



**AMERICAN  
UNIVERSITY OF BEIRUT**

**MAROUN SEMAAN FACULTY OF  
ENGINEERING & ARCHITECTURE**

**American University of Beirut School of Engineering and Architecture**

**Department of Electrical and Computer Engineering**

**EECE503 M – Software Security Project**

You should develop an ecommerce web application (Frontend and Backend). Each group should choose the type of commerce the platform is providing (i.e. clothes, shoes, sportswear, home appliances, etc.). The goal is to let each group develop a distinct project by following the below instructions. You should rewrite the below proposition to meet your shop requirements and submit it no more than **Wednesday 23<sup>rd</sup> of October**.

## **I. Project proposition**

### ***Ecommerce shop:***

Smart Home Appliances Store.

### ***Shop description:***

A smart home appliances e-commerce platform that specializes in connected and IoT-enabled devices such as smart refrigerators, thermostats, lighting systems, security cameras, voice-controlled assistants, and other home automation products. This platform offers a seamless shopping experience, allowing customers to explore cutting-edge technology from top brands, compare features like app integrations and energy efficiency, and read reviews from tech enthusiasts. Customers can also access after-sales support, product warranties.

## **II. Platform Modules**

### **A. Customers/users**

The platform will accommodate both sign-up users and non-sign-up users, providing flexibility for different shopping preferences. While non-sign-up users can browse the catalog and make purchases through guest checkout, registered users will enjoy additional benefits depending on their membership tier: Normal, Premium, or Gold.

#### **Non-Sign-Up Users (Guest)**

- **Browse & Purchase:** Non-registered users can freely browse the product catalog and complete purchases using guest checkout.
- **Limited Benefits:** They will not have access to order tracking, or special promotions.
- **No Saved Information:** Shipping information and payment details will need to be entered manually with each purchase, as guest users cannot save preferences for future orders.

#### Sign-Up Users (Registered Members)

Registered users will be divided into three tiers, each offering specific benefits in terms of promotions, discounts, and delivery options:

##### *Normal Members*

Normal users will not have access to promotions and delivery discount. However, they get personalized experience, saved search and their purchases adds up to reach the upper tiers.

##### *Premium Members*

- **Discounts:** Premium members will receive discounts on selected products.
- **Free Delivery on Select Orders:** Premium members will enjoy free delivery on most orders above a minimum purchase value.
- **Exclusive Gifts:** Members will be eligible for occasional free gifts with certain purchases.
- **Early Access to Sales:** Premium members will be notified in advance of upcoming sales or new product launches.

##### *Gold Members*

- **Highest Level of Discounts:** Gold members will have access to the largest discounts on a wider range of products.
- **Free Delivery on All Orders:** Gold members will enjoy free delivery on all orders, regardless of the order size or value.
- **Exclusive Gifts & Rewards:** Frequent special gifts, vouchers for Gold members during major sales and promotions.
- **Priority Customer Support:** Gold members will have access to priority customer service, including faster response times and dedicated support channels.

#### ***Customer facing features***

##### Sign up page

This page allows users to enter their personal details, photo, payment details and address.

##### Homepage and User Navigation

#### 1. Dynamic Homepage

- For signed up users, the homepage will feature personalized product recommendations, current promotions, best-sellers, and seasonal deals. The homepage should have a section of:
  - Top sold products (for all products)
  - Top sold per category
  - Featured promotions

- **Easy Navigation:** A simple and intuitive navigation bar will offer clear categories such as "Kitchen Appliances," "Laundry Appliances," "Small Appliances," and "Air Conditioners." Subcategories will further refine product listings.
- **Advanced Search:** A powerful search bar will allow users to search by product name, brand, category, or specific technical specifications (e.g., energy rating, capacity, etc.)
- **Smart Filters:** Users can refine search results using filters like brand, price range, customer ratings, dimensions, energy efficiency, features, or color. Filters will adjust dynamically based on user selection to provide real-time results.

## 2. Product Pages

- **Detailed Product Information:** Each product page will include high-quality images, detailed specifications, user manuals, product dimensions, energy efficiency labels, and product videos (if available).
- **Customer Reviews & Ratings:** Users can view product reviews and ratings from verified customers. The platform will allow sorting by most recent, highest, and lowest-rated reviews, and let customers post their own feedback.

## 3. Checkout and Payment Integration

- **Simple Checkout Process:** A streamlined checkout experience will allow users to review their cart, add delivery options, and select their preferred payment methods easily.
- **You should create a Cart page.**
- **Guest Checkout:** Users will have the option to check out without creating an account, making the process quicker for one-time buyers.

## 6. Delivery Options and Tracking

- **Flexible Delivery Options:** Users will be able to choose between standard and express delivery, as well as select specific time slots for delivery.
- **In-Store Pickup (if applicable):** Users can select the option to pick up their products from a physical store or distribution center.

## 7. Returns, Warranty, and After-Sales Services

- **Hassle-Free Returns:** Users will have access to an easy return policy with clear instructions on how to initiate a return for defective or unsatisfactory products.
- **Warranties:** Product pages will include information on warranties and options for purchasing extended warranties.

## **B. Admin Features (Backend/Administrative Features)**

### Inventory Management System

- **Real-Time Inventory Tracking:** Admins can monitor stock levels in real-time across multiple warehouses or physical stores. The system will automatically update product availability and alert admins when stock levels are low.
- **Inventory Reports:** Admins can generate detailed reports to analyze inventory turnover, most popular products, and predict future demand.
- **You should have at least 10 product categories. Each has subcategories.**

### Order Management System

- **Order Processing:** The platform will provide admins with tools to manage customer orders, track their statuses (e.g., pending, processing, shipped, delivered), and generate invoices.
- **Returns Management:** Streamlined process to manage product returns, issue refunds, or offer replacements.

### Product Management

- **Product Listings:** Admins can easily add, update, or remove products from the catalog. This includes uploading product images, descriptions, technical specifications, and setting prices.
- **Bulk Uploads:** Ability to upload multiple product listings at once using CSV files or API integration with suppliers.
- **Pricing and Promotions:** Admins can manage product pricing and create time-sensitive promotions, discounts, or coupon codes per user tier

### Customer Management

- **Customer Profiles:** Admins can view customer profiles, including their order history, saved preferences, wishlists, and support tickets.
- **Customer Segmentation:** The ability to categorize customers based on their behavior (e.g., repeat buyers, high spenders, first-time visitors) to target marketing campaigns more effectively.
- **Communication History:** Track all communication with customers, including emails, live chat transcripts, and service requests.

### Customer Support Tools

- Email support only

### User and Role Management

- **Role-Based Access:** Different access levels for admins. Each Admin user can have one or many of the above roles.
- **Activity Logs:** Track user activities in the backend (e.g., product updates, price changes, order management) for accountability and security purposes.

## **III. Technology stack and architecture**

- You should be using Python Flask as backend.
- Choose the frontend technology of your choice
- The application should be multiservice. The backed should not be a one service running all the application. For example, you can have the DB, customers' module, Admin and RBAC on separate services.

#### IV. Delivery plan and evaluation

Deliverables	Percentage	Delivery date
Admin	50%	November 10
Threat modeling document	10%	November 24
Customer	40%	December 1

- You should take into consideration all the security measures covered in class (e.g., Injection, SSRF, Authentication, Authorization, RBAC, Cryptography failures, etc.).
- Your code should be both secure and functional.
- The evaluation of the deliverables will involve analyzing your code from a security perspective, as well as an interview/presentation.
- You should clearly state each team member's contribution to the project.
- Each team should work independently. No code exchange between groups is allowed, and this will be checked during the evaluation.