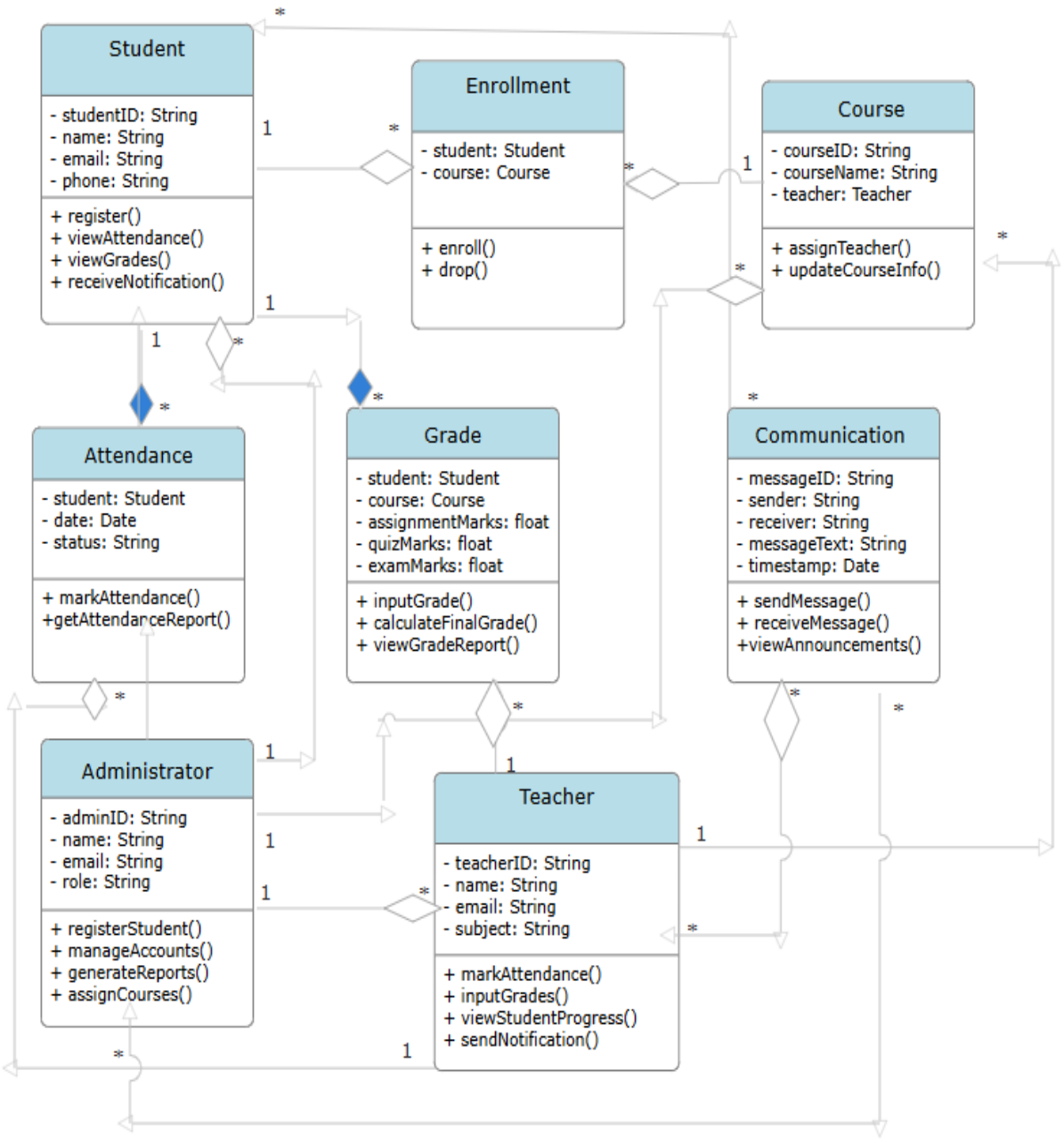
▪ Relationships:

- **Student - Enrollment**: **Composition** - A student can be part of multiple enrollments, but an enrollment belongs to only one student.
- **Enrollment - Course: Composition** - An enrollment belongs to a specific course, and a course can have multiple enrollments.
- **Student - Attendance: Composition** - A student can have multiple attendance records, but an attendance record belongs to a specific student.
- **Student - Grade: Composition** - A student can have multiple grades, but a grade belongs to a specific student.
- **Course - Teacher**: **Aggregation** - A course can have a teacher, but a teacher can teach multiple courses.
- **Teacher - Attendance: Aggregation** - A teacher can mark attendance for multiple students, but an attendance record belongs to a specific student.

- **Teacher - Grade: Aggregation** - A teacher can input grades for multiple students, but a grade belongs to a specific student.

- **Other Observations:**
- Administrator and Teacher are both involved in managing and accessing student information, but they have different roles and responsibilities.
- Communication is a separate entity, representing messages between various entities in the system.
- Student can receive notifications related to various aspects of their academic journey.

Class Diagram:



