Software Engineering
Online Banking
C# Project

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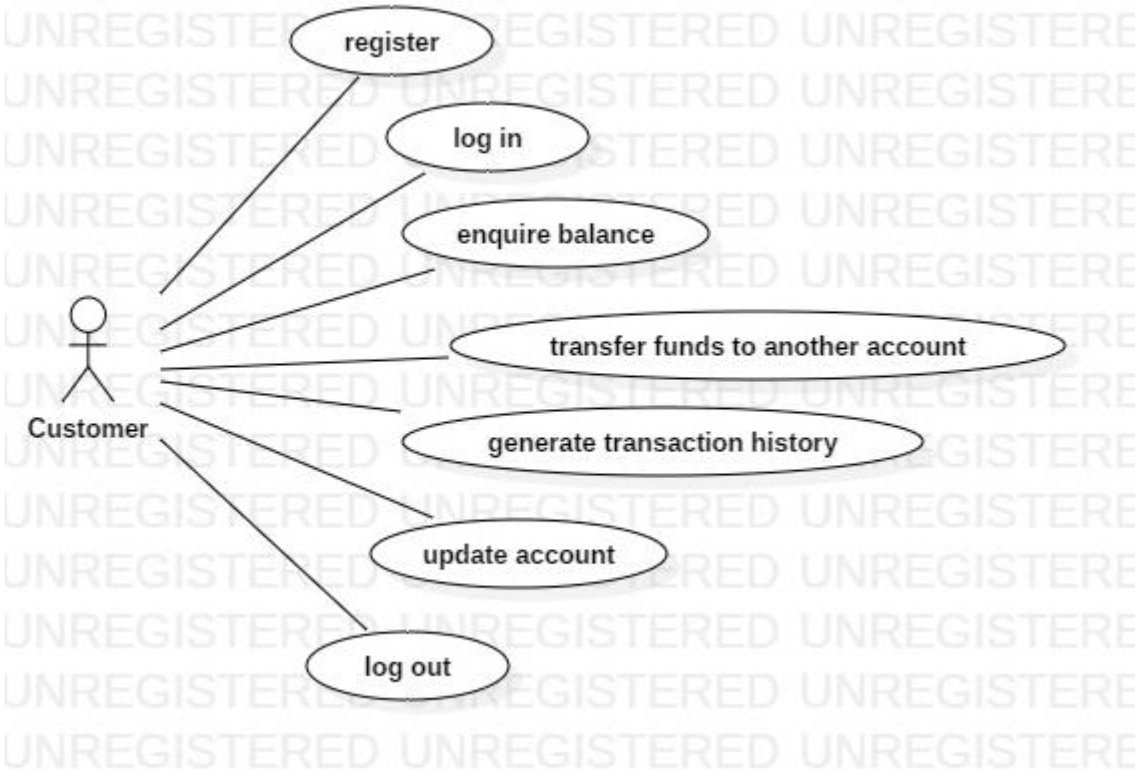
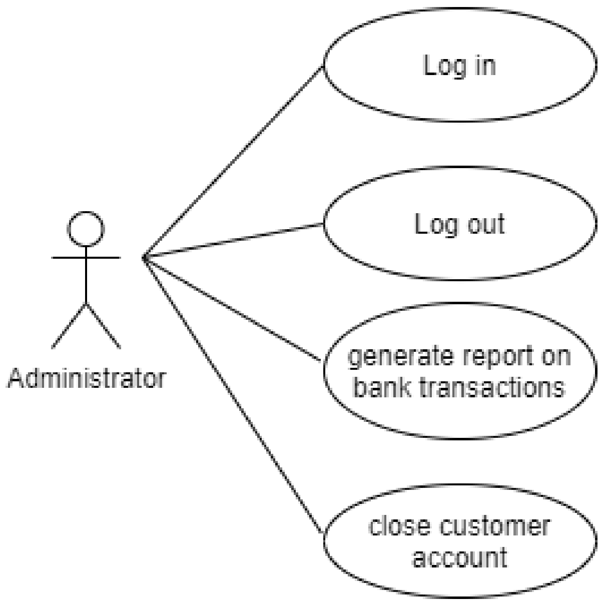
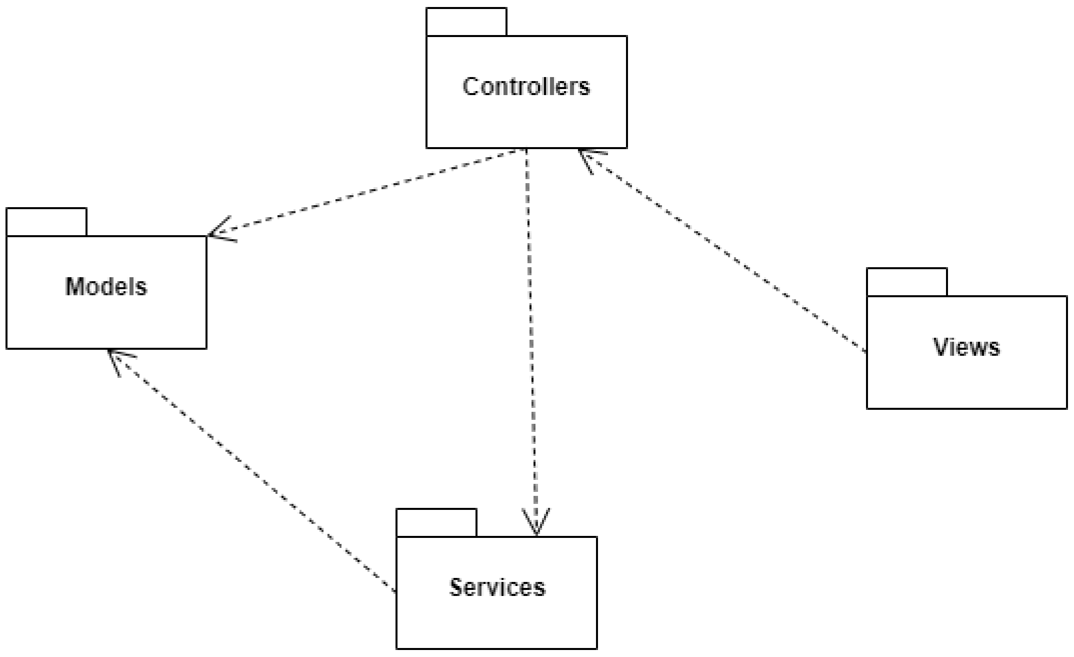
Contents

1. Use Case Diagram

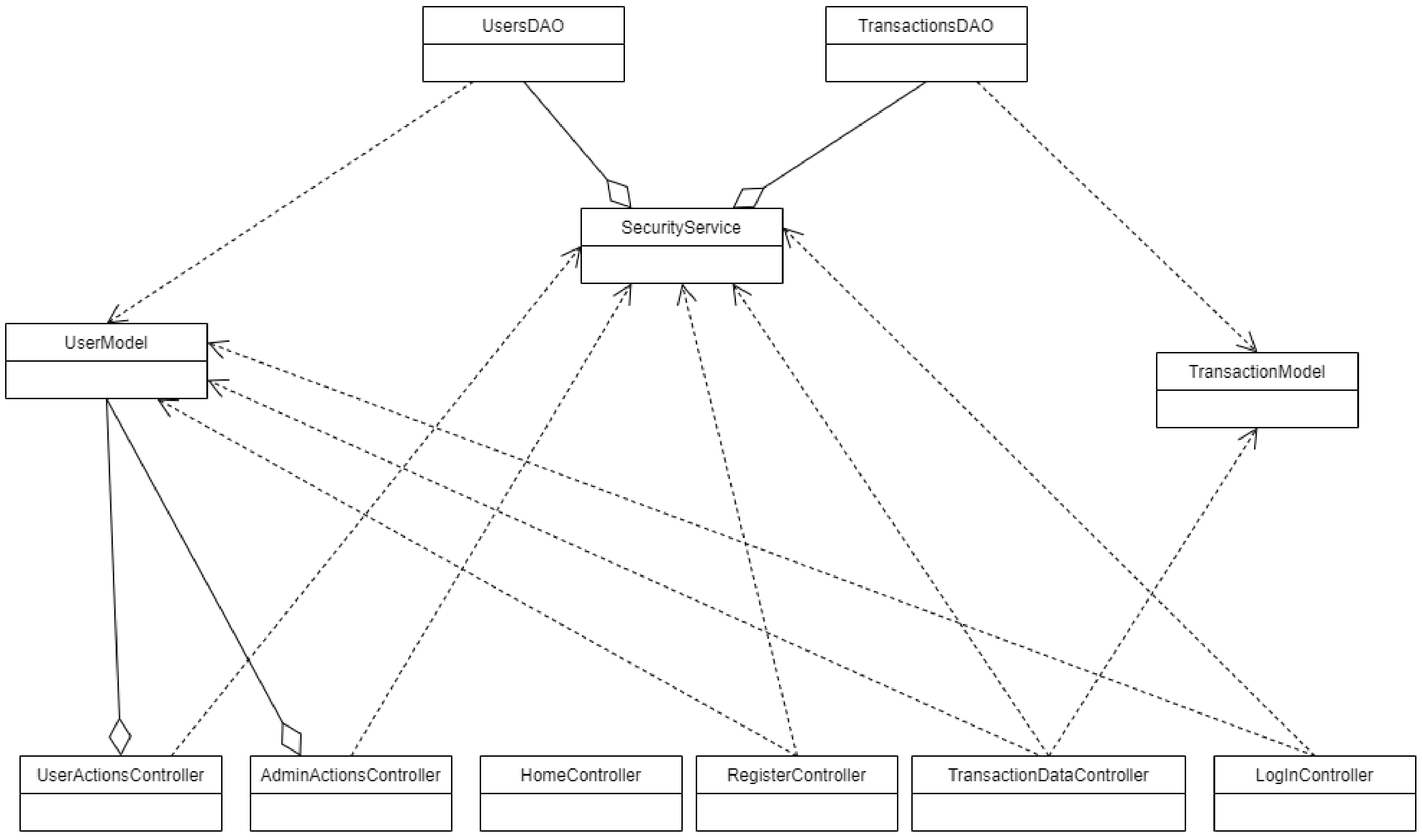

register
log in
enquire balance
transfer funds to another account
generate transaction history
update account
log out
Customer

