Palestine Technical University – Kadoorie

College of Engineering and Technology

Department of Computer Systems Engineering

Course name:

Software Engineering

Project title:

DESIGNING A WEBSITE TO ENHANCE ACADEMIC SUPPORT AND FACILITATE BOOK EXCHANGE AMONG PEERS AT PALESTINE TECHNICAL UNIVERSITY - KADOORIE IN TULKARM

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Abstract:

Collaborative Learning is a website that helps students exchange books and study summaries in paper form. It provides students with everything they need in their academic journey, including books, summaries, explanations, and previous exams electronically. The site contains a search feature by image and sound to facilitate the search process for students. In addition, students can add any book or summary to another that is not present on the site to expand the site and benefit the largest possible number of students.

CHAPTER 1: INTRODUCTION

1.1 Project Overview & Background

Most people tend to aim for leaving a mark or making their names shine, but as university students, they are still working on developing themselves in various fields of study and sharing their personal efforts can sometimes be embarrassing for some and exhausting when it comes to finding a means for it. Additionally, some individuals enjoy helping others in the context of fostering self-satisfaction but don't know how. Our system will be the means for users to present their academic efforts to others in various courses.

1.2 Problem Domain

In the digital age, students face many challenges in accessing essential resources for their studies and managing academic materials efficiently. In addition, a large percentage of students prefer to study on paper rather than electronically. But under the current circumstances, the prices of these books are relatively high, Not all students can afford it, and there is difficulty accessing the necessary study resources electronically.

Therefore, our website aims to serve as a hub offering a wide range of tools, resources and services to support students throughout their academic journey.

1.3 Project Objectives

Our project contributes to the exchange of educational resources among students through electronic and physical format to accommodate diverse preferences. This approach recognizes the importance of traditional print materials for some students. In addition, the project aims to serve a large number of students, simplify study processes, enhance and facilitate knowledge exchange between different universities, and centralize academic materials to facilitate access to them.

❖ How We Propose to Address the Diagnosed Problems:

- Saving time and effort: This is done by providing a service for delivering paper books exchanged between students, which makes it easier for them to obtain educational materials without the need to go to libraries or universities, and providing an advanced search feature that allows students to easily find the required educational resources, whether electronic or paper, Without having to spend a lot of time searching.

- Data security and privacy: Implement strong security measures to ensure the protection of users' personal data and academic materials.

- Reducing costs: Implement a book sharing feature where paper books can be exchanged or borrowed, reducing the burden of purchasing new books.

1.4 Project Scope

Our innovative system, called Collaborative Learning, is a dynamic platform that prioritizes the user and is designed to revolutionize students' access to a wealth of educational resources and interaction with them. Unlike traditional academic programs, our system seamlessly integrates the exchange of physical textbooks with electronic participation. The student places their books on the website for exchange or loaning to other students. Additionally, the website provides study guides, lecture notes, and past exam papers. Our system features advanced capabilities such as image and audio search, making it easier for students to find specific resources even without knowing the exact title or location of the author.

1.5 Chapter Summary

The Collaborative Learning Portal will provide students with a convenient way to display educational resources such as books, notebooks, and test forms through a storage library containing these resources in multiple formats, including digital and paper formats, to meet diverse preferences. In addition, the student can add a request to obtain this resource by registering on the platform and selecting the desired course. The student can also join the discussion room when he wants advice.

This chapter discussed the mechanism of the student assistance system and their effective mutual participation in giving and taking during their academic journey.

Lastly, the project objective and project scope have been listed and discussed.

also, The structure of the proposed system has been justified and project contribution is stated. Next,

will be further discussing about the concept of portal management system.

CHAPTER 2: REQUIREMENTS GATHERING APPROACH

At the beginning of our project, we faced challenges in determining how to design an effective system to manage this process. Therefore, we conducted research online and visited some well-known websites in this field, such as this website: https://www.mostaql.com/portfolio/749164

Or this: https://m.badlkitabk.com/

We gathered ideas on how to achieve our goals and started the requirements discovery phase. We followed an approach based on browsing the web to gather user and system requirements, in addition to consulting with our trainers Dr. Osama Hamed and Dr. Nael Salman, who provided us with guidance on effectively identifying requirements.

We also conducted interviews with software experts where we gained valuable advice on how to gather and analyze requirements correctly.

CHAPTER 3: USER REQUIREMENTS DEFINITION

3.1 Functional User Requirements

I. ADMIN:

- Courses names:
  - Adding Course: When adding a course, all related information should be added.

    This information is:
    - Course name
    - Majors which take this course

  - Deleting Course: using course name.
  - Editing Course Information: the information that can be edit are department and course name

❖ Courses notes:

- Adding Course note: When adding a course note, all related information should be added.

  This information is:

  - Course name.
  - Title.
  - Year and semester.
  - Link.

- Deleting Course note: using course name and title.
- Editing Course Note Information.

❖ Previous exams

- Adding previous exams: When adding a previous exam, all related information should be added.

  This information is:

  - Course name
  - Title
  - Year and semester
  - Link

- Deleting previous exam: using course name and title.
- Editing previous exam Information.

❖ Books

- Adding Book: When adding Book, all related information should be added.

  This information is:

  - Course name.
  - Title.
  - Link.
  - Picture of the book

- Deleting Book: course name and title.
- Editing Book link exam Information

❖ Managing users: the admin shall have a full access on the users database:

- Delete user.
- Edit a user record.
- View user information.
- The administrator can also view the users.

❖ Managing orders:

This is done through the control panel, which is a visual interface that provides a summary of the main information and tools related to requesting and booking paper educational resources to help the administrator carry out these tasks efficiently:

- View requests.

- Update the order status: “Delivered,” “Cancelled,” or “Returned.”

-Solving problems if they occur when ordering books.

❖ The administrator must login using email and password.

II. USER:

❖ No need to have an account:

- Browsing: The user can open courses and download files without the need for access permission.

- Search and discovery: Everything that is uploaded to the platform’s website carries the course number, a description of the content, and an image of it that act as keywords to enable the user to accurately search for the course, display its details, and image search.

❖ Need to have an account: the user identified in the system can, in addition to browsing and searching:

- Request uploaded items offered for exchange or donation through the Create Request button.

- Adding Book: When adding Book, all related information should be added.

  This information is:
  - Course name.
  - Title.
  - Link.
  - Picture of the book

- Adding previous exams: When adding a previous exam, all related information should be added.

  This information is:
  - Course name
  - Title
  - Year and semester
  - Link

- Express opinion: Ability to comment, view ratings, and send feedback.

3.2 Non-Functional User Requirements

❖ Operational Requirements

- The system should operate properly in most web browsers.
- The system should be available when needed, with an acceptable level of downtime for maintenance or upgrades.

❖ Performance Requirements

- The system should meet certain performance criteria, such as response time, throughput, and resource utilization, to that it can meet user needs.
- The system should allow the user to reserve books in a short period of time.

❖ Security Requirements

- The system shall validate the username and password to login and make changes to the system.
- The system shall request the current password of the users to let them change to a new password.
- Passwords should be encrypted.

❖ Usability Requirement

- The portal will have an easy-to-use interface that allows customers to easily navigate and use the portal's features.
- The system should allow users to complete tasks efficiently and without unnecessary steps.
- A new customer should be able to use most system functions in less than half an hour of training.

- Availability: Can be used 24 hours a day, 7 days a week.

- User friendly interfaces:
  - Colors are comfortable to the eye.
  - The window provides assistance such as error messages while entering invalid data.

CHAPTER 4: SYSTEM REQUIREMENTS SPECIFICATION

Now I will try to describe some **functional** and **nonfunctional** requirements that were stated in chapter 3, but **in more detail**.

4.1 FUNCTIONAL SYSTEM REQUIREMENTS

Table 1: <<Functional System Requirement>> User Login

User Login	
Brief Description	The log in use case allows the user to login in the system.
Actor(s)	A user, could be: •An admin. •A students
	Note: I think that there will be a different login form for each type of users mentioned above, because each type will be stored in its own database
Flow of Events	At Homepage → Login Form; 1. The system asks the user to enter his user name and Password (optional). 2- If the user only wants to browse and search, he can access the main page of the site without logging in. 3- The user enters his username and password if he wants to exchange books. 4- The system verifies the accuracy of the information entered, and ensures that the entered data actually exists in the users' database. 5-Users will have the option to reset their password in case they forget it, and the system will send a password reset link to their registered email address for verification. 6- The user is logged in. 7- The use case ends.
Pre-conditions	Having an account before in case of exchanging and reserving books.
Security	Secure connection to the database
Success	The user entered data that is stored in the user account

Table 2: <<Functional System Requirement>> Admin

Admin	
Brief Description	It allows the admin to manage various operations (add, delete, modify)
Actor(s)	The admin is the only one capable of managing the entire system.
Flow of Events	After the admin has successfully logged in: 1. The admin can add, delete, and modify all of the following: - Courses names - Courses notes - Previous exams - Books * When adding, a description is added as needed, such as (Course name, Title ,Year and semester, Link,Picture, etc.). 2.the admin shall have a full access on the users database: - Delete user. - Edit a user record. -View user info. -The administrator can also view the users. 3.Managing orders,This is done through the control panel, which is a visual interface that provides a summary of the main information and tools related to requesting and booking paper educational resources to help the administrator carry out these tasks efficiently: - View requests. - Update the order status: “Delivered,” “Cancelled,” or “Returned.” -Solving problems if they occur when ordering books. * He should track the email to collect paper resources from students and track the status of reservations on these resources. *The administrator must login using email and password.
Pre-conditions	The admin successfully logs into his account
Security	Secure connection to the database. Only the admin can access all the application's permissions and make these changes (insert, update, delete, or modify). Other users can only view and add electronic educational resources, browse them, and add paper educational resources to their basket to reserve or delete them from the basket.
Success	The admin has accessed all permissions.

Table 3: <<Functional System Requirements>> User Functions

User	
Brief Description	Allow the user to view educational resources, and give him the opportunity to reserve and choose how he wants to receive them.
Actor(s)	The user (the student who wants to search - view - add - and exchange).
Flow of Events	**Guest user:** 1. Any guest user can browse the various resources. Each resource must display its name, the title of its course, a picture, and a link to it. 2. When the user clicks on a specific resource, he can see its details such as a picture of the resource and a description of it. And he can download the files of this resource. 3- The user can search, and all resources similar to the search are shown to him. 4- If the user wants to exchange paper resources, he must log in to the website. **After logging in:** Once the user successfully creates an account and logs in, the "Add to Cart" button next to each available paper resource on the website will be activated. • The user can now view their shopping cart and reserve the paper resources they need. • The user can request multiple educational paper resources. Upon completion of the reservation, they must click on the "Submit Order" button. • Subsequently, all reserved resources will be added to the reservations database. • The user can choose their preferred method of receiving the paper resources by clicking on one of the following buttons: 1- Send it via the “delivery company.” When the button is pressed, an icon appears and the user must enter his phone number so that the delivery company can coordinate with him to receive his order. 2- Pick them up from a designated location: The requested resources will be provided on a specific date and time at the university security office by the gate. Then, a message will appear asking the user: "Is this suitable for you?" At this stage, there are two options: • If they choose "Yes", the system will send a notification to the administrator with all the details of the order including time, date, and reserved content, thus completing the reservation successfully.

	• If they choose "No", a date selector will appear for the user to choose a suitable time and date. Afterward, a notification with all the details of the order including time, date, and reserved content will be sent to the administrator.
	➢ The user can add paper educational resources in order to donate them, so that when he clicks on the “Add” button, the “Upload File” button will appear, and the user will upload specifications about the resource such as (the name of his course, a picture of it, and so on) and then a confirmation message will appear. ” You are about to complete the upload, do you want to continue? There are two options: yes, no. • When you click “yes,” a “Uploaded” message will appear with the admin’s email until coordination is made on where the admin will receive the paper resources from the user. • When you click “No”, the process will be cancelled. ➢ As a user who has successfully logged in, he has all the privileges of the guest user, including search, view, download, etc.
Pre-conditions	Guest user does not require any conditions. While the user who wa donate (exchange books) must log in successfully.
Security	Database connection security must be ensured to protect customer data and booking details. Once a customer clicks the confirm button to reserve an item, a confirmation notification will be sent directly to their email address. If the reservation is unauthorized, the customer can report the reservation for cancellation and will be asked to change the password to ensure the safety of his account.
Success	Various operations (add - search - reserve - etc.) were completed within the system successfully

4.2 NON-FUNCTIONAL SYSTEM-REQUIREMENTS

In systems engineering a non-functional requirement specifies how the system should behave and they specify constraints upon the systems behavior. One could also think of nonfunctional requirements as quality attributes of a system.

1.Security:

- The system has a login and sign-up pages.
- To register, the user need to enter email and password which must be at least 7characters, and must include at least: 1 lowercase letter, 1 uppercase letter, numbers,and one of the following characters(#, $, *, !).
- The system will protect this information by using Identity in Asp.net that is made by.net which have
- Also the user cannot complete the registration without entering a code that the system send to him via email.

2.Ease of use:

- The system should have a simple and easy-to-learn graphic userinterfaces.
- A new customer should be able to use most of the system'sfunctionalities in less than half an hour of training.
- Provides help frame such as error messages while entering invalid data.

3. Scaling: It should be able to scale vertically (adding more resources to a single server) and horizontally (adding more servers to distribute the load) as needed.

Scalability testing should be performed to verify the system's ability to handle the increased load without compromising performance or stability.

4. Credibility: The system must operate reliably under normal conditions and in the face of possible malfunctions.They should have mechanisms in place to safely detect and recover from errors or failures, minimizing disruption to users.

Regular data backups should be performed to prevent data loss in the event of unexpected events such as hardware failure or system crash.

