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FACULTY OF

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DEPARTMENT OF COMPUTER ENGINEERING

GRADUATION THESIS

Library Management System

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ABSTRACT

Library management system is a project which aims in developing a computerized system to maintain all the daily work of library .In this project, reservations can be managed from the admin panel. In addition, the user can view and edit their reservation. Uploading books to the system can be done from the admin panel. Once a book reserved by a user, another user cannot reserve that book again. When the reserved book is returned, it is clearly added to the reservation back to the system. The system can be viewed on screens of different resolutions without any distortion. Overall, this project of mine is being developed to help staff of library to maintain the library in the best way possible and also reduce the human efforts.

TABLE OF CONTENTS

1 LIST OF FIGURES

2 INTRODUCTION

A library is a collection of well-organized information and resources that is made available for borrowing to a certain group of people. Library Management System is a software program that allows physical libraries to be converted into digital libraries. The system's deployment in the company will significantly decrease data entry , time, and deliver easily computed results. Instead of utilizing the manual writing system , the user will find it easier to use this automated system. The main purpose of the Project is to is to build an online Library Management System by using different software methodologies. Unlike the library management systems that are normally used, since this system is not an application but a web-based application, it can be accessed and used from any location and device connected to the Internet. This system is designed with the basic and necessary features like the admin can add book , admin/user can manage reservation date , admin can delete reservation, admin can add author and ISBN , user can borrow books.

2.1 Tools used for the project

HTML , CSS , JavaScript and Bootstrap framework is used for Frontend part. Frontend development is a type of computer programming that focuses on the coding and building of a website, which will be visible to the user. It's about ensuring that a website's visual elements are functioning. And for the Backend part the author uses PHP and MySQL. The server side of a program and anything that connects between the database and the browser is referred to as back-end development.

3 MATERIALS AND METHODS

3.1 Visual Studio Code

3.1.1 Overview

Visual Studio Code (famously known as **VS Code**) is a free open-source text editor by Microsoft. VS Code is available for Windows, Linux, and macOS. Although the editor is relatively lightweight, it includes some powerful features that have made VS Code one of the most popular development environment tools in recent times.

3.1.2 Features

VS Code supports a wide array of programming languages from Java, C++, and Python to CSS, Go, and Docker file. Moreover, VS Code allows you to add on and even creating new extensions including code linters, debuggers, and cloud and web development support.

The VS Code user interface allows for a lot of interaction compared to other text editors. To simplify user experience, VS Code is divided into five main regions:

- The activity bar
- The side bar
- Editor groups
- The panel
- The status bar

3.2 XAMPP

3.2.1 Overview

XAMPP, is a free and open-source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages.

3.2.2 Features

XAMPP is regularly updated to the latest releases of Apache, MariaDB, PHP and Perl. It also comes with a number of other modules including OpenSSL, phpMyAdmin, MediaWiki, Joomla, WordPress and more. Self-contained, multiple instances of XAMPP can exist on a single computer, and any given instance can be copied from one computer to another. XAMPP is offered in both a full and a standard version (Smaller version).

- It is free and easy to use. It is usable for Windows , Linux and Mac OS.
- It is a solution package suitable for beginners.
- It is an open-source software package that provides an easy installation experience.

3.3 phpMyAdmin

3.3.1 Overview

phpMyAdmin is a free software tool written in PHP, intended to handle the administration of MySQL over the Web. phpMyAdmin supports a wide range of operations on MySQL and MariaDB. Frequently used operations (managing databases, tables, columns, relations, indexes, users, permissions, etc.) can be performed via the user interface, while you still have the ability to directly execute any SQL statement.

3.4 PHP

3.4.1 Overview

PHP is a scripting language developed by Rasmus Lerdorf in 1994. Originally, he wrote several C programs to execute various tasks on his static website, which he had constructed for himself on the internet. He had unknowingly established the groundwork for a new programming language. The primary goal was to connect with the servers and databases where his static files were stored. PHP is a server-side programming language that is free, open sourced and object oriented. PHP is a good option for developing websites. PHP is a server-side scripting language that is used to create interactive web applications that are linked to a MySQL database. It is responsible for the website's dynamic content, database, and session tracking functions. It has the ability to access the cookies variable as well as set cookies. It contributes to the encryption of data and the application of validation. PHP is compatible with a variety of protocols, including HTTP, POP3, SNMP and may more. One can manage which pages of the website a user can view by using the PHP programming language. The fact that PHP is simple to install and configure is one of the primary reasons why PHP is the finest language to learn. PHP is capable of handling forms in a variety of ways, including collecting data from users via forms, storing it in a database, and returning valuable information to the user.

3.5 SQL

3.5.1 Overview

In computing, SQL stands for Structured Query Language, and it is a programming language that may be used to store, alter, and retrieve data from a database system. A relational database, or SQL, is another term for this kind of database. Based on set theory and predicate logic, the relational model makes data retrieval easier, assures data integrity and provides a database structure that is not reliant on the applications that access the data contained in the database, among other benefits. The relational paradigm is built on the concept of connection. A relation is a table-like structure that has a set of columns and rows that describe a single entity made up of connected data.

