CS 319 Object-Oriented Software Engineering

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Deliverable 1 - 1st Iteration

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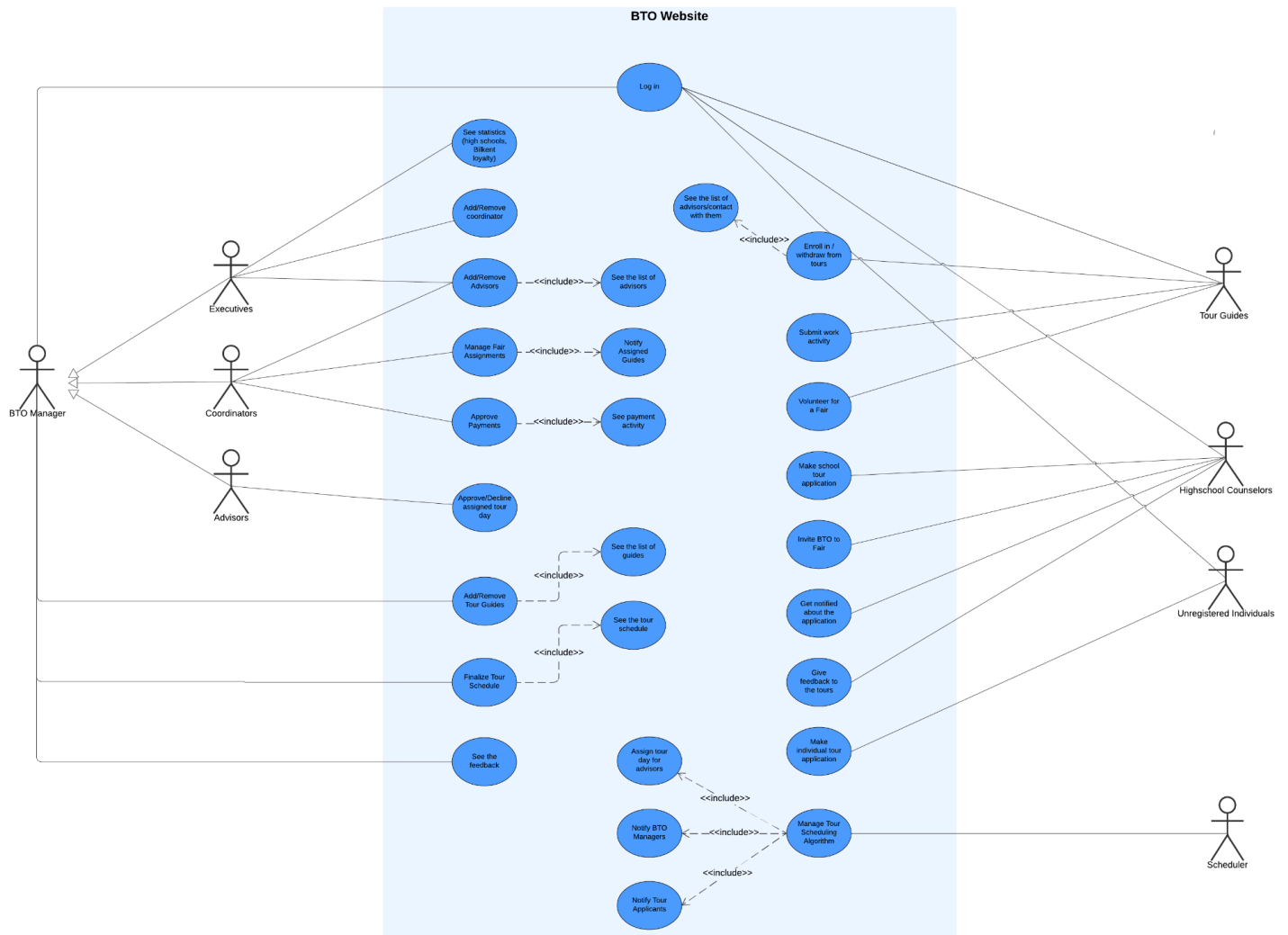# Table of Contents

1. Use Case Diagram

Figure 1: Use Case Diagram of BTO Website

2. Textual Use Case Description

Since this is a high-level diagram, we did not add detailed functionalities, such as school counselors viewing the available tour hours and selecting among them. However, we will mention these functionalities in detail in this document.

2.1 Actors

- **BTO Manager** is a general class containing several core actions that are available to all BTO members except tour guides, such as:
  - Adding/removing tour guides,
  - Finalizing tour schedules created by the Scheduler class (modifying and confirming the schedule),
  - Seeing feedbacks

  It is inherited by Executives, Coordinators, and Advisors.
- **Executives** (Örsan Örge and Dilek Yıldız): These are the authorities of BTO that are entitled to all actions except viewing the "puantaj" table. Their actions include:
  - Viewing more confidential statistics such as high schools' YKS performance, Bilkent loyalties (students' overall tendency to select Bilkent)
  - Managing (adding/removing) advisors and coordinators,
  - Other actions that are inherited from the BTO Manager class.
- **Coordinators** (Boray Güvenç) are responsible for handling payment approval and managing advisors and tour guides.
- **Advisors** mainly assist in managing the scheduling process and get feedback from counselors/students. They can perform the actions inherited by the BTO Manager class (finalize schedule, add/remove tour guides, and see feedback).
- **Tour Guides** interact with the system to enroll in specific tours, submit their working hours, and view payment-related data.
- **High School Counselors** apply for school campus tours, receive notifications about their applications, and provide feedback on the tours.
  - They can see the available dates and time slots for campus tours and select among them from the "availability schedule," where we display the tour schedule without specifying school names, for them to see available time slot visits.
  - They can apply for tours. We did not add the option to withdraw from tours to prevent counselors from last-minute withdrawals.