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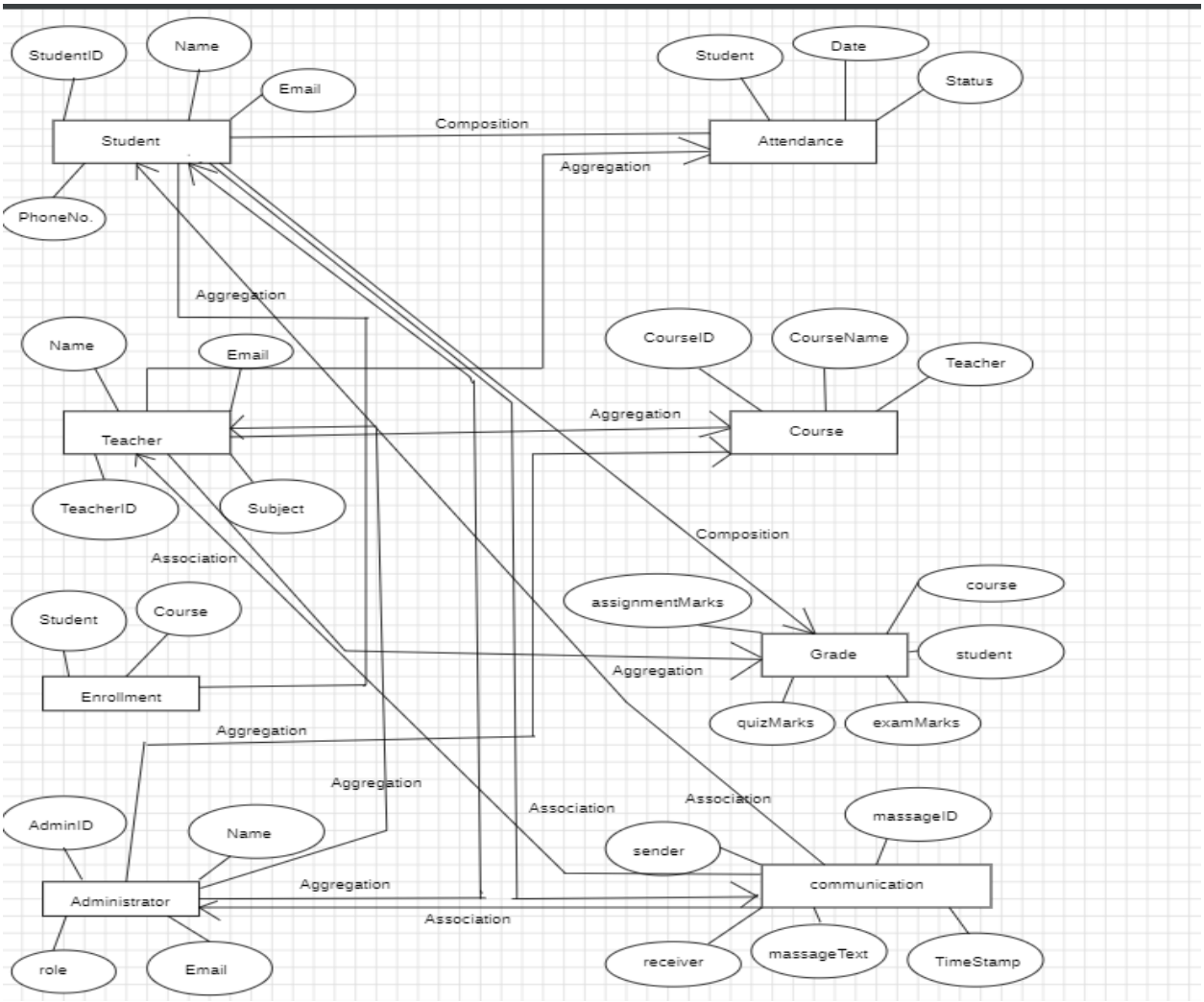
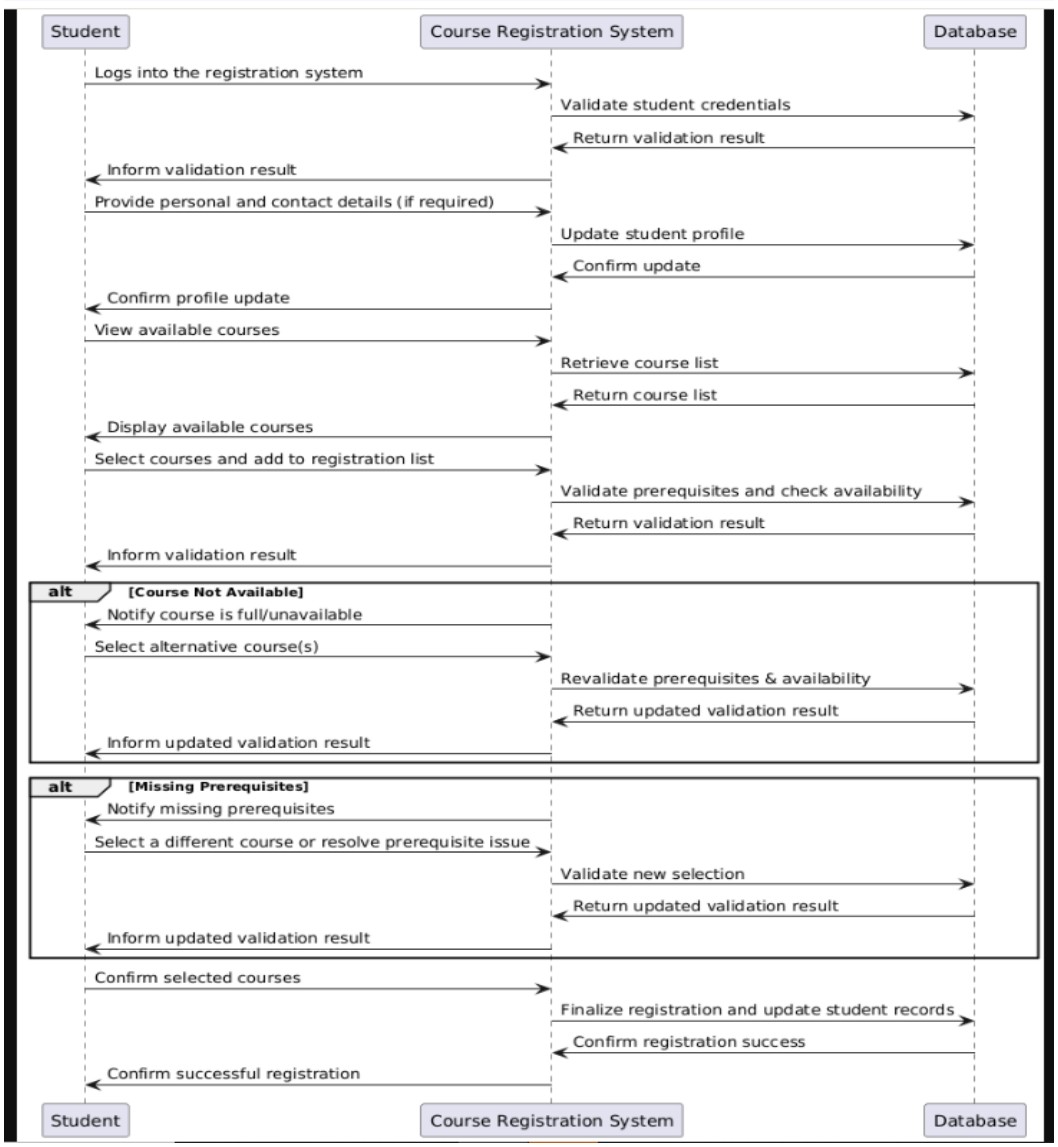


9. References

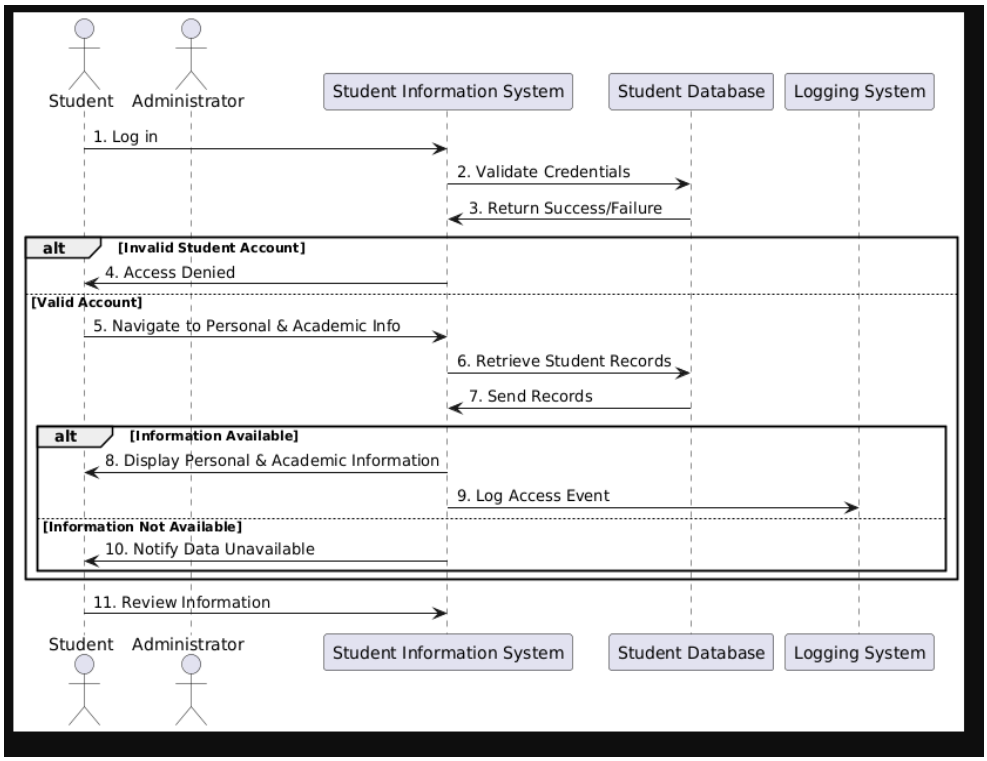
- Database Systems: Design, Implementation, and Management by Coronel and Morris. Tutorials Point SQL Tutorial: https://www.tutorialspoint.com/sql/ . Database Design and Development by Han and Kamber.
- UML Distilled: A Brief Guide to the Standard Object Modeling Language by Martin Fowler. Lucid chart UML Diagram Guide: https://www.lucidchart.com/pages/uml-diagram. The Unified Modeling Language User Guide by Grady Booch, James Rumbaugh, and Ivar Jacobson.

