



**Bilkent University**  
**CS319 - Object Oriented Software Engineering**  
**Campus Connect**  
**Final Report**

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17.12.2023  
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Introduction	3
Build Instructions	3
1. Prerequisites	3
2. Project Setup	4
2.1. Clone the Repository	4
2.2. Backend Setup (Java and Spring)	4
2.3. Frontend Setup (Node.js)	4
2.4. Accessing the Application	5
3. Further issues	5
User Manual	6
Authentication	6
CampusConnect Main Page	8
Posting a Product	9
Obtaining a Product	15
Profile Menu	17
Work Allocation	19
Murat Ertan	19
Yasemin Akın	19
Uygar Aras	19
Ulaş Keskin	20
Bengisu Serinken	20

# Introduction

CampusConnect emerges as a novel social networking platform, crafted to cater exclusively to the Bilkent University community, encompassing students, faculty, and staff. This digital ecosystem is inspired by the early days of localized online networks like Harvard's Facebook, aiming to rekindle a sense of unity and interconnectedness within the academic environment. The platform is designed to simplify campus life by centralizing various functionalities secondary market transactions, management of lost and found items, and resource sharing including lending, borrowing, and donations, all within a single user-friendly environment. Addressing the fragmentation of digital communication within the university, CampusConnect provides a cohesive solution that enhances campus connectivity and operational efficiency. Among its key features are a marketplace for second-hand goods trading, an integrated commenting system for posted items, a lost and found hub, resource sharing capabilities for fostering community engagement. Distinctively, CampusConnect stands out for its dedication to eco-friendly practices, promoting sustainability through reusing items, users can donate, borrow, rent, lend, sell, and buy items which prevents overconsumption. The exclusivity of the platform for Bilkent University members ensures a focused and close-knit community, making it a unique digital extension of the campus experience, increasing the trust between users. With its commitment to community building and sustainability, CampusConnect is not just a digital platform but an intellectually engaging and impactful initiative within the university.

# Build Instructions

This guide provides detailed instructions for setting up the CampusConnect project, a comprehensive platform for Bilkent University's community. Before proceeding, ensure that the following prerequisites are installed on your computer.

## 1. Prerequisites

- **Java Development Kit (JDK)**: Install the latest version from the official Oracle website: (<https://www.oracle.com/java/technologies/javase-jdk11-downloads.html>) or opt for an open-source version like OpenJDK (<https://openjdk.java.net/>).
- **Apache Maven**: Download and install Apache Maven from its official website (<https://maven.apache.org/download.cgi>).
- **Node.js and npm (Node Package Manager)**: These are essential for running the frontend. Download them from the Node.js official website (<https://nodejs.org/en/download/>).
- **WebSphere Application Server (WAS)**: Install and configure WAS for deploying the application. Alternatives like Tomcat (<http://tomcat.apache.org/>) or WildFly (<https://www.wildfly.org/>) can be used, but they may require some adjustments in configuration.
- **IDE**: A proper IDE to run and inspect the codes is a necessity. We used IntelliJ IDEA (<https://www.jetbrains.com/idea/>) to design and run the backend for its compatibility with Spring. For frontend, Visual Studio Code (<https://code.visualstudio.com/>) was selected. Any proper IDE can be used.

## 2. Project Setup

### 2.1. Clone the Repository

Start by cloning the project repository using Git. Open a terminal and enter the following command:

```
git clone https://github.com/YaseminAkin/cs319-project.git
```

### 2.2. Backend Setup (Java and Spring)

The backend of CampusConnect is built with Java using the Spring framework.

a) Open IntelliJ IDEA

- Launch IntelliJ IDEA.
- Choose `Open or Import` and select the project directory from the cloned repository.

b) Run with Spring Configuration

- In IntelliJ, locate the Spring Boot configuration file.
- Run the project using this configuration. This will start the backend Spring application.
- Press Load button on the notification that appears on the down right corner of IntelliJ window. It should state “Maven build script found CampusConnect 3”.
- Make sure that the server is running on <http://localhost:8080/>

### 2.3. Frontend Setup (Node.js)

The frontend of CampusConnect is developed using Node.js.

a) Navigate to the Frontend Directory

- Open a terminal and navigate to the `frontend` directory in the cloned repository:

```
cd frontend
```

b) Install Dependencies

- Install the necessary Node.js dependencies:

```
npm install
```

c) Start the Node.js Application

- In Visual Studio Code or your preferred terminal, run the following command:

```
npm run dev
```

d) Open the Application

- The application will be served at <http://localhost:5173>. Open this URL in a web browser. Also terminal will provide the link while frontend is running. Output should be similar the following:

VITE v4.5.1 ready in 417 ms

- Local: <http://localhost:5173/>
- Network: use --host to expose
- press h to show help

## **2.4. Accessing the Application**

- Access the fully integrated application via the URL provided by your WebSphere Application Server, typically in the format <http://localhost:5173/>.

