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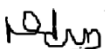
Programme: **BSc (Hons) Software Engineering**

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## 01. Introduction

Applications for selling computer hardware and accessories are obsolete, offer poor user experience and involve very few users. An unlined easy-to-use and pleasurable online shopping experience is more testing than ever in the fast-paced automated world of today. In response to all the manufacture-related problems and the increasing demand for effortless state-of-the-art buying experience the Computer Hardware and Accessories E-commerce Platform was developed. A merged solution that allowed clients to easily browse by and even customize PCs through an interactive online platform was initially lacking in the market. The project needs and creates a web and mobile application that offers a simple and pleasurable shopping experience complete with gamification AI-driven recommendations and safe payment integrations for all consumers.

The platform is currently fully serviceable and offers a strong multi-platform environment that can be accessed through mobile, tablet and web applications. Clients can very quickly browse a large selection of computer accessories and hardware, get customized recommendations that take place in sales and reason and even create their own unique PCs that are neatly assembled and delivered right to their door for client. The client doesn't need to come to the shop. A simplified checkout procedure interactive product displays and complicated shopping tools all help to maximize customer tour of application.

The project's main purpose is to constantly advance by incorporating cutting-edge technologies like blockchain to make better transaction security augmented reality (AR) for virtual product visualization and machine learning models to more extrema hone AI-driven personalization. And all the clients' requirements are filed with this project. Become lager supplier partnerships, subscription-based discounts and improved logistics tracking to ensure even quicker deliveries are other features being considered.

### 1.1 Key Factors

- **Discount and Promotion application:** Using commitment-based discounts and time-limited offers to engage clients.
- Challenges and motivation to boost user memory and revenue are **gamification** features.
- **Personalized Suggestions:** AI-generated suggestions obtain from past browsing, purchase activity, and adding Wishlist.
- Simplified checkout process, exact product details and natural navigation are examples of **advanced shopping tools**.
- 3D models, all products have 360<sup>0</sup> views and complex visual images of products are part of the **interactive product experience** for all consumers.
- **Real-time order searching and notifications:** giving clients modern information on the status of their orders. And add promotions and discounts on the notification bar.
- **Multi-layered security** for user accounts and transactions is given by Secure Payment & Authentication.

## 02. Project Charter

**Project title: Sell Computer Hardware and Accessories Using Mobile and Web**

**Project Manager: Naththandige Fernando**

**Date: 17<sup>th</sup> March 2025**

### **Purpose and Objectives**

The project's main purpose is to create a complete e-commerce platform that enables users to purchase computer accessories and hardware via convenient mobile and web applications. The platform seeks to offer individual and customized shopping experience, make better client engagement and elegant the buying process.

### **Purpose**

- Create a convenient and responsive e-commerce platform for desktop, tablet and mobile users.
- Agree clients to choose elements online and have them gathered and distributed to create custom PCs builders.
- Enhance shopping experience by containing product suggestions driven by AI.
- Use challenges and awards to boost user engagement by executing a gamification system. After challenges win, then give accessories or prizes to clients.
- Provide clients with instant notifications and real-time order tracking to increase their faith.
- View 360° products from 3D models for engagement with clients.
- Use many payment gateways to ensure a quick, easy and safe checkout procedure.
- Agree with both in-person and online buys to ensure shiny omnichannel experience.
- Achieve a high-implementing, expandable and stable system that can manage expanding client demand.

## Scope

Sketching creating and implementing a cutting-edge online store to sell computer hardware and accessories is part of this project's scope. The following elements will be ensured by the project.

## In Range

- **Web and Mobile Application Evaluation:** A flexible web platform, tablet and mobile application built with Flutter.
- **Product category Management:** An executive dashboard for statements management updating and addition.
- **Procedure PC Builder:** This feature lets users choose individual parts and ask for expert assembly.
- **AI-Powered recommendation:** customize product suggestions according to client activities.
- **Gamification** features include challenges with benefits to attract clients.
- **Secure Payment application:** merging many payment gateways to guarantee quick and secure transactions.
- **Order tracking and notification application:** email and push notifications provide real-time order status updates.
- Different gain levels for the client's chief executive and sellers are known as **multi-role user access**.
- Coupon codes shine sales and commitment rewards or priceable elements are examples of **promotions and discounts**.

