HI-Chat – Mid-Term Report

: A Chatbot for Hongik University Information Guidance

지도교수	팀원	학번	C011147	이름	이승연
이장호			C111038		김지윤

1. Requirements Analysis

Describes the target users (students), scope of information covered (academic, administrative, and convenience-related), and expected functionalities including chatbot-based natural language interaction and quick-reply menus.

2. Functional Modeling

A) Student Perspective - Use Case Descriptions

2.1.1 Use Case Scenarios

- A freshman looking for the classroom location of a course
- A student checking the academic calendar or course registration period
- A user asking for eligibility criteria for scholarships or student loans
- General FAQs such as leave of absence, tuition refund, and welfare access
- A student accessing popular services directly from the chatbot menu, such as:
    - Course registration guidance

- Cafeteria (menu and hours)
- Campus phone directory (e.g., department …
- Certificate issuance
- Academic calendar lookup
- Library hours and availability
- GPA/grades lookup
- Campus map navigation
- Midterm/final exam schedule
- On-campus convenience facilities
- Admission inquiries for prospective students

2.1.2 Use Case Description Based on Target System

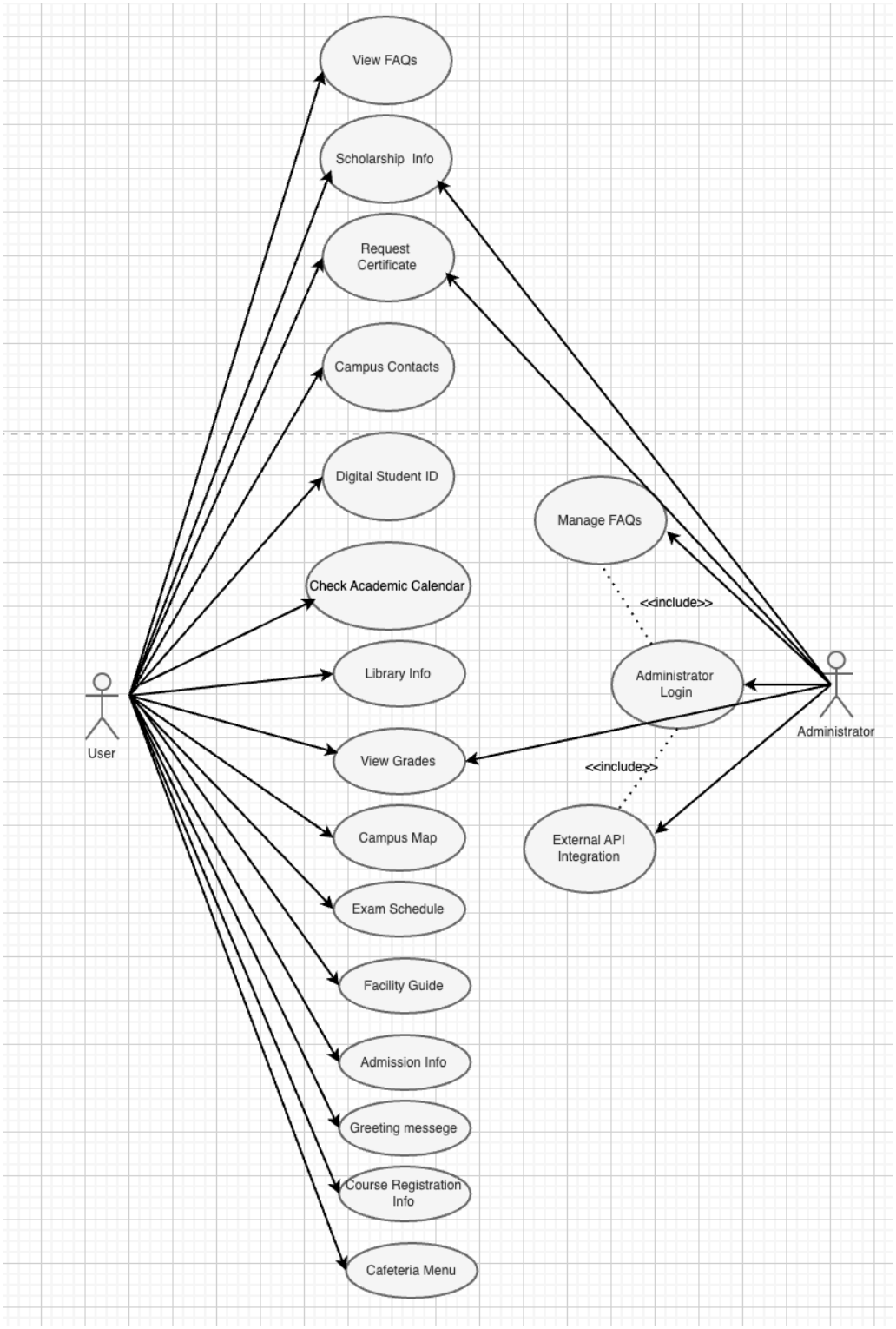
Use Case	Description
Greeting / Welcome Message	The chatbot sends a welcome message to the user upon entry.
View FAQs	Provides answers to commonly asked questions such as tuition refund, leave of absence, etc.
Course Registration Info	Offers details on registration schedules, credit requirements, and how-to instructions.
Cafeteria Menu	Shows daily/weekly cafeteria menu and meal times.
Campus Contacts	Lists phone numbers and locations for offices and departments.
Digital Student ID	Assists in accessing or linking to digital ID functions.
Scholarship Info	Provides eligibility, deadlines, and application info.
Request Certificate	Guides users on how to obtain transcripts or enrollment documents.
Check Academic	Displays semester events, holidays, and deadlines.

