Bilkent University

Department of Computer Engineering

CS 319 Term Project

Spring 2025

Section 1

Group 1

Deliverable 1

Draft Submission

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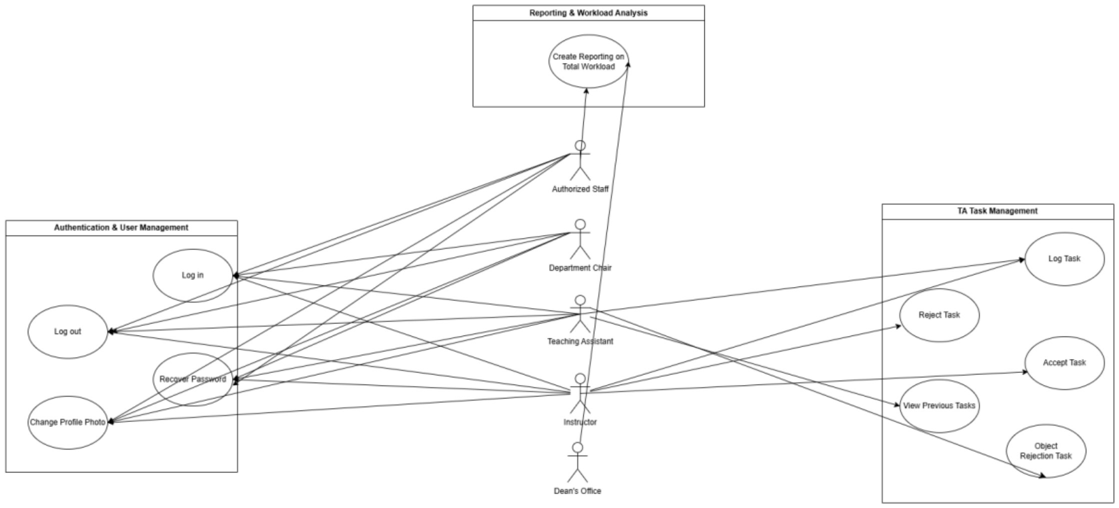
1. Introduction

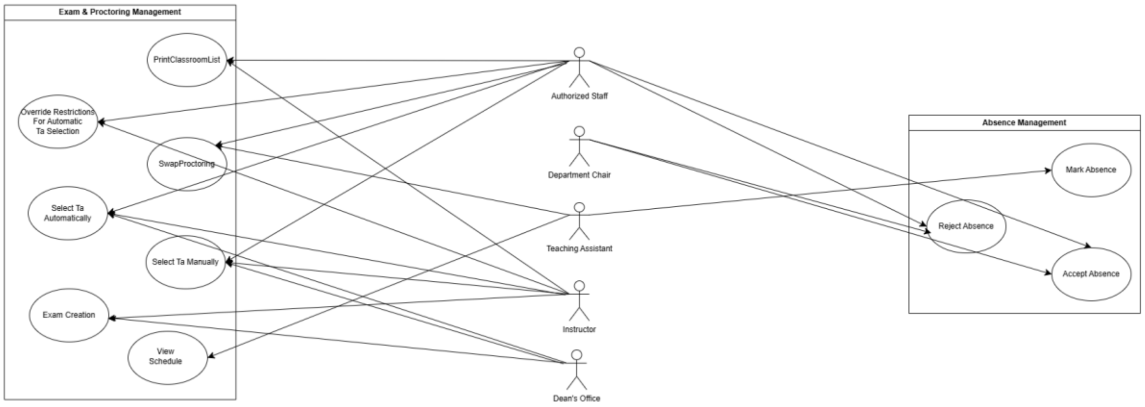
The Teaching Assistant (TA) Management System is a web-based application designed to facilitate the management of TA responsibilities, workload tracking, proctoring assignments, and leave requests in a university setting. The system aims to provide an efficient, automated, and fair method for distributing tasks among TAs while reducing the administrative workload for faculty and staff.

Currently, TA duties such as grading, conducting recitations, assisting in labs, and exam proctoring are managed manually, leading to inefficiencies, workload imbalances, and tracking difficulties. This system seeks to address these challenges by providing a centralized platform that allows for task submissions, workload balancing, automated proctoring assignments, and reporting features.

The system is developed to benefit Teaching Assistants, Instructors, Department Staff, and System Administrators, each with different privileges and functionalities within the platform.