The reason why SQL is widely used are-

- A relational database management system (RDBMS) allows users to obtain access to data.
- Users may make advantage of this functionality to provide explanations for the data.
- Provides users with the ability to specify and govern the data stored in a database.
- Enables the embedding of SQL modules, libraries, and pre-compilers into

other programming languages.
• Users have the power to create databases and tables, as well as remove them.
• Provides the ability for users to create database views, stored procedures, and functions. There are 3 types of SQL: Data definition language, Data control language and data manipulation language. Data definition language is used to create and manipulate tables, views, schemas, domains, triggers, and stored procedures. The keywords are CREAT, ALTER and DROP. The data control language controls user access to object. The DCL keywords are GRANT and REVOKE. Data manipulation language is used to modify or remove database objects. The Data manipulation language keywords are SELECT, INSERT, UPDATE and DELETE.

3.6 MYSQL

3.6.1 Overview

MySQL is a SQL-based relational database management system. MySQL enables users to manage, save, change, and remove data, as well as organize data. MySQL has an integrated tool called MySQL Workbench that simplifies the process of developing, designing, and constructing databases. MySQL comes in a variety of forms and is updated often. MySQL, being an open-source platform, provides a large and active community of users and developers.

3.7 Bootstrap

3.7.1 Overview

Bootstrap is a framework that works with HTML, CSS, and JavaScript to create dynamic and device-friendly webpages. It's a simple and quick web development framework to use. It's a framework for front-end development. For websites and applications, developers may create multifunctional, user-friendly, and beautiful front-end designs. Bootstrap comes with ready-to-use components that make it easier for developers to design websites on a tight schedule. Developers don't have to start from the beginning, and they may tweak particular components depending on one’s suggestions to make it unique. Whether an expert or a novice in web design, a user may effortlessly install Bootstrap. Users do not need to be experts in internet technology (HTML, CSS, or JavaScript) to get started; they may start with the basics.

3.8 JavaScript

3.8.1 Overview

JavaScript is a scripting language Which makes a website more responsive and lucrative. Brendan Eich came up with the idea of JavaScript (co-founder of the Mozilla project, the Mozilla Foundation, and the Mozilla Corporation). JavaScript is a scripting language for beginners with a wide variety of features. As one gets more experience with JavaScript, one will be able to create games, animated 2D and 3D images, database-driven systems, and more. JavaScript is a programming language that is both tiny and powerful. On top of the core JavaScript programming language, developers have built a variety of tools that allow users to get access to a significant amount of functionality with little effort. Here are only a few examples:

Among the functions provided by web browser APIs include the ability to dynamically compose HTML and CSS styles, gather and analyze video feeds from a user's camera, and generate 3D pictures and audio samples. APIs from third-party content providers, such as Twitter or Facebook, enable developers to incorporate elements from their own websites into those of other content producers. Third-party frameworks and libraries that can be used in conjunction with HTML to accelerate the construction of website and mobile app.

4 RESULTS AND DISCUSSIONS

4.1 Screens

4.1.1 Home Page

When logging into the website , there is a homepage and a navbar, as shown in Figure 1. n the Navbar section seen in Figure 2, there are sections “Hakkında”, “Rezervasyon” and “Rezervasyonu Yönet”. At the bottom of the page is the section listing the books that can be reserved.

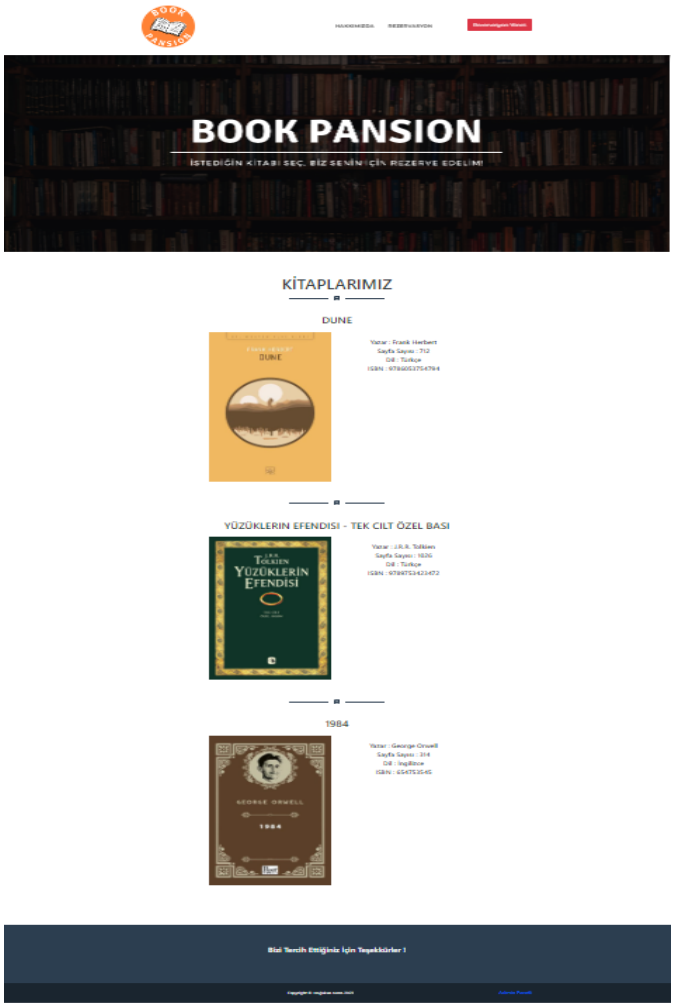


Figure 1: Home Page

Figure 2: Navbar

4.1.2 Reservation

The user who wants to reserve a book must fill out the Reservation form by clicking on “Rezervasyon” button. As can be seen , the reservation system is a page where the user’s information is requested. The user needs to enter the information in the appropriate format. After entering the information, user can perform the issue by clicking on “Rezervasyon Yap” button.

