Project Documentation

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1. Project Goals & Objectives

Overview

- This project aims to develop a basic management system that enables users to efficiently manage data related to various core entities of the application.
- The application should support full CRUD operations, session and role-based access control, input validation, and filtering across all functional modules.
- Role-based access will determine what actions can be performed by different types of users (e.g., admin, manager, staff, customer).
- The backend will be developed using ASP.NET Core Web API to handle all business logic and data operations securely.

Example for an Online Bookstore Management System:

- This project aims to develop an Online Bookstore Management System to manage books, authors, categories, customers, and orders efficiently.
- The system will include complete CRUD operations, user authentication, role-based access control, and input validation across all modules.
- Different user roles such as **Admin**, **Customer**, and **Staff** will have different access levels—ensuring only authorized actions are allowed per user type.
- All backend operations will be handled through a secure ASP.NET Core Web API.

Goals

- **Design a Normalized Database Structure:**
  - Create normalized tables for core entities.
  - Establish one-to-many and many-to-many relationships where needed, including a structure for storing user roles and permissions.
- **Implement CRUD & Authentication Functionality:**
  - Develop Create, Read, Update, and Delete operations for all major modules via Web API.
  - Implement secure user authentication (login, logout, registration) and role-based access controls.
- **Ensure Data Integrity and Validation:**
  - Apply validations for all required fields and enforce consistency in the database.
  - Prevent unauthorized data changes through access checks based on user roles.
- **Develop an Intuitive User Interface:**
  - Build a user-friendly frontend that adapts visibility and accessibility of features based on user roles.
  - Enable role-specific dashboards and menu options.
- **Encourage Good Software Development Practices:**
  - Apply clean coding principles, separation of concerns, and RESTful API conventions.
  - Structure the codebase to support scalability, maintainability, and secure role-based logic.

Example for an Online Bookstore Management System:

- **Design a Normalized Database Structure:**
  - Create normalized tables for books, authors, categories, customers, orders, and reviews.

- Implement many-to-many relationships (e.g., books ↔ authors) and one-to-many (e.g., category → books), including role and user mapping tables.

- **Implement CRUD & Authentication Functionality:**
  - Use ASP.NET Core Web API to implement CRUD for all modules (Books, Categories, Orders, etc.).
  - Authenticate users with login, registration, and logout features.
  - Control access based on roles (e.g., only Admins can manage books; Customers can view and place orders).
- **Ensure Data Integrity and Validation:**
  - Validate inputs like ISBN, email, price, and quantity on both frontend and backend.
  - Prevent unauthorized data operations by enforcing role-based restrictions on APIs.
- **Develop an Intuitive User Interface:**
  - Design a user-friendly frontend that changes dynamically based on the logged-in user's role.
  - Admins see full management tools; customers see product listings, order history, and checkout pages.
- **Encourage Good Software Development Practices:**
  - Implement RESTful API design, modular coding, and layered architecture.
  - Use role-based middleware and services to maintain clean separation of concerns.

Objectives

- **Entity Management:**
  - Enable users to create, view, update, and delete records for all major entities involved in the system.
  - Capture both essential and additional information as required for each entity.
- **Category/Group Management:**
  - Manage groupings or classifications and associate them with primary entities.
  - Access permissions to modify these should be role-restricted (e.g., only admin).
- **User Registration and Record Management:**
  - Enable registration, profile updates, and logical deletion of user-related records.
  - Only authorized roles should access or modify sensitive user data.
- **Scheduling or Transaction Handling:**
  - Allow scheduling or transactional processes to be created and managed based on role (e.g., customer books, admin approves).
  - Role filters should determine who can view, edit, or cancel a transaction.
- **Entity Relationship Mapping:**
  - Maintain complex mappings (e.g., many-to-many) between core entities with update permissions restricted by role.
- **Data Integrity and Validation:**
  - Validate user input on both client and server sides.
  - Use role-based restrictions to prevent unauthorized data tampering.

Example for an Online Bookstore Management System:

- **Book Management:**
  - Admins can add, update, view, or delete books, including metadata like title, author, category, price, and stock.
  - Customers and Staff can only view book details based on role permissions.