CHAPTER 5: SYSTEM MODELS

5.1 Context Diagram

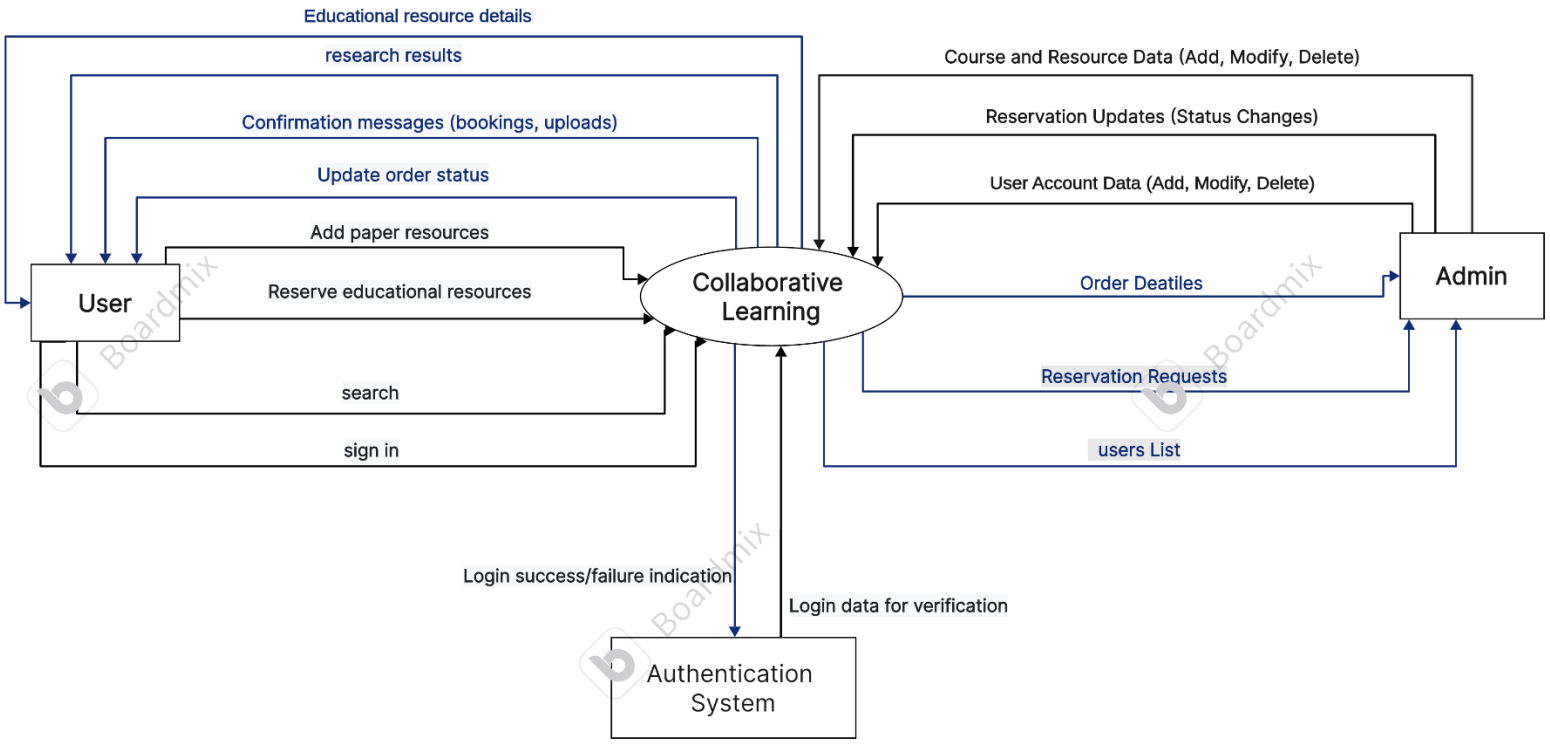


Figure 1: Context Diagram.

5.2 Use-case Diagrams

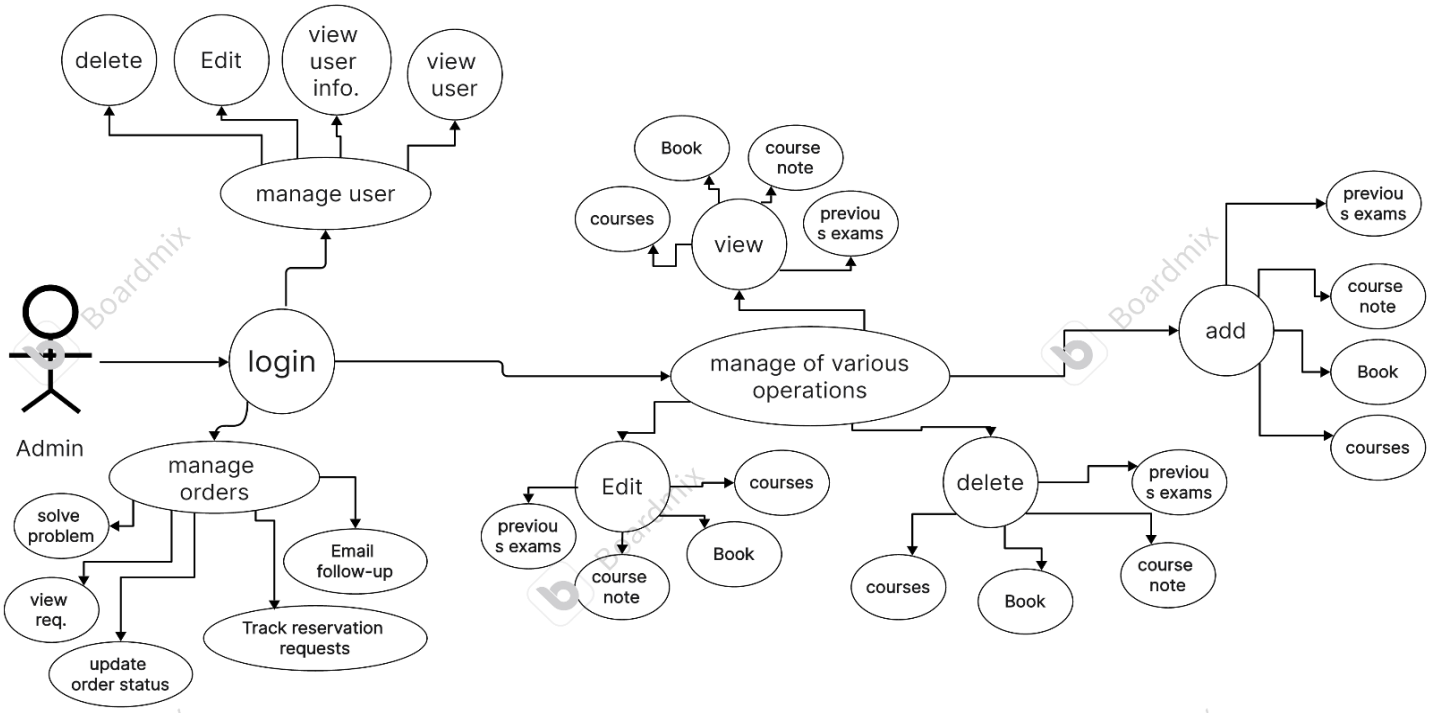


Figure 2: Admin's Use-case Diagram.

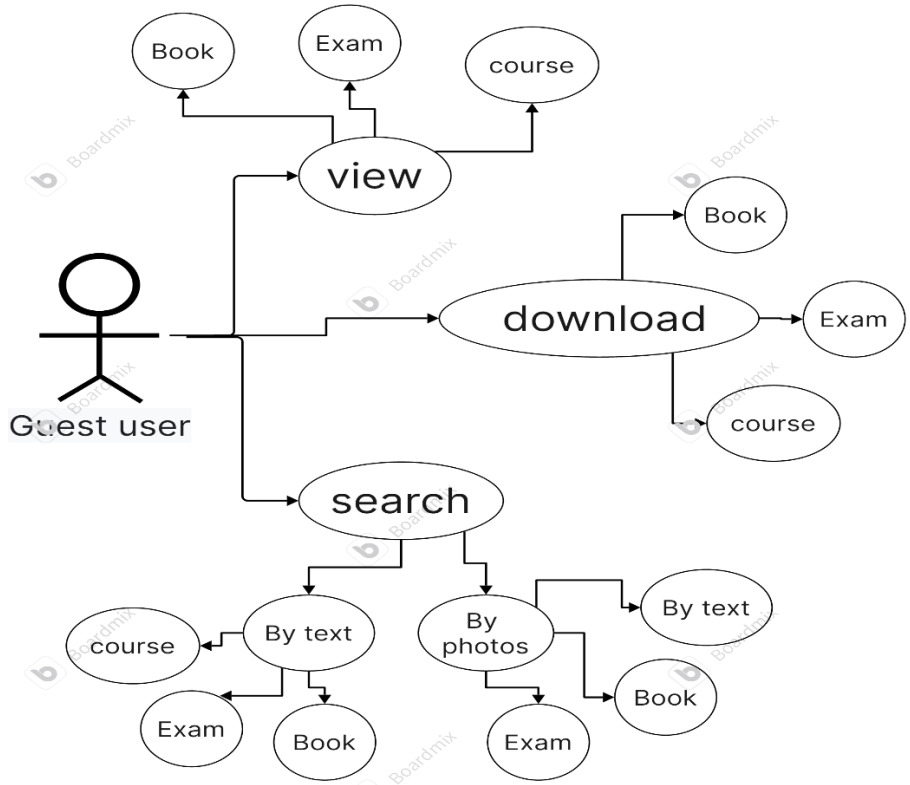


Figure 3: Guest user Use-case Diagram.

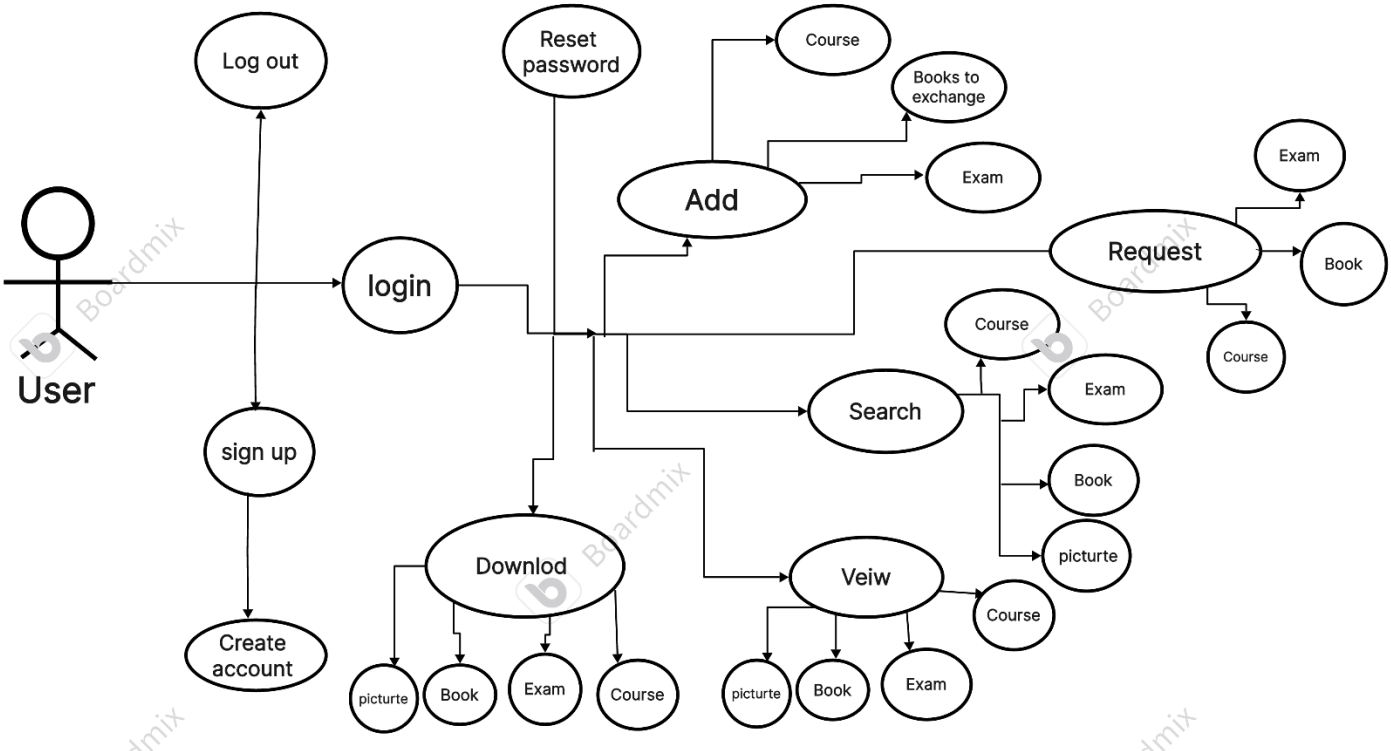


Figure 4: User Use-case Diagram.