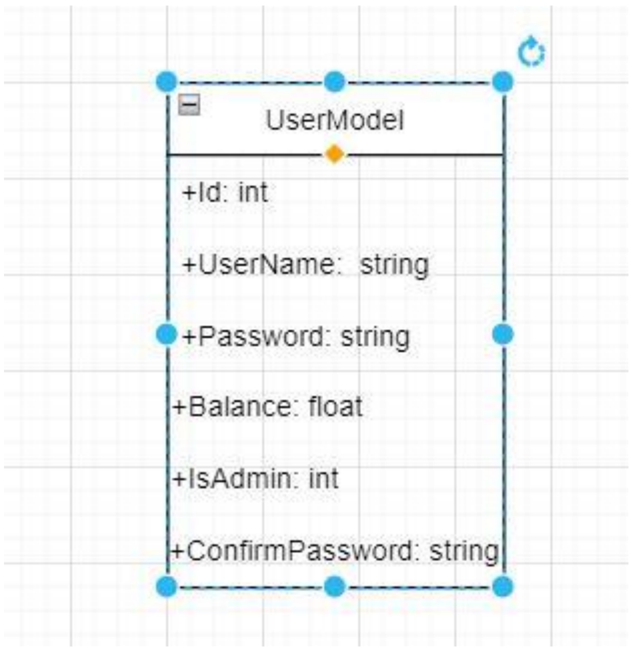


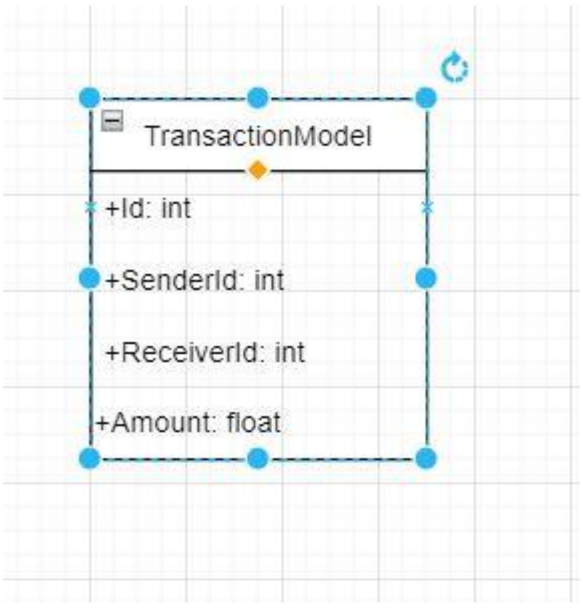
2. Package Diagram

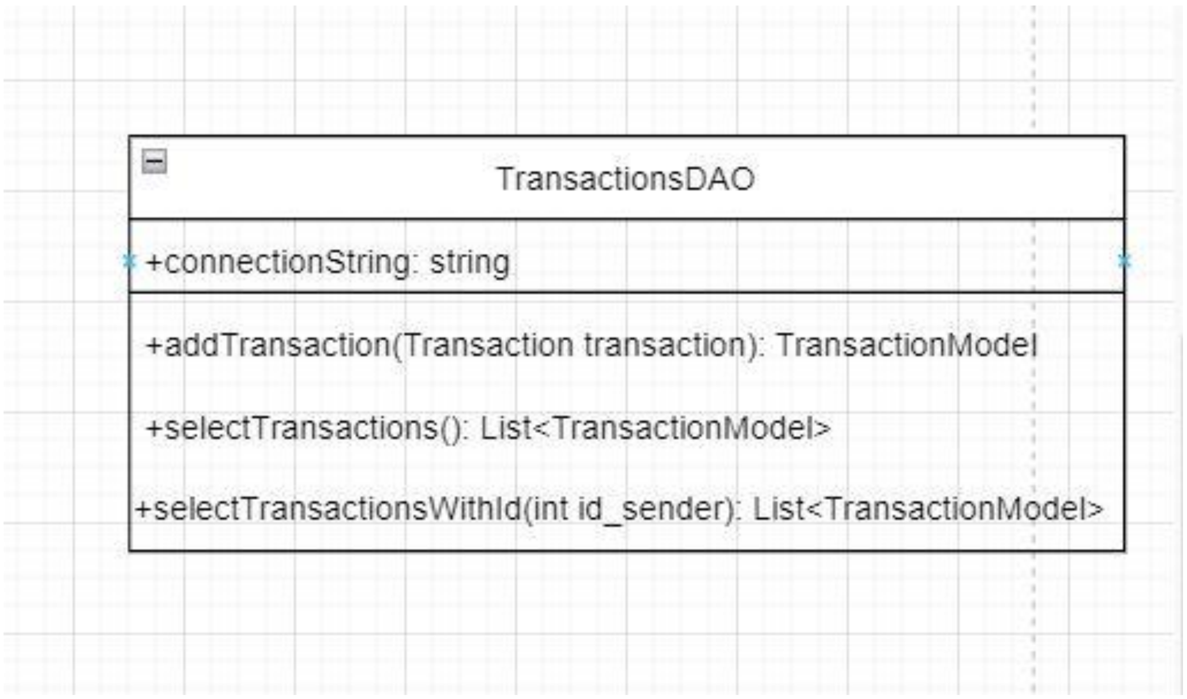


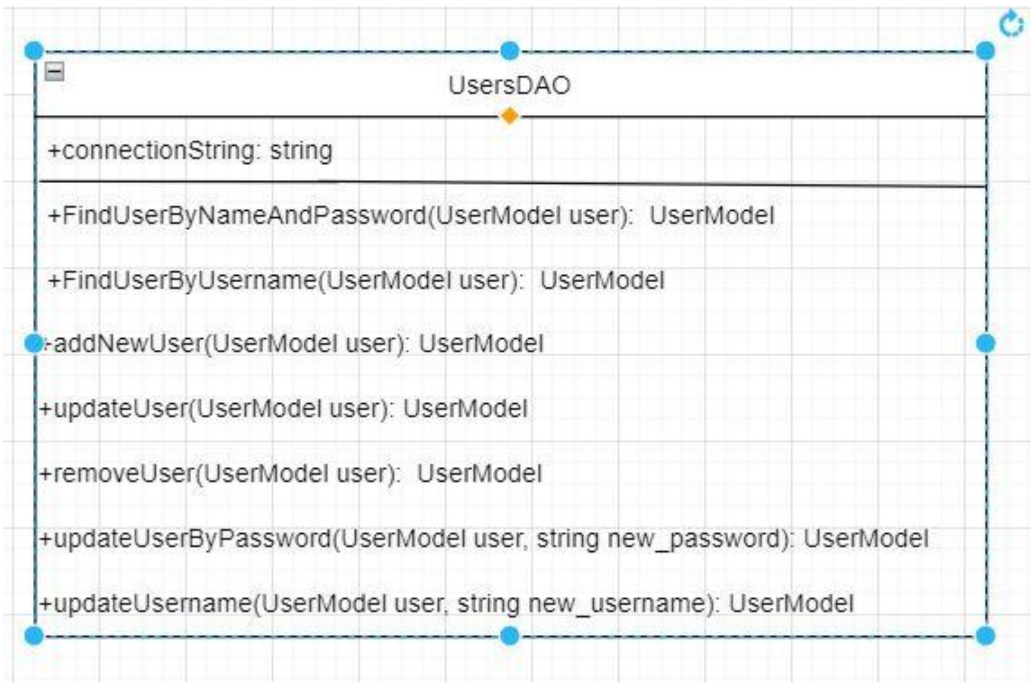
3. Class Diagram

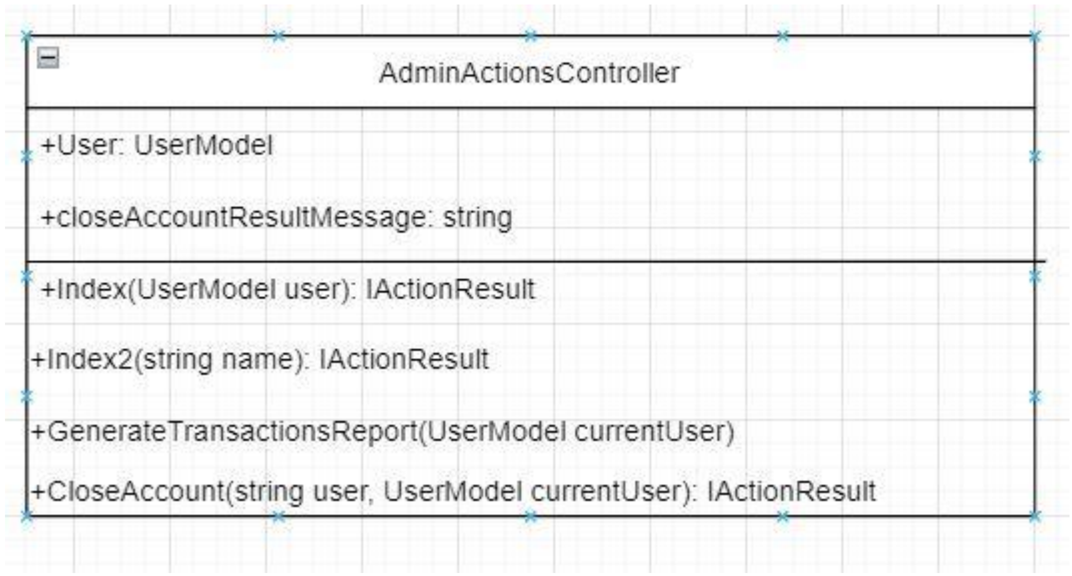


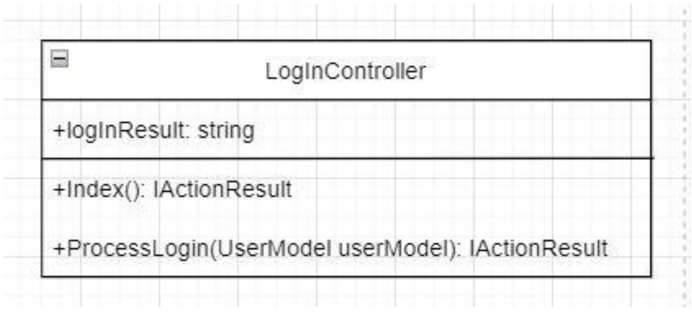

UserModel
+Id: int
+UserName: string
+Password: string
+Balance: float
+IsAdmin: int
+ConfirmPassword: string

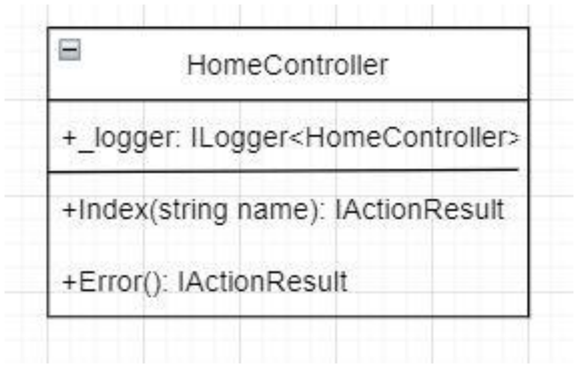

TransactionModel
+Id: int
+SenderId: int
+ReceiverId: int
+Amount: float

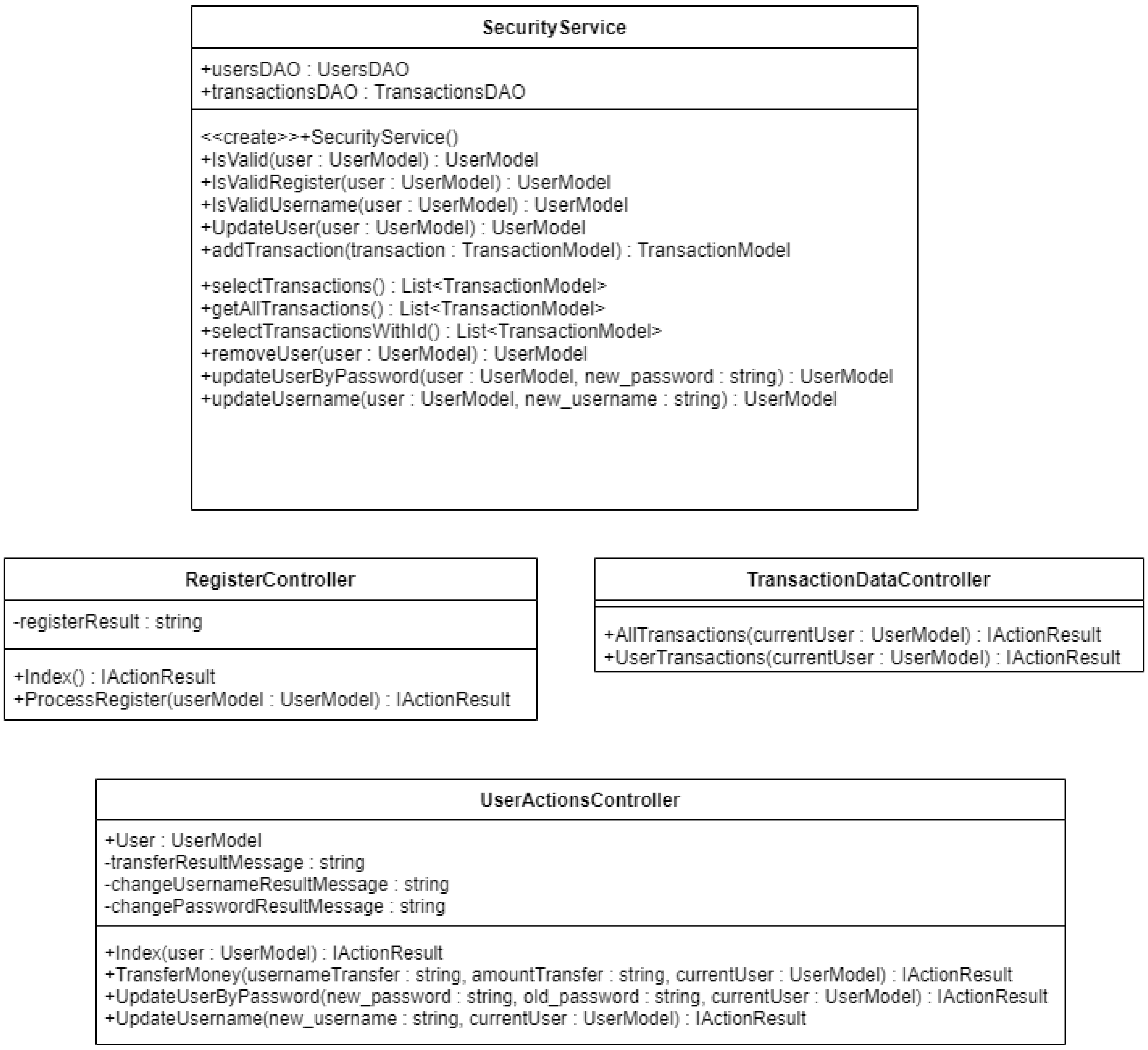

TransactionsDAO
+connectionString: string
+addTransaction(Transaction transaction): TransactionModel
+selectTransactions(): List<TransactionModel>
+selectTransactionsWithId(int id_sender): List<TransactionModel>


UsersDAO
+connectionString: string
+FindUserByNameAndPassword(UserModel user): UserModel
+FindUserByUsername(UserModel user): UserModel
+addNewUser(UserModel user): UserModel
+updateUser(UserModel user): UserModel
+removeUser(UserModel user): UserModel
+updateUserByPassword(UserModel user, string new_password): UserModel
+updateUsername(UserModel user, string new_username): UserModel


AdminActionsController
+User: UserModel
+closeAccountResultMessage: string
+Index(UserModel user): IActionResult
+Index2(string name): IActionResult
+GenerateTransactionsReport(UserModel currentUser)
+CloseAccount(string user, UserModel currentUser): IActionResult


LogInController
+logInResult: string
+Index(): IActionResult
+ProcessLogin(UserModel userModel): IActionResult


HomeController
+_logger: ILogger<HomeController>
+Index(string name): IActionResult
+Error(): IActionResult



SecurityService

```
+usersDAO : UsersDAO
+transactionsDAO : TransactionsDAO
```

```
<<create>>+SecurityService()
+IsValid(user : UserModel) : UserModel
+IsValidRegister(user : UserModel) : UserModel
+IsValidUsername(user : UserModel) : UserModel
+UpdateUser(user : UserModel) : UserModel
+addTransaction(transaction : TransactionModel) : TransactionModel

+selectTransactions() : List<TransactionModel>
+getAllTransactions() : List<TransactionModel>
+selectTransactionsWithId() : List<TransactionModel>
+removeUser(user : UserModel) : UserModel
+updateUserByPassword(user : UserModel, new_password : string) : UserModel
+updateUsername(user : UserModel, new_username : string) : UserModel
```

