DESIGN AND IMPLIMENTATION OF AN ONLINE ELECTRONIC SHOP

BY

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Masters of Science in Computer Science and Engineering

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APPROVAL

This Project titled **"Design and Implementation of an Online Electronic Shop"** Submitted by Md. Ariful Islam, ID No: 211-25-013 to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of M.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 21-09-2022.

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I hereby certify that the " Design and Implementation of an Online Electronic Shop " project that I submitted to Daffodil International University is a record of my original work. The content has not been submitted, in whole or in part, for a degree at this institution or any other university, as expected and recognized in the text.

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I would like to extend my sincere gratitude to Dr. Sheak Rashed Haider Noori, Professor and Head, Department of CSE, Daffodil International University, as well as to the other faculty members and employees of the CSE department at Daffodil International University, for their kind assistance in finishing my project.

We would like to express our gratitude to the elder brothers and fellow students from Daffodil International University who participated in this discussion while working on the assigned coursework.

Finally, we must hold our parents' perseverance, support, and encouragement in high respect.

ABSTRACT

The main goal of this “Design and Implementation of an Online Electronic Shop” project is to make find the product add to cart easy and comfortable for the right of the user from finding route product. In this project, we have two part, Admin and User. The company-to-consumer aspect of electronic commerce is the most significant commercial application of the World Wide Web [3]. The primary goal of an e-commerce website is to conduct online sales of goods and services. The creation of a "Online Electronic Shop" e-commerce website is the focus of this project. It offers the user a list of the many Electronic Devices that may be purchased from the Store. The user is given access to a shopping cart to make online purchases easier. After selection of the items, he is forwarded to Payment Gateway process. This project was selected with the goals of creating a simple website that offers a shopping cart application to customers and learning about the technologies necessary to create such an application [8]. This application is created Front-End using the CSS, React.js and java Script. Back-End using Node.js, Express.js, jsonwebtoken, Redux, Reducer, and database system Mongoose. MongoDB Atlas server have used to display the web page, for data handling and strong. Finally, I hopeful that, the “**Design and Implementation of an Online Electronic Shop”** will be succeed for my and Appointment Booking user.

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CHAPTER 1
INTRODUCTION

1.1 Introduction

Online electronic shopping is the practice of a customer engaging directly and face-to-face with a vendor to make online purchases of goods, services, etc. Online shopping is the practice of buying goods and services from companies that run websites. Since the advent of the World Wide Web, businesses have tried to market their products to Internet users [1]. Customers can browse online stores while utilizing a computer or while relaxing in their homes. Online retailers sell a variety of products to consumers.

In reality, consumers can purchase almost everything from companies who provide their products online. Computers and smartphones are among the hundreds of things that shoppers can buy from an online store. Because it's convenient, many individuals choose to purchase online. Some consumers prefer the thought of physically visiting a store and engaging in the purchasing experience. Customers cannot connect socially or touch products when they purchase online. Additionally, it prohibits people from bringing the goods home the same day they purchase them.

You may browse through many options and even find products that aren't accessible in stores when you purchase online. You're guaranteed to discover what you're looking for on the internet if you're seeking for a great product that might not be available locally. The opportunity to compare products, whether comparable or not, online is much more helpful [3]. You may compare material quality, sizes, and prices while simultaneously searching via numerous stores.

1.2 Motivation

I was inspired to create this electronics website because most people these days spend most of their time online or through social media. So that they see different websites at different times and become familiar with online shopping, so that they continue to be loyal to online shopping.

1.3 Objectives

- Users can easily purchase electronic products at home through online.
- Providing delivery within 24 hours.
- Free home delivery is offered.
- Ensuring quality and brand of all products.
- User interface easy to use.

1.4 Expected Outcome

In the early stages of your engineering career, we have selected the best and most well-liked projects to assist you in finishing your fundamental project work. Here is a lengthy list of suggestions for small-scale electronics projects, complete with references so you can learn more about each one. A components list can be seen on each project page.

Send us the specifics of your project if you wish to share it and assist other customers. Your project will likely be included in this.

1.5 Report Layout

Chapter 1:(About the project, Motivations, objective, Expected outcomes and Future work, Report layout)

Chapter 2:(Introduction, Related works, Comparative studies, Scope of the problem, Challenges)

Chapter 3:(Business process modeling, Requirement application, Definition of DFD, DFD Symbols, Data Flow Diagram, Use Case Modeling and Description, Logical Data Model)

Chapter 4:(Front-end design, Back-end design, Interaction design and ux, Implementation requirements)

Chapter 5:(Implementation of database, Database Design Schema and Model, User Schema, Product Schema, Order Schema)

Chapter 6:(System Testing and Component Testing, Registration Validation Page, Login verification page, Database Testing, Test Results and Reports)

Chapter 7:(Discussion and conclusion, Scope for Future Developments, REFERENCES)

CHAPTER 2
BACKGROUND

2.1 Introduction

This undertaking an online shopping site called Electronic Shopping allows us to purchase consumer goods. Users of this site have access to comprehensive information on all consumer products in addition to the ability to purchase goods. It is made simpler by the variety of product categories. The following are the stages required in placing an order for consumer goods [1]. Users can examine the specific product details with an image after first viewing the categories list. They see both the large and miniature versions of the product image. If consumers decide to purchase just one item, they do so by clicking the Add to Cart option. Anytime they want, they can view the cart. The user's selected products are all present in the shopping basket. For products that have been purchased, it shows the product's name, quantity, price per quantity, and overall cost. Additionally, it features buttons to update and remove items from the shopping cart, respectively.

2.2 Related Works

Online shopping is growing more and more popular these days because it helps consumers save a ton of time and learn about other consumers' experiences with a product. As a result, online shopping has grown significantly in popularity among consumers. As a result, I decided to write this post to share my knowledge about the top online shops where you can purchase your preferred electronics and gadgets with some market researchers. I'll suggest that you shop at the top electronics retailer you can trust completely.

There are: - Pickaboo (Electronics), BD SHOP (Electronics), Daraz (A to Z), PriyoShop (A to Z), AjkerDeal (A to Z).

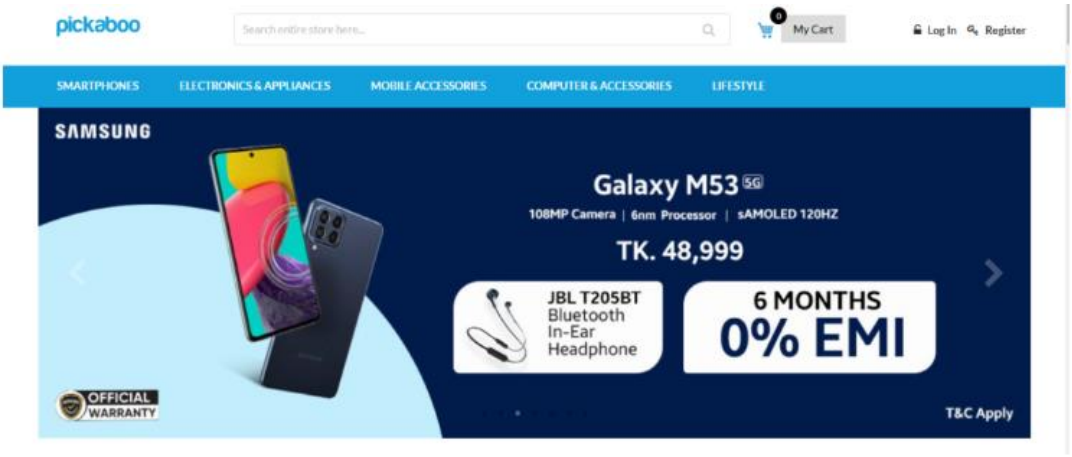

Figure 2.2.1: Pickaboo (Electronics)

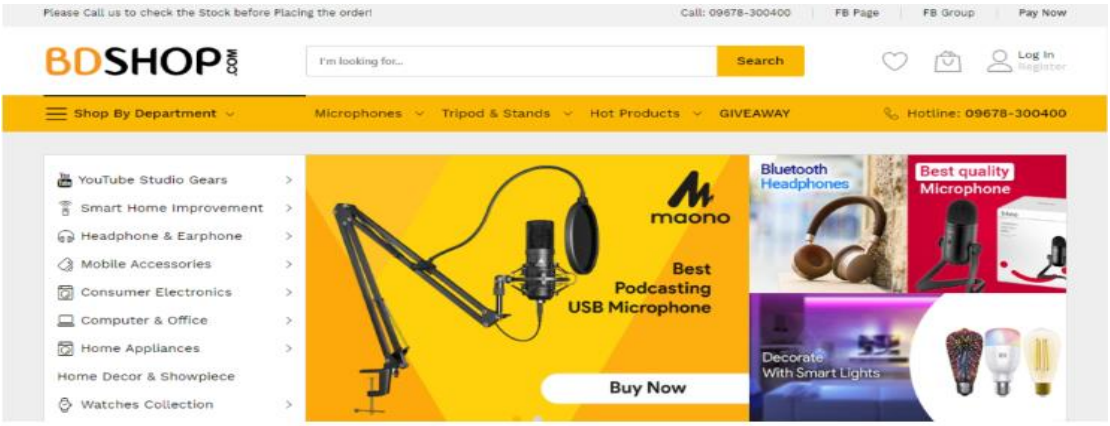

Figure 2.2.2: BD SHOP (Electronics)

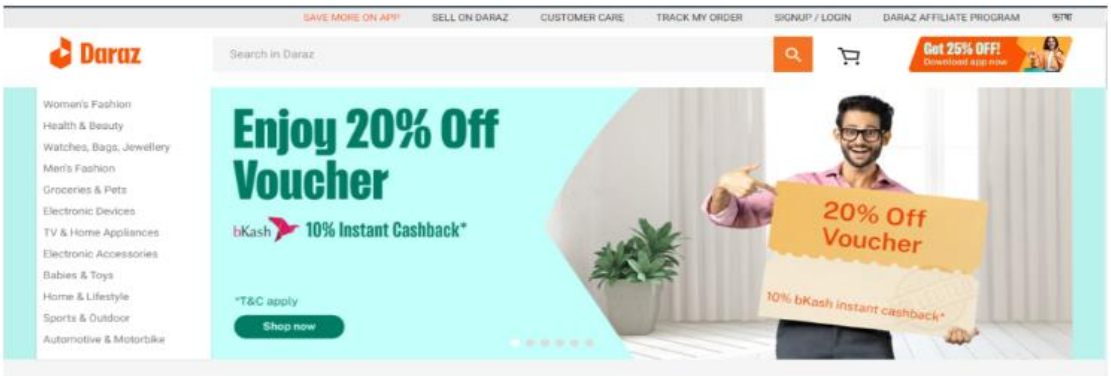

Figure 2.2.3: Daraz (A to Z)

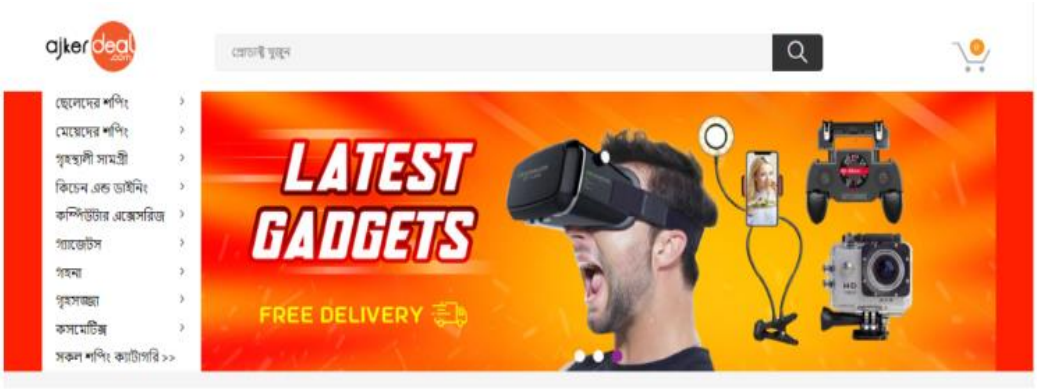

Figure 2.2.4: AjkerDeal (A to Z)

2.3 Comparative Studies

Before you click the "Buy Now" button when online shopping for gadgets, there are a few things you should be aware of. Many individuals are unaware that acquiring a new electrical equipment online isn't as straightforward and practical as doing so for a car or household appliance. There are some things you need to do before buying electronics online, just like with any other transaction. These frequently asked questions can aid in your decision-making.

