Ecommerce website for online shopping

A Research Project submitted in partial fulfillment of the Requirements for the Degree of Bachelor of Science (Engineering) in Computer Science & Engineering.

Submitted By

Azharul Islam
ID: CE-17002
&
Piash Chandra Ghosh
ID: CE-17004
Session: 2016-17
(Re-add with 2017-18)

Supervised By

Mohd. Sultan Ahammad
Assistant Professor
Dept. of CSE.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
MAWLANA BHASHANI SCIENCE AND TECHNOLOGY UNIVERSITY
SANTOSH, TANGAIL-1902, BANGLADESH.

Approval

The Research Project Report about e-commerce website for online shopping **“AdidasBD”** Submitted by **Azharul Islam (ID: CE17002)** and **Piash Chandra Ghosh (ID: CE17004)** to the Department of Computer Science and Engineering, Mawlana Bhashani Science and Technology University, Santosh, Tangail-1902, Bangladesh, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science(Engineering) in Computer Science and Engineering and approved as to its style and contents.

Broad of Examiners

1. ……. (Supervisor)

2……. (Examiner)

3……. (Examiner)

Declaration

We, here by, declare that the Project development work which is presented by the outcome of the investigation performed by us under the supervision of Mohd. Sultan Ahammad , Assistant professor, Department of Computer Science and Engineering, Mawlana Bhashani Science and Technology University, Santosh, Tangail-1902, Bangladesh.

We also declare that no part of this project has been or is being submitted elsewhere for the award of any degree or diploma.

Countersigned

……..

(Mohd. Sultan Ahammad)

Supervisor

Signature

..……

(Azharul Islam)

..……

(Piash Chandra Ghosh)

Candidate

Abstract

Electronic commerce is a process of doing business through computer network. A person sitting on the chair in front of a computer can access all the facilities of the internet to buy or sell the products. Ecommerce which was started in early 1990's has taken a great leap in the world of computers, but the fact that has hindered the growth of e-commerce is security. Security is the challenge facing e-commerce today & there is still a lot of advantage made in the field of security. The main advantage of e-commerce over a traditional commerce is the user can browse online shops, compare prices and order merchandise sitting at home on the chair.

Acknowledgement

First of all, we would like to express our deepest indebtedness and gratitude to the most powerful, gracious Almighty Allah for giving us knowledge, energy, and patience for completing the project work successfully. We are very much grateful to my project supervisor Mohd. Sultan Ahammad **, Assistant Professor, Department of Computer Science and Engineering, Mawlana Bhashani Science and Technology University (MBSTU),** for his continuous guidance, valuable suggestions, constructive comments and endless encouragement throughout the research work and the preparation of this project.

We are indebted to our mates, who are engaged in various analyses as they contributed a lot to form this project.

In addition, thanks to those who helped me directly and indirectly during the different stages of the present project work.

Finally, we record with deep appreciation the patience, understanding, and encouragement shown by my parents, teachers, and friends throughout the period of my study.

Preface

The project is outlines based on the working procedure and details of the system. This is carried out in the department of Computer Science and Engineering, Faculty of Engineering, at Mawlana Bhashani Science and Technology University in Santosh, Tangail - 1902, Bangladesh.

This project includes nine chapters which are briefed as follows:

Chapter-1

Chapter 1 provides the introduction of the system we designed. It describes what the system intends to do.

Chapter-2

Chapter 2 provides the project definition and requirement analysis of the system.

Chapter-3

Chapter 3 discusses the object-oriented design of the whole system.

Chapter-4

Chapter 4 discusses about the technical tools of the system.

Chapter-5

Chapter 5 provides a detailed discussion based on the testing, security and maintenance of the system.

Chapter-6

Chapter 6 provides in detailed the project features and functionalities.

Chapter-7

Chapter 7 discusses about the limitations of the project.

Chapter-8

Chapter 8 discusses about the future scopes of the project.

Chapter-9

Chapter 9 discusses about the conclusion of the project.

Appendix

Appendix covers information about the references for the project.

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Chapter 1

Introduction

1.1 Project Definition

E-commerce (electronic commerce): Ecommerce, also known as electronic commerce or internet commerce, refers to the buying and selling of goods or services using the internet, and the transfer of money and data to execute these transactions.

Types of ecommerce:

a. Business-to-business (B2B)

b. Business-to-consumer (B2C)

c. Consumer-to-consumer (C2C)

d. Consumer-to-business (C2B)

“AdidasBD” is also the Business-to-consumer (B2C) e-commerce web application.

1.2 Project Purpose:

In this world, many products have high values found in Adidas company. Which company based on different products like Men's Sneaker, Men's Pants, Men's Boot, Bag, Cap, Bottle which is available in Bangladesh. We want to make available those products along with other regular products in one e-commerce site at a reasonable price.

1.3 Project Scope:

This project application will help to buy traditional and other goods from one site. The online system is an easy-to-use self-service system which enables the customer to buy products and services online and pays the payment transaction gateway by any cart.

Here, the scopes of our website are given below:

- To apply the opportunity for "boundary crossing" as new entrants, business models, and changes in Technology erode the roadblocks.
- To manage the buying system more efficient;
- Economic growth in the e-commerce area will be increased;
- This project will help to start an ecommerce business.
- By the increasing number of e-commerce and their economic contributions, the working opportunity of the young generation will be increased.

1.4 Requirements:

For creating this application some requirements are needed. We provide these requirements in three parts these are:

- Project Requirements
- Software Requirements
- Hardware Requirements

1.4.1 Project Requirement

- Complete ERD (Entity Relationship Diagram)
- Complete Interaction Diagram
- Complete source code and run files for the front end and back end
- Complete database re-generation script.

1.4.2 Software Requirement

- Framework: Express JavaScript.
- Language: JavaScript.
- Database: MongoDB.
- Web design: HTML, CSS.
- API: Third-Party API.

1.4.3 Hardware Requirement:

- CPU: Pentium 4 or upper version.
- RAM: 2GB or upper.
- HDD: As much as large so that stores a large amount of data.

Chapter 2

Project Definition and Requirement Analysis

It is a B2C (Business to Consumer) web application in which admin (business owner) add brands category and product and manage all of them. Admin also retrieve the order information and manage the order. Customers can choose their product in different ways such as Find by searching find brand wise find category wise which is very user friendly process for finding product. Customer's add their products in cart and also manage the cart for removing or updating products. After fulfil all the requirements customer order his products.

2.1 Project Goals

The main goal of this project is to reduce customer cost reduction, developing customer reach and providing a unique customer experience.

- To reduce manual shopping.
- To provide a user friendly interface for customers.
- To take care of every service related to selling and buying.
- To make secure online business.

- To make efficient online shop planning.
- Working with some new features, such as product related products, buying history.

2.2 Advantages of this System

In this application, there are some special advantages that are improving the drawbacks of the existing manual system. These advantages are below:

- **Save Times:** The application saves valuable time. Users can find products very easily and further steps are very user friendly.
- **Dynamic Process:** It is a dynamic process. The user can visit the site without login but if he want to purchase a product must login if he have already an account otherwise he have to sign up. After login or sign up customer will be able to purchase by providing shipping address and payment method. Every admin module works in this application dynamically for admin if he login once.
- **Availability:** This application is available not only on a laptop or desktop but also on every mobile device because of its responsive design. Users can access it from anywhere if he/she has a device that connects with the internet.
- **Security:** It is a very secure application. The admin must log in first for using the models of the application. Here every admin is verified through the email validation by admin.
- **Reduce complexity:** In this application users can find products by searching, by category wise, brand wise, product related product which will reduce the complexity of finding product.
- **Flexibility:** This application system is flexible for all users. It is very much user-friendly. An authorized admin can use this application very easily for adding new items and order management. It is also user friendly for customers.

2.3 System Analysis

In this section, the system's overall structure and its nuances are outlined. In terms of client-

server technology, the number of tiers is defined in this section. The tiers which are needed for the package architecture, database design, data structure design, etc. are well-defined in this phase. Analysis and design are a very crucial part of the entire development cycle management. Any flaw during this section may be expensive to solve in the larger stage of software development.

A user interface is a very important part of a system with which the users interact. It includes screen displays that provide navigation through the system, the screen and forms that capture data, and the reports that the system produces.

2.3.1 Analysis Model

This document plays a vital role in the development of the life cycle (SDLC) as it describes the complete requirement of the application. It also contains information about the building code that structures use in the load combination process. It is used for analyzing structural behavior and load-bearing and for design. It is meant for use by developers and will be the basics during the testing phase. Any changes made to the requirements in the future will have to go through a formal change approval process.

The SPIRAL MODEL was proposed for the iterative development process. The spiral model was not first to introduce iterative development, rather it was the first model to explain and express why the iteration models come and are so important for project analysis.

Generally, a basic type of iteration model takes typically in 3 months to 6 months long. There are several phases for analysis. The first phase is the designed goal for specific requirements and the second phase is a revision of the progress thus far by the client. All phases follow the goal of the project. Analysis part and engineering part efforts are provided at each phase of the project for enhancing the entire capability of the development process.

The basic steps for the Spiral model can be refactored as follows:

- A proper definition of system requirement is required for continuing the process. The entire external user or internal user is involved in the aspect of a system module for representing the required module.
- For the system, a predefined task or procedure is created.
- From requirements construction of the design process is the first prototype. It is the scaled-down process, that process to the final module.
- The fourfold procedure is the second prototype and important part.
- With the analysis of strength, weakness and risk estimate the 2nd prototype.
- Planning based on analysis applied for designing this prototype.
- Implement and test the entire module.
- If the risk is too high then the customer may abort the process and the project may go to the dark. The risk is an important factor in the prototype analysis and estimation of the whole process. The project success rate extremely depends on it.
- The project prototype carries out such a way that all steps are successfully finished. After a successful prototype, the second prototype may start and it will follow and maintain the same procedure.
- Without customer satisfaction, the project has no meaning. After the customer's approval, all the process indicates full gain with the refactoring risks.
- After finishing the implementation, testing the final system is a thoroughly evaluated process. The routine maintenance and scaling is also part of the project structure.