## **3. Further issues**

Noticing that further unforeseeable issues may rise after submission regarding database, aws or other systems, please refer to the following pieces of information that may be useful for specific situations.

- For safety measures make sure to access the verification mail through a different tab on the same browser.
- Database username and password can be found in application.properties under the resources folder. We are aware that normally this would not be optimal but we aimed for ease of access during grading.



Once again, certain difficulties can be seen while setting up. Please feel free to contact us at our emails:

- [ulas.keskin@ug.bilkent.edu.tr](mailto:ulas.keskin@ug.bilkent.edu.tr)
- [uygar.aras@ug.bilkent.edu.tr](mailto:uygar.aras@ug.bilkent.edu.tr)
- [yasemin.akin@ug.bilkent.edu.tr](mailto:yasemin.akin@ug.bilkent.edu.tr)
- [bengisu.serinken@ug.bilkent.edu.tr](mailto:bengisu.serinken@ug.bilkent.edu.tr)
- [murat.ertan@ug.bilkent.edu.tr](mailto:murat.ertan@ug.bilkent.edu.tr)

# User Manual

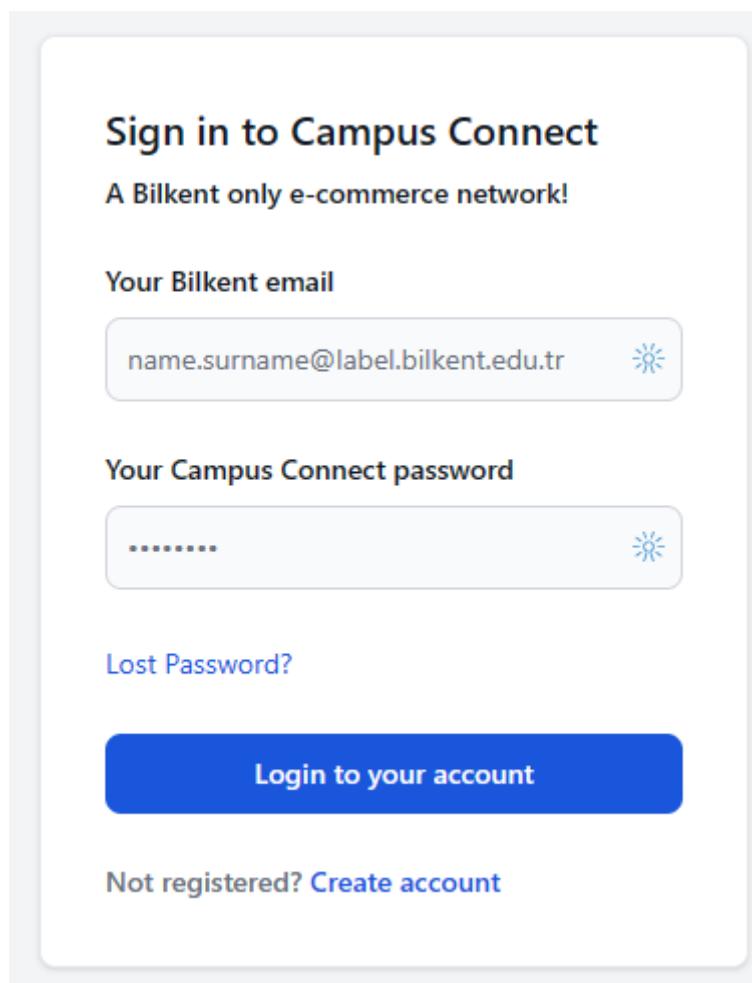
## Authentication

### Log In

When you first arrive to CampusConnect, you will see the log in page. If you have a verified account you can enter your email and CampusConnect password and hit to the “login to your account” button. To access your account.

If you have an account but you don't remember it's password, our system will send password modifications to your account when you hit “Lost Password?” button.

Since you are reading this user manual you haven't yet probably opened an account. You can hit to the “Create Account” button to open the register page.