RegisterController

```
-registerResult : string
```

```
+Index() : IActionResult
+ProcessRegister(userModel : UserModel) : IActionResult
```

TransactionDataController

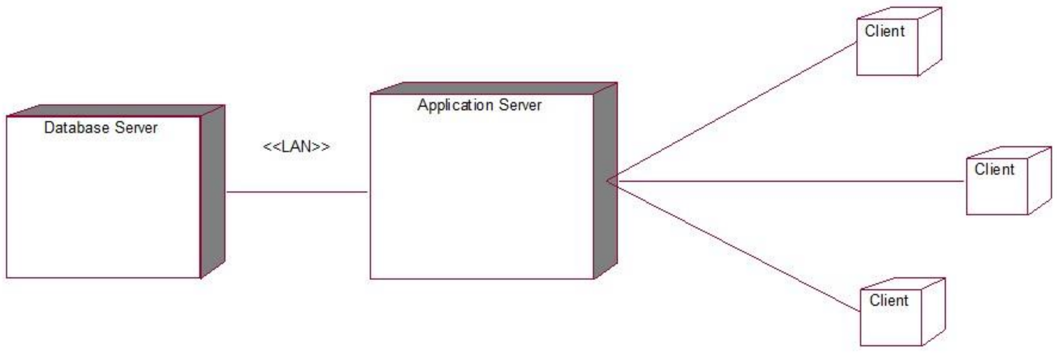
```
+AllTransactions(currentUser : UserModel) : IActionResult
+UserTransactions(currentUser : UserModel) : IActionResult
```

UserActionsController

```
+User : UserModel
-transferResultMessage : string
-changeUsernameResultMessage : string
-changePasswordResultMessage : string
```

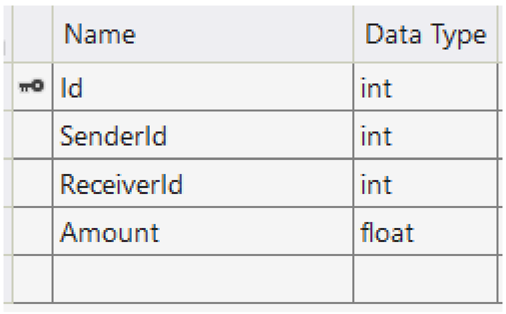
```
+Index(user : UserModel) : IActionResult
+TransferMoney(usernameTransfer : string, amountTransfer : string, currentUser : UserModel) : IActionResult
+UpdateUserByPassword(new_password : string, old_password : string, currentUser : UserModel) : IActionResult
+UpdateUsername(new_username : string, currentUser : UserModel) : IActionResult
```

4. Deployment Diagram



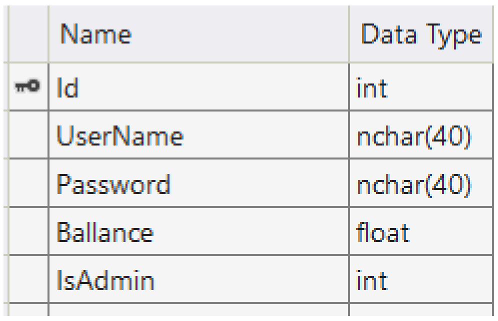
5. Database tables

5.1. Transactions table



	Name	Data Type
🔑	Id	int
	SenderId	int
	ReceiverId	int
	Amount	float

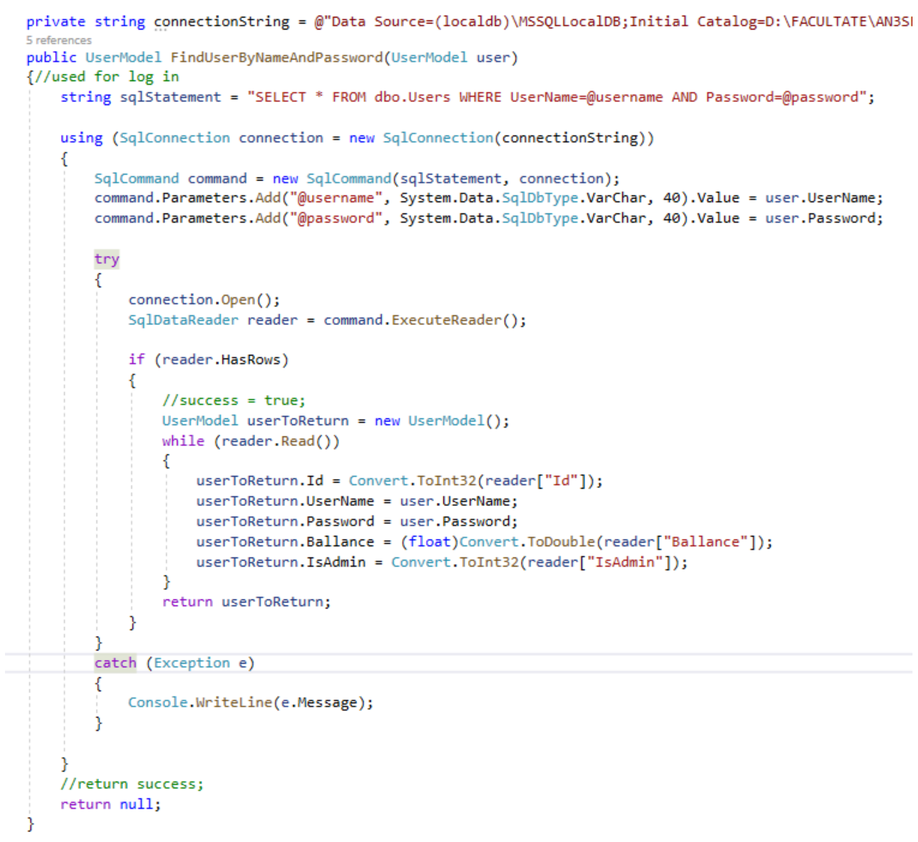
5.2. Users table



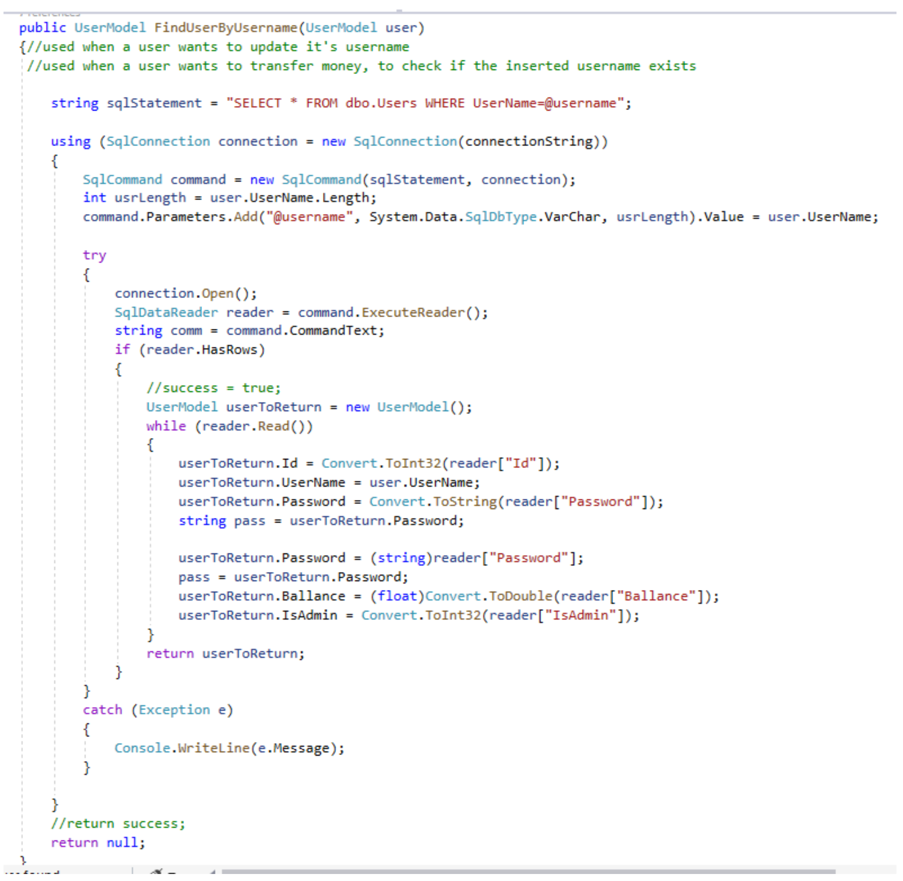
	Name	Data Type
🔑	Id	int
	UserName	nchar(40)
	Password	nchar(40)
	Ballance	float
	IsAdmin	int

6. Code

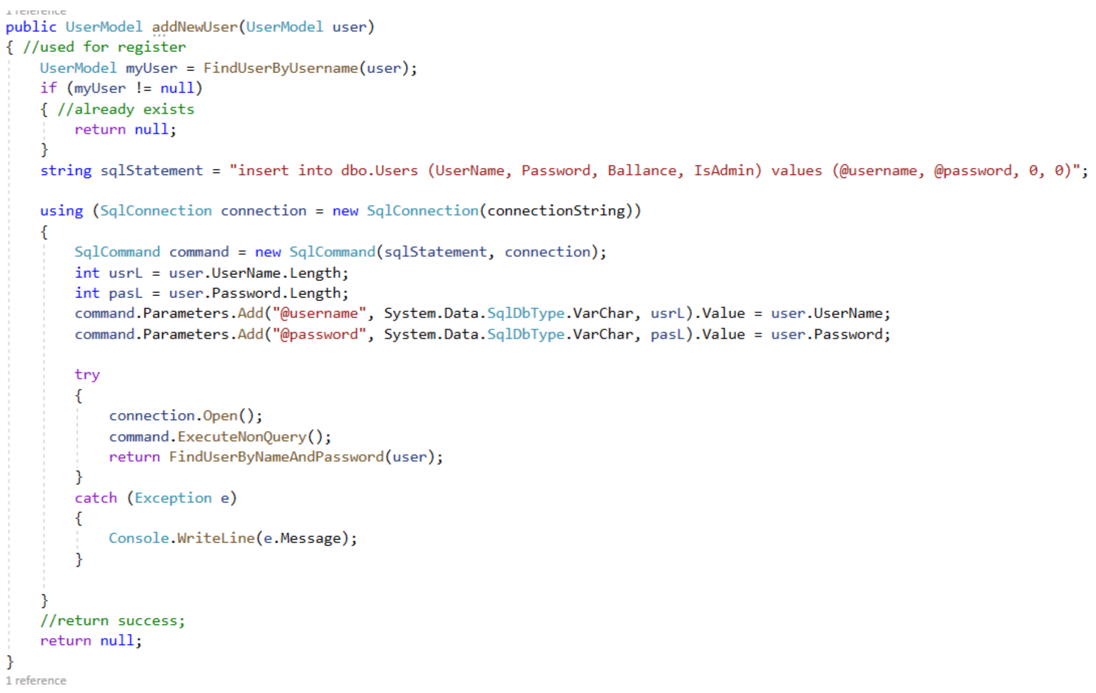
6.1. UsersDAO class



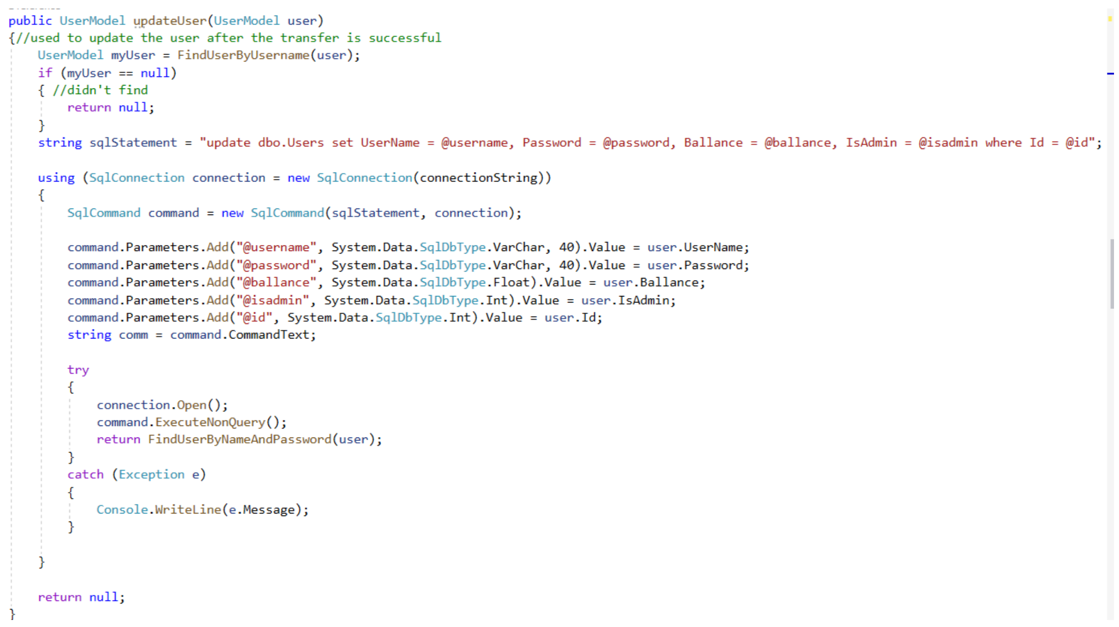
```
private string connectionString = @"Data Source=(localdb)\MSSQLLocalDB;Initial Catalog=D:\FACULTATE\AN3SI
5 references
public UserModel FindUserByNameAndPassword(UserModel user)
{//used for log in
    string sqlStatement = "SELECT * FROM dbo.Users WHERE UserName=@username AND Password=@password";

    using (SqlConnection connection = new SqlConnection(connectionString))
    {
        SqlCommand command = new SqlCommand(sqlStatement, connection);
        command.Parameters.Add("@username", System.Data.SqlDbType.VarChar, 40).Value = user.UserName;
        command.Parameters.Add("@password", System.Data.SqlDbType.VarChar, 40).Value = user.Password;

        try
        {
            connection.Open();
            SqlDataReader reader = command.ExecuteReader();

            if (reader.HasRows)
            {
                //success = true;
                UserModel userToReturn = new UserModel();
                while (reader.Read())
                {
                    userToReturn.Id = Convert.ToInt32(reader["Id"]);
                    userToReturn.UserName = user.UserName;
                    userToReturn.Password = user.Password;
                    userToReturn.Ballance = (float)Convert.ToDouble(reader["Ballance"]);
                    userToReturn.IsAdmin = Convert.ToInt32(reader["IsAdmin"]);
                }
                return userToReturn;
            }
        }
        catch (Exception e)
        {
            Console.WriteLine(e.Message);
        }

    }
    //return success;
    return null;
}
```