I hope that using these online stores will help you in the future when you purchase for electronics. To purchase my electronic goods, I personally tried all of these online retailers and obtained a variety of experiences. In order to get your assistance, I decided to share my experience countdown list with you.

2.4 Scope of the Problem

In consideration of the current system for online purchasing of electronic components, I am interested in creating this kind of system to increase user assistance on these websites. It supports the consumer as a whole user and needs to be used appropriately by everyone online. The user may effortlessly communicate and express their thoughts. In this situation, I believe it would be beneficial for consumers to establish a community and learn from one another. I'm hoping that customers will readily embrace my website for its special helpful feature that enables it to create an online system.

2.5 Challenges

A large and rapidly expanding market is the electronic industry. New electronic goods are released daily and are gaining popularity. Due to the constant introduction of new products, very little attention has been paid to products that vanish from the market, which has caused both retailers and customers to be extremely perplexed. For merchants who struggle to both attract new consumers and keep their existing ones, the situation is extremely important [6]. However, in online trade, e-tailors don't worry about the launch of new electronic products because they won't buy and store any products instead of merely collecting the order from a consumer and giving it to any one of the retailers who connect with them.

CHAPTER 3
REQUIREMENT SPECIFICATION

3.1 Business Process Modeling

In the literature on electronic commerce via the Internet, the word "business model" is not regularly used, and usually authors do not even define it. As a result, before beginning the process of developing a business model, its definition must be established.

By itself, a business model does not yet explain how it will assist any of the enterprises that are its players in realizing their corporate objectives. We must comprehend the company's marketing strategy in order to assess the viability of the firm and offer answers to questions like how competitive advantage is being generated, what is the positioning, what is the marketing mix, and which product-market strategy is employed. As a result, in addition to business models, it is crucial to understand "marketing models".

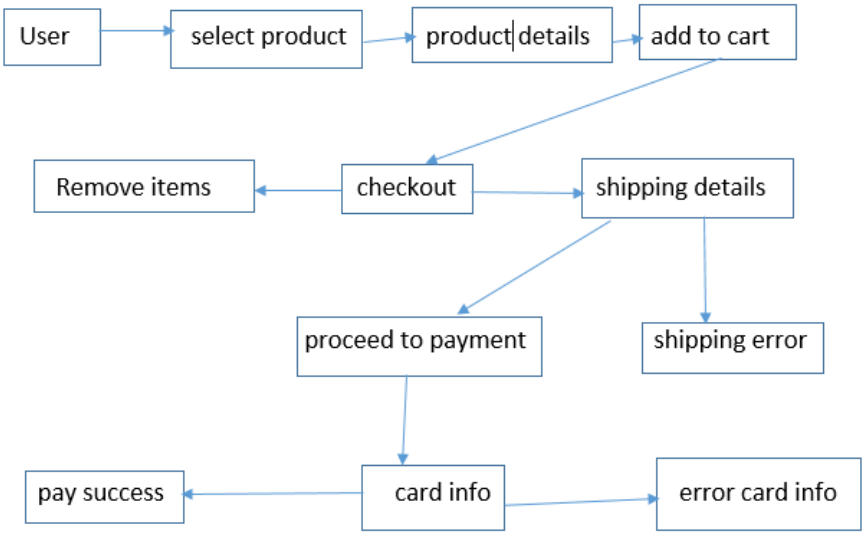

Figure 3.1: Business Process Model for Electronic Shop

3.2 Requirement Application

The gathering and evaluation of requirements is one of the crucial stages in the creation of apps. It is necessary to mount a few requirements of the required scheme before installing the actual software.

1. Operation system (windows 7/10)
2. Front end Technologies
    - CSS3, JavaScript, React.js.
3. Back end Technologies
    - Node.js, Express.js, JWT.
4. Database
    - Mongoose.
5. Tools
    - VS Code, Dev Tools, GitHub.

3.2.1 Definition of DFD.

Every firm has so many moving pieces or divisions that it may be difficult to keep track of each one's contribution. Workplace efficiency and productivity are increased by identifying procedures or areas that require improvement on a regular basis. The data flow diagram is one of the most straightforward and practical tools for companies to analyze, optimize, and implement new systems. DFD symbols are used to make processes and systems inside an organization simpler to understand and manage.

3.2.2 DFD Symbols

A data flow diagram is made up of four basic parts. The elements include external entities, data repositories, processes, and data flows.

- External Entity - a method or system used externally to send or receive data to and from the system depicted in the illustration. They are represented by squares and go by the names sources, terminators, sinks, or actors.
- Process - A process is a method that alters the flow of data by taking in data, processing it, and then providing an output.
- Data Store -Information is kept in data stores for future use, much like a file of documents waiting to be processed.
- Data Flow -Information traveling through processes and data stores to reach the system is known as data flow. The DFD can show you the direction of the data flow with arrows and brief labels.

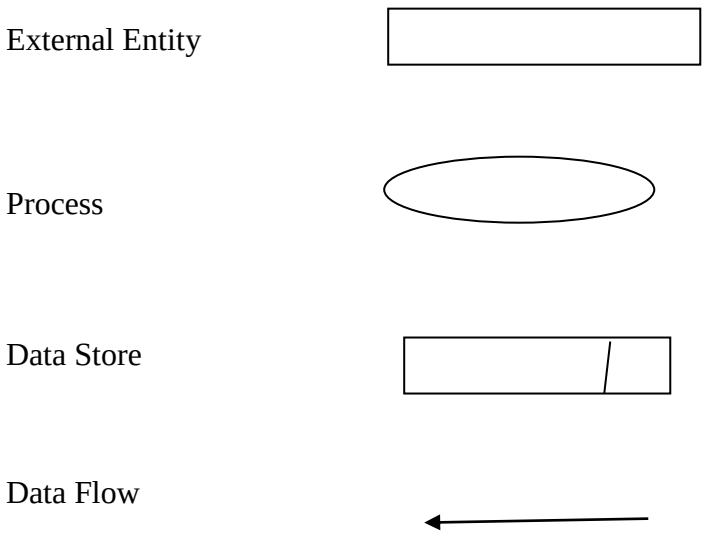

Figure 3.2.2: DFD Symbols

3.2 .3 Data Flow Diagram

A logical model is a fully allocated data model that is not constrained by organizational, technological, or DBMS constraints. Business-as-usual information demands are frequently defined. Relational notation is a common tool for information modeling. To construct the final information implementation, relational technology is not required.

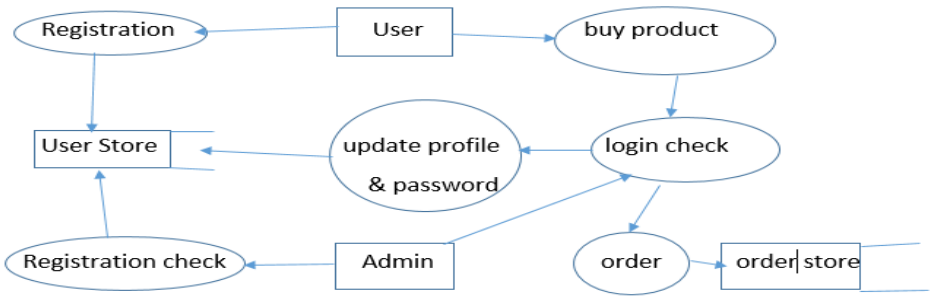

Figure 3.2.3: DFD Diagram for User.

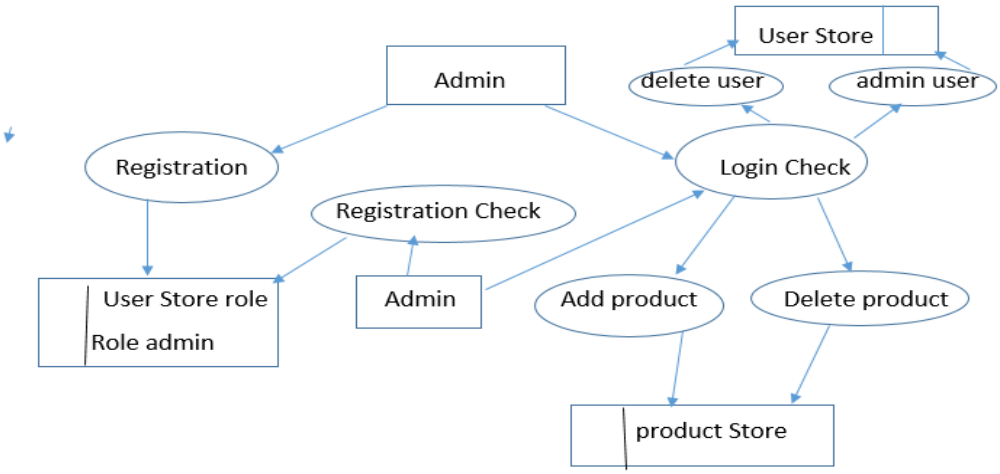

Figure 3.2.4: DFD Diagram for Admin

3.3 Use Case Modeling and Description

A use case is nothing more than a key component of any system that works. After classifying the use cases, we must list every single actor or item that will interact with the system. These individuals are in charge of turning on a system's operations. An actor might be a person, object, or both. It could also be the private entity of a system. These actors must be relevant to the functionality or system they are interacting with.

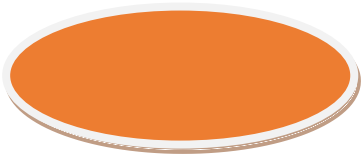

Figure 3.3.1: Use Case.

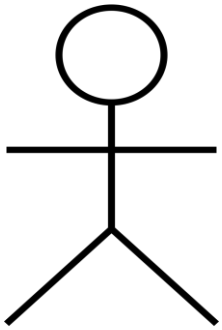

Figure 3.3.2: User

For instance, any user will go to the Our Electronic Shop Website and they see the same route without registration and login. If user click the product route this system goes to the login page. if the user before has registration they can login. Otherwise do the registration before [7]. User login the " Electronic Shop" then buy the product from product route and see the right sidebar. sidebar is some page available, they are Profile, orders, cart and logout. User click the profile page they can see his profile picture, name, email and some links (such as Update Profile, Update Password and My Orders). User go to the cart page they can see the all product are select to buy and user go to the orders page they can see the all product they are successfully pay. User click the logout link user logout this website successfully.

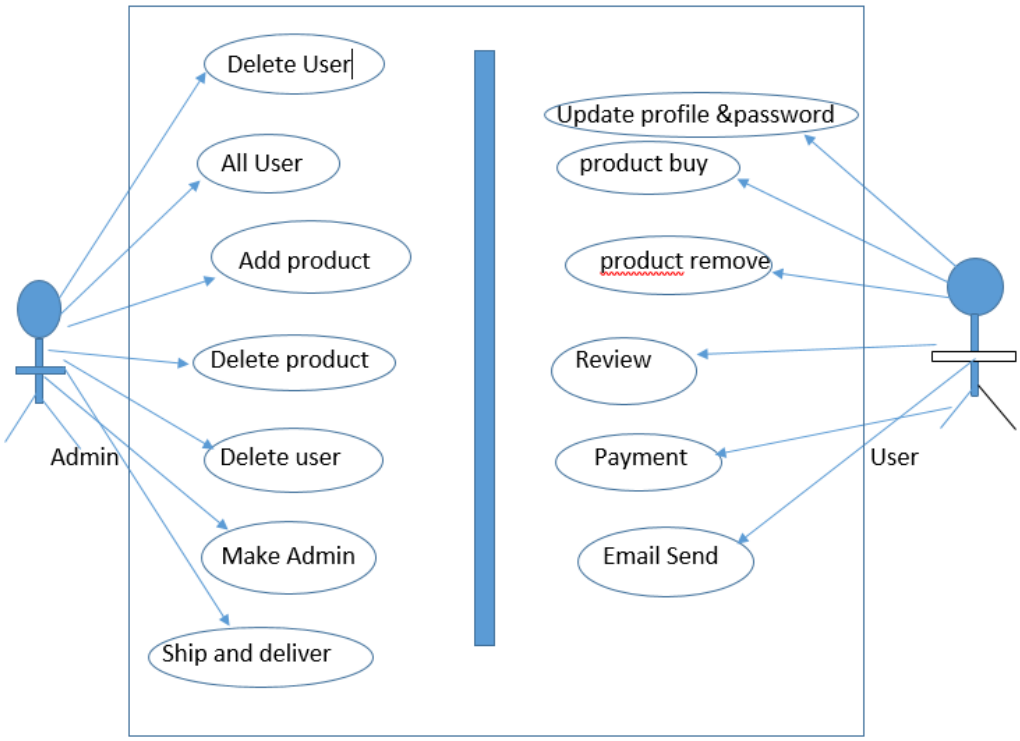

Figure 3.3.3: Use Case Model.