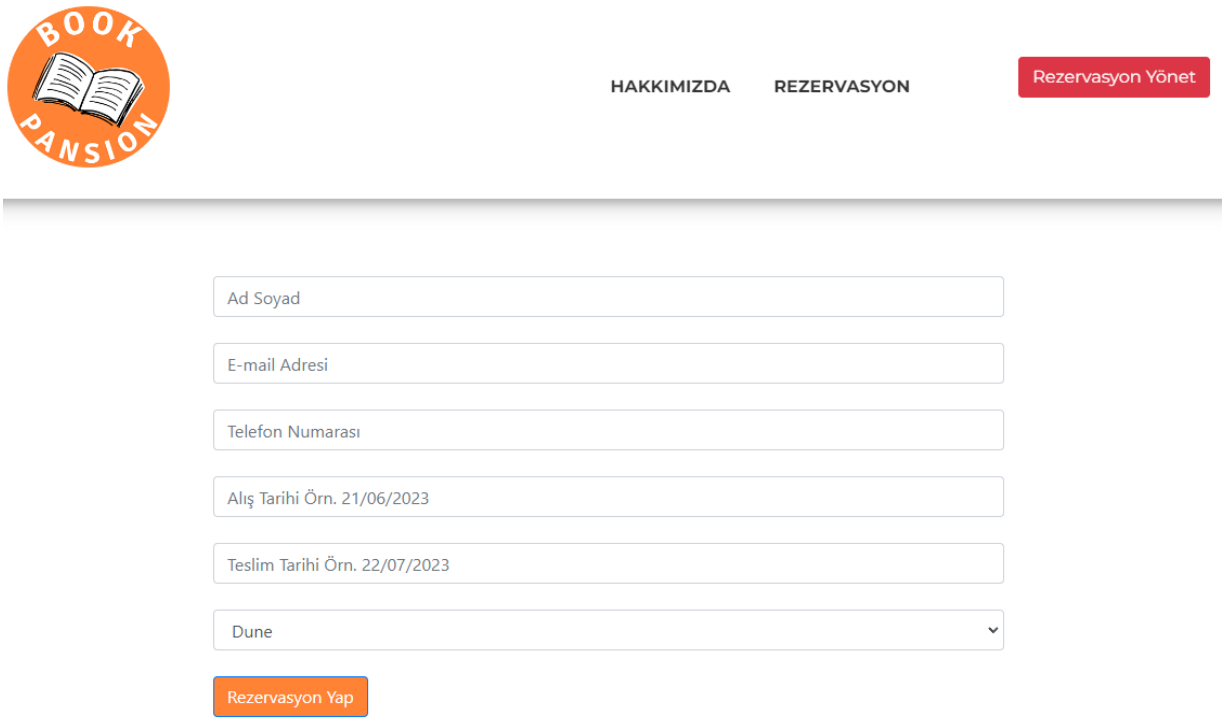


Figure 3:Reservation

4.1.3 About us

Users can access the information of the library system by clicking on the “Hakkımızda” button located on the navbar.

