



**E-Commerce Website For Visually Impaired with
functionality of Narrator**

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CERTIFICATE

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Abstract

Online shopping has become very popular in the recent years and people are moving towards it as more functionalities are being provided to them, But in the current situation of Pandemic the need for an online shopping system has become necessary for almost every business. Most of the businesses in Pakistan run in a face to face environment but in the current conditions of pandemic where social distancing is important and people have started to shift towards online shopping, businesses need to shift towards online e-commerce system so they can still run their business in these conditions. Our proposed system is focused on bringing the facility of online shopping to the visually impaired community. Although many websites have fully functional and advanced systems to help people in easily buying products over the internet but most of these websites do not cater the visually impaired community and there are no special features that are targeted for this community. Our website aim is to provide the full functioning of online shopping with the additional features that will help the visually impaired community to take advantage of the improving online shopping system

Acknowledgement

All praises to Allah Almighty Who helped us not only to avail this great opportunity to increase our expertise but also gave us Devotion and wisdom to work and plan with full enthusiasm. Secondly we would want to thank our supervisor **Sir Hassan Tanvir** who genuinely helped us to prepare the project and tried his best to help us create a product and document which is not only feasible but according to the standards of current market. We would also like to thank our family members who supported us at each difficult time in our life.

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Chapter 1

Introduction

1.1 Covid 19 impact on Business

The world is currently affected by a serious pandemic known as Covid-19 and not only is it affecting the lives of people it is also severely impacting the normal functioning of businesses. Many businesses are totally closed down because of the current conditions and the only businesses that are functioning properly are the ones that are interacting with their customers using an E-Commerce or system using internet facilities. The Impacted businesses need to shift towards an online buy and sell system to face the current pandemic

1.2 What is E-Commerce

Electronic Commerce also known as E-Commerce is the process by which trading of products and services takes place using computer networks mostly through internet. Electronic Commerce mostly works on technologies such as mobile commerce, Electronic funds transfer, supply chain management, internet marketing, online transaction processing, electronic data interchange(EDI), inventory management systems and automated data collection systems. But the latest electronic commerce

mostly uses the World Wide Web for at least one section of the transaction process although it may use any other means of technology such as E-Mail. There are many methods through which businesses can integrate E-Commerce in their system which are

- Selling products over a website which directly targets the consumers
- Business to business buying or selling
- Business to business electronic data exchange
- Marketing of products through email or fax
- Launching new products by engaging in pretail

- Pretail is the sub-category of E-Commerce. It introduces new products and services to the customers online before the actual launch so that the customers can pre order limited products and sometimes book services beforehand so they don't miss the opportunity.

1.3 E-Business

E-business also termed as electronic business is an application of information and communication technology. In E-Business electronic commerce refers to the exchange of products and services and relationships among other business and individuals and focuses mostly on the use of ICT.

1.4 Comparing E-commerce and E-Business

E-business only includes the utilization of some ICT factors in its working whereas E-Commerce focuses more on widespread distribution of either selling or buying

of the online products or services

1.4.1 Digital Economy

Digital economy mostly refers to the technologies based on the computing technologies. It may also be termed as computing technologies. But digital economy is not mainly used in the context of E-Commerce because business can be either digital or traditional and cannot be proposed under a single branch.

1.5 Attributes of E-Commerce

1.5.1 Digitization of Business

As the term suggests this means use of internet and ICT related technology within a business.

1.5.2 Focus on Business Processes

Focus on business processes was also a crucial part of the commerce but in E-commerce we try to automate the business processes so the workload and expenses are reduced considerably.

1.5.3 Use Of Global network

Everyone has a desire that their business becomes popular across the globe but spreading your business is a very difficult task if you don't count the use of technology. But if a business is integrated in an E-commerce environment the chances for the business to become popular increase by a large margin

1.5.4 New Potential for Opportunities

With E-commerce the margin for new opportunities is widely increased as the business is widespread in every corner of the world.

1.6 E-Commerce With 5C Model

E-Commerce can also be defined in terms of 5C model which are discussed below

1.6.1 Commerce

In E-Commerce the products are sold by matching the customers with suppliers and a broad prospective is given to the idea of selling and buying

1.6.2 Collaboration

With the help of E-Commerce the businesses can collaborate with a number of different linkages and networks very easily which cannot be made possible in a business having no ICT integrated.

1.6.3 Communication

E-Commerce an automated direct communication between the customers and sellers that removes any query or question from both sides and eliminates the gap of communication between two parties that wouldn't have been able to establish without the integration of E-commerce in a business.

1.6.4 Connection

A business cannot be widely successful if cannot create relationships and connections among other parties.E-commerce also plays a big role in that regard.

1.6.5 Computation

Resources can also be shared using the help of E-Commerce.

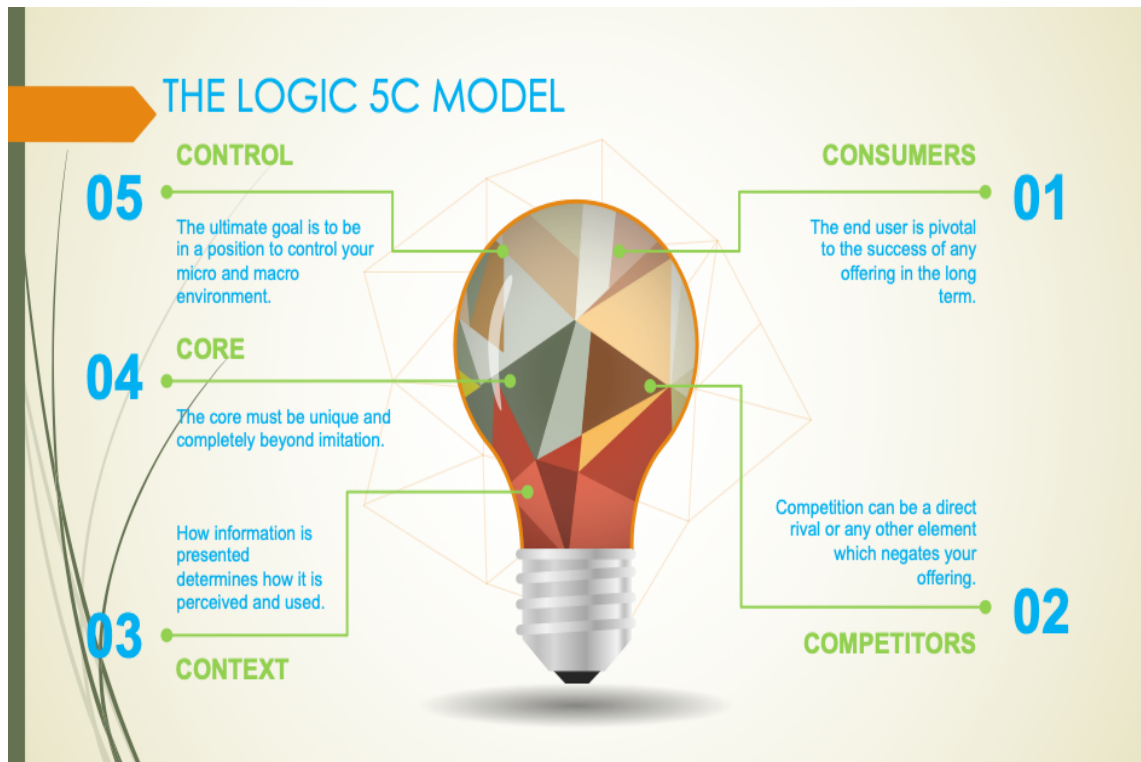


Figure 1.1: 5c Model of E-Commerce

1.7 Additional Terms Related to E-Commerce

1.7.1 M Commerce

Using mobile devices for the purpose of business is called M-Commerce. Some Main features of M-Commerce are

- Locating customers
- As customer base of mobile users is high so M-commerce has high availability of services
- Increasing the processing power of Mobile's.

- Communication of devices using voice and data transfer.
- Increasing the accessibility for the customers
- Providing security to the customers.

1.7.2 E-Procurement

E-Procurement can be basically termed as the automation of processes related to the working of an E-Commerce website. It enables the electronic processes related to the ICT to be integrated on the business.

1.7.3 E Government

The digital interaction between the different levels of government (Cities, provinces, national and international), governance and ICT is termed as E-Governance

1.7.4 E Administration

The process of creating an electronic environment where all the paper work is stored as an electronic administrated data is termed as E-Administration.

1.7.5 E-Democracy

It basically means that the laws under E-Commerce are equal for all communities with no bias for anyone.

1.8 Role of Internet in E-Commerce

In the last decade E-Commerce started to include the purchase and selling of goods over the World Wide Web. This was the turning point in the Web Commerce.

1.9 Business Model Related to E-Commerce

There are certain models associated with ecommerce. One of the model related to ecommerce is discussed below.

1.9.1 IBB

IBB(Internet Based Business) includes the activities that are carried out to cooperate with other firms and service providers in E-Commerce.

1.9.2 Access provider

For every E-Commerce Business over the Web commerce there is a need of an access provider that is responsible for providing the internet access to the business at all time.

1.9.3 Search Engine

The commonly used software's in Internet are Search Engine.Their main aim is provide business opportunity to the people that are looking for it.

1.9.4 Online Shop

Online shop is a website where people can buy products and services.

1.9.5 Content Provider

As the name suggest a content provider is the one that provides the digital good,information news or documents. Major business models in this area are newspaper publishers,radio publishers and publishing companies.

1.9.6 Online marketplace

Online marketplace is a website where buyers and sellers can meet and provide and take services from each other. Examples related to this business model are shopping centres and buying associations

1.9.7 Information Broker

The person or entity that provides the information related to the products and services in an E-Commerce business is termed as business broker,

1.9.8 Transaction broker

The person or entity responsible for executing sales transactions is termed as transaction broker.

1.9.9 CSP

CSP(Cloud Service Provider) an online service provider or cloud service provider is the person or program that provides the storage and backup for the data related to the E-Commerce Website.

1.10 Advantages and Disadvantages of E-Commerce

The advantages of E-Commerce are more than its disadvantages and in the current pandemic situation businesses need to shift towards an ecommerce system to survive or they will face a long term loss. Some advantages and disadvantages are discussed below.

1.10.1 Advantages For Customers

- People can order items on their doorsteps which is very important in the current pandemic where social distancing is the best practice to minimize the chances of being affected by this pandemic
- As the process takes place online its available 24/7
- No real life queues for the customers to wait for
- We can do shopping from our home without the need of moving to a different place.
- Customization is also possible in E-Commerce
- Prices are considerably low because of high competition.

1.10.2 Advantages For Provider

- Multiple customers can be offered services with less resources
- Faster Communication
- There are no intermediate links that take away profit margins
- New customers can easily be attracted

1.10.3 Disadvantages For Customers

- There is always some compromise to the private data of customer in E-Commerce
- Not all product sellers online can be trusted because there is no guarantee of the product prior to buying.

- The chances of Fraud on online shopping is relatively high then self shopping from local stores

1.10.4 Disadvantages For Provider

- As the products need to be delivered the cost of logistics's services is always hard to handle
- Advertising properly is also a negative because without advertising there is zero to none increase in rate of customer base.

1.11 Business Net Types

Web Agora

The main aim of Business web Agora is to run a marketplace for goods and values and the role for the customer is participating in this market

Web Aggregator

The main aim of Business web aggregator is to run a digital super market and the role of customer is to buy and utilize services and products from this digital market.

Business Web Integrator

The process of creating an optimized value creation chain

1.12 WEB 2.0

Web stands for world wide web and the most main function for this is generated content, usability and interoperability. Web 2.0 does not refer to any update it only

focuses on different changes for how the web pages are made.

Blogs

Blogs are an important part of WEB where discussions are carried out regarding some important or historical subjects or news.

Online Communities

Online community in a Web is a virtual community that helps people across the globe to interact with each other and share their life stories, activities or real life connections.

Social Networking Services

Social networking service is an important characteristic of WEB as it allows the communities that share similar interests and activities to communicate with each other.

Forms and Bulletin Boards

As the name suggests forms and bulletin boards stand out among the other information on the WEB and enable the user to focus on some news and alerts that are relatively more important.

Content Aggregators

Content aggregators is a website or software that is responsible for collecting information from multiple sources. More details regarding internet and e-commerce can be found out at [\(Rey00, ey00\)](#)

1.13 Visual Impairment

Visual impairment refers to the decreased ability to see to an extent that is not fixable by usual means.

1.13.1 WHO Estimation

According to the World health organization there were 285 million people who were visually impaired in the world. 346 million people were faced by low vision and 39 million people were blind according to (Who, ho).Developing countries had more visually impaired people mostly at the age of 50 years.

1.13.2 Types of Visual Impairment

The following information is given at (KR02, R02) There are basically three types of visual impairment.

- Blind and legally blind
- Low Vision
- Color Blindness

1.13.3 Blind and Legally blind

Total blindness refers to the complete disability to any light perception.

These people have very limited field of vision and they communicate with the help of Braille and non visual media

1.13.4 Low Vision

Low vision term is used for the people who are unable to read at a normal distance even with glasses and they require some text and visual modification to help with

reading.

1.13.5 Causes of Low Vision

With the advancement of technology the risk of getting low vision is very high due to people spending their time in front of harmful light radiations. Some major causes of Low vision are

- Macular degeneration
- Galucoma
- Amblyopia
- Retinal Detachment

1.13.6 Signs of Visual Impairment

Some signs that help to identify low vision and partial blindness are

- Holding book too close
- Sitting too close to the TV
- Tilting the head to see better
- Sensitivity to Light
- Closing one Eye to read
- Excessive Tearing
- Eye rubbing

1.13.7 Color Blindness

Color blindness refers to the inability of the person to distinguish between all colors like normal people.

1.13.8 Types of Color Blindness

- Congenital Color Blindness
- Acquired Color Blindness

1.13.9 Congenital Color Blindness

It is an inherited condition which is further classified into two types

1.14 Dyschromatopsia

The confusion of colors is termed as Dyschromatopsia It is also classified into three types

1.14.1 Anomoly Trichromatic Color Vision

In this condition all primary can be perceived but the ability to differentiate between one or two of them is affected.

- Protonomalous: In this condition red color appreciation is defected
- Deuteranomalous:In this condition green color appreciation is defected
- Tritanomalous:In this condition appreciation of blue color is defected.

1.14.2 Dichromatic Color Vision

In this condition a person will not be able to perceive one of the three primary colors at all. Classified into three types

- Protanopia: Complete defectiveness of red color.
- Deuteranopia: Complete defectiveness of green color.
- Tritanopia: Complete defectiveness of blue color.

1.14.3 Red Green Deficiency

The defectiveness of both red and green colors. It is more common and causes a lot of severe affects on the people facing this problem.

1.14.4 Blue Cone Monochromatism

It is the condition in which the red and green cone are completely absent.

1.15 Achromotopsia

This condition is very rare. In this condition there is complete rod cell monochromatism. A person facing this issues can be characterized by

- Total Color Blindness
- Day Blindness
- Nystagmus
- Fundus is normal

1.16 Acquired Color Blindness

It is mostly related to decreased visual activity due to the damage of macula or optic nerve. It has three conditions.

- Blue Yellow Impairment
- Red Green Deficiency
- Acquired Blue Color Defect

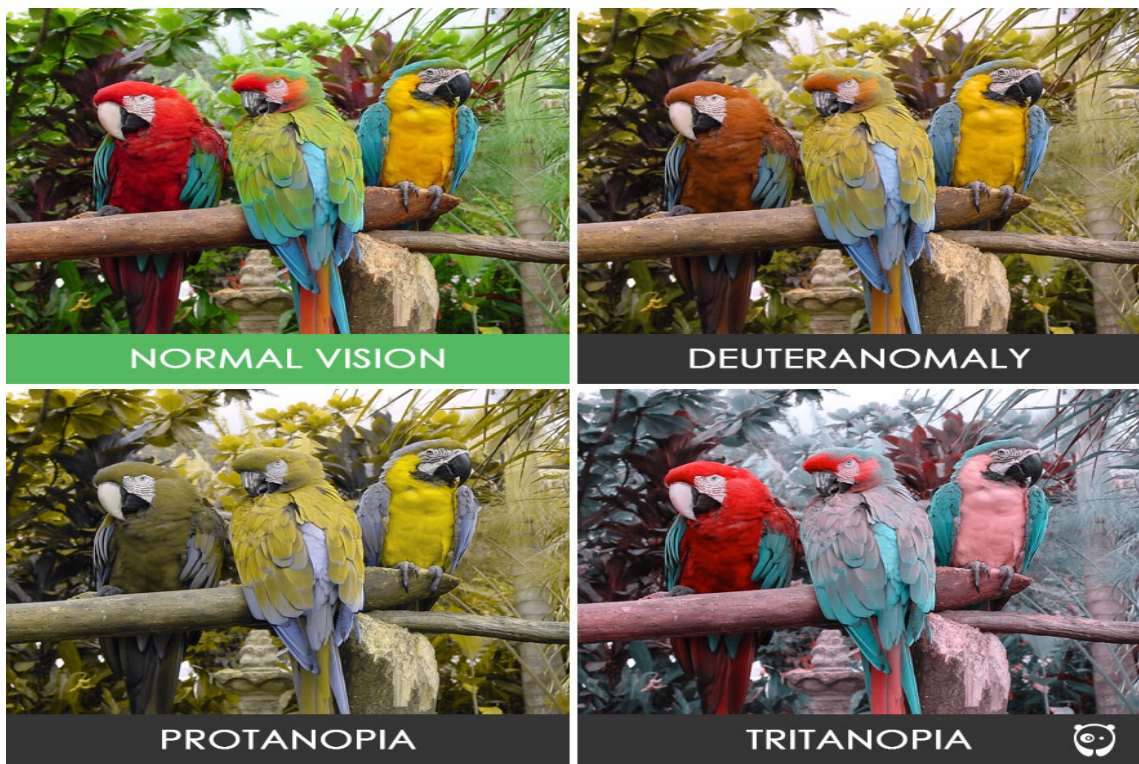


Figure 1.2: Color Blindness Types

1.17 E-Commerce And Visually Impaired People

As discussed E-Commerce has revolutionized the business strategies and provided a lot of beneficial functionalities for people to sell and buy products very easily

through the online market.