- **Unregistered Individuals** can apply for individual tours without requiring a full registration in the system. Other than that, any unregistered and registered user can access the information about Bilkent from the website.
- **The Scheduler** is a class role that provides a tentative schedule by handling the automatic assignment of school tours and individual tours to time slots, utilizing a scheduling algorithm with some prioritization conditions. The BTO Members have access to the Scheduler class and can confirm or modify the tentative schedule the Scheduler class provides. After BTO Members confirm the schedule, the Scheduler class will notify the tour applicants (individuals or counselors) and other BTO Members.

2.2 Use Cases

Log in (All Actors): A standard authentication process granting different actors access to their specialized user interfaces.

See statistics (Executives): Executives can see the high school statistics, the number of students they sent to Bilkent, etc.

Add/Remove Advisors (Executives, Coordinators): Coordinators and executives can view the current list of advisors while adding or removing them.

Manage Fair Assignments (Coordinators): Coordinators can assign guides to fairs after high schools have invited the BTO. They can review volunteer applications and assign guides to fairs based on availability and suitability.

Notify Assigned Guides (System): After assignments are completed, the system automatically sends notifications to the assigned Tour Guides, informing them of their upcoming fair participation.

Approve Payment Activity (Coordinators): Track and confirm payments made to tour guides and advisors regarding working hours. (It is assumed that executives do not have access to the puantaj and do not view payment activity.)

Add/Remove Tour Guides (Executives, Coordinators, Advisors): BTO managers can view the tour guides list and manage tour guides.

Finalize Tour Schedule (Executives, Coordinators): BTO managers can view the current tour schedule prepared by the Scheduler and finalize the schedule for campus tours.

See the feedback (Executives, Coordinators, Advisors): BTO managers can see the feedback provided by school counselors after the tours are completed.

Enroll in / Withdraw from Tours (Tour Guides): Tour guides can choose tours to guide by enrolling through the system. Their choice of tours and work is also reflected in their payment details. They can also withdraw from the tours in advance.

Submit Work Activity (Tour Guides): Tour guides submit the details of their work, such as detailed information about the tours they have conducted (date, time slot, high school information, and the number of hours the tour has taken).

Volunteer for a Fair (Tour Guides): Once the BTO is invited to the fair by a high school, the fair becomes available on the system. The Tour Guide logs in, views the list of upcoming fairs and selects the one they wish to volunteer for.

Make School Tour Application (High School Counselors): Counselors submit applications to arrange school campus tours for their students, specifying details such as preferred dates and time slots.

Invite BTO to a Fair (High School Counselors): Counselors can send formal invitations to the BTO through the system, specifying details like the fair date, location, and other relevant information.

Get Notified About the Application (High School Counselors): Counselors are notified about the status of their tour applications, guiding them through the process.

Give Feedback to the Tours (High School Counselors): Following the completion of a campus visit, counselors will be asked to provide feedback about their experience. They will be able to rate the tour out of 5 stars, similar to the Google Maps comment section.

Make Individual Tour Application (Unregistered Individuals): Prospective students or their families can apply for individual tours. They do not need to create an account since they are not regular applicants, such as high school counselors. In case of cancellation of the tour, they will be notified via email.

Manage Tour Scheduling Algorithm (Scheduler): A specialized function that automates the assignment of time slots for campus visits based on high school characteristics. After time slots are automatically assigned, advisors will approve the slots. Then, advisors and applicants will be notified.

Notify BTO Managers (Scheduler): After the tour schedule is approved, BTO managers will be notified via email. In addition, they can see scheduled programs through the system.

Notify Tour Applicants (Scheduler): After the tour schedule is approved, tour applicants will be notified via email.

3.   Tech Stack

3.1 Backend

We decided to use the **Spring Boot** framework of Java for backend purposes.

- ○ It provides built-in tools for creating RESTful APIs quickly, which is ideal for developing the business logic that our application requires, such as managing tours, users, schedules, and feedback.
- ○ Since Spring Boot provides security with built-in tools such as **Spring Security,** we can implement strong authentication, authorization, and other security mechanisms efficiently. We have sensitive data such as High School prioritization, feedback mechanisms, and payment control. These functionalities should be protected with a strong and secure system, which Spring Boot provides.
- ○ Spring Boot easily integrates with relational databases using Spring Data JPA. This feature allows us to do CRUD (Create, Read, Update, Delete) operations easily.
- ○ It is a widely used framework with a large community to help us resolve our problems.

3.2 Frontend

We decided to use React, a Javascript library, in addition to HTML/CSS for frontend purposes.

- ○ React is designed to work seamlessly with RESTful APIs, which fits perfectly with the Spring Boot backend.
- ○ The React ecosystem offers a wide range of libraries and tools, such as React Router for handling navigation and Redux for state management. These are useful for building complex interfaces like role-based dashboards (e.g., different views for coordinators, counselors, and executives).
- ○ React uses a virtual DOM, which optimizes rendering and updates, ensuring the front end is fast and responsive. This is particularly important for applications with real-time updates, such as notifications about tour statuses.

3.3 Database Management

We decided to use a relational database management system called MySql for database operations.

- ○ MySQL integrates well with Spring Boot using Spring Data JPA. This allows us to work with the database using Java entities.
- ○ It ensures secure data storage. This ensures that sensitive information, such as user credentials and tour data, remains secure.

- ○ MySQL is open-source, making it a cost-effective solution with enterprise-grade features. It has a large community and extensive documentation, providing support and guidance for best practices.