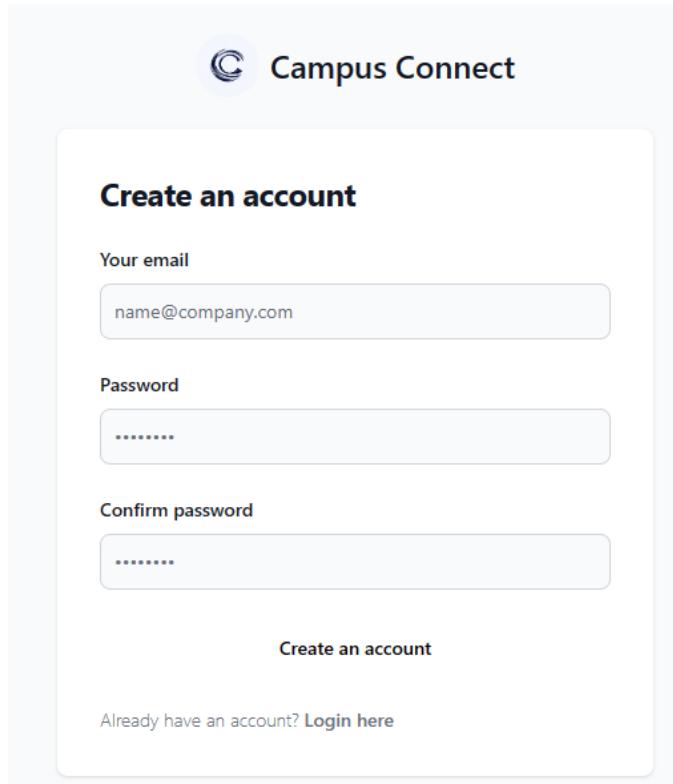


### Register

When you are registering, since CampusConnect is only available for Bilkent community, you will need to enter your Bilkent email provided by BCC. After that, create your unique password and store it in a safe place and hit “Create an account” button.

You will have to verify your registration. Please head over to your Bilkent mail and verify your request by clicking to the forwarded link. Now your account is successfully created and you are ready to enjoy CampusConnect!

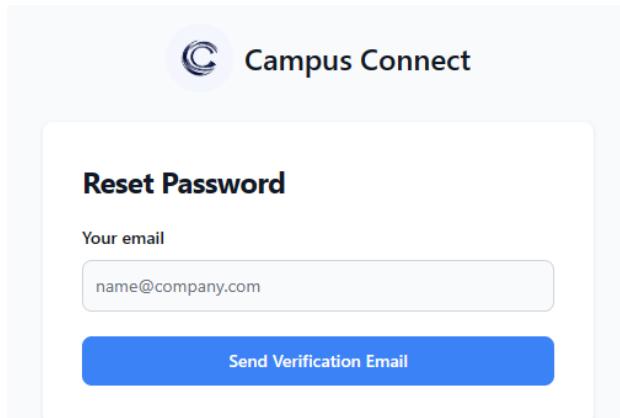
You can switch back to the login page if you mistakenly clicked to register page.



The image shows a screenshot of the Campus Connect 'Create an account' form. At the top, there is a logo consisting of a stylized 'C' icon followed by the text 'Campus Connect'. Below the logo, the title 'Create an account' is centered. The form contains three input fields: 'Your email' with the placeholder 'name@company.com', 'Password' with a redacted input field, and 'Confirm password' with a redacted input field. Below these fields is a blue 'Create an account' button. At the bottom of the form, there is a link 'Already have an account? [Login here](#)'.

## Reset Password

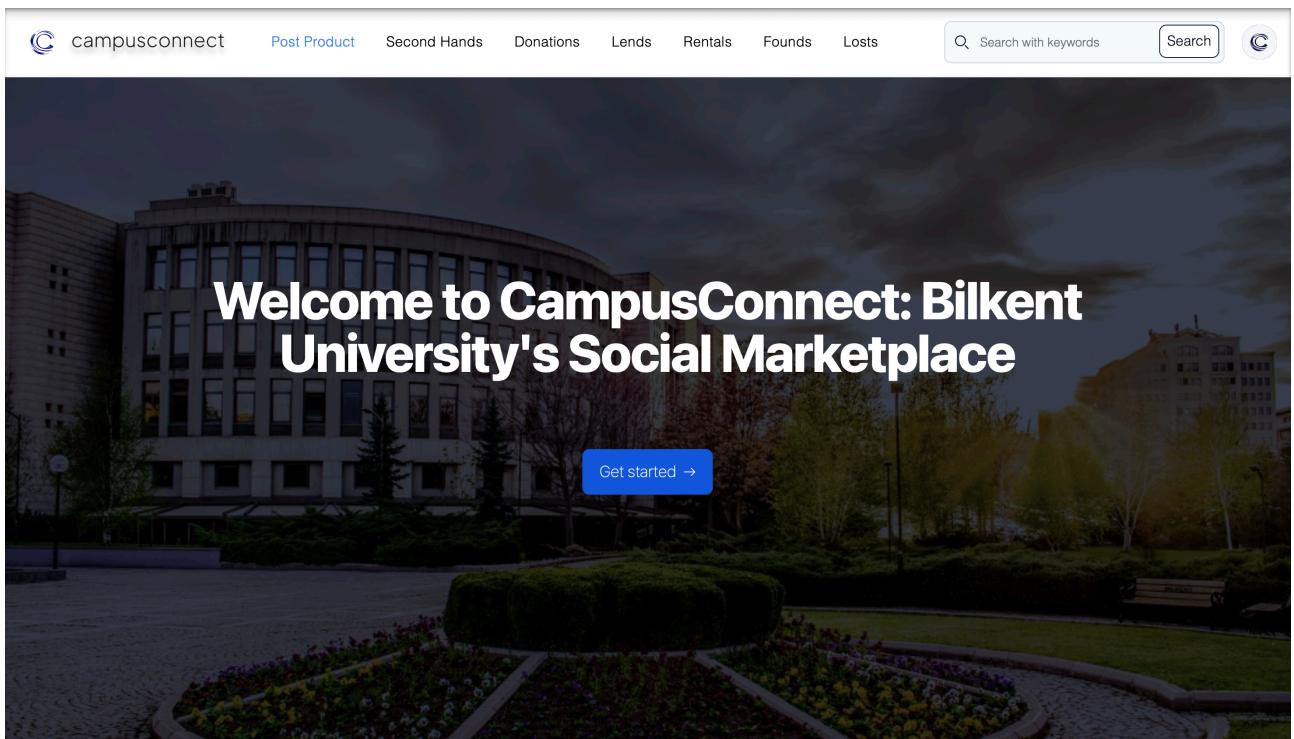
You will need to provide your registered email to recover your account. Any email that is not registered to the system will not receive any email from CampusConnect.