Calendar	
Library Info	Gives information on library hours, seat availability, and borrowing services.
View Grades	Guides users to access GPA or semester grades.
Campus Map	Provides visual guide or map-based directions to locations on campus.
Exam Schedule	Displays midterm and final exam periods or personalized schedule.
Facility Guide	Offers information about lounges, study rooms, printers, and other convenience spaces.
Admission Info	Informs prospective students about application requirements and deadlines.

These use cases represent a one-stop campus assistance experience via HI-Chat. Each function is accessible through a combination of quick-reply menus.

2.1.3 Use Case Diagram

The following diagram shows the interaction between users (students and administrators) and the primary services offered by HI-Chat:



2.1.4 Use Case Flow Example

Use Case: Course Registration Info

Actor: Student

Main Flow:

1. Student opens HI-Chat via web or KakaoTalk.
2. Chatbot greets and shows main menu.
3. Student selects "Course Registration Info" or types related query.
4. Chatbot responds with:
    - Key dates for registration and add/drop.
    - Required credits and major/minor policy links.
    - Option to access academic portal.
5. Student optionally follows link or returns to main menu.

Alternative Flow:

- If the user types an unclear question (e.g., “Can I add classes late?”), the chatbot redirects to the related FAQ or asks for clarification.

Use Case: Library Info

Actor: Student

Main Flow:

1. Student opens HI-Chat and selects “Library Info.”
2. Chatbot provides options: hours, seat availability, location.
3. Student selects “Seat availability.”
4. Chatbot responds with real-time seat info or a link to the reservation system.
5. User returns to the main menu.

Alternative Flow:

- If user types ambiguous input (e.g., “Where to study?”), chatbot suggests Library, Cafeteria, or Lounge based on keyword matching.