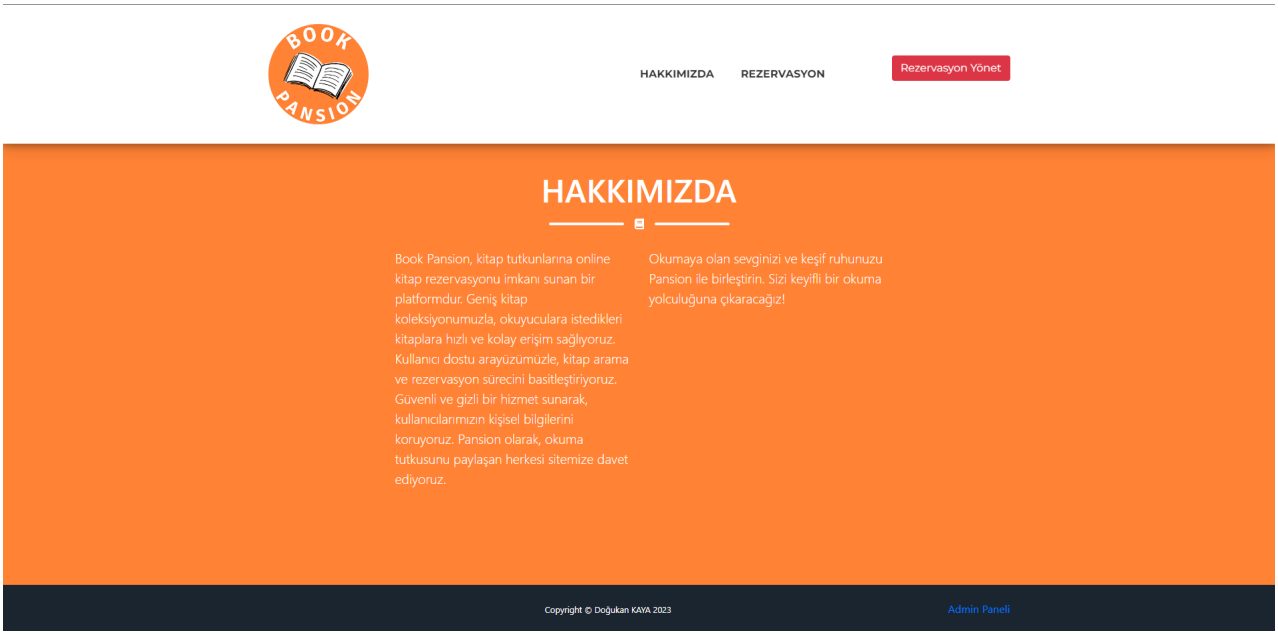


Figure 4: About us

4.1.4 User Reservation Management

The user can make changes to the reservation he has made by pressing the “Rezervasyon Yönet” button. In order for the user to make changes to his reservation, he must enter the necessary information and click on the “Rezervasyonu Bul” button.

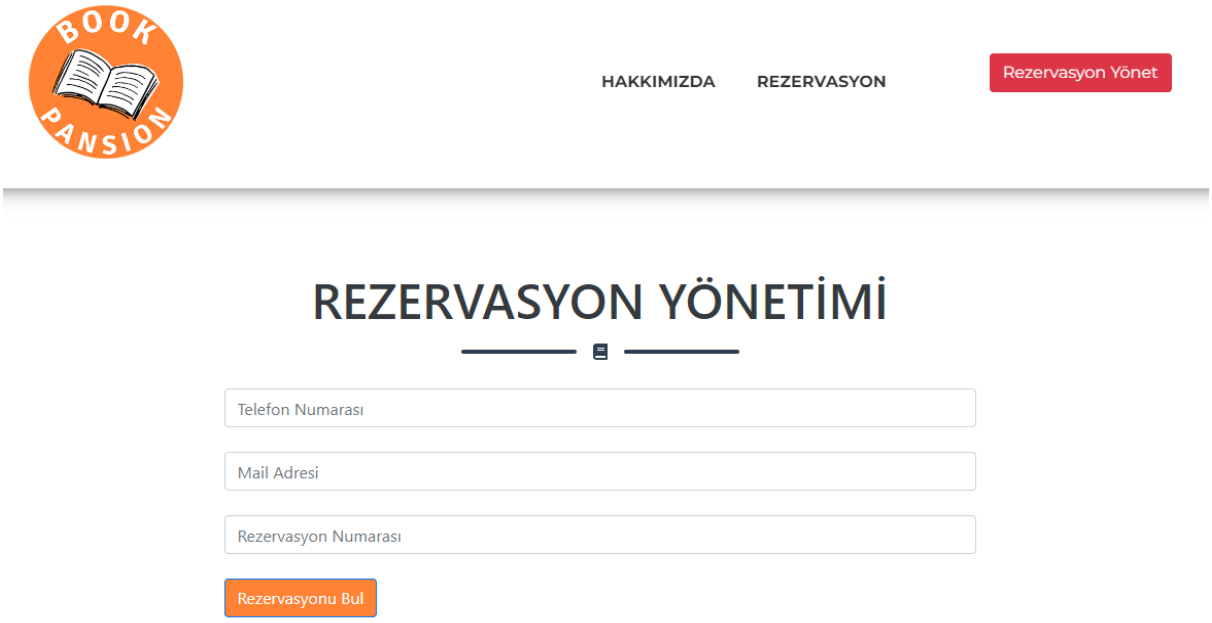


Figure 5: User Reservation Management

4.1.5 Admin Panel Login Page

In order for admin to log in to the panel, he needs to click on the “Admin Paneli” button located at the bottom right of the homepage. By entering information’s, admin can view book reservations and make changes to them.