5.3 Sequence Diagram

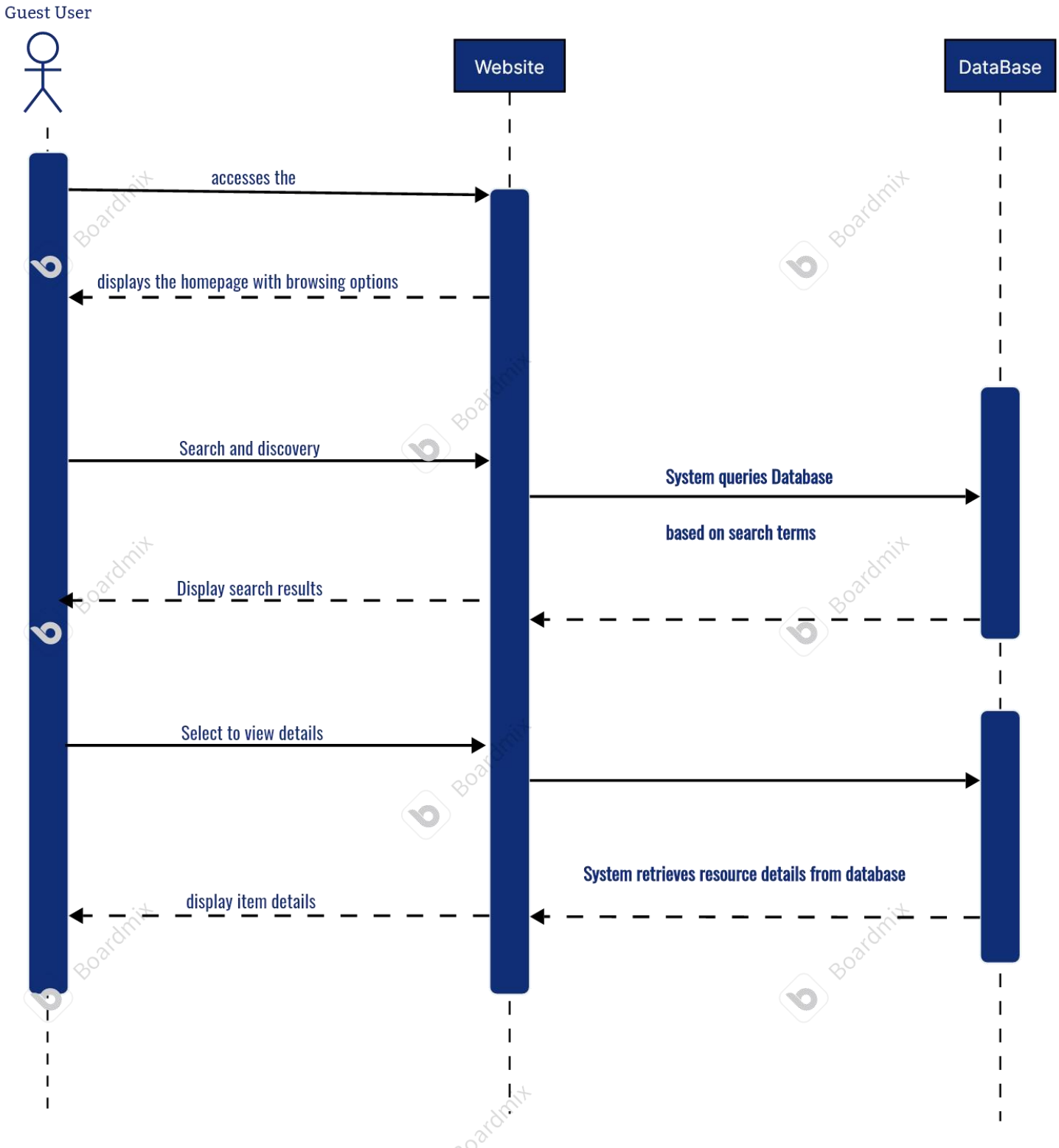


Figure 5: Guest User Sequence Diagram.

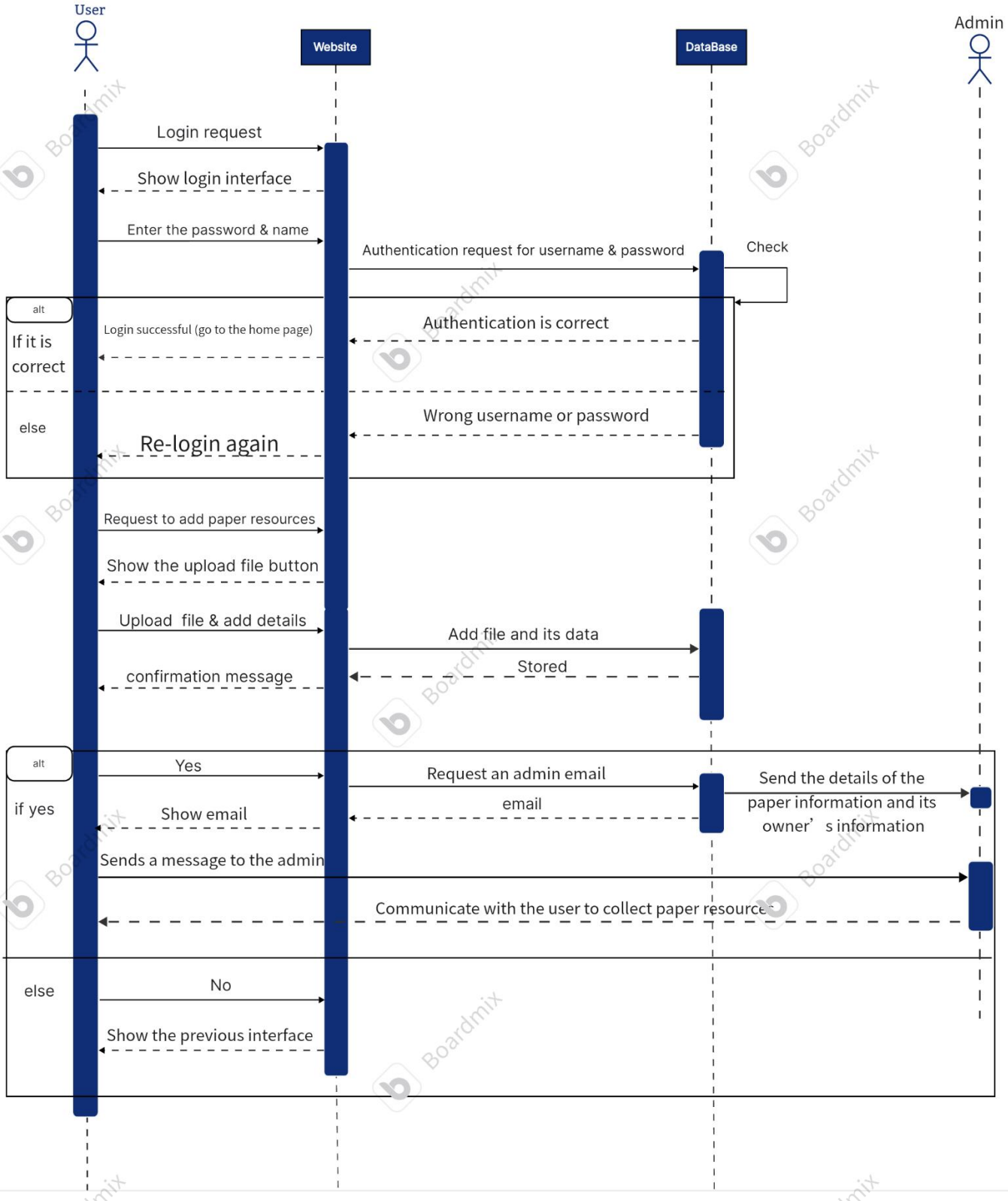


Figure 6: Login and add paper resources, user Sequence Diagram.

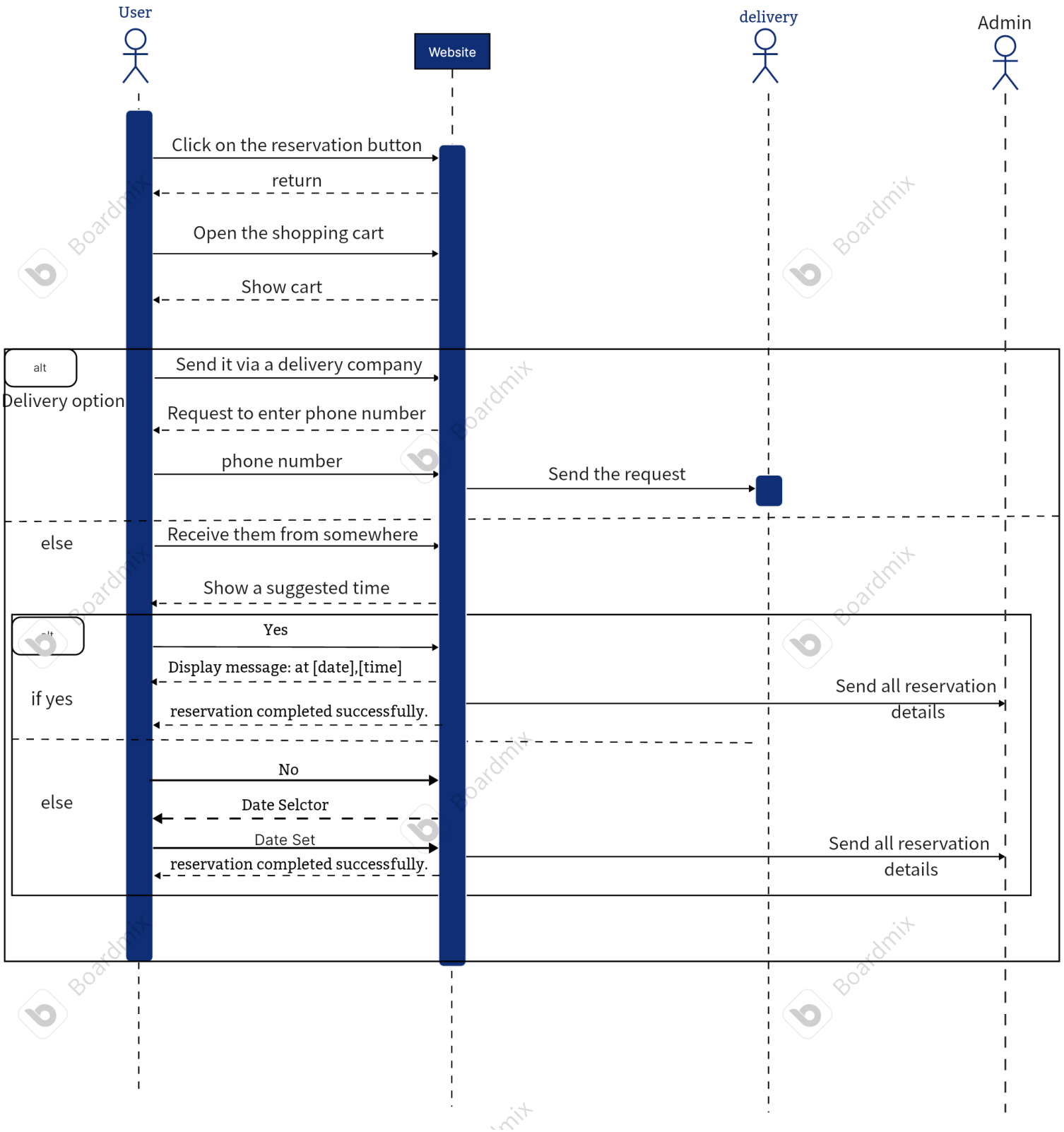


Figure 7: Booking process, user Sequence Diagram.

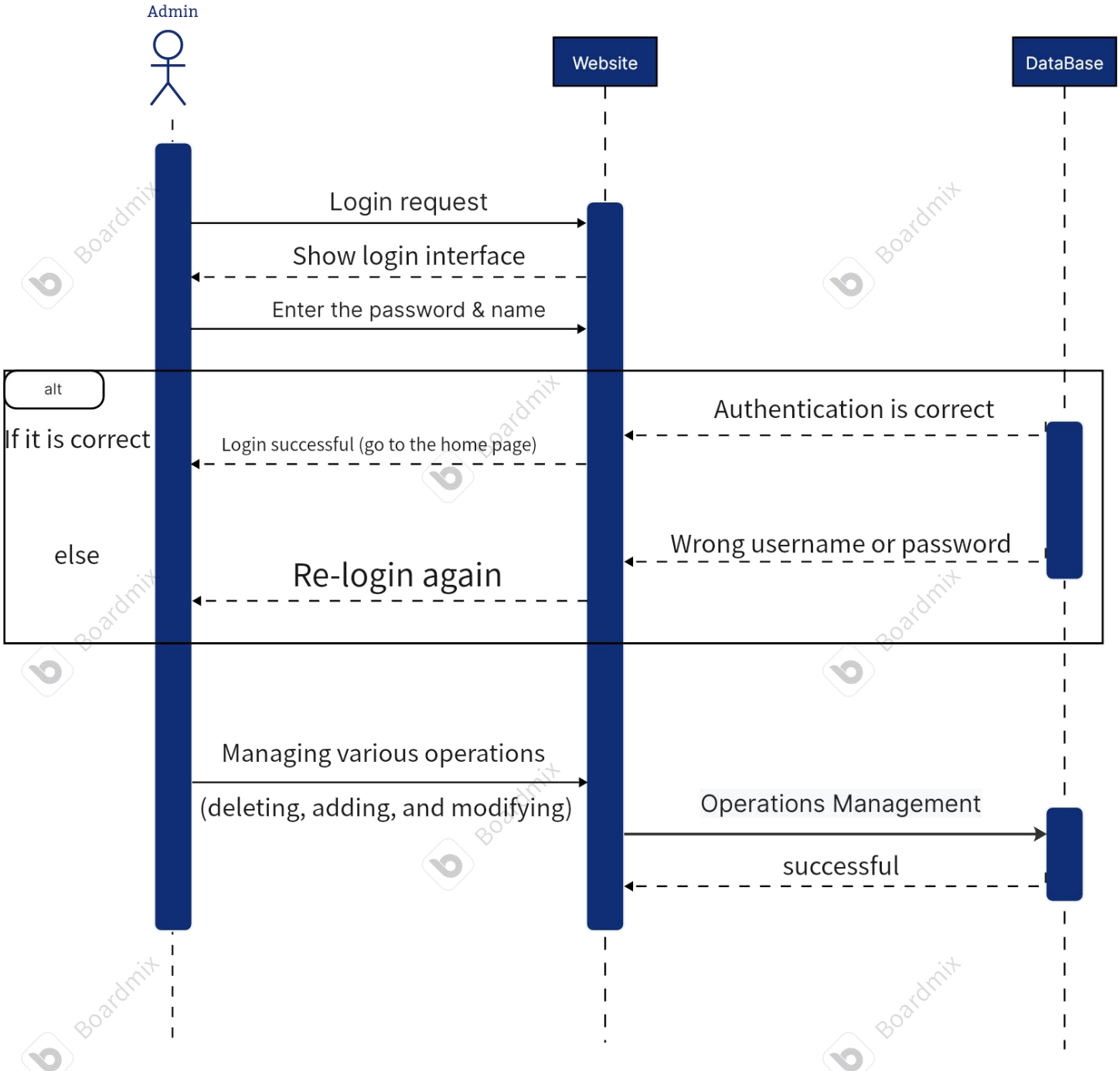


Figure 8: Admin Sequence Diagram.