## Out of Ranges (Exclusions)

- **Direct construction of hardware:** The stages will only market and put together pre-operating parts.
- **Shipping globally:** First, the system will only sustain local clients.
- **Physical shopfront management:** In-store buys are agreeing to receive but running a physical store is not.

## Key Requirements and Obtaining principals

Requirements	Obtaining principals
Verification and user registration.	Users have secure access to register, log in and manage their profiles.
Customize PC Builder	Clients can select their own components and accessories for PC builders. And receive PC builder for client home door.
Search and Browser Accessories	Clients can search products using filtering and categorizing the selections.
AI-based suggestions products	The application uses a client's browser, whitelist, and personalized products for recommendation for client.
Hunting orders and Notifications	The application sends emails, and inbuild notifications for track products and gets promotions and discounts.
Secure Payments and Checkouts	Payments and checkout procedures are more secure with integrating powerful gateways.
Promotions and Gamification	Clients can face challenges and gamify from the platform then clients can get priceable accessories, prize amounts, and promotions.

## Stakeholders

Stakeholders	Roles	Concerns
Project manager	Oversee the execution of the application and guarantee on-time delivery.	Accomplishment of the project
Development team	Develops design of UI and UX for mobile, tablet, and web full stack project.	Execution and check the performance of the application before giving it to the client.
UI/UX Designers	Design comprehensive UI and UX to create more client satisfaction with the application.	Client's pleasurable and interactive with application.
Marketing team	Promote application for all island clients and control all campaigns.	Improve and get more satisfaction for clients and sales for the shop.
Users	Clients buy products and accessories.	Security, obtainability and ease of use.
Suppliers	Supply products and accessories for the shop on time.	Grow brand and sells.
Business owner	Invest in the project and begin objectives and goals.	gainfulness as well as encourage expansion.

Total Budget		
Variety	Estimated Cost (LKR)	Message
Development cost	200000	Customize mobile, tablet, and web applications.
UI/UX Designs	100000	Executive design and more attractive user UI/UX design for app.
Hosting and other features	30000	SSL certificates domain registration and yearly hosting services.
Payment gateway cost	25000	cost related to transaction and integration for many payment gateways.
Safety and conformity.	50000	application of safe estimate and agreements to regional laws.
Marketing and advertisements	40000	first marketing capability to advertise for grow client engagement.
<b>Total approximate budget.</b>	<b>445,000</b>	

Milestone TimeLine				
Discovery	Start Date	End Date	Period	Description
Product Launching and planning	Feb-15-2025	Feb-19-2025	5 days	Build project goals, objectives, scope, and gather all the requirements.
UI/UX Design accomplishments	Feb-20-2025	Feb-26-2025	7 days	Design attractive user interfaces with wireframing and prototyping.
Backend setups	Feb-27-2025	March-04-2025	6 days	Develop main features for both mobile and web applications.



Developing Mobile and Web applications	March-05-2025	March-15-2025	11 days	position databases back-end aspects and server infrastructure.
Developing testing and feedback	March-16-2025	March-22-2025	7 days	Carry out user testing gathers all input and makes the required adaptation.
Finish Feature Optimization and Developments.	March-23-2025	March-28-2025	6 days	contain additional features and enhance application with efficiency.
Last Testing and Security	March-29-2025	March-31-2025	4 days	Perform and check all the complete application and test all features and security of users and applications.
Advertisements for marketing and official launches.	April-01-2025	April-02-2025	2 days	Initiate marketing advertisements and make the project live.

### 03. Project Solution Architecture

#### 3.1 System Scope

The application has all the features needed to give customers a smooth online shopping experience and interactive with application. These features are divided into several main categories.

##### **Core Functionalities:**

- Browse search and filter products and accessories.
- Checkout process and shopping cart management.
- Procedure customer payments securely.
- Tool for building custom PCs with expert assembly services.
- Customers can add Wishlist for their products or accessories.
- Interactive and easily connected with application.

##### **Engagement with Customers:**

- Recommendations handled by AI and based on user activity and search results.
- Challenges that are gamified to win rewards. real-time alerts for updates and order confirmations.
- When customers reach out products then give them a reward like product or accessories.