2.3.2 Graphical User Interface

In the flexibility of the uses, the interface has been developed with a graphics concept in mind, associated through a browser interface. GUI is a program interface that takes advantage of the computer's graphics capabilities to make the program easier to use. Many users find that they work more effectively. The GUI'S at the top level have been categorized as

- Administrative user interface

- The operational or generic user interface.

The administrative user interface concentrates on the consistent information that is practically part of the organizational activities and which needs proper authentication for the data collection. The interface helps the administrations with transactional states like data insert, data delete, data up-gradation, reporting, and helpline for the users along with the extensive data search capabilities.

The generic user interface helps the user upon the system in transactions through the existing data and required services. The operational user interface also helps the ordinary user in managing their own information in a customized manner as per the assisted flexibilities.

2.3.3 Number of Modules

After finishing this application it has been identified to be presented with the following modules. Modules are divided into three parts. In this application, we have a user module, an agent module, an admin module.

✓ User Modules:

- To search a specific product.
- Male and Female Search.
- View available products.
- Find products according to category.
- Add items to cart.
- Checkout.
- Login/Sign up.
- Update the profile details.
- Provide Shipping details.

- Select payment method and confirm order.

✓ Admin Modules:

Admin has overall control of the system.

- View order list.
- Manage order list.
- Database management.
- Add a new item.
- Manage item's list.
- Update the item's list.
- Confirm the customer order.
- Foreword the order for further steps.
- Make Admin.

An elaborate description of those modules is given in chapter 6.

2.4 System Planning

Project planning is the application of knowledge, skill, tools, and techniques to the project activities to fulfill the project requirements. Perform and evaluate feasibility studies like cost-benefit analysis, technical feasibility, time feasibility and operational feasibility for the project. The project schedule should be made using PERT charts.

A feasibility study is carried out to decide whether the proposed system is feasible for the company. The feasibility study is to serve as a decision document it must answer three key questions:

- Is there a new and better way to do the job that will benefit the user?
- What are the cost and the savings of the alternatives?
- What is recommended?

2.5 Feasibility Study

A feasibility study is an evaluation and analysis of the potential of the proposed project which is based on extensive investigation and research to give full comfort to the decision makers. Feasibility studies aim to objectively and rationally uncover the strengths and weaknesses of an existing business or proposed venture, opportunities and threats as presented by the environment, the resources required to carry through, and ultimately the prospects for success. In its simplest terms, the two criteria to judge feasibility are cost required and value to be attained.

As such, a well-designed feasibility study should provide a historical background of the business or project, description of the product or service, accounting statements, details of the operations and management, marketing research and policies, financial data, legal requirements, and tax obligations. Generally, feasibility studies precede technical development and project implementation.

2.5.1 Technology and System Feasibility

The assessment is based on an outline design of system requirements, to determine whether the company has the technical expertise to handle the completion of the project. When writing a feasibility report, the following should be taken into consideration:

- A brief description of the business to assess more possible factor/s which could affect the study.
- The part of the business being examined.
- The human and economic factor.
- The possible solutions to the problems

At this level, the concern is whether the proposal is both technically and legally feasible (assuming moderate cost).

2.5.2 Operational Feasibility

Operational feasibility is a measure of how well a proposed system solves the problems and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development.

The operational feasibility assessment focuses on the degree to which the proposed development projects fit in with the existing business environment and objectives with regard to the development schedule, delivery date, corporate culture, and existing business processes.

2.5.3 Economic Feasibility

The purpose of the economic feasibility assessment is to determine the positive economic benefits to the organization that the proposed system will provide. It includes quantification and identification of all the benefits expected. This assessment typically involves a cost/ benefits analysis.

2.5.4 Technical Feasibility

The technical feasibility assessment is focused on gaining an understanding of the present Technical resources of the organization and their applicability to the expected needs of the Proposed system. It is an evaluation of the hardware and software and how it meets the needs of The proposed system.

Chapter 3

Object Oriented Design

3.1 System Architecture Flow Diagram

3.2 Design Specification

A System block diagram portrays a series of actions that define how modules of software work. A data flow diagram represents how the task of software flow between resource find the machine or user uses the application software for software development, a data flow diagram is a delineation of series of steps a process must execute consistently.

3.3 Use Case Diagram

The use case diagram is one of the parts of the unified modeling language. If nature is dynamic and it has a graphical depiction of the interaction internal or external factors. The use case is used in system analysis to identify, clarify and organize system requirements. A use case diagram one kind of flow chart instinctive symbols represents the system elements which are like an actor, use case, the association includes relationship.