9. Sequence Diagrams

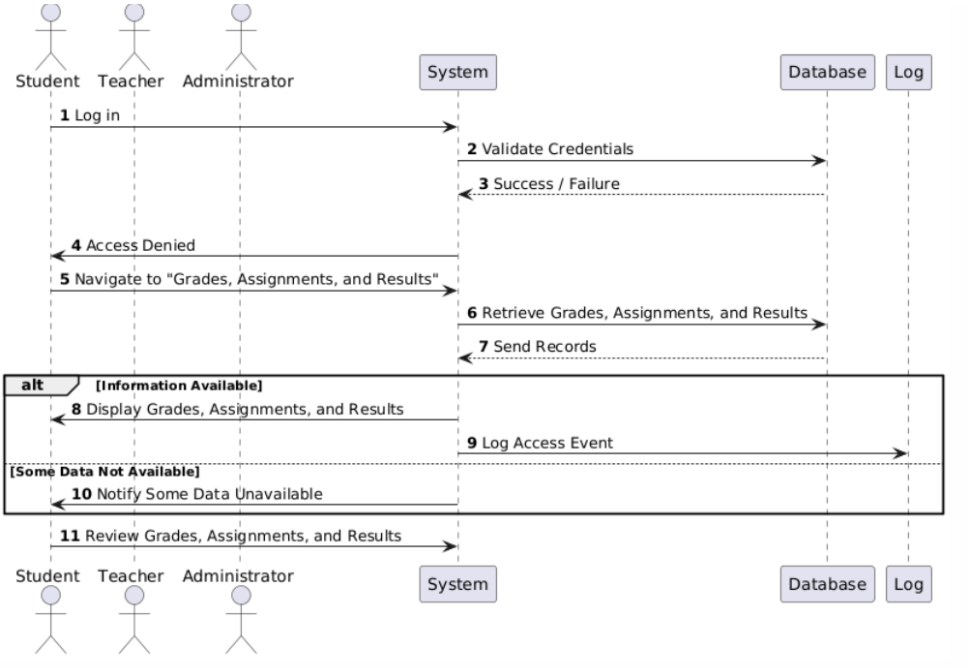
UC-01: Register a student



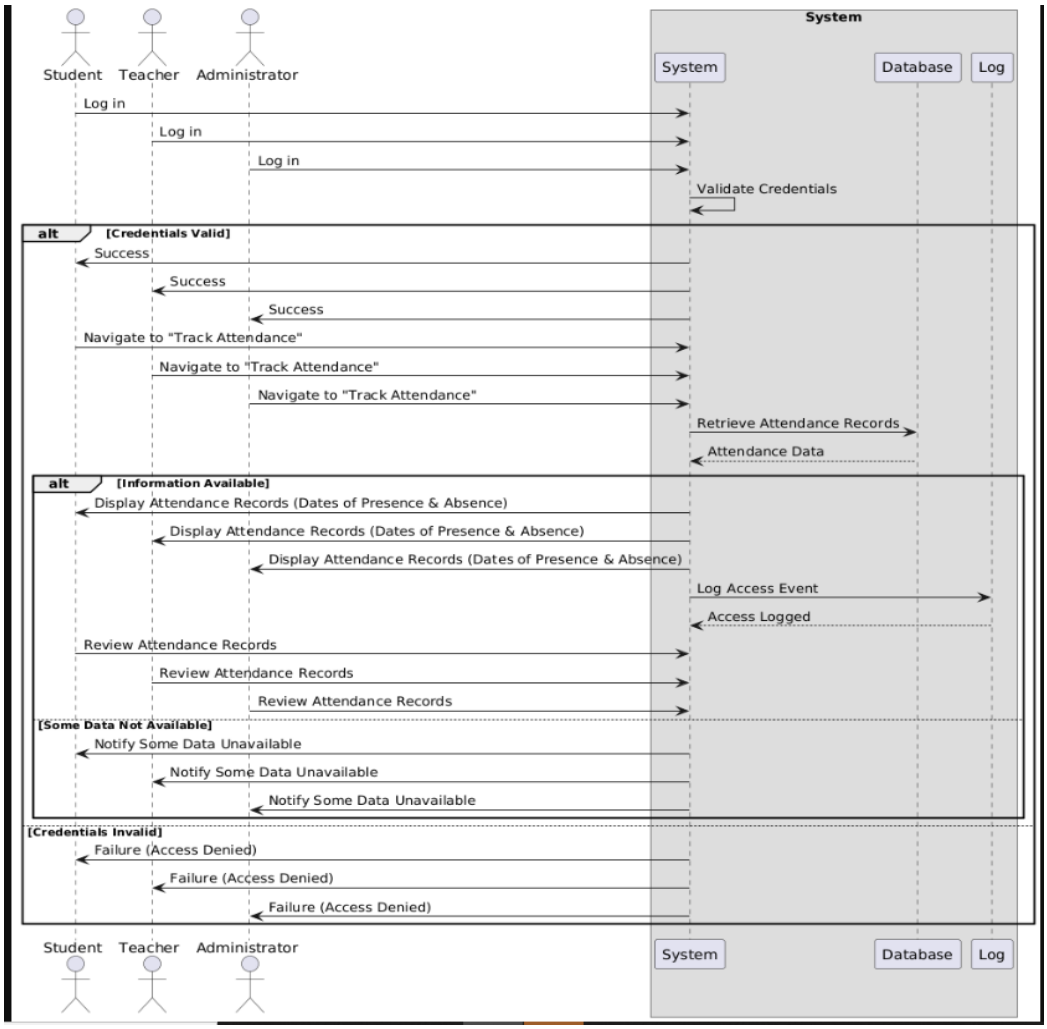
UC-02: View Personal or Academic Information