The image shows a screenshot of the Campus Connect 'Reset Password' form. At the top, there is a logo consisting of a stylized 'C' icon followed by the text 'Campus Connect'. Below the logo, the title 'Reset Password' is centered. The form contains one input field: 'Your email' with the placeholder 'name@company.com'. Below the input field is a large blue 'Send Verification Email' button. There is also a small link at the bottom right of the button area.

# CampusConnect Main Page

You have arrived to the CampusConnect main page. Let's delve into what you can do with CampusConnect.



When you scroll down or click “Get started” button, you will see the latest uploaded items awaiting your attention. You can click any of them and see the details.

A screenshot of the CampusConnect website showing a grid of lost items. The grid consists of eight cards, each containing a small image of the lost item, a title, a brief description, a 'Lost Item' button, a 'View Details →' link, and a timestamp. The items include a pink folder, AirPods Pro, a golden hoop earring, an Apple Watch, a New York State driver license, a Rolex watch, a Basys3 electronic device, and a spiral notebook. The last card in the grid has a green border around it.

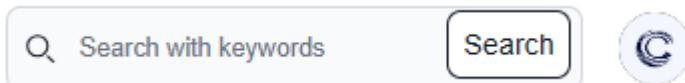
## Navigation

This is your navigation. We will go for each of the pages in this manual. You can click any of them to access the relative pages.

When you click to the Post Product, you will arrive to a page that you can market your items. We will go into posting process later in the manual.

[Post Product](#)    [Second Hands](#)    [Donations](#)    [Lends](#)    [Rentals](#)    [Found](#)s    [Lost](#)s

Alternatively, you can search for any item using keywords in the search bar just at the right corner of the page.



## Posting a Product

Let's go step by step for each box for you to push your product to the system. The system will not accept any product that has incomplete information. Different product types have different required specifications, for example, the user is prohibited to enter a price for a "lost" product.

**Post a new product**

Product Title (max. 60 characters)

Type  
 Select type  Price ('.' for decimal, enter positive values)

Duration Type  
 Select type

How many s?

Location (Select the nearest)  
 Select location  Condition

Date and Time  
 Select a date and time

**Upload Product Photo**  
 Click to upload or drag and drop  
PNG or JPG (MAX. 5MB)

Product Description (max. 160 characters)

**Post Product**

## **Title**

For all the products, you will have to provide a title. This title will be available to all customers, and they will select your item based on that title. Choose wisely. You will have 60-character limit.

## **Type**

There are six post types you can choose. Let's go step by step for each of them.

### *Second Hand*

For the second hand item, you will have to enter it's price. CampusConnect doesn't take any commission so, the price listed will be the final price.

Type	Price ('.' for decimal, enter positive values)
Second Hand	12

You will have to indicate the item's status as well with the drop-down menu. Please choose the one that is likely to be correct for your item.

Condition
Fair
Select condition
Like New
Very Good
Good
Fair
Poor

### *Donation*

Donation is a sub-type of *Second Hand*. You do not specify it's price because it's a donation. However, you will have to choose it's condition in the dropdown menu.

Condition
Fair
Select condition
Like New
Very Good
Good
Fair
Poor

### *Rental*

Rental posts are items that are lent for a duration in exchange for a price. You will have to input the price.

Price ('.' for decimal, enter positive values)
0

Besides, you will have to choose the duration.

Duration Type

Day

How many days?

Enter number

You can change the duration from the drop down menu.

Duration Type

Day

Select type

Day

Week

Month

Finally you specify the post condition.

Condition

Select condition

Select condition

Like New

Very Good

Good

Fair

Poor

### Lend

Lend posts are items that are rented for a duration in except for a price.

Similar to renting process, you will have to choose the duration.

Duration Type

Day

How many days?

Enter number

You can change the duration from the drop down menu.