##### **Operational Help:**

- Stock levels are managed through inventory management.
- Order tracking and logistics incorporation for delivery.
- Customer service through live agents or chatbots.

## **Platforms:**

- For access while on the go use a mobile app
- desktop web application.

### **3.2 Interactions with Outside Factors.**

To efficiently provide its services the platform communicates with several outside entities. A context outside parties is given below and put what are the inputs fields and output fields.

#### **1. Customers**

- Input: Product choices, payment information and browsing liking.
- Results: Delivery updates, order confirmations and adjust suggestions.

#### **2. Gateways for payments**

- Input: The platforms request payments.
- Result: obtaining or rejections of transactions.

#### **3. Logistics Suppliers**

- Input: Customer addresses and delivery requests.
- Result: Up-to-date delivery status information.

#### **4. Orders placed**

- Input: online but completed in-store are input.
- Result: Alerts concerning the orders prepared for gathering or collection.

### **3.3 Parts of the System for E-commerce**

#### **1. The front-end presentation layer.**

- Design layout and navigation are examples of visual elements that are controlled by the user interface (UI).
- User experience or UX is the study of improving usability and availability to increase customer satisfaction.
- Web and mobile apps: Make the platform reachable on a variety of devices.

#### **2. Application Layer**

- Business Logic: Product management oversees inventory pricing and product catalogues.
- Order processing oversees the payment checkout and shopping cart procedure.
- Customer management includes managing profiles, logging in and registering users.
- Recommendations powered by AI: Provides adapted product recommendations according to user activity.

#### **3. Data Layer**

- Database: Holds transaction details order histories customer information and product details.
- Data analytics: Offers information about customers' behaviour system performance, sales trends and search results.

#### **4. Modules for e-commerce**

- The catalogue module oversees organizing and managing product listings.
- Pricing Module: Manages discounts and pricing policies.
- Marketing Module: make possible marketing initiatives and gamification.
- Inventory Module: Controls replacement and keeps track of stock levels.

#### **5. Integrations with third parties**

- Secure payment processing services are integrated by payment gateways.
- Logistics Providers: Makes connections with delivery services to complete orders.
- AI Services: Makes use of third-party AI engines to provide recommendation algorithms and data structures.

### **3.4 Interfaces Between Components**

The article describes the use of JSON and XML data interchanging formats standard web communication protocols like HTTP/HTTPS and WebSocket for real-time updates and APIs like RESTful and GraphQL for data interchanging between components.

Structured Decomposition offers scalability, maintainability, flexibility, and reusability. It allows for individualistic scaling based on demand, easy updates or renewal without affecting the entire application, and allows for the combination of new features or technologies.

### **3.5 Key System Behaviors.**

#### **1. User Interaction Designs**

- Product browsing: In response to user exploration the system is concerned with presenting suitable products according to search parameters filters and sorting choices.
- Custom PC Building: The system should verify similarities computing total costs and suggest additional elements when users choose parts for custom PCs.
- The checkout procedure should be operated securely by the system which should also update inventory levels and send emails confirming successful transactions.

#### **2. AI-Driven Suggestion Operations**

- Customize Suggestions: The system is concerned with making appropriate products or quantity recommendations based on user browsing and purchase history.
- Real-time Updates: As user operations develop, recommendations are concerned to be updated accordingly.

#### **3. Schema related to promotions and gamified.**

- Involvement in Challenges: Users should be able to take part in challenges and receive rewards. The application will keep track of their progress and give them prizes when they finish them.
- Promotion Display: The system is concerned to automatically apply current discounts and promotions at checkout emphasizing them.

### **3.6 Operation in Different Epics**

Throughout their implementation these operations cut across several epics.

1. **Epics User Experience:** Focusing on product browsing custom PC construction and checkout procedures, Epic User Experience guarantees a smooth and user-friendly interface on both web and mobile platforms.
2. **Epics AI-Powered Suggestions:** Emphasizing real-time updates and personalized product recommendations Epics AI-powered recommendations increase user engagement.
3. **Epics Gamify and Advertising:** With an emphasis on challenge participation reward tracking and promotion display Epics gamification and promotions feature promotes user engagement and retention through interactive challenges and incentives.