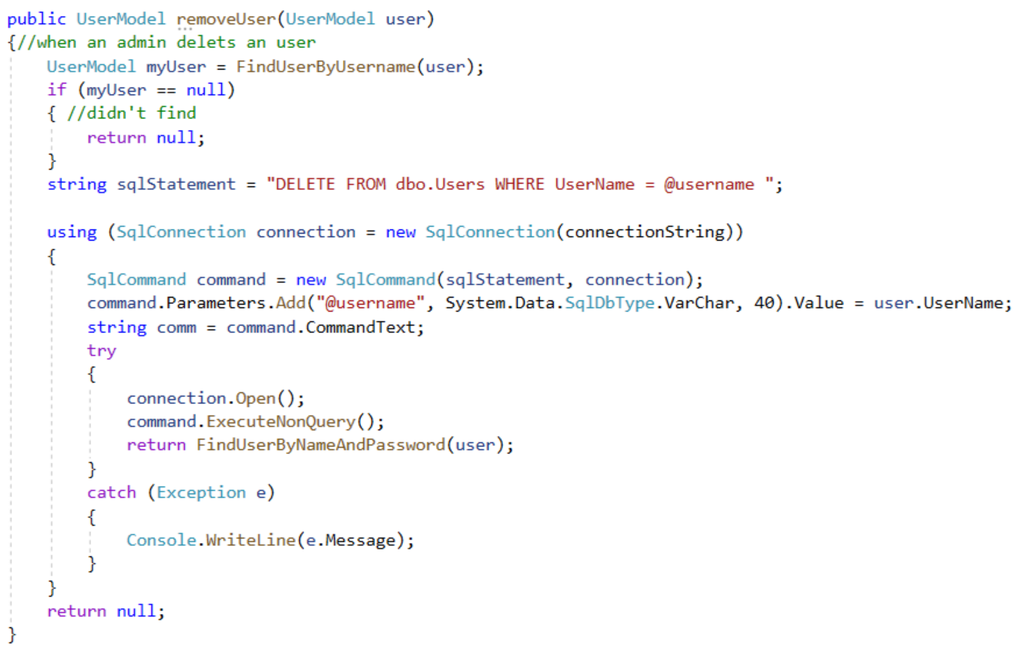
```
public UserModel FindUserByUsername(UserModel user)
{//used when a user wants to update it's username
 //used when a user wants to transfer money, to check if the inserted username exists

    string sqlStatement = "SELECT * FROM dbo.Users WHERE UserName=@username";

    using (SqlConnection connection = new SqlConnection(connectionString))
    {
        SqlCommand command = new SqlCommand(sqlStatement, connection);
        int usrLength = user.UserName.Length;
        command.Parameters.Add("@username", System.Data.SqlDbType.VarChar, usrLength).Value = user.UserName;

        try
        {
            connection.Open();
            SqlDataReader reader = command.ExecuteReader();
            string comm = command.CommandText;
            if (reader.HasRows)
            {
                //success = true;
                UserModel userToReturn = new UserModel();
                while (reader.Read())
                {
                    userToReturn.Id = Convert.ToInt32(reader["Id"]);
                    userToReturn.UserName = user.UserName;
                    userToReturn.Password = Convert.ToString(reader["Password"]);
                    string pass = userToReturn.Password;

                    userToReturn.Password = (string)reader["Password"];
                    pass = userToReturn.Password;
                    userToReturn.Ballance = (float)Convert.ToDouble(reader["Ballance"]);
                    userToReturn.IsAdmin = Convert.ToInt32(reader["IsAdmin"]);
                }
                return userToReturn;
            }
        }
        catch (Exception e)
        {
            Console.WriteLine(e.Message);
        }

    }
    //return success;
    return null;
}
```



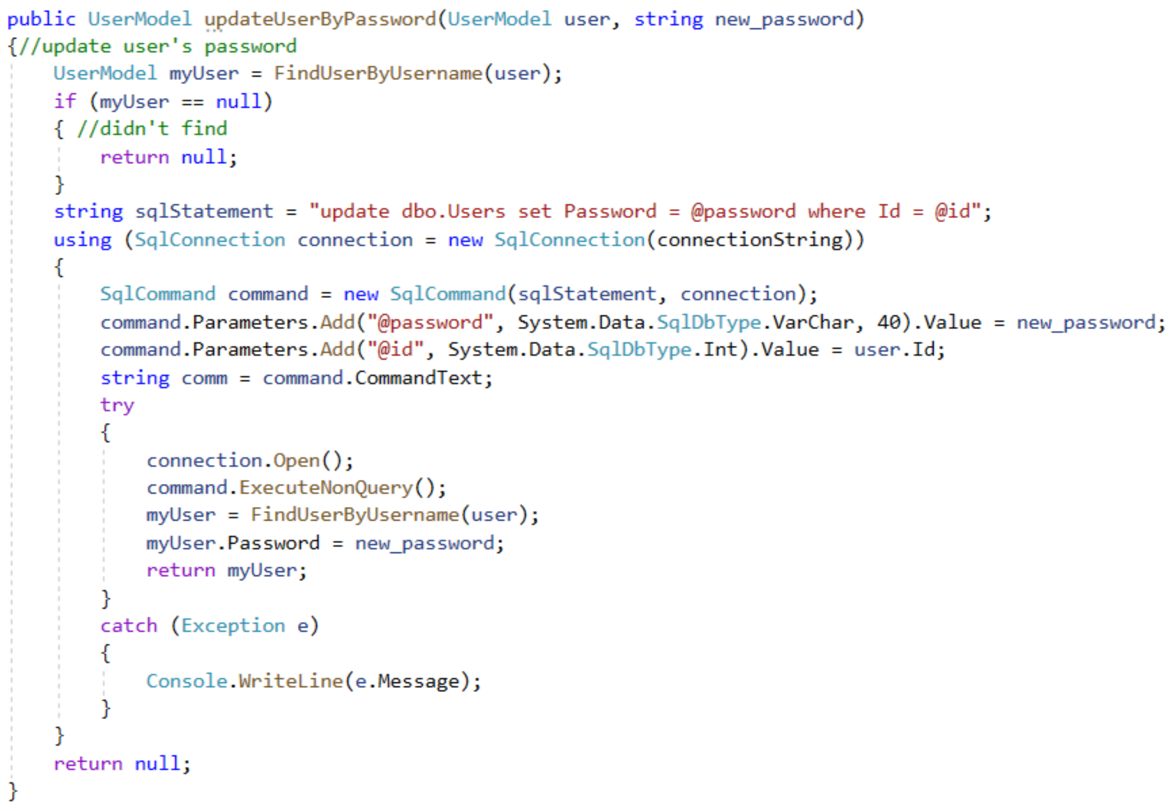
```
public UserModel addNewUser(UserModel user)
{ //used for register
    UserModel myUser = FindUserByUsername(user);
    if (myUser != null)
    { //already exists
        return null;
    }
    string sqlStatement = "insert into dbo.Users (UserName, Password, Ballance, IsAdmin) values (@username, @password, 0, 0)";

    using (SqlConnection connection = new SqlConnection(connectionString))
    {
        SqlCommand command = new SqlCommand(sqlStatement, connection);
        int usrL = user.UserName.Length;
        int pasL = user.Password.Length;
        command.Parameters.Add("@username", System.Data.SqlDbType.VarChar, usrL).Value = user.UserName;
        command.Parameters.Add("@password", System.Data.SqlDbType.VarChar, pasL).Value = user.Password;

        try
        {
            connection.Open();
            command.ExecuteNonQuery();
            return FindUserByNameAndPassword(user);
        }
        catch (Exception e)
        {
            Console.WriteLine(e.Message);
        }

    }
    //return success;
    return null;
}
1 reference
```



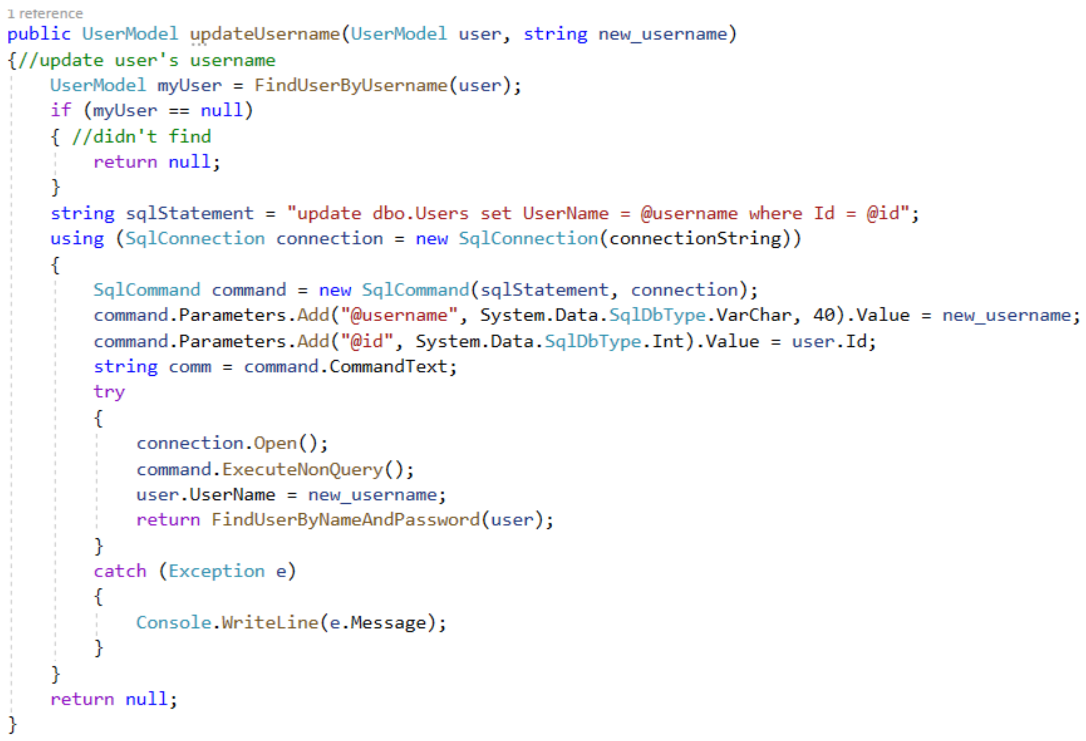
```
public UserModel updateUser(UserModel user)
{//used to update the user after the transfer is successful
    UserModel myUser = FindUserByUsername(user);
    if (myUser == null)
    { //didn't find
        return null;
    }
    string sqlStatement = "update dbo.Users set UserName = @username, Password = @password, Ballance = @ballance, IsAdmin = @isadmin where Id = @id";

    using (SqlConnection connection = new SqlConnection(connectionString))
    {
        SqlCommand command = new SqlCommand(sqlStatement, connection);

        command.Parameters.Add("@username", System.Data.SqlDbType.VarChar, 40).Value = user.UserName;
        command.Parameters.Add("@password", System.Data.SqlDbType.VarChar, 40).Value = user.Password;
        command.Parameters.Add("@ballance", System.Data.SqlDbType.Float).Value = user.Ballance;
        command.Parameters.Add("@isadmin", System.Data.SqlDbType.Int).Value = user.IsAdmin;
        command.Parameters.Add("@id", System.Data.SqlDbType.Int).Value = user.Id;
        string comm = command.CommandText;

        try
        {
            connection.Open();
            command.ExecuteNonQuery();
            return FindUserByNameAndPassword(user);
        }
        catch (Exception e)
        {
            Console.WriteLine(e.Message);
        }

    }

    return null;
}
```



```
public UserModel removeUser(UserModel user)
{//when an admin delets an user
    UserModel myUser = FindUserByUsername(user);
    if (myUser == null)
    { //didn't find
        return null;
    }
    string sqlStatement = "DELETE FROM dbo.Users WHERE UserName = @username ";

    using (SqlConnection connection = new SqlConnection(connectionString))
    {
        SqlCommand command = new SqlCommand(sqlStatement, connection);
        command.Parameters.Add("@username", System.Data.SqlDbType.VarChar, 40).Value = user.UserName;
        string comm = command.CommandText;
        try
        {
            connection.Open();
            command.ExecuteNonQuery();
            return FindUserByNameAndPassword(user);
        }
        catch (Exception e)
        {
            Console.WriteLine(e.Message);
        }
    }
    return null;
}
```

