**Project Planning Report**

**The SynVilla**

**Project Overview**

The SynVilla is an e-commerce platform designed to sell furniture, doors, windows, and other wooden items for home decoration. The website will feature a user-friendly interface, allowing customers to browse products, read reviews, and make purchases seamlessly.

**Key Features**

1. Product Catalog with Filters
2. Product Details and Reviews
3. Add to Cart and Checkout
4. Order History
5. Customer Profile
6. Admin Page

**Processes and Backend Routes**

**1. User Authentication**

* Routes:
  + POST /api/auth/register - Register a new user
  + POST /api/auth/login - User login
  + GET /api/auth/logout - User logout
  + GET /api/auth/profile - Get user profile
  + PUT /api/auth/profile - Update user profile
* Possible Errors:
  + User already exists
  + Invalid credentials
  + Profile not found

**2. Product Management**

* Routes:
  + GET /api/products - Get all products (with filters)
  + GET /api/products/:id - Get product details
  + POST /api/products - Add a new product (Admin only)
  + PUT /api/products/:id - Update product details (Admin only)
  + DELETE /api/products/:id - Delete a product (Admin only)
* Possible Errors:
  + Product not found
  + Invalid product data

**3. Cart Management**

* Routes:
  + GET /api/cart - Get current user's cart
  + POST /api/cart - Add item to cart
  + PUT /api/cart/:id - Update item quantity in cart
  + DELETE /api/cart/:id - Remove item from cart
* Possible Errors:
  + Item not found in cart
  + Invalid cart data

**4. Checkout and Order Management**

* Routes:
  + POST /api/checkout - Process checkout
  + GET /api/orders - Get order history
  + GET /api/orders/:id - Get order details
* Possible Errors:
  + Checkout failed
  + Order not found

**5. Reviews Management**

* Routes:
  + POST /api/products/:id/reviews - Add a review for a product
  + GET /api/products/:id/reviews - Get reviews for a product
* Possible Errors:
  + Product not found
  + Invalid review data

**6. Admin Management**

* Routes:
  + GET /api/admin/products - Get all products (Admin)
  + GET /api/admin/orders - Get all orders (Admin)
  + GET /api/admin/users - Get all users (Admin)
* Possible Errors:
  + Unauthorized access

**Status Codes**

**1. User Authentication**

* **201 Created** → When a user registers successfully.
* **200 OK** → When login, logout, profile retrieval, or profile update is successful.
* **400 Bad Request** → When required fields are missing (e.g., username, email, password).
* **401 Unauthorized** → When login credentials are incorrect or token is missing.
* **404 Not Found** → When a requested user profile does not exist.
* **500 Internal Server Error** → When unexpected errors occur (e.g., database issues).

**2. Product Management**

* **200 OK** → When retrieving product details or fetching all products successfully.
* **201 Created** → When a new product is added successfully (Admin only).
* **204 No Content** → When a product is updated or deleted successfully.
* **400 Bad Request** → When product data is invalid (e.g., missing required fields).
* **404 Not Found** → When the requested product does not exist.
* **500 Internal Server Error** → When there’s a server-related issue.

**3. Cart Management**

* **200 OK** → When fetching cart details successfully.
* **201 Created** → When an item is successfully added to the cart.
* **204 No Content** → When an item is updated or removed successfully.
* **400 Bad Request** → When invalid data is provided (e.g., negative quantity).
* **404 Not Found** → When the requested cart item does not exist.
* **500 Internal Server Error** → When something goes wrong on the server side.

**4. Checkout and Order Management**

* **201 Created** → When an order is placed successfully.
* **200 OK** → When fetching order history or order details.
* **400 Bad Request** → When checkout fails due to invalid details.
* **404 Not Found** → When the requested order does not exist.
* **500 Internal Server Error** → When unexpected errors occur during checkout.

