CS 319 Object-Oriented Software Engineering

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Deliverable 3 - 2nd Iteration

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Design Goals

1. Reliability

We prioritized reliability as our top design goal because the previous system lacked this feature the most. Previously, operations for customers (counselors) and users (coordinators and tour guides) were managed through shared Google Sheets and Excel files. For example, tour guide activity tracking and tour schedules were stored in shared documents accessible to everyone. This setup introduced significant risks, as sensitive data -such as puantage/payment details or tour schedules- could be accidentally or intentionally modified by unauthorized users.

Our application aims to minimize these errors by streamlining operations for creating or modifying schedules, puantage tables, and statistics. Additionally, it will securely manage sensitive information, such as school prioritization details, tour feedback, and tour guide statistics. Access to this data will be role-based, ensuring that end users only have authorization for specific operations. For instance, feedback data will only be visible to coordinators and executives, not tour guides.

Another example of why reliability is addressed is because it is a relevant criterion for the handling of counselor applications. Once an application is approved and the relevant notification is sent to the counselor, the likelihood of a tour being canceled due to BTO office decisions is extremely low. Edge cases, such as a tour guide canceling their application, are mitigated by scenarios where an advisor steps in or a replacement tour guide is assigned for the time slot. This ensures smooth operations and reliability across all processes.

2. Usability

Our application is primarily designed for counselors and tour guides, with the overarching goal of attracting as many qualified schools as possible. To achieve this, we prioritize creating a highly user-friendly interface.

High school counselors, a key user group, often have limited technical proficiency. Therefore, the interface must be intuitive and straightforward, avoiding any complexity that could overwhelm or discourage them from using the application for tasks like registering and managing tours. A cumbersome system could lead to frustration and diminish their willingness to engage.

For tour guides, simplicity is equally important. The interface should enable them to effortlessly perform tasks such as tracking completed tours, reporting attendance, and logging availability. A clear display of core functionalities will also benefit coordinators by making it easier to track updates, monitor changes, and oversee operations efficiently. By transitioning coordinators from older systems for scheduling and payments, the application can help reduce errors and inefficiencies, fostering greater motivation and adoption.
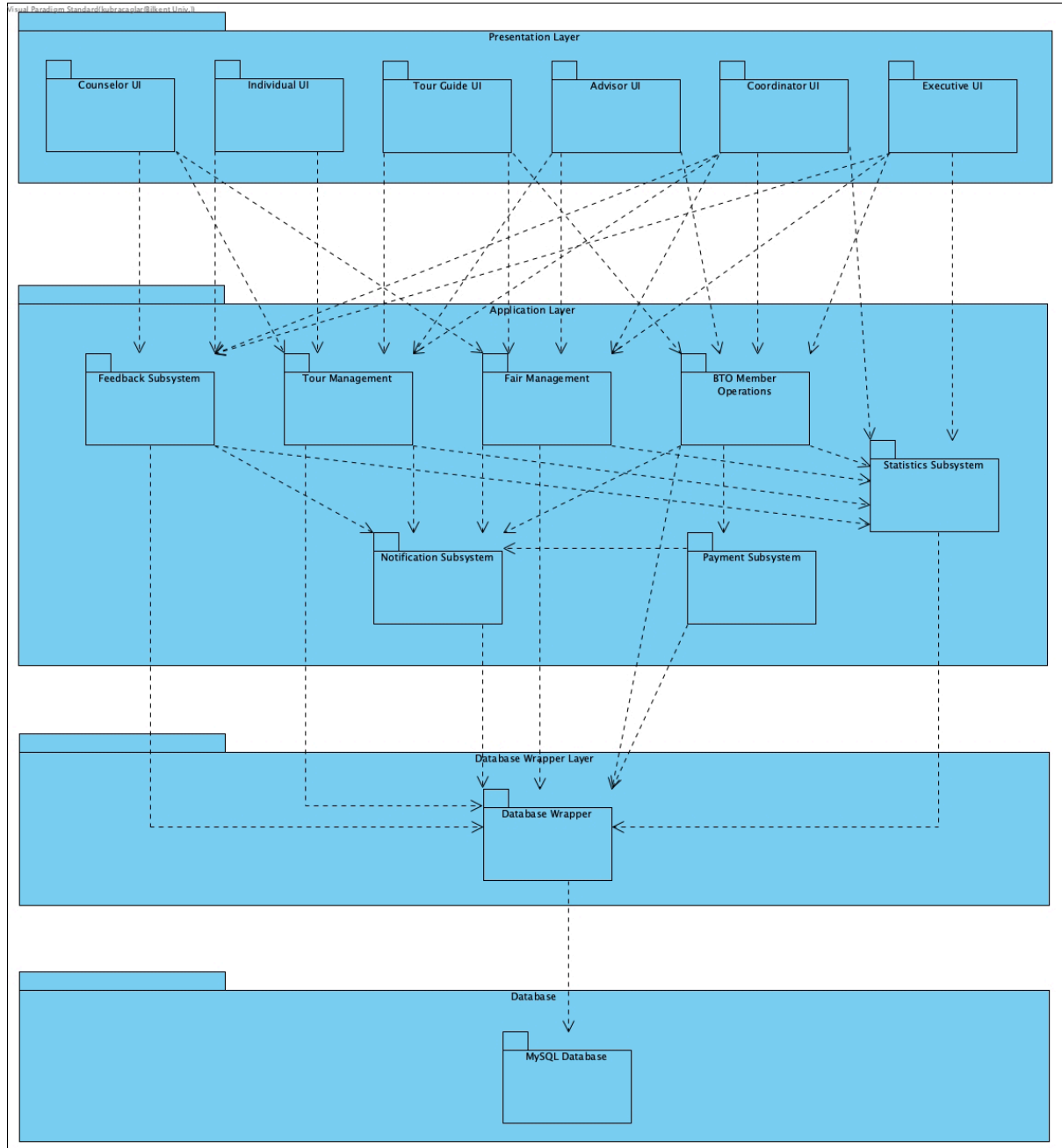
Design Trade-Offs