5.4 Class Diagram

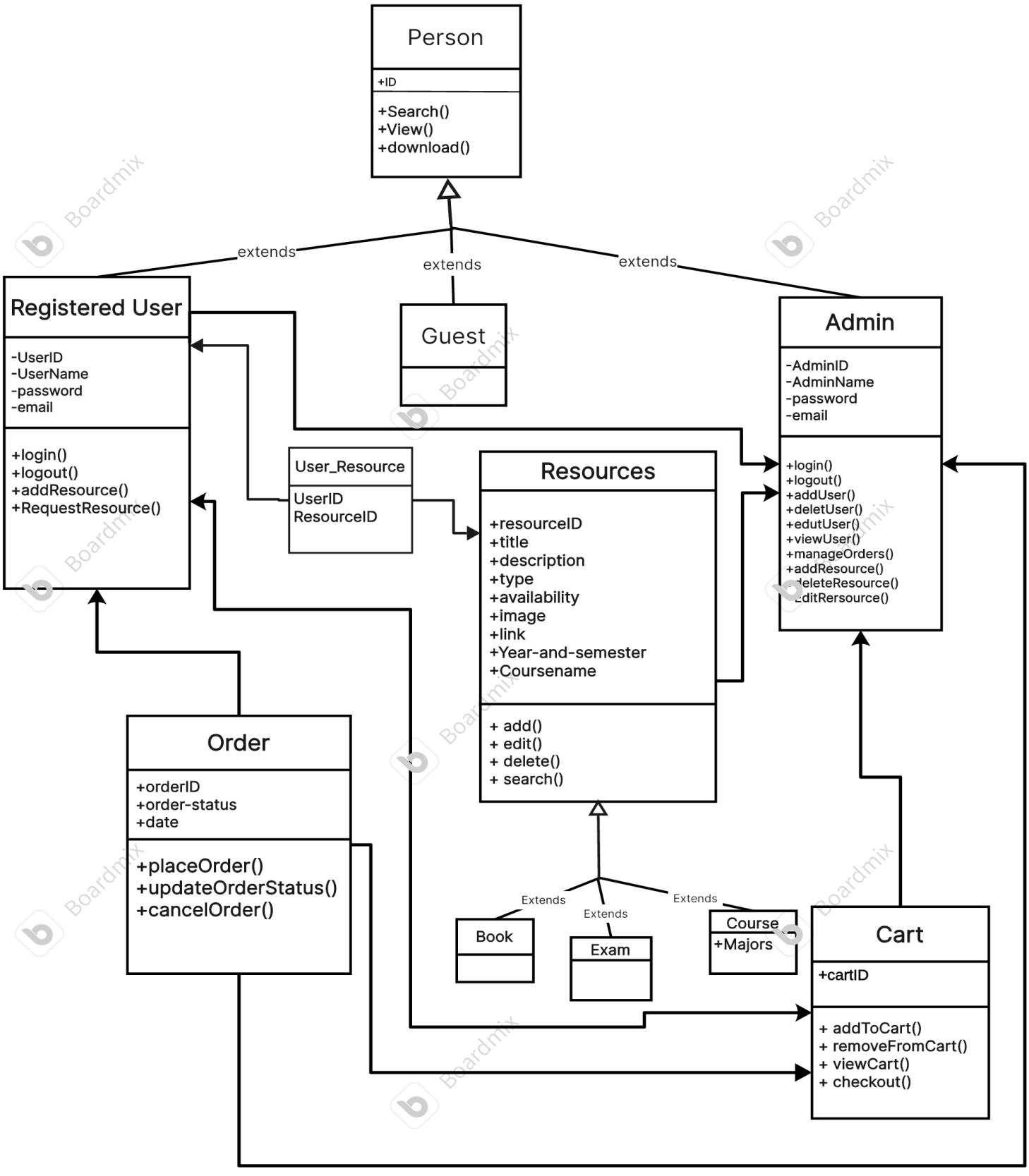


Figure 9: Class Diagram.

5.5 ER Diagram

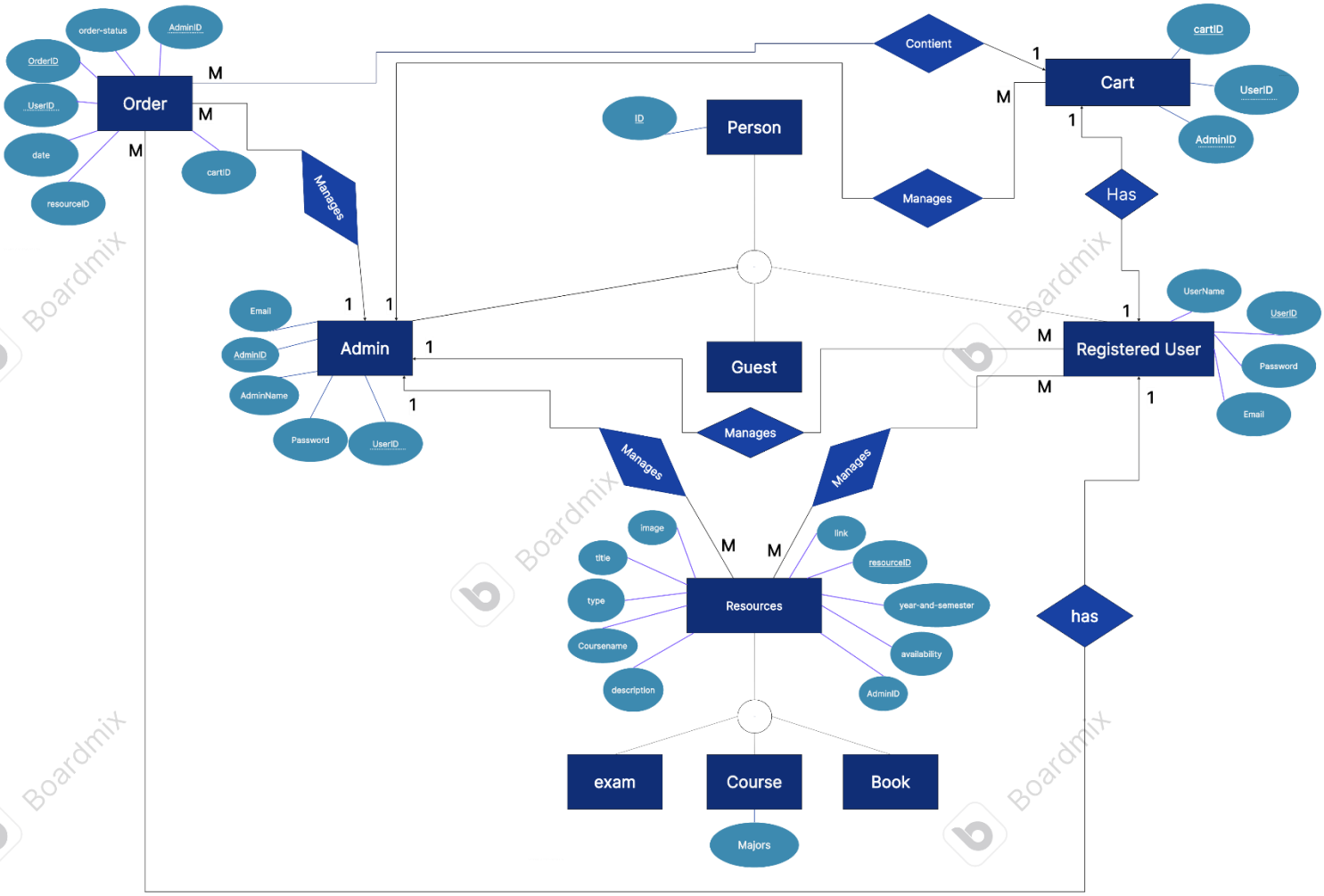


Figure 10: ER Diagram.

5.6 Schema Diagram

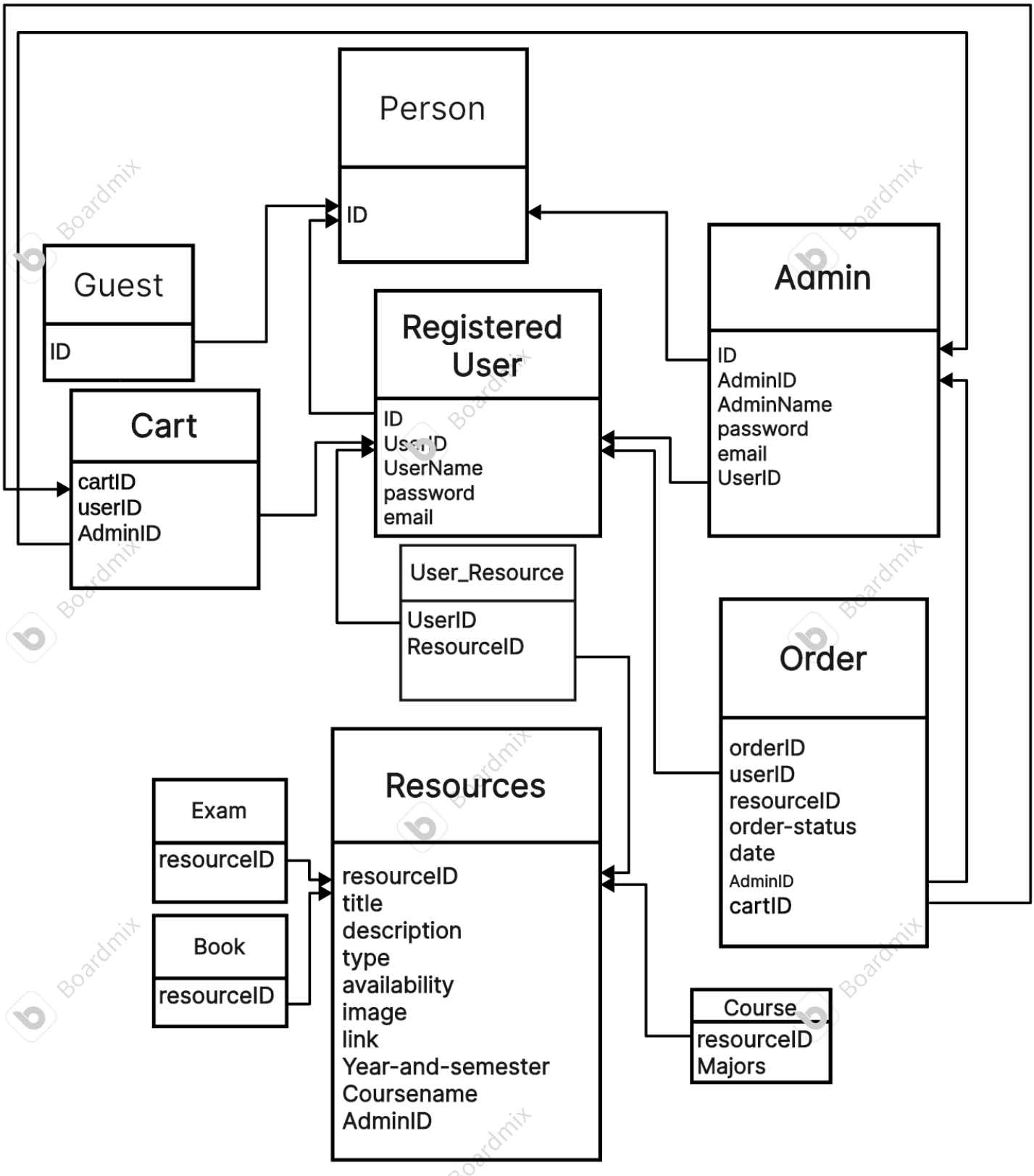


Figure 11: Schema Diagram.

