Centralized E-Commerce Platform for laptop sales and Auction Management System

Software Requirements Specification

Prepared by - Group 8
M.A.O. Rodrigo – FC115278
U.J.N.S. Tharaka – FC116345
S. Gunaruban – FC115733
D.P. Gamage – FC115528
U.S. Ravihara – FC115659
U.K.D.S. Sandaruwan – FC115250
L.R. Thuduwege – FC115558
K.G.A.K. Sathsarani – FC115592

Table of Contents

1. Introduction

Our Centralized E-Commerce Platform for laptop sales and Auction Management System is a web application built to facilitate the listing, auctioning and selling of laptops and other related electronic peripherals. The primary clients of this system include the buyers of electronic products and the vendors who wish to sell and distribute their devices. The system supports multiple vendors, allowing both individuals and organizations to register and sell their products online.

Given the increase in digitization, it has become a necessity to own a laptop due to its portability and importance in work and study. However, most customers face difficulty in finding quality products and vendors struggle to reach customers. This platform aims to address this issue.

Customers can easily browse the catalogue of items and choose to buy their desired product through the system. Additionally, this platform features an auction system that allows sellers to list their limited edition or special products for bidding within the system, and the buyers can place their bids within a specified range.

Our system consists of 3 major roles. Customer, Seller and Admin. A customer may register as a seller if needed. An account-based system is used to monitor and track role-specific data. Moreover, each role has its own functions within the system. While the primary focus is on laptops, the platform also supports selling other computer peripherals such as mice, keyboards, headsets and other accessories.

2. Motivation

With the increase of technological advancements, a laptop and other relevant devices have become an essential items. Our platform addresses this need by providing a dedicated centralized platform which allows both sellers of devices and buyers of these devices to connect and perform business transactions for buying laptops and related devices.

Our platform automates the buying and selling process of laptops with the seamless connection between the two relevant parties. The seamless connection between the business transactions is managed by automating the processing of inventory and order taking, payment and tracking. Furthermore, it manages access to the database of the clients for the vendors. This platform will reduce the errors and wastage a manual system could have by automating all workflows. This automates the process of marketing your own products as the platform assists in the distribution process of the product.

Additionally, this platform assists small vendors or individuals to enter the market and perform their transactions with ease thus lowering the entry barrier for E-commerce infrastructure. Moreover, automating product listing and order processing will be extremely beneficial to vendors which saves time and resources on their end.

Also, this system helps sellers to easily keep track of their clients as a database that contains all relevant details of the customer is used by this platform. Our platform provides the necessary tools required for handling orders, inventory and customer analytics. Moreover, this streamlines the process and helps sellers distribute the correct product to the correct client without any misconceptions.

To summarize, the motivation behind building this platform is to automate the process from the vendors side regarding listing a product, taking the order of the product and handling the payment of the product. From the side of the client this platform makes it easier for them to browse the catalogue of devices from many vendors, compare them with their reviews and purchase the most suitable laptop for their needs. This platform also provides an auction system the clients can utilize to get the best deal on a product. A platform such as this would be extremely beneficial for customers who struggle with choosing a laptop from multiple vendors On top of that for vendors the system is beneficial to reach their customers easily.

3. Objectives

The objectives of this system are categorized into mainly primary and secondary goals.

Primary goals –

- Allow customers to browse, compare and purchase laptops and other accessories with ease.
- Enable vendors (Individual/ organizations) to list, manage and sell laptops and other computer peripherals through a centralized platform.
- Provide an auction feature for sellers to auction limited-edition or special products.
- Maintain an account-based system that supports three user roles such as Customer, Seller and Admin with role specific functionalities.
- Enable user authentication through email credentials and third-party identity providers such as Google, Facebook and other commonly used platforms.

Secondary goals –

- Support multiple vendors to ensure equal opportunities for all vendors.
- Provide seamless and user-friendly product distribution and inventory management system to ease the functionalities of the vendor.
- Maintain a database to store customer transactions.
- Allow customers to upgrade to sellers through the same account through role switching.
- Offer a wide variety of computer peripherals in addition to laptops.
- Ensure fairness and transparency in the auction process.

4. Scope

The system will enable users to browse, compare and purchase laptops and other related accessories, as well as allowing vendors to list and manage products.

The main features covered by our system are as follows:

- User authentication
- Role management: Customer, Seller, Admin
- Product listing and inventory management
- Auction functionality
- Order and payment handling
- Transaction and customer database

This platform targets multiple user segments.

1. Primary users
   - University students
   - IT professionals
   - Business professionals

   Our platform provides a quick efficient way for primary users to purchase a laptop without any hassle

2. Secondary users
   - Non-tech savvy individuals who may face difficulties in choosing the right product

   Our platform provides an efficient, unbiased AI agentic system for secondary users to select a suitable laptop that aligns with their specific needs without any hassle.

This system will be a web-based application, accessible via modern browsers.

5. System Requirements

5.1 Functional Requirements

A. User Registration and Login
   - Users must be able to login to the system through their emails or third-party accounts (E.g. Google, Facebook)
B. Role-based Access control
   - System must support the three roles with relevant access and permissions
C. Product listing and inventory management
   - Sellers should be able to add, update and remove products

- Inventory quantity should be tracked and updated with each purchase.
D. Product browsing and comparison
- Customers must be able to browse and search for products.
E. Auction management
- Sellers can list items for auction
- Buyers can place bids within the auction period
- Winning bid is automatically handled after auction time expiry
F. Order placement and payment handling
- Customers can place orders and complete payments
- Vendors get notified about relevant orders
G. Admin management
- Admins should be able to manage users, moderate content and overall monitor the system
H. Review system
- Customers should be able to rate and review products or vendors depending on their service