This market is mostly targeted to the community of people with no major defect especially related to visual aspect as most of E-Commerce is dependent on the visual interaction between the online product and the customer.

Although many websites and applications have given functionalities to visually impaired people to also take advantage of all the features they offer which include

- E-Learning for visually impaired students
- Audio enabled books
- Access Note

But when it comes to E-Commerce and online shopping not many websites are targeted and specifically designed for them which is negatively affecting them because of the current trend of online shopping. We will further discuss the concerns related to the existing websites regarding visually impaired people and how our project will help to minimize these concerns in the next chapter of our report.

Chapter 2

Literature Review

2.1 Existing E-Commerce Websites

There are many websites that are promoting and running successful businesses through E-Commerce on the internet. Some of these websites working are discussed in detail below.

2.1.1 Amazon

Amazon was founded by Jeff Benzos in 1993. It initially started as an online bookstore. The growth rate in the starting years was very low for amazon but it became the world's largest bookstore as the time progressed. After some success Amazon transformed their simple book store business into a complete online E-Commerce system. And all the success they achieved was only possible due to the power of technological progress, bandwidth, data storage technologies and computational power. Currently Amazon sells products related to over 40 different categories. They range from electronics ,books to groceries.

2.1.2 Features of Amazon

The key features of amazon are

- Low price
- Convenience
- Selection
- Availability
- User Friendly environment

2.1.3 Key platforms of Amazon

The main key platforms that Amazon works as are

- Logistics Platform
- Search Engine
- Internet Advertisement Platform
- Advertising Platform
- E-Commerce and IT platform

2.1.4 How Amazon E-Commerce Website Works

Amazon works as a direct buyer seller approach. After opening the homepage of Amazon user can see special offers and featured products and in case of an old user amazon keeps track of the products searched or looked by the user and shows related products to the user on the main page. The user can either sell or look for the products. The user can add the items in the cart and order them in the cart menu and they will be shipped directly to the user's provided address.

2.1.5 Design of Amazon

Amazon has a simple design that shows list of products in mini panels and a short description about the products is given under the product including the price. The user can click on any time to see the full description about the product. Some design samples of Amazon are listed below

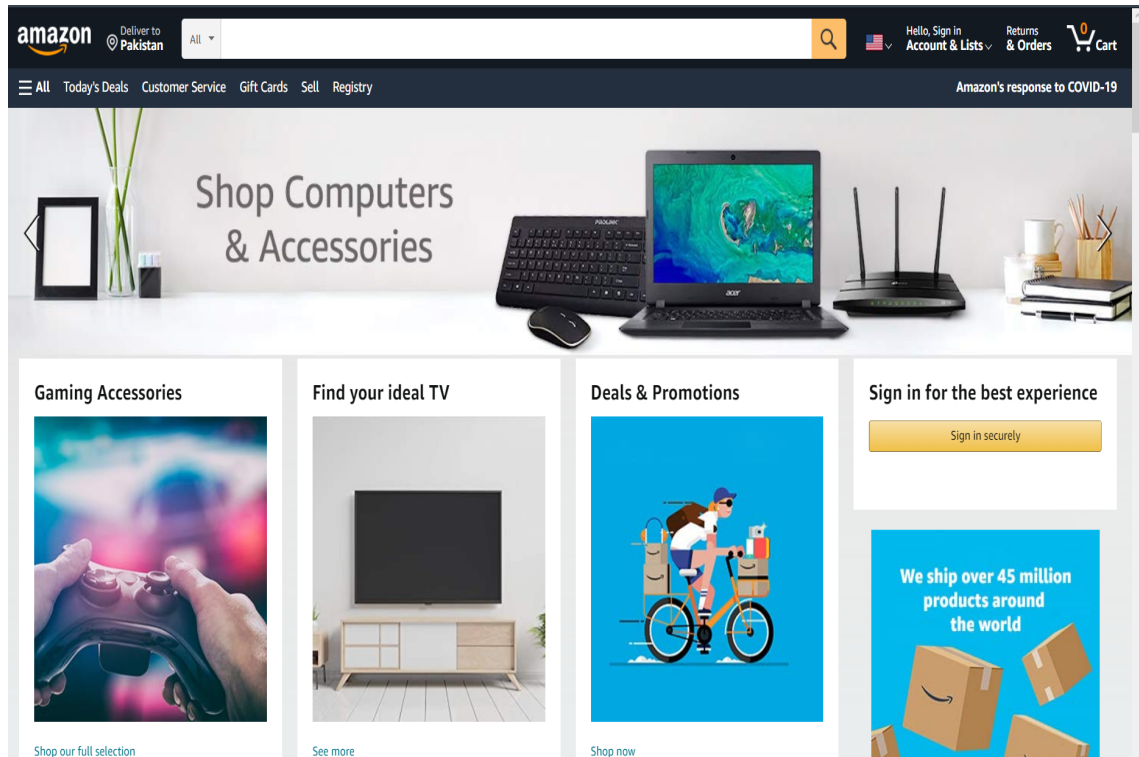


Figure 2.1: Design of Amazon Website

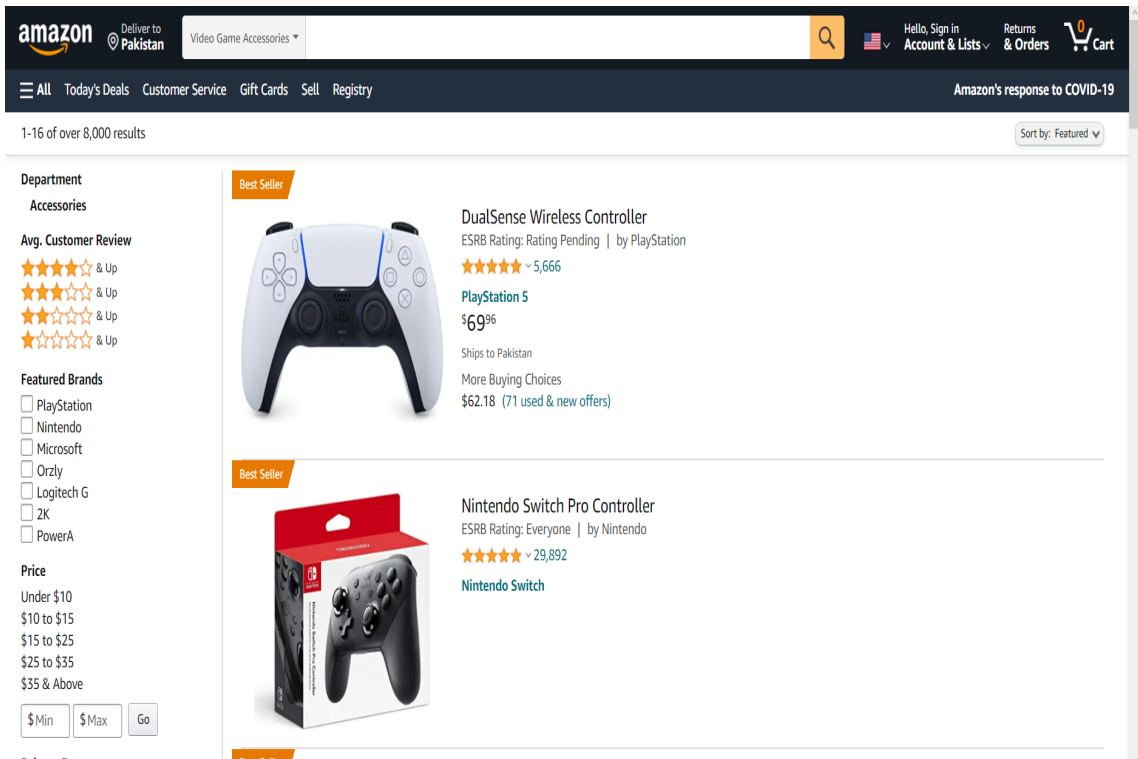


Figure 2.2: Design of Amazon Website

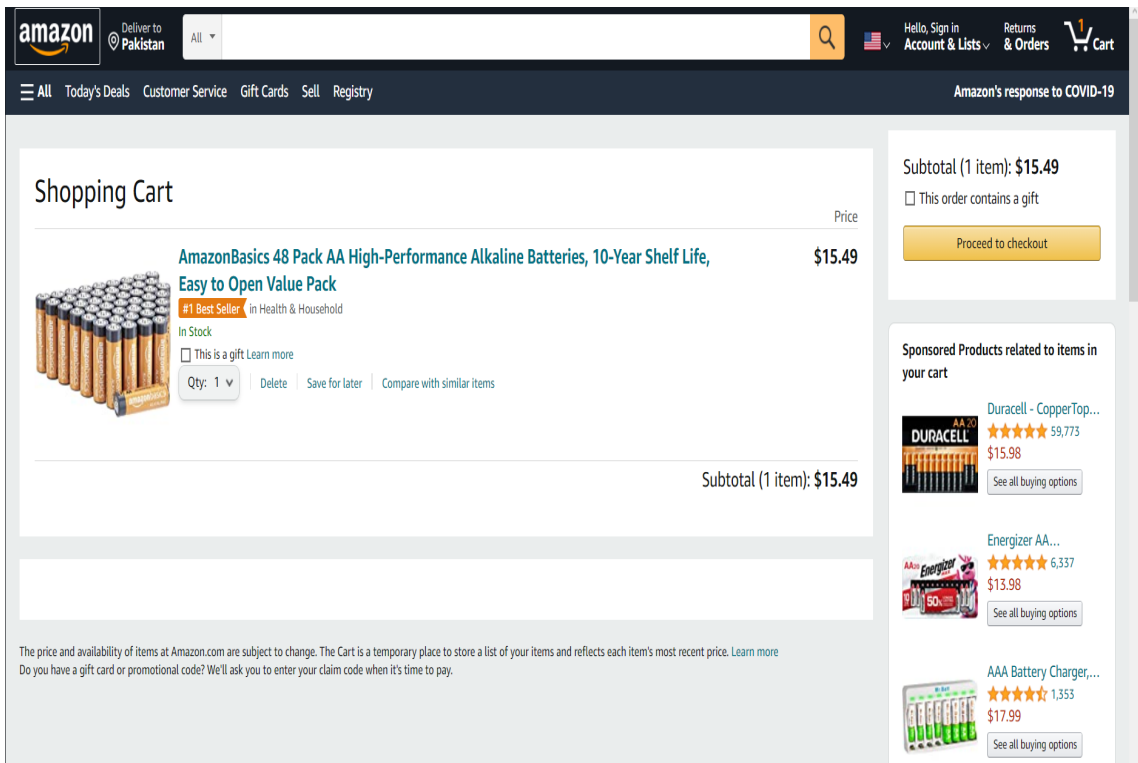


Figure 2.3: Design of Amazon Website

2.1.6 Amazon Design Analysis

As amazon has been in the market for many years and it has acquired and improved a lot due to its increasing coverage and linkages its design has also improved over the years. Amazon offers a simple and flexible design of user interface which allow variety of users to easily select their desired products and order them with ease. All of this is possible because of the simple and clean design of Amazon which enables both the sellers and buyers to engage with this website as easily as possible. Further Details can be found out at [\(O3, 3\)](#)

2.1.7 Daraz

Daraz is also a popular online market place mainly operating in South Asia and Southeast Asia. It was founded as an online fashion e-commerce marketplace in Pakistan by Muneeb Maayr (Founder) and Farees Shah (Co-Founder). Daraz group is currently operating E-Commerce and logistic in Bangladesh, Nepal, Pakistan and Sri Lanka. Daraz was also recently acquired by Ali-Baba from a German Company. The more information can be found out at [\(JJ19, J19\)](#)

2.1.8 Features of Daraz

Daraz was mainly targeted in South Asia so they needed some features that benefited the people of these regions. Some of the features that daraz offers are

- Single platform for all product shopping
- Door Step Delivery
- Availability at all times
- Cash on Delivery option
- Multiple Payment methods including easypaisa for Pakistani customers

2.1.9 Key Platforms of Daraz

Daraz has many key platforms in the market that helped it to grow rapidly in the recent years. Some of these key platforms that Daraz works as are

- Logistic Platform
- Advertisement Platform
- New Businesses entrance opportunity

2.1.10 How Daraz Works

Daraz works mostly same as Amazon there is a list of items shown on the main page which can be added to cart by the customer. After confirming the order the customer can get it delivered to their door steps with the payment method of customer choice.

2.1.11 Design of Daraz

Daraz design is quite different than Amazon. It displays its products in form of a multiple line and the product type and price is given below the image of the product which can be opened to look at the full product description and reviews. Some design samples of Daraz are given below