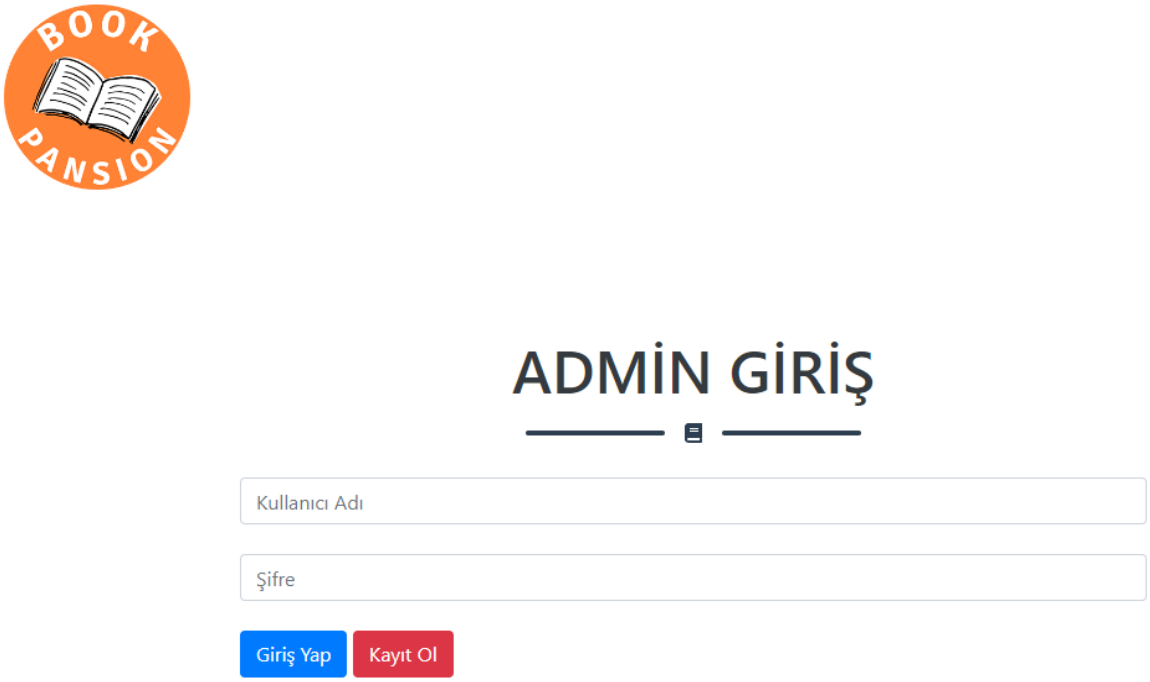


Figure 6: Admin Panel Login Page

4.1.6 Admin Register

When the “Kayıt Ol” button is clicked on the admin login page , it is redirected to the Admin Registration page and the registration information of the admin user is received.

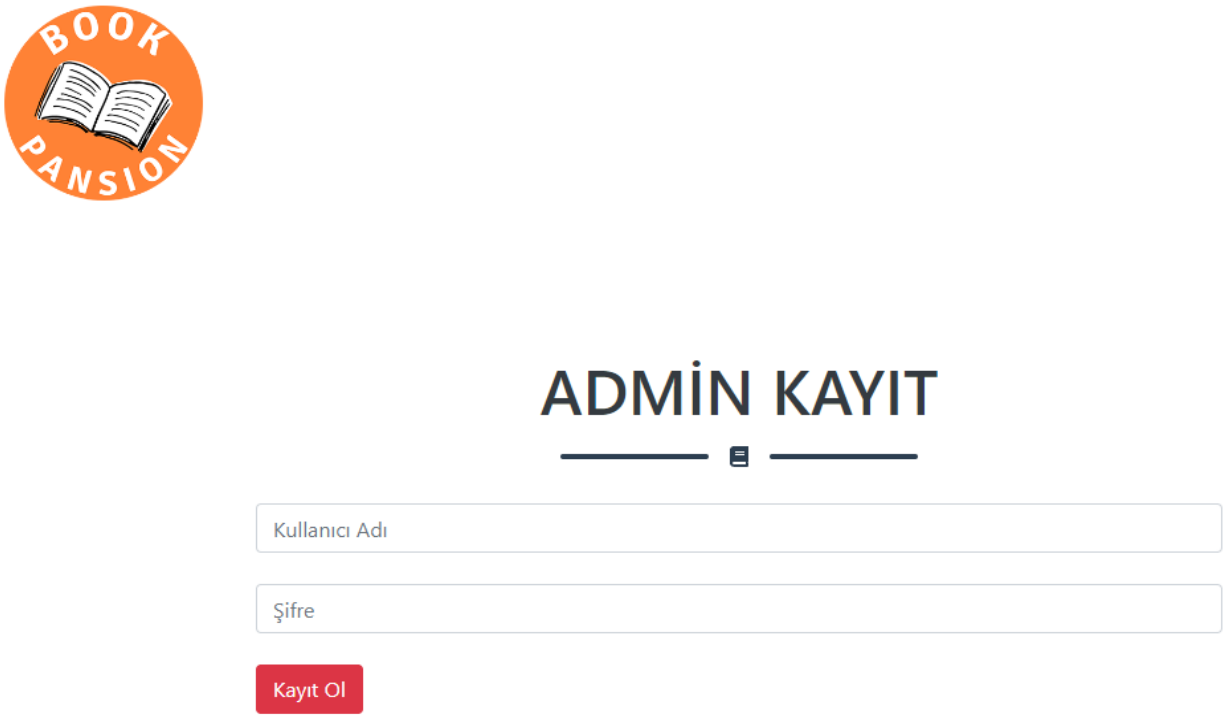


Figure 7: Admin Register

4.1.7 Admin Page Reservation List

After logging in, Admin displays all the reservations made by users under the name of “Tüm Rezervasyonlar” and can make changes to them or delete the reservation.

Figure 8: Admin Page Reservation List

4.1.8 Insert Book

After logging in, Admin can add a book to the system by filling in the necessary information about the book to be uploaded to the system from the “Kitap Ekle” section and selecting the book image.