Use Case: Scholarship Info

Actor: Student

Main Flow:

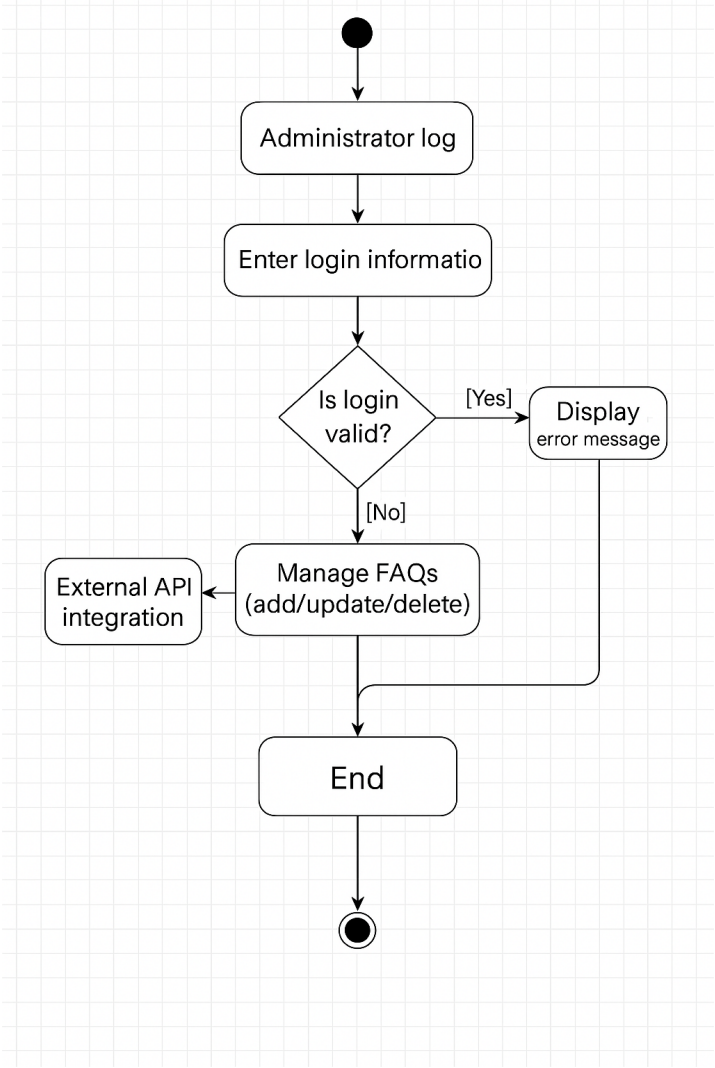
1. Student enters “Scholarship Info” into chatbot.
2. Chatbot lists categories (merit-based, need-based, external).
3. Student selects “Merit-based.”
4. Chatbot shows eligibility, deadline, and link to apply.
5. Student clicks link or returns to explore other categories.

Alternative Flow:

- If the user only types “Money support,” the chatbot asks clarifying question: “Are you looking for scholarships or student loans?”