2. Use-Case Diagram





3. Use Case Textual Descriptions

3.1. Authentication & User Management

3.1.1. Login

Actors: TA, Instructor, Department Chair, Authorized Stuff

Entry Conditions: The user is on the login page.

Exit Conditions: The user is successfully logged into the system.

Flow of Events:

1. The user navigates to the login page.
2. The user enters their username and password.
3. The user clicks the "Login" button.
4. The system verifies the user's credentials.
5. If the credentials are correct, the system logs the user in and redirects them to the dashboard.
6. If the credentials are incorrect, the system displays an error message and prompts the user to try again.

3.1.2. Logout

Actors: TA, Instructor, Department Chair, Authorized Stuff

Entry Conditions: The user is logged into the system.

Exit Conditions: The user is successfully logged out of the system.

Flow of Events:

1. The user clicks the "Logout" button.
2. The system logs the user out.
3. The system redirects the user to the login page.

3.1.3. Recover Password

Actors: TA, Instructor, Department Chair, Authorized Stuff

Entry Conditions: The user is on the login page and has forgotten their password.

Exit Conditions: The user receives instructions to reset their password.

Flow of Events:

1. The user navigates to the login page.
2. The user clicks the "Forgot Password" link.
3. The system prompts the user to enter their registered email address.
4. The user enters their email address and clicks the "Submit" button.
5. The system verifies the email address.
6. If the email address is registered, the system sends a password reset link to the user's email.
7. The user receives the email and clicks the password reset link.
8. The system prompts the user to enter a new password.

9. The user enters a new password and confirms it.
10. The user clicks the "Reset Password" button.
11. The system updates the user's password and displays a confirmation message.
12. The user can now log in with the new password.

3.1.4. Change Profile Photo

Actors: TA, Instructor, Department Chair, Authorized Stuff

Entry Conditions:

- The user has logged in and is on the main page where the profile photo is displayed.

Exit Conditions:

- The user has changed their profile photo successfully.
- The profile photo could not be updated due to some reason, the system displayed a message stating the problem.

Flow of Events:

1. The user clicks on the “Change Profile Photo” option on the main page near the current profile photo.
2. The system provides an option to upload a new photo from the device.
3. The user selects an image from their device.
4. The system previews the selected image before finalizing.
5. The system checks the file format, size, and other restrictions (e.g., PNG, JPG, max file size).
6. If the image does not meet the criteria, an error message is displayed, and the user is asked to select another file with a prompt that displays available formats.
7. If the image passes validation, the system processes the image upload and updates the user's profile photo.
8. If successful, the new profile photo is displayed, and a confirmation message appears.
9. If the upload fails (due to network issues, format errors, etc.), an error message is displayed, and the user is prompted to retry.

Quality Requirements

- The system should support JPEG**,** PNG**,** and WEBP file formats.
- The maximum file size should not exceed 5 MB.
- The minimum resolution should be 200 × 200 pixels, with a recommended size of 500 × 500 pixels or higher.
- The system should crop non-square images automatically or provide a manual cropping tool.
- The profile photo update process should be completed within 5 seconds under normal network conditions.

3.2. TA Task Management

3.2.1. Log Task

Actors: TA, Instructor

Entry Conditions:

The TA is logged into the system and has performed a task related to their assigned course.

Exit Conditions: The task details are submitted for approval by the course instructor.

Flow of Events:

1. The TA navigates to the task logging page.
2. The TA selects the course from the list of assigned courses.
3. The TA enters the date and time of the task.
4. The TA selects the task type (e.g., Lab, Lab Preparation, Grading).
5. The TA enters the duration spent on the task.
6. The TA clicks the "Submit" button to log the task.
7. The system securely transmits the task details to the backend.
8. The course instructor receives a notification about the logged task.

Task Approval Outcome:

- If the course instructor approves the task, the system adds the task duration to the TA's total workload for the semester
- If the course instructor rejects the task, the system notifies the TA and prompts them to review and resubmit the task details if necessary.

3.2.2. Accept Task

Actors: Instructor

Entry Conditions:

- A TA has logged their task.
- The instructor of the course is logged into the system.

Exit Conditions:

- The TA’s task log is accepted and recorded in the system.
- The TA is notified that their task has been accepted.