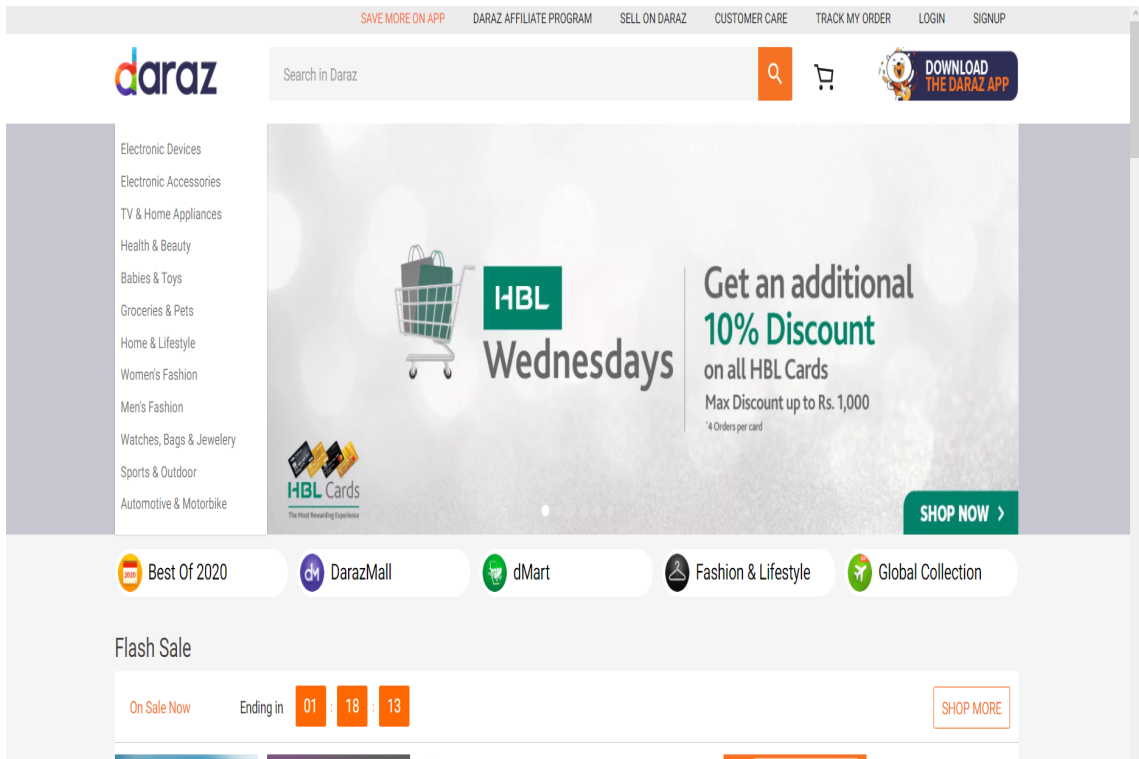


Figure 2.4: Design of Daraz Website

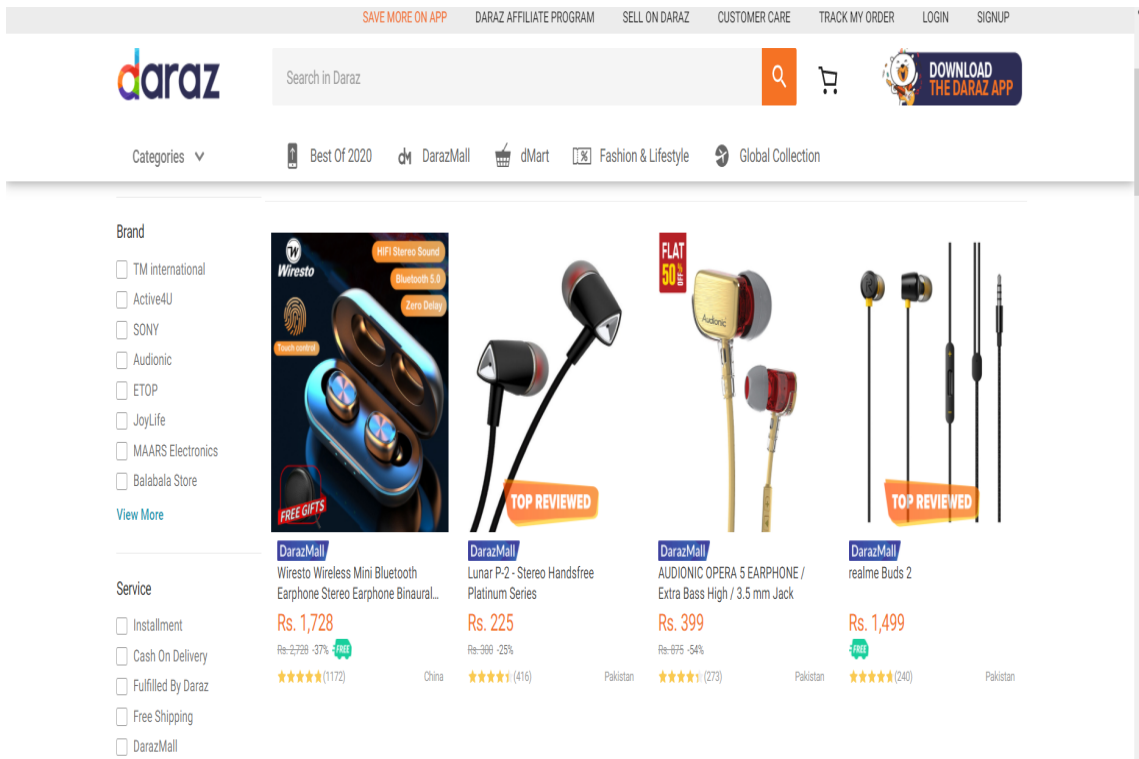


Figure 2.5: Design of Daraz Website 2

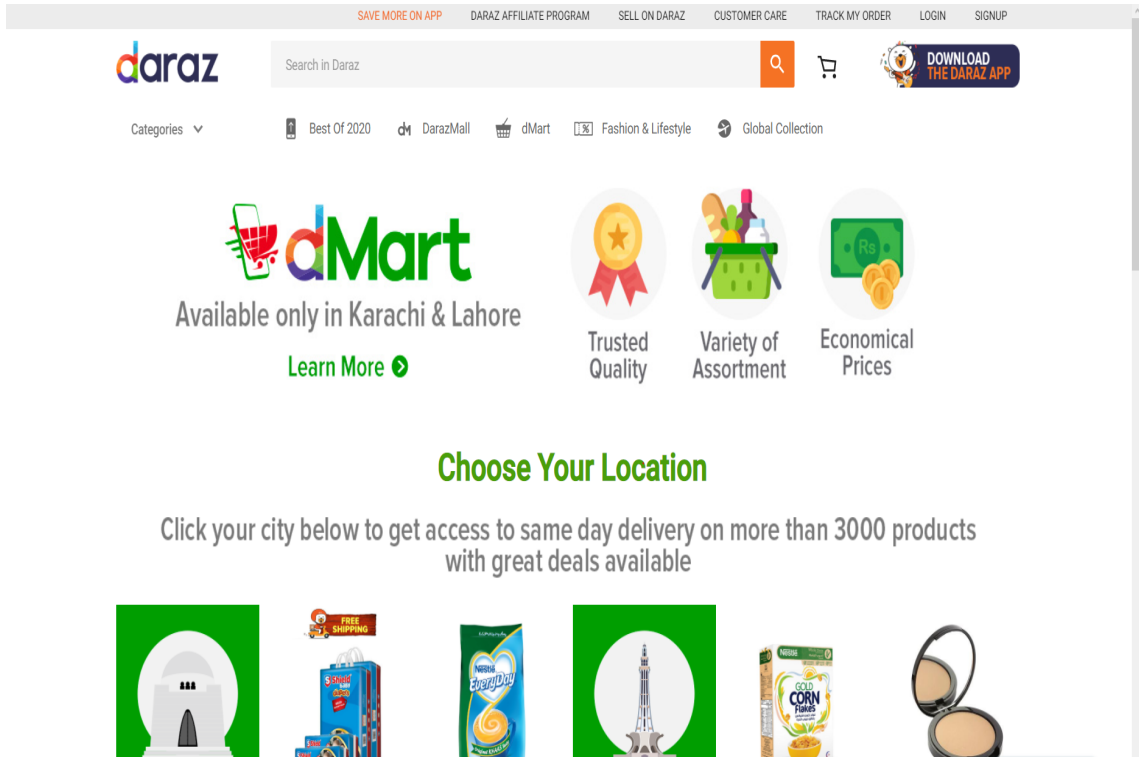


Figure 2.6: Design of Daraz Website 3

2.1.12 Daraz Design Analysis

Daraz has also improved its design over the years giving its users new offers regularly based on the user needs and giving them an interface which they can easily go through to buy the products they desire

But as Daraz is new in the market their are many businesses that are selling over priced and low quality products so there is a lot of work required by Daraz in improving the product and business quality related to its linkages.

2.2 Issues With Existing Websites

We have briefly discussed the existing E-Commerce websites and how they are working in the market but now we will come across the main issue with these websites that was the lack of features and no focus towards the visually impaired

people. These websites are mostly provide an user friendly environment for people with normal eyesight but in case of visually impaired people there is no proper functionality added. In some cases people with low vision and color blindness may be able to use these websites but they become totally in-usable in case of a blind person. Some of the major concerns related to these websites to be used by visually impaired people are

2.2.1 Font Size

Font size plays a major role when we are dealing with visually impaired people especially people with low vision. Many websites provide a beautiful and appealing font style and size but that's mainly focused on the people with good eyesight. People with low vision need to either decrease their distance from the screen or use the zoom feature of browser to see the contents of the websites clearly. This shouldn't be a problem if websites either make the font readable by all kinds of people which is rather difficult to do or add option for user to adjust the size of the font so that they can view the contents of website with ease.

2.2.2 Products Presentation

The way by which products are presented on the website and how user interacts with them is also important in an E-Commerce website. All existing websites have a unique presentation model and it appealing in its own way but the main issue with these designs is that they are mostly presented to appeal the people with good or normal eyesight and without any sight defect. It's not suitable for visually impaired people and these websites provide no option to change the view of these products according to their eyesight preference which cause a lot of issues for the visually impaired community at using these websites.

2.2.3 No Narrator Facility

There is no built in narrator facility for audio output of products and their description in these websites that makes it difficult for visually impaired people to use these websites.

2.2.4 No functionality for color blind people

Color blind people cannot visualize different combination of colors and these websites do not focus on this problem and use color combinations that are not favourable for color blind people. These people can often find it very difficult to visualize products that have the color combination not suitable for their eyes.

2.3 Feasibility of proposed website

After analyzing the issues with the existing websites related to the visually impaired community we decided to make our own E-commerce website that is mainly focused on providing functionalities to visually impaired people that will enable them to buy like the normal community through online websites. The functionalities that we are aiming to include in our proposed website are

2.3.1 Functionality of Narrator

We will provide narrator on our website for the visually impaired community. This narrator will help the people to get audio feedback of which product they are selecting and what are the features of that product.

2.3.2 Functionality for Color Blind people

Our proposed website will have three different modes which will be made specifically to change the view of website based on the color blind problem faced by the people. Color blind people can select the option they prefer and the design and layout of the website will be changed based on the option selected. These options will be

- Deutromoly mode
- Protanomoly mode
- Tritanomoly mode

2.3.3 Different Appearance Based on User Choice

As there is a variety of people that will be using our proposed website we cannot only consider the people that are visually impaired as other people with good eyesight can also use our proposed website. So there will be three options which will change the appearance of how products are shown on our website these options are

- Normal Mode
- Low vision Mode
- Blind Mode

2.3.4 Normal Mode

In this mode the products and main page will be in an overview mode where the page will contain a large number of products in a relatively short division because normal people can visualize the website clearly so they will be able to go through more products in the page as compared to other modes

2.3.5 Low Vision Mode

In this mode the products number will become small on one page and they will be shown in a relatively large division area so that the person with low visibility can easily visualize the contents and description of the product.

2.3.6 Blind Mode

In this mode only one product will be shown on the page. The reason for this is because blind people cannot visualize anything so our focus would be on the accessibility of the product through audio to the blind person which is relatively easy to do for one product at one time on the page.

2.4 Proposed System Diagram

Our proposed website will interact with a number of different physical systems while giving the functionality to the users. These interaction are shown in form of a simple proposed system diagram of our website.

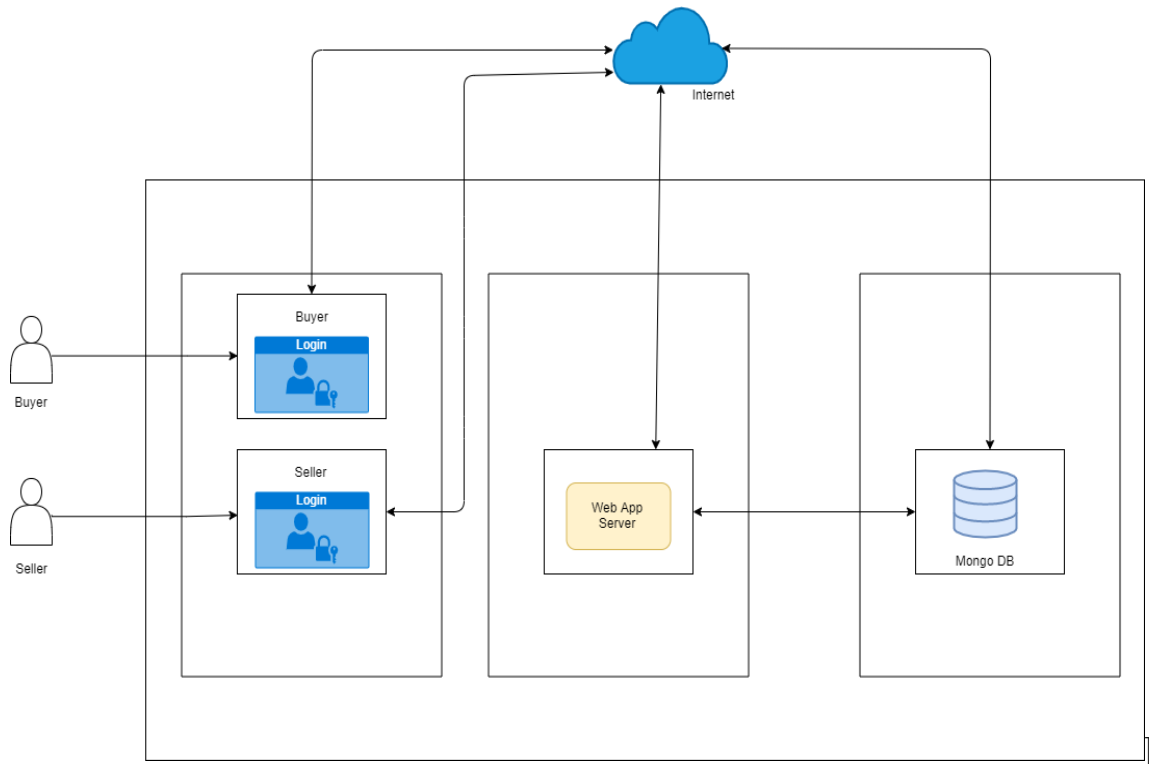


Figure 2.7: Proposed System Diagram

In this diagram our system has two main entities interacting with different components of our proposed system. These components interact with the cloud service of mongo database using the mongoose library in react and saves the user and admin interactions in the mongo database cluster.

2.4.1 Key Difference between existing websites and proposed website

The main differences between our proposed website and the existing websites is discussed below in form of a functionality check difference. We will compare the features that are missing in the existing websites.

Feature	Daraz	Amazon	Proposed Website
Sign in and Sign Up facility	Yes	Yes	Yes
Multiple Payment Options	Yes	Yes	No
Appearance Modes for Visually Impaired People	No	No	Yes
Narrator Facility	No	No	Yes
Different Product Views For Color Blind People	No	No	Yes
Customer Order History	Yes	Yes	Yes
Order Tracking	Yes	Yes	Yes

Table 2.1: Key Differences between Existing Websites and Proposed Website

2.4.2 Proposed System Review

After analyzing all the functionalities that are non-existent in the existing E-Commerce websites to help the visually impaired people, we can easily deduce that our system that will provide important functionalities to help the visually impaired people will prove as a good substitute for E-Commerce websites for the visually impaired community. We will be providing the functionalities that mostly zero to none of the E-Commerce websites are providing.

Chapter 3

Software Requirement Specification

3.1 Introduction

3.1.1 Purpose

The main purpose of this system is that with the advancement of technology many people are slowly trusting and using internet and other social platforms to order and buy the products they are in need of online and get those products delivered at their door-steps. There are many e-commerce markets that exist on the internet today namely Amazon, Daraz, Alibaba. Although these websites are well designed and have the latest functionality that makes it easier for any user to order an item online the area where these websites fail to deliver is the visually impaired community. The design of these websites is not suitable for visually impaired people and there are no features provided that can aid the visually impaired community in ordering products online with ease. The main purpose of our proposed website is to create an e-commerce website whose design is suitable for both normal and visually impaired community and offer certain features to the visually impaired

community that will aid them in ordering products online with ease.

3.1.2 Document Conventions

In this document every requirement has its own importance because this system is largely dependent on the requirement specification and every requirement must be properly initialized.

3.1.3 Intended Audience

The intended audience for our proposed websites are mainly the visually impaired community which includes

- Color Blind People
- People with Low vision

But our proposed website is not limited to this audience only. Normal users that want to buy products online can also avail the features and services of our website.

3.1.4 Product Scope

Our proposed website mainly targets the visually impaired community and its scope revolves around the online community that buys and sells products over the internet.

3.2 Overall Description

3.2.1 Product Perspective

Our proposed website will work same as the existing E-Commerce websites where people can order products online but it will include extra features and functionali-

ties that will aid the visually impaired community to easily order products online.

3.2.2 Product Functions

The product functions related to our proposed website are also the functional requirements of our system. These product functions are given below in form of a table indicating each function and its input output and workflow

ID	PF-01
Name	Create Admin Account
Description	Enter the details required to create the account
Input	Admin gives his First name, last name email and password in the sign up process
Output	Admin account is created in the database
Requirements	Active internet connection is required for this function
Workflow	Admin enters correct information and clicks submit button and system saves the record in database

Table 1 Product Function for Creating Account

ID	PF-02
Name	Login Admin Account
Description	Enter the details required to log in account
Input	Admin gives his username and password
Output	Admin is logged in his account
Requirements	Active internet connection is required for this function
Workflow	Admin enters correct information and clicks submit button and the system opens the login page of the admin

Table 2 Product Function for Login Account

ID	PF-03
Name	Add Product
Description	Enter the details of the product that needs to be created
Input	Admin provides the name,category,image,description,price and quantity of the product
Output	Product is created in the database
Requirements	Active internet connection is required for this function
Workflow	Admin enters the product details and clicks on add product and the system adds the product in database

Table 3 Product Function for Adding Product

ID	PF-04
Name	Add Category
Description	Enter the details of the category that needs to be created
Input	Admin provides the category name,image and parent category of the category that needs to be created
Output	Category is created in the database
Requirements	Active internet connection is required for this function
Workflow	Admin enters the category details and clicks on add category and the system adds the category in database

Table 4 Product Function for Adding Category

3.2.3 User characteristics

The requirements required for a user to be applicable for utilizing the features of our proposed system are

- The user should have basic knowledge of using internet
- The user should be familiar with the working process of online shopping
- The user should have a valid address for product to be delivered

3.2.4 Constraints

As our proposed system is based on innovation of a already designed system there are many constraints associated with it. Some of these constraints are

- As our proposed system is based on a improved UI design for visually impaired people there are many design constraints associated with it because design preferences differ from person to person and we cannot incorporate every design on a single website

- Safety and Security is another high level constraint of our proposed system as people might try to sell fake products or misuse user information in case of a breach in security.
- As our proposed system includes the narration of audio there are also many audio related constraints associated with it.

3.2.5 Assumption And Dependencies

The requirement specified in our proposed system will be greatly affected if any of these assumption are not fulfilled.

- Visually impaired people may not find our design and functionalities useful to them as assumed by us .
- Color blind people may not like the different product views based on their defective color type.
- Low vision People might not prefer the font size intended for them on our website as assumed by us.

3.2.6 Apportioning of Requirements

The features that may get delayed in our proposed system are the automated generated audio for narrator because we will first incorporate simple audio output for Urdu narrator and if that works well in our proposed system we may add this requirement in our system

3.3 Specific Requirements

The requirements associated with our proposed system are divided as functional and non functional requirements which are discussed in detail below

3.3.1 Function Requirements

The functional requirements of our proposed system are

- **Login and Sign Up Feature for Admin**

This is the basic functionality that is required for the customer and admin to get registered in the database.