### **3.7 Required Resource Distributions**

1. **Allocating Ability -** Managing user traffic and promising consistency component interactions depend heavily on ability.
  - Both front-end and back-end components manage high-resolution product images, 3D models and collective elements while allocating ability for web and mobile apps API communications and AI-powered recommendation engines.
2. **Assign of Computing forcefulness -** The giving out of computing resources needs to consider how complex the tasks that each component performs are.
  - While the Custom PC Builder guarantees component similarity and assembly costs, the AI Recommendation Engine study user behaviour data to provide adapted recommendations.
3. **Space Allocation for Storage.**
  - Large amounts of storage are needed for the product categorizing user information and order history to hold high-aspiration photos large specifications 3D models client profiles browsing history and transaction logs.

## **04. Release Plan**

### **4.1 Explaining Features Needed to Coverage Objectives**

1. **The suggestions are powered by AI**
  - Apply AI engines to client behaviours analysis product suggestions engagement related product discovery and sales.
2. **Inventory Handle in Real Time**
  - To avoid exceed guarantees correct stock information minimizes overstocking and improves client satisfaction by lowering shortage implement a real-time inventory system.
3. **Improvement to the Custom PC Builder**
  - By enabling real-time similarities checks and cost approximation the tool enhances the custom PC builder procedure by making it simpler, lowering errors and increasing customer confidence.

#### **4. Gamify and Difficulties**

- Build challenges like games or something that give client discounts or accessories. enhances repeat business advance community and promotes contribution.

#### **5. The checkout process optimized**

- Eliminating steps combine safe payment methods and guarantee smooth transactions to a more secure client checkout process.

### **4.2 Discuss the details**

#### **1. AI-Powered recommendations**

- structure contains real-time data processing pipelines and machine learning structures. High calculation costs and data privacy consent are among the risks. CRM integration and third-party APIs are examples of external dependencies.

#### **2. Quick Inventory Control**

- There are risks related to cloud-based inventory databases and APIs for supplier and logistics combination such as third-party dependencies and delayed data synchronization. Adopt early combinations for high risk and value.

#### **3. Tool for Custom PC Creating**

- In addition to 3D rendering tools inventory management systems and a component similarities validation engine the system also has dependencies and risks such as supplier and constructure APIs.

#### **4. Challenges and benefits that are gamified.**

- Infrastructure puts a system for tracking user activity and logic for distributing rewards. It carries the risk of making the user experience too complicated and possibly being misused. Among the external dependencies are SMS and email APIs.

### **4.3 Decide how much work**

#### **1. Initiate sprint goals.**

- Improving platform functionalities with user experience and providing significant value like an enhanced custom PC builder tool AI-powered recommendations and checkout security should be the main goals of sprints.

#### **2. Analyse the speed of the team**

- To guess the teams, work capacity considers team accessibility including support and vacation time and use actual data from previous sprints.

#### **3. Control the task items**

- To promise accuracy and efficiency break down big projects into smaller more handballed tasks that can be completed in a sprint. Examples of these tasks include secure payment gateway integration AI-powered suggestions and customized PC Builder improvements.

#### 4. Take architecture Tasks into Account

- Set apart time for tasks involving the architecture like configuring cloud hosting, improving database execution and putting observe tools in place for feature development.

#### 5. Responding to Known Breaks

- To control unpredictable problems set aside 10–15% of sprint time for bug fixes or client support questions. Project use Kanban boards to seek ongoing support tasks in addition to sprint objectives.

#### 6. Prepare the distribution of the workload.

- Divide the backlog into doable tasks like building a user interface for component selection training machine learning models integrating API endpoints and developing similarities validation logic. Track Development Throughout Sprints. In addition to using burndown charts to visualize progress and make necessary workload adapting daily standups are held to identify barriers and make sure tasks are on track.

#### 4.4 User experiences and impressive prioritized

- AI suggestions for product browsing search user authentication client PC building shopping cart checkout and order tracking are all the **most worth**.
- Notifications gamify and the admin/vendor portal rank **average**.
- Enhancements to security and customer service are at a low level.

#### 4.5 Plan of Repetition Sprints

- First Sprint Shopping cart search and authentication (20 SP).
- Second Sprint: Client PC builder and checkout process (20 SP).
- Third Sprint: AI recommendations seller portal and order tracking (20 SP).
- Fourth Sprint: Security features client service gamifies and notifications (20 SP).