Duration Type

Day

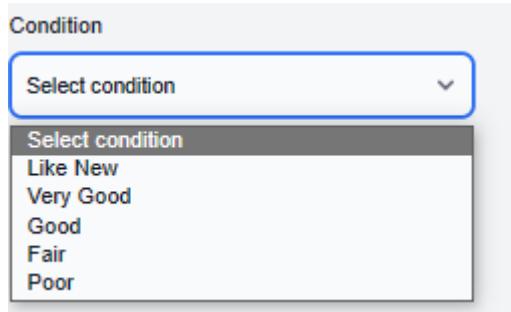
Select type

Day

Week

Month

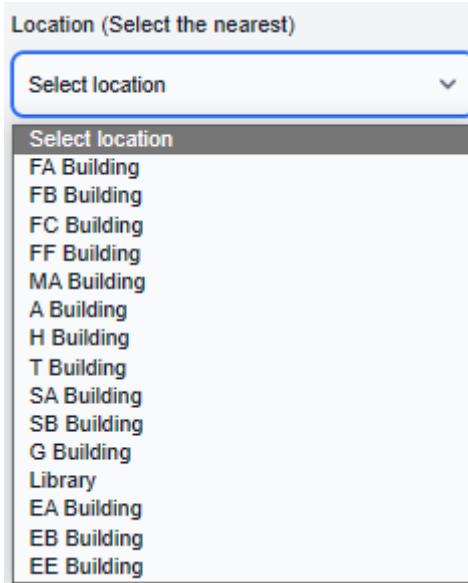
Finally you specify the post condition.



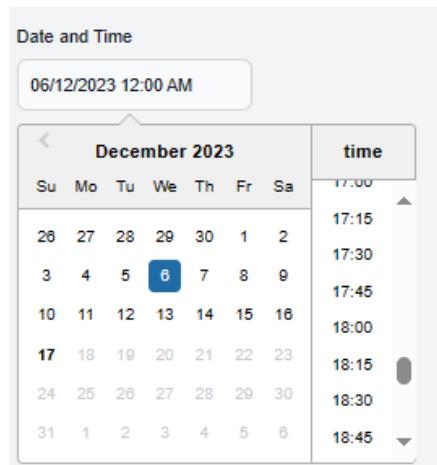
### Lost

Lost items are for the posts you have lost. You input the item's information so that CampusConnect users may inform you if they find the item.

You have to select the Location where you might have lost the item. The locations can be selected from the drop-down menu which are Bilkent buildings.



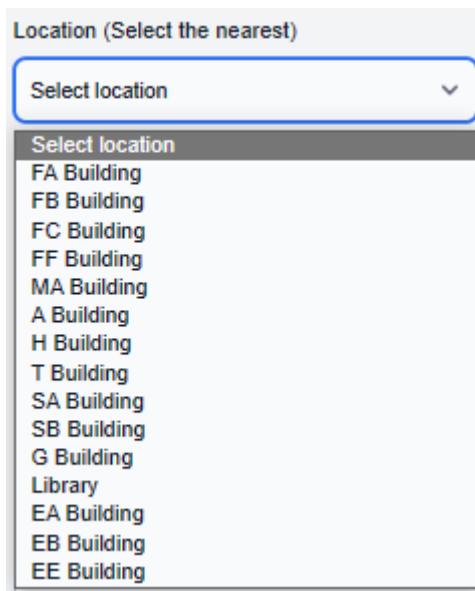
Additionally, you have to specify the date and time you have lost the item. The time intervals are adjusted for quarters.



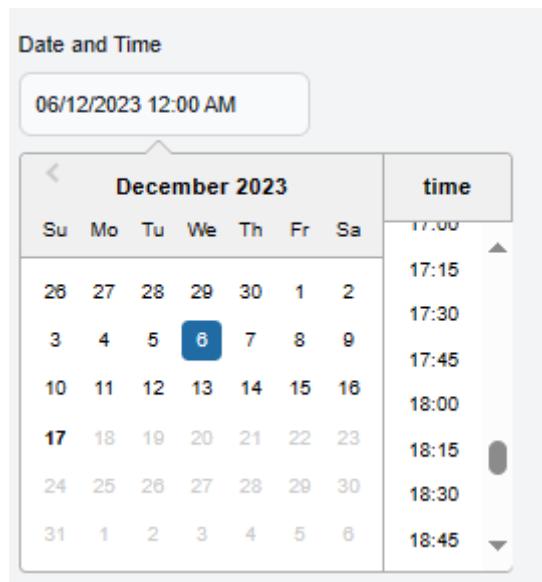
### *Found*

Found items are for the posts you have found. You input the item's information so that CampusConnect user or user's friend who have lost the item can reach it back.

You have to select the Location where found the item. The locations can be selected from the drop-down menu which are Bilkent buildings.



Additionally, you have to specify the date and time you have found the item. The time intervals are adjusted for quarters.



### *Other Labels*

You do not have to upload an image for any of the types. However, you are required to write a description.