Figure 9: Insert Book

4.2 Source Codes

4.2.1 Admin Table

In the admin table the usernames and passwords of the admins are kept.When logging into the admin panel, admins login with this informations.

			id	username	password
Düzenle	Kopyala	Sil	3	dogukankaya	12345
Düzenle	Kopyala	Sil	4	admin	1234

Figure 10: Admin Table

4.2.2 Admin Authentication

The username and password used by the admin while logging in are checked here and entered into the admin panel.

```php
<?php
if (isset($_POST['username']) && isset($_POST['password'])) {
    $adminkontrol = mysqli_query($conn, "SELECT `username`,`password` FROM `admin` WHERE `username` = '".$_POST["username"]."' AND `password` = '".$_POST["password"]."'");
    if(mysqli_num_rows($adminkontrol))
    {
        $isim=$_POST['username'];
        $_SESSION['admin'] = true;
        header("location:adminpaneli.php"); // BURADA SESSION KULLANILARAK ADMİN PANELİNE GİRİŞ YAPILACAK.
        exit();
    }
    else {
        echo 'Girilen kriterlere ait admin bulunamadı!';
    }
}
?>
```

Figure 11: Admin Authentication

4.2.3 Books Table

The name of the book , the author, the ISBN , the number of pages , the language of the book,the variable that controls whether the book is reserved or not , and the file location where the picture of the book will be added are kept. reservationCheck returns a value of 1 when the book is reserved. reservationCheck value is updated as 0 in case of reservation cancellation. bookimage variable holds the file location of the added image of the book.System uses this file location when uploading images.

	bookid	bookname	author	ISBN	pageNumber	language	reservationCheck	bookimage
Düzenle Kopyala Sil	1	Dune	Frank Herbert	9786053754794	712	Türkçe	0	assets\img\kitaplar\dunekitap.jpg
Düzenle Kopyala Sil	2	Yüzüklerin Efendisi - Tek Cilt Özel Bası	J.R.R. Tolkien	9789753423472	1026	Türkçe	0	assets\img\kitaplar/yuzuklerinefendisikitap.jpg
Düzenle Kopyala Sil	3	NUTUK	ATATÜRK	000000000	543	Türkçe	1	assets\img\kitaplar\nutuk.jpg
Düzenle Kopyala Sil	4	1984	George Orwell	654753545	314	İngilizce	0	assets/img/kitaplar/1984kitap.jpg

Figure 12: Books Table

4.2.4 Customer Table

In the customer table , the information that the user gave while making a reservation is kept.

		id	cusname	phone	mail
Düzenle Kopyala Sil		7	Doğukan Kaya	5330878460	dgkn_kaya@hotmail.com
Düzenle Kopyala Sil		8	d	123	d@d
Düzenle Kopyala Sil		9	dogukan	d	dogukan@d
Düzenle Kopyala Sil		23	Doğukan Kaya	5330878460	dgkn_kaya@hotmail.com

Figure 13: Customer Table

4.2.5 Reservation Table

In the reservation table , the information of the user and the information of the book user has reserved are kept. The sdate and edate values hold the user's reservation dates. The bookid holds the id of the book that the user has reserved. The reservationcheck value in the booktable is updated according to the bookid value kept in this table. User can update the reservation with the rezid , phone and email values kept in this table.

	rezid	sdate	edate	bookid	phone	email
Düzenle Kopyala Sil	23	10/06/2023	30/06/2023	3	5330878460	dgkn_kaya@hotmail.com

Figure 14: Reservation Table

4.2.6 Database Connection

In this code block, connection operations are made to the database of the system.

```php
<?php
ob_start();
$servername = "localhost";
$username = "root";
$password = "";
$dbname = "library";

$conn = mysqli_connect($servername, $username, $password, "library");
if (!$conn) {
  die("Connection failed: " . mysqli_connect_error());
}
ob_end_flush();
?>
```

Figure 15: Database Connection

4.2.7 Listing Books

In this code block, the books that are registered in the system and that are not reserved are listed on the frontend.

```
<section class="page-section portfolio" id="kitaplar">   <!--KİTAPLAR BULUNACAK-->
    <div class="container">
        <h2 class="page-section-heading text-center text-uppercase text-dark mb-0">KİTAPLARIMIZ</h2>
        <div class="row">
            <?php
            $sql = "SELECT * FROM  books";
            $result = $conn->query($sql);

            if ($result->num_rows > 0) {
                while($row = $result->fetch_assoc()) {
                    $id = $row["bookid"];
                    if($row["reservationCheck"] == 0 ) { ?>
            <div class="divider-custom">
                                <div class="divider-custom-line"></div>
                                <div class="divider-custom-icon"><i class="fas fa-book"></i></div>
                                <div class="divider-custom-line"></div>
                            </div>
            <div class="container mb-5">
                    <div class="row justify-content-center text-center">
                        <div class="col-lg-8">
                            <h2 class="portfolio-modal-title text-dark text-uppercase mb-4 mt-4" id="portfolioModal1Label"><?php echo $row["bookname"]; ?></h2>
                            <div class="row">
                                <div class="col">
                                    <img class="img-fluid" src="<?php echo $row["bookimage"]; ?>" alt="">
                                </div>
                                <div class="col d-flex justify-content-center mt-4">
                                    <div class="bookInfo">
                                        <h5>Yazar : <?php echo $row["author"]; ?></h5>
                                        <h5>Sayfa Sayısı : <?php echo $row["pageNumber"]; ?></h5>
                                        <h5>Dil : <?php echo $row["language"]; ?></h5>
                                        <h5>ISBN : <?php echo $row["ISBN"]; ?></h5>
                                    </div>
                                </div>
                            </div>
                        </div>
                    </div>
                </div>
<?php }  }
            }else {
                echo "0 results";
            }
                ?>
        </div> <!--div.row-->
        </div> <!--div.container-->
    </section> <!--section.kitaplar-->
```