#### 4.6 Adjusting to Capacity and Changes.

- 20 Story Points are assigned to each sprint to continue a balanced task.
- If necessary, lower levels feature like client service or gamify can wait.

## 05. Overview of Kanban Methodology

Kanban is a visual project management technique that allows teams to track tasks efficiently, making sure smooth workflow and timely accomplishment. The Kanban board for this application helps in controlling the development of the platform, covering both web and mobile app development.

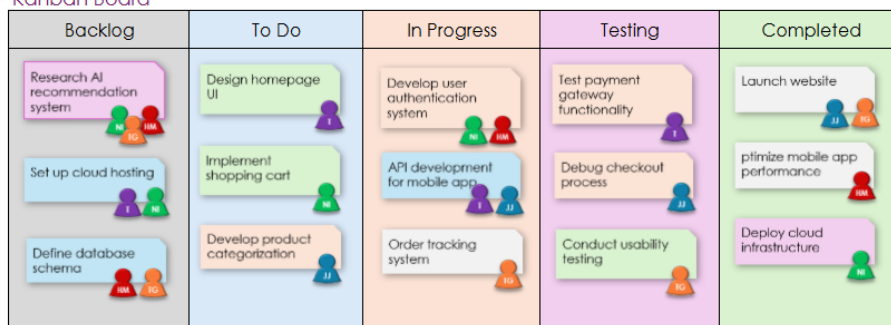
For this project, the Kanban board is split into the following stages:

- Backlog – Tasks that are recognized but not yet started.
- To-Do – Tasks that are planned and ready for implementation.
- In Progress – Assignments actively being worked on.
- Testing – Tasks under review or classification assurance.
- Completed – Successfully completed all tasks.

### 5.1 Kanban Chart Diagram

ARCHIVE						
CATEGORY	ROLE	ASSIGNED TO	ACTION	RATIONALE	STATUS	PRIORITY
Website Deployment	Project Lead	DevOps Team	Archive after deployment	Website successfully launched	Completed	High
AI Product Recommendation	Developer	AI Engineer	Archive model development	AI system integrated	Completed	Medium
Payment Gateway Testing	QA Team	Tester 1	Document test results	Payment system verified successfully	Completed	High
UI/UX Design	UI/UX Designer	Designer Team	Archive design files	UI approved and implemented	Completed	High
API Development	Backend Dev	Developer B	Document API endpoints	API tested and working	Completed	High

Kanban Board



	Hirusaduni		Tharushi
	Nadun		Harshana
	Tharani		

### 5.2 Importance of the Kanban Board in Project Management

- Task Assignments: Each team member knows their responsibilities, make less doubts.
- Due Dates & Deadlines: Make sure on-time project accomplishments by tracking timelines.
- Progress Tracking: Tasks are classified based on their current development phase.
- Improved Productivity: Helps identify restrictions and improve workflow of project.
- Better Collaboration: Remains all stakeholders informed about project procedure.

## 06. Project Plan using Excel

This section outlines the high-level tasks and milestones for the Platform project. The project plan is structured based on the release plan and puts key deliverables, deadlines, and responsible team members.

Project Name	Computer Shop
Project Manager	Nadun idushera
Project Deliverable	Project Plan
Start Date	12-Feb-25
End Date	3-Apr-24
Overall Progress	System

Approve project charter	Responsible	Start	End	Days	Status	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	18-Feb	19-Feb	20-Feb	21-Feb	22-Feb	23-Feb	24-Feb	25-Feb	26-Feb	27-Feb	28-Feb	1-Mar	2-Mar	3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar
Project Start		15-Feb-25	19-Feb-25	5 Days	Completed																										
Define project objectives	Project Manager	15-Feb-25	19-Feb-25	5 Days	Completed																										
Approve project charter	Management	15-Feb-25	19-Feb-25	5 Days	Completed																										
Develop front-end (UI/UX)	Frontend Dev	20-Feb	26-Feb	7 Days	Completed																										
Develop back-end	Backend Dev	27-Feb-25	4-Mar-24	6 Days	Completed																										
Integrate front-end and back-end	Backend Dev	27-Feb-25	4-Mar-24	6 Days	Completed																										
Develop mobile & web applications	Full Stack Dev	5-Mar-25	15-Mar-25	11 Days	In Progress																										
Testing & Quality Assurance	Full Stack Dev	16-Mar-24	22-Mar-25	6 Days	In Progress																										
Identify and fix bugs, Deployment Phase	QA Team	16-Mar-24	24-Mar-25	8 Days	In Progress																										
Resolve post-launch issues	Support Team	25-Mar-25	28-Mar-25	4 Days	Not Started																										
Final Testing and Security	Management	29-Mar-25	31-Mar-25	4 Days	Not Started																										
Official launches	Project Manager	1-Apr-25	2-Apr-25	2 Days	Not Started																										
Project End																															