5. 7 Relation Schema

Person(ID)

Registered User (UserID, UserName, email, password, ID)

Admin (AdminID, AdminName, Password, UserID, Email, ID)

Guest (ID)

Manages(Registered User , resourceID)

Resources (resourceID, year-and-semester, availability, AdminID, link, description, Coursename, type, title, image)

Course (resourceID, year-and-semester,Majors, availability, AdminID, link, description, Coursename, type, title, image)

exam (resourceID, year-and-semester, availability, AdminID, link, description, Coursename, type, title, image)

Book (resourceID, year-and-semester, availability, AdminID, link, description, Coursename, type, title, image)

Cart (cartID, UserID, AdminID)

Order(OrderID, UserID, date, resourceID, cartID, order-status, AdminID)

5.8 Activity diagrams

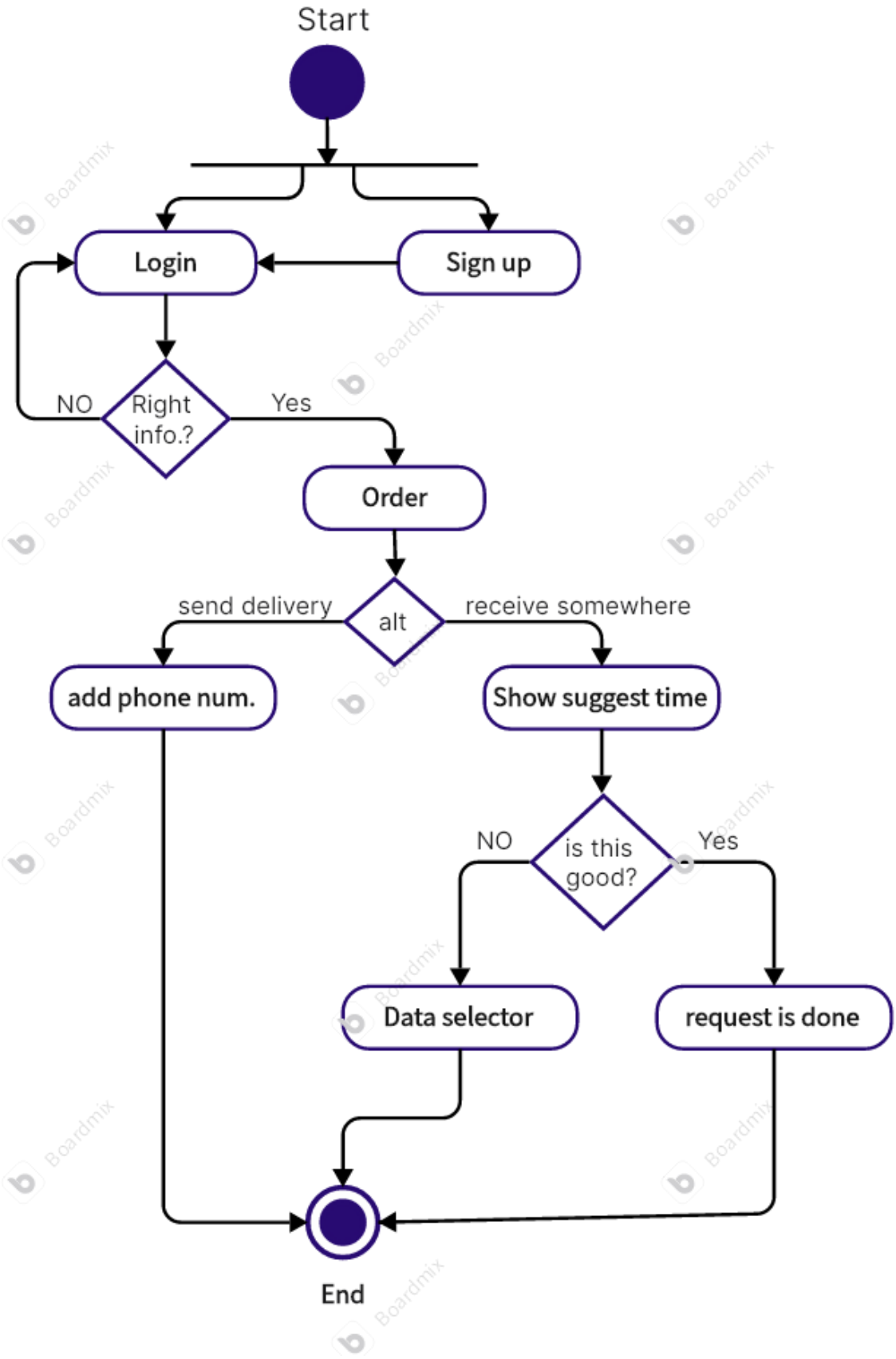


Figure 12: Login and order paper resources, Activity diagram.

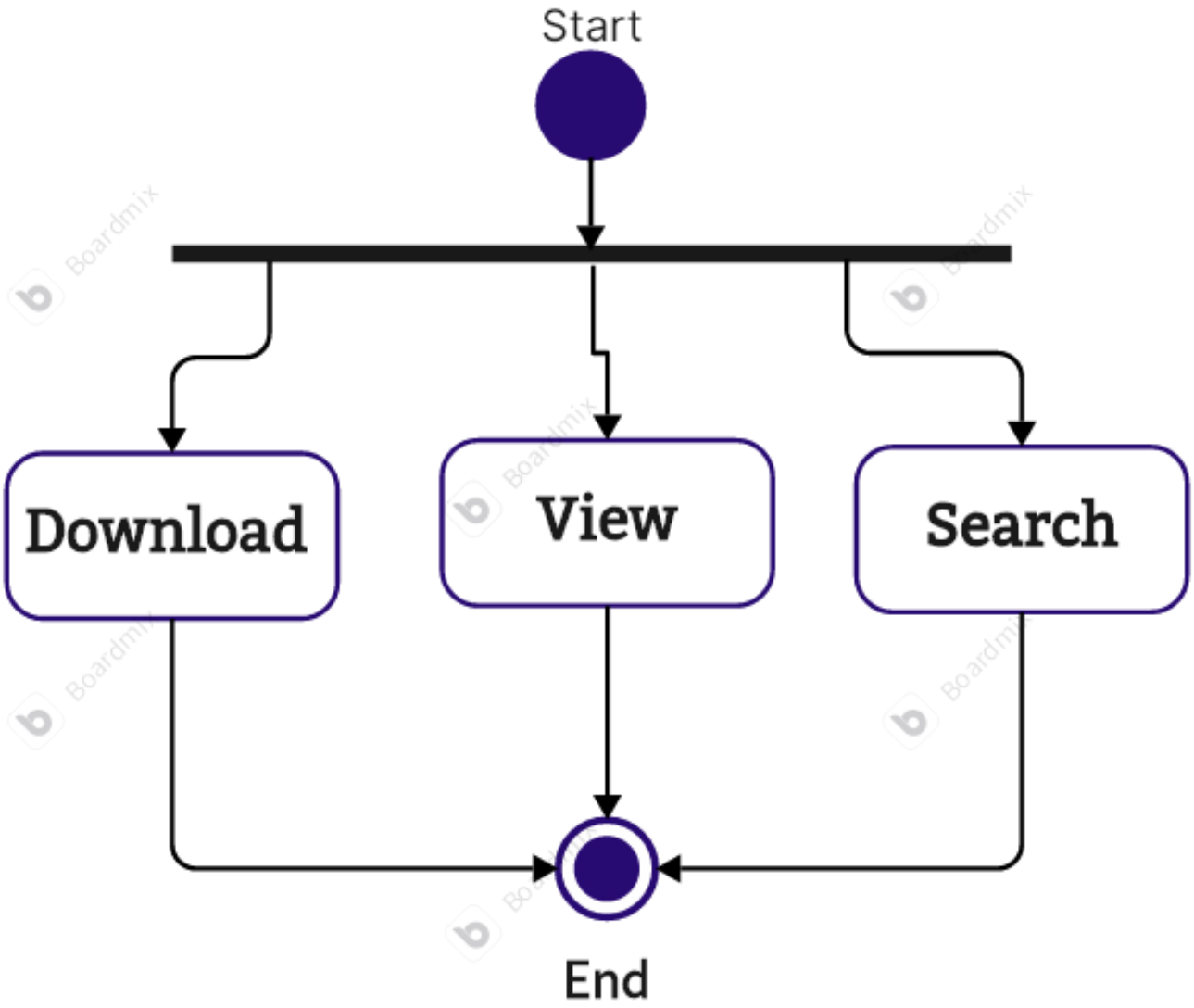


Figure 13: Guest user, Activity diagram.

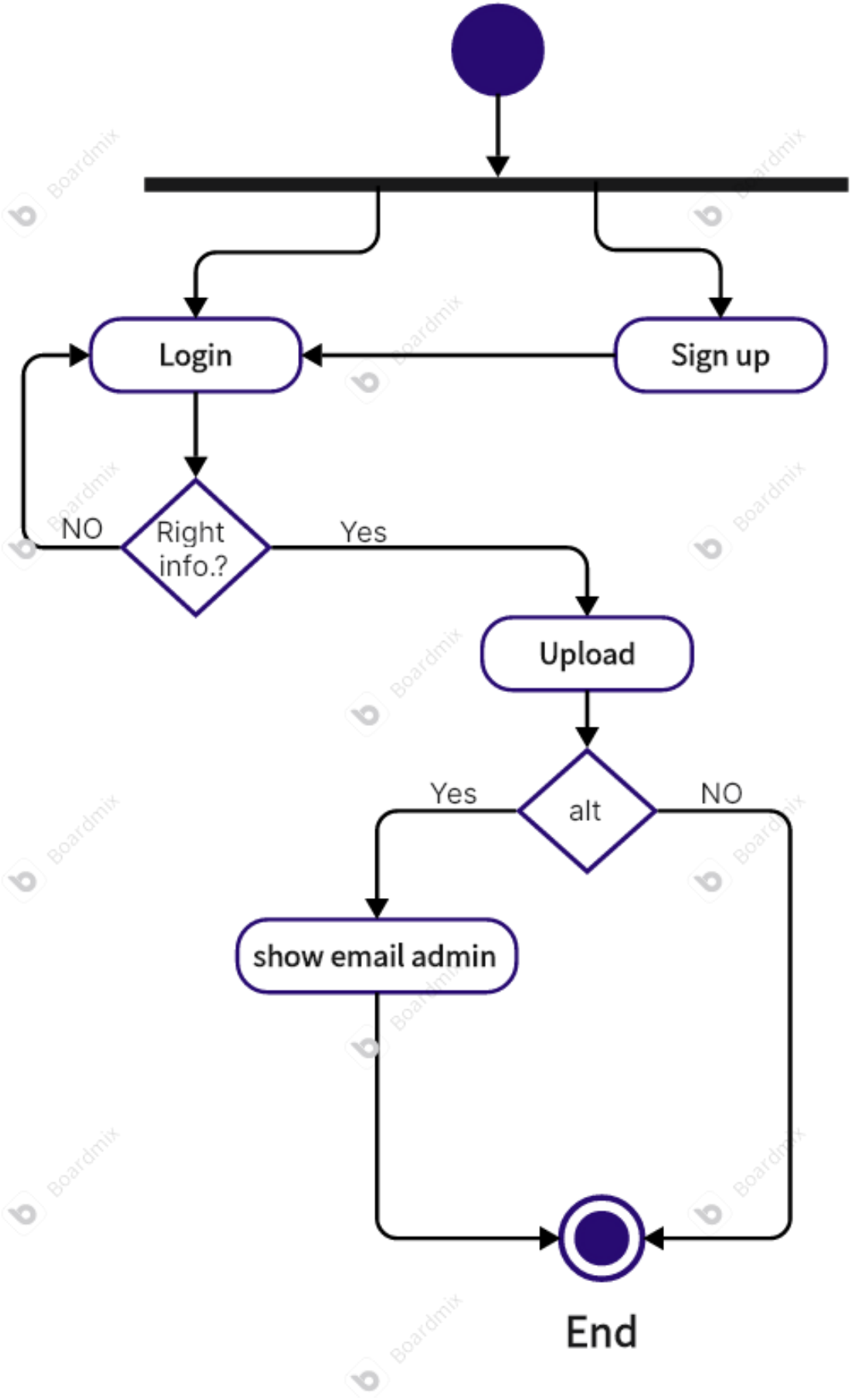


Figure 14: Login and upload paper resources, Activity diagram.

CHAPTER 6: SYSTEM EVOLUTION

SYSTEM LIMITATION

Integrating our system with advanced search functionalities like image and voice recognition is still under development due to limited access to high-end APIs and the necessary expertise in these areas. Additionally, while the system supports electronic exchange, the physical book exchange is manual and depends on user coordination, which can be time-consuming and prone to errors.

SYSTEM ENHANCEMENT

1. **Advanced Search Integration**: Future enhancements will include the integration of more sophisticated search capabilities such as image and voice recognition to simplify resource finding.

2. **Mobile Application Development**: We plan to develop a mobile application to make the platform more accessible. This app will include features like real-time notifications, a streamlined interface for book exchange, and easy access to study materials.

3. **Automated Book Exchange System**: Implementing an automated system for physical book exchanges, possibly incorporating a local delivery service, will streamline the process and reduce the need for manual coordination.

4. **User Feedback Mechanism**: Introducing a rating and feedback system where users can rate the resources they borrow and provide feedback to improve the quality and reliability of the materials available on the platform.

CHAPTER 7: PLAN FOR REST OF WORK

Based on the new information and the feedback received, we have refined our initial plan which was outlined in the project proposal. Our work plan has been updated to include additional phases and tasks:

1. **Refinement of User Requirements**: Conduct additional user interviews and surveys to refine and expand the requirements.

2. **Development of Mobile Application**: Begin the development of the mobile application, focusing first on core functionalities such as browsing, searching, and resource reservation.

3. **Implementation of Advanced Search Features**: Research and integrate advanced search features into the platform.

4. **Automated Physical Book Exchange System**: Design and implement an automated system for managing physical book exchanges, including partnerships with local delivery services.