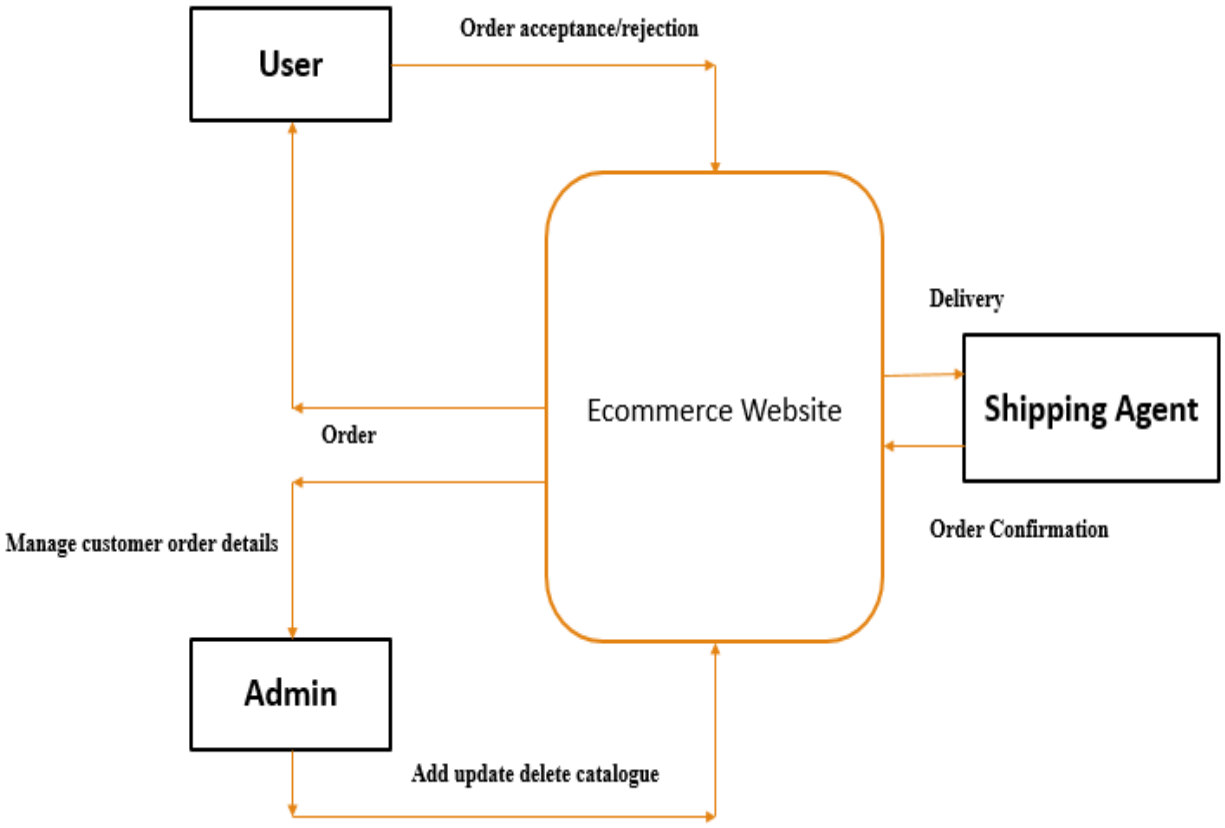

Figure 1 : System Architecture Flow Chart

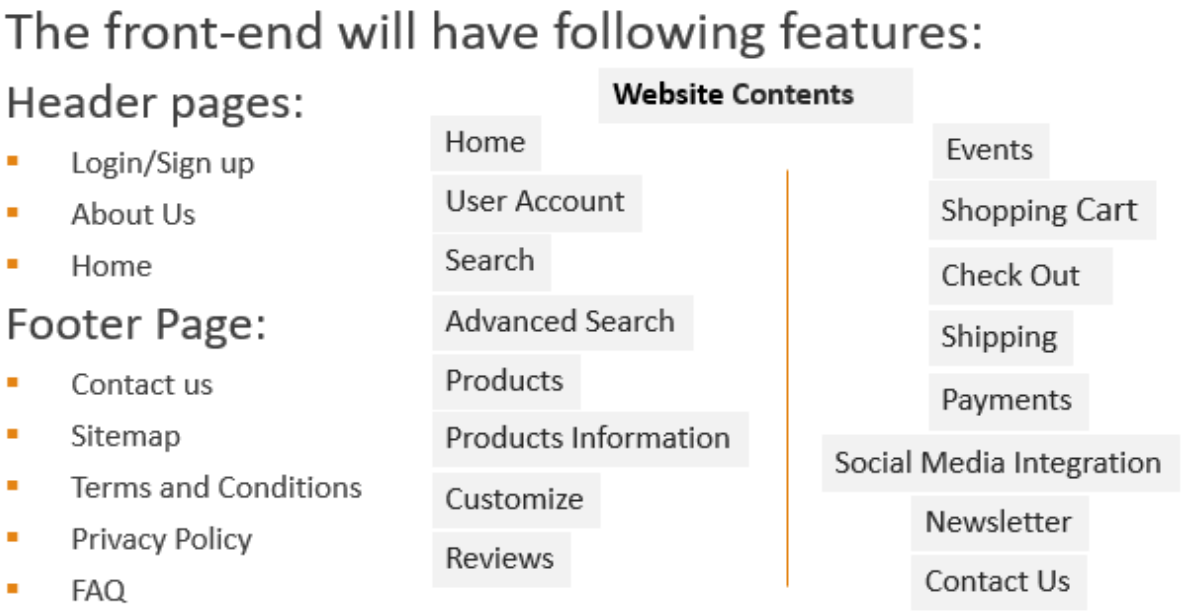

Figure 2 : Design Specification

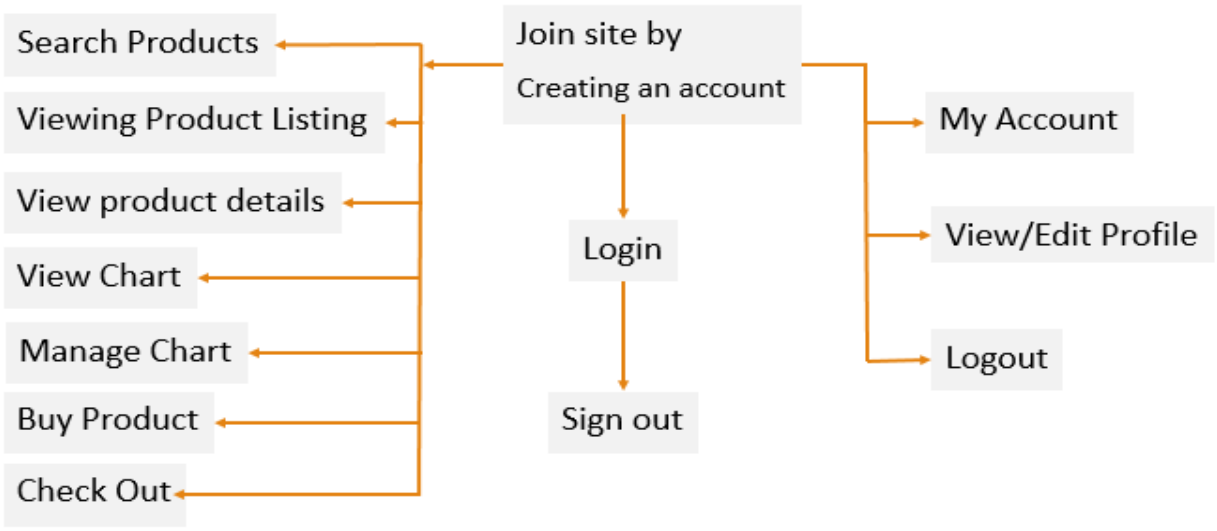

Figure 3 : System Block Diagram

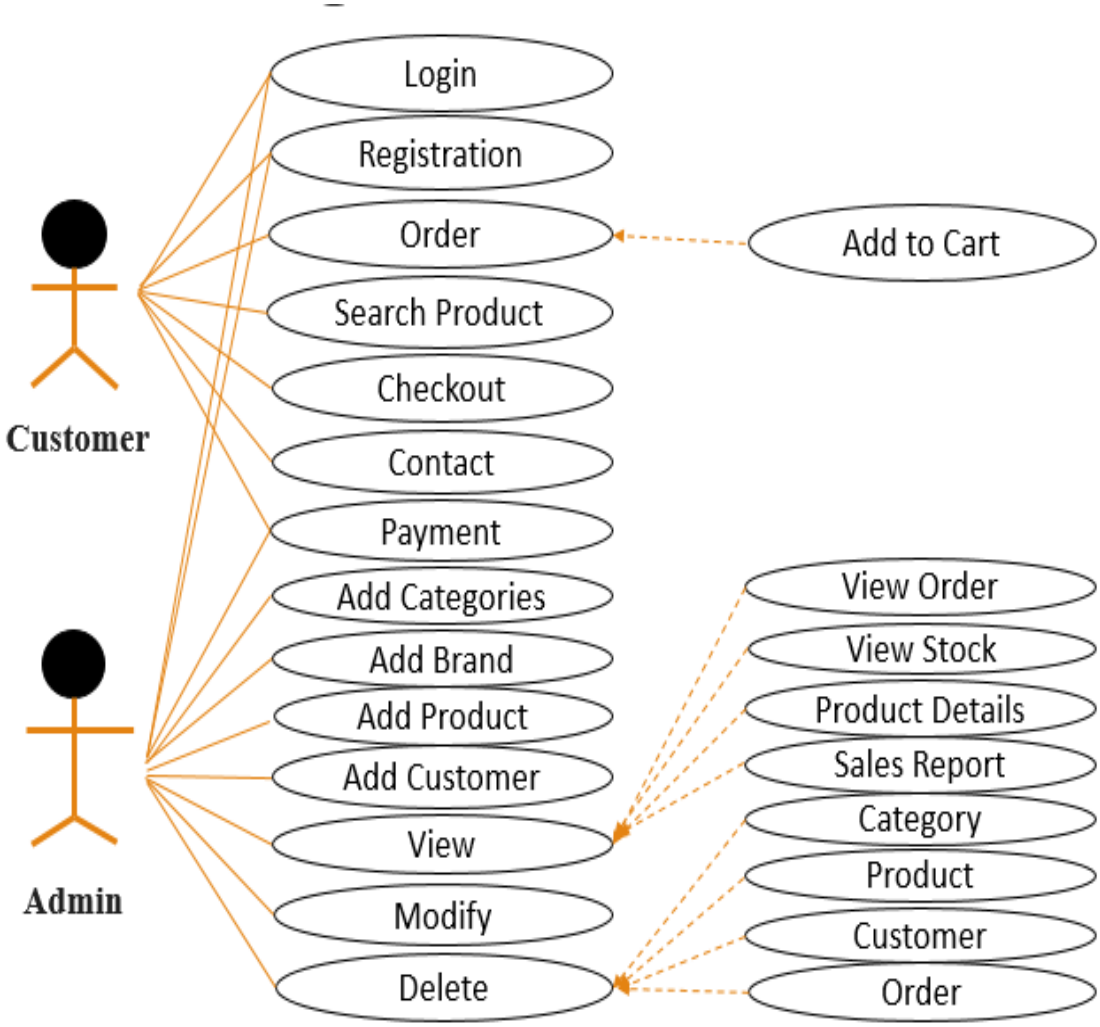

Figure 4 : Use case Diagram

Chapter 4

Technical Tools

4.1 Visual Studio Code Editor

Visual Studio Code is **a source-code editor made by Microsoft** for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.

4.2 Express JavaScript Framework

Express is a minimal and flexible Node.js web application framework that provides a robust set of features to develop web and mobile applications. It facilitates the rapid development of Node based Web applications. Following are some of the core features of Express framework

- Allows to set up middleware's to respond to HTTP Requests.
- Defines a routing table which is used to perform different actions based on HTTP Method and URL.
- Allows to dynamically render HTML Pages based on passing arguments to templates.

4.3 Postman

Postman is an API client that makes it easy for developers to create, share, test and document APIs. This is done by allowing users to create and save simple and complex HTTP/s requests, as well as read their responses. The result - more efficient and less tedious work.

4.4 MongoDB

MongoDB is a source-available cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with optional schemas. MongoDB is developed by MongoDB Inc. and licensed under the Server Side Public License.

4.5 React JavaScript Library

ReactJS offers graceful solutions to some of front-end programming's most persistent issues, allowing you to build dynamic and interactive web apps with ease. It's fast, scalable, flexible, powerful, and has a robust developer community that's rapidly growing. There's never been a better time to learn React.

4.6 Node JavaScript

JavaScript is one of the most popular programming languages. The powerful Node.js runtime environment has been ranked the technology most commonly used by professional developers. Node.js is an event-driven JavaScript runtime. Node has myriad potential uses for JavaScript development including being a great environment for building efficient network applications.

4.7 Languages

1. **JavaScript:** JavaScript is a dynamic computer programming language. It is lightweight and most commonly used as a part of web pages, whose implementations allow client-side script to interact with the user and make dynamic pages. It is an interpreted programming language with object-oriented capabilities. JavaScript was first known as **Live Script,** but Netscape changed its name to JavaScript, possibly because of the excitement being generated by Java. JavaScript made its first appearance in Netscape 2.0 in 1995 with the name **Live Script**. The general-purpose core of the language has been embedded in Netscape, Internet Explorer, and other web browsers.

The ECMA-262 Specification defined a standard version of the core JavaScript language.

- JavaScript is a lightweight, interpreted programming language.
- Designed for creating network-centric applications.
- Complementary to and integrated with Java.
- Complementary to and integrated with HTML.
- Open and cross-platform

2. **HTML:** Hypertext Markup Language (HTML) is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript.

   Web browsers receive HTML documents from a web server or from local storage and render the documents into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document.

   HTML can embed programs written in a scripting language such as JavaScript, which affects the behavior and content of web pages. The inclusion of CSS defines the look and layout of content. The World Wide Web Consortium (W3C), a former maintainer of the HTML and current maintainer of the CSS standards, has encouraged the use of CSS over explicit presentational HTML since 1997.

3. **CSS:** Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language like HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

   CSS is designed to enable the separation of presentation and content, including layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple web pages to share formatting by specifying the relevant CSS in a separate .css file and

reduce complexity and repetition in the structural content.

Separation of formatting and content also makes it feasible to present the same markup page in different styles for different rendering methods, such as on-screen, in print, by voice (via speech based browser or screen reader), and on Braille-based tactile devices. CSS also has rules for alternate formatting if the content is accessed on a mobile device.