[Project Plan.xlsx](#)

## 07. Preliminary Budget

### 7.1 Approximate Expenses Breakdown

The budget at this point is high-level and puts main project elements like labour management approvals and operating costs. The expenses estimate is established on assumptions relevant to the Sri Lankan market and industry qualities.

### 7.2 Employment Costs

The project will expense LKR 1806000 to complete which inserts hiring a project manager, QA engineer, UI/UX designers and frontend and backend developers. In Sri Lanka a full-time team will work on the development and testing process for six weeks.

### 7.3 Other Expenses

Additional costs for hosting security licensing and marketing are included in the estimated LKR 550000 total expense. This address cloud storage SSL security domain registration controlling consent and payment gateway integration. Social media marketing promotional offers to improve client's engagement and the initial launch campaign are assigned marketing and branding costs.

### 7.4 Total Approximate Budget

The budget is based on real pricing information from hosting companies' software development concerns and government manager in Sri Lanka. It makes the assumptions that structure and advertisements costs will be enough for a successful start and that development will be completed in six weeks. statements adjustments could be necessary though due to risks like scope worm unexpected technical difficulties manager changes and shifting market conditions. To deliver a scalable the platform the estimate ensures a balance between status security and financial viability.



### **7.5 Possible budget errors and high-level threats.**

- **Scope edge:** During development new features could appear elevating the cost.
- **Unexpected technical questions:** unpredicted errors or security flaws could involve more time and money spent on development.
- **Manager Compliance Changes:** Future moderation to Sri Lankas e-commerce laws may call for updates which would add to the expenses.
- **Market Movements:** Movements in currency exchange rates may influence the price of third-party services.
- **Costs associated with client** purchase could go up if marketing capabilities require more funding than expected.

## **08. Conclusion**

Establishing a reliable and easy-to-use sell computer hardware and accessories platform that provides seamless online and in-store experiences is the goal of this application. Through the combinations of gamify AI-powered suggestions and more interactive product customization the platform makes sure secure delivery and advanced order processing while improving client's engagement. A well-organized development plan efficient use of funds and an importance on client satisfaction will position the platform to become a top destination for tech enthusiasts. Growth and long-term success will also be fuelled by strategic marketing ongoing improvements and industry trend adjustments.

## **09. Appendices**

### **Appendix 1: Calculations for approximating Effort for project.**

The evaluated amount of work needed for each position associated with in creating the computer hardware and accessory e-commerce application is listed in this appendix. The approximation covers roles like project management frontend and backend development UI/UX design and quality assurance and is established on a six-week development period. To ensure an effective workflow that coincides with project milestones and deadlines each role is assigned working hours.

### **Appendix 2: The budget seizing up.**

The projected application budgets are thoroughly outlined in this section which also covers labour costs hosting security licensing and advertisements. To make sure safe transactions seamless user experiences and successful advertisements campaigns the cost takes into reflection the necessary infrastructure. These numbers are based on industry norms and current market rates ensuring a scalable and accessible solution.

### **Appendix 3: Project Timeline and Milestones**

An orderly development process is made sure by the project timeline which establishes important milestones between February 15, 2025, and April 2, 2025. Phases like planning UI/UX design development testing and final deployment are all included. These planned milestones lay the foundation for a successful product launch and client engagement strategy by helping in progress monitoring and make sure timely accomplishment.

## 10. References

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## **Presentation Video**

[Group 45 Presentation Video\(SPM\).mp4](#)

## **Figma File of User Interfaces**

<https://www.figma.com/design/HkD790YUCmRhOBJrWXafE0/UI-Hardware-Shop?node-id=0-1&t=uWwltwS6R7GyUYLZ-1>