Role-Based Product Management System in ASP.NET Core MVC

Submitted by: Rajesh Kethireddy
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1. Introduction

This project demonstrates a **Role-Based Product Management System** using **ASP.NET Core MVC**. The system allows users to manage products with **role-based access control**.

- **Admin:** Can create, edit, and delete products.
- **Manager:** Can view and edit products, but cannot delete them.

Security features implemented:

- Secure user registration and login using **ASP.NET Identity**.
- Password policies enforcing minimum length, uppercase, and special characters.
- Role-based authorization for product management.
- HTTPS for secure data transmission.
- CSRF protection using **AntiForgeryToken**.
- Data protection for sensitive information like product prices.

2. Project Architecture

The project follows a **MVC architecture**:

1. **Models:** Contains Product and ViewModels for Login and Register.
2. **Views:** Razor pages for login, registration, product list, create, and edit.
3. **Controllers:**
   - AccountController: Handles login, registration, logout.
   - ProductController: Handles CRUD operations on products with role-based access.
4. **Data:**
   - ApplicationDbContext (Entity Framework Core) connects to **SQL Server**.
5. **Security:**
   - ASP.NET Identity for authentication and role management.
   - Role-based authorization using [Authorize(Roles = "Admin,Manager")].

3. Packages Required

To run this project, install the following NuGet packages:

- Microsoft.AspNetCore.Identity.EntityFrameworkCore
- Microsoft.EntityFrameworkCore.SqlServer
- Microsoft.EntityFrameworkCore.Tools
- Microsoft.AspNetCore.Authentication.Cookies

5. Views

5.1 Login Page

- Secure login using ASP.NET Identity.
- Input fields with validation and placeholders.
- Styled with modern card design.

5.2 Register Page

- Registration allows assigning roles: Admin or Manager.
- Password policies enforced.
- Styled similarly to login page.

5.3 Product List Page

- Lists all products in a table with actions: Edit/Delete.
- Admin can create, edit, delete products.
- Manager can edit only.
- Action buttons dynamically shown based on role.

5.4 Create Product Page

- Accessible only to Admin.
- Form to add a new product with name and price.

5.5 Edit Product Page

- Accessible to both Admin and Manager.

- Allows updating product name and price.

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6. Security Implementation

- **Role-Based Authorization:** [Authorize(Roles = "Admin")] and [Authorize(Roles = "Manager,Admin")].
- **CSRF Protection:** @Html.AntiForgeryToken() used in forms.
- **HTTPS:** Project configured to run with HTTPS.
- **Data Protection:** Sensitive data like price stored securely.

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7. Sample Input and Output

User Registration:

Username	Password	Role
admin	Admin@123	Admin
manager1	Manager@123	Manager

Product Operations:

1. **Admin creates product:**
    - Product Name: Laptop
    - Price: $1200
    - Output: Product "Laptop" has been successfully created!
2. **Manager edits product:**
    - Updates price to $1100
    - Output: Product "Laptop" has been successfully updated!
3. **Manager tries to delete product:**
    - Output: Access Denied: You do not have permission to delete products.

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8. How to Run the Project

1. Open **Visual Studio** or **VS Code**.
2. Clone or copy the project folder.
3. Restore NuGet packages:

```
dotnet restore
```

4. Ensure the SQL Server is running and the connection string points to your server.

6. Run the project:

```
dotnet run
```

7. Open browser and navigate to:

https://localhost:5001

8. Register users, then login to access product management features.

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9. Conclusion

This project successfully demonstrates:

- Role-based access control in **ASP.NET Core MVC**.
- Secure authentication and authorization.
- CRUD operations on products with proper role restrictions.
- Modern UI design using Bootstrap.
- Implementation of security best practices like HTTPS, CSRF protection, and password policies.

End of Report