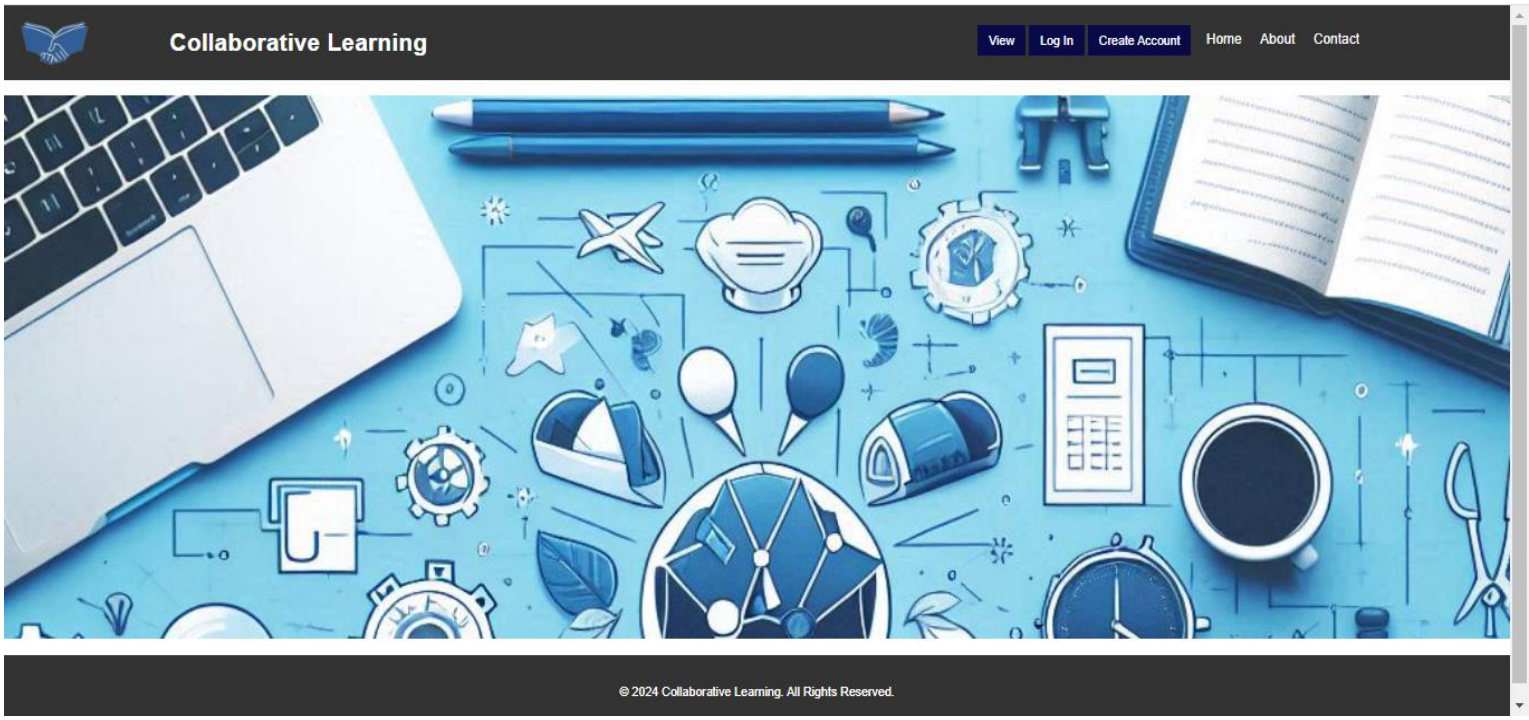
5. **Testing and Quality Assurance**: Conduct extensive testing of all new features and improvements to ensure reliability and usability.

6. **User Training and Support**: Develop user guides and provide training sessions to help users adapt to the new features.

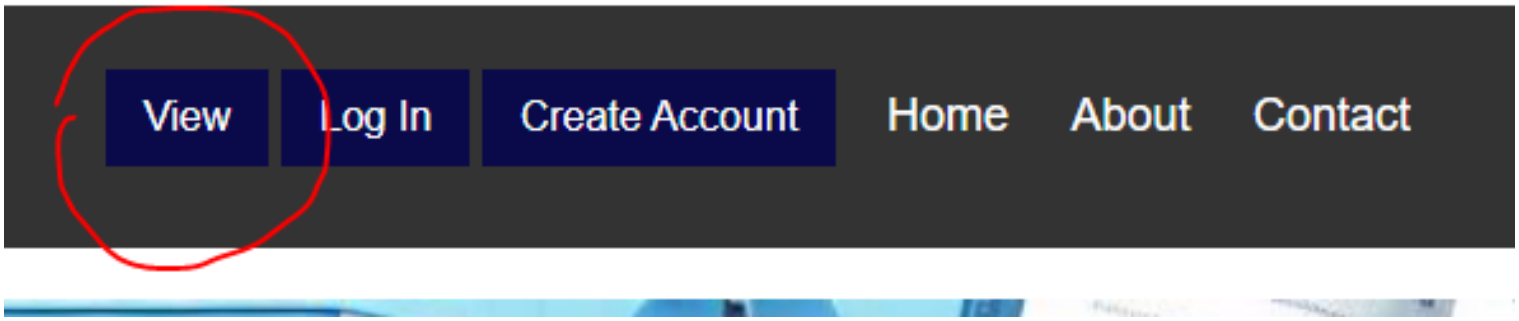
Our goal is to ensure that all enhancements are implemented seamlessly, improving the overall user experience and expanding the platform's capabilities.

CHAPTER 8: IMPLEMENTATION

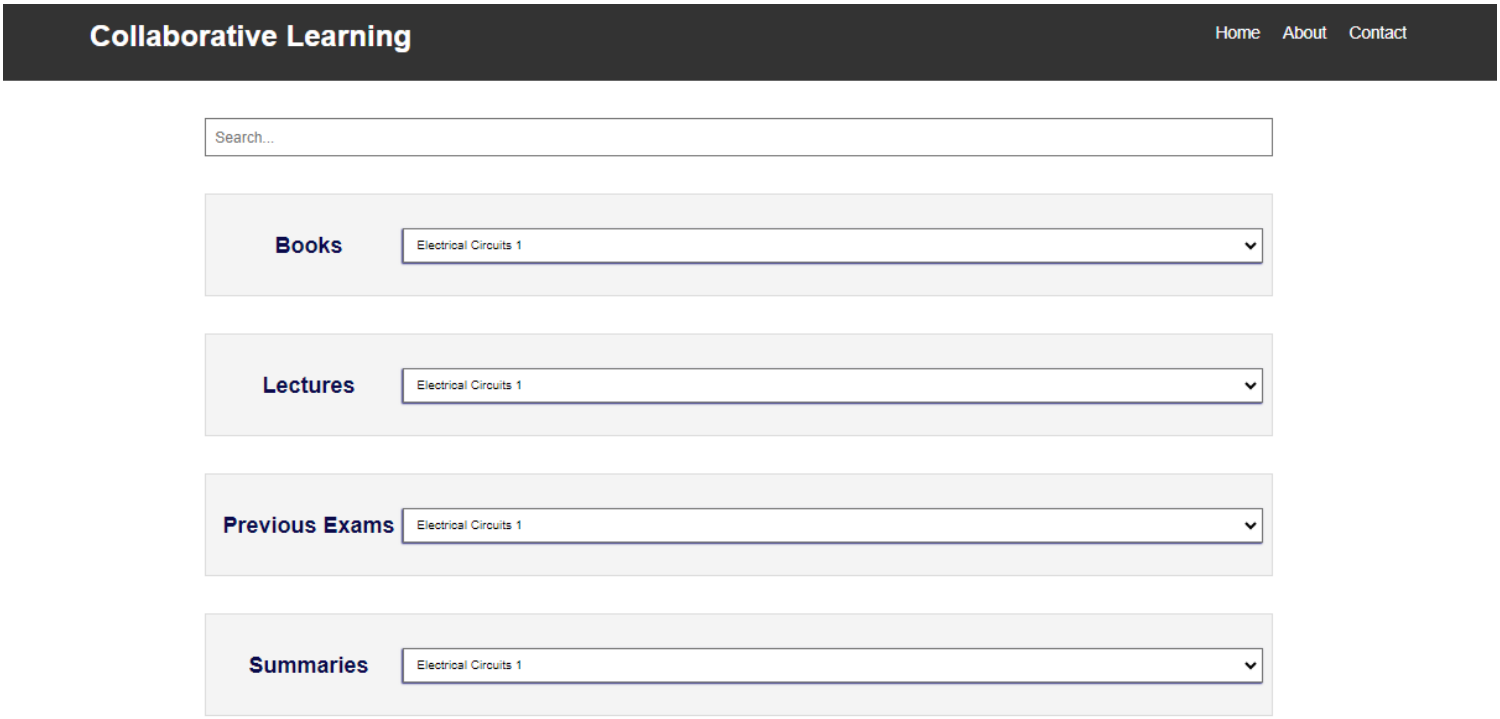
- **When any user enters the website, this interface will appear to him:**



- **If the user only wants to browse and search for files uploaded electronically, he should click here:**

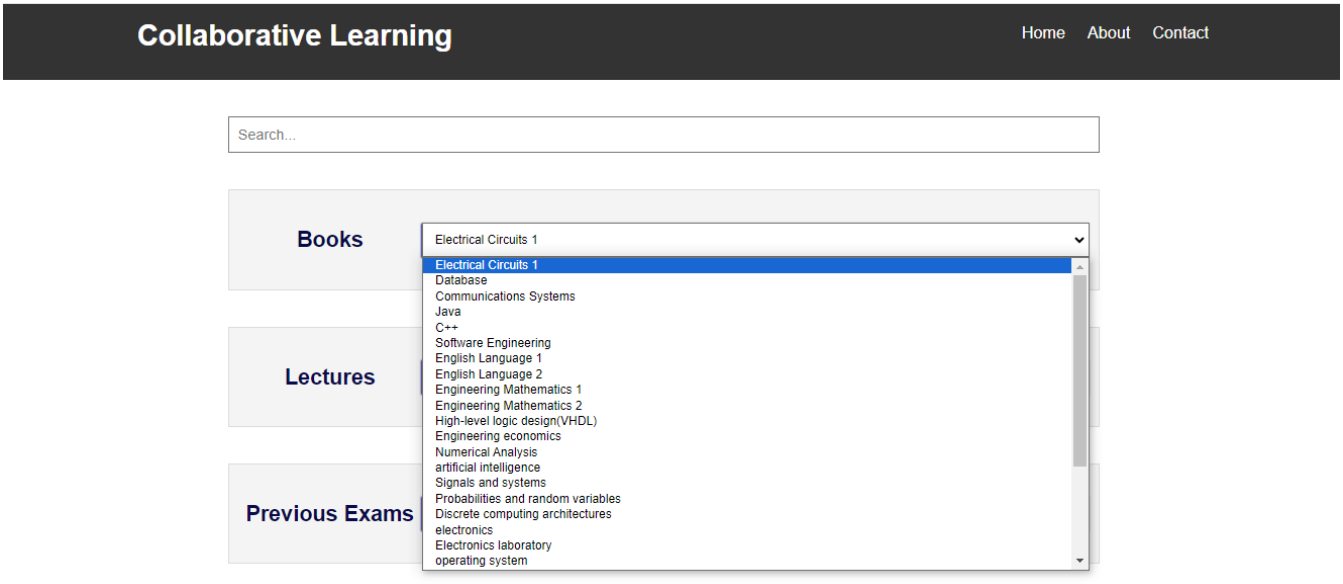


After clicking on View, this interface will appear:



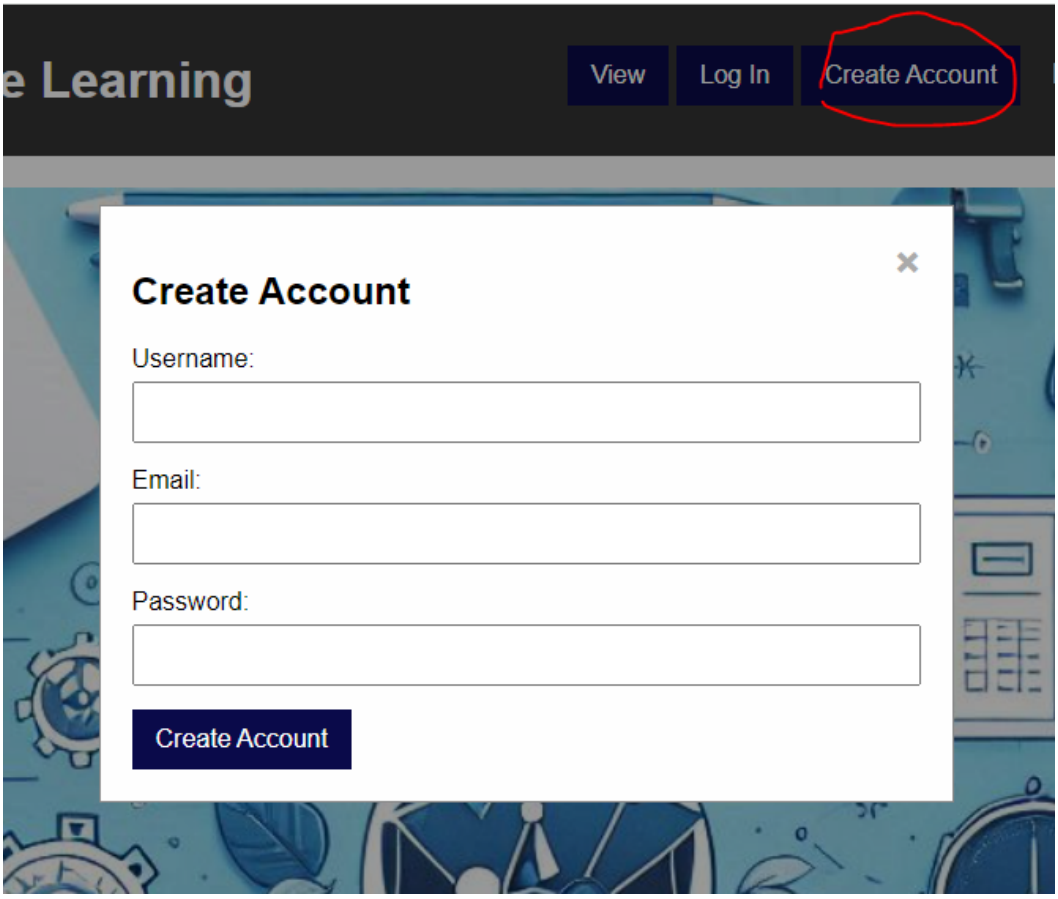
This interface displays the different sections of educational resources with a list of available materials.