Upload Product Photo



Click to upload or drag and drop  
PNG or JPG (MAX. 5MB)

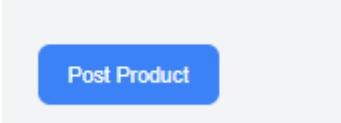


Product Description (max. 160 characters)

Type your description here

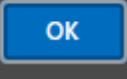
## Post the Item

Finally post the item with the “Post Product” button specified below.

 Post Product

The system will give an error message if you do not fill the required fields.

Please fill in all required fields with appropriate values.

 OK

Your product will be instantly listed on the main menu.

**campusconnect** [Post Product](#) Second Hands Donations Lends Rentals Founds Losts

Search with keywords

ivy ex bought them, I t... someone please buy it, I nee...  Second Hand Item  <a href="#">View Details →</a>  Posted 2 hours ago by uygar.aras	upperware suisuk Lacivert suluğumu kaybettim...  Lost Item  <a href="#">View Details →</a>  Posted 2 hours ago by bengisu.serinken	basyss for Sale Yeni gibi kardeşim garantis...  Second Hand Item  <a href="#">View Details →</a>  Posted 2 hours ago by uygar.aras	Mavi Kartıkk 9 tane kart sizabili, sağlam, ...  Donated Item  <a href="#">View Details →</a>  Posted 2 hours ago by yasemin.akin
			
Laptop case Pink laptop case for 15 inch l...  Second Hand Item  <a href="#">View Details →</a>  Posted 2 hours ago by bengisu.serinken	FIRE SNEAKERS My uncle brought them from ...  Second Hand Item  <a href="#">View Details →</a>  Posted 2 hours ago by uygar.aras	I LOST MY BAG!! I lost my bag at MA starbuck...  Lost Item  <a href="#">View Details →</a>  Posted 2 hours ago by uygar.aras	Glasses with Black Fra... Glasses with black frame.  Second Hand Item  <a href="#">View Details →</a>  Posted 2 hours ago by yasemin.akin

## Obtaining a Product

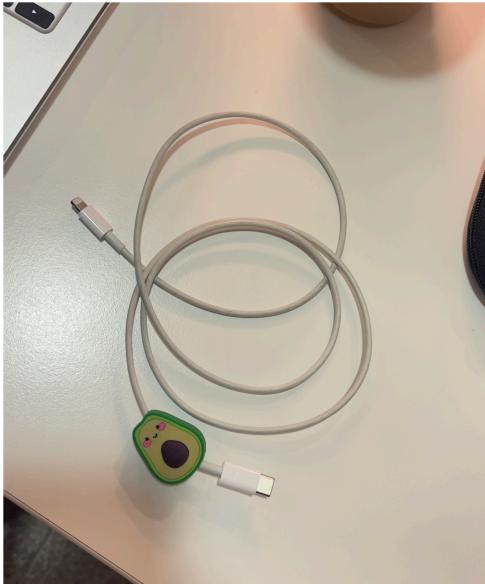
From the navigation menu you can go to the specific type.

**campusconnect** [Post Product](#) Second Hands Donations Lends Rentals Founds Losts

Search with keywords

			
My ex bought them, I t... someone please buy it, I nee...  Second Hand Item  <a href="#">View Details →</a>  Posted 2 hours ago by uygar.aras	FIRE SNEAKERS My uncle brought them from ...  Second Hand Item  <a href="#">View Details →</a>  Posted 2 hours ago by uygar.aras	Basyss for Sale Yeni gibi kardeşim garantis...  Second Hand Item  <a href="#">View Details →</a>  Posted 2 hours ago by uygar.aras	Laptop case Pink laptop case for 15 inch l...  Second Hand Item  <a href="#">View Details →</a>  Posted 2 hours ago by bengisu.serinken
			

You can click “View details” which will take you to the product page.



campusconnect Post Product Second Hands Donations Lends Rentals Founds Losts Search

LOST ITEM

## C type charging cable

Charging cable with avocado cable protector charm

**Location Lost:** EE Building  
**Date and Time Lost:** 17/12/2023, 9:30 pm

[Mark as Active](#) [Update Product](#)

Write a comment...

[Post comment](#)

Remember, comments to this post should follow our [Community Guidelines](#).

You will see the information regarding the product. If you want to comment something about the product, you can use the “Post comment” button with your message.



campusconnect Post Product Second Hands Donations Lends Rentals Founds Losts Search

SECOND HAND ITEM

## My ex bought them, I tryed it once

someone please buy it, I need to get rid of this

**Price:** 777 TRY  
**Condition:** Good

[Click and e-mail to owner](#)

 New comment from **yasemin.akin**: How is the texture?  
12/17/2023 10:25:31 PM Delete

