



Bilkent University

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Department of Computer Engineering

# CS 319 Term Project

Fall 2024

Section 1

Group 4

## Deliverable 1 - 1st Iteration,

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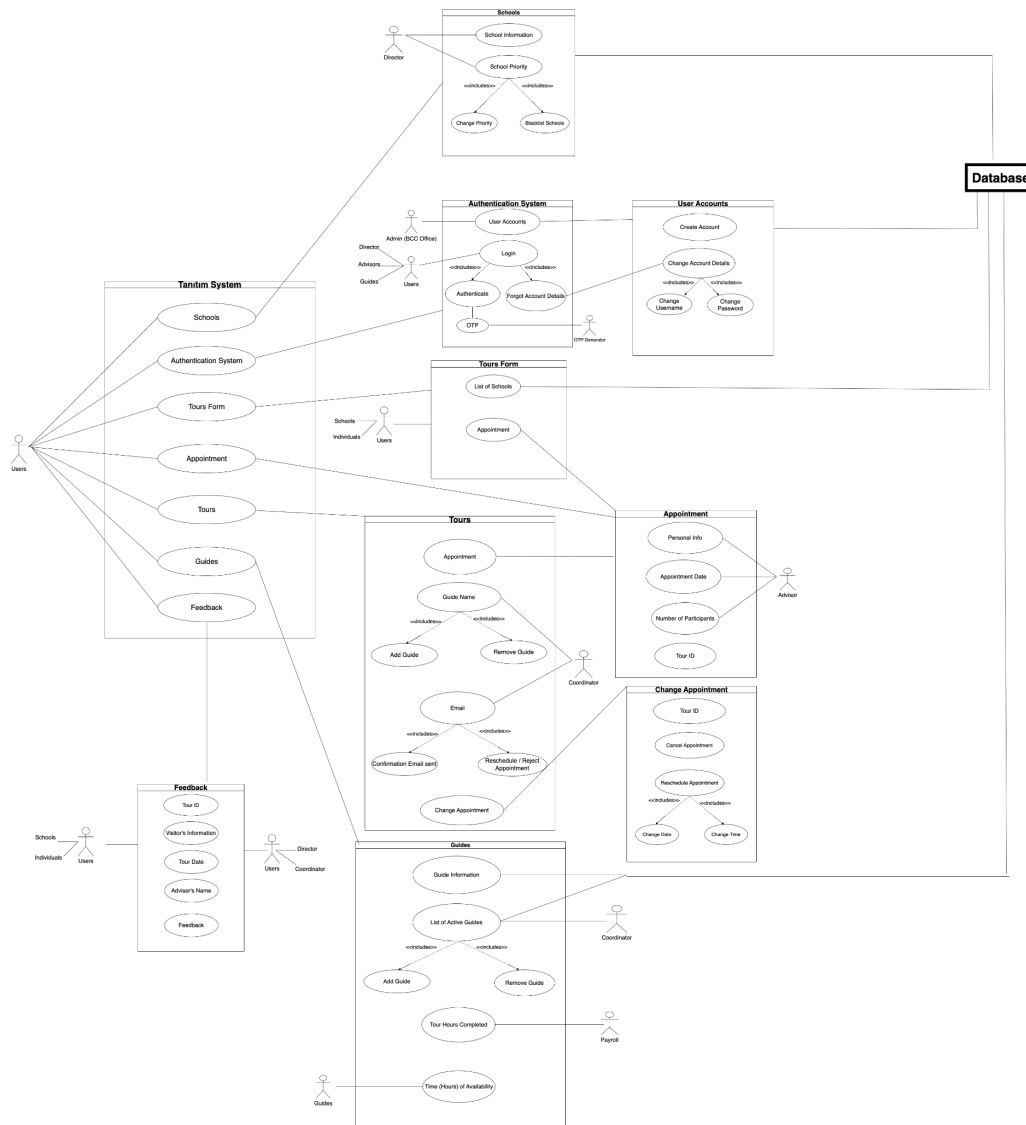
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## 1. Introduction

The Tour Management System is a web-based platform designed to automate and organize the process of arranging the high-schools and individuals tours within the Bilkent University. The process is manually done through excel sheets currently which is time consuming and prone to human error. This project aims at utilizing available data and make use of resources more effectively. The platform automates processes such as scheduling tours, assigning guides, sending automatic confirmation mails. The system allows director, coordinators, and guides to effectively manage their times reducing the workload on the administrative staff and ensures a more seamless tour experience for prospective students.