- **Login and Sign In feature for User**

This functionality is required for both customer and admin to log in to their account and retrieve their data from the database.

- **Admin dashboard for Admin**

The admin requires a functionality of a dashboard page where he can perform different actions required for the system to operate like creating and deleting categories,products,managing orders and creating pages.

- **Narrator**

This functionality provides the facility of narrating the product name price description to the customer to aid the visually impaired community.

- **Color blind modes**

This functionality provides the different modes to the customer that range from low vision,color blind mode and blind mode. All these are required to facilitate the different visually impaired community.

- **Order Tracking**

By using this functionality the customer and admin can track the order placed in the database.

- **Cart System**

A proper cart system is needed in our proposed ecommerce website that will work for the logged off customer too.

- **Order History**

The customer can view the order history through this functionality at any time while interacting with our website.

3.3.2 Non Functional Requirements

The non functional requirements associated with our proposed website are

- **Security**

For security we will integrate a session api, middle ware and a bcrypt api that will encode the password of the user into a hash password. This will allow us to make our system more secure for both customer and admin.

- **Reliability**

For reliability purpose we will integrate a backend api that even if some error occurs in the system the request made by user is sent to the system. This will make our proposed system more reliable.

- **Performance**

We will develop our system using react framework which itself increases the performance of the system by a large margin . Furthermore we will use MVC approach in developing our system that will ensure that all actions are performed in an optimized way to increase performance.

- **Usability**

For usability purpose we will make our system as simple as possible so that both the customer and admin can easily get familiarized with the functioning of our system.

3.4 Use Cases

The use cases of our proposed system are partitioned into two types of admin as A and customer as U and they are given in detail separately.

3.4.1 Use Case A-01

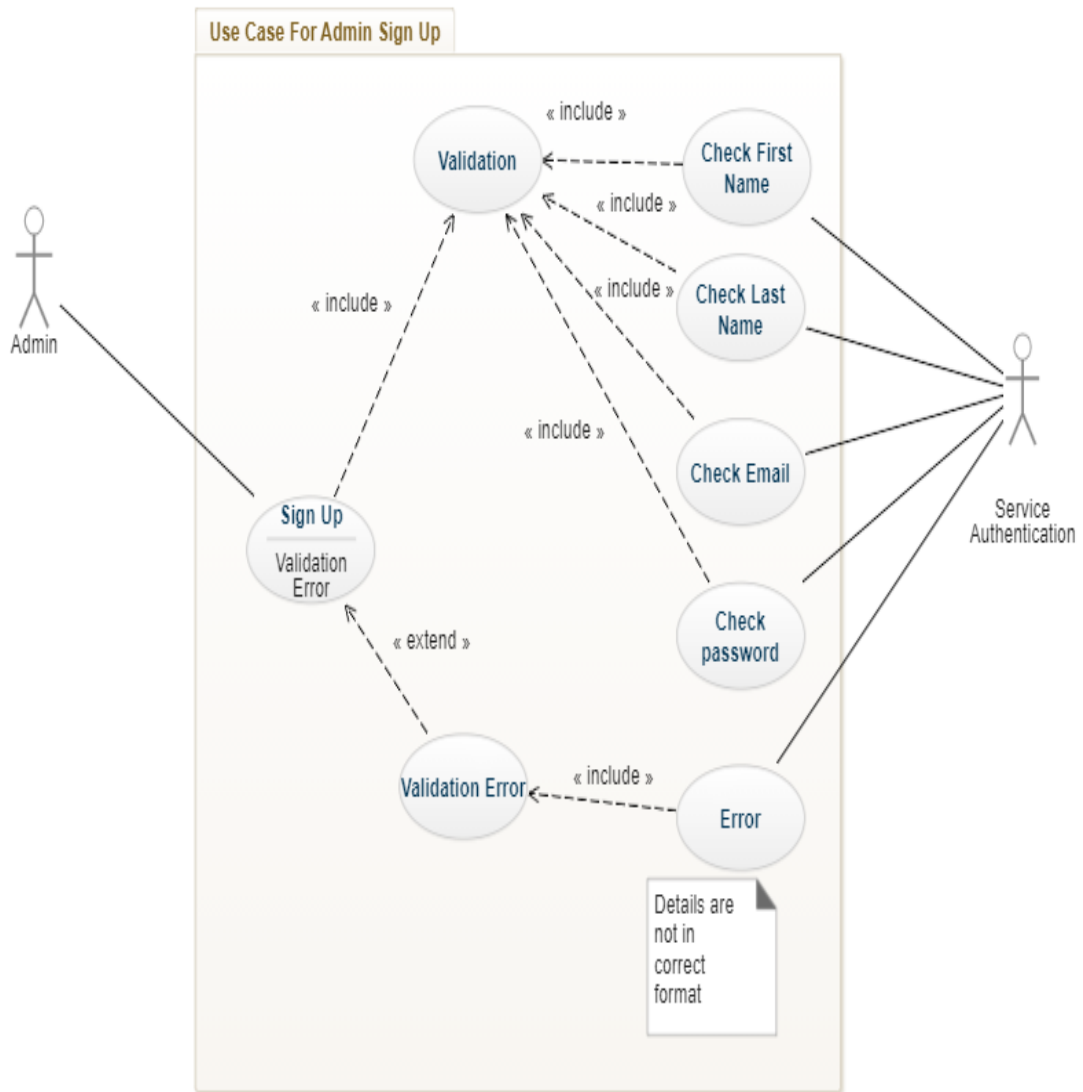


Figure 3.1: Use Case Admin Sign up

ID	UC-A01
Use Case Name	Admin Sign Up
Description	Enter the details required for admin to Sign up
Primary Actor	Admin
Secondary Actor	Service Authentication
Pre-Condition	Active Internet Connection is Required,back end server should be running
Post Condition	Admin is successfully added in the database
Actor Action	Admin Enters his details and clicks on Sign up
System Action	System adds the admin information in the database
Alternate Flow	Admin enters wrong sign up details and an error message is displayed

Table For Use case UC A01

3.4.2 Use Case A-02

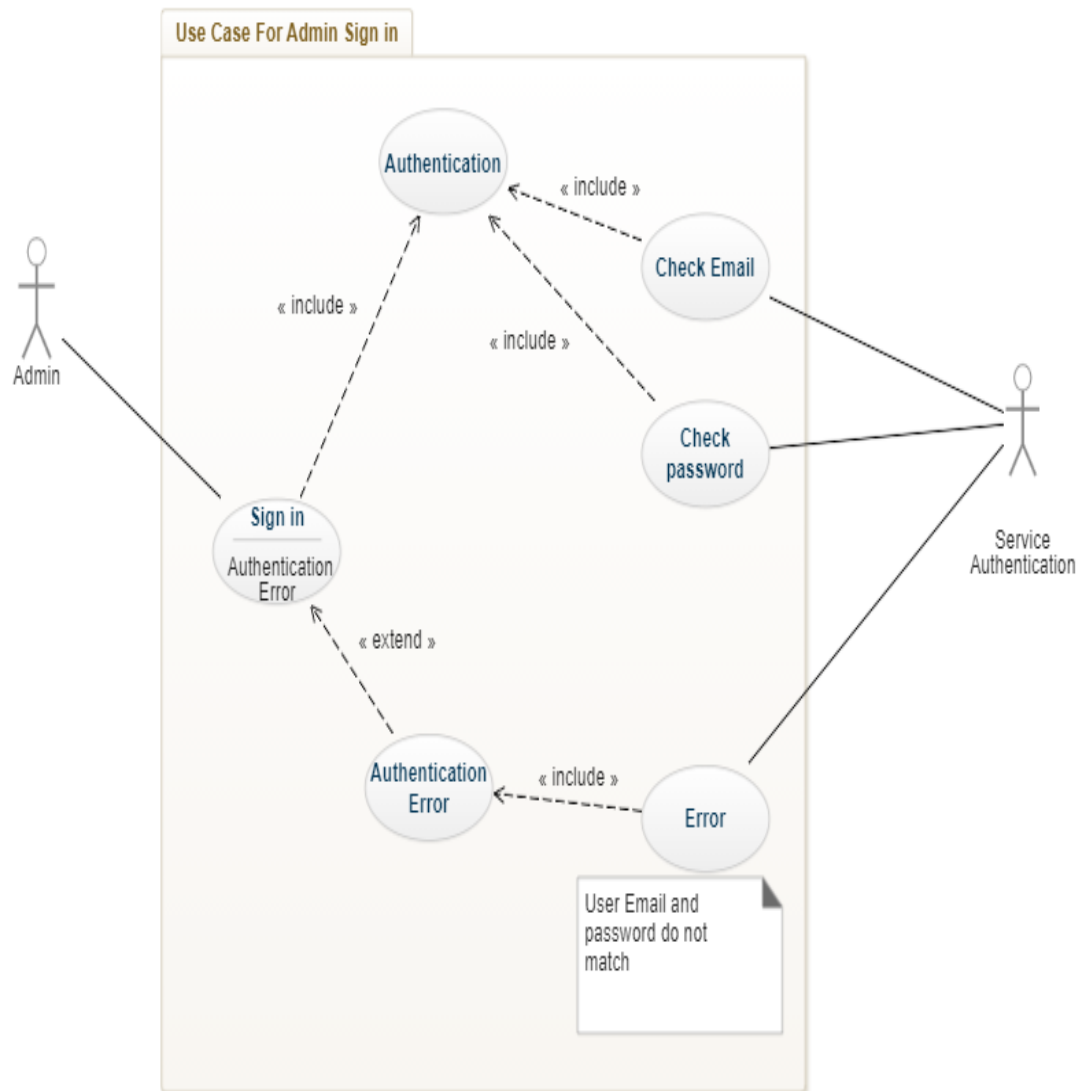


Figure 3.2: Use Case Diagram For Admin Sign In

ID	UC-A02
Use Case Name	Admin Sign In
Description	Admin Enters email and password and if its present in database admin is redirected to dashboard
Primary Actor	Admin
Secondary Actor	Service Authentication
Pre-Condition	UC-A01,active internet connection,back end server is running
Post Condition	Admin is successfully logged in the system and redirected to dashboard
Actor Action	Admin enters username and password and clicks log in
System Action	System redirects the admin to dashboard on successful login
Alternate Flow	Admin enters incorrect username or password and an error message is displayed on screen

Table For Use case UC A02

3.4.3 Use Case A-03

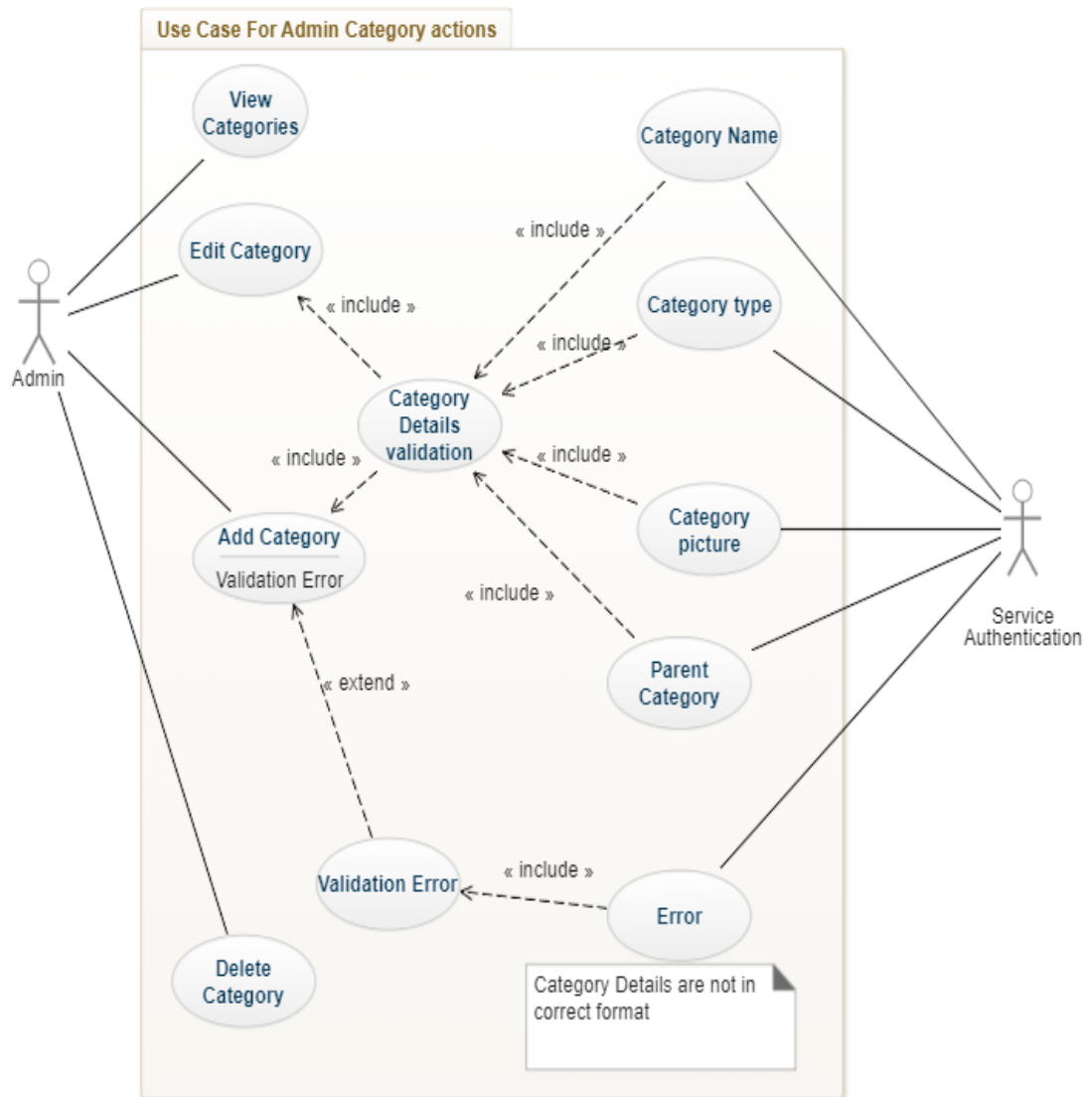


Figure 3.3: Use Case Diagram For Managing Categories

ID	UC-A03
Use Case Name	Managing Categories
Description	Admin Views the total categories in the system and can add,edit delete the categories
Primary Actor	Admin
Secondary Actor	Service Authentication
Pre-Condition	UC-A02,active internet connection,back end server should be running
Post Condition	Category is successfully added in the system
Actor Action	Admin View the Categories and adds,edits or deletes the product
System Action	System shows,adds,edits and deletes the product based on admin action
Alternate Flow	Category details provided are not in correct format and admin is shown an error message on screen

Table For Use case UC A03

3.4.4 Use Case A-04

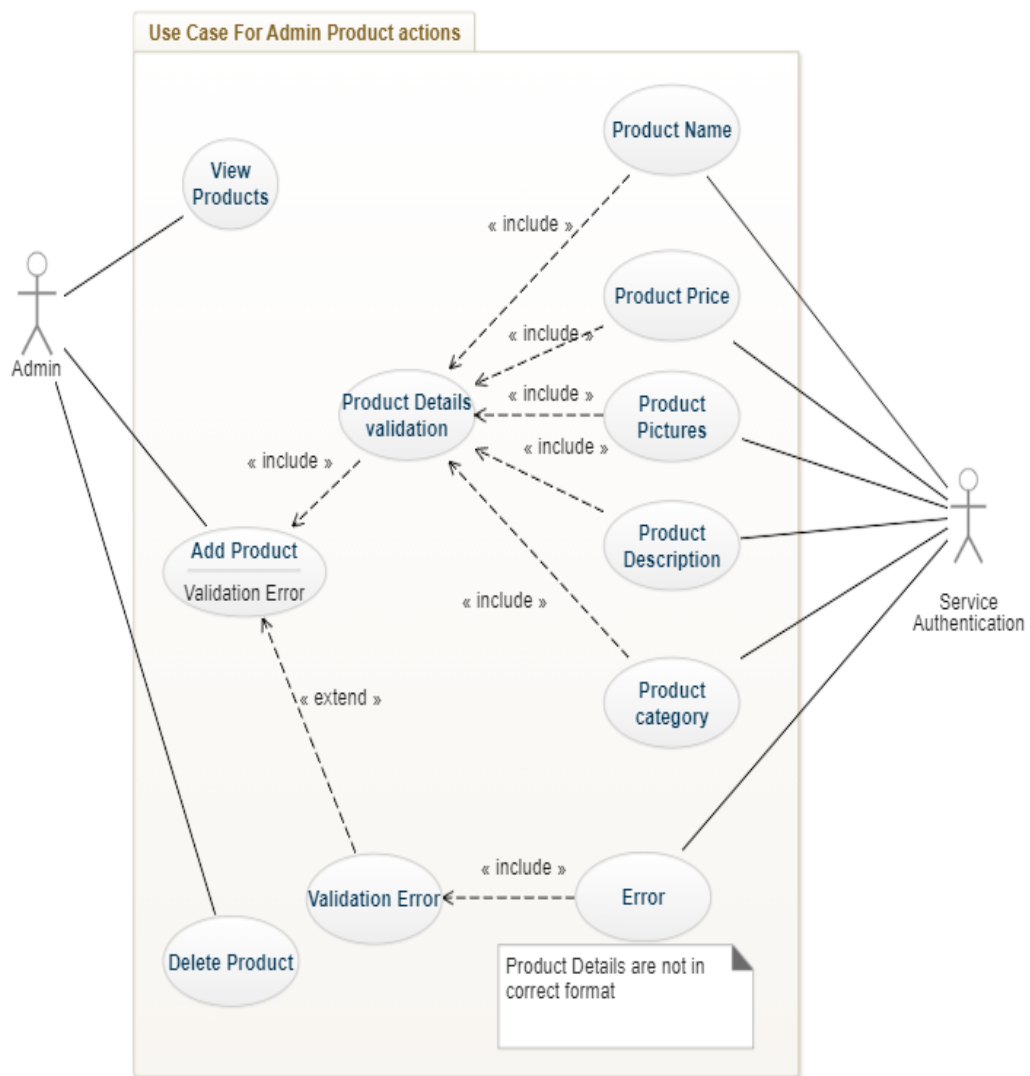


Figure 3.4: Use Case Diagram For Managing Products

ID	UC-A04
Use Case Name	Managing Products
Description	Admin can view add and delete the products
Primary Actor	Admin
Secondary Actor	Service Authentication
Pre-Condition	UC-A02,Active Internet Connection is Required,back end server is running
Post Condition	Product can be viewed,added and deleted based on admin action
Actor Action	Admin selects the product that he wants to view and delete.
System Action	System shows adds or deletes the product based on admin action
Alternate Flow	Admin enters invalid product details and is shown an error message on the screen