The name cascading comes from the specified priority scheme to determine which style rule applies if more than one rule matches a particular element. This cascading priority scheme is predictable.

Chapter 5

Testing, Security and Maintenance

5.1 Methodology used for testing

Completion of a web-based application will achieve its fulfillment only after it has been thoroughly tested, it makes a feeling that the project of this application is completed, the project cannot go through without this stage. Actually, in this stage, we can decide whether the project is able to run in real-time environment execution without any breakdowns.

5.1.1 Testing methods

Software testing methods are traditionally divided into two methods which are black-box testing and white box testing. These two methods are used to describe the testing results from the point of view of those methods.

5.1.1.1 Black box testing:

In black-box testing the whole software is tested as a black box without any knowledge of the internal implementation. Black box testing methods are a combination of some methods which are given below

- Equivalence partitioning
- Boundary value analysis
- All pairs testing
- Fuzz testing
- Model-based testing
- Traceability matrix
- Exploratory testing

5.1.1.2 White box testing

When tester access to the internal data structure and algorithm white box testing works as a contrast to black-box testing. The white box testing method is also used for evaluation as the completeness of the test suit that was created with the black box testing. The software team is allowed to examine all the parts of the software and ensure that the most important functions have been tested. There are some other methods outside of these traditional testing methods. These are

- Gray box testing
- Acceptance testing
- Regression testing
- Non-functional testing

Using this testing varied on software companies or the market of the software.

5.2 Security:

The project contains a high level of security as a software system required. The digitalization of the e-commerce system has two types of users as clients and admin with their personal securities. Anyone without mail authentication can’t use any secure operation in this application. No user can’t edit a system database or system except his own changeable information like name, password, etc. Admin can’t access or edit users' personal information.

5.3 Maintenance:

When we start to complete the software development life cycle we find a stage called software maintenance. Software maintenance is a term used in software engineering when the software is delivered like correction, bug fix, performance increase. Software is applying based on the real world. So when the real world changes we need to change the model of software. There are

multiple reasons that software might need maintenance. Market conditions, client needs, host needs, organization structure change or even the need to reset the software to the initial condition it was. So the main purpose of software maintenance is to correct faults after delivery and update software applications when demand is changed based on the real world. Improving performance or other attributes is also part of software maintenance. Software maintenance could differ in many ways. Based on the size and the nature of maintenance there are four types of maintenance.

- **Corrective maintenance:** Ideals with a simple bug fix, spelling check or modification requested in a user report.
- **Adaptive maintenance:** It may conclude system upgrades or keeping the software up to date with the latest features and trends.
- **Perfective maintenance:** This might be related to a new feature upgrade, keep the software usable or scale the software for new users.
- **Preventive maintenance:** It ensures the safety of the software in the future. Some modifications aren't necessary for the present condition but could be a bigger problem for some modification or maintenance that might be necessary.

Chapter 6

Project Features and Functionalities

6.1 Home Page User Interface

The home page user interface represents the whole facility of the AdidasBD web application for customers such as product category wise find product brand wise find by searching. It also contains contact information and terms and conditions.

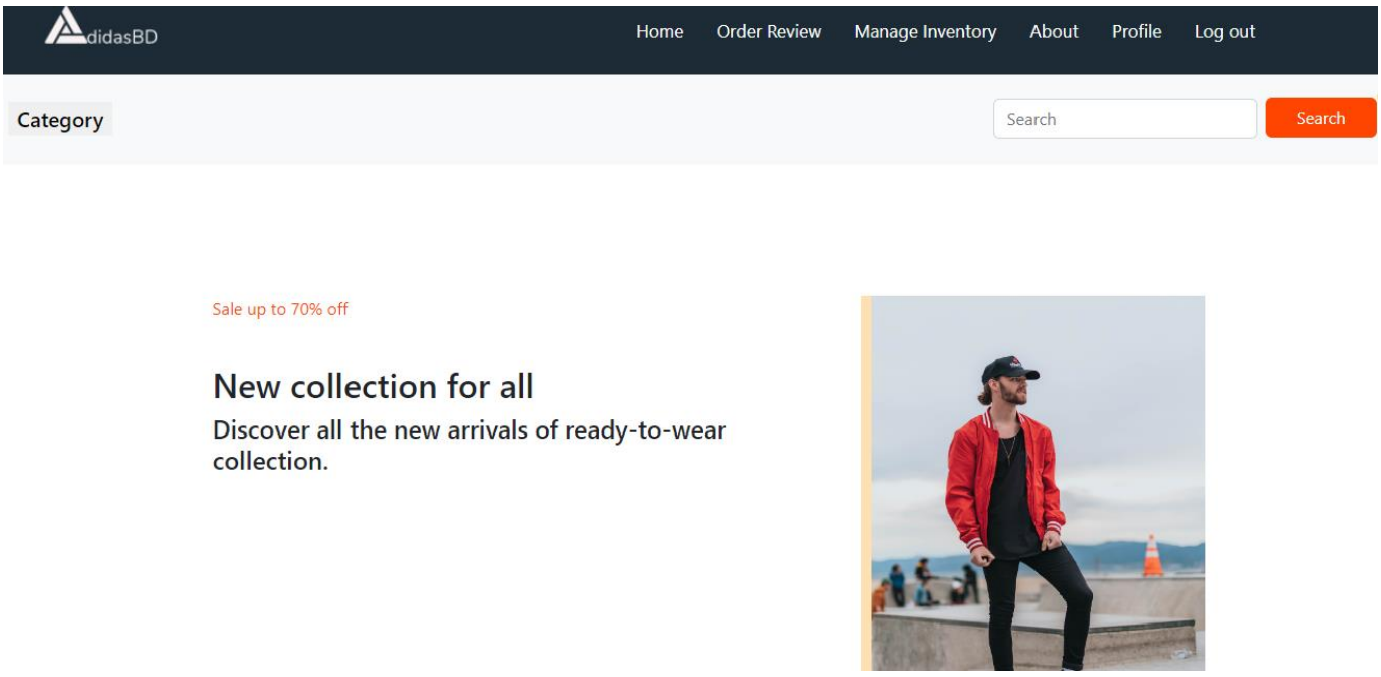

Figure 5 : Home page user interface

6.2 Products Find by Category

To find out the available product according to category. Header section of this interface contains

all available categories. Clicks the specific category to find that category related products.

6.3 Search Product

Search option allows customers to find certain products and search keyword related other products.

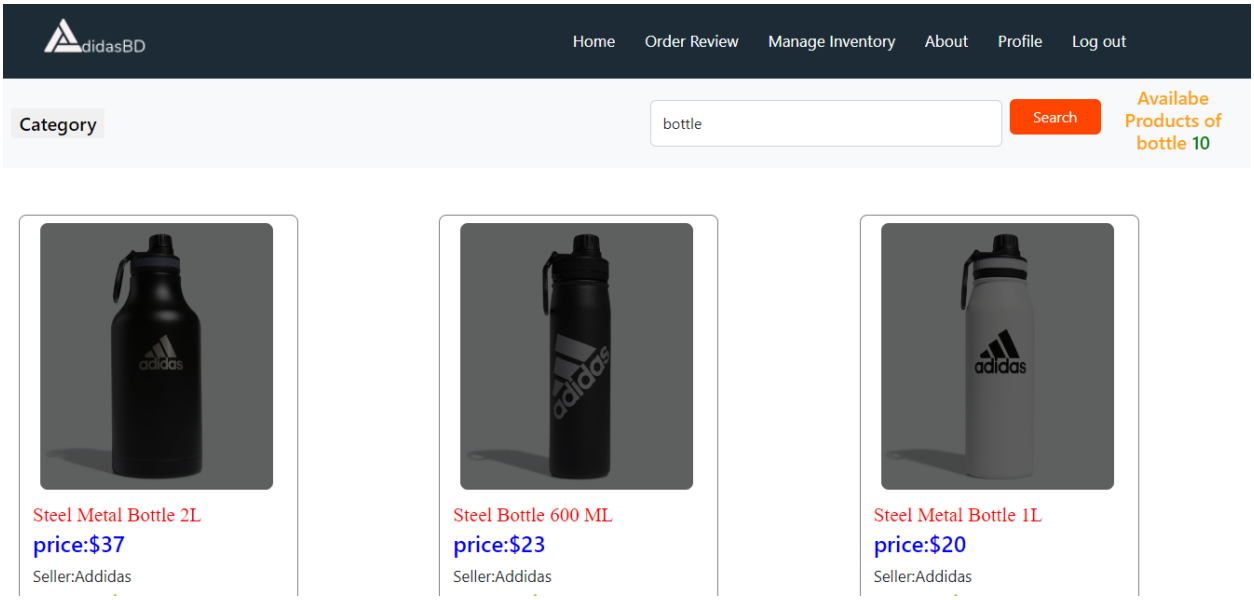

Figure 6 : Searching product user interface

6.4 Product Checkout

A product description is the marketing copy used to describe a product's value proposition to potential customers. Here product details page contains description and all information about the product. Customer will add to cart from this details page with quantity. It also shows below

related product of product details product.