## 2. Use-Case Diagrams



### 3. Use-Case Description

#### 3.1 Manage Login

##### 3.1.1 User Authentication

**Actors:**

- Director
- Advisors
- Guides
- System

**Description:**

This place is where users such as the director, advisors etc. can login to their accounts provided they enter correct information to the system.

**Precondition:**

- Actor who wants to login proceeds to login page.
- Actor has a valid user account in the system.

**Basic Flow:**

- Actor gives required information to the user authentication page.
- The system takes this information and checks whether it is correct or not.
- If given information is correct, the system proceeds to the actor's required page.

**Post-conditions:**

- The actor can take actions according to their privileges given according to BTO's specifications.

**Exceptional Flow:**

- If given information is not correct, the user is asked to give required information again, prompted with an error dialogue.

### 3.1.2 Manage Account Details

**Actors:**

- Administrator

**Description:**

If there is a need to change account information. This could occur because of incorrect information that has been entered when the account was first created or if the user's current personal/institutional information is no more up-to-date so they want to change the previous version. This can include situations like promotion, demotion of an employee or when a school changes their counselor.

**Precondition:**

- The actor is informed there is a need to change a user's information. The actor who wants to change should be logged in, and have the permission to do the needed account details.

**Basic Flow:**

- Actor will change the personal/institution's information that is needed.
- System will update the information according to the actor's inputs

**Post-conditions:**

- Information of the user has changed.
- If the user's role has changed, user now has a different level of access to the features.

**Exceptional Flow:**

- If the actor states the same property for an attribute, the system will prompt an error, that the property has not been changed.

### 3.1.3 Create Account

**Actors:**

- Administrator

**Description:**

Actor will be the only actor that will have the ability to create accounts. When there is a new director, an advisor or a guide, the actor will create a new account. This information will be provided by an authority. Also, when a school that has not come before will come, the school counselor should first send the email address for his/her respective school to the system. By not getting the counselor's mail but school's, direct connection with the school will not be lost, even if the school changes their counselor.

**Precondition:**

- There is a new person or institution to add to the system.

**Basic Flow:**

- Actor will fill out the personal/institution's information.
- Urgency level, which will increase automatically in urgent times.

**Post-conditions:**

- New user is added by the actor to the database
- The new user will have different features available to them, according to their role in the system.

**Exceptional Flow:**

- When the user is being added, the system may find out that they have been added before. If the school has the same name and is located in the same city, the system will prompt an error, that the school is already in the system, and they should use their already existing account or what they want is to change account information they should use another feature of the website.
- When a director, an advisor or a guide is added to the system, the system may also check whether they have been added before. If the account's information only has differences in their current year, role, department, contact number, system will not permit this new account and prompt an error saying that the user

is already in the system, what they want is to change account information they should use another feature of the website.

## 3.2 Manage Tour Applications

### 3.2.1 Individual Tour Application

**Actor:**

- Individual Tour Applicant

**Description:**

Bilkent also has individual tours for the campus separate from the school tours. These tours are solo tours for individuals, and they will be with their close family members during the tour. Individuals can apply for this service by using this feature. Neither them nor the administrators have to create a new account for setting their tour.

**Precondition:**

- Individual who is applying should have the means to apply for a form and come to the Bilkent campus.

**Basic Flow:**

- After selecting an individual tour, the actor must provide personal information, including not only their name, school, city, contact information, parents' contact number but also indicate their field of interest and provide mandatory date(s), and their time(s) for the tour.
- In the confirmation mail that is sent to the actor, there will be random alphanumeric code.

**Post-conditions:**

- The actor has an alphanumeric code, which enables them to correct their personal information from change appointment feature and also ability to cancel the tour.

**Exceptional Flow:**

- If there is any time conflict, the system will prompt an error, saying the actor should choose a different time. If the actor does not choose another

time, they will not be able to complete their tour application, as the complete button will not be clickable and its color will be faded until the required spaces are filled with accepted answers.

### 3.2.2 Institutional Tour Application

**Actor:**

- Institution

**Description:**

The institutions with accounts can only use this feature. So if an institution wants to use this feature, they should first create an account. They cannot use individual tour application feature to bypass the account creation step, as in the individual tours only the student and their close family members can attend.

**Precondition:**

- Applicant has a valid institutional account information (the institution the counselor belongs to is registered to system by admin)
- The applicant has logged into the system.