If the user wants to obtain a book (for example), all he has to do is click on the rectangle and the available e-books will appear to him. As in the picture:

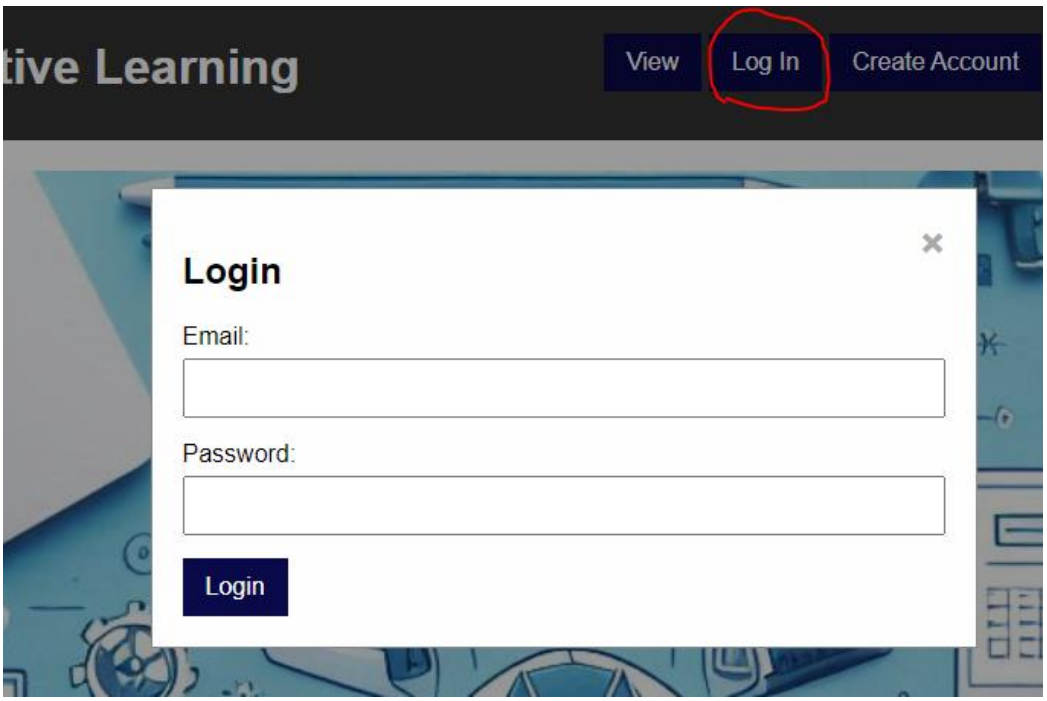


Note: The existing list is an example of materials, and of course others can be added.

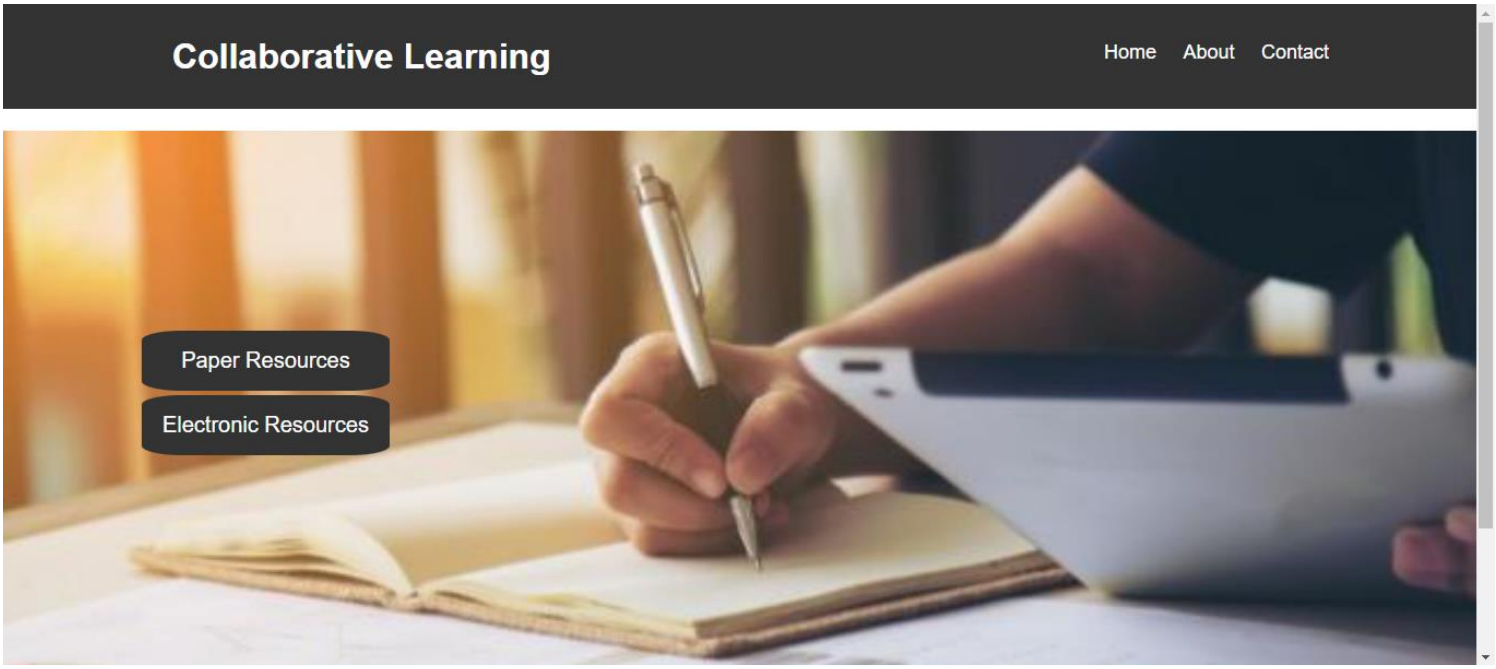
If the user wants to create an account, he clicks the button (Create Account), and this interface appears to him, and he must fill in the data:



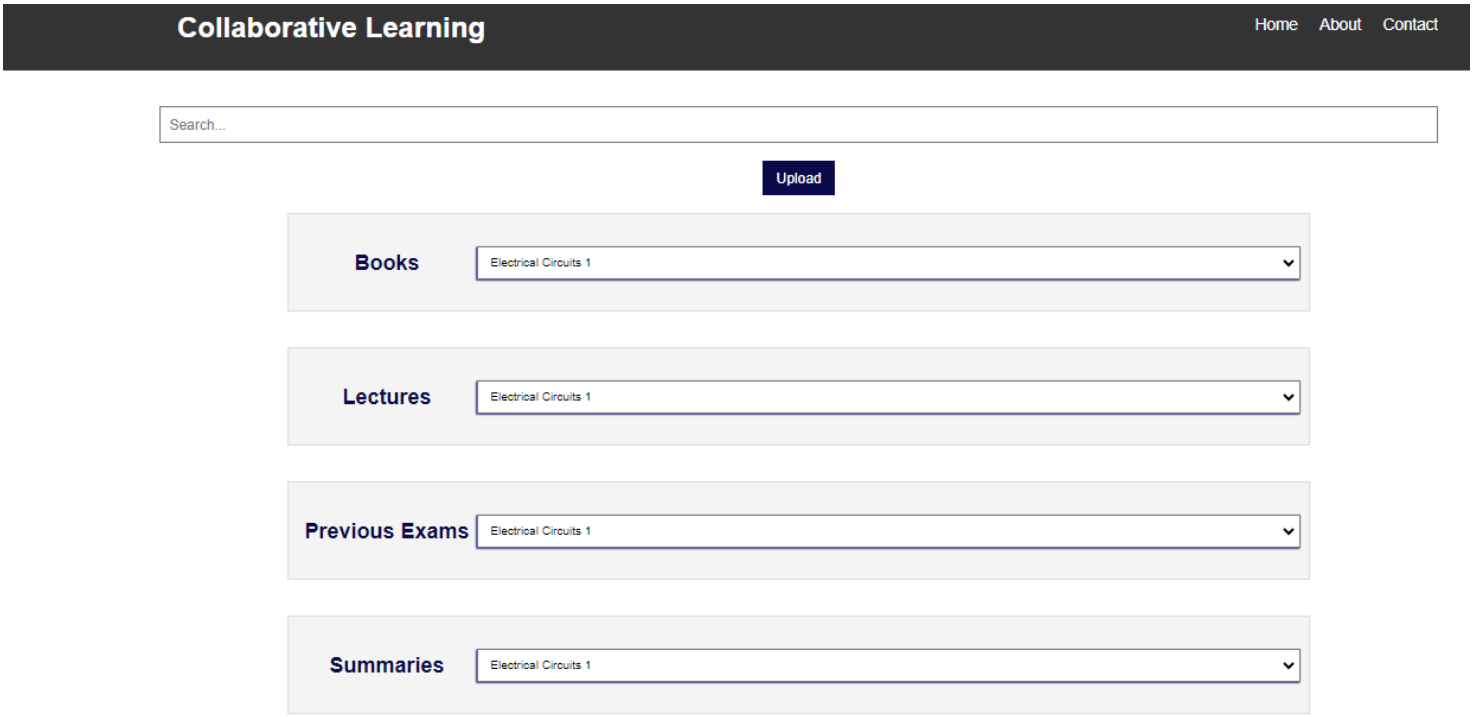
To log in, he clicks on the (Log In) button and must fill in the data correctly:



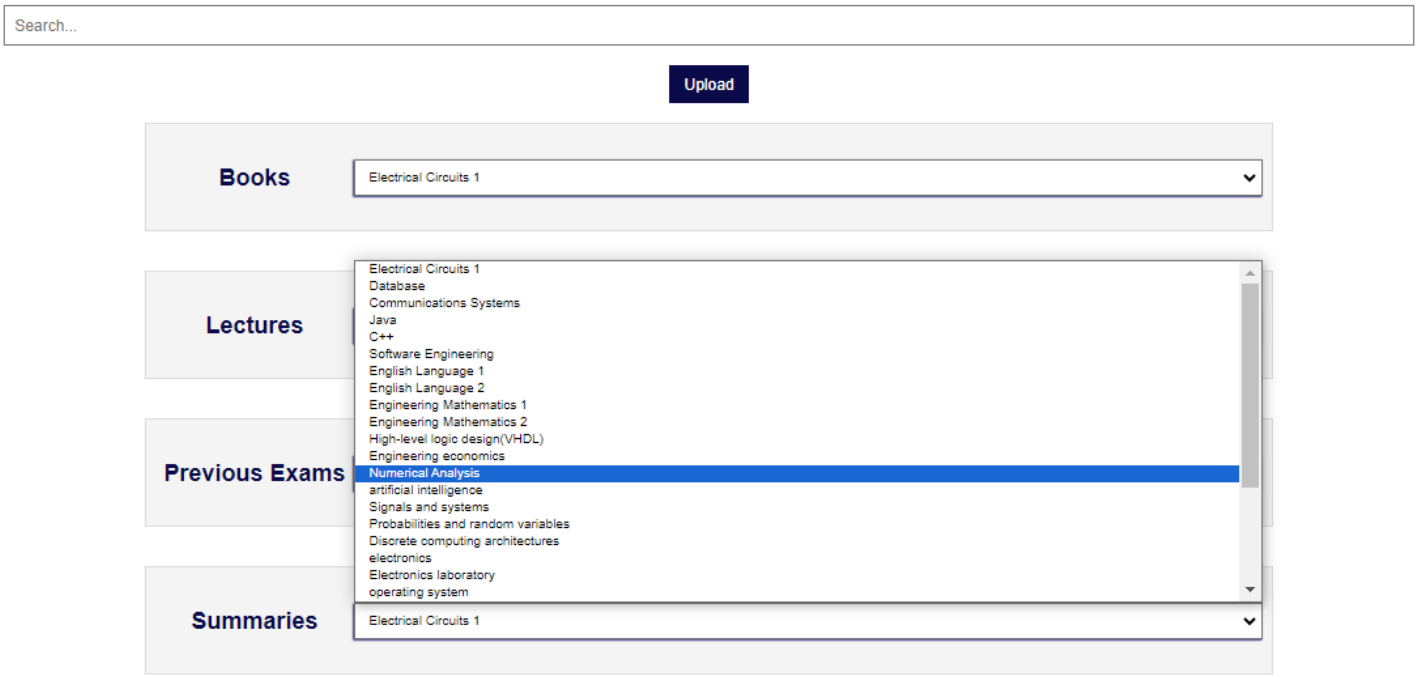
After logging in, this interface appears for the user to choose the nature of the resource he is searching for.