- **Author and Category Management:**
    - Admins manage categories and authors.
    - Books can be associated with multiple authors and one category using relationship tables.
- **Customer Registration and Profile Management:**
    - New customers can register, update their profile, and view their personal order history.
    - Only Admins can view all customer data..
- **Order Placement and Tracking:**
    - Customers can place, update, or cancel their own orders.
    - Staff can view all orders for processing, and Admins can update order statuses.
- **Book-Author Association:**
    - Admins manage many-to-many relationships between books and authors.
    - Only authorized roles can add or remove these associations.
- **Data Integrity and Validation:**
    - Validate formats like ISBN, email, and phone.
    - Use role-based checks to avoid privilege misuse (e.g., a customer trying to modify stock levels).

2. Scope of the Project

- **Entity and Category Management**
    - Users with admin or manager roles can create, update, or delete records.
    - Category/group tagging should be managed by privileged users only.
    - Mapping relationships between entities should respect role permissions.
- **User or Record Management**
    - Basic users can view or update their own records.
    - Admin-level users can view, approve, or deactivate other users and perform soft deletes.
- **Transaction or Event Scheduling**
    - Regular users can create or request transactions (e.g., bookings, orders).
    - Admin or staff can confirm, reschedule, or cancel based on permissions.
    - Role restrictions should govern visibility of event details and access to actions.
- **Dashboard and Summary Views**
    - Dashboard content will differ by role (e.g., admin sees full analytics, user sees personal activity).
    - Summary cards and filters must only show data that the role has permission to access.
- **Input Validation and Error Handling**
    - All roles should experience consistent and helpful feedback for invalid inputs.
    - Unauthorized actions must trigger proper role-based error messages and redirections.

Example for an Online Bookstore Management System:

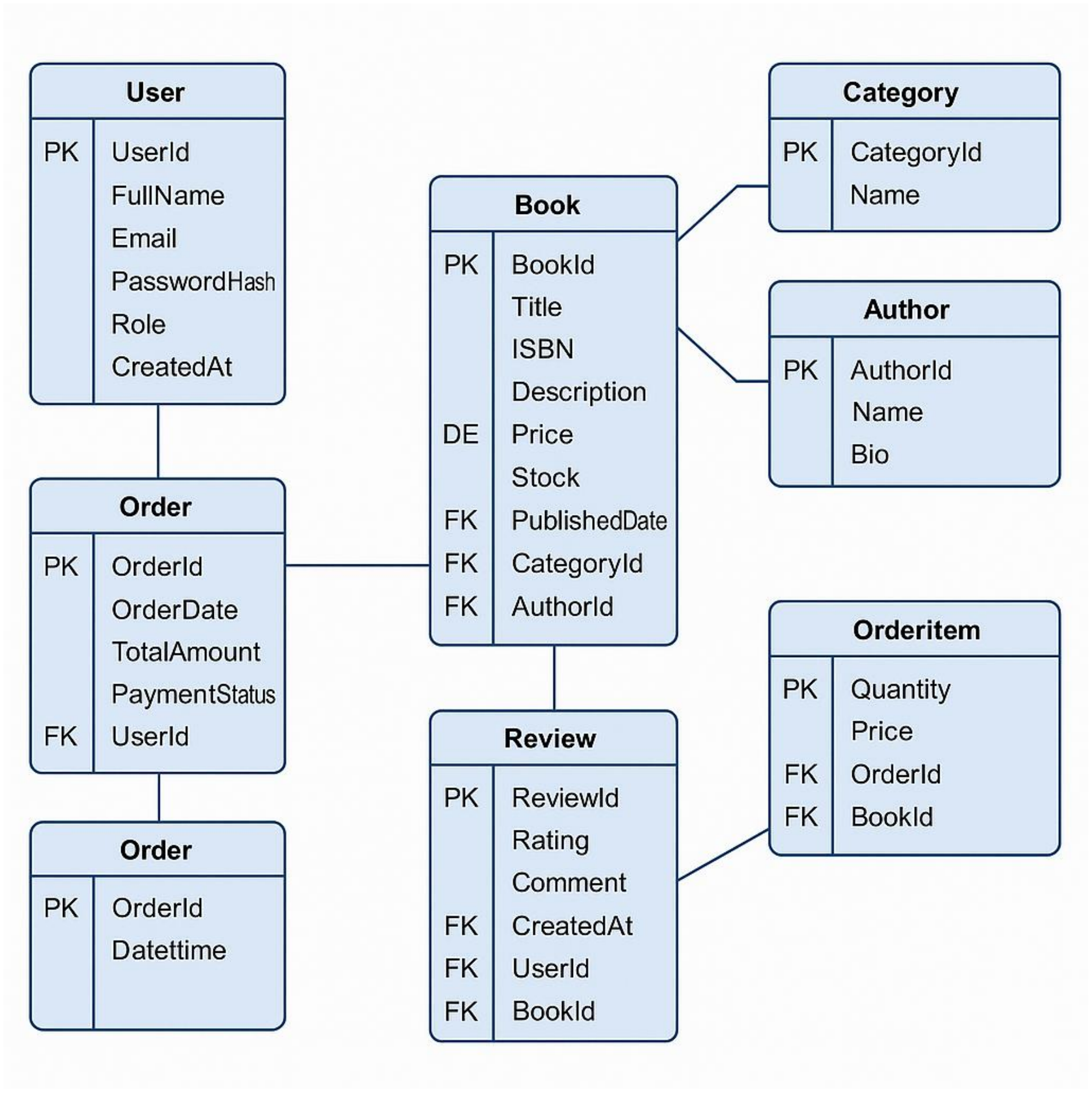
- **Book and Category Management**
    - Admins can add, update, or delete books, categories, and author profiles.
    - Customers can view books and filter by category or author.
    - Staff may have read-only access to books for stock review purposes
- **Customer and Order Management**
    - Customers can manage their personal profiles and view their orders.
    - Staff can view all orders to handle dispatching.