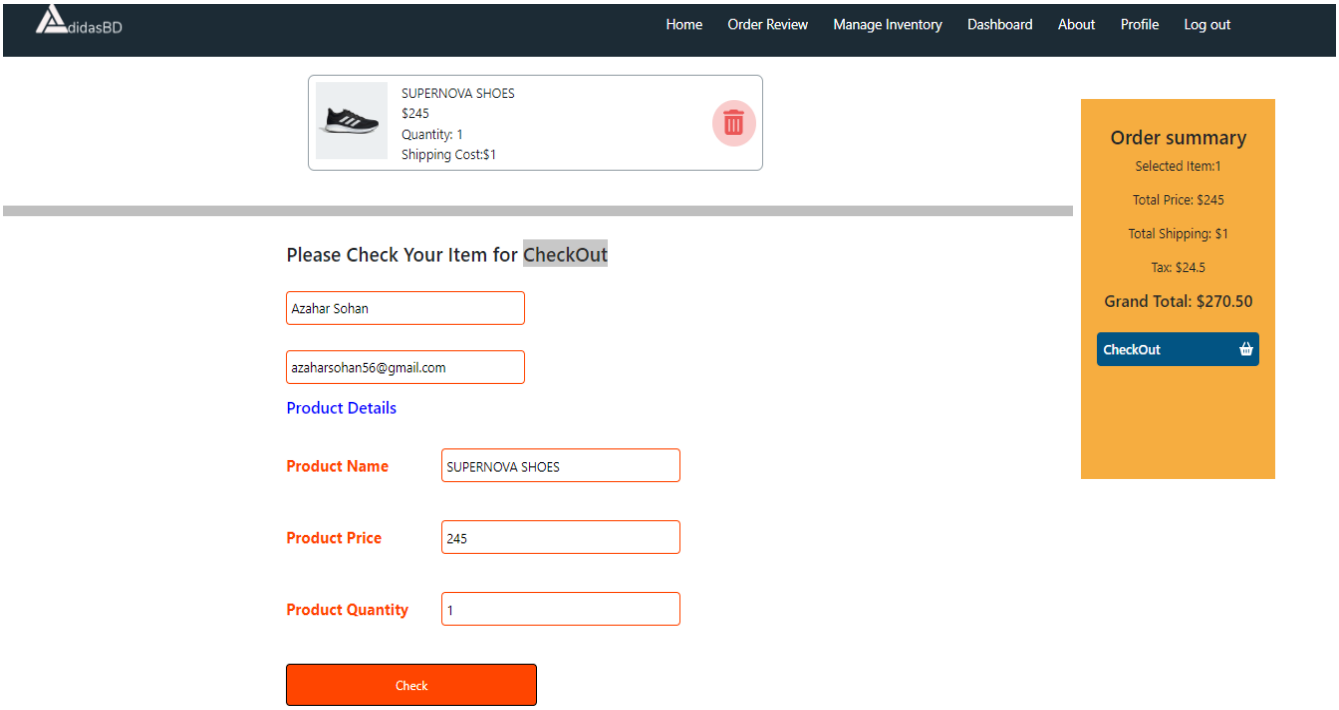

Figure 7 : Product Checkout user interface

6.5 Add Products in Cart

Here, Add to Cart is a way to create a temporary list of items by adding them to your cart, which will keep track of the product items until you leave the website. It also provides some dynamic functionality to remove update and add product items. After completing all of these functionality customer will press checkout to update the buying status. If customer have already an account and is signed, he will be redirected to shipping details page otherwise customer sign in sign up page to fulfill the requirements.

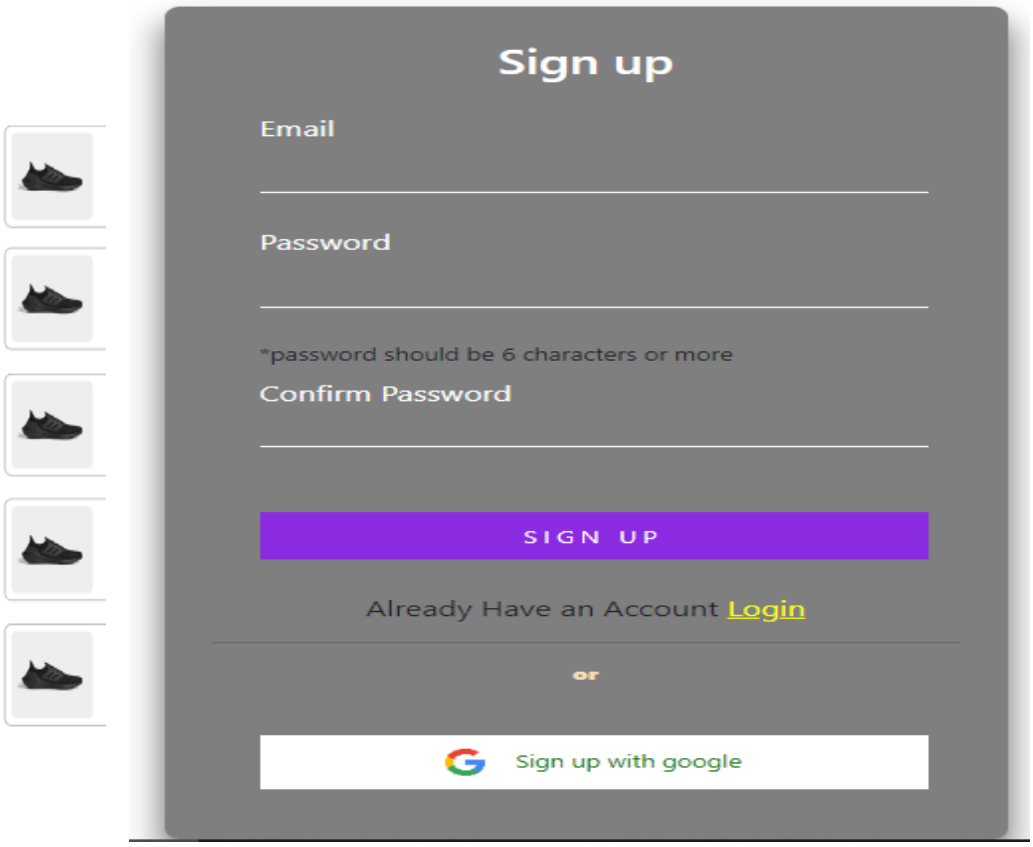

Figure 8 : Add product in cart user interface

6.6 Customer sign in and Login

After checkout pressing, if the customer contains an account He needs to sign in otherwise he needs to sign up by providing new information.

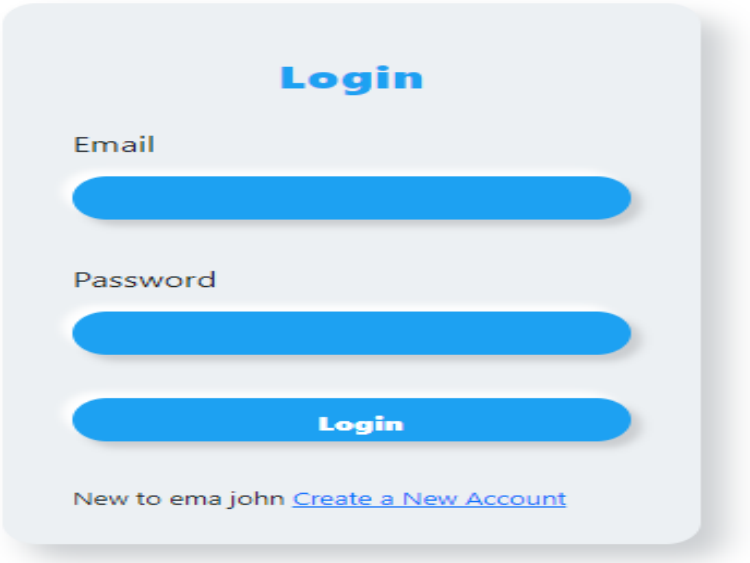

Figure 9 : Customer sign in Login user interface

6.7 Customer Edit and Update Profile

To edit profile fill in the all criteria (ex: Name, address, phone number) with upload photo. If any

customer will changing any information update their profile.