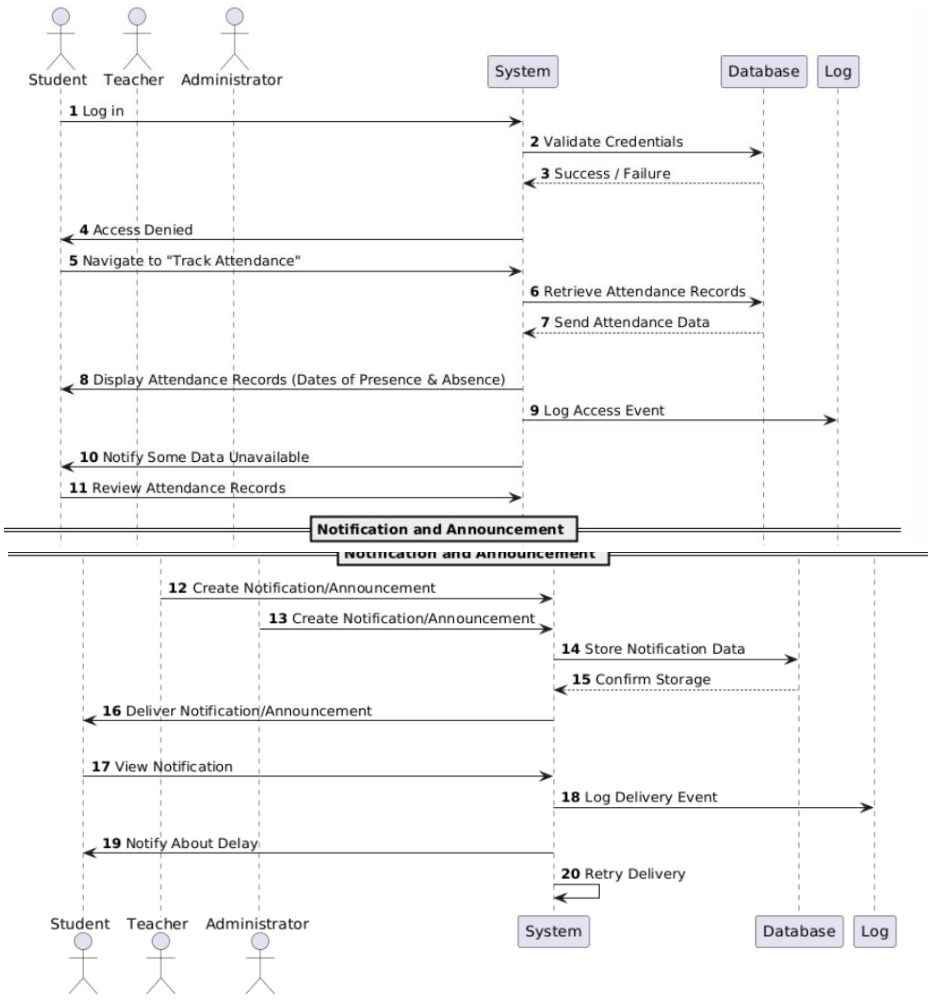
UC-03: View Grades, Assignments, Result



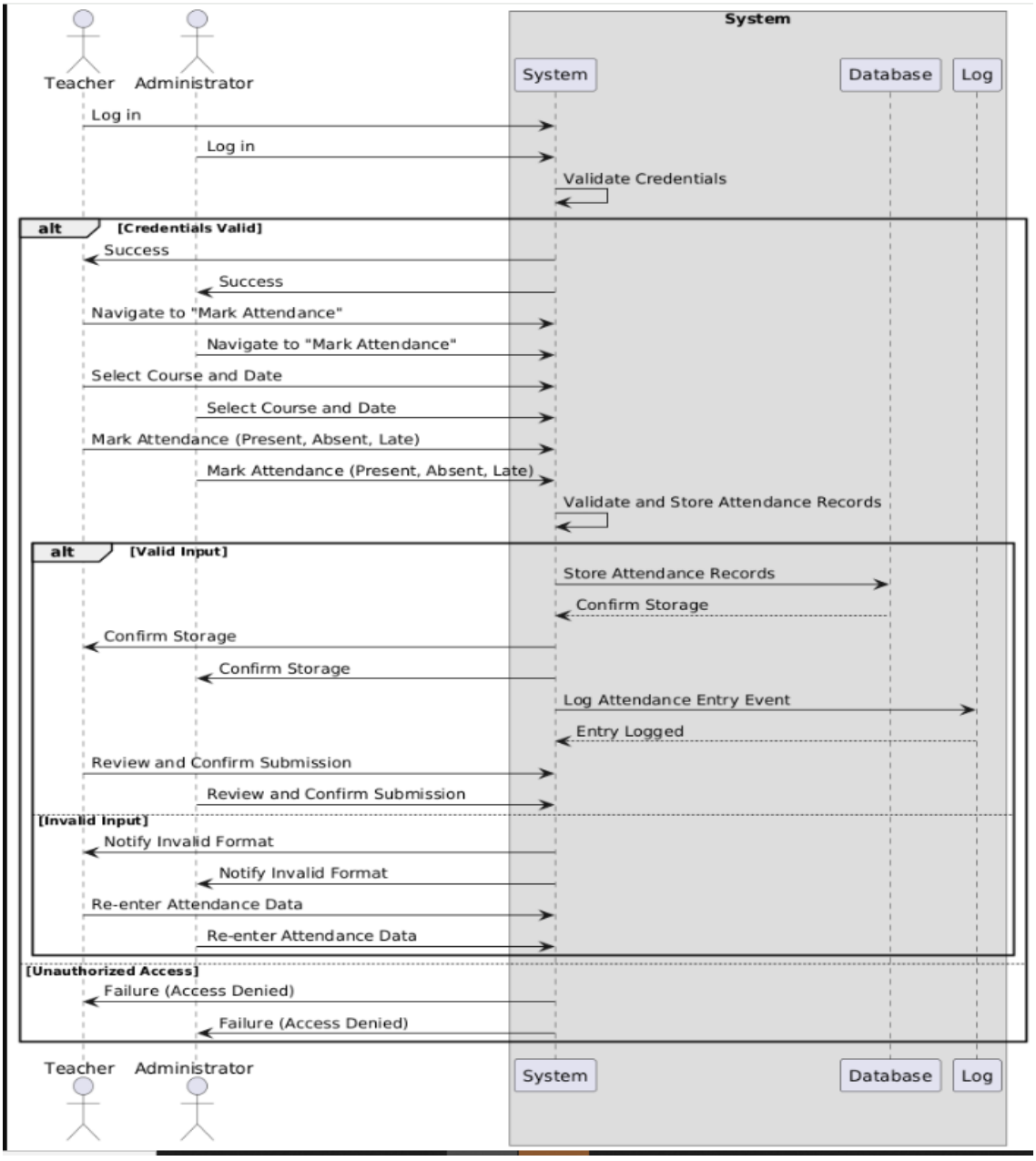
UC-04: Track attendance



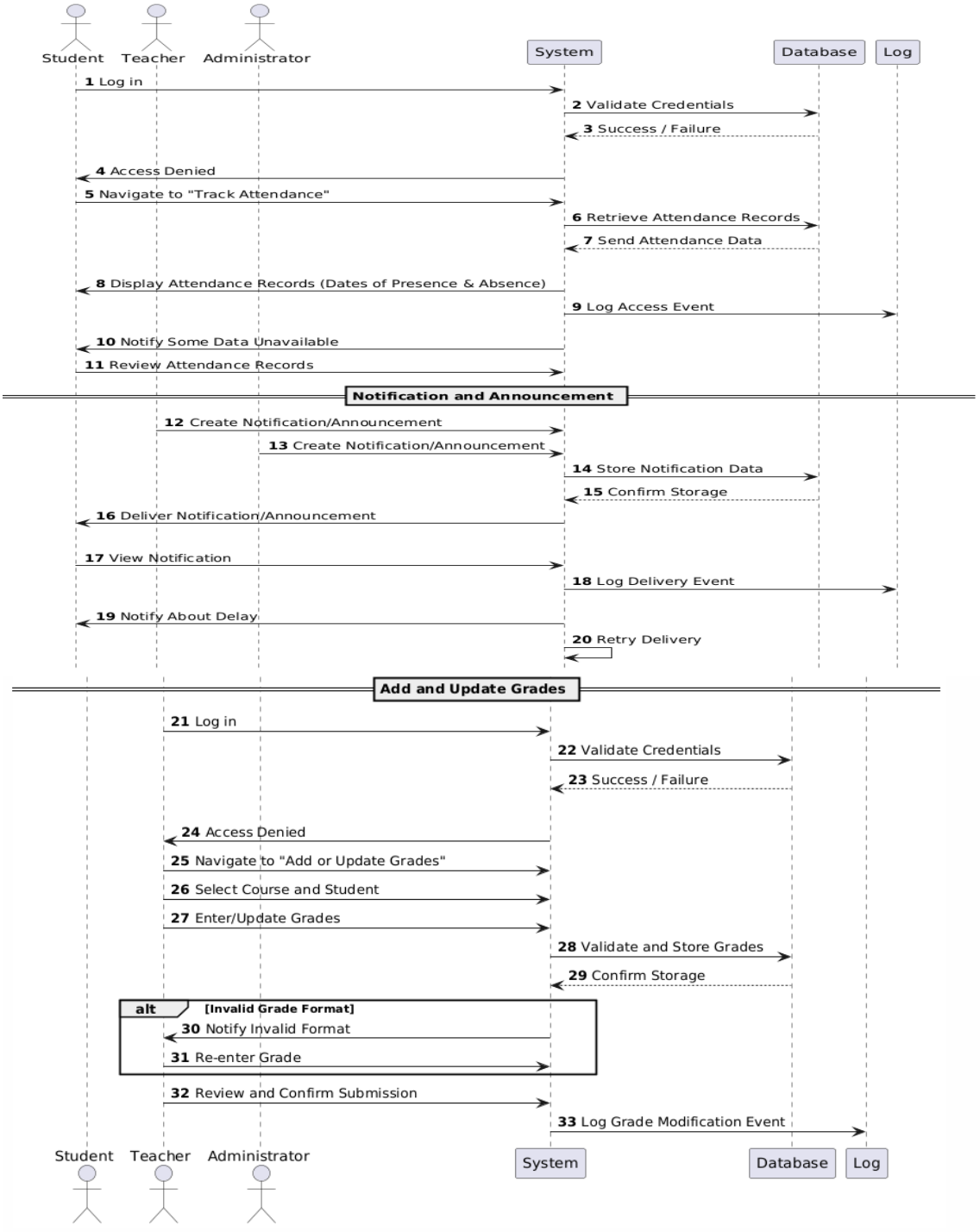
UC-05: Receive notification and Announcement