Figure 16: Listing Books

4.2.8 Javascript code of page animation

When the logo is clicked to go to the top of the page , there is a JavaScript code block written for the animation of going to the top of the page.

```
assets > js > JS scripts.js > ...
(function($) {
    "use strict";

    $('a.js-scroll-trigger[href*="#"]:not([href="#"])').click(function() {
        if (location.pathname.replace(/^\//, '') == this.pathname.replace(/^\//, '') && location.hostname == this.hostname) {
            var target = $(this.hash);
            target = target.length ? target : $('[name=' + this.hash.slice(1) + ']');
            if (target.length) {
                $('html, body').animate({
                    scrollTop: (target.offset().top - 71)
                }, 1000, "easeInOutExpo");
                return false;
            }
        }
    });

    $(document).scroll(function() {
        var scrollDistance = $(this).scrollTop();
        if (scrollDistance > 100) {
            $('.scroll-to-top').fadeIn();
        } else {
            $('.scroll-to-top').fadeOut();
        }
    });

    $('.js-scroll-trigger').click(function() {
        $('.navbar-collapse').collapse('hide');
    });

    $('body').scrollspy({
        target: '#mainNav',
        offset: 80
    });

    var navbarCollapse = function() {
        if ($("#mainNav").offset().top > 500) {
            $("#mainNav").addClass("navbar-shrink");
        } else {
            $("#mainNav").removeClass("navbar-shrink");
        }
    };
    navbarCollapse();
    $(window).scroll(navbarCollapse);

})(jQuery);
```

Figure 17: Javascript code of page animation

4.2.9 Date Formatter

In this code block, there is a JavaScript code block embedded in HTML that allows the user to format the dates entered.

```
                <div class="control-group">
                    <div class="form-group controls mb-3 pb-2">
                        <input class="form-control" name="giris" type="text" placeholder="Alış Tarihi Örn. 21/06/2023" onkeyup="
var v = this.value;
if (v.match(/^\d{2}$/) !== null) {
    this.value = v + '/';
} else if (v.match(/^\d{2}\/\d{2}$/) !== null) {
    this.value = v + '/';
}" required="required" maxlength="10" />
                    </div>
                </div>
                <div class="control-group">
                    <div class="form-group controls mb-3 pb-2">
                        <input class="form-control" name="cikis" type="text" placeholder="Teslim Tarihi Örn. 22/07/2023" onkeyup="
var v = this.value;
if (v.match(/^\d{2}$/) !== null) {
    this.value = v + '/';
} else if (v.match(/^\d{2}\/\d{2}$/) !== null) {
    this.value = v + '/';
}" required="required" maxlength="10" />
                    </div>
                </div>
```

Figure 18: Date Formatter

4.2.10 Adding Reservation

It is the code block where the information is recorded in the customer and reservation tables as a result of the user's reservation process. As a result of the registration , the reservation id is given to the user with a pop-up.

```php
<?php
require('sistem.php');
// REZERVASYON VE CUSTOMER TABLOLARINA MAİLİ EKLEMİYOR GERİYE KALAN BİLGİLERİ EKSİKSİZ DBYE KAYDEDİYOR
if (isset($_POST['phone'])) {
    //kayit1  customer tablosuna fromdan aldığı değerleri ekler
    $kayit1 = mysqli_query($conn, "INSERT INTO customer (`cusname`, `phone`, `mail`) VALUES ('" . $_POST['adsoyad'] . "','" . $_POST['phone'] . "','" . $_POST['email'] . "') ");
    // kayit  reservation tablosuna formdan aldığı değerleri ekler
    $kayit = mysqli_query($conn, "INSERT INTO reservation (`sdate`, `edate`, `bookid`, `phone`,`email`) VALUES ('" . $_POST['giris'] . "','" . $_POST['cikis'] . "','" . $_POST['bookid'] . "','" . $_POST['phone'] . "','" . $_POST['email'] . "') ");
    echo "<script>alert('Kitabınız reserve edilmiştir. Rezervasyon numaranız : ".mysqli_insert_id($conn)." Lütfen rezervasyon numaranızı not alınız.');window.location.href='index.php';</script>";
    $updateReservationCheck  = mysqli_query($conn, "UPDATE books SET reservationCheck = 1 WHERE bookid = '" . $_POST["bookid"] . "'");

}
?>
```

Figure 19: Adding Reservation

4.2.11 Admin Authentication

The username and password used by the admin while logging in are checked here and entered into the admin panel.

```php
<?php
if (isset($_POST['username']) && isset($_POST['password'])) {
    $adminkontrol = mysqli_query($conn, "SELECT `username`,`password` FROM `admin` WHERE `username` = '".$_POST["username"]."' AND `password` = '".$_POST["password"]."'");
    if(mysqli_num_rows($adminkontrol))
    {
        $isim=$_POST['username'];
        $_SESSION['admin'] = true;
        header("location:adminpaneli.php"); // BURADA SESSION KULLANILARAK ADMİN PANELİNE GİRİŞ YAPILACAK.
        exit();
    }
    else {
        echo 'Girilen kriterlere ait admin bulunamadı!';
    }
}
?>
```

Figure 20: Admin Authentication

4.2.12 Adding Books from the Admin Panel

It is the code block where the information of the book is saved in the database while the admin adds a new book to the system.