Table For Use case UC A04

3.4.5 Use Case A-05

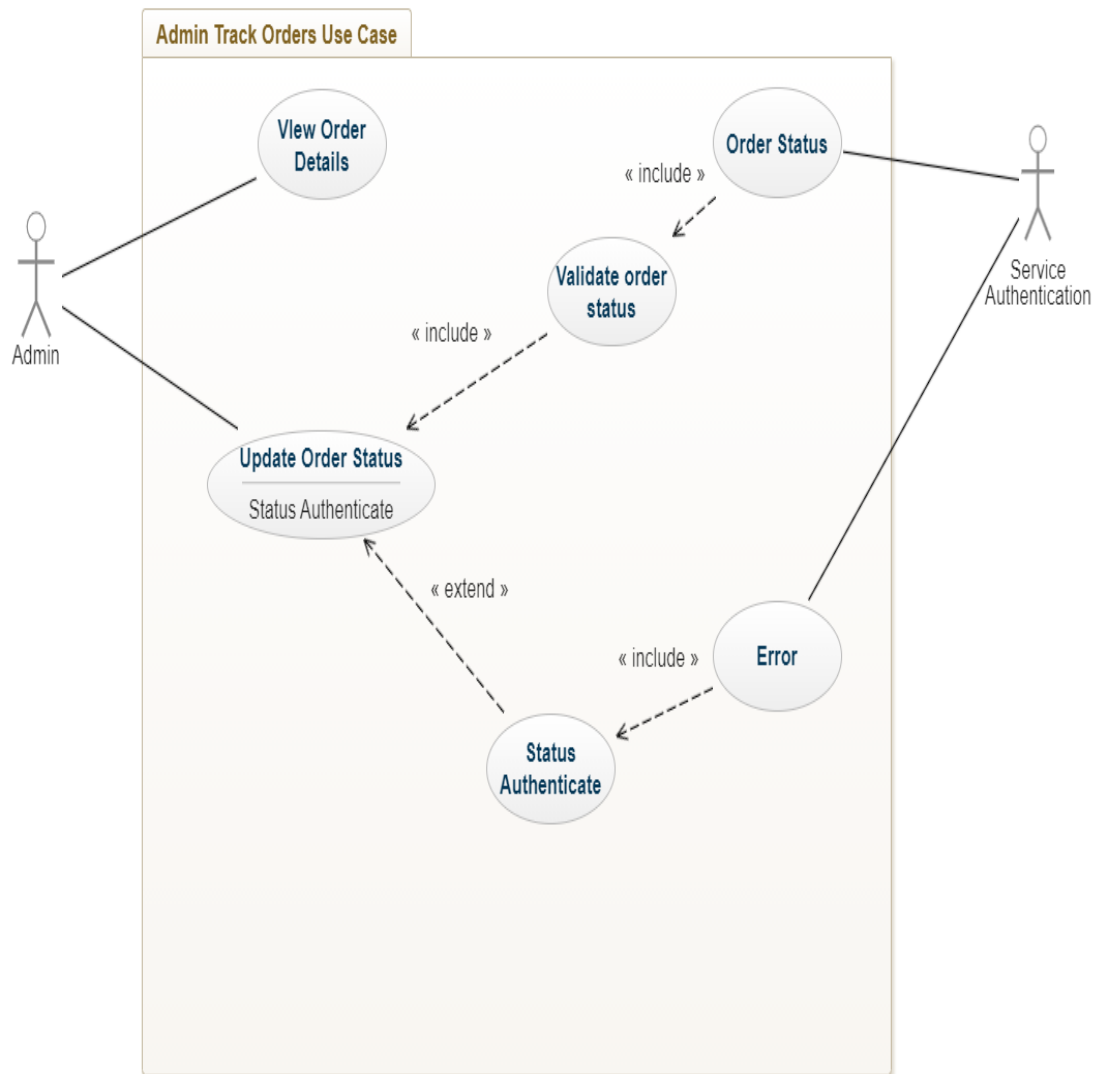


Figure 3.5: Use Case Diagram For Managing Orders

ID	UC-A05
Use Case Name	Managing Categories
Description	Admin can view and change the status of the orders
Primary Actor	Admin
Secondary Actor	Service Authentication
Pre-Condition	UC-A02,active internet connection,back end server should be running
Post Condition	Orders are displayed and the status of order is changed successfully
Actor Action	Admin Selects the order tab and changes the status of the order
System Action	System shows the orders and changes the status of order
Alternate Flow	Order is already completed and status cannot be changed

Table For Use case UC A05

3.4.6 Use Case UC-A06

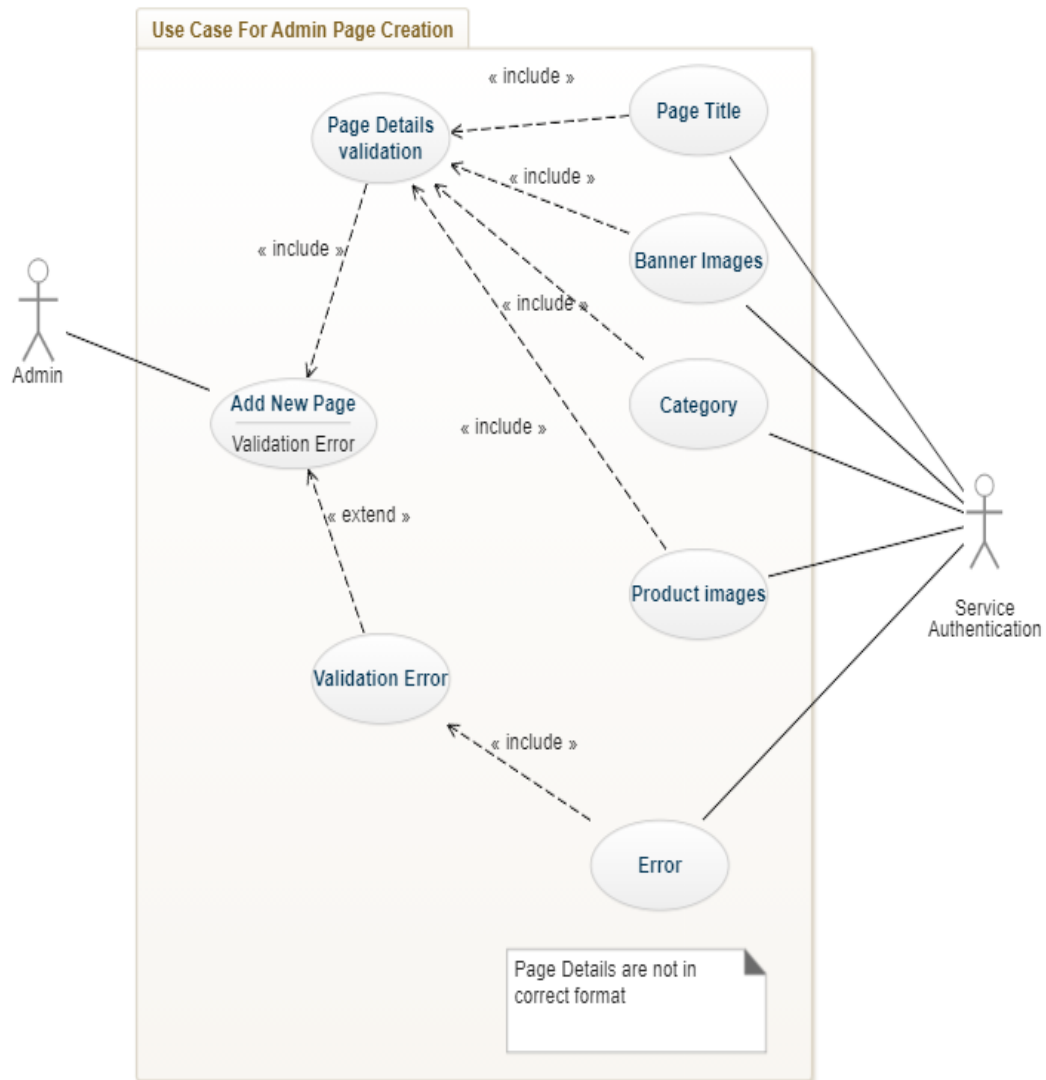
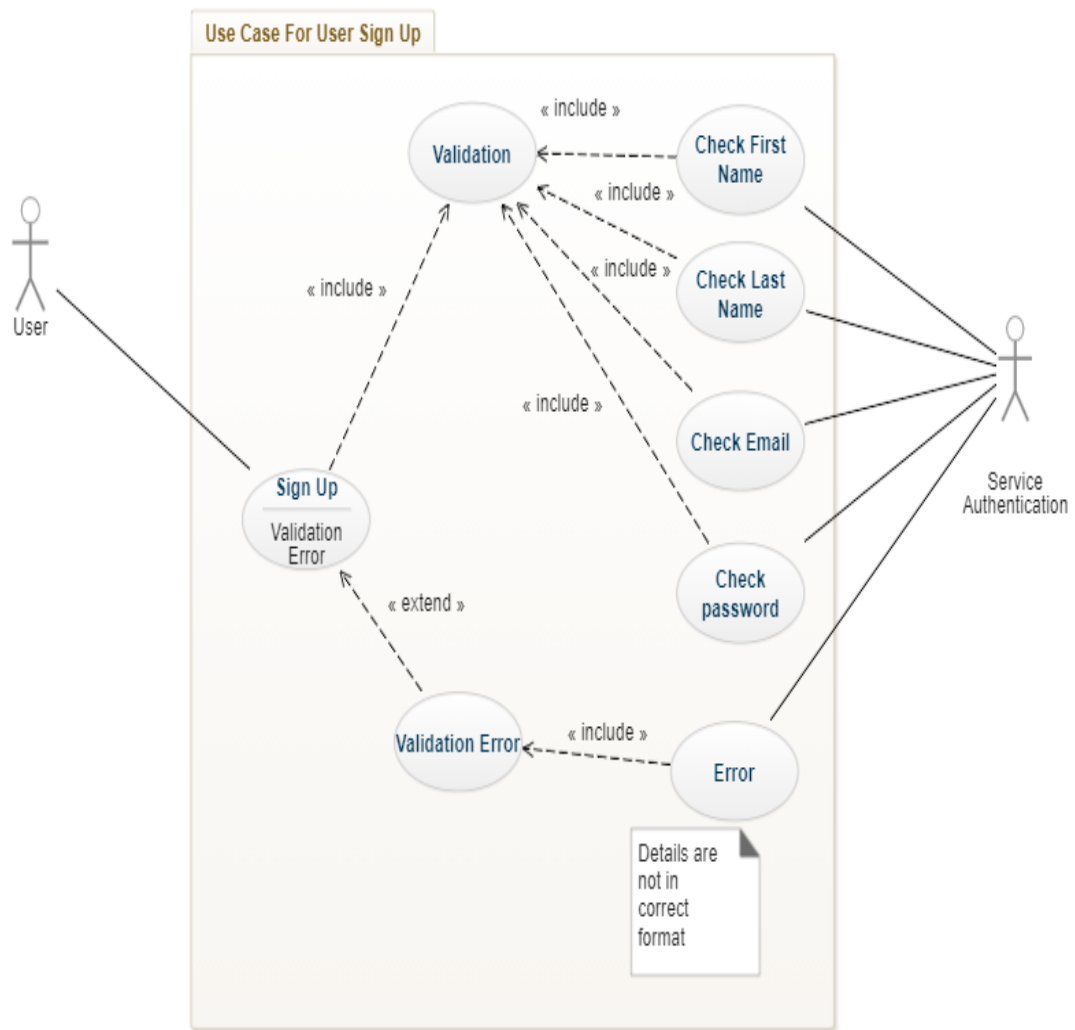


Figure 3.6: Use Case Diagram For Managing Page

ID	UC-A06
Use Case Name	Managing Page
Description	Admin adds the new page details and it is added in the database
Primary Actor	Admin
Secondary Actor	Service Authentication
Pre-Condition	UC-A02,active internet connection,back end server should be running
Post Condition	Page is successfully added in the system
Actor Action	Admin clicks on page tab and adds a new page
System Action	System adds the new page details given by the user in database
Alternate Flow	Page details given are not valid and admin is displayed an error message

Table For Use case UC A06

3.4.7 Use Case UC-U01



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Figure 3.7: Use Case User Sign up

ID	UC-U01
Use Case Name	User Sign Up
Description	Enter the details required to Sign up
Primary Actor	User
Secondary Actor	Service Authentication
Pre-Condition	Active Internet Connection is Required,back end server should be running
Post Condition	User is successfully added in the database
Actor Action	User Enters his details and clicks on Sign up
System Action	System adds the user information in the database
Alternate Flow	User enters invalid sign up details and an error message is displayed

Table For Use case UC U01

3.4.8 Use Case U-U02

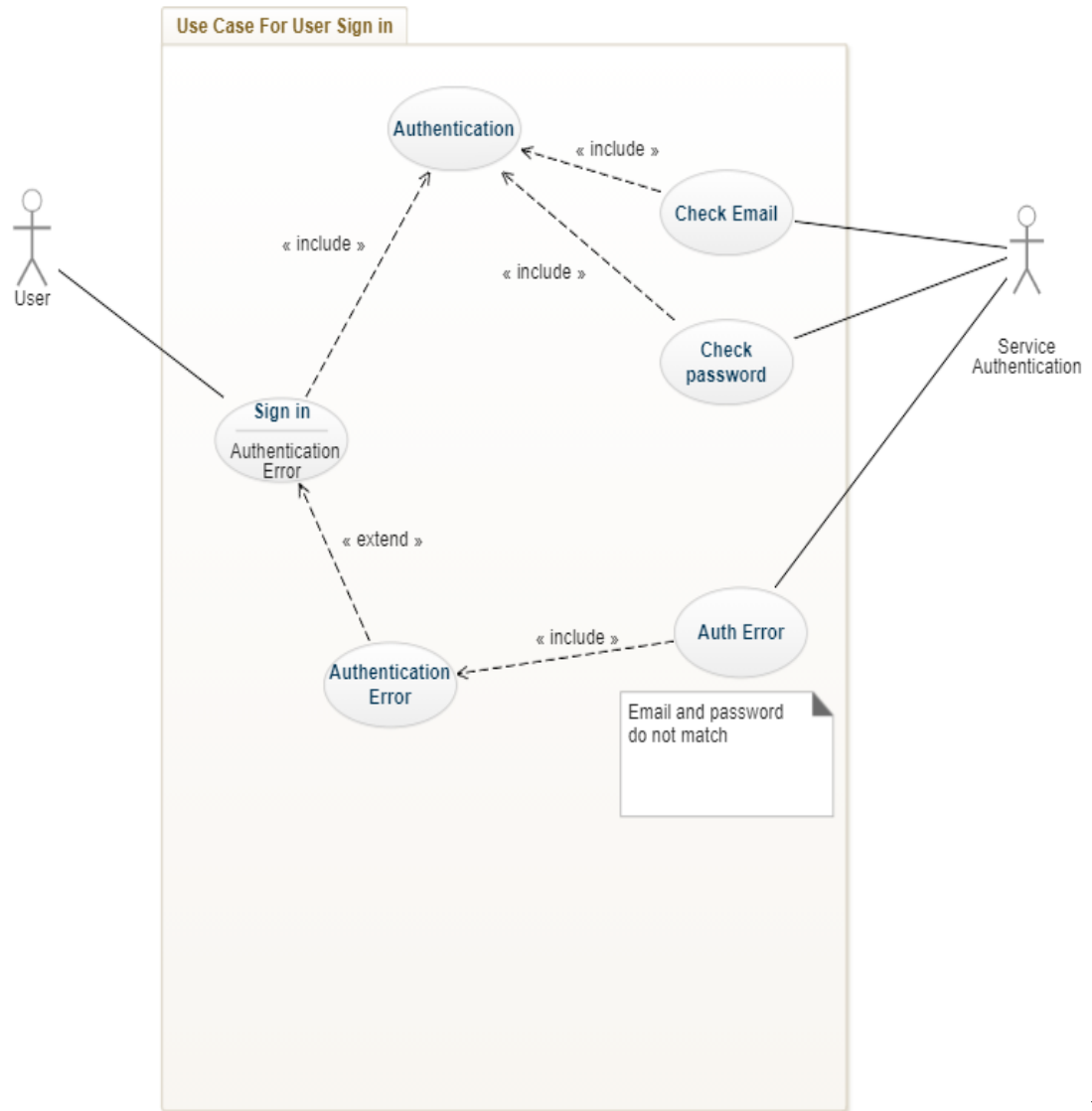


Figure 3.8: Use Case Diagram For User Sign In

ID	UC-U02
Use Case Name	User Sign In
Description	User Enters email and password and if its present in database user data is retrieved from the database
Primary Actor	User
Secondary Actor	Service Authentication
Pre-Condition	UC-U01,Active internet connection,back end server is running
Post Condition	User is successfully logged in the system
Actor Action	User enters username and password and clicks log in
System Action	User is logged in system in and user data is retrieved
Alternate Flow	User enters incorrect username or password and an error message is displayed on screen