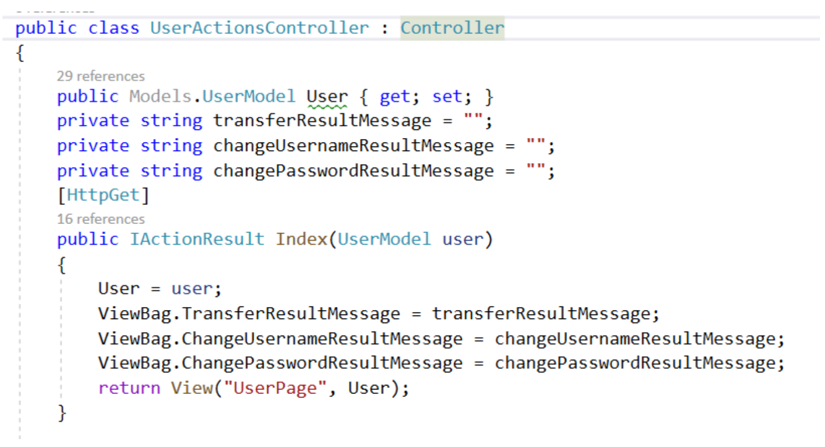


```
public UserModel updateUserByPassword(UserModel user, string new_password)
{//update user's password
    UserModel myUser = FindUserByUsername(user);
    if (myUser == null)
    { //didn't find
        return null;
    }
    string sqlStatement = "update dbo.Users set Password = @password where Id = @id";
    using (SqlConnection connection = new SqlConnection(connectionString))
    {
        SqlCommand command = new SqlCommand(sqlStatement, connection);
        command.Parameters.Add("@password", System.Data.SqlDbType.VarChar, 40).Value = new_password;
        command.Parameters.Add("@id", System.Data.SqlDbType.Int).Value = user.Id;
        string comm = command.CommandText;
        try
        {
            connection.Open();
            command.ExecuteNonQuery();
            myUser = FindUserByUsername(user);
            myUser.Password = new_password;
            return myUser;
        }
        catch (Exception e)
        {
            Console.WriteLine(e.Message);
        }
    }
    return null;
}
```

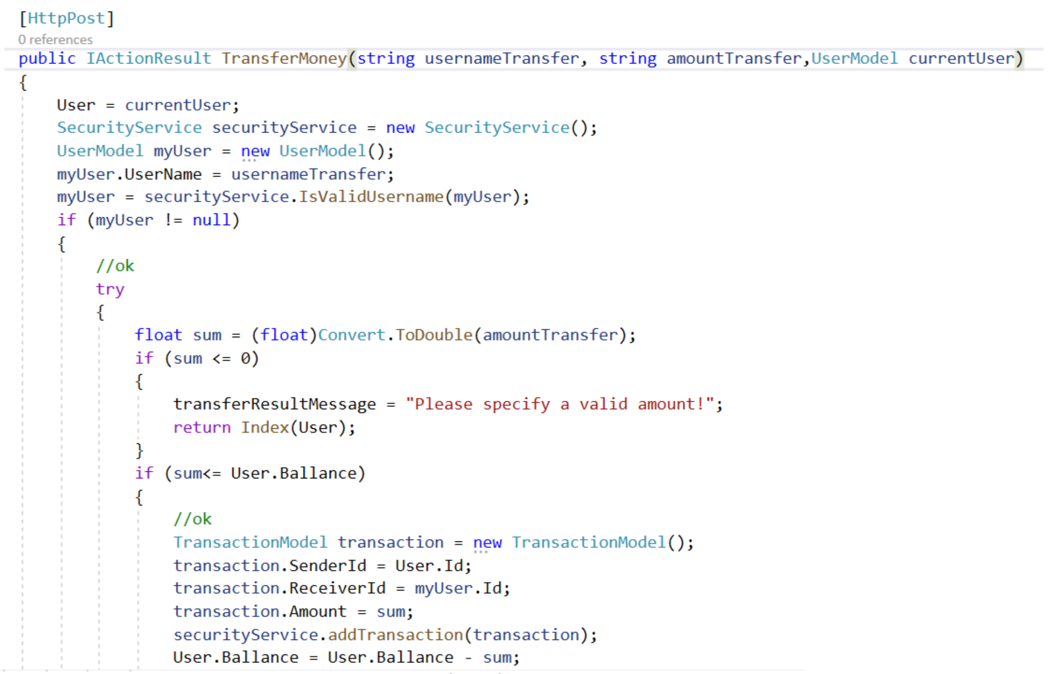
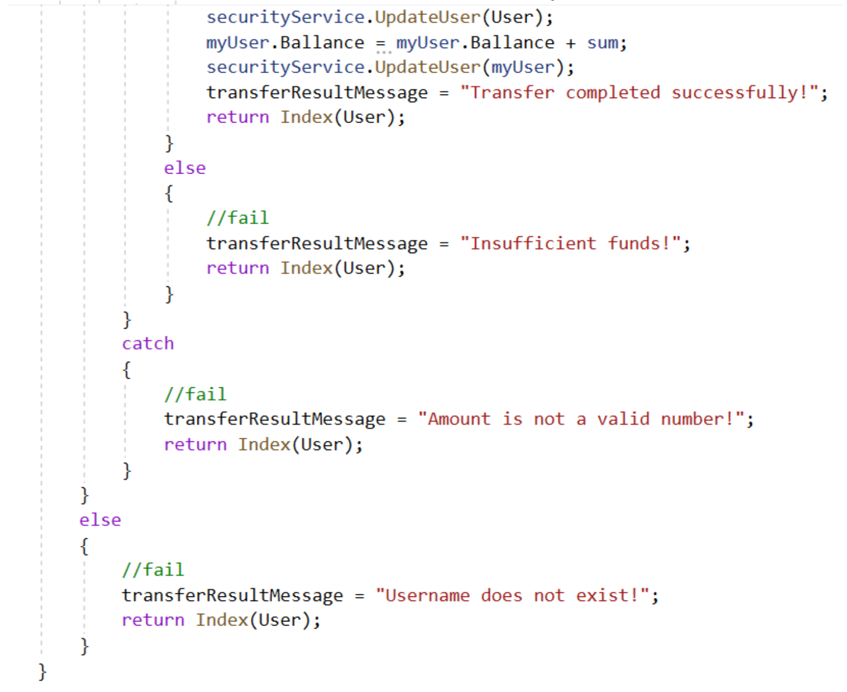


```
1 reference
public UserModel updateUsername(UserModel user, string new_username)
{//update user's username
    UserModel myUser = FindUserByUsername(user);
    if (myUser == null)
    { //didn't find
        return null;
    }
    string sqlStatement = "update dbo.Users set UserName = @username where Id = @id";
    using (SqlConnection connection = new SqlConnection(connectionString))
    {
        SqlCommand command = new SqlCommand(sqlStatement, connection);
        command.Parameters.Add("@username", System.Data.SqlDbType.VarChar, 40).Value = new_username;
        command.Parameters.Add("@id", System.Data.SqlDbType.Int).Value = user.Id;
        string comm = command.CommandText;
        try
        {
            connection.Open();
            command.ExecuteNonQuery();
            user.UserName = new_username;
            return FindUserByNameAndPassword(user);
        }
        catch (Exception e)
        {
            Console.WriteLine(e.Message);
        }
    }
    return null;
}
```

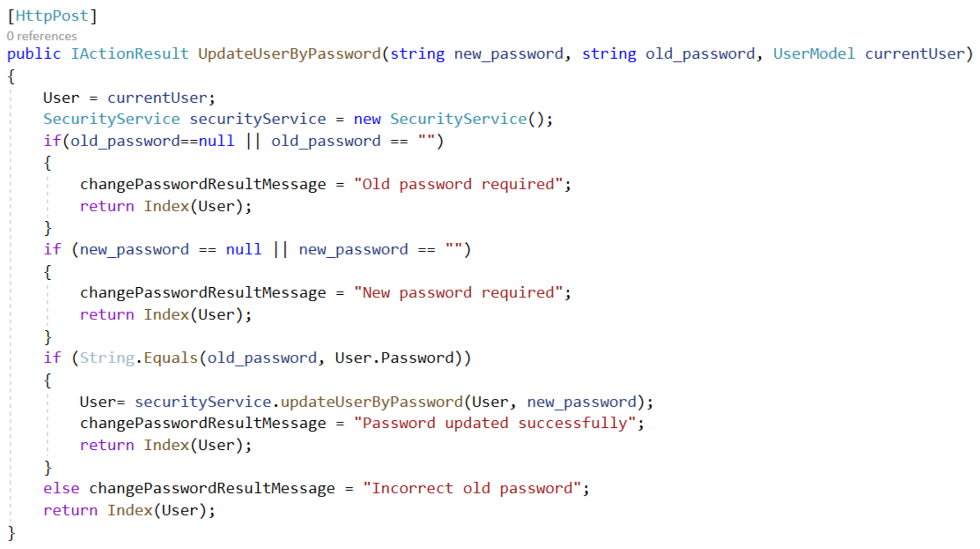
6.2. UserActionsController class



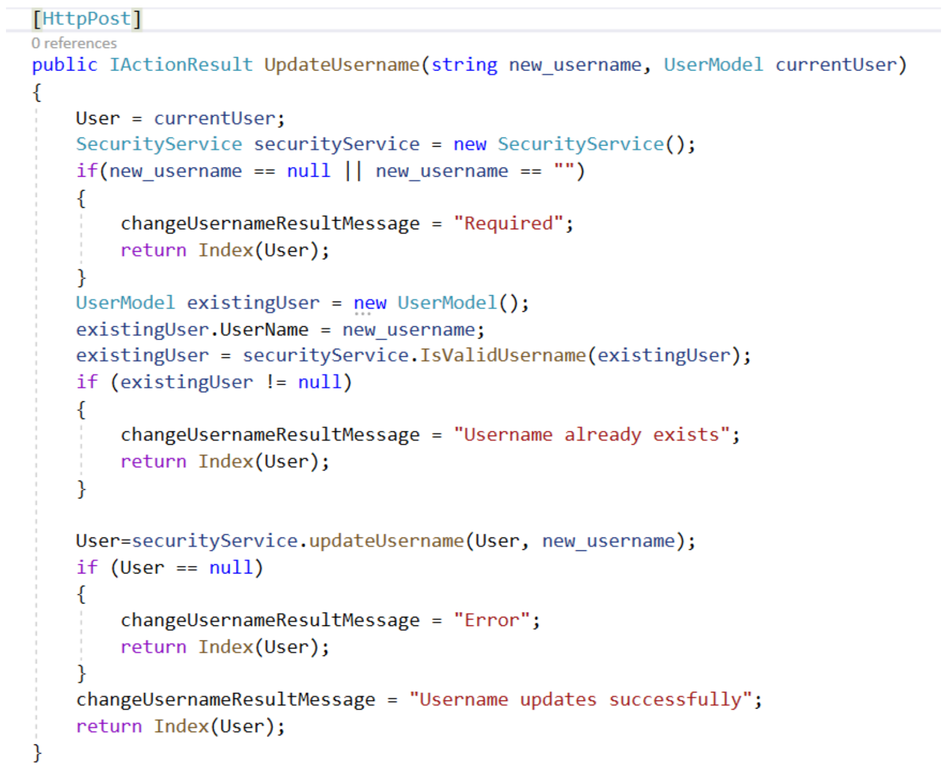
```
public class UserActionsController : Controller
{
    29 references
    public Models.UserModel User { get; set; }
    private string transferResultMessage = "";
    private string changeUsernameResultMessage = "";
    private string changePasswordResultMessage = "";
    [HttpGet]
    16 references
    public IActionResult Index(UserModel user)
    {
        User = user;
        ViewBag.TransferResultMessage = transferResultMessage;
        ViewBag.ChangeUsernameResultMessage = changeUsernameResultMessage;
        ViewBag.ChangePasswordResultMessage = changePasswordResultMessage;
        return View("UserPage", User);
    }
```

```
[HttpPost]
0 references
public IActionResult TransferMoney(string usernameTransfer, string amountTransfer,UserModel currentUser)
{
    User = currentUser;
    SecurityService securityService = new SecurityService();
    UserModel myUser = new UserModel();
    myUser.UserName = usernameTransfer;
    myUser = securityService.IsValidUsername(myUser);
    if (myUser != null)
    {
        //ok
        try
        {
            float sum = (float)Convert.ToDouble(amountTransfer);
            if (sum <= 0)
            {
                transferResultMessage = "Please specify a valid amount!";
                return Index(User);
            }
            if (sum<= User.Ballance)
            {
                //ok
                TransactionModel transaction = new TransactionModel();
                transaction.SenderId = User.Id;
                transaction.ReceiverId = myUser.Id;
                transaction.Amount = sum;
                securityService.addTransaction(transaction);
                User.Ballance = User.Ballance - sum;
                securityService.UpdateUser(User);
                myUser.Ballance = myUser.Ballance + sum;
                securityService.UpdateUser(myUser);
                transferResultMessage = "Transfer completed successfully!";
                return Index(User);
            }
            else
            {
                //fail
                transferResultMessage = "Insufficient funds!";
                return Index(User);
            }
        }
        catch
        {
            //fail
            transferResultMessage = "Amount is not a valid number!";
            return Index(User);
        }
    }
    else
    {
        //fail
        transferResultMessage = "Username does not exist!";
        return Index(User);
    }
}
```