Flow of Events:

1. The instructor navigates to the "Task Requests" section.
2. The system displays a list of pending task requests.
3. The instructor selects a task request to review.
4. The system presents details of the task request, including TA’s name, their rejection/approval rate from the previous tasks, date, duration of the task and task type.
5. The instructor selects the "Accept" option.
6. The system updates the request status to "Approved".
7. The system notifies the TA about the approval.

3.2.3. Reject Task

Actors: Instructor

Entry Conditions:

- A TA has logged their task.
- The instructor of the course is logged into the system.

Exit Conditions:

- The TA’s task log is rejected and recorded in the system.
- The TA is notified that their task log has been rejected.

Flow of Events:

1. The instructor navigates to the "Task Requests" section.
2. The system displays a list of pending task requests.
3. The instructor selects a task request to review.
4. The system presents details of the task request, including TA’s name, date, duration of the task and task type.
5. The instructor selects the "Reject" option and provides a reason for the rejection.
6. The system updates the request status to "Rejected".
7. The system notifies the TA about the rejection with the provided reason.

3.2.4. View Previous Tasks

Actors: TA

Entry Conditions:

- The TA is logged into the system.

Exit Conditions:

- The TA has reviewed previous tasks.

Flow of Events:

1. The TA navigates to the "Task Logs" section.
2. The system displays a list of previously logged tasks.
3. The TA selects a specific task to view details.
4. The system presents detailed information about the selected task.

Exceptional Flow:

- If TA has not logged any tasks before, the system displays a message indicating that no task logs are available.

3.2.5. Object Rejection Task

Actors: TA

Entry Conditions:

- The instructor has rejected a task of the TA.

TA is logged into the system.

Exit Conditions:

- The TA and the instructor that has rejected the task was notified that the TA objected to the rejection.

Flow of Events:

1. The TA navigates to the old task logs, and opened a rejected task log.
2. TA edits any section, and add an explanation of it's task log according to the rejected task's from the instructor.
3. After TA makes any wanted changes, TA can click the "Object Rejection" button, and send the objection to the instructor.
4. The course instructor receives a notification about the objection to the rejected task, and TA receives a notification that his/her objection was successfully sent.

Exceptional Flow:

- If TA does not edits anything but objects, then the system will alert “No Edits Made” error to the TA, and prevent the submission of the objection.

3.3. Reporting & Workload Analysis

3.3.1. Create Reporting on Total Workload

Actors: Dean's Office, Authorized Staff

Entry Conditions:

- The system contains data on TA workload and proctoring assignments.

Exit Conditions:

- The user has successfully downloaded the report as a PDF.
- Alternatively, the user has chosen to cancel and is returned to the reports list page without downloading.

Flow of Events:

1. The user opens the Navigation Panel and clicks on the "Reports" option.
2. The system navigates the user to a reports page where a list of different report types is available, each list item having a "Create" button on the right-hand side. (Available reports include: total proctoring workload per semester, total TA duty per course per semester, other relevant workload reports)
3. When the user clicks the "Create" button, the system generates a PDF preview of the selected report using the current data.
4. On the PDF preview page, the user can adjust printing settings and choose between "Print" and "Cancel" options.
5. If the "Print" button is clicked, the system downloads the report as a PDF.

6. If the "Cancel" button is clicked, the system navigates the user back to the report list page.

Quality Requirements

- The report preview should load within 3 seconds.
- The report should be formatted for clarity and readability, ensuring correct alignment of tables and text.
- The system should allow generating reports for specific timeframes (e.g., a selected semester or academic year).

3.4. Absence Management

3.4.1. Mark Absence

Actors: Teaching Assistants (TAs)

Entry Conditions:

The TA is logged into the system.

The TA needs to request absence for a future date to avoid proctoring assignments.

Exit Conditions:

The absence request is recorded in the system.

The TA receives confirmation of the request submission.

Flow of Events:

1. The TA navigates to the "Absence Request" section.
2. The system displays an absence request form.
3. The TA selects the date(s) and provides a reason for the absence.
4. The system validates the input and allows submission.
5. The TA submits the request.
6. The system records the request and updates the absence list.
7. The system notifies the department chair or authorized staff for review.
8. The TA exits the section.

3.4.2. Accept Absence

Actors: Department Chair, Authorized Staff

Entry Conditions:

- A TA has submitted an absence request.
- The department chair or authorized staff is logged into the system.

Exit Conditions:

- The TA's absence request is approved and recorded in the system.
- The TA is notified about the approval.