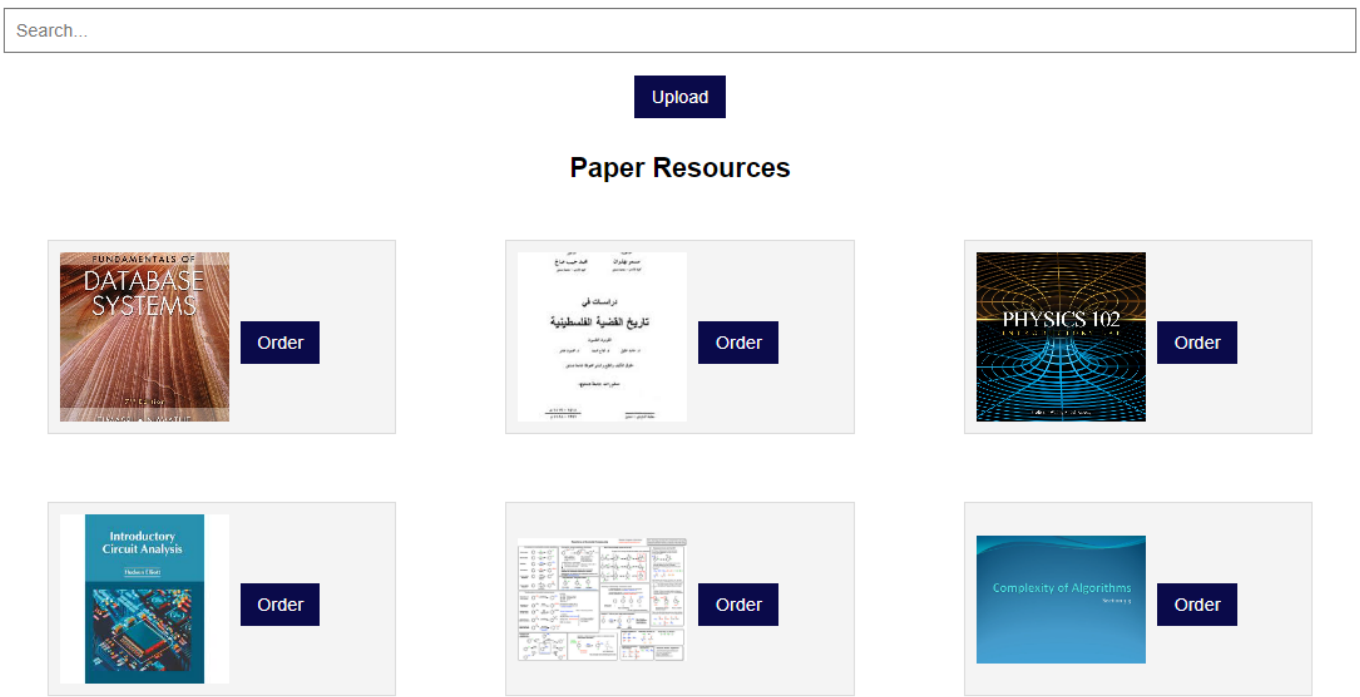
If he clicks on the (Electronic Resources) button, the following interface will appear:



If the user wants to obtain summaries (for example), all he has to do is click on the rectangle and the names of the electronic materials for which summaries are available will appear. As in the picture:

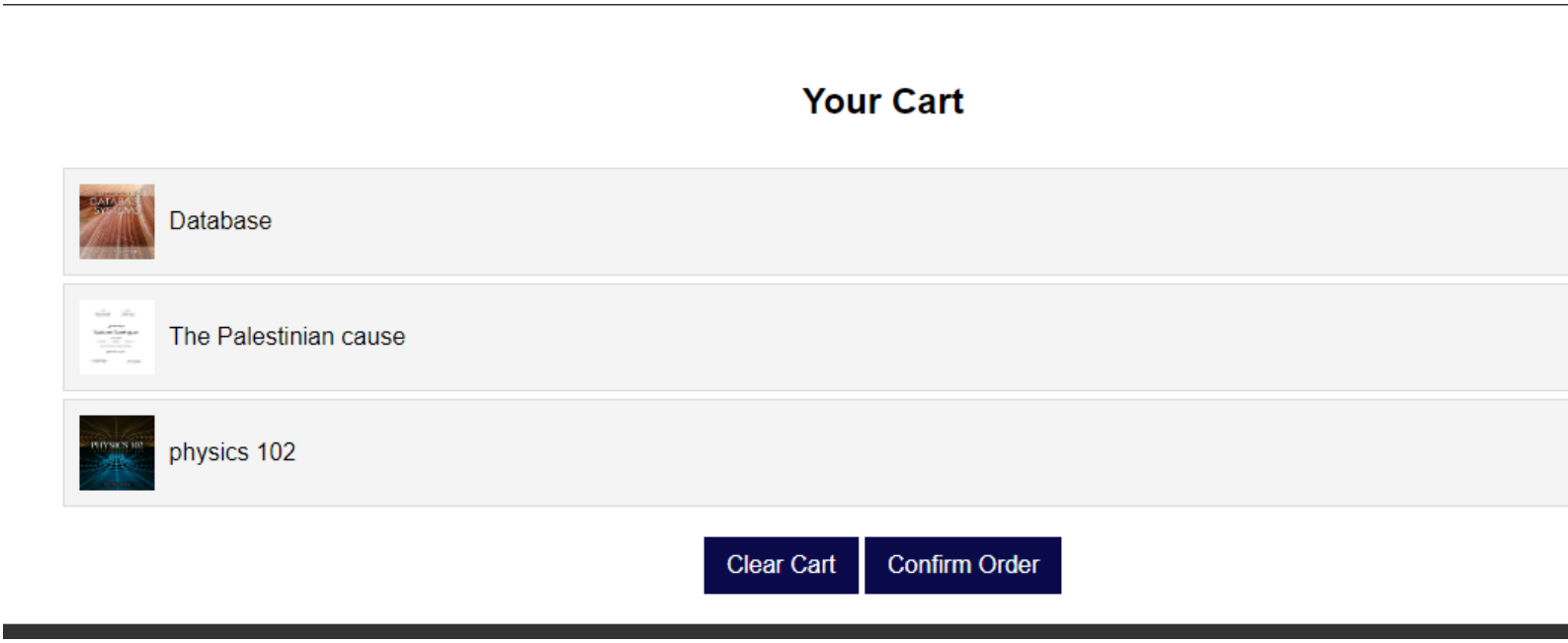


If the user clicks on (Paper Resources), this interface will appear and show all the paper books available for exchange:



If the user wants to order a specific resource, he just clicks on (order):

His cart appears, and the cart contains the names of the paper resources that the user has reserved, along with a picture of these resources, as follows:



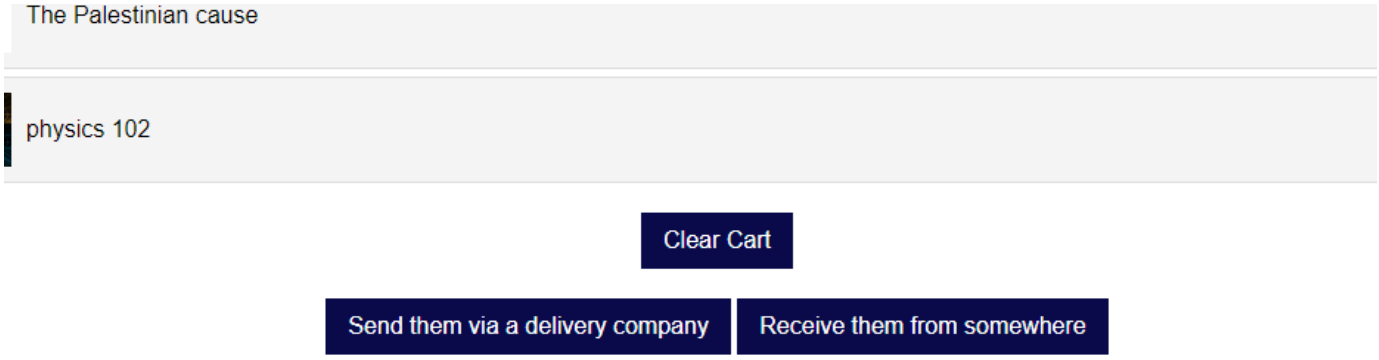
Notes:

***The user can add more than one resource.**

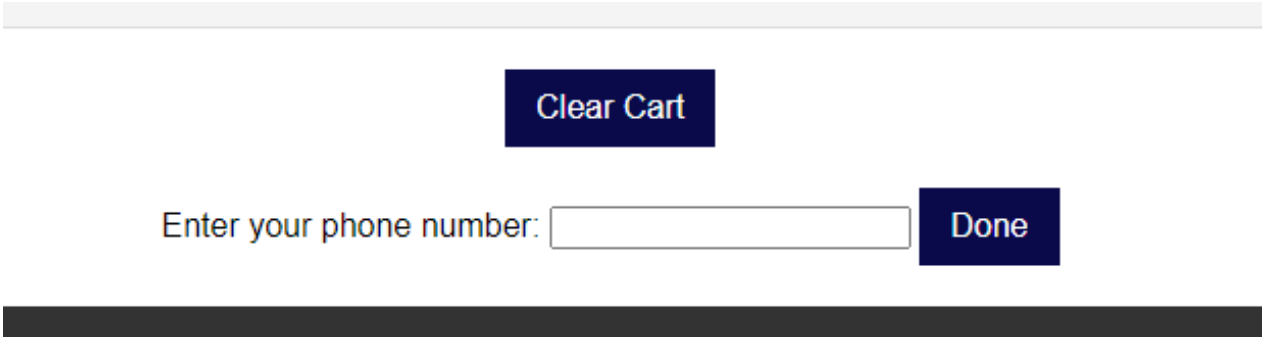
***(Clear Cart) button deletes all resources from the basket.**

***(Confirm Order) button confirms the user's order.**

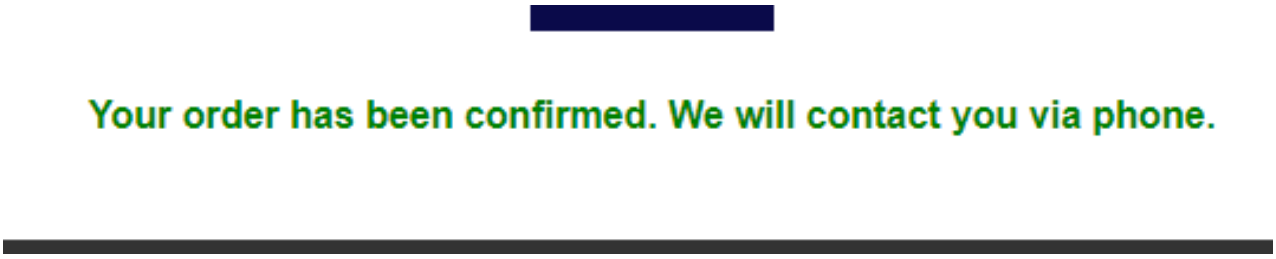
When you click (Confirm Order), two options will appear for a method to determine how the user will receive paper resources, and he must choose one of them:



If (Send them via delivery company) is selected, this field will appear for the user to enter his phone number:

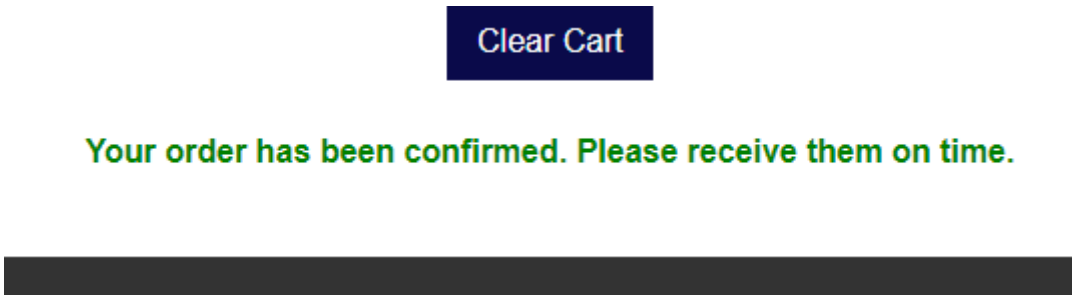


After entering the number, this message appears:

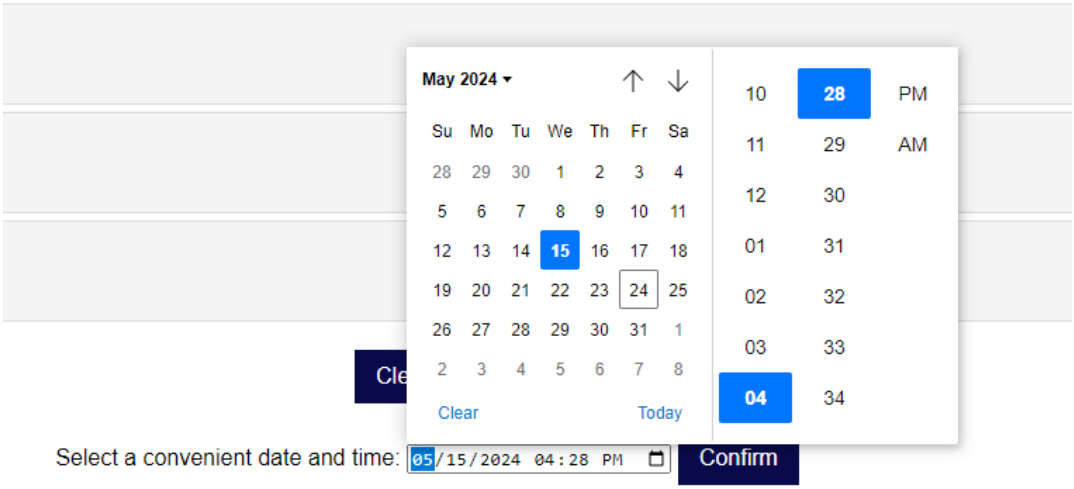


If the user selects (Receive them from somewhere) a default time message will appear for receipt:

If he presses (yes):



If he presses (NO):



Here the user must select the appropriate date and time for him and then press the (Confirm) button. and a message appears:

Your order has been confirmed. Please receive according to the specified date.

CHAPTER 8: CONCLUSION

The development of the "Collaborative Learning" platform has been an insightful and educational journey. At the outset, we encountered challenges in conceptualizing the project and gathering comprehensive user and system requirements. Despite these initial hurdles, our team has made significant progress.

The project, though seemingly straightforward, involves complex functionalities and requires a deep understanding of both web development and user experience design. Given our limited experience in large-scale web development projects, this project has been a valuable learning experience. It has necessitated a high degree of collaboration and mutual support among team members.

Moving forward, our focus will be on refining the system, implementing the planned enhancements, and ensuring that the platform meets the evolving needs of its users. We believe that with continued effort and dedication, "Collaborative Learning" will significantly enhance the academic experience for students at Palestine Technical University - Kadoorie.

We are committed to the ongoing development and improvement of this platform, and we look forward to the positive impact it will have on our academic community.

REFERENCES:

How to create Sequence diagram:

https://youtu.be/pCK6prSq8aw?si=hxI4F_unV3ydIgeu

How to make a Class diagram:

https://youtu.be/gyRsgt2iKXg?si=ooveHZQjFeMZ147t

Data Base book :

https://bookstore.grandview.edu/fundamentals-database-systems

Inheritance in ER Diagram:

https://youtu.be/4_vsGgy9cGs?si=B9VscPA1OibZPqtc

Software SRS :

https://www.perforce.com/blog/alm/how-write-software-requirements-specification-srs-document

The site used in drawing diagrams:

https://boardmix.com/app/share/CAE.CJGvGiADKgYzMDg2MTgwCEAB,

GitHub link:

https://github.com/Raghads22/Project-S.E