1. Reliability vs Functionality

To prioritize security and reliability, the implementation of reliability measures—outlined in the previous section—deliberately limits certain system functionalities. Access to features is restricted based on user authorization to protect sensitive data and maintain system integrity. For instance, tour guides are limited to modifying only their own attendance data, ensuring data privacy and accuracy. Additionally, tour guides cannot modify pre-approved tour dates or alter the list of schools eligible for tours, safeguarding sensitive information and centralizing critical decisions.

2. Usability vs. Security

To prioritize ease of access for counselors and tour guides, we decided not to implement two-factor authentication for system login. This enhances usability but introduces a trade-off by increasing the risk of unauthorized access to sensitive data. To address this, we will mitigate security risks through role-based access controls and activity monitoring, aiming to strike a balance between simplicity and security.

System Decomposition Diagram

Presentation Layer

| Counselor UI | Individual UI | Tour Guide UI | Advisor UI | Coordinator UI | Executive UI |

Application Layer

Feedback Subsystem

Tour Management

Fair Management

BTO Member Operations

Statistics Subsystem

Notification Subsystem

Payment Subsystem

Database Wrapper Layer

Database Wrapper

Database

MySQL Database

Subsystems

1. **Feedback Subsystem**: Handles user-generated feedback for tours and fairs, allowing counselors to submit ratings and comments that improve future activities.

2. **Tour Management**: Manages tour applications and schedules, facilitating the assignment of guides and approval or cancellation of tours.

3. **Fair Management**: Manages the organization of fairs, including receiving the application from counselors and confirmation by coordinators.

4. **Notification Subsystem**: Delivers notifications to users regarding system events such as any application approvals, cancellations, and payments.

5. **Payment Subsystem**: Manages the financial aspects of the system, such as calculating and processing payments for tour guides and directing the information to accountants.

6. **BTO Member Operations**: Offers tools for managing system users, excluding counselors.

7. **Statistics Subsystem**: Provides data insights, such as alumni success rates and tour/fair performance, to support decision-making for executives and coordinators.