Table For Use case UC U02

3.4.9 Use Case U-U03

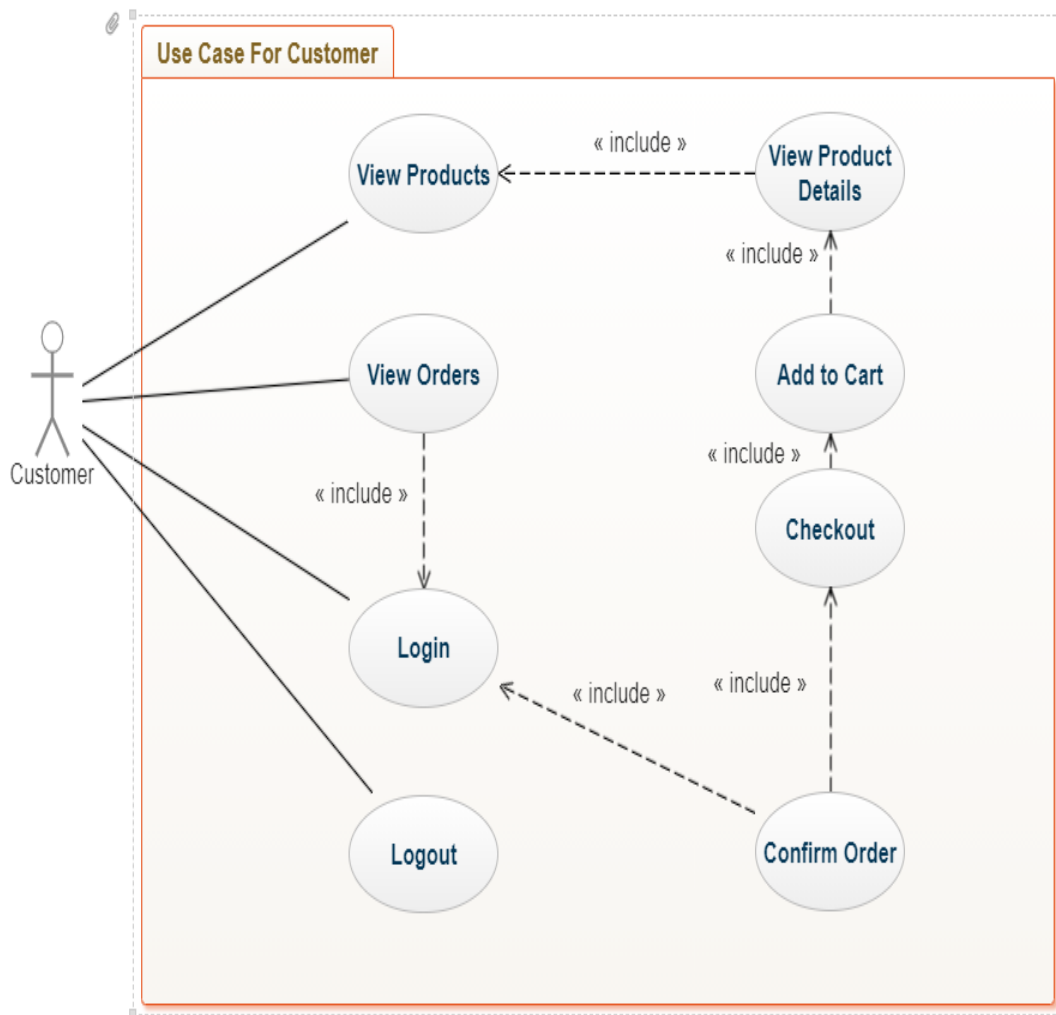


Figure 3.9: Use Case Diagram For Customer

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ID	UC-U03
Use Case Name	Customer side
Description	Customer interacts with the main website and can view,buy and track products
Primary Actor	User
Secondary Actor	Service Authentication
Pre-Condition	UC-U02,Active internet connection,back end server is running
Post Condition	Customer successfully places the order in the system
Actor Action	Customer adds the products in cart proceeds to checkout and places the order in the system
System Action	System places the order of the customer in database
Alternate Flow	Customer is not logged in the system before placing order and is redirected to the login page

Table For Use case UC U03

Chapter 4

Design

4.1 Design Methodology

In Pakistan the trend for online businesses is still in initial stages but it is evolving with the passage of time. Most of the online businesses follow the methodology of level orientated design where the solution of the problem is produced in steps and in the form of a top down process. Our system will also follow the same level orientated strategy in the design phase where we will divide the problems in smaller parts and then design and come up with the solution to each problem.

4.2 Data Flow Diagram

In this section we will describe the design of our data flow among different product functions. The data flow will be represented in the form of

4.2.1 DFD Level 0

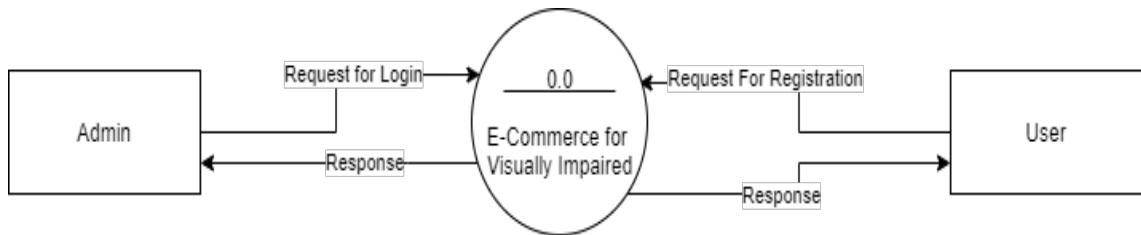


Figure 4.1: Data flow Diagram Level 0

In figure 4.1 we have shown our main system and the different actors that will interact with our system and what kind of data is being sent and received across them.

4.2.2 DFD Admin level 1

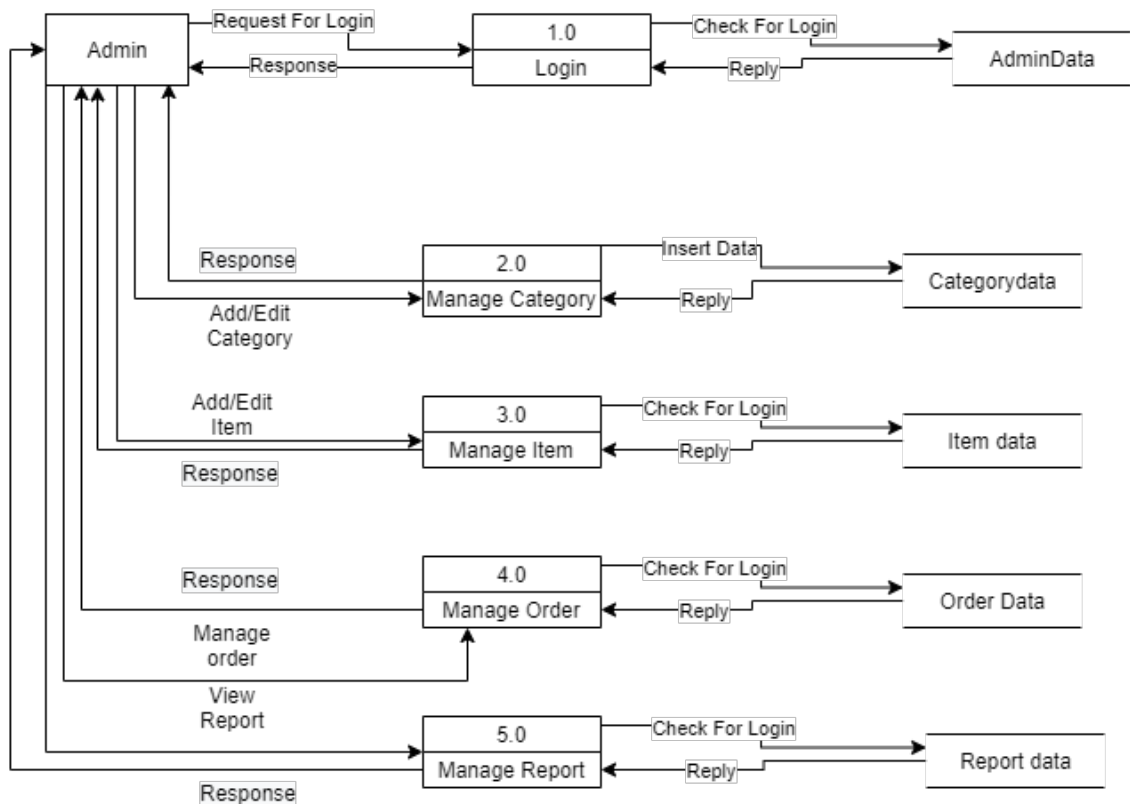


Figure 4.2: Admin DFD Level 1

In figure 4.2 the data flow of admin information between the admin and the system is shown. The different types of data stored in the database are and what kind of information is being sent and retrieved is shown in the diagram.

4.2.3 DFD User level 1

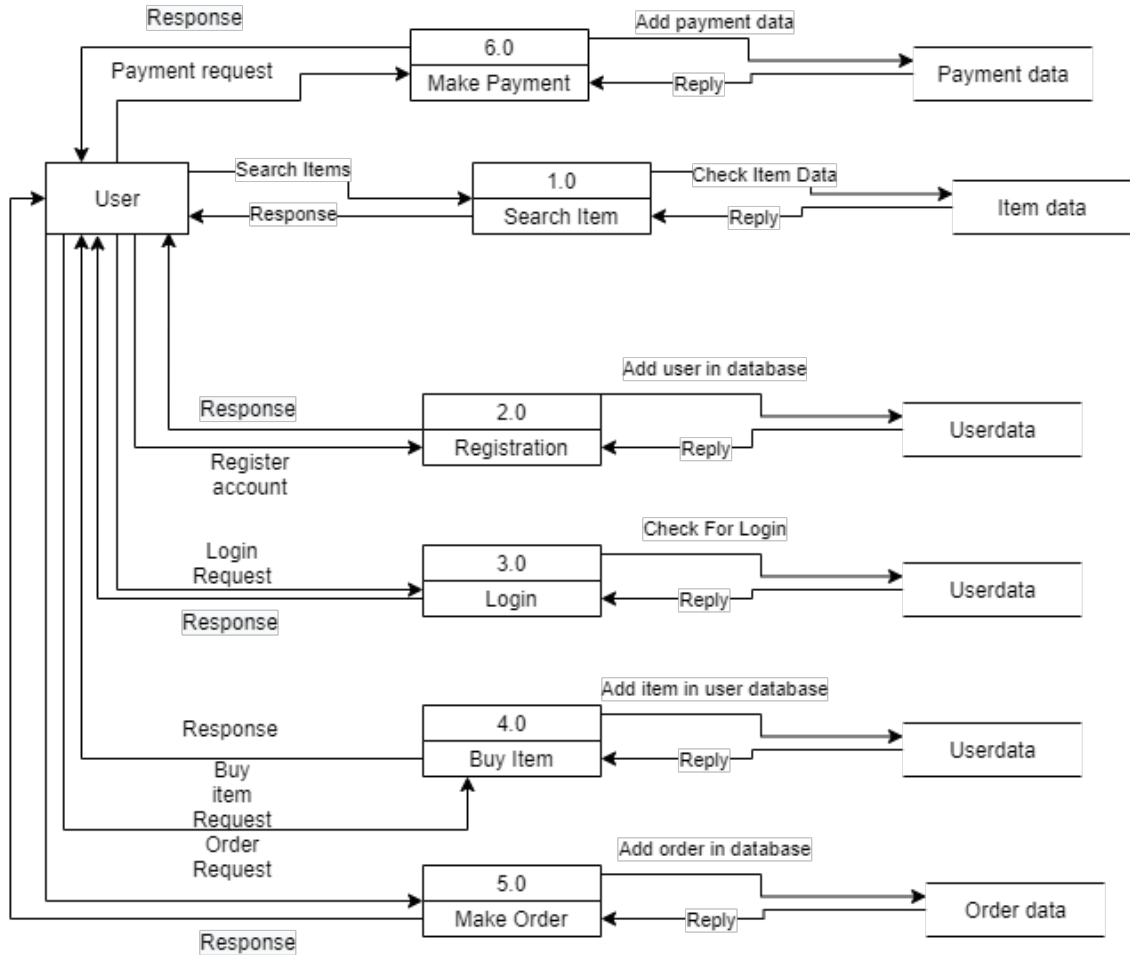


Figure 4.3: User DFD Level 1

In figure 4.3 the data flow of user information between the user and the system is shown. The different types of data stored in the database are and what kind of information is being sent and retrieved is shown in the diagram. .

4.3 Activity Diagram

4.3.1 Admin

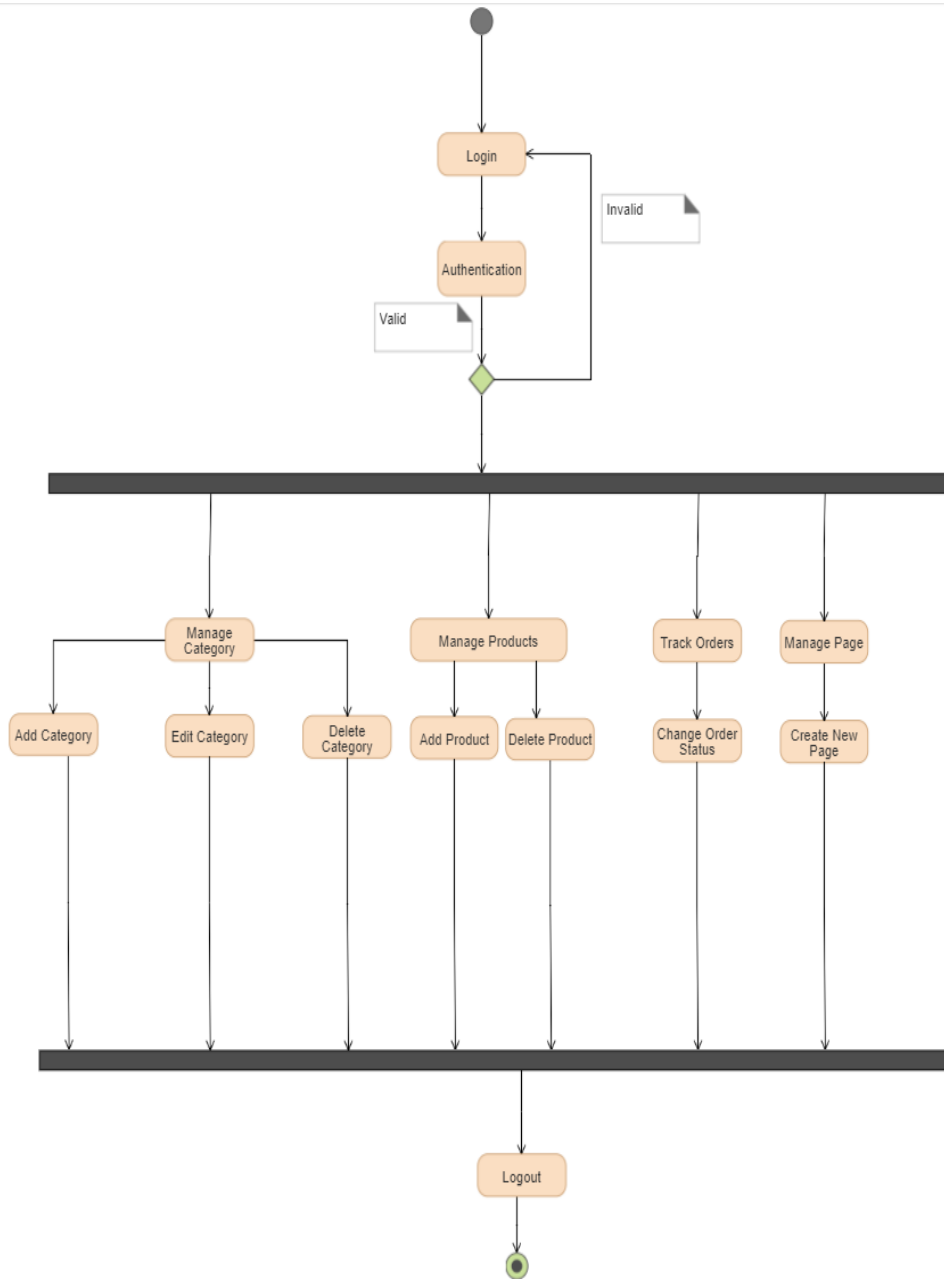


Figure 4.4: Activity Diagram For Admin

In figure 4.4 the functions and actions performed by the admin are described in the form of an activity sequence. Admin logs in the system and performs different

activities like adding categories products and after performing these activities the admin logs our from the system and the activity cycle is stopped.

