**1. Class Diagram**

**Purpose**

The class diagram illustrates the main entities within the chat application and their relationships. It helps us understand how different components interact with each other.

**Key Classes**

* **Student**: Represents the students who use the chat application. Each student has a unique ID, name, email, and a list of classrooms they belong to. They can send messages and join or leave classrooms.
* **Teacher**: Represents the teachers in the school. Teachers have their own ID, name, email, and a list of classrooms they manage. They can create classrooms and send messages.
* **Classroom**: Represents a classroom where students and teachers interact. It contains lists of students, teachers, and messages.
* **Message**: Represents the messages exchanged in the chat. Each message has an ID, content, sender, and timestamp.
* **Notification**: Represents notifications sent to users, informing them about new messages or events.

**Relationships**

* Students and teachers can join multiple classrooms.
* Classrooms contain multiple students and teachers.
* Each classroom stores messages sent by users.

**2. Sequence Diagram**

**Purpose**

The sequence diagram depicts the interactions between users and the system during specific scenarios, such as a student sending a message in a classroom.

**Scenario: Sending a Message**

1. **Joining Classroom**: The student joins a classroom, and the system confirms their entry.
2. **Sending a Message**: The student sends a message to the classroom.
3. **Creating the Message**: The system processes the message creation and stores it.
4. **Notifying the Teacher**: The teacher is notified about the new message.
5. **Viewing Messages**: The teacher views the messages in the classroom.
6. **Replying**: The teacher replies to the message, which is processed similarly.
7. **Notifying the Student**: The student receives a notification about the teacher's reply.

**3. Use Case Diagram**

**Purpose**

The use case diagram outlines the various functionalities of the chat application and the actors involved. It provides a high-level view of how users interact with the system.

**Actors**

* **Student**: Uses the chat application to join classrooms, send and receive messages, and view chat history.
* **Teacher**: Manages classrooms, sends messages, and interacts with students.
* **Admin**: Oversees the chat application, manages users, and sends notifications.

**Use Cases**

* **Join Classroom**: Both students and teachers can join a classroom.
* **Send Message**: Users can send messages to the classroom.
* **Receive Message**: Users receive messages from others.
* **View Messages**: Users can view the chat history.
* **Reply to Message**: Users can reply to messages in the classroom.
* **Create Classroom**: Teachers can create new classrooms for their subjects.
* **Manage Users**: Admins can manage user accounts.
* **Send Notifications**: Admins and teachers can notify users about important updates