3.4 logical Data Model

Data objects, attributes, keys, and relationships are shown using a type of data model called a logical data model (LDM). To create a basic framework for elements of the semantic layer in data management systems, this form of model is uniquely independent from a particular database [3]. An LDM can be compared to a blueprint: It stands for the definitions and traits of data pieces that endure despite technological advancements. My project's design demands will differentiate and the product, system, or experience I have designed. The primary key is defined for each entity. Foreign key is specified and also specified all attributes type. In figure 3.4.1 had shown the projects ER diagram, design of database table.

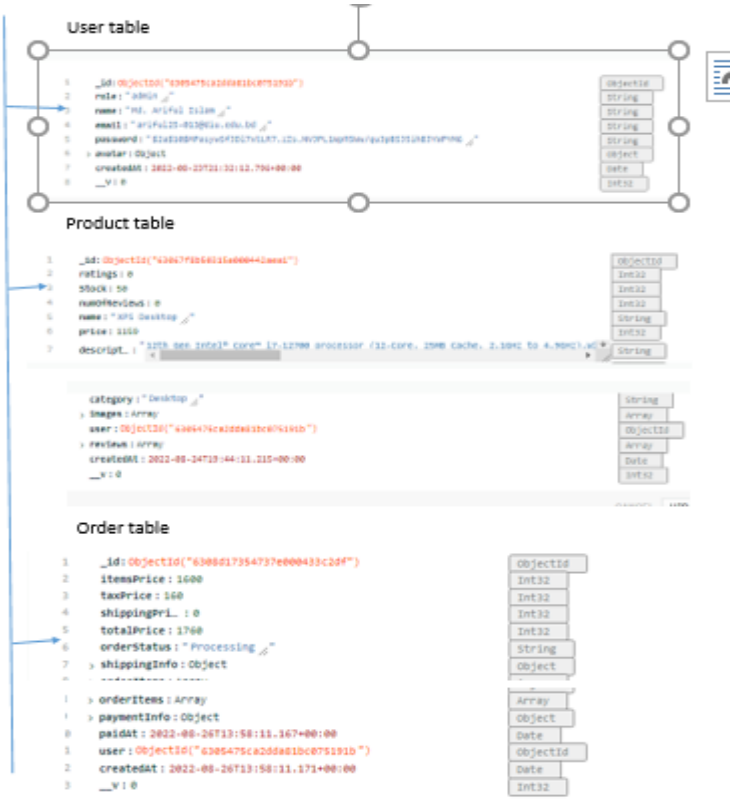

Figure 3.4.1: E-R Table DBMS.

Following this Figure 3.4.2 had shown E-R Diagram of user and admin category.

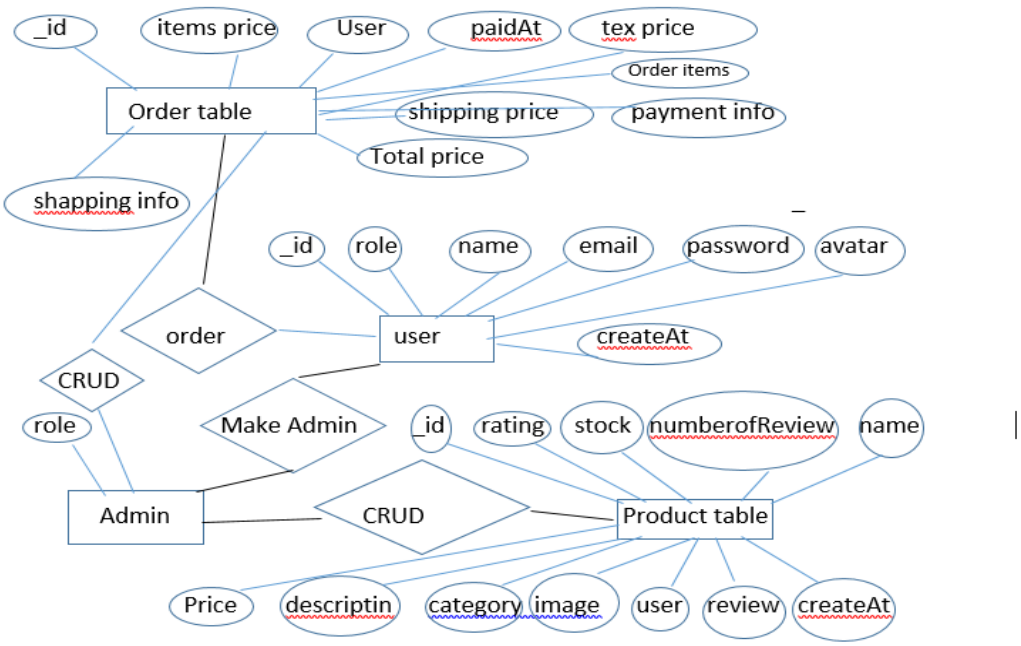

Figure 3.4.2: E-R Diagram

CHAPTER 4
DESIGN SPECIFICATION

4.1 Front-end Design

This web site is designed with frontend using React.js, CSS and JavaScript.

React.js: React is a front-end JavaScript framework for building user interfaces based on UI components that is open-source and free. Meta updates it along with a number of independent programmers and companies.

CSS: The language used to create Cascading Style Sheets allows you to write style sheets that specify how a document will look when presented in a markup language like HTML or XML. CSS is one of the underlying technologies of the World Wide Web, along with HTML and JavaScript.

JavaScript: JavaScript is a dynamic programming language that may be used to build a variety of things, including websites, web applications, games, and more. With it, you can provide websites dynamic elements that you couldn't achieve with only HTML and CSS.

Home, Product, About, Contact, and Sign Up Login all use front-end design.

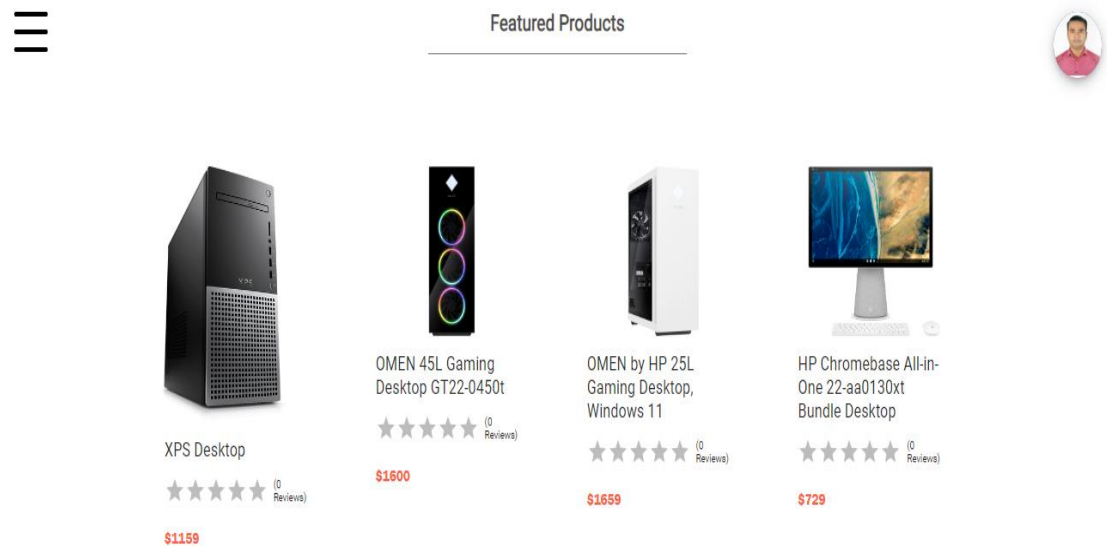

Figure 4.1.1: Top Home Page

Product Page: User Click the Product Route he can see the many products. If the user goes to the product page, he can see many products and buy according to his choice, but the user must be logged in to the website.

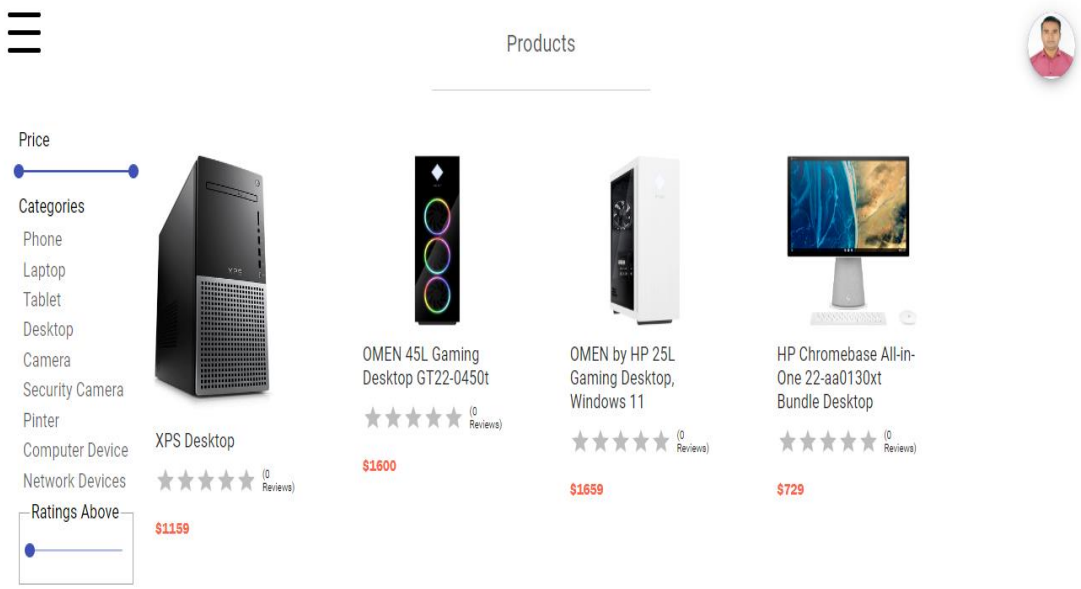

Figure 4.1.2: Product Page.

Phone Category: If the user goes to the phone category on the product page, he can see many phones and buy according to his choice, but the user must be login to the website.

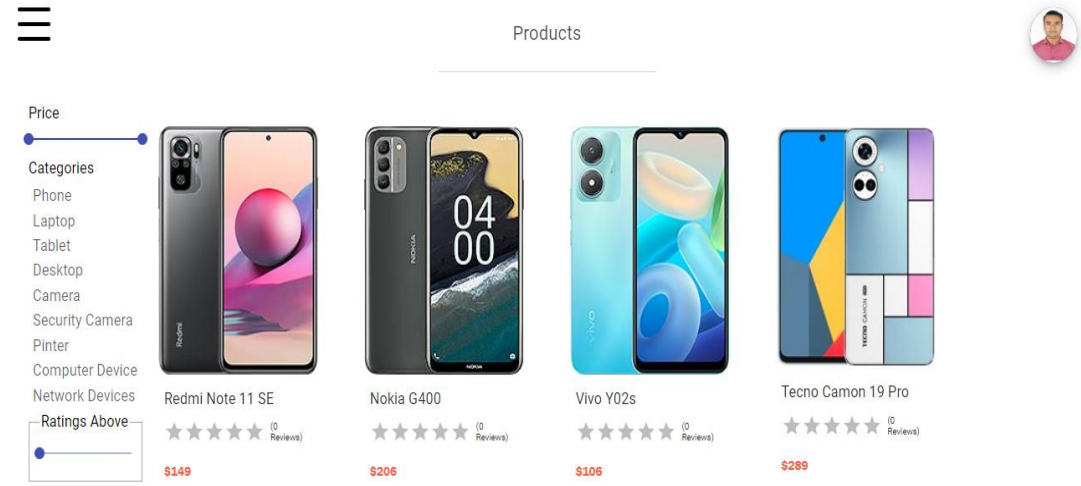

Figure 4.1.3: Phone Category Page.