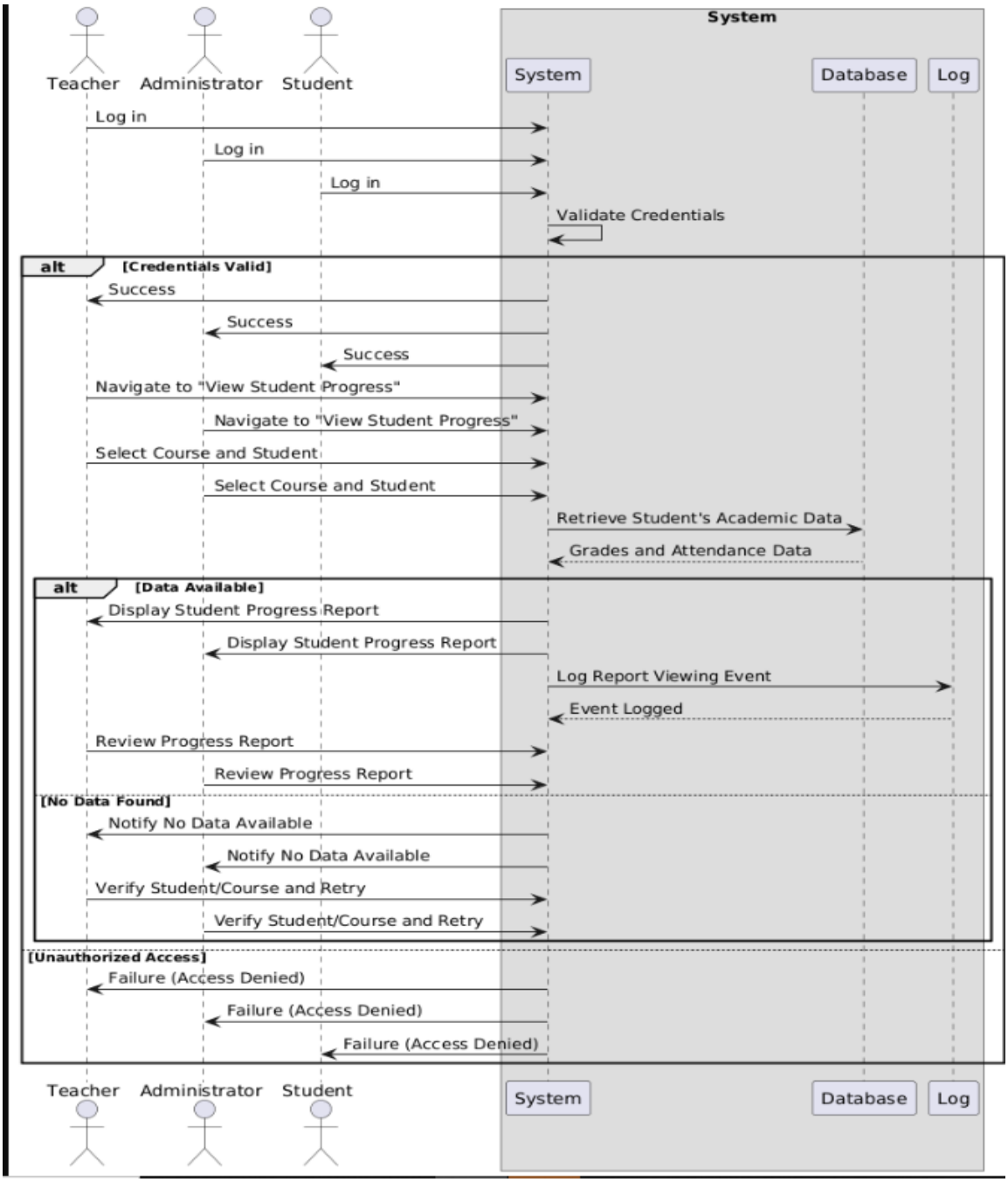
UC-06: Mark student Attendance



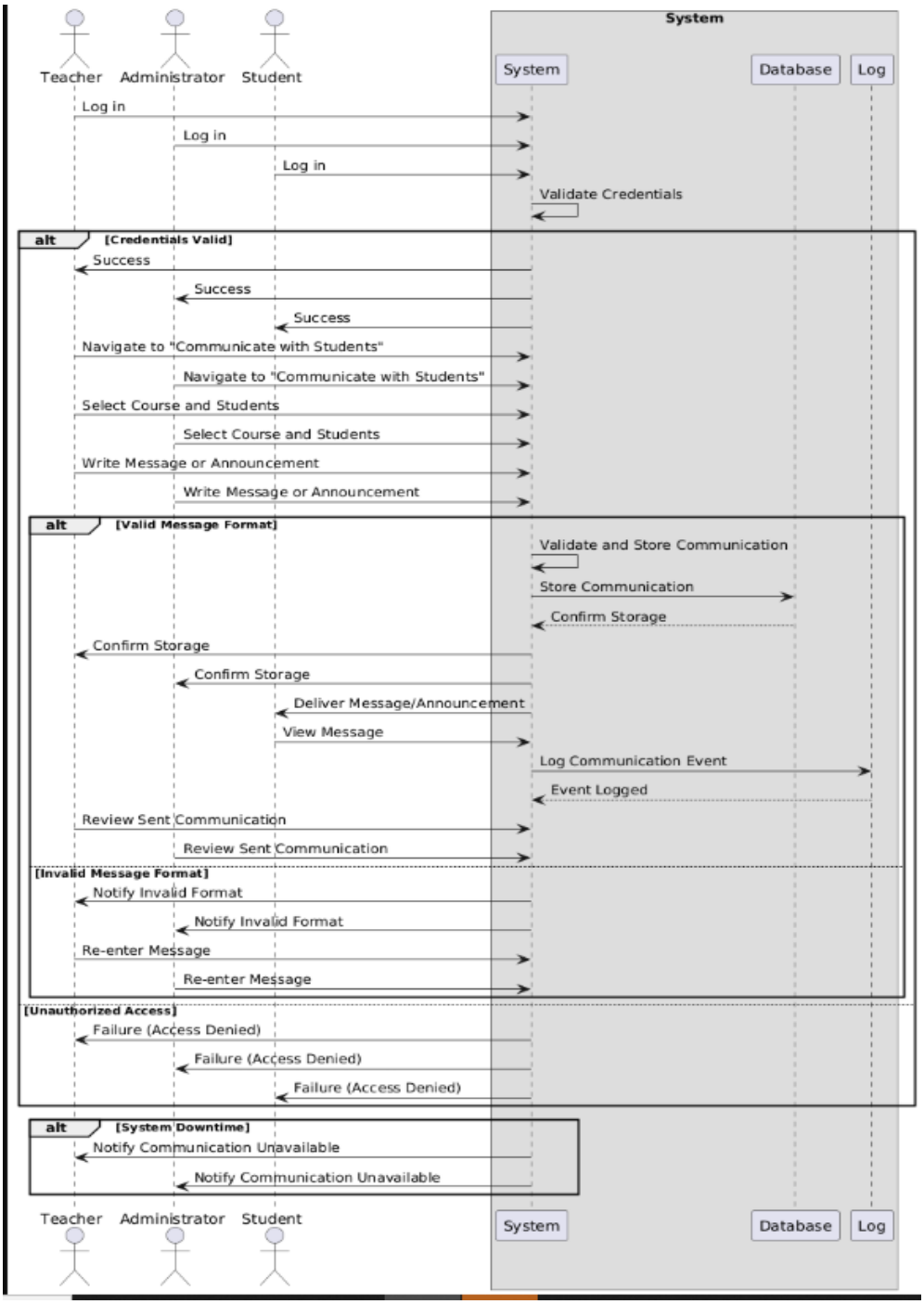
UC-07: Add and update grades



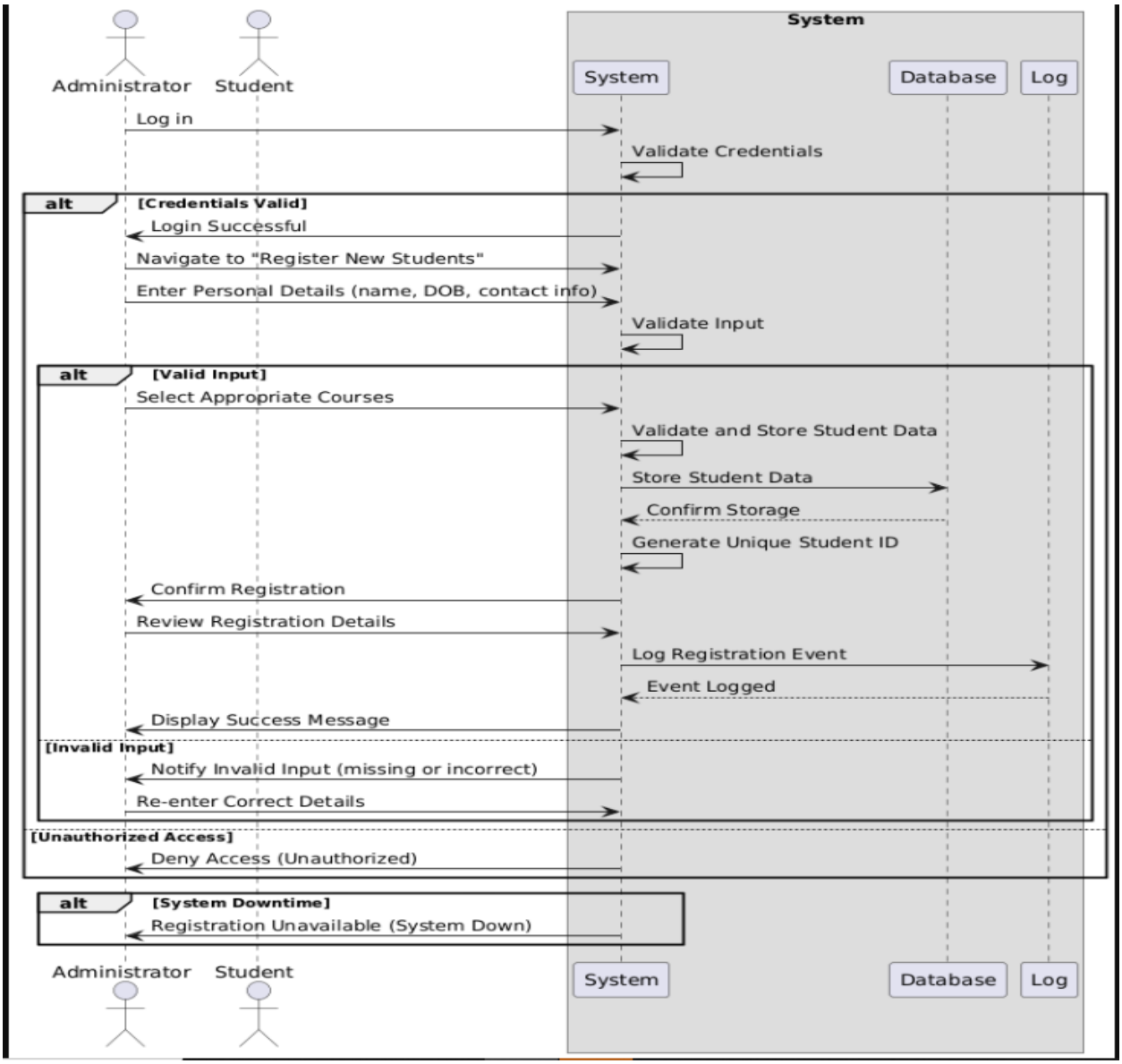
UC-08: View Student Progress



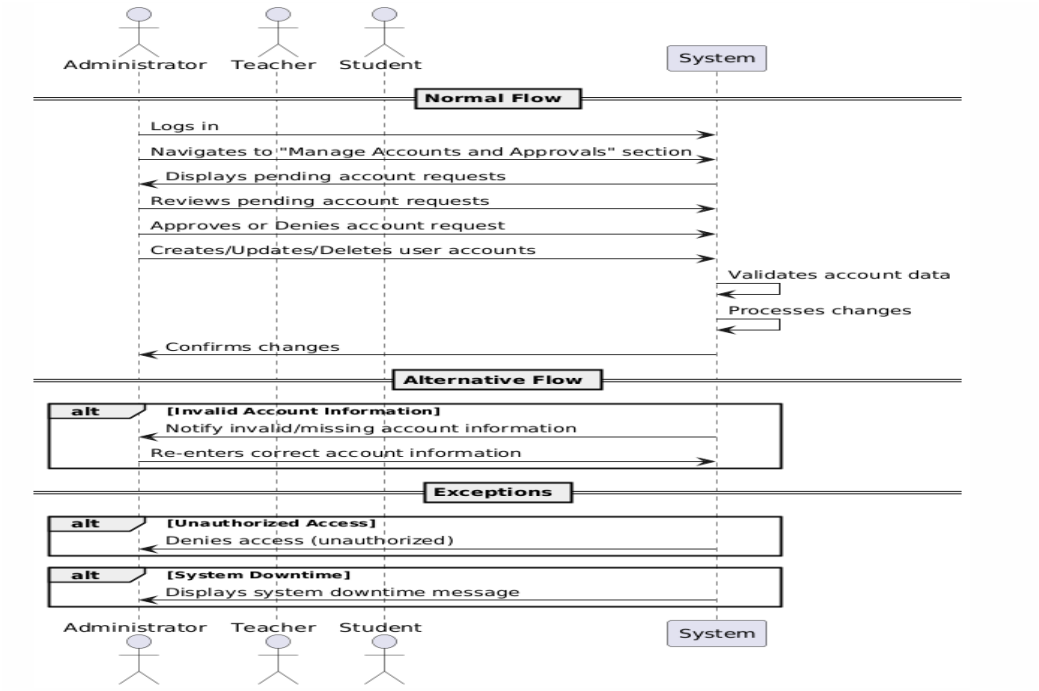
UC-09: Communicate With Students



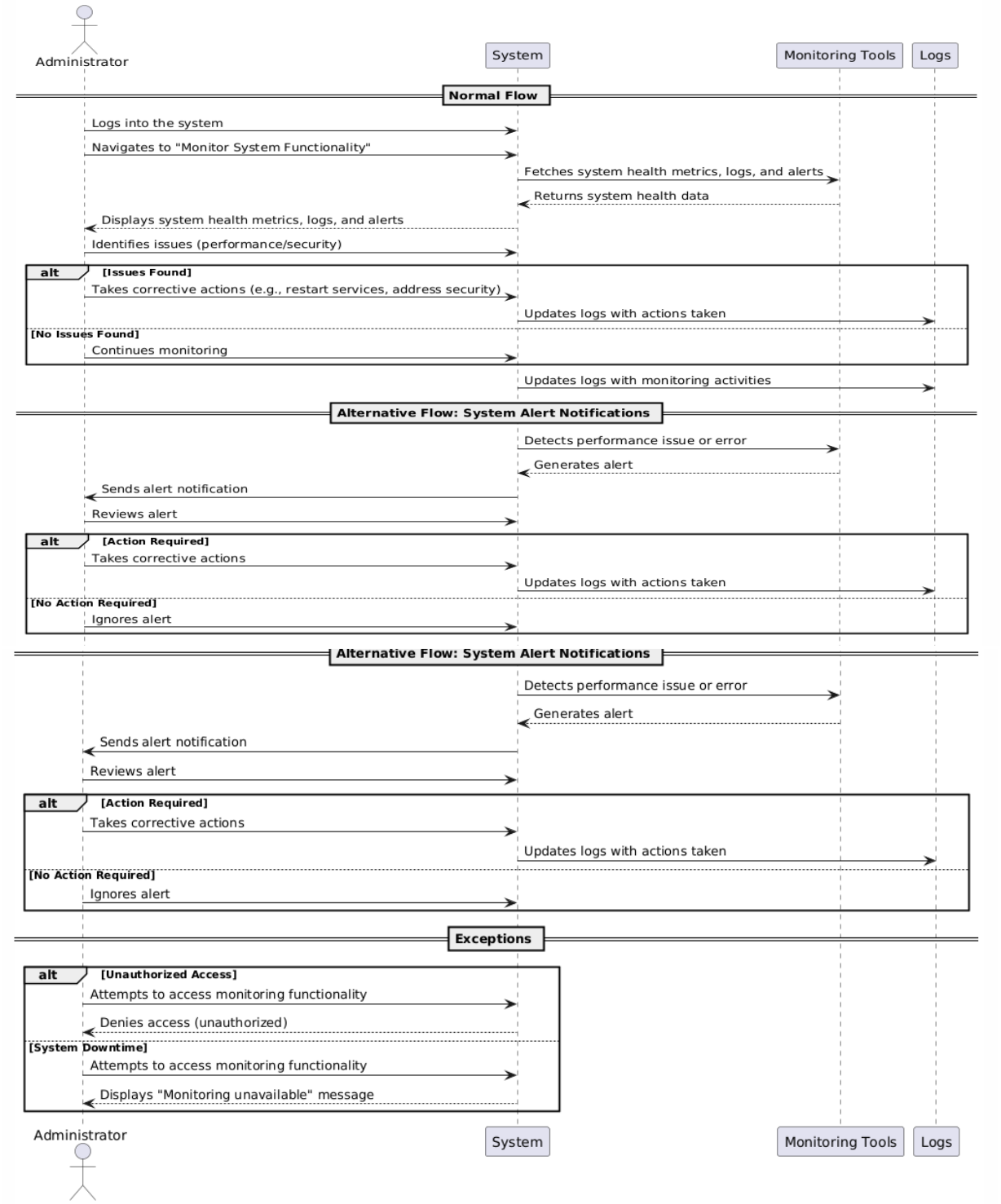
UC-10: Register new student