**5. Reviews Management**

* **201 Created** → When a review is successfully added.
* **200 OK** → When retrieving product reviews.
* **400 Bad Request** → When invalid review data is provided (e.g., missing rating).
* **404 Not Found** → When the product being reviewed does not exist.
* **500 Internal Server Error** → When there is a server error while fetching or posting a review.

**6. Admin Management**

* **200 OK** → When fetching all products, orders, or users as an admin.
* **403 Forbidden** → When a non-admin user tries to access admin routes.
* **404 Not Found** → When requested data (product, order, or user) does not exist.
* **500 Internal Server Error** → When unexpected issues arise on the server side.

**Database models:**

1. **User Model**
   * Stores user information.
   * Fields:
     + username: Unique and required string.
     + email: Unique and required string.
     + password: Required string.
     + profile: Embedded object containing firstName, lastName, address, and phone.
     + role: Default is "customer" (can be "admin" or "customer").
     + createdAt: Timestamp when the user was created.
2. **Product Model**
   * Stores product details.
   * Fields:
     + name: Required string.
     + description: Required string.
     + price: Required number.
     + category: Required string.
     + stock: Required number indicating available quantity.
     + images: Array of image URLs.
     + reviews: Array of review references linked to the Review model.
     + createdAt: Timestamp when the product was added.
3. **Review Model**
   * Stores user reviews for products.
   * Fields:
     + productId: Reference to the Product model.
     + userId: Reference to the User model.
     + rating: Number between 1 and 5 (required).
     + comment: Optional text.
     + createdAt: Timestamp when the review was created.
4. **Cart Model**
   * Stores user cart information.
   * Fields:
     + userId: Reference to the User model.
     + items: Array containing:
       - productId: Reference to the Product model.
       - quantity: Minimum 1, required number.
     + createdAt: Timestamp when the cart was created.
5. **Order Model**
   * Stores order details.
   * Fields:
     + userId: Reference to the User model.
     + items: Array containing:
       - productId: Reference to the Product model.
       - quantity: Minimum 1, required number.
     + totalAmount: Required number representing the order’s total cost.
     + status: Default is "pending" (can be "pending", "completed", or "canceled").
     + createdAt: Timestamp when the order was placed.

**Front End Pages**

**1. Authentication Pages**

* **Register Page** → /register
  + Allows new users to sign up.
* **Login Page** → /login
  + Allows users to log in.
* **Logout** → No specific page, handled via API call.

**2. Home & Product Pages**

* **Home Page** → /
  + Displays featured products, categories, and banners.
* **Product Listing Page** → /products
  + Shows all products with filters for categories, price, and ratings.
* **Product Details Page** → /products/:id
  + Displays details of a specific product with reviews.

**3. Cart & Checkout Pages**

* **Cart Page** → /cart
  + Shows items in the user's cart with options to update or remove them.
* **Checkout Page** → /checkout
  + Allows users to enter shipping details and place orders.
* **Order Confirmation Page** → /order-confirmation
  + Displays order success message after a successful purchase.

**4. User Profile & Orders**

* **User Profile Page** → /profile
  + Allows users to update their profile information.
* **Order History Page** → /orders
  + Displays a list of past orders.
* **Order Details Page** → /orders/:id
  + Shows details of a specific order.

**5. Reviews Page**

* **Product Reviews Page** → /products/:id/reviews
  + Displays user reviews and allows customers to add reviews.

**6. Admin Panel (Restricted to Admin Users)**

* **Admin Dashboard** → /admin
  + Overview of store performance.
* **Manage Products** → /admin/products
  + Allows admins to add, update, or delete products.
* **Manage Orders** → /admin/orders
  + Displays all customer orders with status updates.
* **Manage Users** → /admin/users
  + Shows a list of registered users.

**7. Miscellaneous Pages**

* **About Us Page** → /about
  + Provides information about the company.
* **Contact Us Page** → /contact
  + Displays contact details and a form to reach out.
* **404 Page (Not Found)** → \*
  + Displays when a user tries to access an invalid route.