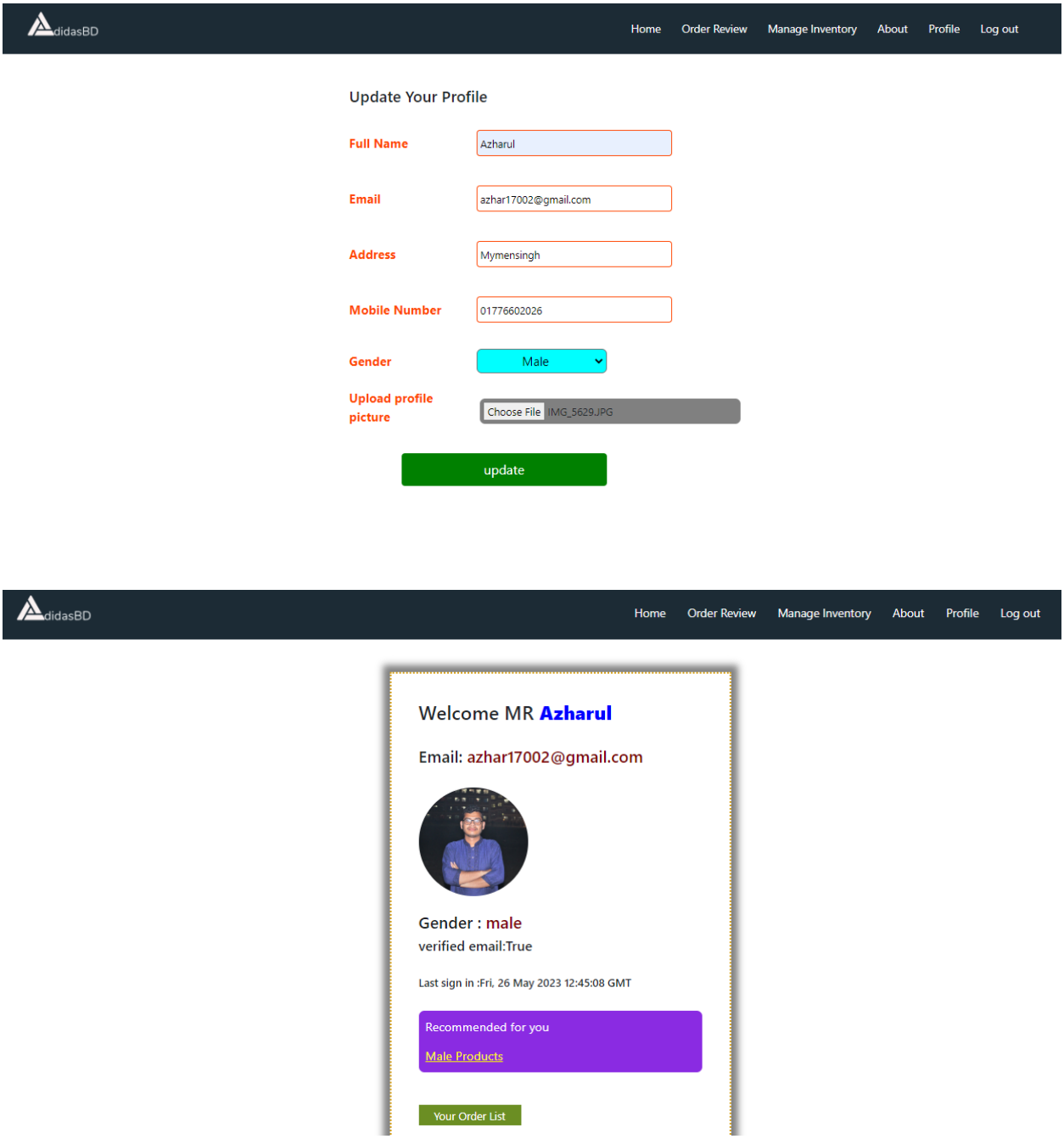

Figure 10 : Customer profile edit and update user interface

6.8 Male and Female Product

If male customers are create their profile, they will show male products. In the same way female

customers will show female products.

6.9 Shipping Details

After finishing update profile the customer will be redirected to the shipping page. Here customer has to provide all the necessary information for shipping. Products will be delivered to the provided address.

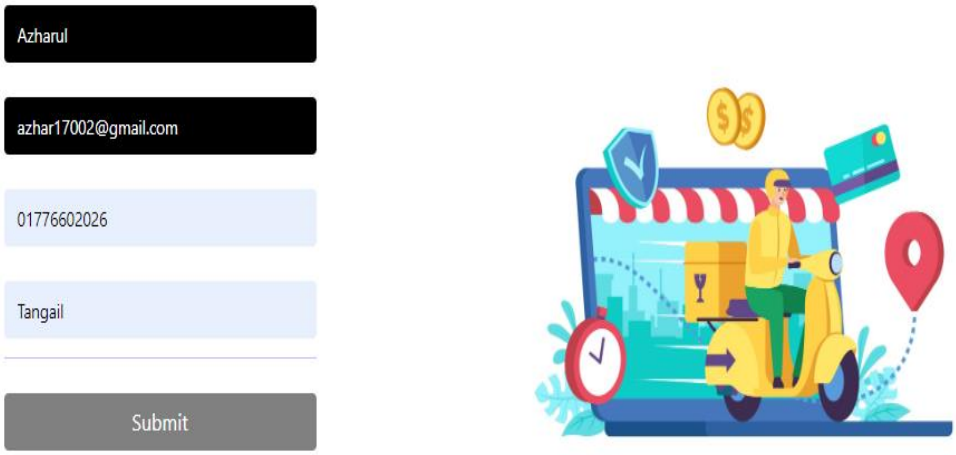

Figure 11 : Shipping details customer interface

6.10 Payment Methods

After providing shipping information customer will be redirected to payment methods page. Next we will apply Visa cart for payment method. Finally selecting and confirming the payment method customer will get a success message.

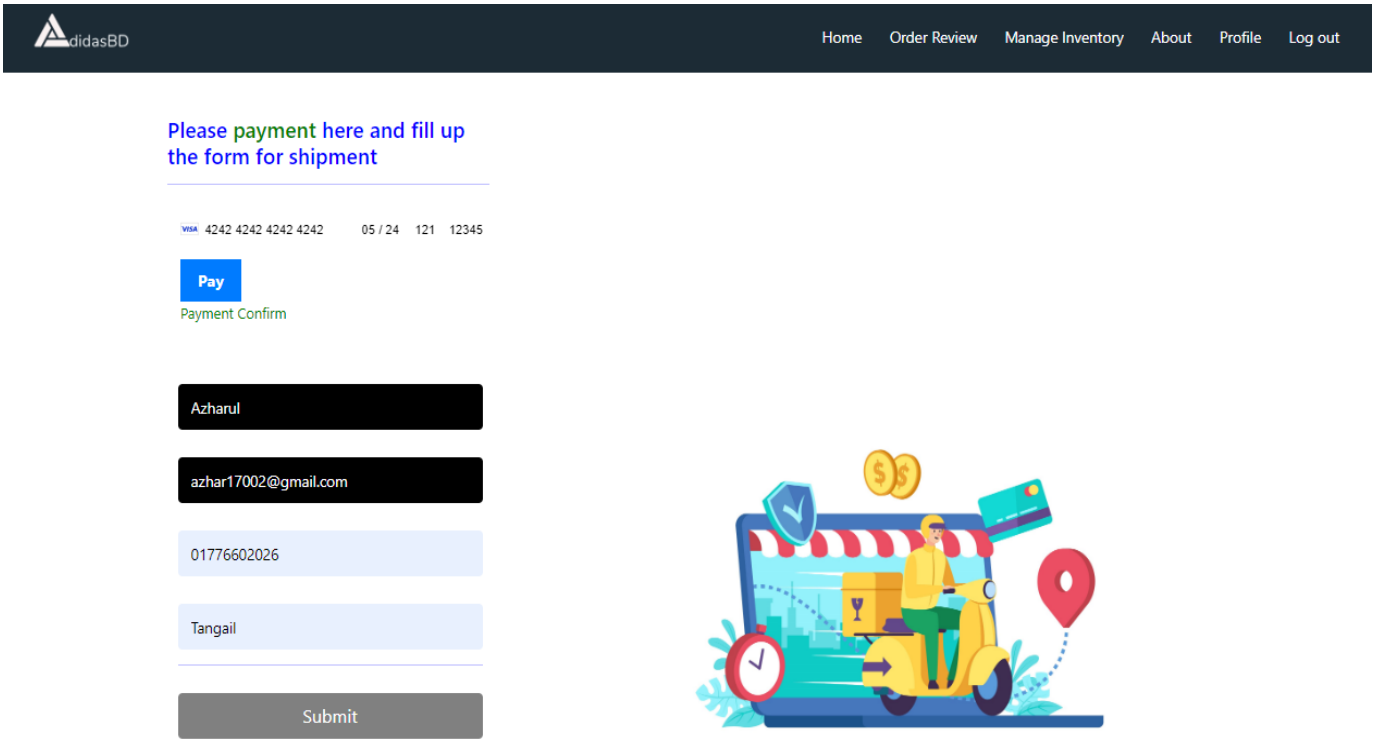

Figure 12 : Payment methods customer interface

6.11 Admin Dashboard

Here, admin is the business owner's man. After providing the valid and verified information such as email and password man will be redirected to dashboard.

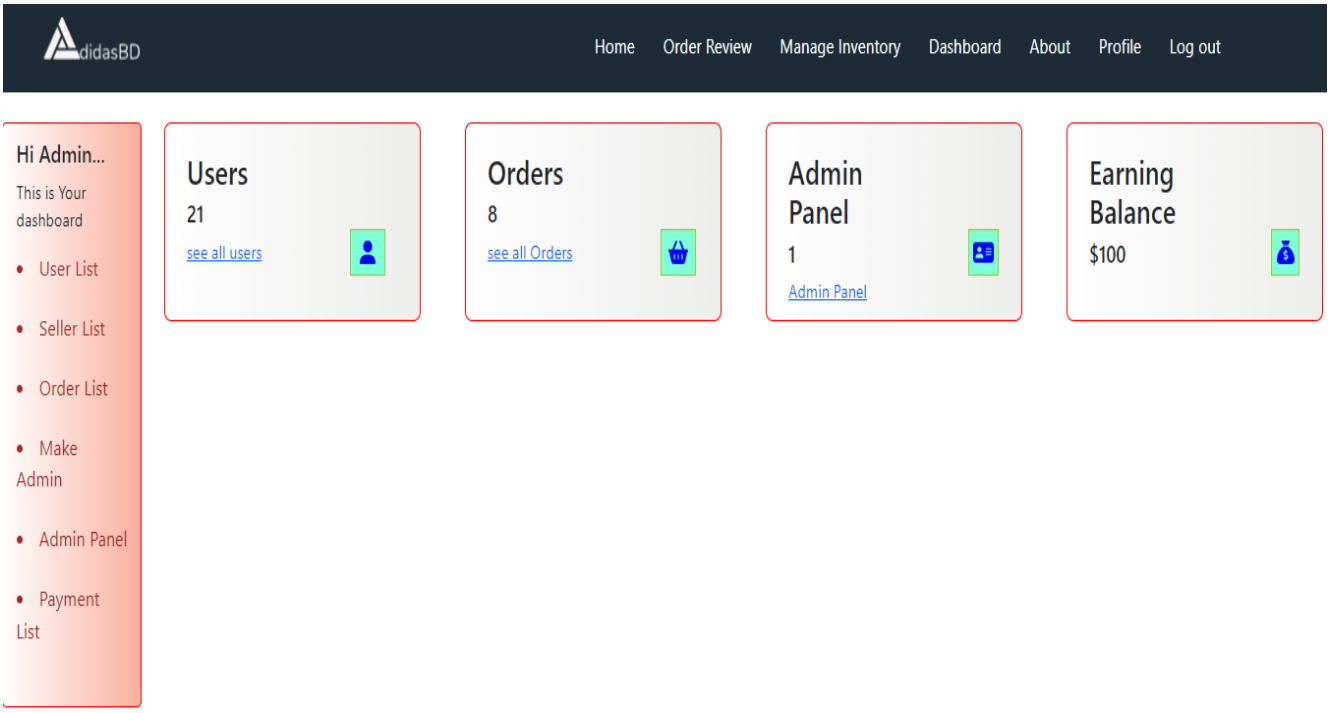

Figure 13 : Admin dashboard user interface

6.12 Add Products

Add products is related to Brand and Category. It contains three table information. By providing all the information admin user will be able to create a new product.