Tablet Product: User click the Tablet category the see buy the tablet form the website

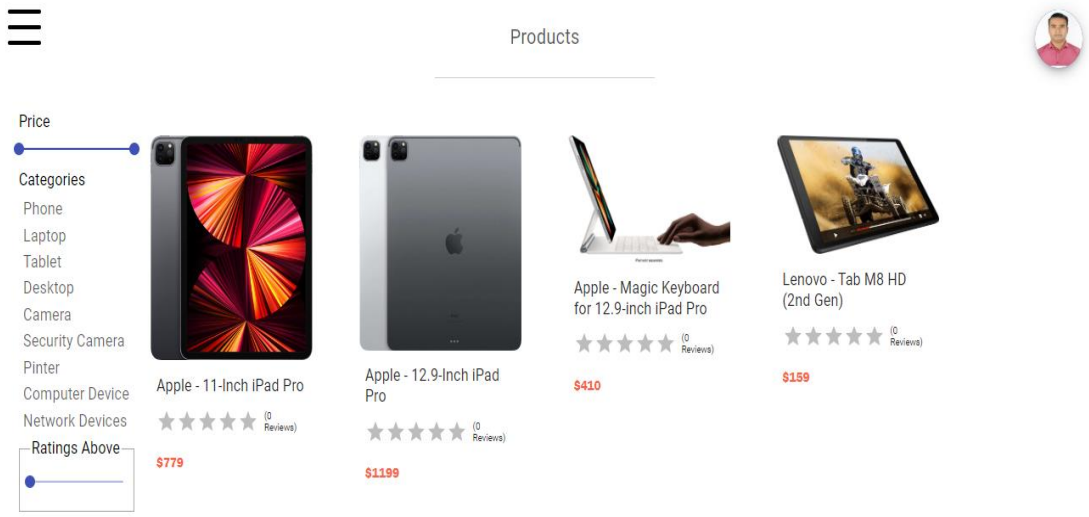

Figure 4.1.4: Tablet Categories Page.

Computer Device Product: User click the compute device category the see buy the compute device form the website

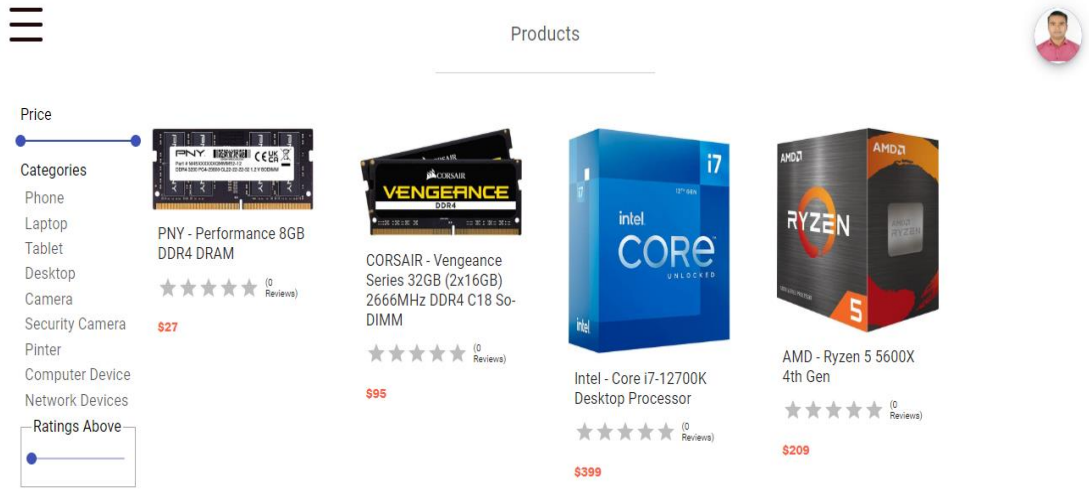

Figure 4.1.5: Compute Device page

Contact Page: When the user goes to the contact page, he will see a form. If you have any opinion about the website, write it in the message option and click on the send button, the message will go to the admin.

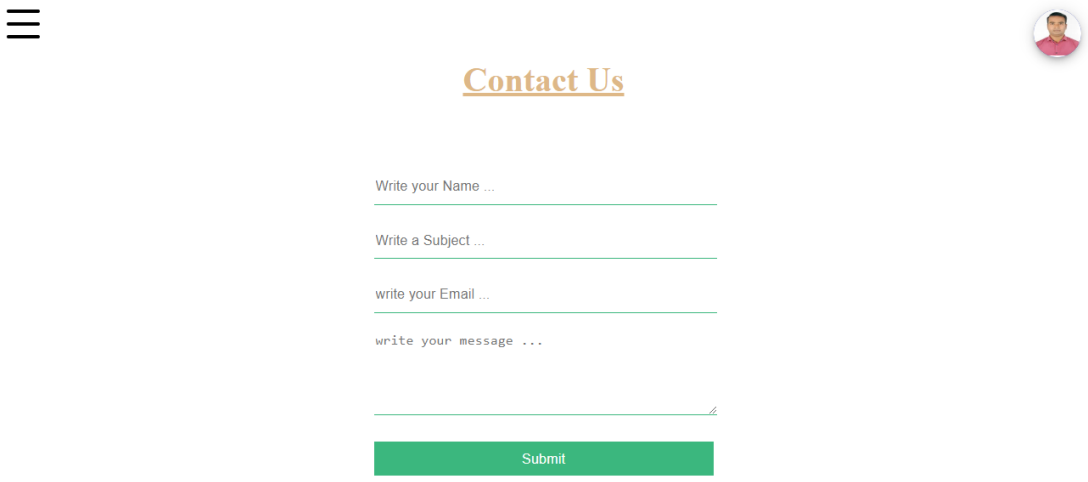

Figure 4.1.6: Contact Page.

About Page: If the user goes to the about page, he will know about the website.

Figure 4.1.7: About Page.

Register Page: If the user wants to register on the website then he has to give his name, email, password and picture. If not, registration will not take place

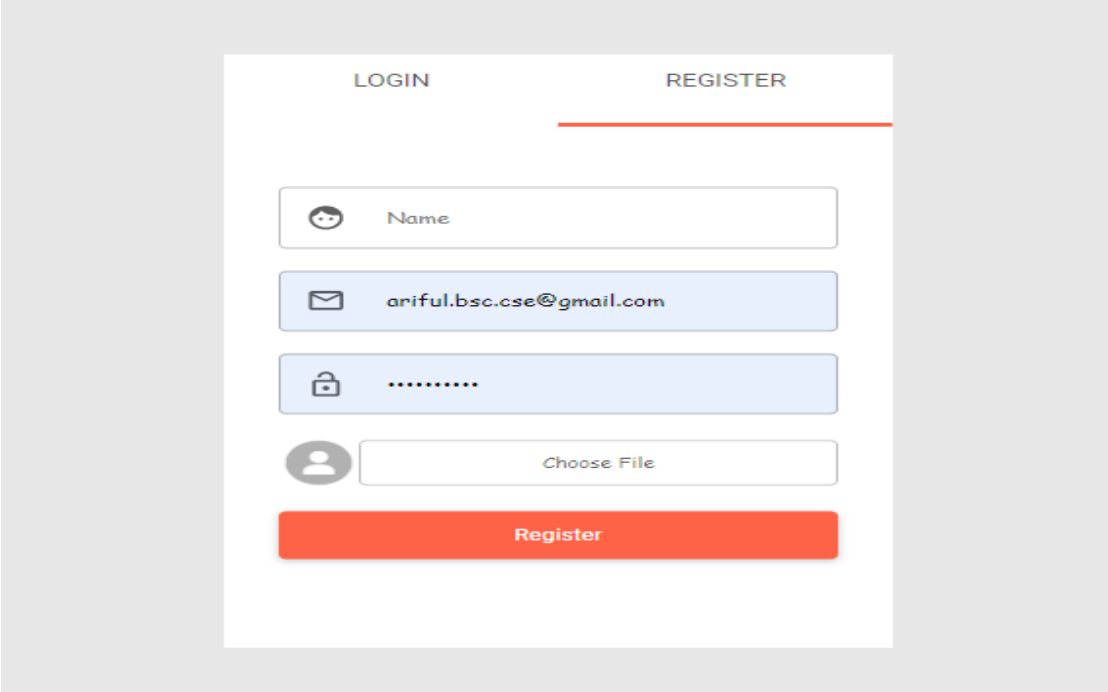

Figure 4.1.8: Registration Page.

Login Page: If the user wants to login to the website then he has to give his email and password. The email and password that has been registered. otherwise login will not occur

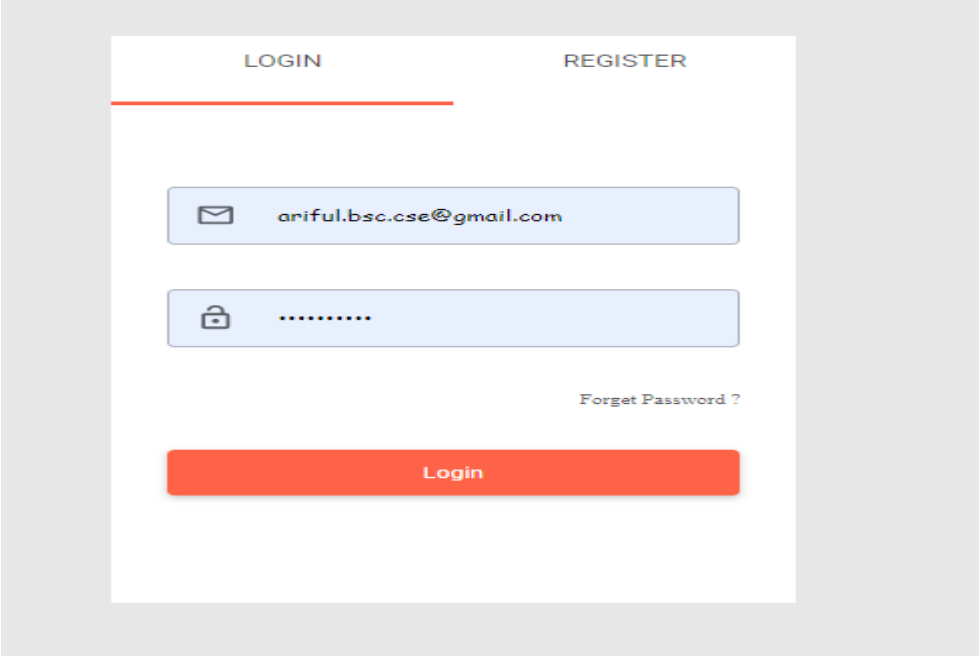

Figure 4.1.9: Login Page.

4.2 Back-end Design

This web site is designed with Backend using Node.js, Express.js, JWT and Database (Mongoose).

Node.js: The open source development environment Node.js allows JavaScript code to execute server-side. Real-time apps that require a constant connection from the browser to the server, such as chat, news feeds, and web push notifications, benefit from the use of Node.

Express.js: Express is a node js web application framework that offers a wide range of functionality for developing both online and mobile applications. It may be used to build web applications that are single pages, multipage, or hybrid. It is a layer that has been introduced to Nodejs to help with server and route management.

JWT: A client and a server can share security-related information using the open standard known as JWT, or JSON Web Token. Each JWT has a set of claims that are represented as JSON objects.

Mongoose: A simple, schema-based method for modeling your application data is offered by Mongoose. Type casting, validation, query construction, business logic hooks, and more features are already built-in.

Home, Product, About, Contact, and Sign Up Login all use front-end design. To create and keep the back-end section, I use MongoDB database and MongoDB Atlas server in our project.

Profile page: User can go to profile sidebar page to see his profile update, password update and all his orders.