4.3.2 Customer

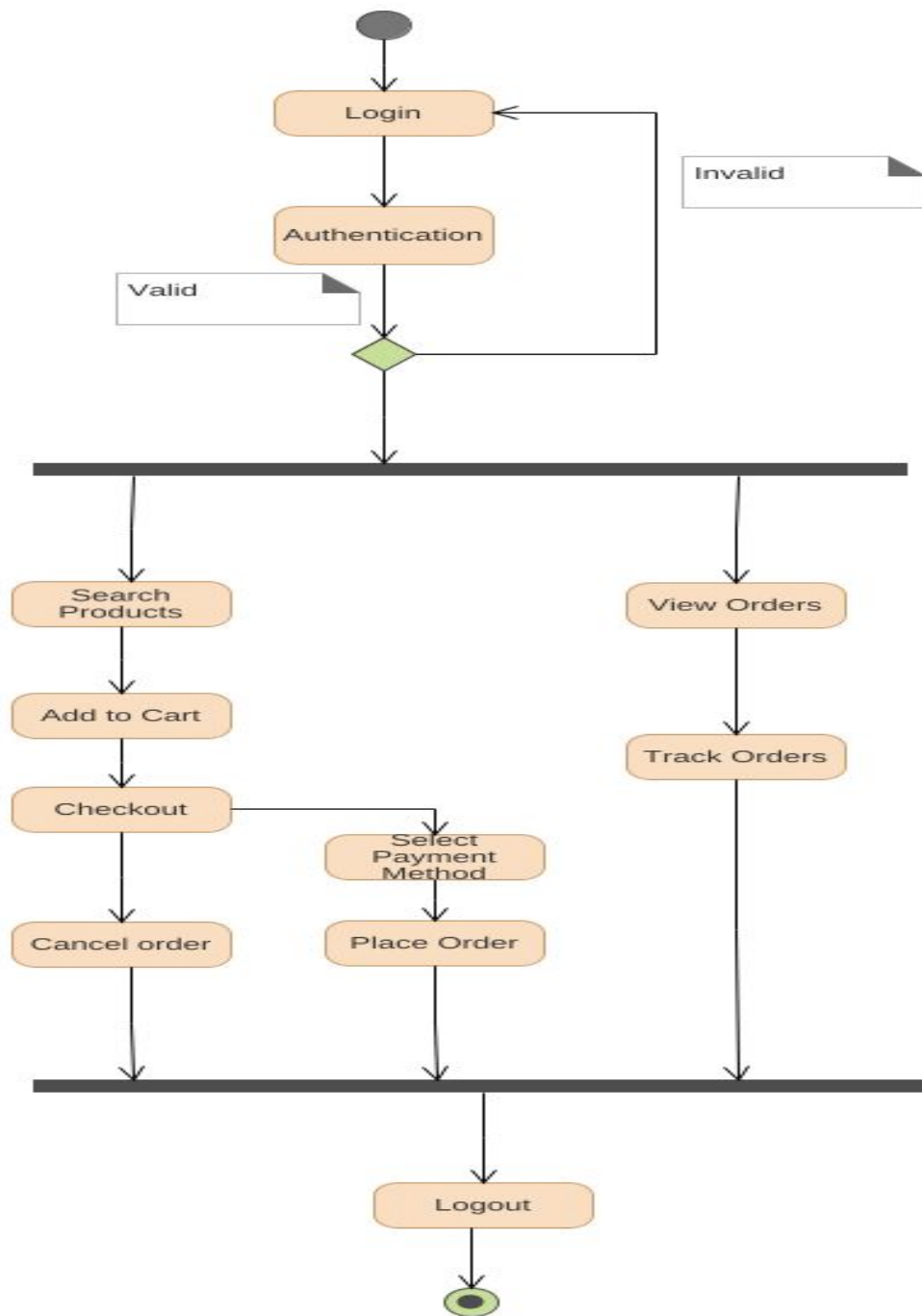


Figure 4.5: Activity Diagram For Customer

In figure 4.5 the flow of activities through which the customer will go through until the order is successfully placed and the customer logs out from the system are described.

4.4 Component Diagram

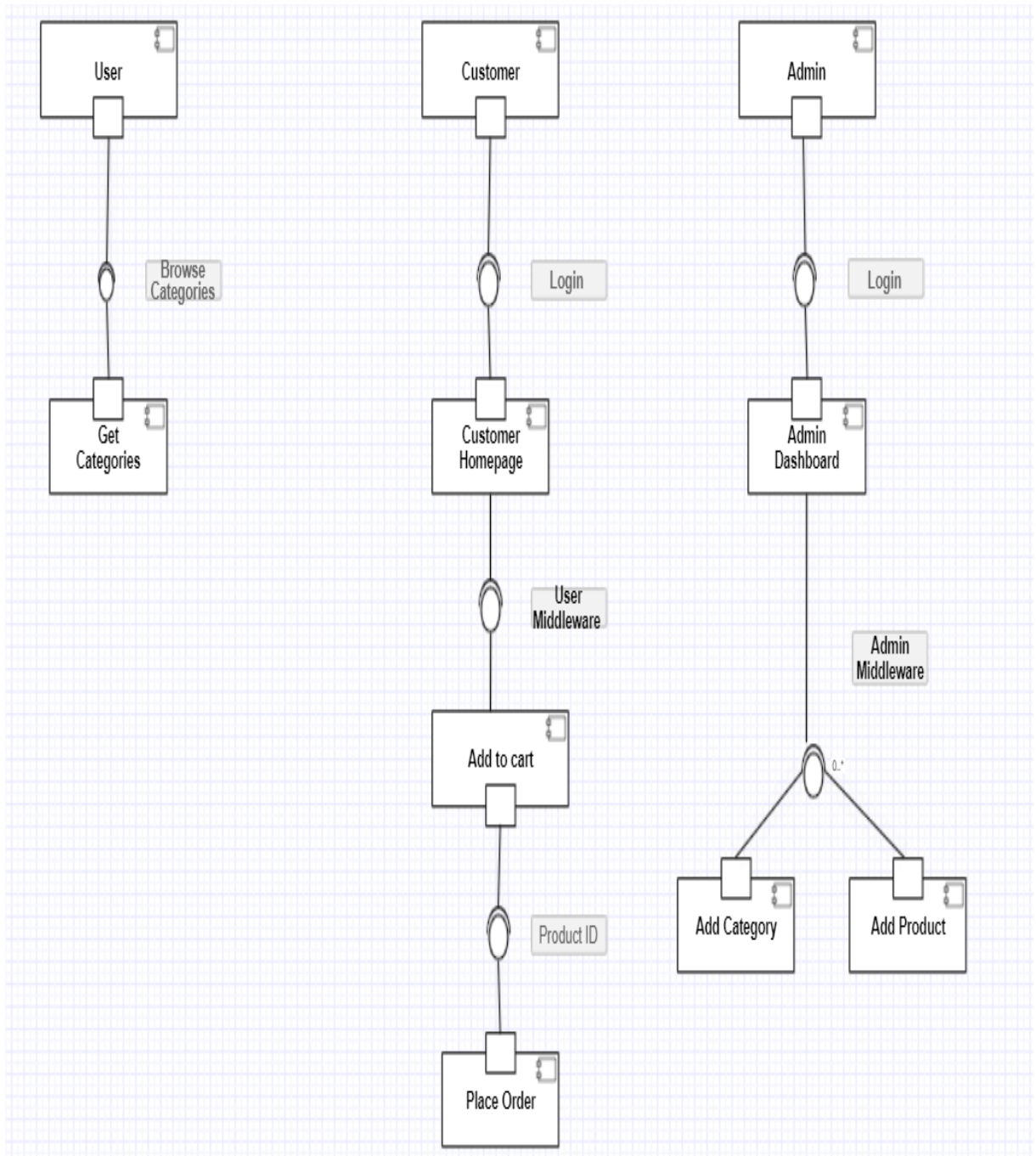


Figure 4.6: Component Diagram

In figure 4.6 the different components of system are shown in a way that its easy to understand the different components of our system. Component diagram helps to

model large systems into smaller subsystems which makes it easier to understand the whole component architecture and working of the system.

4.5 Sequence Diagram

4.5.1 Sequence Diagram for Admin Sign Up

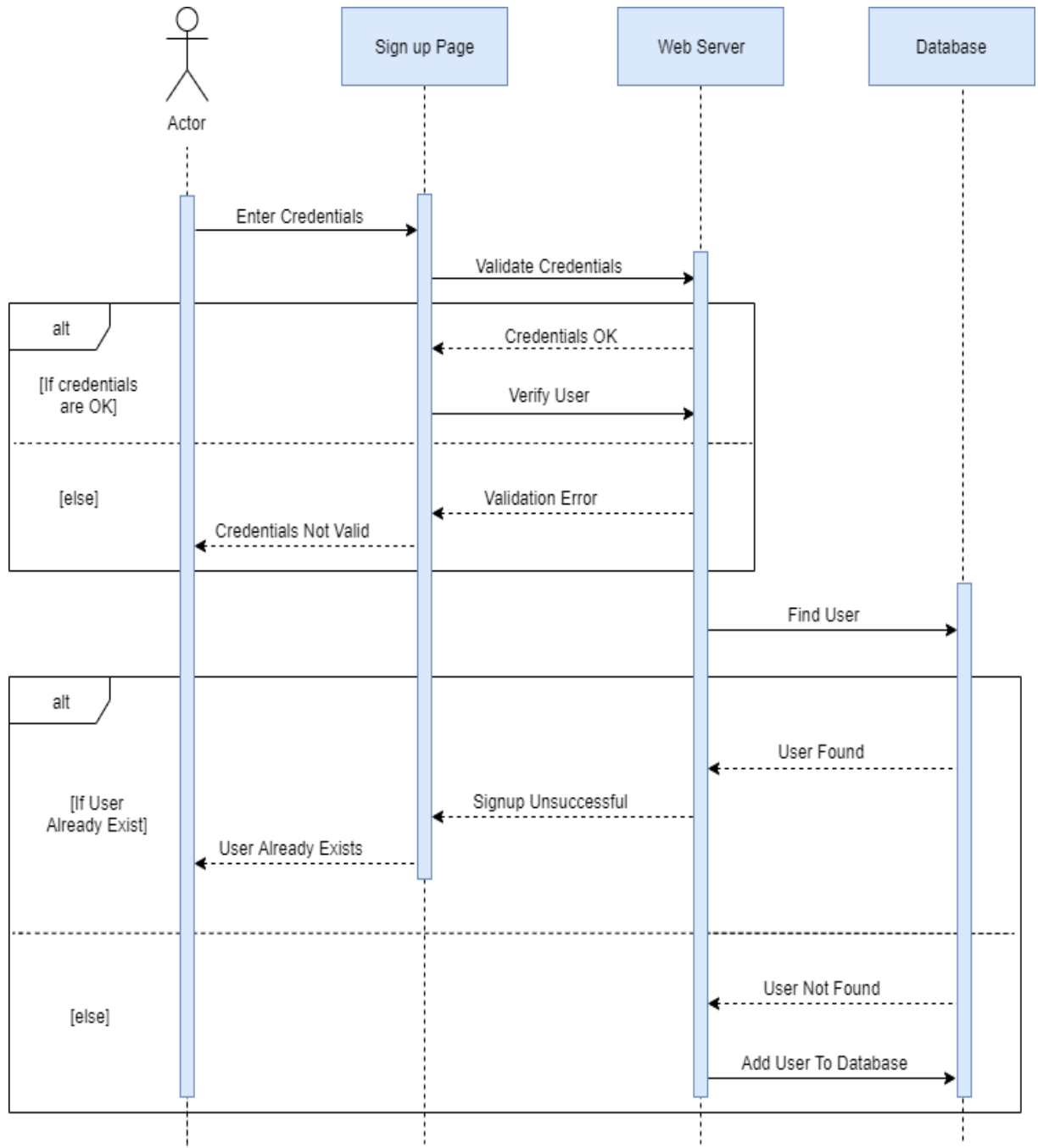


Figure 4.7: Sequence Diagram For Admin Sign up

In figure 4.7 the interaction of the admin with the application when the admin signs up is given in the form of a sequence diagram. The admin provides the necessary details to sign up in the system and if the details are in correct format the system adds the user in database. If the admin provides invalid details then an error message is displayed on the screen of the admin.

4.5.2 Sequence Diagram For Admin Sign in

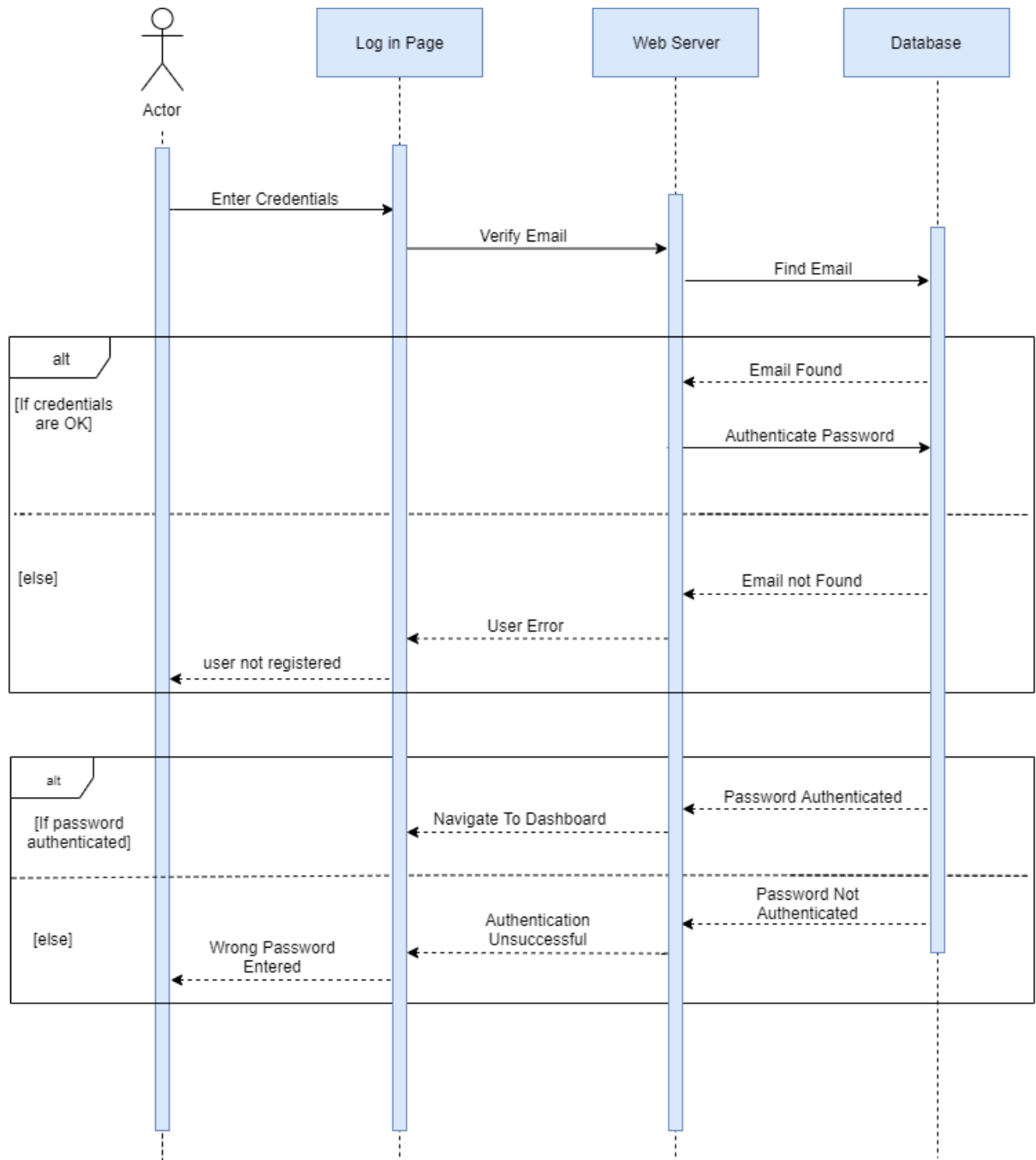


Figure 4.8: Sequence Diagram For Admin Sign In

In figure 4.8 the admin first enters the email and password that he used to register in the application. If the credentials match with the database the admin is logged

in the system but if the credentials do not match then the admin is displayed an error message on the screen.