**Basic Flow:**

- Actor must direct to the tour application page.
- Actor must provide the necessary information that includes multiple contact options, while the continuation of the tour, type of representative (e.g., counselor), number of students attending, student's field of interests.
- Applicant institution have to choose 3 different suitable times, as when the institution's tour will be adjusted according to the applicant's priority and the other institutions' priority that also wants the same time.
- The applicant will be notified that there is a possibility that their tour's time is subject to change between the 3 time choices they stated, even after they got the confirmation mail, and will get other mails if the time has changed to one of their other time choice.

**Post-conditions:**

- After the actor successfully finished their application, and checked the box stating they understand that their tour time is subject to change. They will get a confirmation mail stating their time and other details they put on the form, so if they check if they put any wrong information on the application form.
- If another applicant with a higher priority has chosen the same time, the applicant with lower priority will have their tour rescheduled to another time that has been chosen by them, while filling the application form.

**Exceptional Flow:**

- If the applying institution's preferred tour times have already been filled by other schools, then the system will send a mail to the institution to change their tour's time by using the change tour application form as there is a time conflict. If they don't, their tour application will be deleted 2 days before the time they chose for their latest chosen tour time.
- Applying institution cannot apply for a tour 5 months or more before the preferred tour date. If done so, the system will prompt an error, saying they cannot plan 2 months or more ahead.

### 3.2.4 Change Tour Application Form (Individuals and Institutions)

**Actors:**

- Institution
- Individuals

**Description:**

The applicants are allowed to change their submitted forms under some conditions.

**Precondition:**

- The individual has used the tour application feature before, and has been sent the access code to it.



- The institution has used the tour application feature, and the given information is no longer updated, or they entered it incorrectly, or their schedule has been canceled because of the time conflict.

#### **Basic Flow:**

- Actor chooses the “change application form”
- The system prompts actors to login or provide their, which was sent to them by confirmation mail, unique code to their form.
  - If login is chosen the institution representative logs in
    - The system retrieves the forms that include times that have chosen times that have not passed the current time from the database.
    - Actor chooses the relevant form, as the school may want not only 1 tour to the Bilkent campus but multiple campus tours.
  - If the actor chooses to enter the unique code,
    - The system retrieves the form from the database.
- Individual applicant can change the filled out form.

#### **Post-conditions:**

- Changed form is saved to the database by modifying the old one
- Changed version of the form is used in the system
  - After the approval of the BTO staff responsible
  - Immediately if it is a “**Quick Request**”

#### **Exceptional Flow:**

- **Quick Request:** If the change is requested within 24 hours of tour application or it is not scheduled yet, it can urgently send notice to coordinator of all guides
- **Form with the given unique code does not exist:** User is notified and asked to re-enter the code or apply for a tour if it was not done before.
- Institution applicant cannot change their tour time to 2 months or more ahead from the original time the application form was filled.

### 3.2.3 Tour Application Cancel

**Actor:**

- Individuals
- Institutions (High School Representative)

**Description:**

The applicants may cancel their tour.

**Precondition:**

- There must be a submitted tour application made by the actor.
- The actor must possess a unique access code if it is the individual applicant.
- The actor must possess a unique access code or they are logged into their account if they are an institution.

**Basic Flow:**

- The actor goes to “Cancel Tour Application” segment of the site.
- The actor gets options to either,
  - Login
    - The actor chooses the application to cancel from their applications.
  - Enter unique access code.
- The system retrieves tour application to be canceled.
- The actor is asked to provide a reason for their application’s cancellation.
- The actor confirms the process.

**Post-conditions:**

- The system updates status of application.
- If the application was scheduled beforehand, removed from the schedule.  
This includes:
  - Freeing guide schedule
  - Continues into reschedule, if there is any application pending and the rescheduling preconditions are met.
- The system notifies the relevant parties:
  - Guide(s) and trainees
  - Applicant
  - Director if the applicant is an institution.

**Exceptional Flow:** Special school priority will also apply, and the applicant can select city and school from a predefined list.

### 3.3 Manage Tour Schedules

#### 3.3.1 Schedule Tours

**Actors:**

- System
- Coordinator

**Description:**

The tour schedule is done automatically. If the director prefers to schedule a tour by hand, they may block a time being for scheduling the tour.

**Precondition:**

- There is enough application to schedule a tour for that week
  - OR there are 2 weeks for some applied forms.
- Schools have chosen 3 different tour hours
- Available time slots of the guides are present for the time period.

**Basic Flow:**

- The system retrieves all pending tour applications in the priority order from the database.
- The system evaluates each application
  - Matches highest-priority application to one of 3 slots
  - Selects a guide based on experience

**Post-conditions:**

- Tour schedule is updated.
- Schedule goes into guide confirmation stage if its pre-conditions are satisfied.