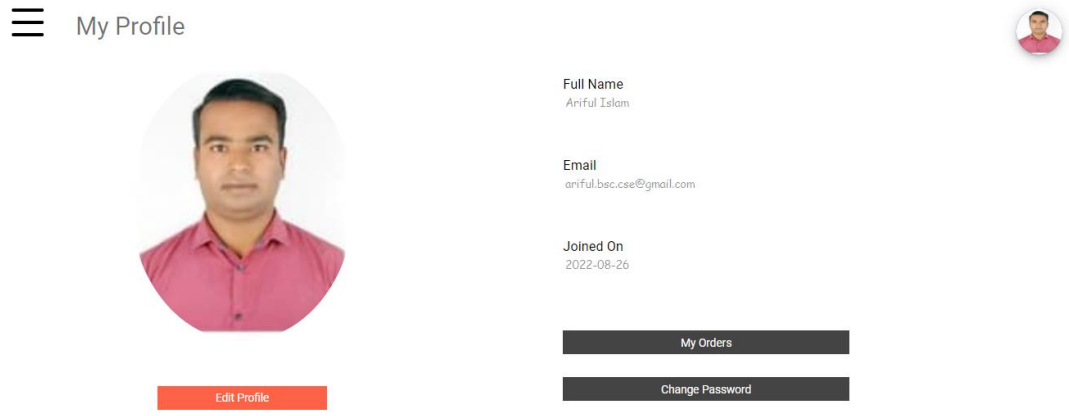

Figure 4.2.1: Profile Page.

Cart Page: The user can go to the cart sidebar page and see the products that have been added to the cart.

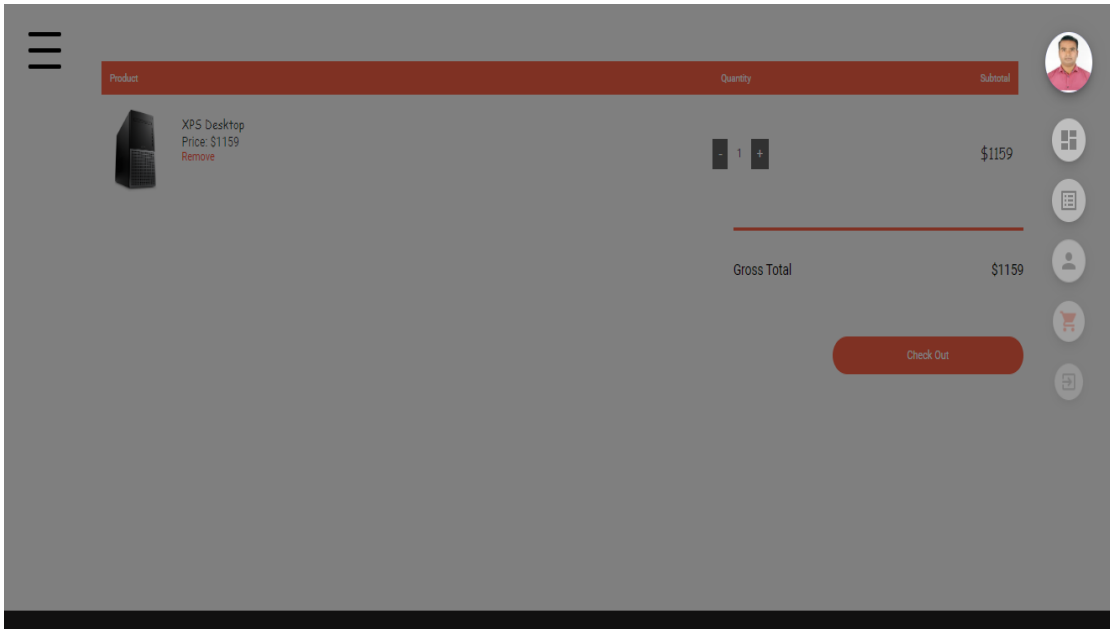

Figure 4.2.2: Cart Page.

Dashboard: Admin can see all products and users on dashboard page.

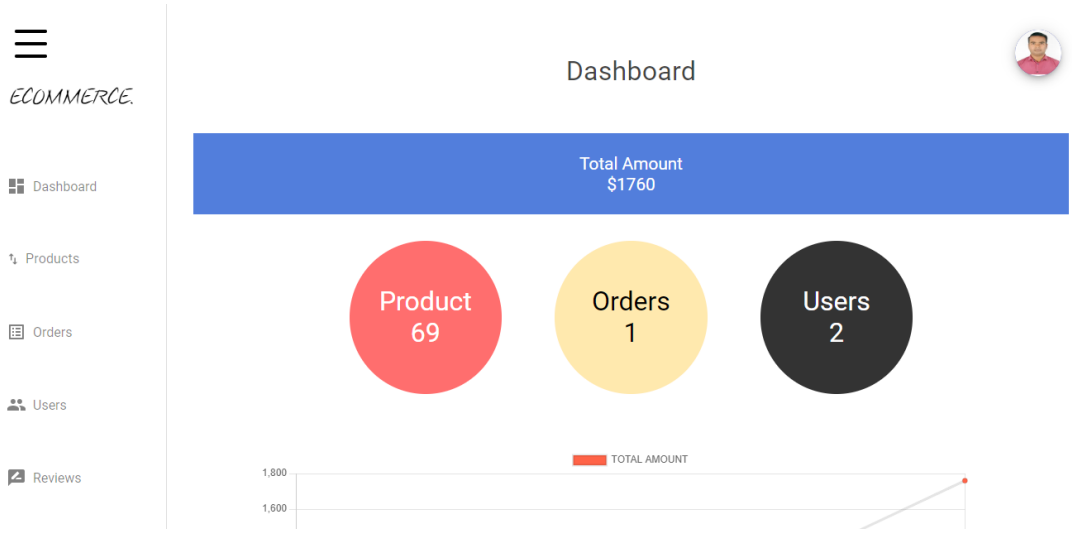

Figure 4.2.3: admin dashboard Page.

ALL PRODUCTS: Admin can go to all products page and admin can be delete any product.

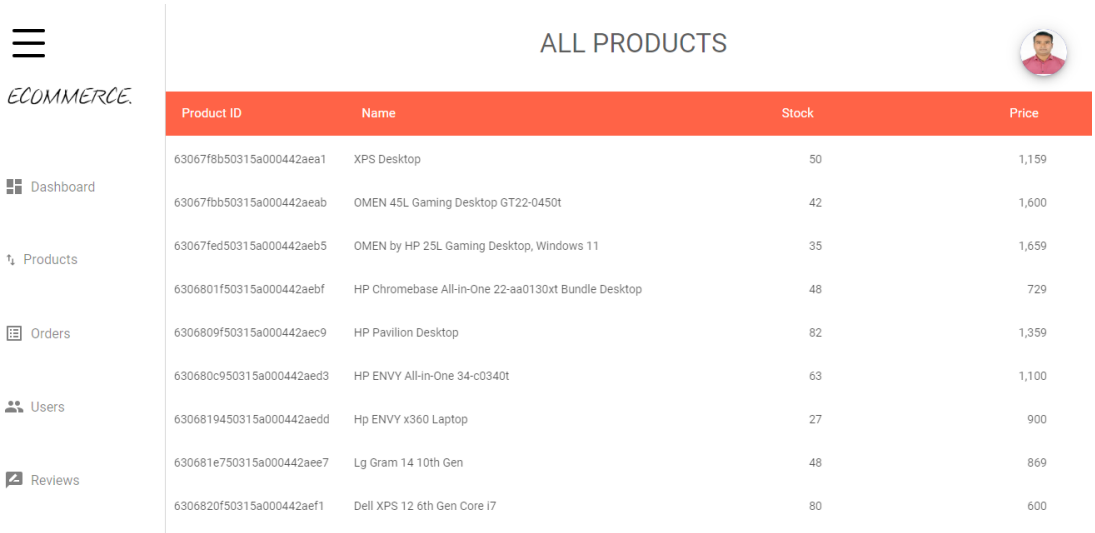

Figure 4.2.4: admin all product Page.

ALL ORDERS: Admin can go to all orders page and all orders can be shipped and delivered.

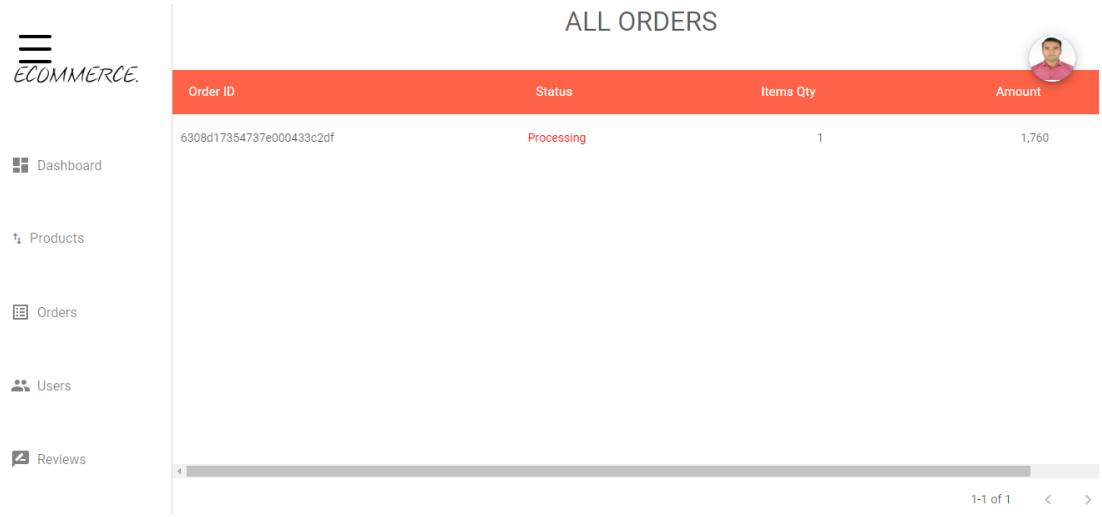

Figure 4.2.5: admin orders Page.

ALL USERS: Admin can go to all user's page and admin can be delete user and make admin.

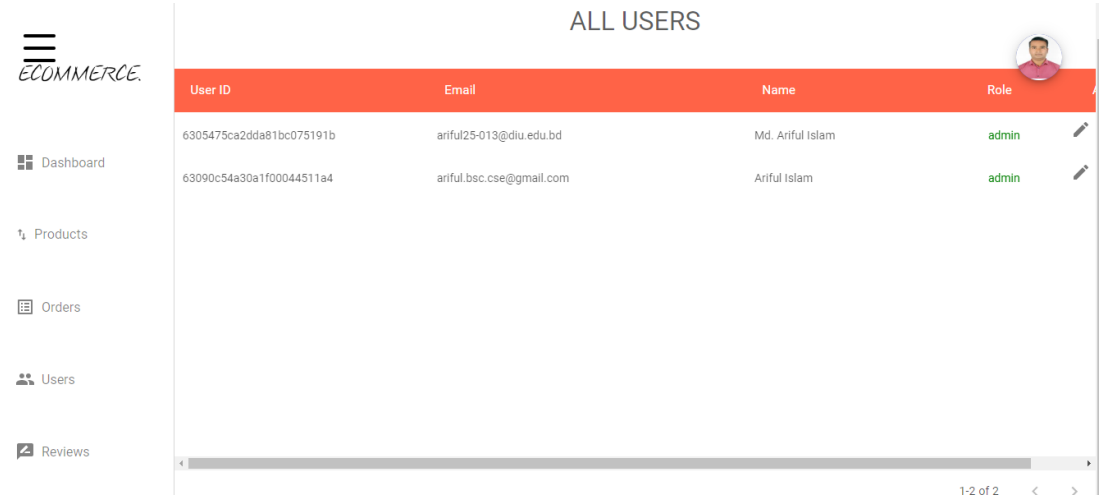

Figure 4.2.6: admin all users Page.

Create Product: Admin make a add product.