Flow of Events:

1. The department chair or authorized staff navigates to the "Absence Requests" section.
2. The system displays a list of pending absence requests.

3. The department chair or authorized staff selects an absence request to review.
4. The system presents details of the absence request, including reason, date, and supporting documents (if any).
5. The department chair or authorized staff selects the "Accept" option.
6. The system updates the request status to "Approved" and records the decision.
7. The system notifies the TA about the approval.
8. The department chair or authorized staff exits the section.

3.4.3. Reject Absence

Actors: Department Chair, Authorized Staff

Entry Conditions:

- A TA has submitted an absence request.
- The department chair or authorized staff is logged into the system.

Exit Conditions:

- The TA's absence request is rejected and recorded in the system.
- The TA is notified about the rejection decision.

Flow of Events:

1. The department chair or authorized staff navigates to the "Absence Requests" section.
2. The system displays a list of pending absence requests.
3. The department chair or authorized staff selects an absence request to review.
4. The system presents details of the absence request, including reason, date, and supporting documents (if any).
5. The department chair or authorized staff selects the "Reject" option and provides a reason for rejection.
6. The system updates the request status to "Rejected" and records the decision.
7. The system notifies the TA about the rejection with the provided reason.
8. The department chair or authorized staff exits the section.

3.5. Exam & Proctoring Management

3.5.1. Exam Creation

Actors: Instructor, Dean’s Office

Entry Conditions:

- The Instructor navigates to the "Create Exam" section.

Exit Conditions:

- The instructor is notified that they successfully created the exam.

Flow of Events:

1. The system displays an empty form, with the areas date, course, time duration, and place. These are required to fill to finish creating the exam.
2. After the instructor fills all the required spaces, the user can click the "Finish Creating Exam" button, and create the exam.
3. The system updates the calendar, and the specified time slot is marked as occupied.
4. The user is notified that they successfully created the exam.

Exceptional Flow:

- If there is another activity happening in that time for that course, then the system will alert Time Conflict error to the instructor, and prevent the creation of the exam until the exam time has changed.
- If a required field is missing, then the system will alert Missing Field error to the instructor, and prevent the creation of the exam until all the required spaces are filled.

3.5.2. Print Classroom List

Actors: Instructor, Authorized Staff

Entry Conditions:

- There exists an exam with classrooms assigned.

Exit Conditions:

- The user has successfully downloaded the classroom list PDF.
- Alternatively, the user has chosen to cancel and is returned to the exam list page without downloading the PDF.

Flow of Events:

1. The user navigates to the exams page.
2. The system displays the upcoming exams as a list, each list item having a button "Print". (An instructor can only display the exams s/he is responsible, whereas an authorized staff can display them all)
3. When the "Print" button is clicked, the system displays a PDF preview page where the user can adjust printing settings, along with "print" and "cancel" button. The user can make a selection whether to print in alphabetic or random order.
4. If the "Print" button is clicked, the system downloads the PDF.
5. If the "Cancel" button is clicked, the system navigates the user back to the exam list page.

Quality Requirements

- The PDF preview should load within 3 seconds.
- The downloaded PDF must maintain proper formatting and readability across different devices and printers.

- The system should support commonly used print settings (e.g., page orientation, margins, and scaling).

3.5.3. Override Restrictions for Automatic TA Selection

Actors: Instructor, Authorized Staff

Entry Condition:

- Automatic TA Selection was attempted, but not enough TAs met the criteria.

Flow of Events:

1. The system notifies that insufficient TAs were found.
2. The instructor chooses which restrictions to override (e.g., consecutive-day limit).
3. The system re-processes the TA list with relaxed criteria.
4. The system presents the new results for the instructor's confirmation.
5. The instructor confirms the final assignment.

Exit Condition:

- TAs are successfully assigned under relaxed rules, or the process fails if none can be found.

Exceptional Flow:

- All overridden steps must be logged for auditing.
- The system should guide the user on which overrides might be risky.

3.5.4. Swap Proctoring

Actors: Authorized Staff, TA

Entry Conditions:

- A TA is assigned to a proctoring duty but wants to swap
- Another TA is available to take over the proctoring duty.

Exit Conditions:

- Other TA accepted the swap and it is recorded in the system.
- Both TAs involved in the swap are notified.

