2024-2025 SPRING SEMESTER

CS319 – Object-Oriented Software Engineering

Deliverable #3

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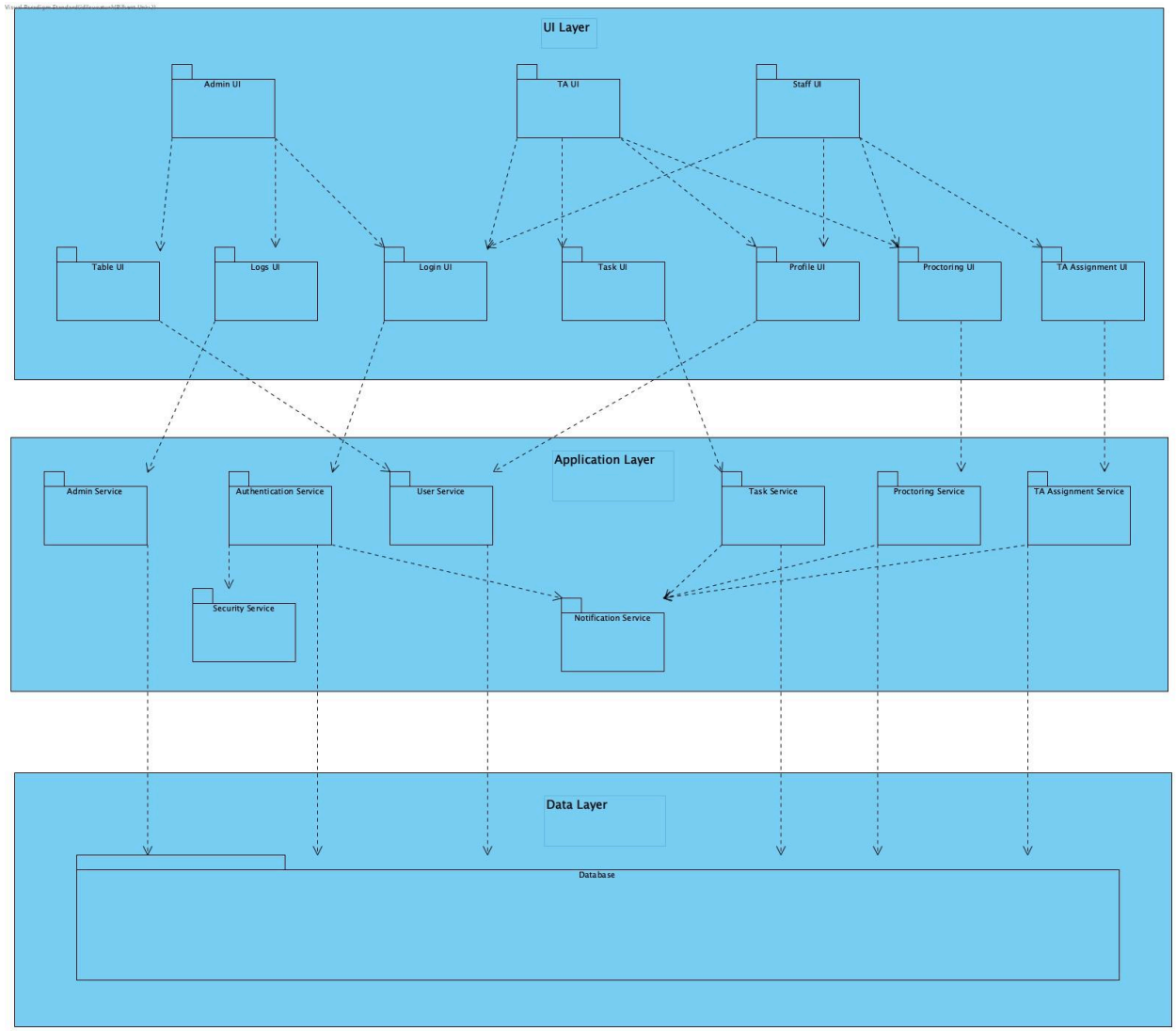
Table of Contents

1. Subsystem Decomposition

1.1 Subsystem Decomposition Diagram



1.2 UI Layer

The UI layer of the system is used to group the frontend of the project. This layer makes the changes in frontend easier. This layering model helps with designing a user-friendly UI that does not have to affect every change in the logic of the application. UI layer consist the following packages:

Admin UI: Contains all the frontend elements that are special to admin panels. It has interactions with tables, logs and login packages as well.