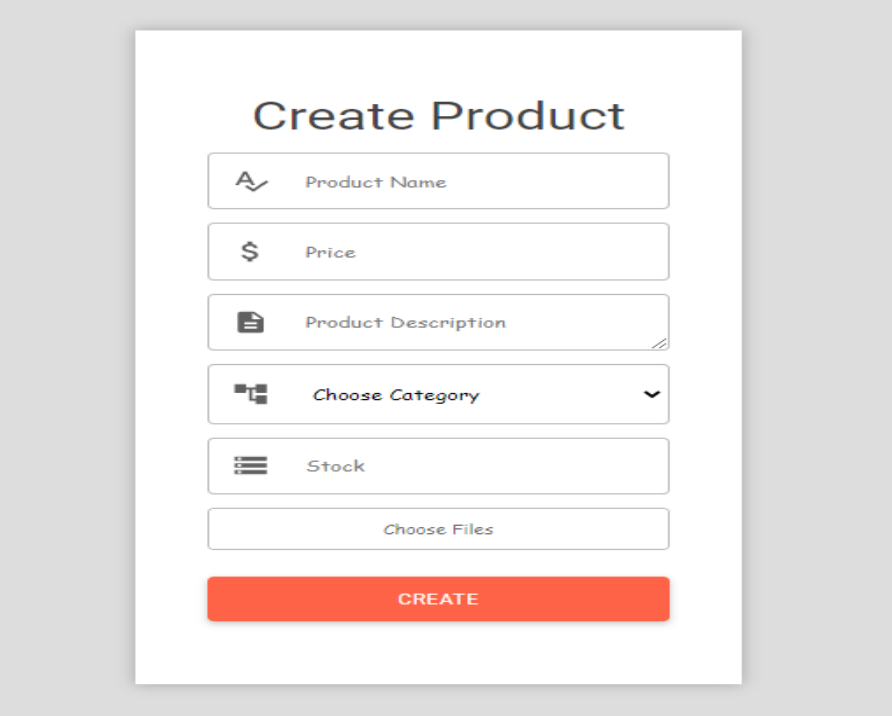

Figure 4.2.6: admin add product Page.

4.3 Interaction Design and UX

Interaction design and user experience design are sometimes used interchangeably. Given the substantial overlap between interface design and user experience design, that makes logical. The connection between a user and a product is crucial since UX design is all about impacting the user experience of a product. User experience and interface design, however, are not the same [7].

The way we approach user interactions is where UX and interaction design diverge most. The objective of interaction designers is to enhance the interactive experience for users at the point where they interact with a product.

According to UX designers, the actual interaction is just one step in a user's journey when using a product. User experience design takes into account every aspect of a system or product that consumers may see. According to UX designers, the actual interaction is just one step in a user's journey when using a product. User experience design takes into account every aspect of a system or product that consumers may see.

4.4 Implementation Requirements

Developmental tools are primarily used to create a whole web page where all features are derived from the tools. Setting specifications is the first stage in creating a significant sports venue. Without requirements, you wouldn't have any backbone. because the developer is unsure of his next steps. The system's weedy details are provided by requirements, which are necessary to prevent the system from entering an undefinable state [5]. Therefore, it is crucial to create a good requirement implementation for their website.

Customers may make purchases from the convenience of their homes or places of employment. The internet simplifies and facilitates shopping for the consumer. The transactions may be canceled with ease as well.

- conserves time and energy.
- the ease of doing your shopping at home.
- There are many different goods available.
- Good price reductions and discounts.
- Learn all there is to know about the product.
- We can contrast different models and brands.

CHAPTER 5
DESIGN AND IMPLEMENTATION

5.1 Implementation of Database

Mongooses is used as the backend database in this project. Mongoose is an Object Data Modeling (ODM) framework for MongoDB built on the Node.js platform. Similar to SQLAlchemy, it is an Object Relational Mapper (ORM) for traditional SQL databases. The problem that Mongoose attempts to address is the ability for developers to impose a certain schema at the application layer. In addition to enforcing a schema, Mongoose includes a wide range of hooks, model validation, and other features that facilitate working with MongoDB.

5.1.1 Database Design Schema and Model.

ODMs like Mongoose, which are on the other end of the spectrum, force us to adopt a semi-rigid schema straight away. A Schema object would be defined in your Mongoose application code and correlate to a collection in your MongoDB database. The Schema object specifies how the documents in your collection should be organized. The schema must then be converted into a Model object. The model is used to interact with the collection.

The mongoose module is one of NodeJS's most effective external modules. Mongoose, a MongoDB ODM, is used to translate the code and its representation from MongoDB to the Node.js server.

Advantages of Mongoose module:

- The MongoDB database's collection validation is simple to do.
- The collection may be used to implement Predefined Structure.
- With the help of Mongoose, constraints may be added to collection documents.
- The Mongoose module, which is built on top of the MongoDB driver, allows simple query abstraction and definition.

Update Profile: User can go to his profile page and update his profile with his valid information. Example User name more than 15 characters, password most including @ and phone number 11 characters.

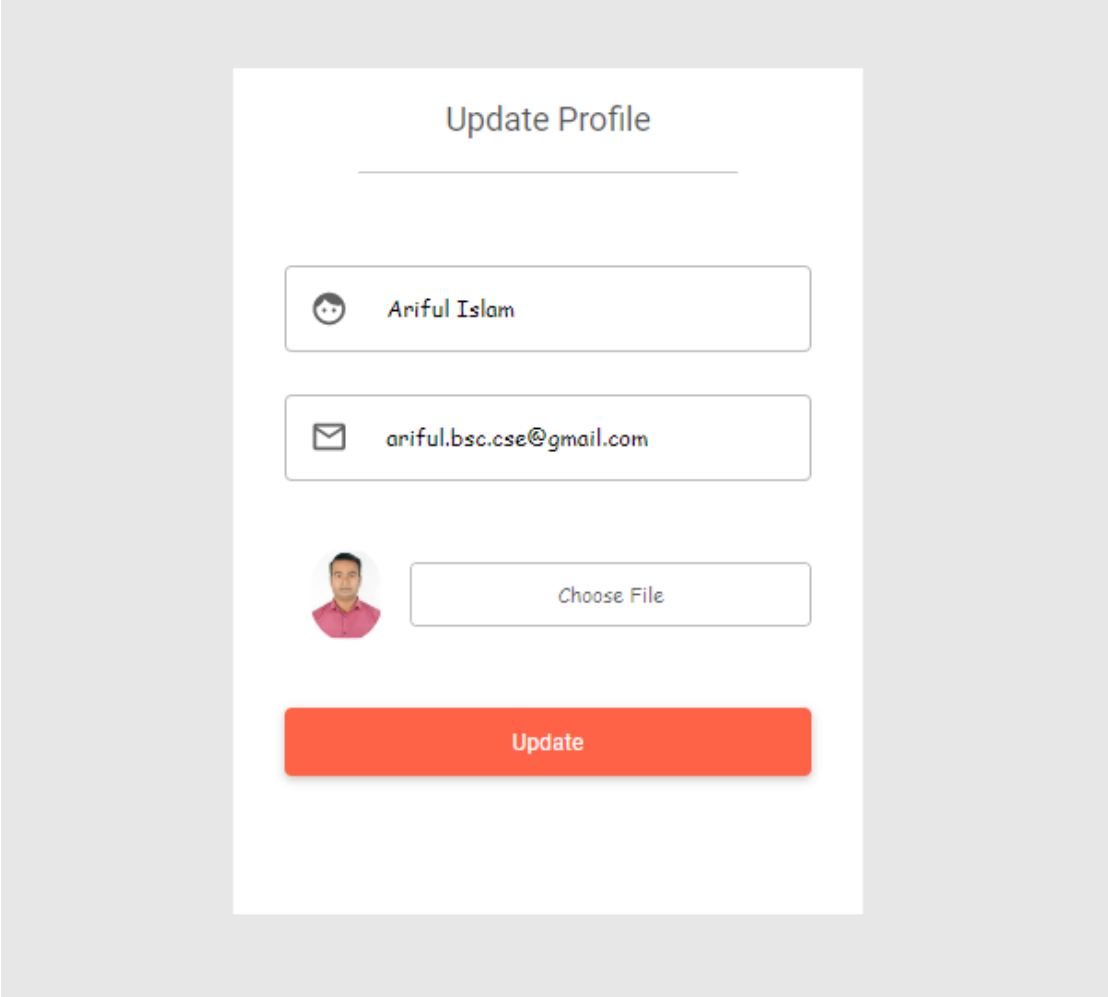

Figure 5.1.1: Update Profile

Change Password: User can go to his profile page and update his password with his valid information. Example previous password, new password and confirm password (Password is more than 8 characters).

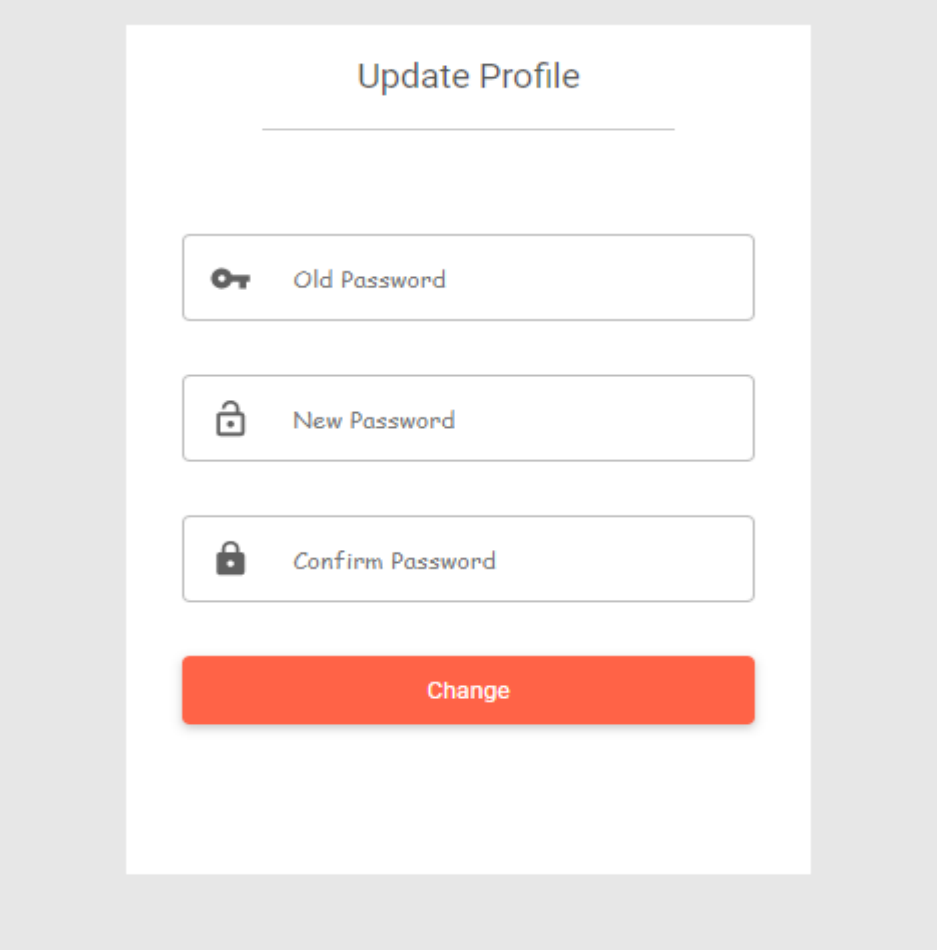

Figure 5.1.2: Change Password

My Orders: User can go to his orders page and see all his paid orders.

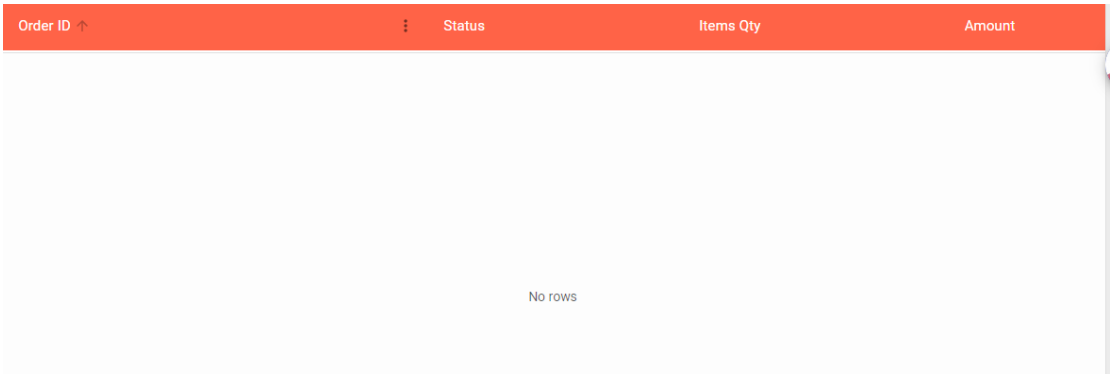

Figure 5.1.3: My Orders

Shipped Product: Admin click the all product page and click the edit pen then Admin can ship all the products that have been sent to the user by going to the orders page.