Flow of Events:

1. A TA initiates a proctoring swap request by selecting an available TA to take over the duty.
2. The system sends a swap request notification to the selected TA.
3. The selected TA reviews the request and either accepts or declines it.
4. If the selected TA accepts:
    a. The system updates the proctoring schedule to reflect the new assignment.
    b. Both TAs and relevant staff members are notified of the change.

5. If the selected TA declines: The system notifies the requesting TA.
    a. The requesting TA may choose a different TA for the swap or cancel the request.
    b. The process continues until a successful swap is completed or the request is withdrawn.
6. The actors exit the section.

3.5.5. Select TA Automatically

Actors: Instructor, Authorized Staff, Dean's Office

Entry Condition:

- An exam already exists (from "Exam Creation").

Flow of Events:

1. The user chooses "Automatic TA Selection."
2. The system retrieves available TAs, sorted by lowest total workload.
3. The system considers priorities (course TAs first, then others) and any constraints (e.g., MS/PhD rule). (For the Dean's Office, TA's from all departments are available)
4. The system proposes a set of TAs that satisfy the requirements.
5. If TAs are insufficient or conflicts exist, the system may prompt for overrides (see "Override Restrictions for Automatic TA Selection").
6. Once TAs are finalized, the system assigns them and updates schedules.

Exit Condition:

- TAs are automatically assigned, or the process moves to override restrictions.

Exceptional Flow:

- The automatic selection should complete within a few seconds.
- Assignments must minimize workload unfairness and obey restrictions by default.

3.5.6. Select TA Manually

Actors: Instructor, Authorized Staff, Dean's Office

Entry Condition:

- An exam already exists (from "Exam Creation").

Flow of Events:

1. The user selects "Manual TA Selection."
2. The system shows a list of available TAs in priority order (course TAs first, then department TAs).
3. The user chooses one or more TAs to assign. (For the Dean's office, TA's from all departments are available, whereas for instructors this is not the case?)

4. The system checks for restrictions (e.g., TA’s own exam schedule, absence). If restrictions are triggered, the instructor decides whether to override or pick another TA.
5. The system confirms the assignment and updates the TAs’ schedules.

Exit Condition:

- One or more TAs are manually selected for the exam.

Exceptional Flow:

- The list of TAs must be displayed accurately with real-time availability.
- Instructor must have clear prompts if assignment conflicts exist.

3.5.7. View Schedule

Actors: TA

Entry Condition:

- The TA is logged into the system.
- The TA has an assigned weekly schedule including proctoring and lectures.

Flow of Events:

1. The TA navigates to the "Schedule" section.
2. The system retrieves and displays the TA’s schedule for the week.
3. The TA can apply filters such as course name, proctoring duties, or specific time slots.
4. The TA selects a specific day or event for more details.
5. The system displays detailed event information including location, time, and participants. The TA exits the section.

Exit Condition:

- The TA views their weekly schedule, including proctoring duties and lecture times.

4. Tech Stack

The technology stack chosen for the project is React for the front end, Express and Node js for the back end and PostgreSQL for the database.

4.1 Front End:

- **React** will be used for client-side (frontend) development. It provides an efficient way to build dynamic and interactive user interfaces using reusable components. React will allow us to provide an interactive, user-friendly interface. Schools and individuals can easily browse date and time for their preferred university tour and make appointments in real-time. React’s component-based structure allows for reusability, so components like appointments, staff profiles, and tour scheduling can be consistently implemented across the system.

4.2 Back End:

- As the runtime environment, **Node.js** powers JavaScript on the server, handling requests, managing resources, and handling non-blocking I/O operations efficiently. Node.js will enable fast data processing and efficient handling of multiple requests simultaneously. Node enables asynchronous operations, which allow multiple bookings or searches to be processed without slowing down the system, ensuring a seamless experience for schools, individuals, advisors and guides.
- The server-side functionality is managed by **Express**, which enables efficient routing for various requests, such as fetching tour data, handling user appointments, processing payroll payments for guides, and managing user accounts. Express also supports authentication, which will allow secure logins for staff and admins, and will be able to handle admin-specific tasks.

4.3 Database:

- MySQL is an SQL database server that supports different back ends, API’s, and a choice of administrative tools; while providing structured and efficient data storage. In our system, MySQL is a good option for managing and organizing TA assignments, tracking workload distribution, linking courses with TAs, and storing exam proctoring schedules while ensuring data integrity and consistency. Additionally, the utilization of MySQL was a client request.