**Task: E-Commerce Website MVC Project Documentation**

**Project Overview**

This project is an e-commerce web application that allows users to browse, search, and purchase products online. The application uses the MVC architectural pattern to ensure separation of concerns, scalability, and maintainability.

**Functional Requirements**

1. User Management
   * **Sign Up**: Users can register by providing a username, email, and password.
   * **Login/Logout**: Users can log in using their credentials and log out securely.
   * **Profile Management**: Users can view and update their profile information.
   * **Address Management**: Users can add, update, and delete delivery addresses.
2. Product Management
   * **Product Listing**: Display a list of available products with details.
   * **Product Search and Filter**: Users can search for products by name, category, or other criteria and apply filters.
   * **Product Details**: Users can view detailed information about a specific product.
3. Shopping Cart
   * **Add to Cart**: Users can add products to their shopping cart.
   * **View Cart**: Users can view the contents of their cart, update quantities, and remove items.
   * **Checkout**: Users can proceed to checkout, review their order, and enter payment details.
4. Order Management
   * **Order Placement**: Users can place an order after checkout.
   * **Order History**: Users can view their past orders and order details.
   * **Order Tracking**: Users can track the status of their orders.
5. Admin Management
   * **Product Management**: Admin users can add, update, or delete products.
   * **Order Management**: Admin users can view, update, and manage orders.
   * **User Management**: Admin users can manage user accounts and permissions.

**Database Structure**

1. **Users Table**
   * **user\_id** (Primary Key, Integer, Auto Increment)
   * **username** (VARCHAR)
   * **email** (VARCHAR)
   * **password\_hash** (VARCHAR)
   * **created\_at** (DATETIME)
   * **updated\_at** (DATETIME)
2. **Products Table**
   * **product\_id** (Primary Key, Integer, Auto Increment)
   * **name** (VARCHAR)
   * **description** (TEXT)
   * **price** (DECIMAL)
   * **stock\_quantity** (INTEGER)
   * **category\_id** (Foreign Key, References **category\_id**)
   * **created\_at** (DATETIME)
   * **updated\_at** (DATETIME)
3. **Categories Table**
   * **category\_id** (Primary Key, Integer, Auto Increment)
   * **name** (VARCHAR)
   * **description** (TEXT)
   * **created\_at** (DATETIME)
   * **updated\_at** (DATETIME)
4. **Cart Table**
   * **cart\_id** (Primary Key, Integer, Auto Increment)
   * **user\_id** (Foreign Key, References **user\_id**)
   * **created\_at** (DATETIME)
5. **Cart\_Items Table**
   * **cart\_item\_id** (Primary Key, Integer, Auto Increment)
   * **cart\_id** (Foreign Key, References **cart\_id**)
   * **product\_id** (Foreign Key, References **product\_id**)
   * **quantity** (INTEGER)
   * **created\_at** (DATETIME)
   * **updated\_at** (DATETIME)
6. **Orders Table**
   * **order\_id** (Primary Key, Integer, Auto Increment)
   * **user\_id** (Foreign Key, References **user\_id**)
   * **total\_price** (DECIMAL)
   * **status** (VARCHAR)
   * **created\_at** (DATETIME)
   * **updated\_at** (DATETIME)
7. **Order\_Items Table**
   * **order\_item\_id** (Primary Key, Integer, Auto Increment)
   * **order\_id** (Foreign Key, References **order\_id**)
   * **product\_id** (Foreign Key, References **product\_id**)
   * **quantity** (INTEGER)
   * **price** (DECIMAL)
   * **created\_at** (DATETIME)

**Workflow**

1. **User Registration and Login**
   * Users register and log in to the application.
   * Authentication is managed using secure password hashing.
2. **Browsing and Searching Products**
   * Users browse the list of products and use the search and filter functionality to find specific items.
3. **Shopping Cart Management**
   * Users add products to their cart, review cart contents, and update quantities as needed.
4. **Checkout and Order Placement**
   * Users proceed to checkout, review their order details, enter payment information, and place the order.
5. **Order Management and Tracking**
   * Users view their order history and track the status of their orders.
   * Admin users manage and update orders as necessary.
6. **Admin Product and User Management**
   * Admin users add, update, or delete products and manage user accounts and permissions.