- Admins have full control over all users and order records
- **Order Scheduling and Processing**
  - Customers place and manage orders.
  - Staff updates order status to "Packed", "Dispatched", or "Delivered".
  - Admin can override or cancel orders if required
- **Dashboard and Reports**
  - Admins see analytics like sales reports, top-selling books, and user metrics.
  - Staff sees pending orders and stock alerts.
  - Customers see their latest orders and recommendations.
- **Input Validation and Error Handling**
  - All roles experience user-friendly validation feedback.
  - Unauthorized actions return role-specific error messages (e.g., "Admin access required" or "Permission denied").

3. Project Timeline

Week No.	Week Date	Task List
1	16/06/2025 - 22/06/2025	Requirement Gathering, Project Scope, and Feasibility Analysis
2	23/06/2025 - 29/06/2025	Design Database Schema, Create EF Core Models, Define Entities & Relationships
3	30/06/2025 - 06/07/2025	Set up Web API Project, Configure EF Core with Database, Scaffold Basic CRUD for Main Module
4	07/07/2025 - 13/07/2025	Implement CRUD APIs for Additional Modules/Tables
5	14/07/2025 - 20/07/2025	Add Validation, Data Annotations, Business Logic Layer
6	21/07/2025 - 27/07/2025	Implement JWT Authentication and Authorization
7	28/07/2025 - 03/08/2025	Implement Role-Based Access Control in APIs
8	04/08/2025 - 10/08/2025	Add Advanced API Features: Filtering, Sorting, Pagination
9	11/08/2025 - 17/08/2025	Consume Web API in Client Application — Part 1 (Setup, Basic Data Retrieval, Display)
10	18/08/2025 - 24/08/2025	Consume Web API in Client Application — Part 2 (Role-Based UI, Secure Calls with JWT, Error Handling)
11	25/08/2025 - 31/08/2025	Implement Extra Functionalities (Logging, Caching, Notifications, Export Data, etc.)
12	01/09/2025 - 07/09/2025	Evaluation

Sample ER Diagram for Online Bookstore Management System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