B) Admin Activity Diagram

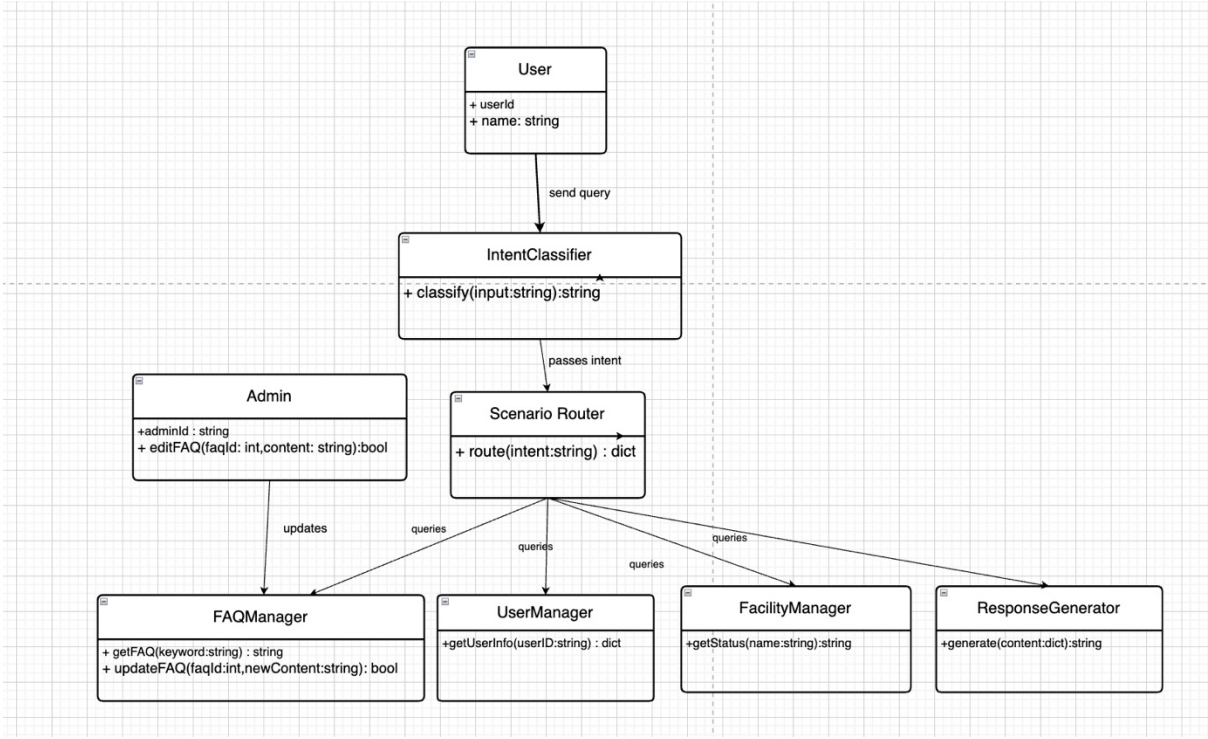
1. Access admin panel (future feature)
2. Add/edit FAQs or schedule
3. Update chatbot response logic
4. Review query logs (optional future extension)



This activity diagram represents the primary operations and decision flow for the **administrator role** within the hi-Chatbot system. The administrator is responsible for maintaining FAQ content, managing user data, and ensuring integration with external systems when needed.