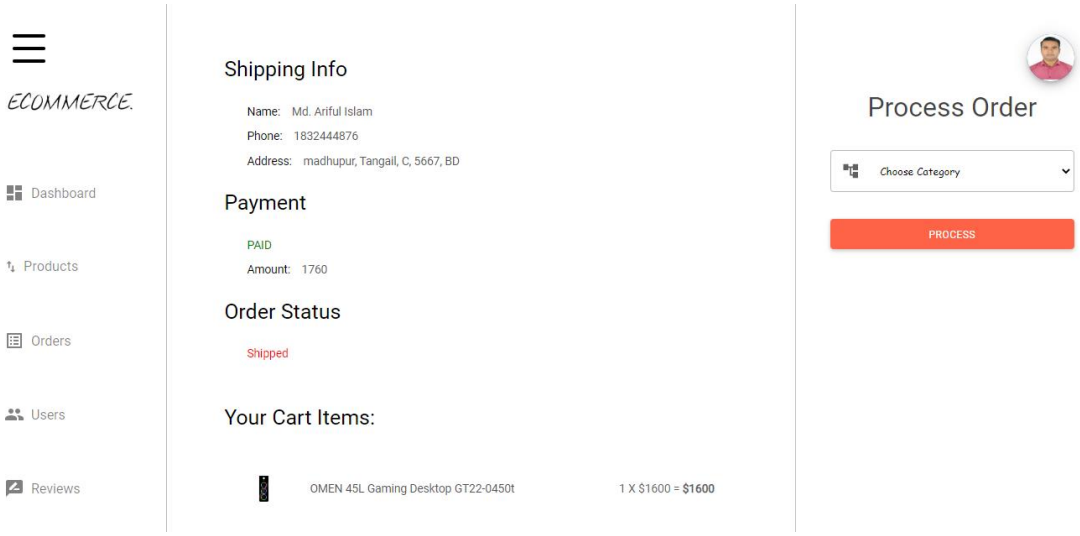

Figure 5.1.4: Shipped Product

Delivered Product: By going to the Admin Orders page and click the edit pen then all the products that the user has received can be delivered.

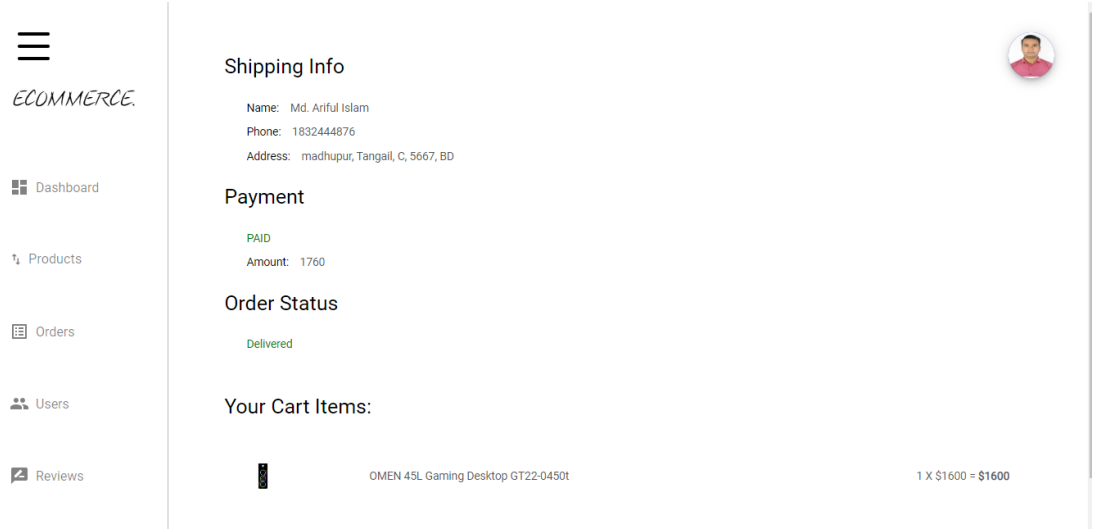

Figure 5.1.5: Delivered Product

Make Admin: Admin can give admin access to any user by going to edit option of orders page and delete any user.

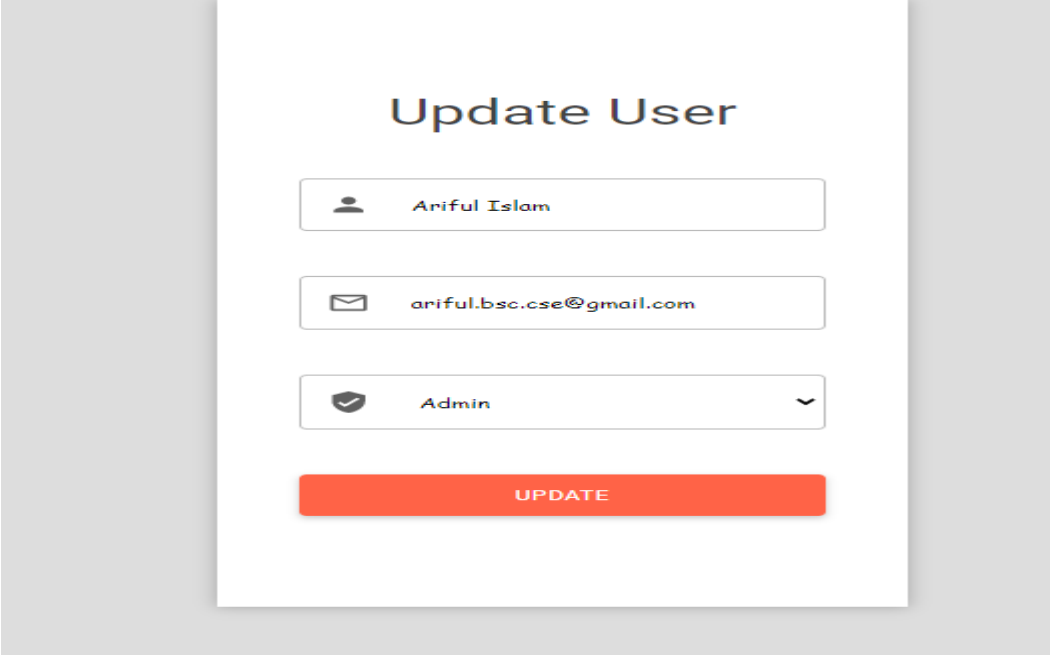

Figure 5.1.6: Make Admin

View Product Details: When the user wants to buy any product, he goes to the product view page to get an idea about that product. When a user goes to the product view page, a user will see the product name, product price, product description, and offer price information about that product. User can review and give a review about that product boot to the website login

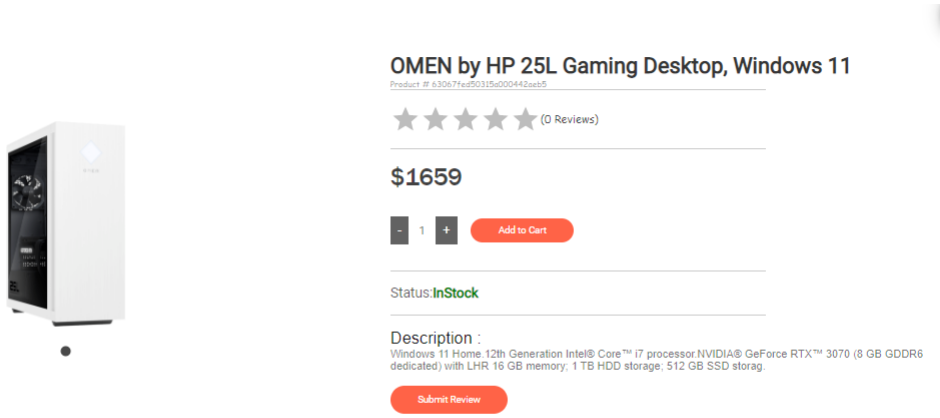

Figure 5.1.7: View Product Details

Check-out: When the user clicks on add to cart to buy a product, the product is added to the cart. If the user wants to buy that product by going to the cart page, he will click on the checkout button and if he does not want to, he will click on the remove link.

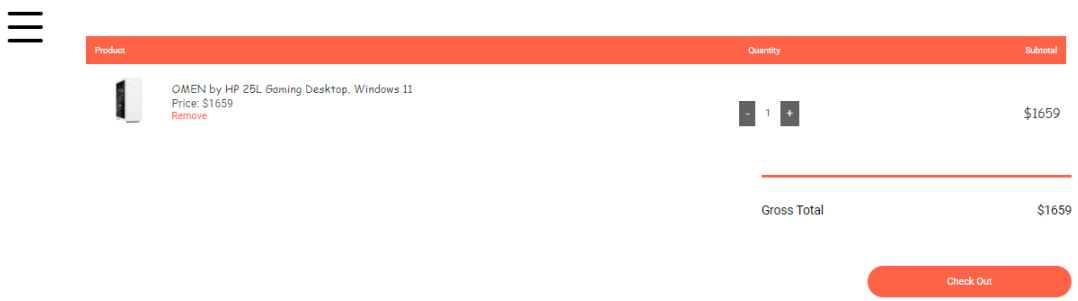

Figure 5.1.8: Check-out

Shipping Details: If the user clicks on the checkout button to buy a product, he will be taken to the shipping details page. Go to the user's shipping details page and give the information of his address, city, pin code, phone number, country and state.

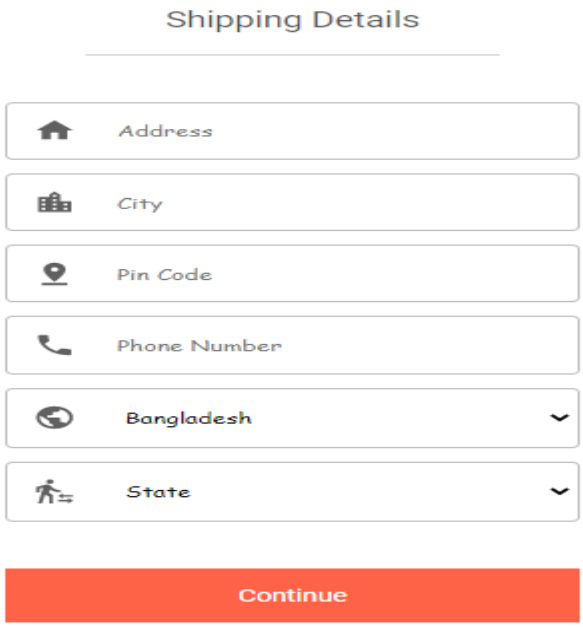

Figure 5.1.9: Shipping Details

Shipping Info: When the user goes to the shipping info page, he will see all the shipping related information. For example, you can see his name, phone number, address, information about the product he adds to buy and the total amount he will pay.