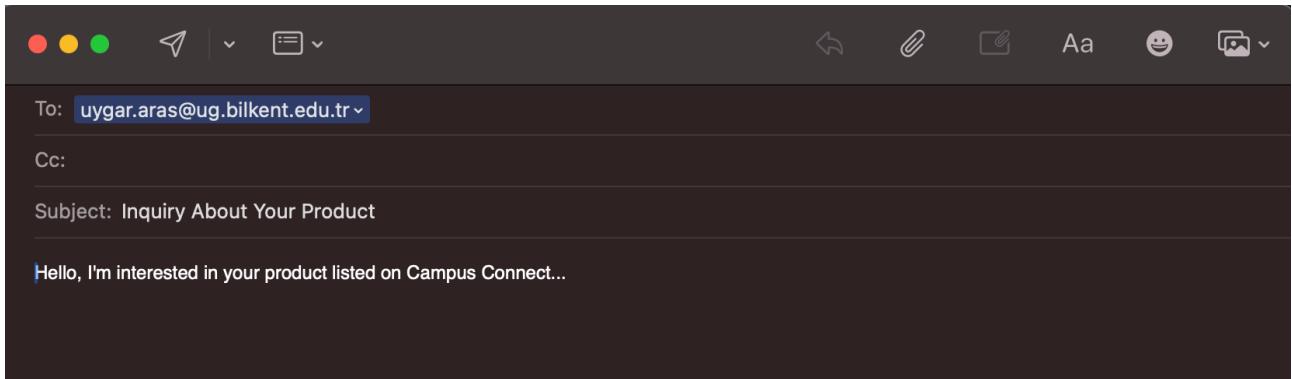
 New comment from **bengisu.serinken**: What is its size?  
12/17/2023 11:51:00 PM Delete

Write a comment...

[Post comment](#)

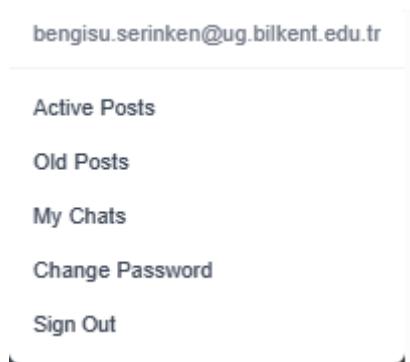
Remember, comments to this post should follow our [Community Guidelines](#).

You can also e-mail to user. CampusConnect’s purpose is to connect the buyers and sellers, not providing a complete transaction. Thus, the users can negotiate on the price or speak about the specific details of the product.



## Profile Menu

You can click on the CampusConnect symbol on the right corner to view a dropdown menu.



### Active Posts

You can view your active posts.

The screenshot shows the campusconnect website interface with a navigation bar at the top. Below the navigation, there are four active posts displayed in boxes:

- Math230 notları**  
Final için notlar, çıkmış sorul...  
Donated Item  
[View Details →](#)  
Posted 2 hours ago by bengisu.serinken
- Black wallet**  
Wallet with "ck" print  
Found Item  
[View Details →](#)  
Posted 2 hours ago by bengisu.serinken
- Basys3**  
You can use it for 2024 Spring...  
Rented Item  
[View Details →](#)  
Posted 2 hours ago by bengisu.serinken
- Laptop case**  
Pink laptop case for 15 inch l...  
Second Hand Item  
[View Details →](#)  
Posted 2 hours ago by bengisu.serinken

Below these four posts, there is a partial view of a fifth post featuring a blue water bottle.

## Old Posts

You can view your old posts.

The screenshot shows a list of lost items on the campusconnect platform. There are five items listed, each with a thumbnail image, a title, a brief description, and a 'View Details' link. The items are:

- Golden hoop lost!!**  
I have lost my original gold h...  
Lost Item  
[View Details →](#)  
Posted 1 hours ago by bengisu.serinken
- Airpods pro 2nd gener...**  
It had a blue silicone cover  
Lost Item  
[View Details →](#)  
Posted 1 hours ago by bengisu.serinken
- Pembe defter**  
It had my name Bengisu Seri...  
Lost Item  
[View Details →](#)  
Posted 1 hours ago by bengisu.serinken
- Lost Apple Watch**  
Beyaz silikon kordonlu Apple...  
Lost Item  
[View Details →](#)  
Posted 1 hours ago by bengisu.serinken
- Lost item**  
Lost Item  
[View Details →](#)  
Posted 1 hours ago by bengisu.serinken

## Change Password

You can change your password from here. Please enter your new password two times. You can use your old password as an input.

The screenshot shows the 'Change Password' form for Campus Connect. It has two input fields: 'New Password' and 'Confirm password', both containing placeholder text '.....'. Below the fields is a 'Change password' button.

## Sign Out

You can safely sign out from the system. Thanks for using our application!