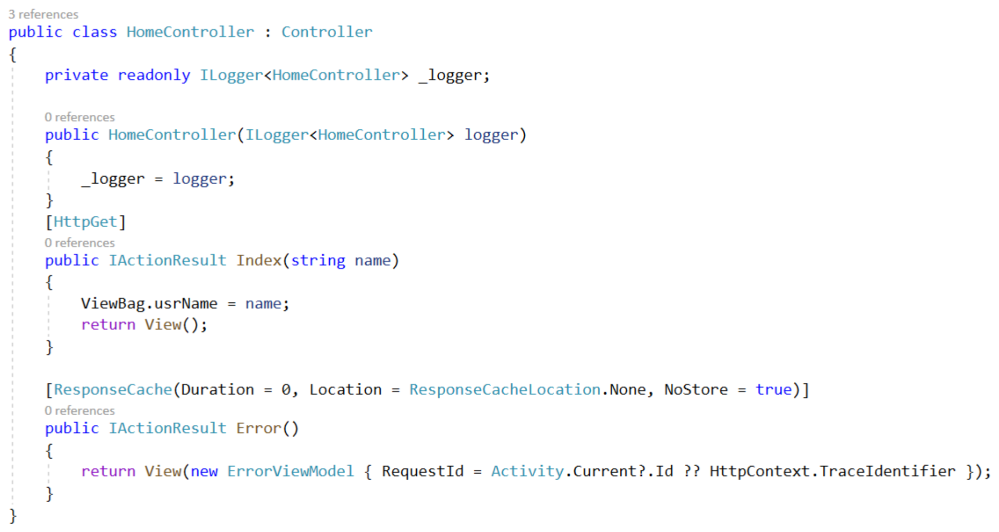


```
[HttpPost]
0 references
public IActionResult UpdateUserByPassword(string new_password, string old_password, UserModel currentUser)
{
    User = currentUser;
    SecurityService securityService = new SecurityService();
    if(old_password==null || old_password == "")
    {
        changePasswordResultMessage = "Old password required";
        return Index(User);
    }
    if (new_password == null || new_password == "")
    {
        changePasswordResultMessage = "New password required";
        return Index(User);
    }
    if (String.Equals(old_password, User.Password))
    {
        User= securityService.updateUserByPassword(User, new_password);
        changePasswordResultMessage = "Password updated successfully";
        return Index(User);
    }
    else changePasswordResultMessage = "Incorrect old password";
    return Index(User);
}
```



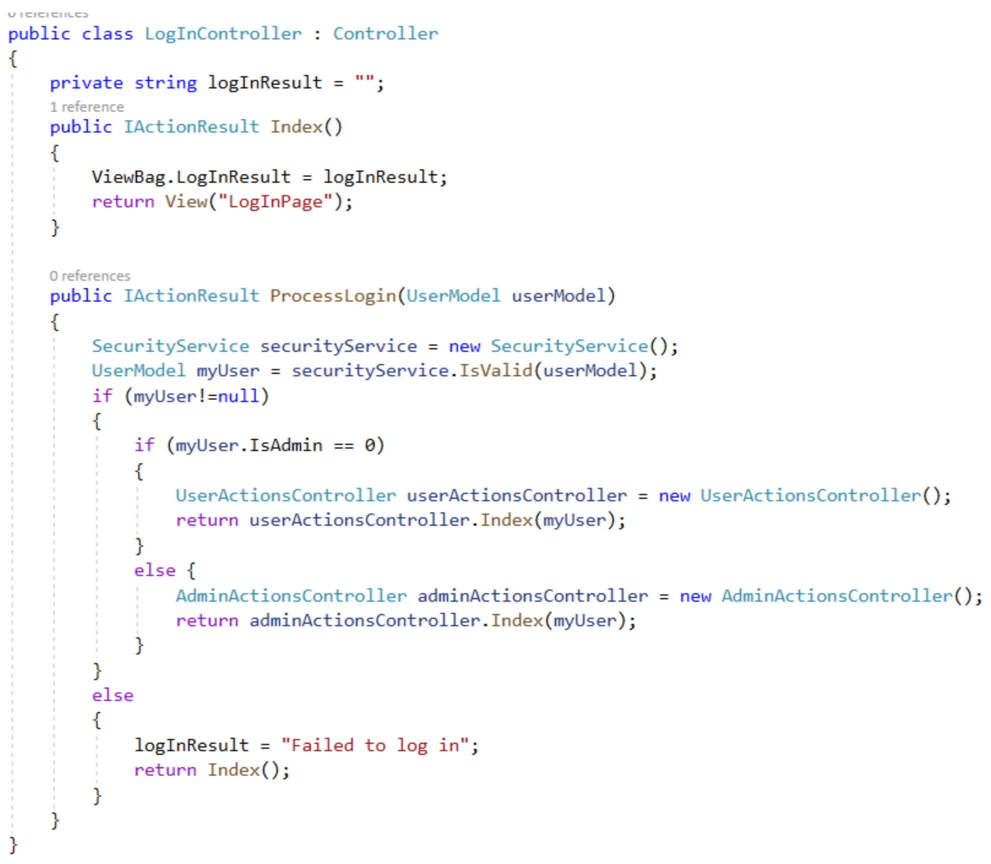
```
[HttpPost]
0 references
public IActionResult UpdateUsername(string new_username, UserModel currentUser)
{
    User = currentUser;
    SecurityService securityService = new SecurityService();
    if(new_username == null || new_username == "")
    {
        changeUsernameResultMessage = "Required";
        return Index(User);
    }
    UserModel existingUser = new UserModel();
    existingUser.UserName = new_username;
    existingUser = securityService.IsValidUsername(existingUser);
    if (existingUser != null)
    {
        changeUsernameResultMessage = "Username already exists";
        return Index(User);
    }

    User=securityService.updateUsername(User, new_username);
    if (User == null)
    {
        changeUsernameResultMessage = "Error";
        return Index(User);
    }
    changeUsernameResultMessage = "Username updates successfully";
    return Index(User);
}
```

6.3. HomeController class



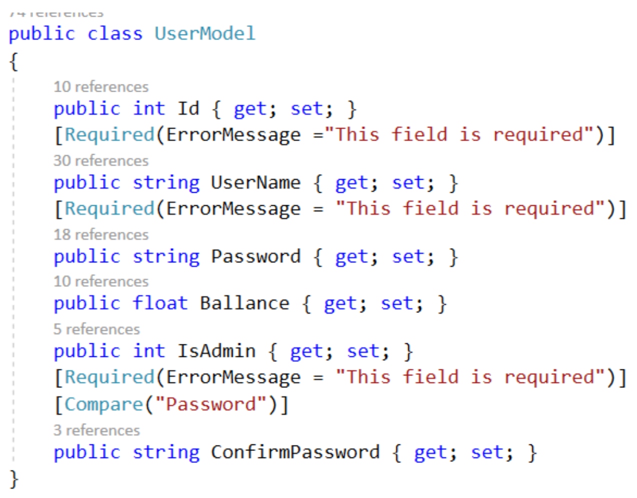
```
3 references
public class HomeController : Controller
{
    private readonly ILogger<HomeController> _logger;

    0 references
    public HomeController(ILogger<HomeController> logger)
    {
        _logger = logger;
    }
    [HttpGet]
    0 references
    public IActionResult Index(string name)
    {
        ViewBag.usrName = name;
        return View();
    }

    [ResponseCache(Duration = 0, Location = ResponseCacheLocation.None, NoStore = true)]
    0 references
    public IActionResult Error()
    {
        return View(new ErrorViewModel { RequestId = Activity.Current?.Id ?? HttpContext.TraceIdentifier });
    }
}
```

6.4. LogInController class



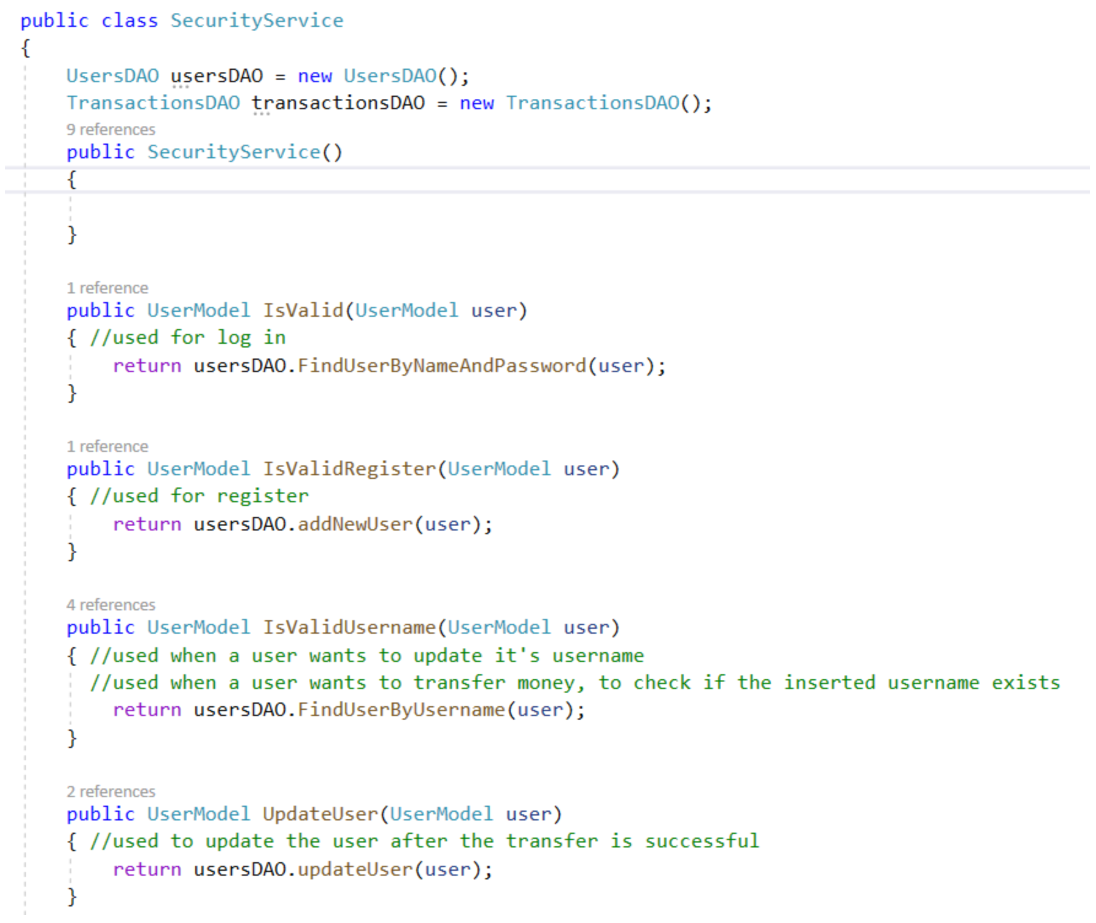
```
0 references
public class LogInController : Controller
{
    private string logInResult = "";
    1 reference
    public IActionResult Index()
    {
        ViewBag.LogInResult = logInResult;
        return View("LogInPage");
    }

    0 references
    public IActionResult ProcessLogin(UserModel userModel)
    {
        SecurityService securityService = new SecurityService();
        UserModel myUser = securityService.IsValid(userModel);
        if (myUser!=null)
        {
            if (myUser.IsAdmin == 0)
            {
                UserActionsController userActionsController = new UserActionsController();
                return userActionsController.Index(myUser);
            }
            else {
                AdminActionsController adminActionsController = new AdminActionsController();
                return adminActionsController.Index(myUser);
            }
        }
        else
        {
            logInResult = "Failed to log in";
            return Index();
        }
    }
}
```

6.5. UserModel class

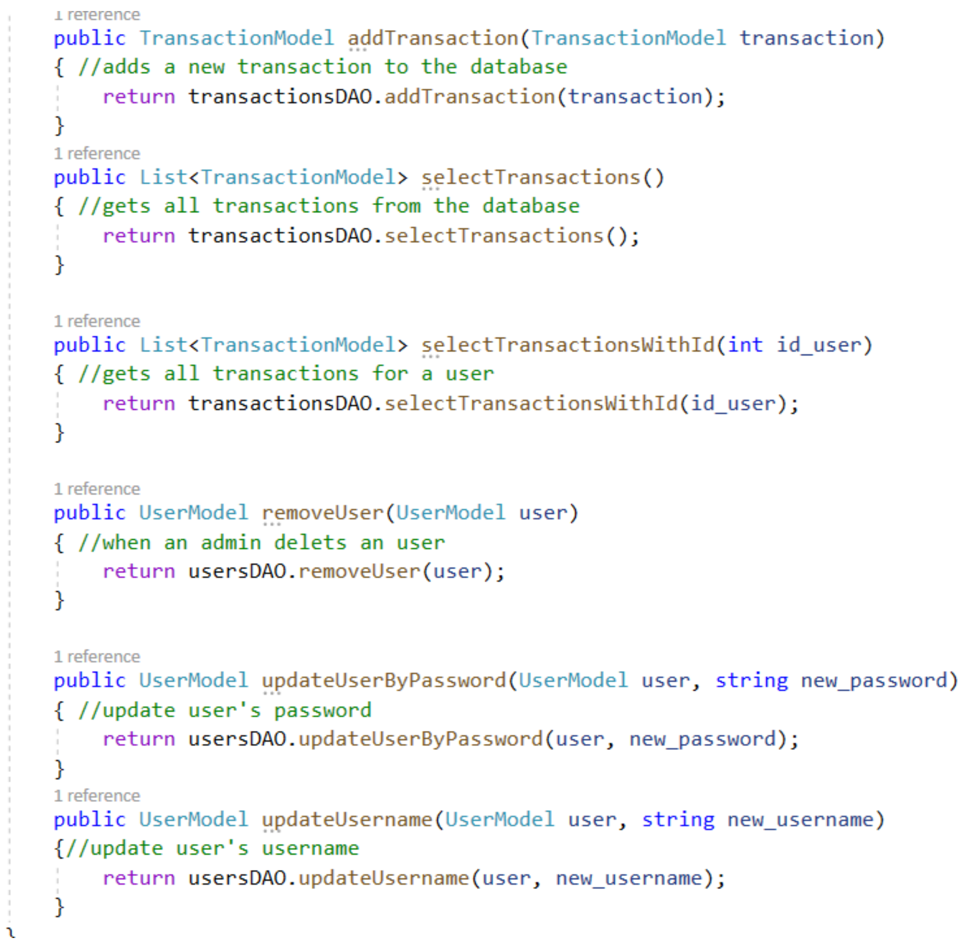


```
74 references
public class UserModel
{
    10 references
    public int Id { get; set; }
    [Required(ErrorMessage ="This field is required")]
    30 references
    public string UserName { get; set; }
    [Required(ErrorMessage = "This field is required")]
    18 references
    public string Password { get; set; }
    10 references
    public float Ballance { get; set; }
    5 references
    public int IsAdmin { get; set; }
    [Required(ErrorMessage = "This field is required")]
    [Compare("Password")]
    3 references
    public string ConfirmPassword { get; set; }
}
```