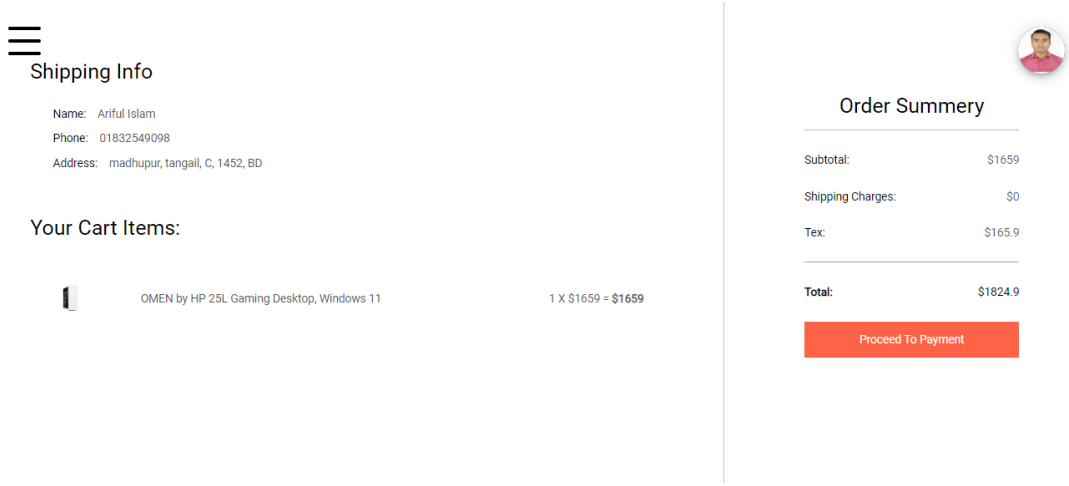

Figure 5.1.10: Shipping Info

Card Info: When the user clicks on the process then payment button, it will bring him to the card info page. Then pay with valid card information. Like valid card number, future date and 3 character cvc number.

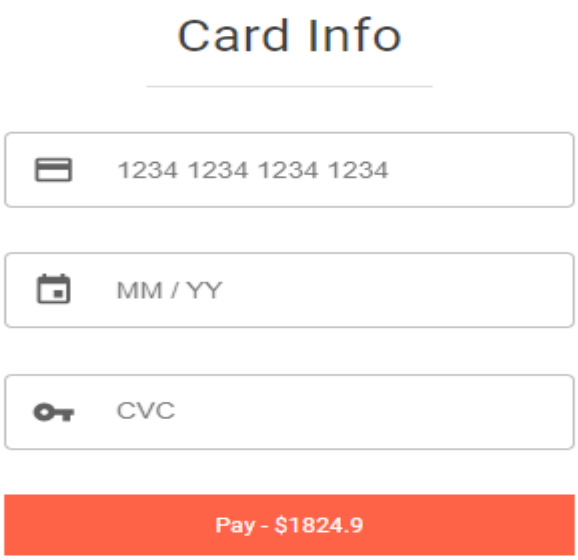

Figure 5.1.11: Card Info

5.2 Implementation and Interaction

Interactions are typical in systems nowadays. It's essential to make a system interactive and user-friendly. Making a system engaging is also essential. As we previously stated, we made an effort to develop a user-friendly and dynamic platform. It ought to be done in a way that appeals to the user.

CHAPTER 6
SYSTEM TESTING AND COMPONENT TESTING

6.1 System Testing and Component Testing

In order to test the functionality of a system, two or more system components must be integrated, and a system-wide embedded test must be executed. Web browsers have been used to test the software on Internet Explorer 8, Google Chrome, and Opera 35.0. Windows Operating System was used to evaluate the software as well.

The process of evaluating the various components of the system to ascertain whether their necessary functionality is being satisfied is referred to as component testing, also known as module testing [4]. It makes it possible to identify flaws in the components or modules of a system, ensuring that all flaws in the components are revealed and may be fixed. Prior to inclusion testing, component testing is essential since it helps find bugs.

6.2 Registration Validation Page

When a user initially logs in, they must click the Sign Up button and fill out some form data. If the data is accurate, he proceeds to the home page. And if he enters incorrect information (such as ariful120gmail.com or a password with fewer than eight characters, a name, or a photo, for example), he will be unable to register with this system. An error message is displayed below.

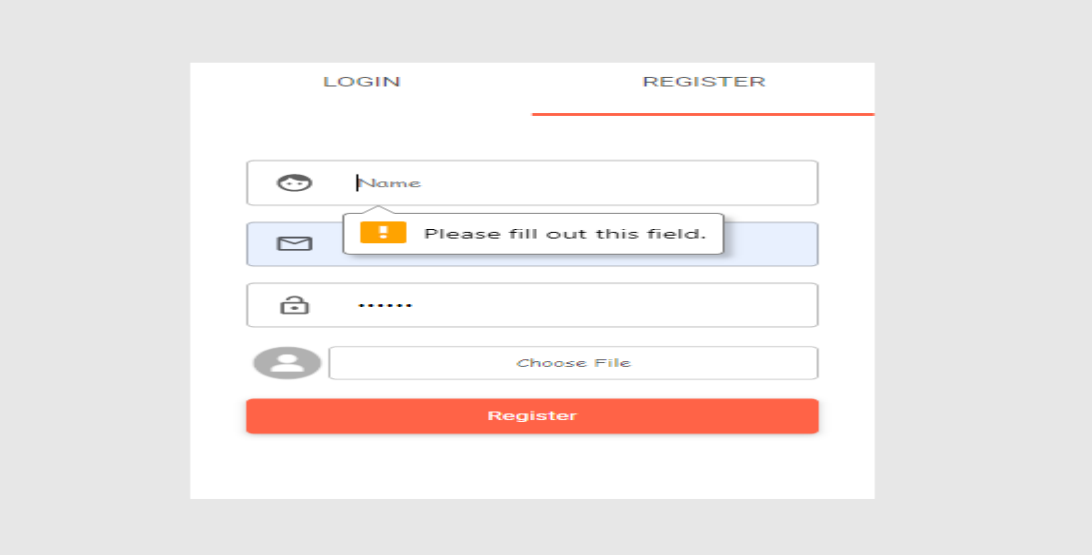

Figure 6.2: Registration Validation Page

6.3 Login verification page

If a user registers with this system and enters the necessary information, he or she can log in. Otherwise, the system displays a warning message that reads "Invalid username or password," but it allows the user another chance to enter the right information before redirecting to the site.

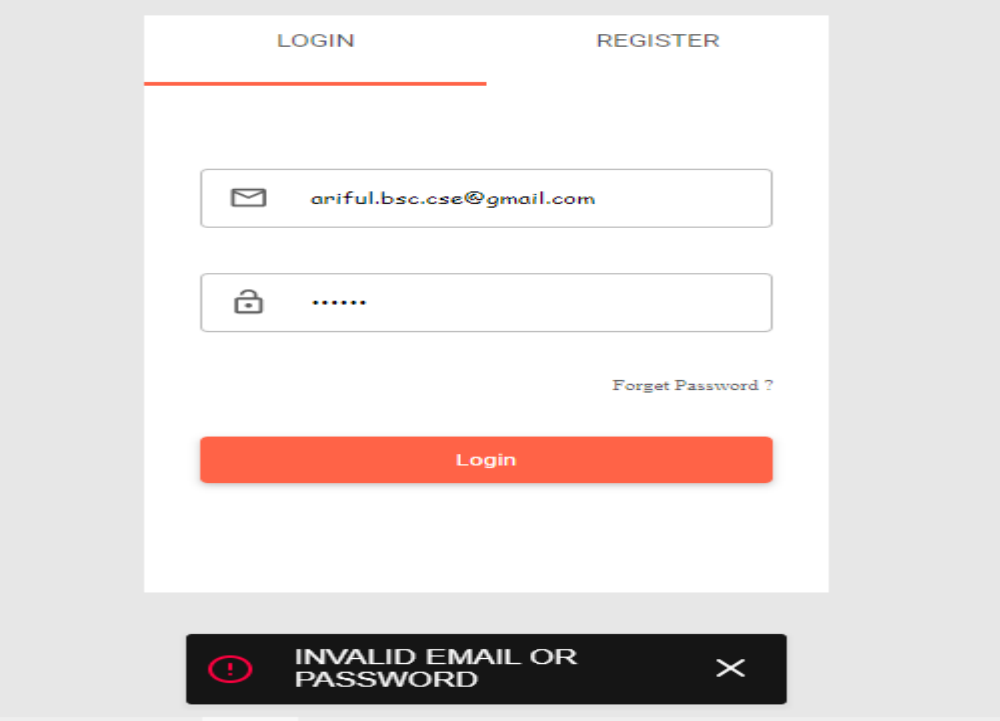

Figure 6.3: Login verification page

6.4 Database Testing

Database testing is crucial because it helps identify problems that might compromise the reliability, consistency, and safety of a system. It also helps in evaluating the strategy in light of user needs. Database testing is crucial for ensuring that a database system fulfills the fundamental criteria of a database management system.

Product Table Image: Figure 6.4.1 product table containing all product details.

Figure 6.4.1: Product Table Image

User Table Image: Figure 6.4.2 User table containing all user details.

Figure 6.4.2: User Table Image

Order Table Image: Figure 6.4.2 Order table containing all order details.

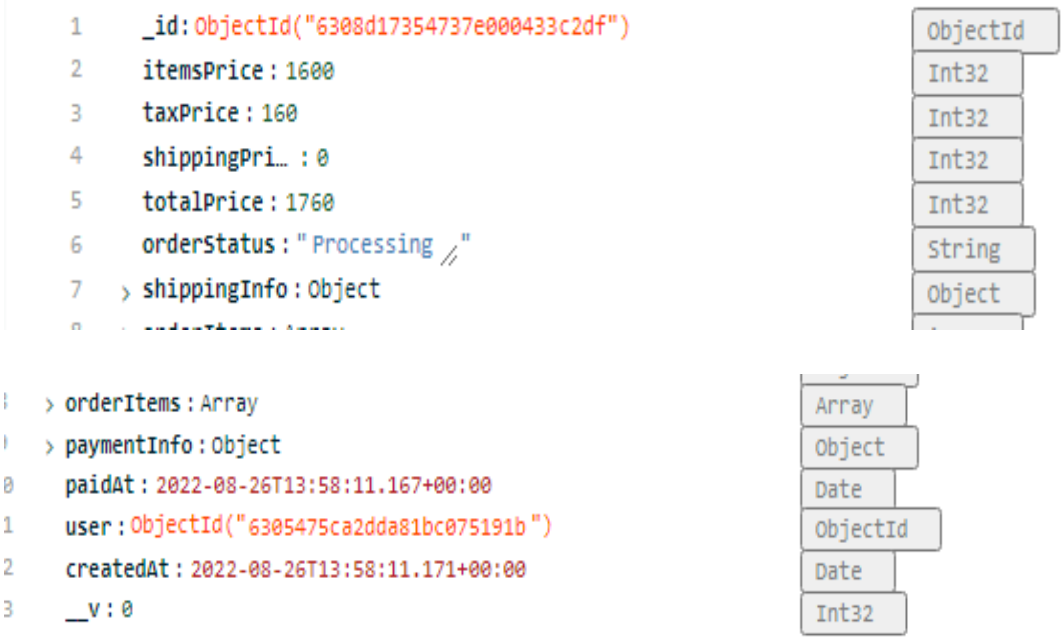

Figure 6.4.3: Order Table Image

6.5 Test Results and Reports

Since test reports must explicitly state test findings, it is possible to estimate test results rapidly. It is a document that describes the surrounding or working environment, arranges data from an assessment experiment, and illustrates how test results are compared to goals. The next characteristic of the visitors is usability testing. In order to show the user or learner the advantages of usability testing in the end:

- Improved quality and educational website.
- Any user might easily use it.
- Users are more likely to accept it.
- Additional Information.
- Better UX; affordable service

CHAPTER 7

CONCLUSION AND FUTURE SCOPE

7.1 Discussion and Conclusion

Technology that provides a better online shopping experience is currently available to consumers, and this trend will only grow in the future. People have asserted that due to the rapid expansion of goods and businesses, online electronics shopping may surpass in-store purchases. Physical and mortar businesses are still in demand, despite the fact that this has been the case in certain regions, in marketplaces where people like to see and handle the item being purchased [8]. However, the availability of online electronics retailers has led to better-informed customers who can comparison shop quickly and with little effort. In exchange, online Electronics stores give access to markets to numerous small retailers that would never operate if they had to pay the high cost of opening a brick and mortar location. The deal ultimately benefitted both the buyer and the seller.

7.2 Scope for Future Developments

The system was created with the potential for future development in mind. To provide better service in the future, the suggested system has to have the following features.

- More payment gateway.
- Live chat option.
- Return policy.
- Add the Google map.

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DESIGN AND IMPLIMENTATION OF AN ONLINE ELECTRONIC SHOP

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