3. Static Modeling

A. Class Diagram

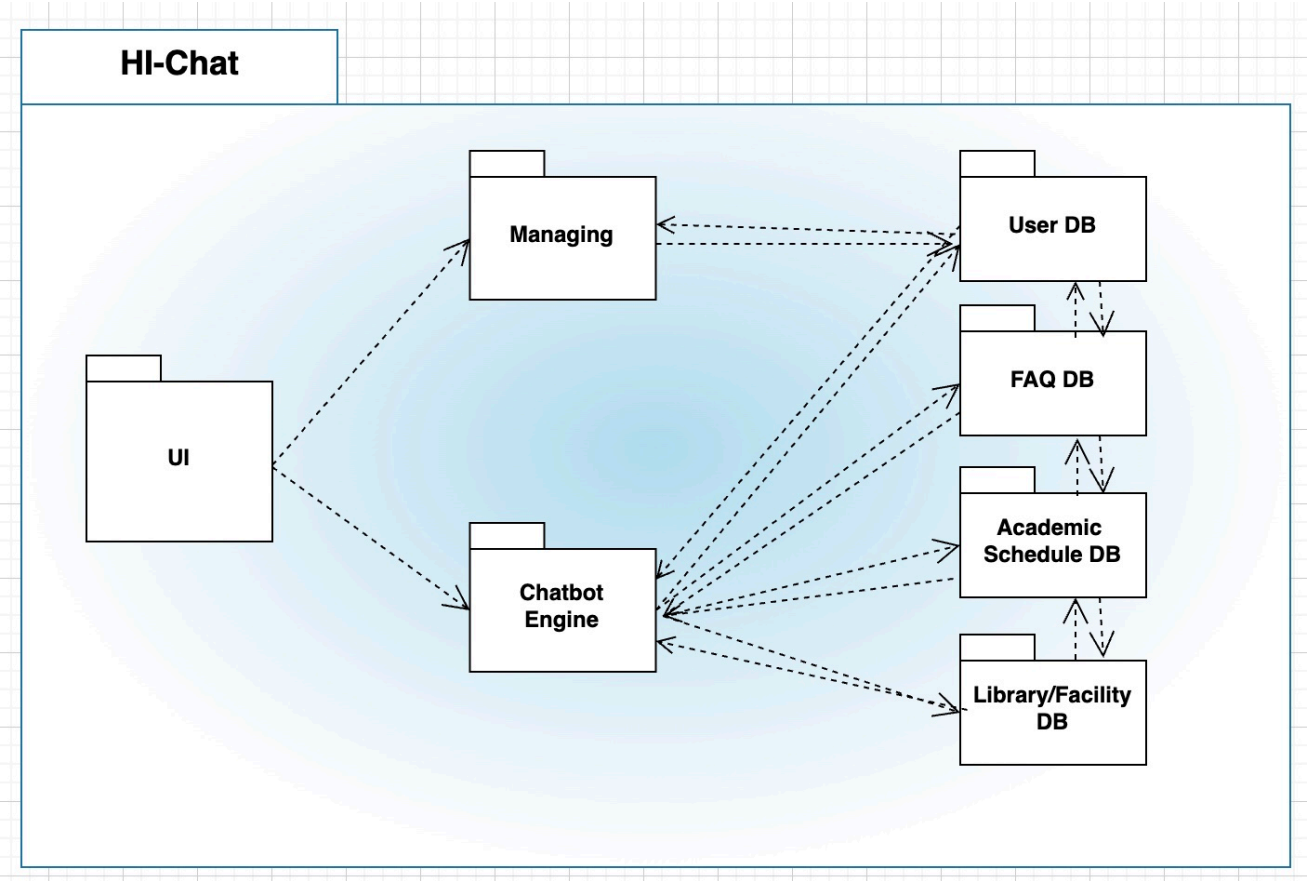


B. Explanation

- ‘User’ initiates queries and interacts with the system.
- ‘IntentClassifier’ determines the user's intent using keyword-based matching.
- ‘ScenarioRouter’ sends the classified intent to the appropriate manager.
- Manager classes (‘FAQManager’, ‘UserManager’, ‘FacilityManager’) retrieve or update domain-specific data.
- ‘ResponseGenerator’ assembles a final user-facing message.
- ‘Admin’ has access to modify FAQ content via the ‘FAQManager’, and also manages user data through the ‘UserManager’ when necessary.