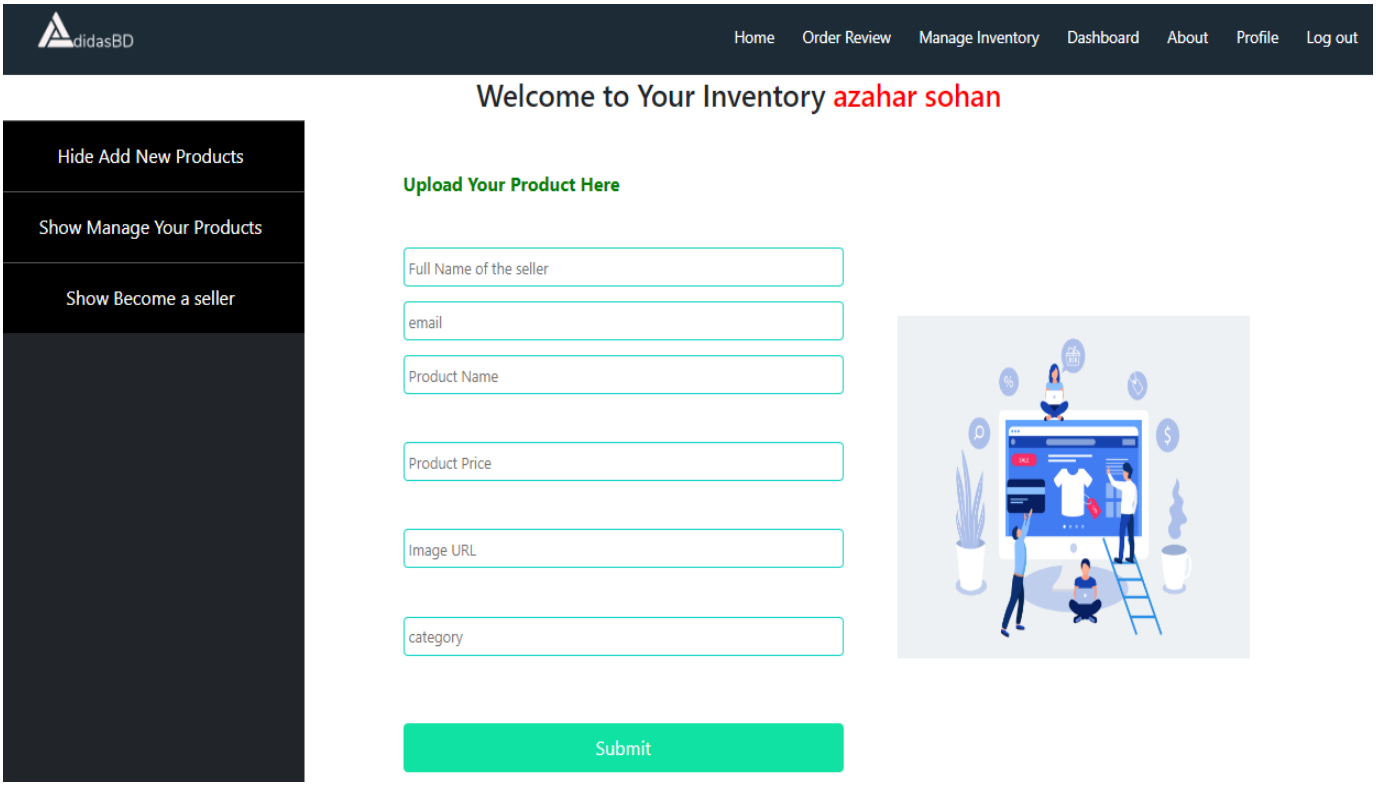

Figure 14 : Add product admin user interface

6.13 Update Product

If you need to change any information about the products. Update product has this facility.

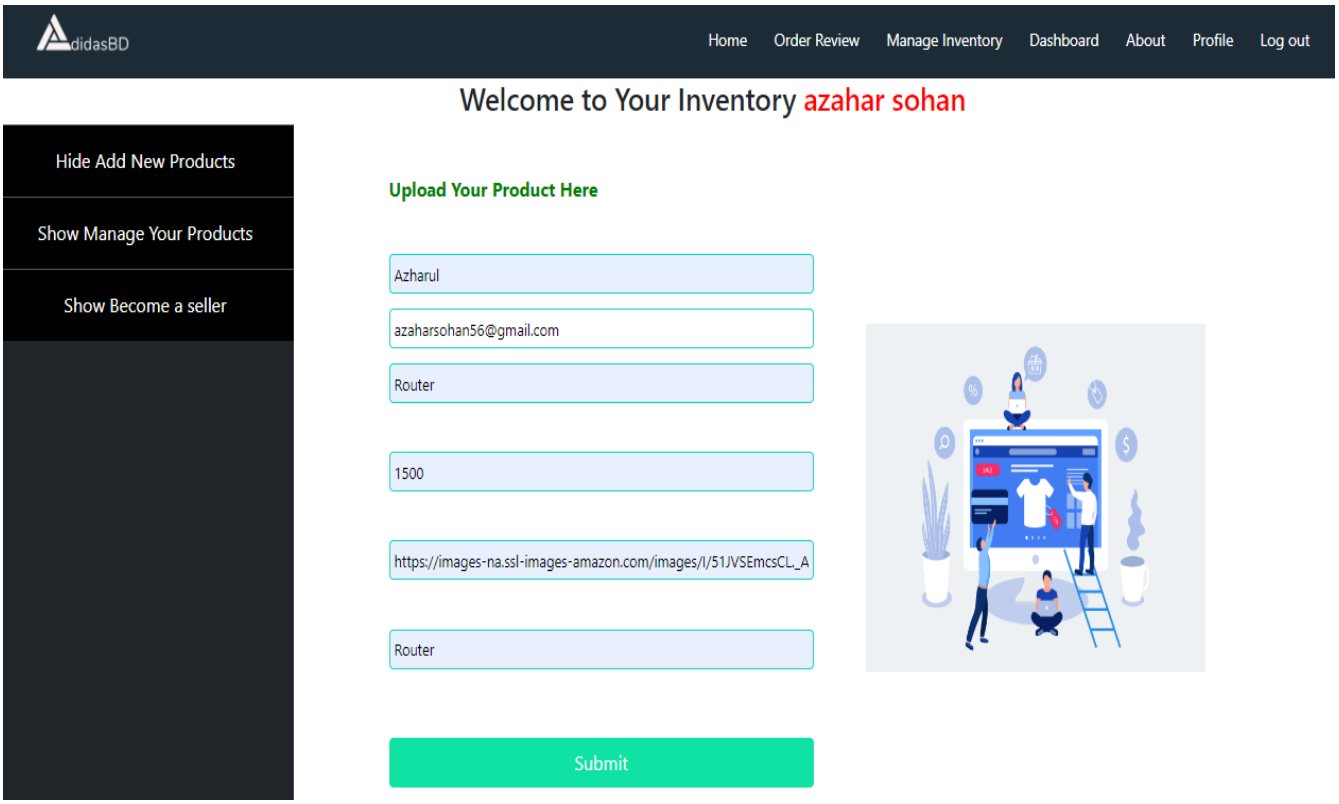

Figure 15 : Update product admin user interface

6.14 Manage Products

When we will gone manage product updated products shows.