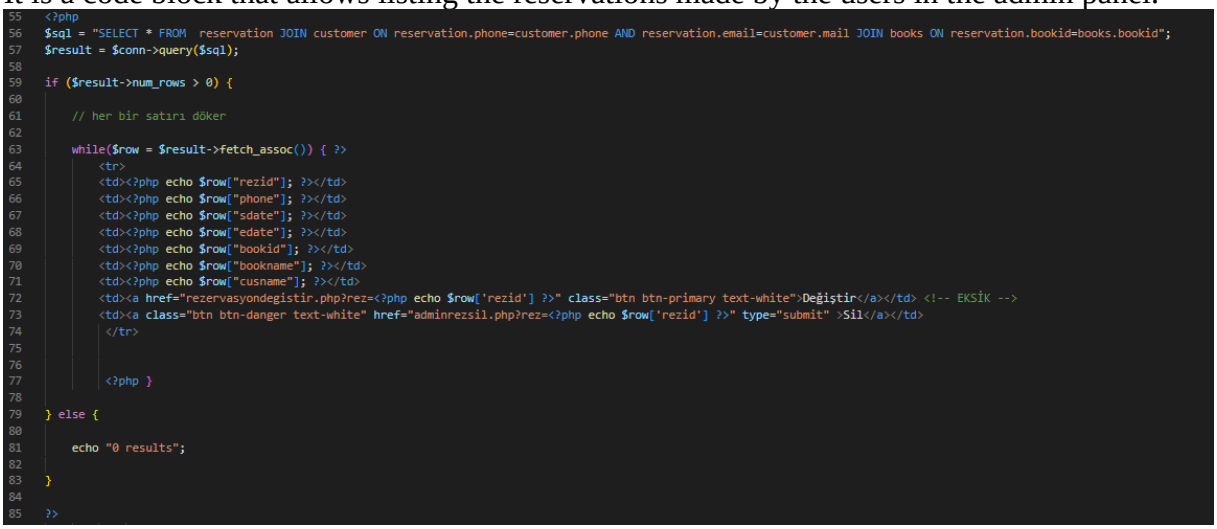
```php
<?php
require('sistem.php');


if(isset($_POST['bookname'])){
$_POST['reservationCheck'] = false;
$_POST['bookimage'] = "assets/img/kitaplar/".$_POST['bookimage'];
$eklebookqi = mysqli_query($conn,"INSERT INTO books (`bookname`, `author`, `ISBN`, `pageNumber`, `language`, `reservationCheck`, `bookimage`) VALUES ('" . $_POST['bookname'] . "','" . $_POST['author'] . "','" . $_POST['ISBN'] . "','" . $_POST['pageNumber'] . "','" . $_POST['language'] . "','" . $_POST['reservationCheck'] . "','
'" . $_POST['bookimage'] . "')");
echo "<script>alert('Kitap Eklenmiştir.');</script>";
}else{
    echo "Kitap eklenemedi.";
}
```

Figure 21: Adding Books from the Admin Panel

4.2.13 Admin Panel Reservation List

It is a code block that allows listing the reservations made by the users in the admin panel.



```php
<?php
$sql = "SELECT * FROM  reservation JOIN customer ON reservation.phone=customer.phone AND reservation.email=customer.mail JOIN books ON reservation.bookid=books.bookid";
$result = $conn->query($sql);

if ($result->num_rows > 0) {

    // her bir satırı döker

    while($row = $result->fetch_assoc()) { ?>
        <tr>
        <td><?php echo $row["rezid"]; ?></td>
        <td><?php echo $row["phone"]; ?></td>
        <td><?php echo $row["sdate"]; ?></td>
        <td><?php echo $row["edate"]; ?></td>
        <td><?php echo $row["bookid"]; ?></td>
        <td><?php echo $row["bookname"]; ?></td>
        <td><?php echo $row["cusname"]; ?></td>
        <td><a href="rezervasyondegistir.php?rez=<?php echo $row['rezid'] ?>" class="btn btn-primary text-white">Değiştir</a></td> <!-- EKSİK -->
        <td><a class="btn btn-danger text-white" href="adminrezsil.php?rez=<?php echo $row['rezid'] ?>" type="submit" >Sil</a></td>
         </tr>


         <?php }

} else {

    echo "0 results";

}

?>
```

Figure 22: Admin Panel Reservation List

5 Conclusion

The thesis project is focused on the development of a system that is both efficient and user friendly when it comes to providing library management service to the users. To achieve this goal ; HTML , CSS , Bootstrap , JavaScript , PHP and MySQL were used. The challenging part of the project is to add a new book to the admin panel . To overcome this challenge , the location of the file was kept in the database instead of the file. All the basic functionality testing is successful which is planned to do in the Library Management System. The project is in prototype stage and it is not fully ready to use , as there is need to add more functionalities to ensure good user experience. As example currently the user does not receive a notification about the reservation date is approaching. User needs to enter to Reservation Management System to check this issue. Despite its flaws, the system can perform the essential functions required by a library management system.

6 CV

Doğukan Kaya was born in 22/11/2000 in Adana . Kaya graduated from Mehmet Özöncel Anatolian High School in 2018. In 2018 , he got into the Çukurova University Bachelor’s degree of Computer Engineering department. In his first years, he took part in different roles in CENGA. In February 2022 , he started to work remotely as Business Development Specialist in Pexbo LLC which is an e-commerce company located in US. He is currently working as a Executive Assistant in this company. In June 2023, he was a last year student of the Çukurova University Bachelor's degree of Computer Engineering department.

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