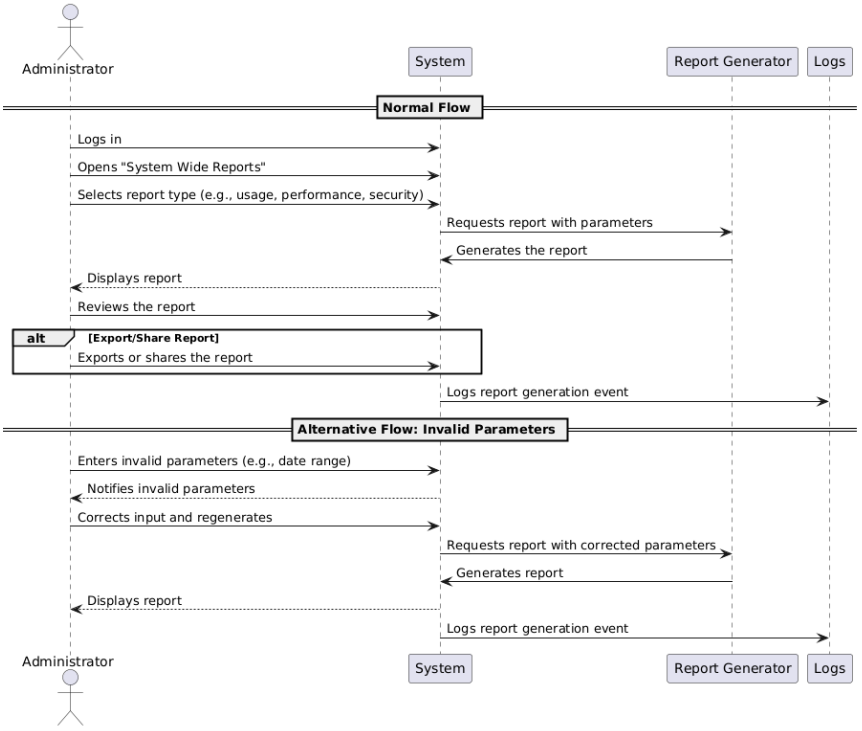
UC-11: Manage Accounts And Approvals


Administrator
Teacher
Student
System
Normal Flow
Logs in
Navigates to "Manage Accounts and Approvals" section
Displays pending account requests
Reviews pending account requests
Approves or Denies account request
Creates/Updates/Deletes user accounts
Validates account data
Processes changes
Confirms changes