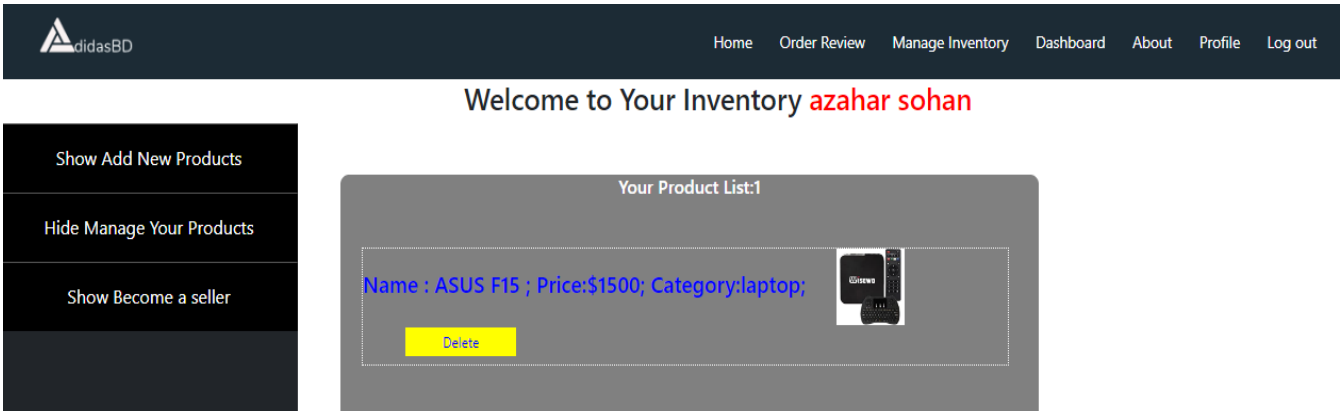

Figure 16 : Manage Products Interface

6.15 Create a Seller Account

If admin want be making a seller

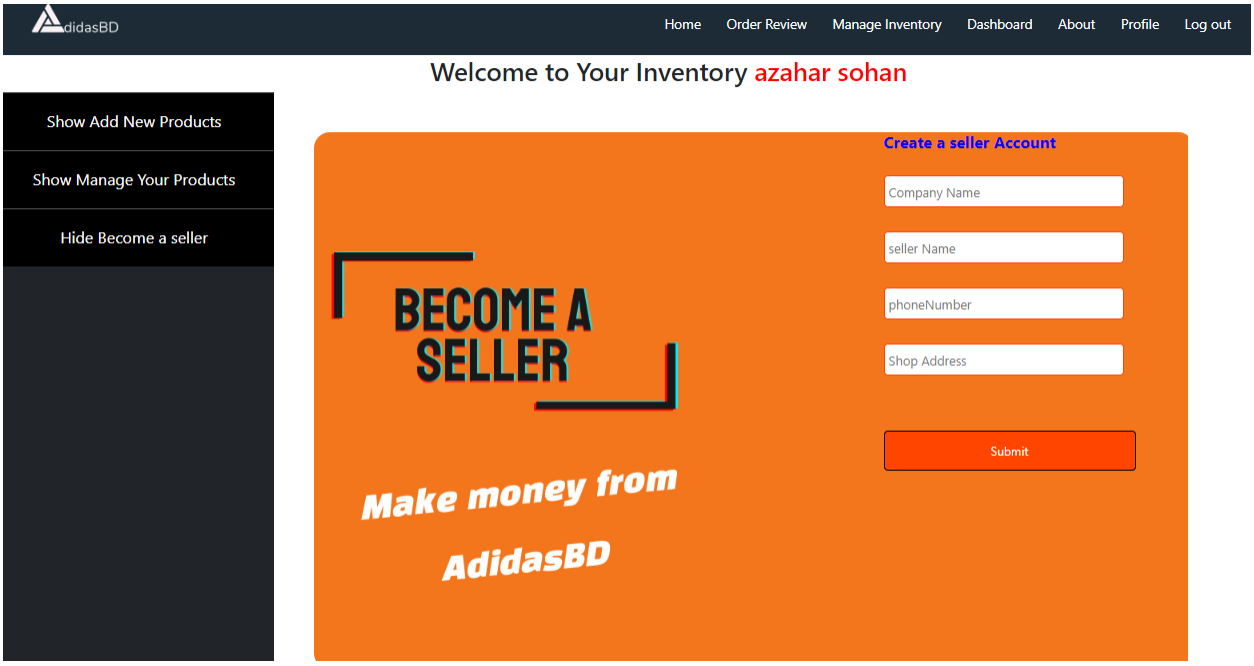

Figure 17: Create a Seller Account

6.16 Manage Order

Manage order contains the customer order information and some actions are available to manage this order. Update the order status pending or complete view full details about order such as customer details shipping details and order details. After completing order life cycle we can delete the order.

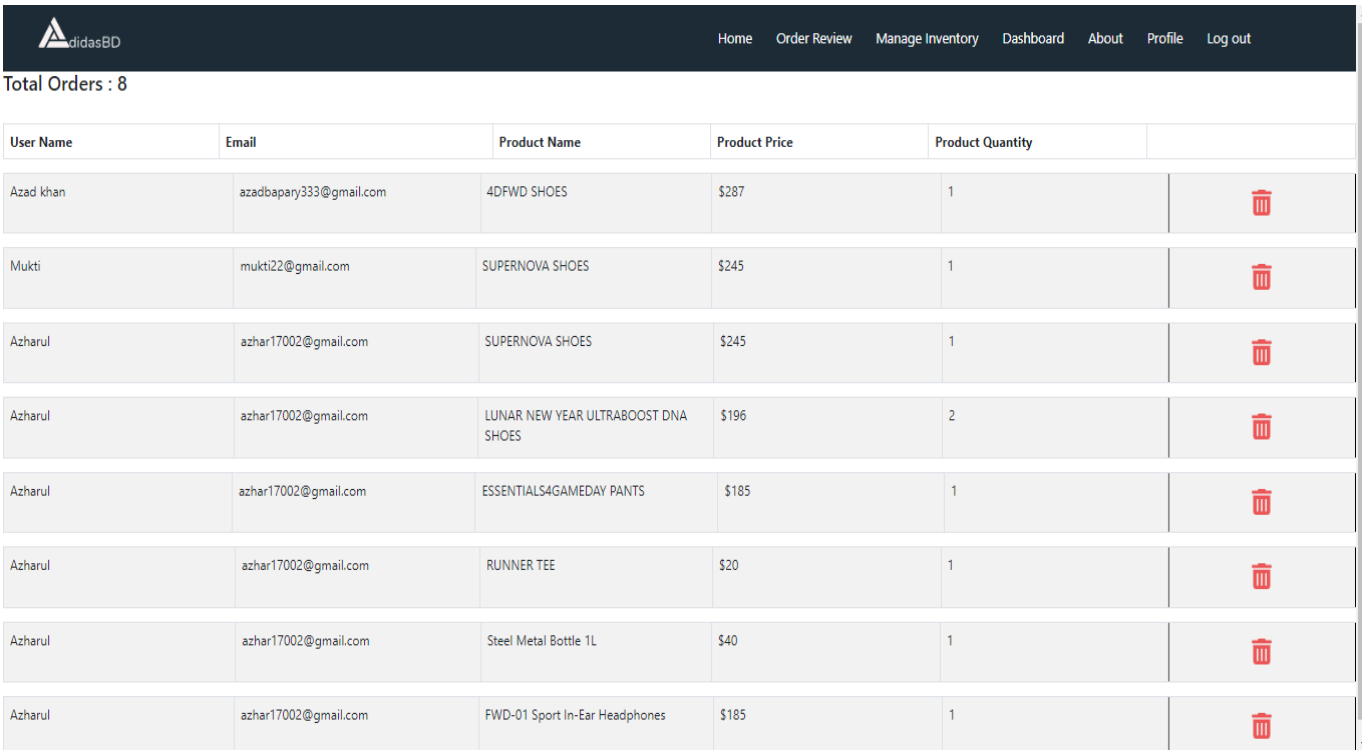

Figure 18 : Manage order admin user interface

6.17 Payment Confirm

Here admin users will get payment for order. Now, Admin get ready to delivery products.

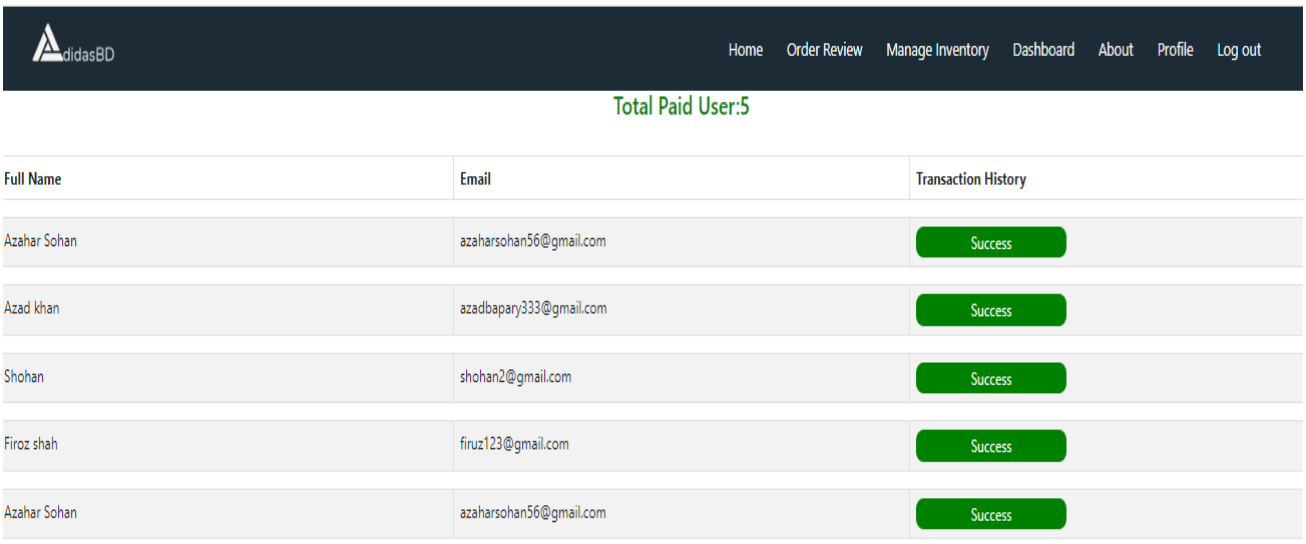

Figure 19 : Payment Confirm user interface

Chapter 7

Limitations of the Project

Limitations

Throughout our research with the topic, a few areas were overlooked. Some of those limitations can be pretended as follows:

- The payment process is done manually.
- It is not fully responsive but web version.
- Mechanical failure can cause unpredictable effects on the total process.
- No one can buy during a site crash.
- Shipping times can be lengthy.

Chapter 8

Future Scope of the Project

Future Scope

- Payment gateway API will be added to get more payment gateway options and buying processes dynamically.
- This project can be used to plan e-commerce business in the future.
- The idea of entering the global market place by performing search engine optimization (SEO) on this project can be considered.

Chapter 9

Conclusion

Nowadays, all ecommerce business are taking an important role in buying and selling facility-Commerce is not just about conducting business transactions via the Internet. Its impact will be far-reaching, and more prominent then we know currently. ... Since more businesses are being held online resulting in high economy development and emergence of a more innovative and advanced technology.

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