**SOFTWARE REQUIREMENT SPECIFICATION FOR**

**E-COMMERCE APPLICATION**

**Requirement Analysis:**

1. **User Authentication and Authorization**

**Description**: Users should be able to register, login, and logout securely.

* **Functional Requirements:**
* Registration: Users can create an account with email/password or social media authentication.
* Login: Users should be able to log in securely using their credentials.
* Logout: Users can securely log out of their accounts.
* **Non-functional Requirements:**
* Security: Implement secure authentication mechanisms like bcrypt for password hashing.
* Privacy: Ensure user data privacy and compliance with relevant regulations

1. **Product Browsing and Searching**

**Description**: Users should be able to browse and search for products easily.

* **Functional Requirements:**
  + Product Categories: Products should be organized into categories for easy navigation.
  + Search: Implement a search functionality allowing users to find products by name, category, or attributes.
  + Filtering: Allow users to filter search results based on various criteria (e.g., price, brand).
* **Non-functional Requirements:**
  + Performance: Ensure fast and responsive browsing and searching, minimizing server-side processing time.
  + Accessibility: Design the browsing and search interfaces to be accessible to users with disabilities.

1. **Shopping Cart Management**

**Description**: Users should be able to add/remove products to/from their shopping carts.

* **Functional Requirements:**
  + Add to Cart: Users should be able to add products to their carts from product pages.
  + Remove from Cart: Users should be able to remove products from their carts.
  + Quantity Adjustment: Allow users to change the quantity of products in their carts.
* **Non-functional Requirements:**
  + Persistence: Ensure that shopping cart contents persist across user sessions.
  + Scalability: Design the shopping cart system to handle a large number of concurrent users.

1. **Checkout Process**

**Description**: Streamlined process for users to complete purchases securely.

* **Functional Requirements:** 
  + Payment option: Multiple payment options (credit card, PayPal, etc.).
  + Address : Shipping address and delivery options.
  + Order Summary : Order summary before finalizing purchase.
* **Non-Functional Requirements:**
  + - Security: Secure transmission of payment information using encryption.
    - Esurance : Confirmation email with order details sent to the user.

1. **Order Management**

**Description**: Administrators should be able to manage orders efficiently.

* **Functional Requirements:**
  + Track Order : View and filter orders by status (pending, shipped, delivered).
  + Status : Update order status (e.g., mark as shipped).
  + Billing : Generate invoices and packing slips.
* **Non-Functional Requirements**:
  + Notifications : Notification system for new orders and status updates.
  + Data Management: Data archival and backup mechanisms to prevent data loss.

1. **Product Listing and Management**

**Description**: Sellers should be able to list and manage their products effectively.

* + **Functional Requirements:**
    - Product Upload: Allow sellers to upload product listings with details such as title, description, images, price, and inventory quantity.
    - Bulk Upload: Support bulk uploading of products through CSV or Excel files for efficient inventory management.
    - Product Variation Management: Enable sellers to create product variations (e.g., size, colour) and manage inventory for each variant.
  + Non-functional Requirement:
* Scalability: scalable to accommodate a growing number of sellers and products over time.
* Auditability: system should maintain a detailed audit trail of product listing and management

1. **Payment Processing**

**Description**: Secure processing of payments for orders.

* + Functional Requirements:
  + Payment gateways: Integration with payment gateways (Stripe, PayPal, etc.).
  + Error Handling :Handling of payment failures and retries.
  + Refund : Refund processing for cancelled orders.
  + Non-Functional Requirements:
    - Security: Compliance with PCI DSS standards for payment security.
    - Reliability: Redundant payment gateway integration for reliability.

1. **Sustainability into Software design and development**

**Description:** Incorporate sustainability principles into software design and development.

* + **Functional Requirements:**
    - Energy-efficient algorithms and data structures.
    - Minimization of server resource usage during idle periods.
    - Carbon footprint tracking and reporting.
  + **Non-Functional Requirements**:
    - Adoption of green hosting solutions (renewable energy sources, energy-efficient data center).
    - Regular environmental impact assessments and improvement plans.

**Functional Specification:**

1. **User Authentication and Authorization**

* **Registration**:
  + Users can create an account using email/password or social media authentication.
  + Mandatory fields: email, password, username (optional), and agreement to terms of service.
* **Login**:
  + Users can securely log in using their registered email and password.
* **Logout**:
  + Users can securely log out of their accounts.

**2. Product Browsing and Searching**

* **Product Categories**:
  + Products are categorized into various categories (e.g., electronics, clothing, home decor).
  + Each category displays a list of relevant products.
* **Search**:
  + Users can search for products by name, category, brand, or attributes using a search bar.
  + Search results are displayed in real-time with relevant product suggestions.
* **Filtering**:
  + Users can filter search results based on criteria such as price range, brand, size, colour, and customer ratings.