Alternative Flow
alt
[Invalid Account Information]
Notify invalid/missing account information
Re-enters correct account information
Exceptions
alt
[Unauthorized Access]
Denies access (unauthorized)
alt
[System Downtime]
Displays system downtime message
Administrator
Teacher
Student
System

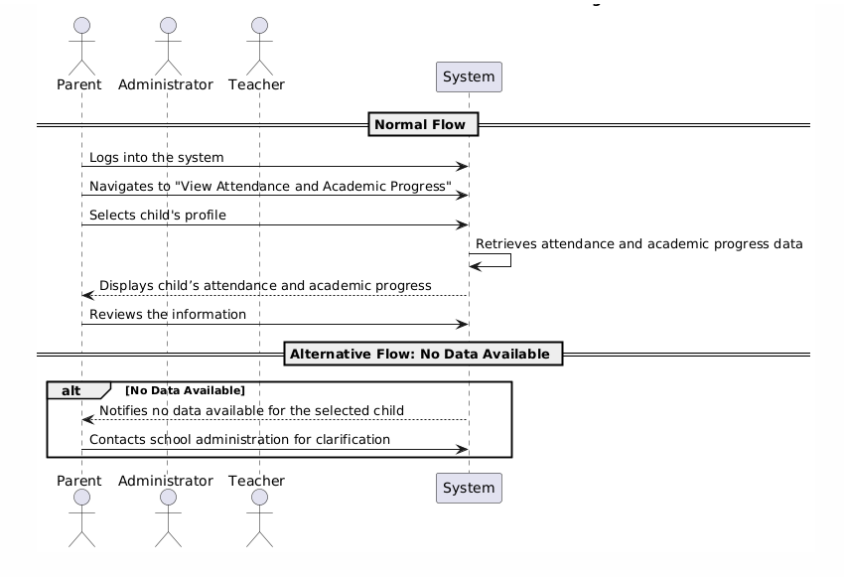
UC-12: Monitor System Functionality