The screenshot shows a sign-out menu and a list of items. The sign-out menu includes options: Active Posts, Old Posts, My Chats, Change Password, and Sign Out. The list of items includes:

- Laptop case**  
Pink laptop case for 15 inch l...  
[View Details →](#)
- Second Hand Item**  
[View Details →](#)

# **Work Allocation**

## **Murat Ertan**

- Murat has made the profile package in D1.
- He has created activity diagram in D2 and improved that activity diagram for the final submission of D2.
- He has written the design goals for D4 and improved it based on the feedback. In D5, written the classes for ccuser and item classes.
- He has iterated and edited all of the deliverables for clarity and writing mistakes.
- For the final version of D5, improved the final class diagram for all of the classes and corrected some noted mistakes.
- He also tested CampusConnect on windows with some features.

## **Yasemin Akın**

- Drew the whole use-case diagram using the Visual Paradigm for D3 and help to textualize it.
- Helped to finalize and organize deliverables at the very end.
- Drew the whole high-level architecture (subsystem decomposition) diagram for D5 and wrote down structural, creational, and architectural design patterns used in the implementation process in our application.
- Implemented %90 of the user interface using React as a javascript framework. Used TailwindCSS as CSS framework. I have written JSX throughout the front-end implementation. Also, I have written pure CSS and pure JavaScript for some parts.
- For the back-end part, implemented comment controller, item controller, commentDTO, itemDTO, all entities, item repository, comment repository, comment service, and item service.
- Also, AWS S3 and RDS were configured for cloud storage service to store images and files uploaded to the system and cloud database service. I have implemented the storage service and AWS configuration classes for that aim.
- I did a lot of testing throughout the semester and implemented a database seeder class to initialize item and user entities for faster and easier testing.
- I have made sure of the communication between the front-end and back-end for all parts of the project. Implemented request and response mechanisms. Made sure the associations between items, users, and comments were arranged well.
- Implemented search functionality to be able to search through the titles and descriptions of items with specified keywords.
- Helped to build up the overall system architecture.

## **Uygar Aras**

- Comment Feature Implementation. Developed a method for fetching comments based on item IDs. Implemented functionality to display comments in the UI, including user emails. Created and integrated a JavaScript method to format timestamps for comments.
- User Authentication and Authorization. Discussed token-based authentication and the use of session storage for JWT (JSON Web Tokens). Implemented conditional rendering and navigation based on user authentication status.
- Item Details Page. Enhanced the item details page, including displaying various attributes like price, duration, condition, location, and date. Added functionality to change the status of an item (e.g., mark as given/active) and update item details.
- Community Guidelines Page. Created a new page to display community guidelines. Implemented navigation to this page via a link on the comment section of the item details page.
- Private Messaging and WebSocket Integration. Addressed the integration of WebSockets for real-time private messaging. Discussed handling WebSocket connections and sending private messages.
- Marketplace Functionality. Worked on the marketplace aspect of the application where users can buy, sell, or donate items. Discussed displaying items with their details and handling user interactions with these items.

- Lost and Found Feature. Implemented features for lost and found items, including displaying location and date details.
- Email Functionality. Added functionality to fetch and display user emails securely. Implemented an email feature where users can click to email the item owner.
- About Page Content. Drafted and formatted the content for the "About" page of the application.
- Product Update Page. Worked on a page for updating product details. Handled form inputs and state management for various product attributes.
- Front-End UI/UX Enhancements: Suggested improvements and modifications to CSS for better layout and design. Discussed enhancing user experience through intuitive UI design.
- Dynamic Data Handling and State Management. Managed state updates in response to user actions and data fetching. Ensured dynamic and responsive UI elements based on the current state and data.
- Report Writing and Editing. Worked on the first 4 reports on the parts that has been assigned to me after discussing as a group.

## **Ulaş Keskin**

- For D1 report did Management section for use case diagram.
- For further reports did state diagrams and grammar checks. Took part in all reports.
- Spring Boot Initialization. Researched and optimized dependencies in the beginning and throughout the projects design process.
- Created packages and divided the entities accordingly. Wrote first versions of repository, service and controllers.
- Worked on Spring Security and config implementations.
- Fixed Spring Boot version related problems.
- Worked on messaging implementation. Wrote backend classes and small frontend parts to test functionality.
- Worked on database optimization and research Hibernate and JPA for better understanding.
- Tried to implement a forum functionality but failed do to time constraints and conflicts in aws.
- Worked on bug fixing and small errors.
- Wrote build instructions and combined parts for the final report.

## **Bengisu Serinken**

- Wrote Readme file for the project that contained main properties. Finalized and uploaded the Readme file.
- Worked in the implementation of Backend, during preparation of Repository, Entity, Service classes.
- Prepared Authentication part of Use Case diagram, finalised Use Case diagram for D1 first draft. Created corresponding Use Case descriptions.
- Prepared class diagram except item classes for D2. Finalised the class diagram by connecting all classes according to multiplication and inheritance connections.
- Prepared Client layer of high level architecture diagram.
- Added the corresponding Messaging, Repository and Service classes to the final Class diagram for D5. Finalised the class diagram by connecting all classes and packages according to inheritance, usage and multiplication levels.
- Worked to implement messaging functionality.
- Prepared the Demo 1 min Youtube video.