4. Architecture Modeling

A. Package Diagram



B. Explanation

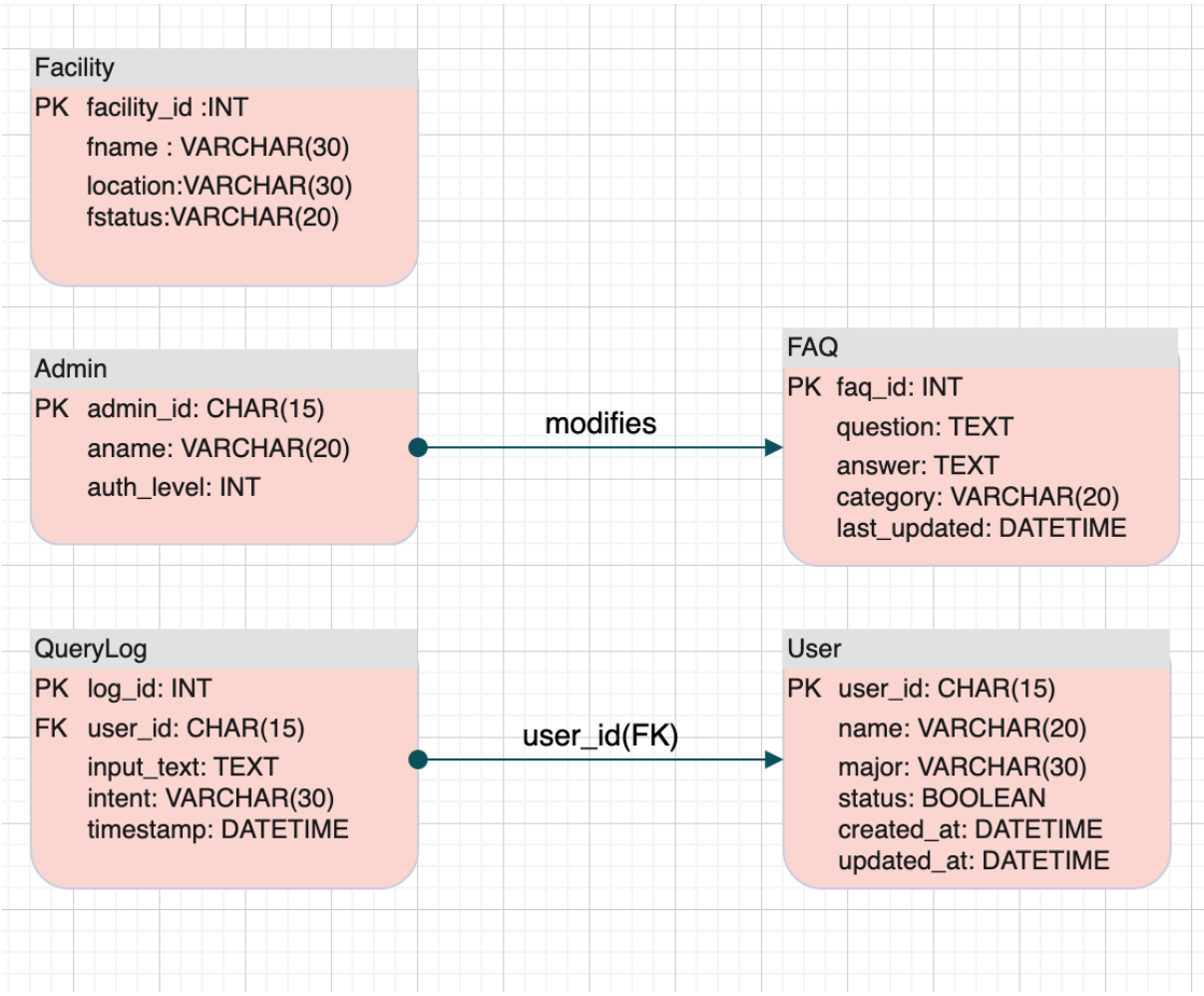
The HI-Chat system architecture is composed of seven core modules that interact in a layered and modular design:

1. **UI (Web & KakaoTalk)** - The entry point for user interaction with the chatbot.
2. **Chatbot Engine** - Handles intent routing and scenario processing. It references:
    - **User DB** for personalized responses,
    - **FAQ DB** for template-based answers,
    - **Academic Schedule DB** for calendar-based replies,
    - **Library/Facility DB** for campus service info.

3. **Database Layer (MySQL)** - Stores all structured data and query logs.
4. **Managing** - Enables FAQ and schedule updates for system maintainers.

5. Data Design

A. ERD Diagram



6. Program Flow

6.1 User Interaction Flow

User Login → FAQ Retrieval → Response Generation → Logging the Query

1. **User Login or Session Start**

- A User begins interacting with the chatbot through a web or mobile interface.
- User data (ID, name, major, status, timestamps) is either retrieved from or updated in the User table.

2. **FAQ Retrieval**

- When the user asks a question, the chatbot parses the input_text.
- The system searches the FAQ table using keyword matching against question and category.

3. **Response Generation**

- If a matching FAQ is found, the chatbot returns the corresponding answer field to the user.
- If no match is found, a fallback message is sent.

4. **Logging the Query**

- Every interaction is logged in the QueryLog table:
    - user_id: foreign key referencing the User
    - input_text: original question
    - intent: if intent classification is available (e.g., “academic_calendar”)
    - timestamp: current datetime

6.2 Administrator Flow

“Admin Login -> FAQ Management”

1. **Admin Login**
    - An Admin logs into the management console.
    - Authentication is validated using admin_id and auth_level.
2. **FAQ Management**
    - Admins can perform Create / Read / Update / Delete (CRUD) operations on the FAQ table.
        - faq_id, question, answer, category, last_updated fields are modified.
    - These actions are linked via the modifies relationship from Admin to FAQ.