**3. Shopping Cart Management**

* **Add to Cart**:
  + Users can add products to their shopping cart from product detail pages or search results.
* **View Cart**:
  + Users can view the contents of their shopping cart, including product details, quantity, and total price.
* **Update Cart**:
  + Users can update the quantity of products in their cart or remove products entirely.
* **Save for Later**:
  + Users can move items from their cart to a "Save for Later" list for future purchase consideration.

**4. Checkout Process**

* **Cart Review**:
  + Users review the items in their cart, adjust quantities, and remove items if necessary.
* **Shipping Address**:
  + Users provide a shipping address for delivery, with the option to save multiple addresses for future use.
* **Payment Options**:
  + Users select a preferred payment method (credit/debit card, PayPal, etc.) and enter payment details securely.
* **Order Confirmation**:
  + Users receive a confirmation page with order details, including an order number and estimated delivery date.
* **Order History**:
  + Completed orders are stored in the user's order history for future reference.

**5. User Profile Management**

* **Edit Profile**:
  + Users can edit their profile information, including name, email, password, and contact details.
* **Address Management**:
  + Users can add, edit, or delete shipping addresses for convenient checkout.
* **Payment Method Management**:
  + Users can add, edit, or delete payment methods, including credit/debit cards and PayPal accounts.

**6. Ratings and Reviews**

* **Product Ratings**:
  + Users can rate products on a scale (e.g., 1 to 5 stars) and leave written reviews.
  + Average rating and total number of reviews are displayed on product detail pages.
* **Review Moderation**:
  + Reviews are moderated to ensure they meet community guidelines and are not spam or abusive.
* **User Feedback**:
  + Users can provide feedback on their shopping experience, product quality, and delivery satisfaction.

**7. Product Listing and Management**

* **Product Upload:**
  + Sellers can upload product listings with details such as title, description, images, price, and inventory quantity.
* **Product Variation Management:**
  + Enable sellers to create product variations (e.g., size, color) and manage inventory for each variant.

**8. Order Management (for Admin)**

* **Order Processing**:
  + Admins can view and process incoming orders, update order status (e.g., pending, processing, shipped).
* **Inventory Management**:
  + Admins can manage product inventory, update stock levels, and add new products to the catalog.
* **Customer Support**:
  + Admins can communicate with customers regarding order inquiries, returns, and refunds.

**External Interface Specification**

* **User Interface**

***UI for User***

1. **Homepage**:
   * Shows featured products, promotions, and navigation.
   * Includes a search bar and category navigation.
2. **Product Pages**:
   * Displays detailed product info, variants, and an "Add to Cart" button.
   * Shows related products for cross-selling.
3. **Shopping Cart**:
   * Summarizes items in the cart with quantity adjustment.
   * Offers a "Proceed to Checkout" button.
4. **Checkout Process**:
   * Guides users through shipping, payment, and order review.
   * Allows guest checkout or account creation.
5. **User Account Dashboard**:
   * Provides order history and status.
   * Offers address management and account settings.

***UI for Seller***

**1. Seller Dashboard:**

* Quick access to tools for managing products, orders, and customers.
* Graphs showing sales trends, top products, and order status.

1. **Product Management:**

* Interface to add, update, and manage products and inventory.
* Tools for categorizing, pricing, and defining product variations.

***UI for Admin***

**1. Dashboard:**

* Centralized hub for sales, revenue, and website traffic metrics.
* Quick access to tools for managing the e-commerce platform.

1. **Order Management:**

* Dashboard for incoming orders with status indicators.
* Tools for order processing, invoicing, and shipping label printing.
* Ability to track order status, manage returns, and handle inquiries.

1. **User Management:**

* Interface for managing user accounts (customers, sellers, admins).
* Tools for adding users, updating profiles, and resetting passwords.
* Ability to monitor user activity and enforce security measures.
* **Communication Interfaces**

1. HTTPS Encryption:
   * Secure communication between clients and servers using HTTPS protocol.
   * SSL/TLS certificates for data encryption and authentication.
2. RESTful APIs:
   * Expose RESTful APIs for client-server communication.
   * Define endpoints for user authentication, product management, and order processing.

* **Hardware Interfaces**
  + 1. Device Compatibility:
* Support for desktop computers, laptops, tablets, and smartphones.
* Responsive design for different screen sizes and resolutions.
  + 1. Peripheral Devices:
* Compatibility with standard input devices (keyboard, mouse) and output devices (display).
  + 1. Internet Connectivity
* Need internet connectivity medium as for modem , LAN-WAN, Ethernet Cross Cable
* **Database**

1.Relational Database management system such as MySQL

2.Data access layer

**Technical Specification**