TA UI: Contains dashboards, navigation bars and elements that are specific to the use of TAs, using other packages in the UI layer such as task, calendar and profile UI.

Staff UI: This package contains the pages for instructors, deans and faculty staff. These roles in the system do not vary much, which is why they are all in the same package.

Table UI: This package includes the user interface of all the tables in the database to make it easier for an admin to edit and view the tables. In the system, user and course tables are available.

Logs UI: In TA Management System, admins have access to view all logs in the system. This package lists the logs so that admins can check when needed.

Login UI: This package is used to implement a basic login page for all users, including admin, TAs, and staff. It is directly linked to the authentication service package.

Task UI: Includes all the features related to the tasks of TAs. This package allows communication between TA UI and Task Service packages.

Profile UI: All the users except admins use this Profile UI package. Admins have different profile pages which are included in the Admin UI since they have access to more than normal users and their profiles include less information.

Proctoring UI: It creates pages for staff to view proctors who are responsible for the exams they are related to. For proctors, this package displays the exam information and allows swapping with other proctors.

TA Assignment UI: This package is created especially for the CS department, which allows this department to assign TAs to sections easily at the beginning of each semester.

1.3 Application Layer

Application layer includes all the services and related entities. This layer has codes for necessary functionalities of the system, such as TA and proctor assignment. Additionally,

this layer connects with both Database Layer and the UI Layer of the system. The following packages are included in the layer:

Admin Service: This package contains the codes for getting data from the database and processing the data so that Admin UI and Logs UI can use this to display.

Authentication Service: Includes codes for securing the login process. It is associated with Login UI and Database.

Task Service: This package is used to implement the algorithm for TAs to enter tasks they have done.

User Service: User Service package includes codes for algorithms related to edit and adding user information.

Proctoring Service: This service has some of the most important features available in the system. It makes it easier for staff to make proctoring assignments and for TAs to view information about their proctoring.

TA Assignment Service: Includes entities and controllers for manual TA assignment, which will be done by the CS department.

Notification Service: Responsible for generating and managing system notifications, interacting with Authentication Service, Task Services, TA Assignment Service and Proctoring Service by sending emails.

Security Service: Authenticates user login operations and limits access to the elements (HTML page, CSS code, backend code, JS code, picture etc.) for unauthorized users.

1.4 Data Layer

This layer is specific to the database of the system, which is MySQL-based. All necessary information in the system, such as users, courses, and exams, are held in the database.

2. Design Goals

2.1 Functionality

One of the design goals of TA Management System is functionality because the program is designed for use in various roles with various expectations. For different departments, TA Management System presents different features. TAs can take leave of absence requests, swap proctors, enter tasks manually and view their calendars, whereas academic staff can assign TAs to sections, make their TA preference for a specific course, make manual and automatic TA assignments, swap TAs, approve or reject various requests done by TAs. Additionally, admin users can edit every table in the system and can view logs. With this variety of roles and features, it can be said that functionality is an important design goal for the system.

2.2 Security

The TA Management System includes sensitive information about users and gives excessive access to authorized users; security is one of the main concerns while implementing the code. The sector has not changed much over the years, which is why implementing a secure system in the beginning and using the same code for years would be more efficient.

3. Design Trade-offs

3.1 Functionality vs Rapid Development

Since the TA Management System includes an excessive set of features, it makes it slower to create. However, working as a team of five and having three months to implement the system, the team has enough time to include more functionality. That is why functionality is preferred to rapid development in this project.

3.2 Security vs Usability

The TA Management System will be used by a specific well-educated group of people who have enough knowledge about computer software. Additionally, the system stores an excessive amount of sensitive information about users and authorized roles have the power to make serious decisions and can take serious decisions in the system. That is why security is one of the main concerns during implementation. The TA Management System includes 2-factor authentication via email, which makes the login phase inconvenient for users but also secures their information.