5.2 Non-functional requirements

A. Scalability
- The system should support multiple vendors and customers without performance degradation
B. Performance
- Page loads and account transactions should not exceed 5 seconds under normal load
C. Security
- Data should be stored securely
- Authentication mechanisms must prevent unauthorized access to data
D. Availability
- The system should be available 24/7 with minimum down time
E. Usability
- The User interface should be user friendly even for non-tech users
F. Maintainability
- Codebase and architecture should allow for easier updates and fixes
G. Responsiveness
- The application must work on multiple screen sizes (PC, Tablet and mobile)

5.3 Hardware Requirements

Hardware Component	Recommendation
Server type	Cloud based
CPU	Minimum 4 core processor
RAM	Minimum 16 GB
Storage	SSD with 100 GB minimum
Bandwidth	Sufficient to handle concurrent users
Backup	Daily backup system (Cloud/ External)

5.4 Software Requirements

Category	Component
Database	PostgreSQL / MySQL/ Firebase Firestore
Authentication	OAuth 2.0 + Email Auth
Payment integration	Bank gateway
File Storage	Firebase Storage
Hosting	Vercel/ Netlify
CI/ CD	GitHub-integrated (auto-deploys)
Version control	GitHub

6. Main Critical Features

There are five main critical features existing in the proposed system.

6.1 User Authentication and role-based access

Users are allowed to log in to the system through their emails or third-party login methods such as Google and Facebook. There are three user roles: Customer, Seller and Admin. Each user has specific access to certain features.

- Customer: Can search, browse, compare and bid on laptops and other accessories. They have access to only view and purchase products.
- Seller: Can add, update and remove products. Can view customer details. Sellers have access to view customer records and edit product catalogues.
- Admin: Manage users, moderate content and monitor the platform. Admins have overall access to edit within the system.

6.2 Product listing and inventory management

Sellers have the ability to add, update and remove products. Each product will contain details such as product name, product specifications (Processor type, Ram capacity, etc.), price, stock and images. Inventory levels should be updated according to the orders placed to avoid overselling.

6.3 Product browsing and comparison

Customers should be able to browse products with ease. Additionally searching and comparing multiple products should be allowed. Comparing the products can be done by looking at the reviews each product has and decide on it. This is done by the user. The system just makes it easier with a user-friendly UI. Furthermore, after a purchase the user should be able to rate and review the product.
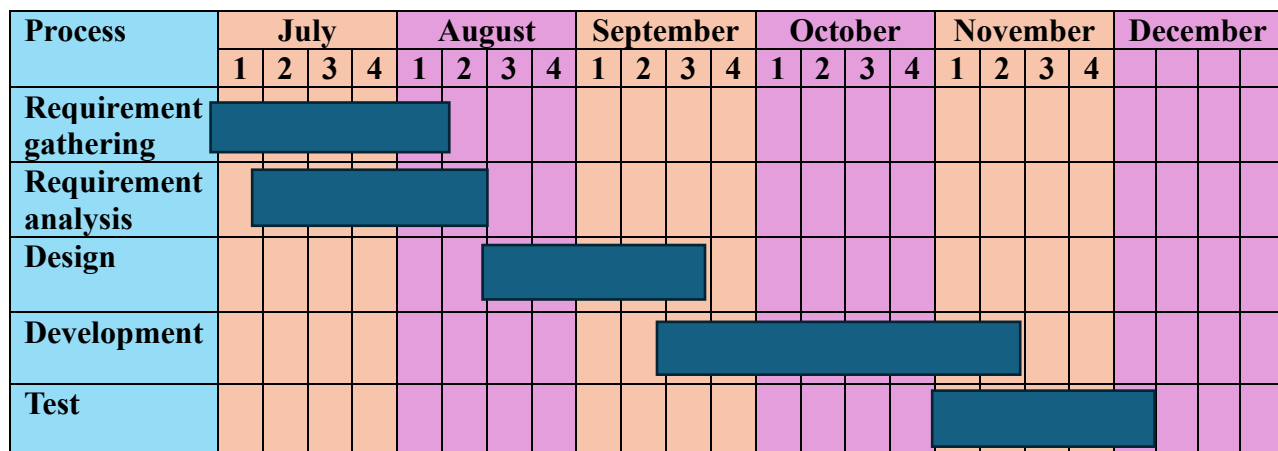
6.4 Auction management system

This system provides sellers with the ability to create auctions with a time limit and a starting bid for special or limited-edition products. Buyers are allowed to place bids during the auction period. After the expiry, the highest bidder is selected and notified automatically by the system. This functionality adds competitive pricing for rare products which would be beneficial for sellers.

6.5 Order placement and payment handling

Once a customer finds a suitable product, they can directly place orders or if it's a special product up for an auction bid on it and win the auction. Afterwards the customer is redirected to the payment portal which will allow secure payment options. Options such as pay on delivery or money transfer to a bank account will be allowed. After the payment the relevant vendor will receive a notification regarding the new order. The system will log order details both for the vendor and customer reference.

7. GANTT chart

Process	July				August				September				October				November				December			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Requirement gathering	■	■	■	■	■																			
Requirement analysis		■	■	■	■																			
Design						■	■	■	■															
Development									■	■	■	■	■	■	■	■	■							
Test																	■	■	■	■	■			

8. Team details

Register No	Name	Role
FC115278	RODRIGO M.A.O.	Project manager
FC116345	THARAKA U.J.N.S.	Analyst
FC115733	GUNARUBAN S.	Designer
FC115528	GAMAGE D.P.	Database administrator
FC115659	RAVIHARA U.S.	Full stack developer
FC115250	SANDARUWAN U.K.D.S.	Front-end developer
FC115558	THUDUWEGE L.R.	Back-end developer
FC115592	SATHSARANI K.G.A.K.	Quality assurance engineer