**Exceptional Flow:**

- **No available guides:** Coordinator is notified for manual scheduling.

### 3.3.2 Reschedule Tour

**Actors:**

- System,
- Coordinator

**Description:**

System will automatically match the highest scoring guide that is available from the timesheet and match it with the school. If there are more than 1 school on that day, other available guides that have the highest score next will get the next highest priority school. However, this system may overburden the guide that has the highest score in the timesheet, so with this feature coordinator can also manually change the guide of the tour. Or because the system's choice is not optimal because it does not take into account that the guide's high school is also on that day, and is motivated to guide them.

**Precondition:**

- There is enough application to schedule a tour for that week OR there are 2 weeks to some applied forms in the application pool.
- Coordinator has logged into their account and decided that the system's guide choice was not optimal and chose to manually change the guide.

**Basic Flow:**

- Coordinator chooses the tour from the planned tours section.
- Coordinator will click on the guide information.
- When clicked, the system will show only the other guides that have specifically stated they will be able to guide in the tour's planned time.
- Next to these guides also their scores from the timesheet will be available.
- Coordinator will choose the guide they want, and save the changes.

**Post-conditions:**

- New and old guides will be notified that the planned tour's guide has changed.

**Exceptional Flow:**

- If the same guide has been chosen, no guide will be notified, and the system will prompt a warning that the coordinator did not change the guide, and will stay the same.

## 3.4 Manage Guides

### 3.4.1 Guide List

**Actors:**

- Administrator
- Coordinator

**Description:**

To see guides list, which in detail includes their tour hours completed, time (hours) of availability.

**Precondition:**

- The system is operational
- The actor has a valid account and logged in

**Basic Flow:**

- The actor accesses the system and identifies the need to see the guides list
- System evaluates the actor's user privileges and decides whether they can see the list
- If user has the privileges, the system allows the actor to proceed to guide list page

**Post-conditions:**

- The actor that now has the access to the list can now see the list of guides with their information such as tour hours completed, time of availability

**Exceptional Flow:**

- If the actor doesn't have the required privileges, the system denies access and sends a warning to the administrator
- If any error arise even if the actor has required privileges, the actor reports this issue to the admin for resolution

### 3.4.2 Add Guide (to system)

**Actor:**

- Coordinator

**Description:**

The coordinator wants to add a guide to the system, use this feature and adds new guide.

**Precondition:**

- Coordinator is logged in.
- The trainee information are made available to the coordinator.
- Coordinator is in the relevant page of the system.

**Basic Flow:**

- The coordinator chooses the trainee to promote to guide.
- System checks if the trainees have finished their training based on preset conditions such as the training duration or timesheet table.
- The coordinator approves the promotion request.

**Post-conditions:**

- The guide is added to the system and the rescheduling conditions are checked if they are met, the new guide is used in the rescheduling.
- Director gets a notification.

**Exceptional Flow:**

- **Trainee has not completed their training yet:** The system warns the coordinator. If the coordinator insists on the decision, this promotion is presented to the head of communication and director for approval.
- **The guide is already added:** The system detects a guide that as already been added to the system. Displays a warning message and reports conflict to director.

### 3.4.3 Guide Approval for Tour

**Actor:**

- Coordinator of the day

**Description:**

The application process includes selecting the guide.

**Precondition:**

- The scheduling process is over.
- Coordinator of the day is notified for the schedule 2 weeks earlier to the schedule.
- The coordinator is in the relevant section on “Tour Schedule Approval”

**Basic Flow:**

- The coordinator can view the profile of the selected guide.
- The coordinator decides if the guides are to be approved or not:
  - **Approving the guide:** No explicit steps for this part, may leave a comment for the tour guide if desired.
  - **Change the guide:** The available guides are shown. If the coordinator believes another guide to be more fit to job, guide(s) can be selected from the list.

**Post-conditions:**

- Schedule information is changed.
- Schedule is opened for guides to see.
- The hours are logged into timesheet as scheduled hours.

**Exceptional Flow:**

- **The schedule is already published to guides:** The system notifies the removed and added guides.
- **No guides available to change:** The coordinator requests a reschedule approval from the director.

### 3.4.3 Remove Guide (from the system )

**Actor:**

- Coordinator

**Description:**

The coordinator wants to remove a guide from the system, use this feature and remove the guide.

**Precondition:**

- Coordinator is logged in.
- The guide information is available to the coordinator.
- Coordinator is on the relevant page of the system.

**Basic Flow:**

- The coordinator chooses the guide to remove.

- The coordinator approves the removal request.