6.6. SecurityService class

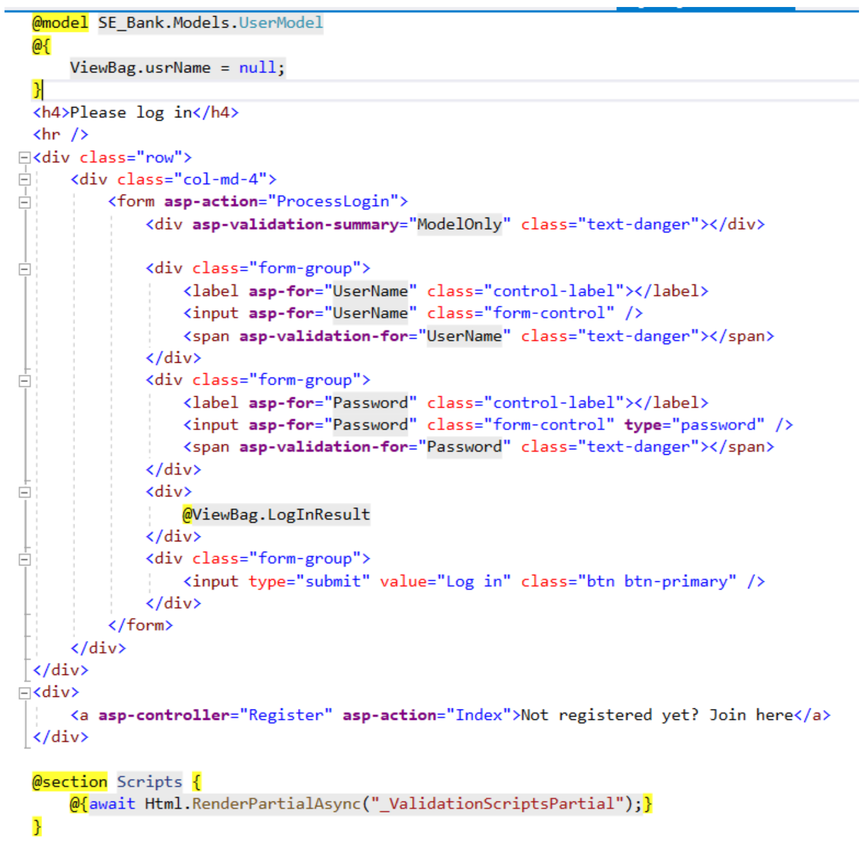


```
public class SecurityService
{
    UsersDAO usersDAO = new UsersDAO();
    TransactionsDAO transactionsDAO = new TransactionsDAO();
    9 references
    public SecurityService()
    {

    }

    1 reference
    public UserModel IsValid(UserModel user)
    { //used for log in
        return usersDAO.FindUserByNameAndPassword(user);
    }

    1 reference
    public UserModel IsValidRegister(UserModel user)
    { //used for register
        return usersDAO.addNewUser(user);
    }

    4 references
    public UserModel IsValidUsername(UserModel user)
    { //used when a user wants to update it's username
      //used when a user wants to transfer money, to check if the inserted username exists
        return usersDAO.FindUserByUsername(user);
    }

    2 references
    public UserModel UpdateUser(UserModel user)
    { //used to update the user after the transfer is successful
        return usersDAO.updateUser(user);
    }
```



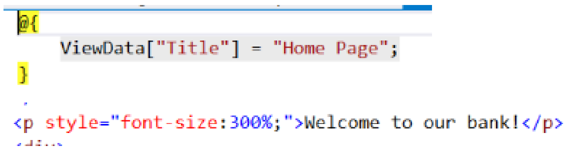
```
1 reference
public TransactionModel addTransaction(TransactionModel transaction)
{ //adds a new transaction to the database
    return transactionsDAO.addTransaction(transaction);
}
1 reference
public List<TransactionModel> selectTransactions()
{ //gets all transactions from the database
    return transactionsDAO.selectTransactions();
}

1 reference
public List<TransactionModel> selectTransactionsWithId(int id_user)
{ //gets all transactions for a user
    return transactionsDAO.selectTransactionsWithId(id_user);
}

1 reference
public UserModel removeUser(UserModel user)
{ //when an admin delets an user
    return usersDAO.removeUser(user);
}

1 reference
public UserModel updateUserByPassword(UserModel user, string new_password)
{ //update user's password
    return usersDAO.updateUserByPassword(user, new_password);
}
1 reference
public UserModel updateUsername(UserModel user, string new_username)
{//update user's username
    return usersDAO.updateUsername(user, new_username);
}
}
```

6.7. LogInPage page

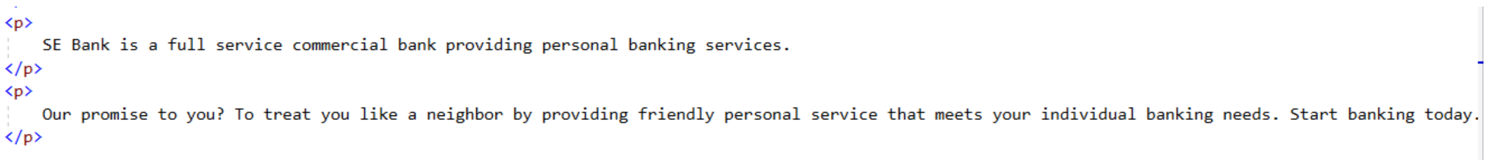


```
@model SE_Bank.Models.UserModel
@{
    ViewBag.usrName = null;
}
<h4>Please log in</h4>
<hr />
<div class="row">
    <div class="col-md-4">
        <form asp-action="ProcessLogin">
            <div asp-validation-summary="ModelOnly" class="text-danger"></div>

            <div class="form-group">
                <label asp-for="UserName" class="control-label"></label>
                <input asp-for="UserName" class="form-control" />
                <span asp-validation-for="UserName" class="text-danger"></span>
            </div>
            <div class="form-group">
                <label asp-for="Password" class="control-label"></label>
                <input asp-for="Password" class="form-control" type="password" />
                <span asp-validation-for="Password" class="text-danger"></span>
            </div>
            <div>
                @ViewBag.LogInResult
            </div>
            <div class="form-group">
                <input type="submit" value="Log in" class="btn btn-primary" />
            </div>
        </form>
    </div>
</div>
<div>
    <a asp-controller="Register" asp-action="Index">Not registered yet? Join here</a>
</div>

@section Scripts {
    @{await Html.RenderPartialAsync("_ValidationScriptsPartial");}
}
```

6.8. Index page (Home)

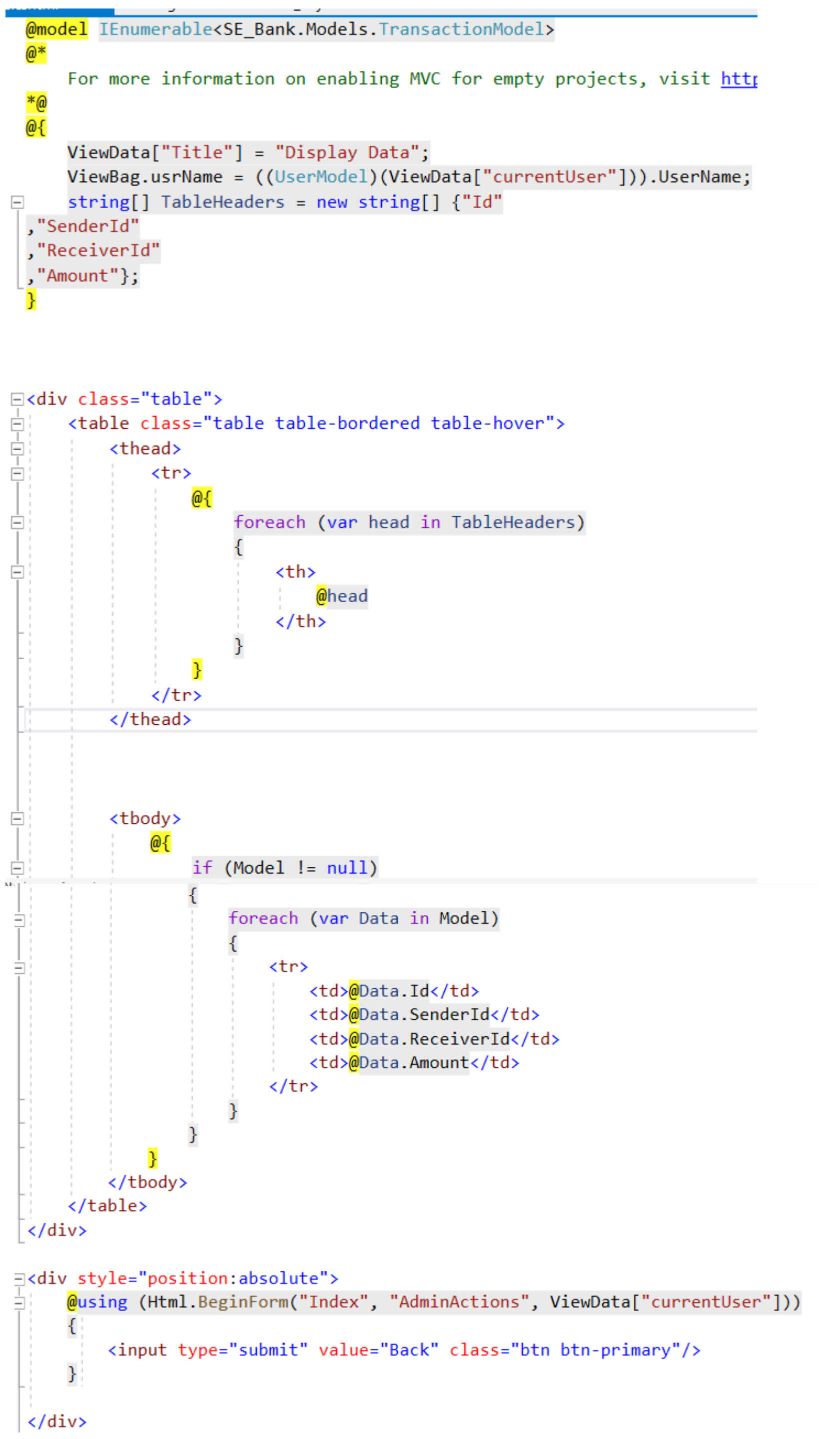


```
@{
    ViewData["Title"] = "Home Page";
}

<p style="font-size:300%;">Welcome to our bank!</p>
```



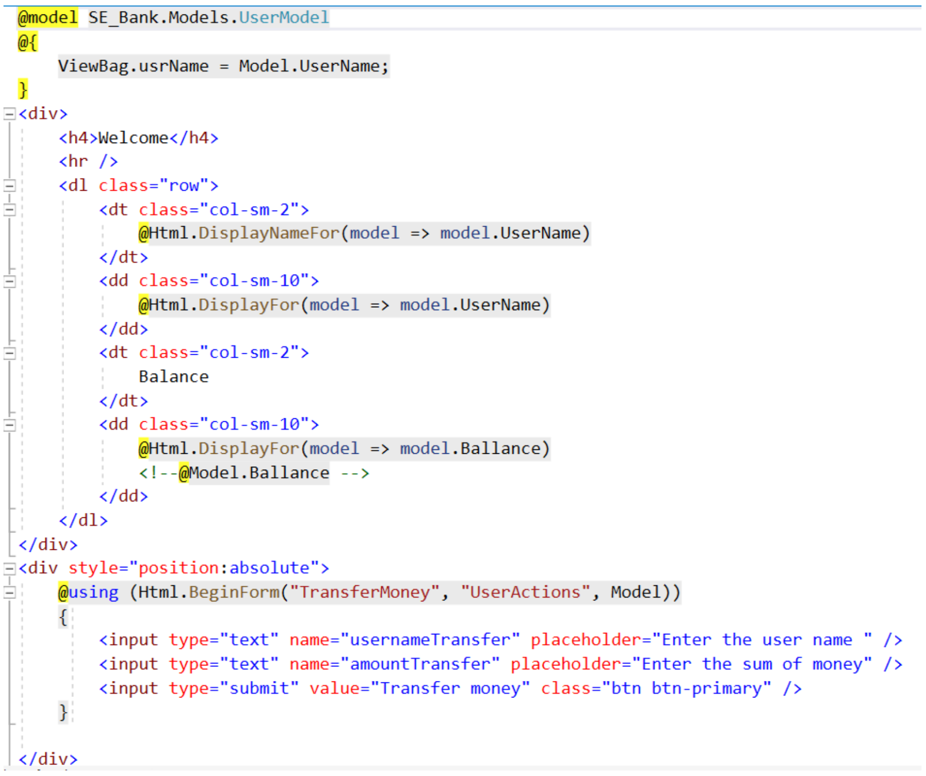
```
<p>
    SE Bank is a full service commercial bank providing personal banking services.
</p>
<p>
    Our promise to you? To treat you like a neighbor by providing friendly personal service that meets your individual banking needs. Start banking today.
</p>
```