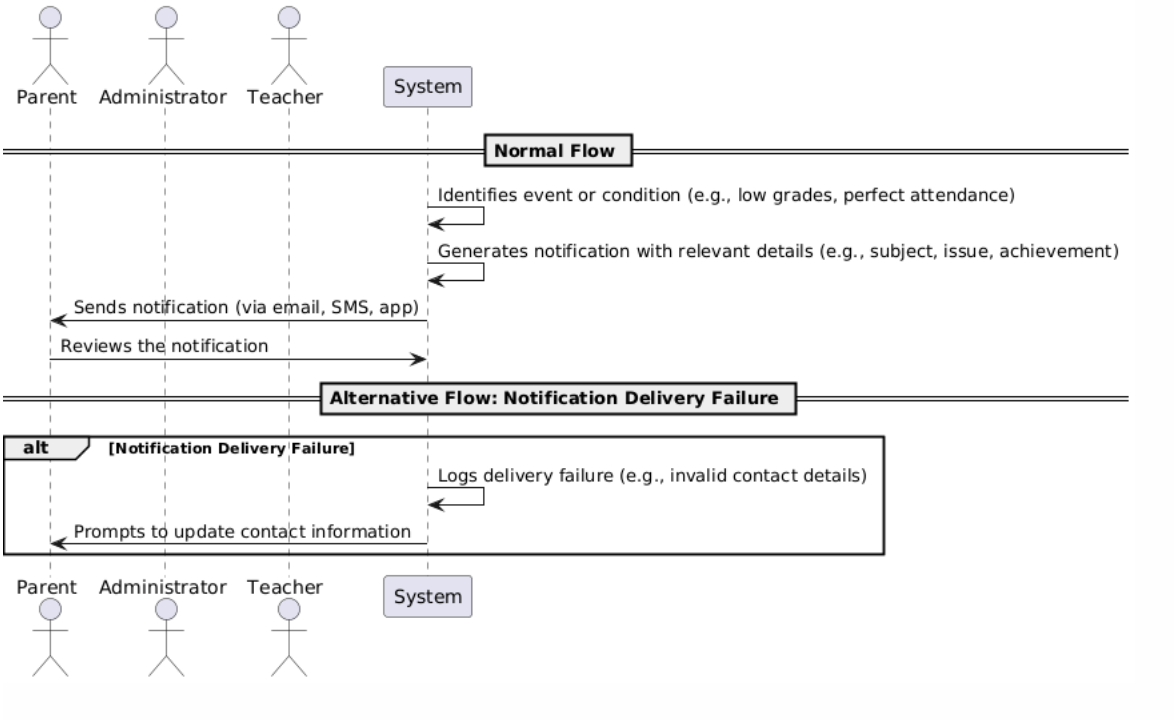
UC-13: Generate System Wide Reports



UC-14: View Child Attendance And Academic Progress



UC-15: Receive Notifications about Child Performance



References:

1. www.spiceworks.com › articles › sequence-diagramSequence Diagrams Explained: Elements, Examples, and Benefits ...
2. I use PlantUml for diagram or deepseek as ai tool for some help as well