**Post-conditions:**

- The guide is removed from the system and if the removed guide was to be in a scheduled tour, the rescheduling conditions trigger.
- Director gets a notification.

**Exceptional Flow:**

- **Guide had a scheduled tour :** The system warns the coordinator. Scheduled tour needs a new guide to be appointed or else must be rescheduled. Director is notified.

## 3.5 Manage Schools

### 3.5.1 Manage School Information

**Actors:**

- Director

**Description:**

Detailed information of each school: name, location, counselor name and their contact information, priority.

**Precondition:** They can login and navigate to the relevant page.

**Basic Flow:** Information of each school can be retrieved. Contact information can be used to communicate with specific schools. School information can also be changed by the user.

**Post-conditions:** School information is processed and any changes made are saved.

**Exceptional Flow:** No such exceptional case regarding school information exists.



### 3.5.2 Manage School Priority

**Actors:**

- Director

**Description:**

Each school has a different assigned priority. This is done due university has limited resources and it should be used efficiently to attract brightest students that have potential to come to Bilkent. This feature is used to manage this “priority” that is assigned to each school.

**Precondition:**

- The actor should be logged in as a user that has required privileges

**Basic Flow:**

- The actor proceeds to priority section in the school information
- If indeed the actor is the director, they can edit the information
- After saving, backend will the the input and update it in database accordingly

**Post-conditions:**

- Information regarding priority of that school is updated in the database

**Exceptional Flow:**

- If the actor enters an invalid priority attribute, the system gives an error message and does not update the database

### 3.6 Manage Feedback

**Actors:**

- Institutions
- Individuals
- Students of the Institutions

**Description:** Getting feedback is an important part of improving our project, and the overall tour experience.

**Precondition:**

- After the end of the tour, an email will be sent to the individual tour participant, and the institution email, and the individuals clicking the link, and institution forwarding the link to their students. Link that has been forwarded by the school is different from the individual's and institution's links.

**Basic Flow:**

- Individuals and the institution will fill 2 different boxes.
  - These consist of "Your Recommendations for the Website" in Turkish and "Your Recommendations for the Tour" in Turkish.
- Students that got the different email will only fill 1 box.
  - Students will only fill the "Your Recommendations for the Tour" in Turkish.

**Post-conditions:**

- Sending the form, which only requires the form filler to at least write 1 word.

**Exceptional Flow:**

- If no character has been written, send button will have a faded color and will be not clickable.

## 3.7 Manage Analytics

### 3.7.1 Timesheet System for Guides

**Actor:**

- System
- Coordinator

**Description:**

After approving a tour for a guide or removing, the system allows for point adjustments. The system records scheduled hours and worked hours. The coordinator can review and update the system upon giving a reason for the update. The system will automatically adjust guide points and report changes with the monthly timesheet report.

**Precondition:**

- The system has access to scheduled tour hours, and current time to track completed tours.

**Basic Flow:**

- The system logs scheduled hours.
- The system gets triggered 6 hours after the tour has completed..
- System checks whether the tour status is completed and checks if the coordinator has confirmed the guide attendance.
- System logs the hours.

**Post-conditions:**

- Changes to a guide's points can be made.

**Exceptional Flow:**

- **The coordinator submits changes:** The coordinator changes the hours completed in the schedule of their day by reporting a reason. The system shows the change in the monthly report of the timesheet and notifies the director.

### 3.9 Fair Attendance Form

**Actor:**

- Institution
- Coordinator
- Director
- System

**Description:**

Fairs are events that schools do when they want to invite universities to their schools. These fairs are a great chance for Bilkent to present itself to students and familiarize its name with them. This feature allows high schools to apply a form to Bilkent. These forms are then listed according to priorities of these schools. This list can be seen and managed by either director or coordinator.

**Precondition:**

- Institution has a valid account and logged in
- The page that carries out this feature must be open

**Basic Flow:**

- Authorized person that logged in as institution should fill the form according to required information
- They should select a time from the schedule and apply
- The system is then updates the part of database that handles information about fairs
- The system sends a notification to the coordinator

**Post-conditions:**

- System is updated with information about the fair in the context
- Coordinator can now notify guides about this fair

**Exceptional Flow:**

- If the selected schedule conflicts with another fair, the system should notify coordinator about this, for means of selecting fairs and appointing guides earlier and more careful

## 4. The 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:

- As a relational database, PostgreSQL provides structured and secure data storage, making it ideal for handling complex queries and relationships among data. In our system, PostgreSQL is well-suited for organizing and relating data, such as linking schools with appointments, staff (advisors and guides) with tour handling, and recording feedback.