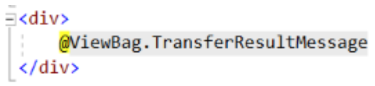
6.9. UserTransactions page

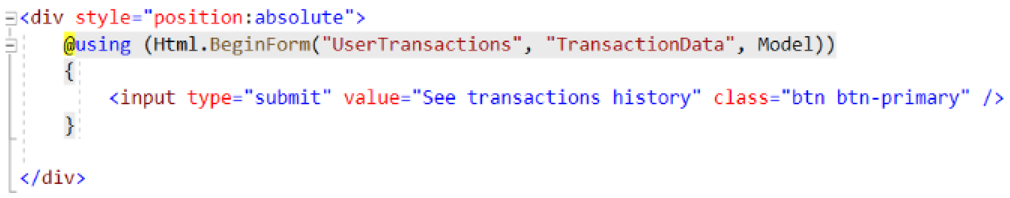


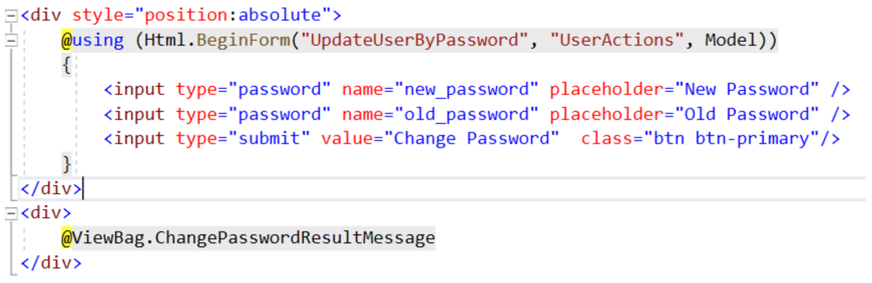
```
@model IEnumerable<SE_Bank.Models.TransactionModel>
@*
    For more information on enabling MVC for empty projects, visit http
*@
@{
    ViewData["Title"] = "Display Data";
    ViewBag.usrName = ((UserModel)(ViewData["currentUser"])).UserName;
    string[] TableHeaders = new string[] {"Id"
,"SenderId"
,"ReceiverId"
,"Amount"};
}


<div class="table">
    <table class="table table-bordered table-hover">
        <thead>
            <tr>
                @{
                    foreach (var head in TableHeaders)
                    {
                        <th>
                            @head
                        </th>
                    }
                }
            </tr>
        </thead>



        <tbody>
            @{
                if (Model != null)
                {
                    foreach (var Data in Model)
                    {
                        <tr>
                            <td>@Data.Id</td>
                            <td>@Data.SenderId</td>
                            <td>@Data.ReceiverId</td>
                            <td>@Data.Amount</td>
                        </tr>
                    }
                }
            }
        </tbody>
    </table>
</div>

<div style="position:absolute">
    @using (Html.BeginForm("Index", "AdminActions", ViewData["currentUser"]))
    {
        <input type="submit" value="Back" class="btn btn-primary"/>
    }

</div>
```

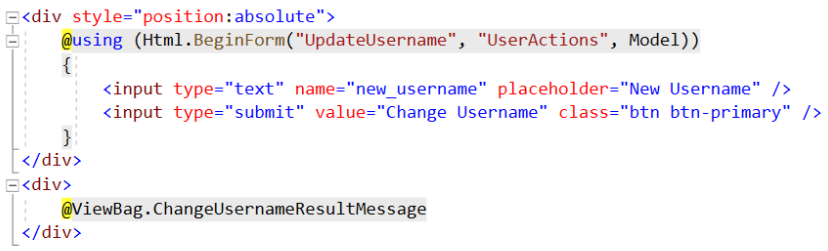
6.10. UserPage page


```
@model SE_Bank.Models.UserModel
@{
    ViewBag.usrName = Model.UserName;
}
<div>
    <h4>Welcome</h4>
    <hr />
    <dl class="row">
        <dt class="col-sm-2">
            @Html.DisplayNameFor(model => model.UserName)
        </dt>
        <dd class="col-sm-10">
            @Html.DisplayFor(model => model.UserName)
        </dd>
        <dt class="col-sm-2">
            Balance
        </dt>
        <dd class="col-sm-10">
            @Html.DisplayFor(model => model.Ballance)
            <!--@Model.Ballance -->
        </dd>
    </dl>
</div>
<div style="position:absolute">
    @using (Html.BeginForm("TransferMoney", "UserActions", Model))
    {
        <input type="text" name="usernameTransfer" placeholder="Enter the user name " />
        <input type="text" name="amountTransfer" placeholder="Enter the sum of money" />
        <input type="submit" value="Transfer money" class="btn btn-primary" />
    }

</div>
```

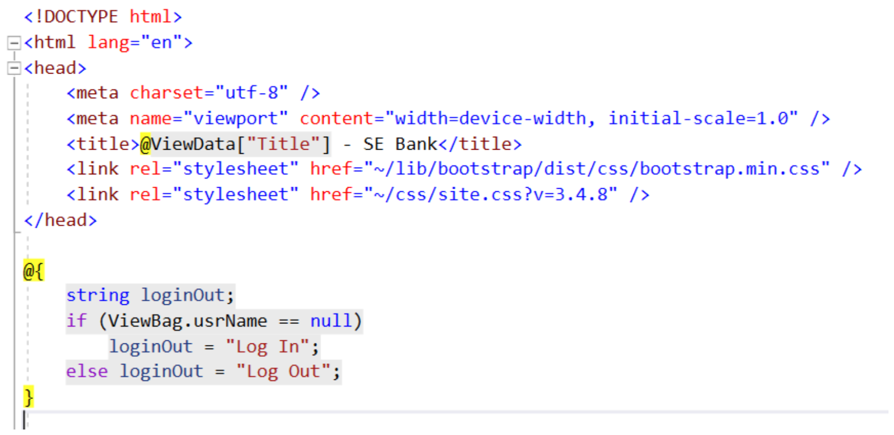

```
<div>
    @ViewBag.TransferResultMessage
</div>
```


```
<div style="position:absolute">
    @using (Html.BeginForm("UserTransactions", "TransactionData", Model))
    {
        <input type="submit" value="See transactions history" class="btn btn-primary" />
    }

</div>
```

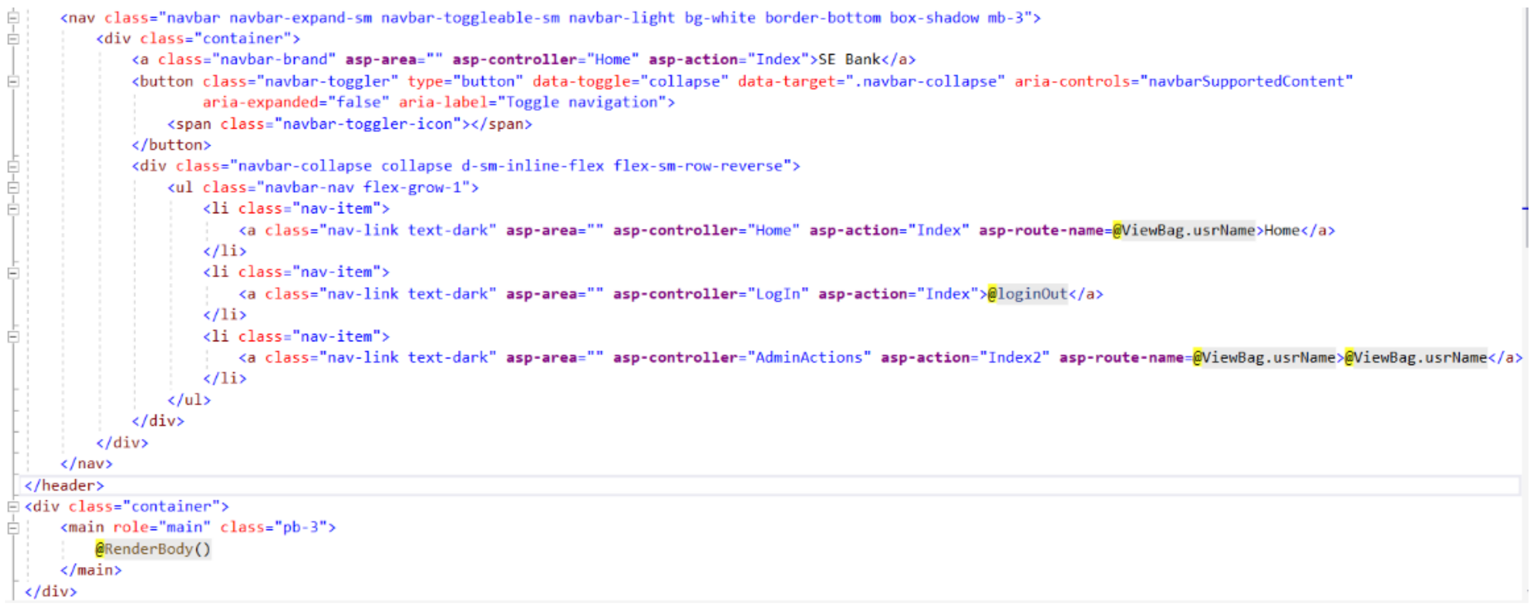

```
<div style="position:absolute">
    @using (Html.BeginForm("UpdateUserByPassword", "UserActions", Model))
    {
        <input type="password" name="new_password" placeholder="New Password" />
        <input type="password" name="old_password" placeholder="Old Password" />
        <input type="submit" value="Change Password"  class="btn btn-primary"/>
    }
</div>
<div>
    @ViewBag.ChangePasswordResultMessage
</div>
```


```
<div style="position:absolute">
    @using (Html.BeginForm("UpdateUsername", "UserActions", Model))
    {
        <input type="text" name="new_username" placeholder="New Username" />
        <input type="submit" value="Change Username" class="btn btn-primary" />
    }
</div>
<div>
    @ViewBag.ChangeUsernameResultMessage
</div>
```

6.11. _Layout page



```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="utf-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <title>@ViewData["Title"] - SE Bank</title>
    <link rel="stylesheet" href="~/lib/bootstrap/dist/css/bootstrap.min.css" />
    <link rel="stylesheet" href="~/css/site.css?v=3.4.8" />
</head>

@{
    string loginOut;
    if (ViewBag.usrName == null)
        loginOut = "Log In";
    else loginOut = "Log Out";
}
```



```
    <nav class="navbar navbar-expand-sm navbar-toggleable-sm navbar-light bg-white border-bottom box-shadow mb-3">
        <div class="container">
            <a class="navbar-brand" asp-area="" asp-controller="Home" asp-action="Index">SE Bank</a>
            <button class="navbar-toggler" type="button" data-toggle="collapse" data-target=".navbar-collapse" aria-controls="navbarSupportedContent"
                    aria-expanded="false" aria-label="Toggle navigation">
                <span class="navbar-toggler-icon"></span>
            </button>
            <div class="navbar-collapse collapse d-sm-inline-flex flex-sm-row-reverse">
                <ul class="navbar-nav flex-grow-1">
                    <li class="nav-item">
                        <a class="nav-link text-dark" asp-area="" asp-controller="Home" asp-action="Index" asp-route-name=@ViewBag.usrName>Home</a>
                    </li>
                    <li class="nav-item">
                        <a class="nav-link text-dark" asp-area="" asp-controller="LogIn" asp-action="Index">@loginOut</a>
                    </li>
                    <li class="nav-item">
                        <a class="nav-link text-dark" asp-area="" asp-controller="AdminActions" asp-action="Index2" asp-route-name=@ViewBag.usrName>@ViewBag.usrName</a>
                    </li>
                </ul>
            </div>
        </div>
    </nav>
</header>
<div class="container">
    <main role="main" class="pb-3">
        @RenderBody()
    </main>
</div>
```

7. References

1. https://www.youtube.com/watch?v=BfEjDD8mWYg
2. https://creately.com/blog/diagrams/deployment-diagram-tutorial/
3. https://www.youtube.com/watch?v=RPTpC1O87_Q
4. https://docs.microsoft.com/en-us/dotnet/api/system.string.length?view=net-6.0
5. https://docs.microsoft.com/en-us/dotnet/api/system.windows.forms.button?view=windowsdesktop-6.0
6. https://stackoverflow.com/questions/3081916/convert-int-to-string
7. https://stackoverflow.com/questions/16112982/how-to-use-the-varchar-data-type-in-c/16112990
8. https://stackoverflow.com/questions/9264835/how-to-align-an-input-tag-to-the-center-without-specifying-the-width
9. https://www.w3schools.com/tags/tag_center.asp
10. https://www.quackit.com/css/css_color_codes.cfm
11. https://css-tricks.com/strategies-for-cache-busting-css/
12. https://stackoverflow.com/questions/21351004/css-body-background-image-doesnt-work
13. https://docs.microsoft.com/en-us/aspnet/core/mvc/views/razor?view=aspnetcore-6.0