4.5.3 Sequence Diagram for User Sign Up

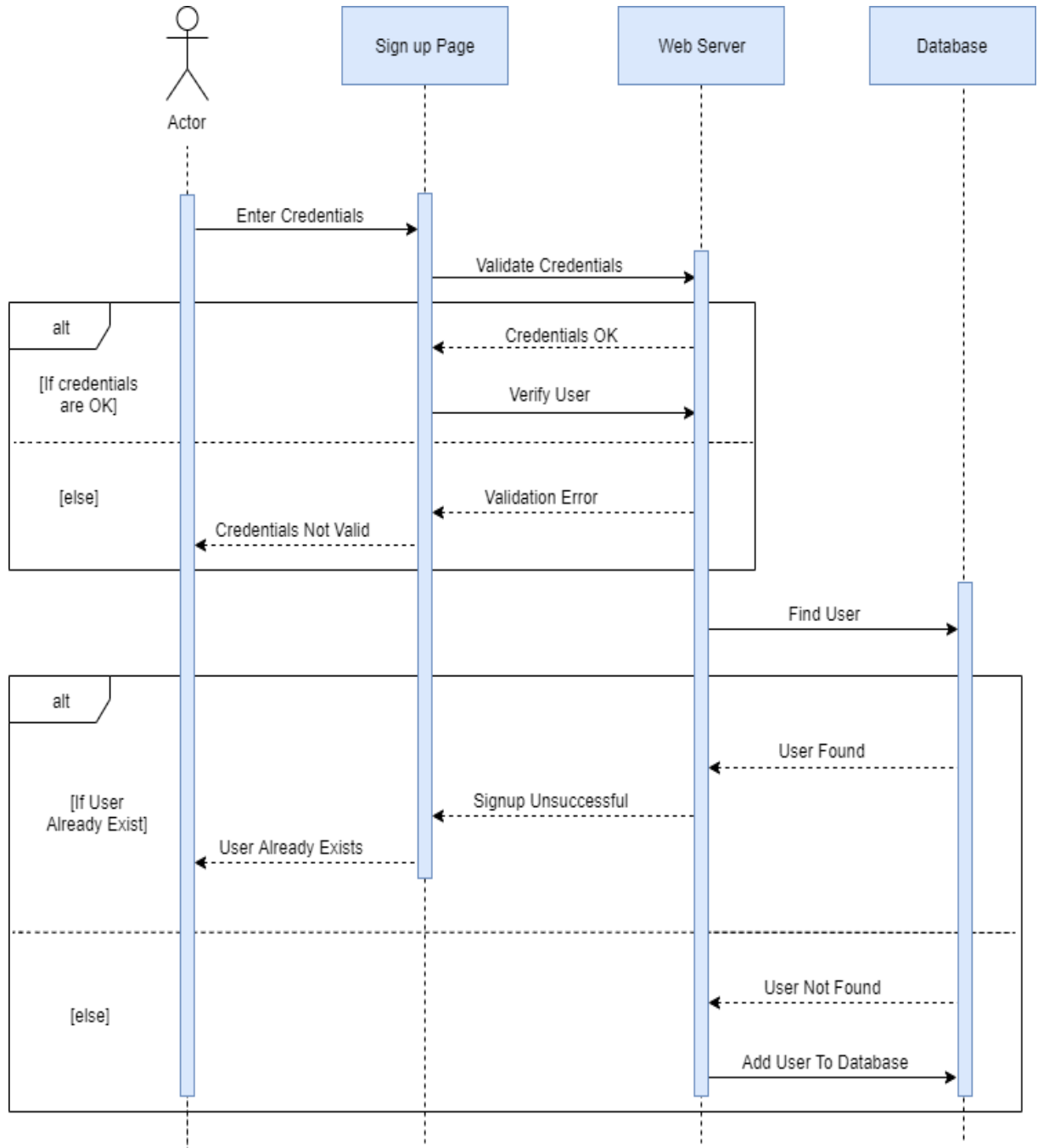


Figure 4.9: Sequence Diagram For User Sign up

In figure 4.9 the interaction of the user with the application when the user signs up is given in the form of a sequence diagram. The user provides the necessary details to sign up in the system and if the details are in correct format the system adds the user in database. If the user provides invalid details then an error message is displayed on the screen of the user.

4.5.4 Sequence Diagram For User sign in

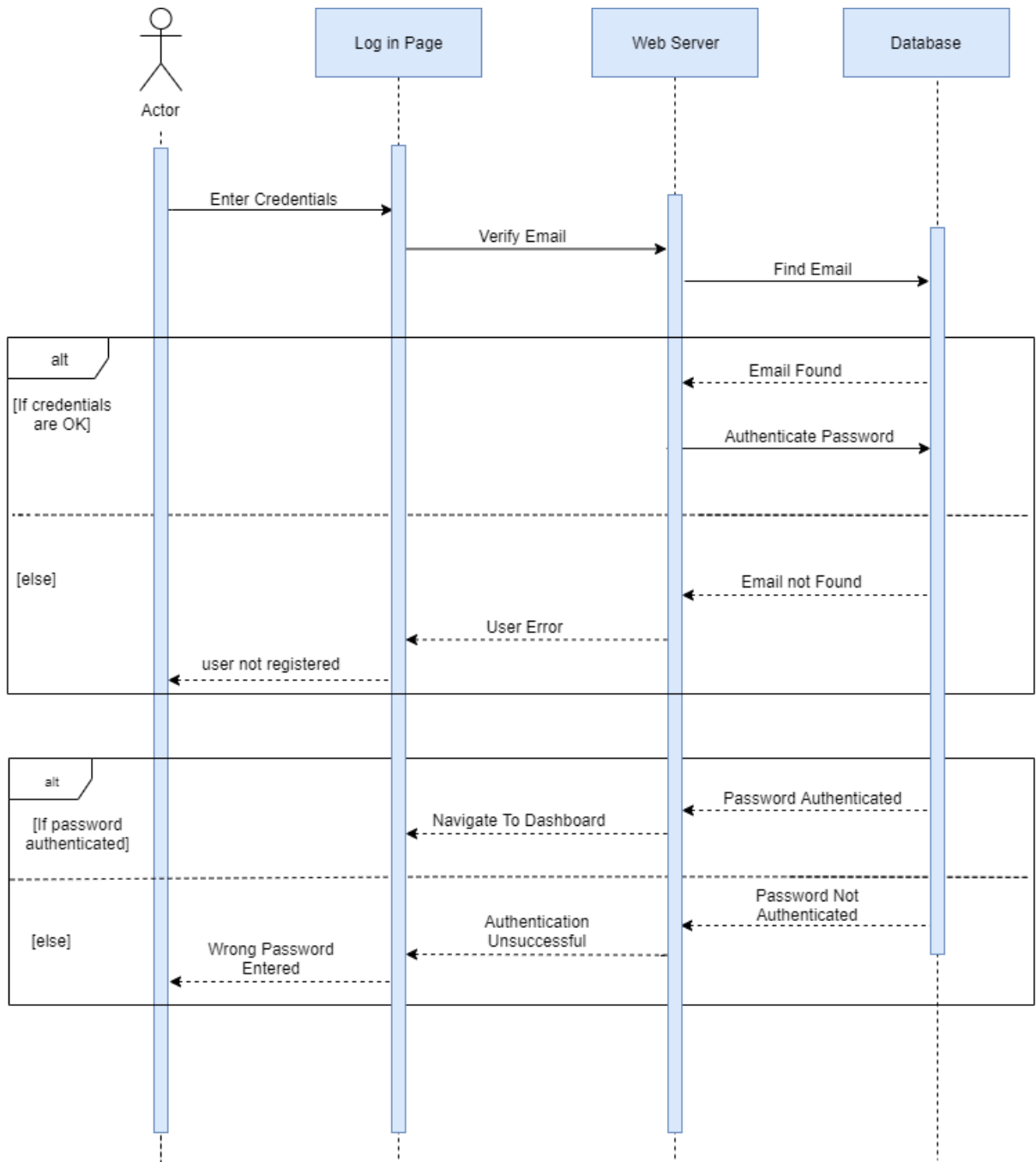


Figure 4.10: Sequence Diagram For User Sign In

In figure 4.10 the user first enters the email and password that he used to register in the application. If the credentials match with the database the user is logged

to the system but if the credentials do not match then the user is displayed an error message on the screen.

4.5.5 Sequence Diagram for Cart System

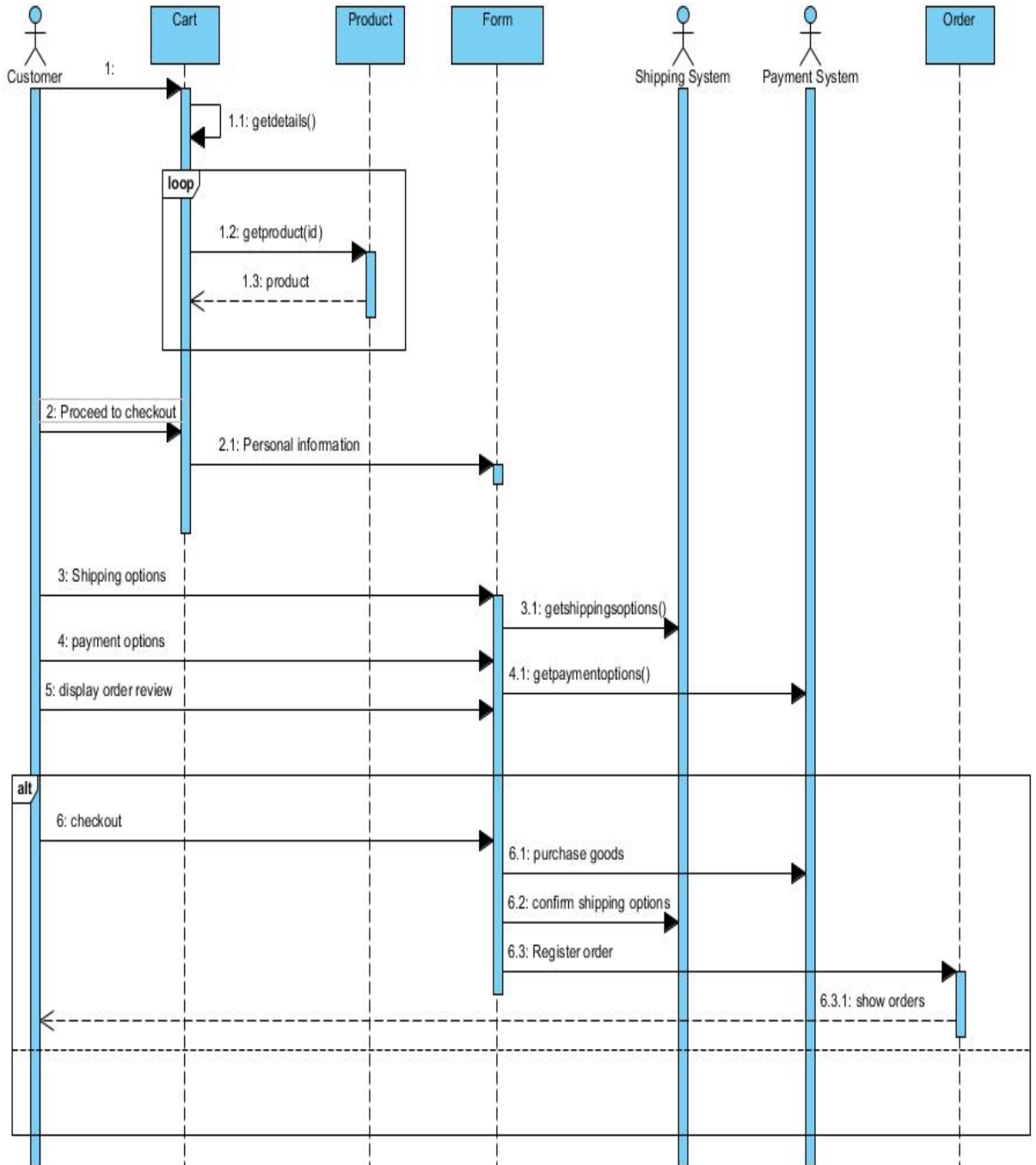


Figure 4.11: Sequence Diagram For Placing Order

In figure 4.11 the interaction of the system components with the customer are illustrated in the form of a sequence diagram. The customer searches through the products in a look and selects the product that he wants to add to the cart. After adding the products to the cart the customer can proceed to checkout and provide address details, select payment type and confirm the order.

4.5.6 Sequence Diagram for Adding Categories

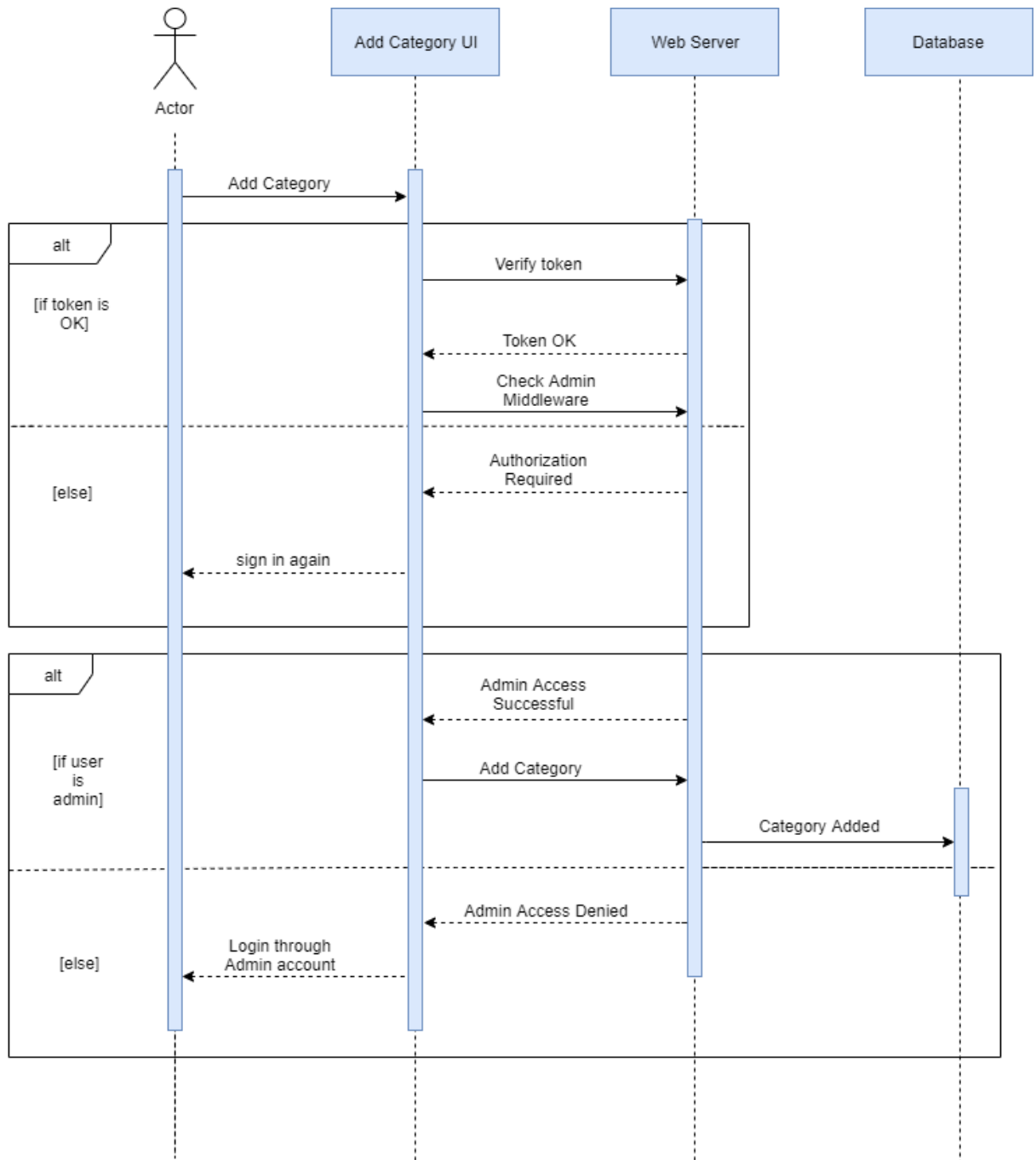


Figure 4.12: Sequence Diagram For Adding Categories

In figure 4.12 the interaction of admin in the admin dashboard are shown in the form of a sequence diagram. The admin adds the category in the system and if the

category details are valid the category is added in the database and if the details are invalid the admin is returned an error message on the screen.

4.5.7 Sequence Diagram for Adding Products

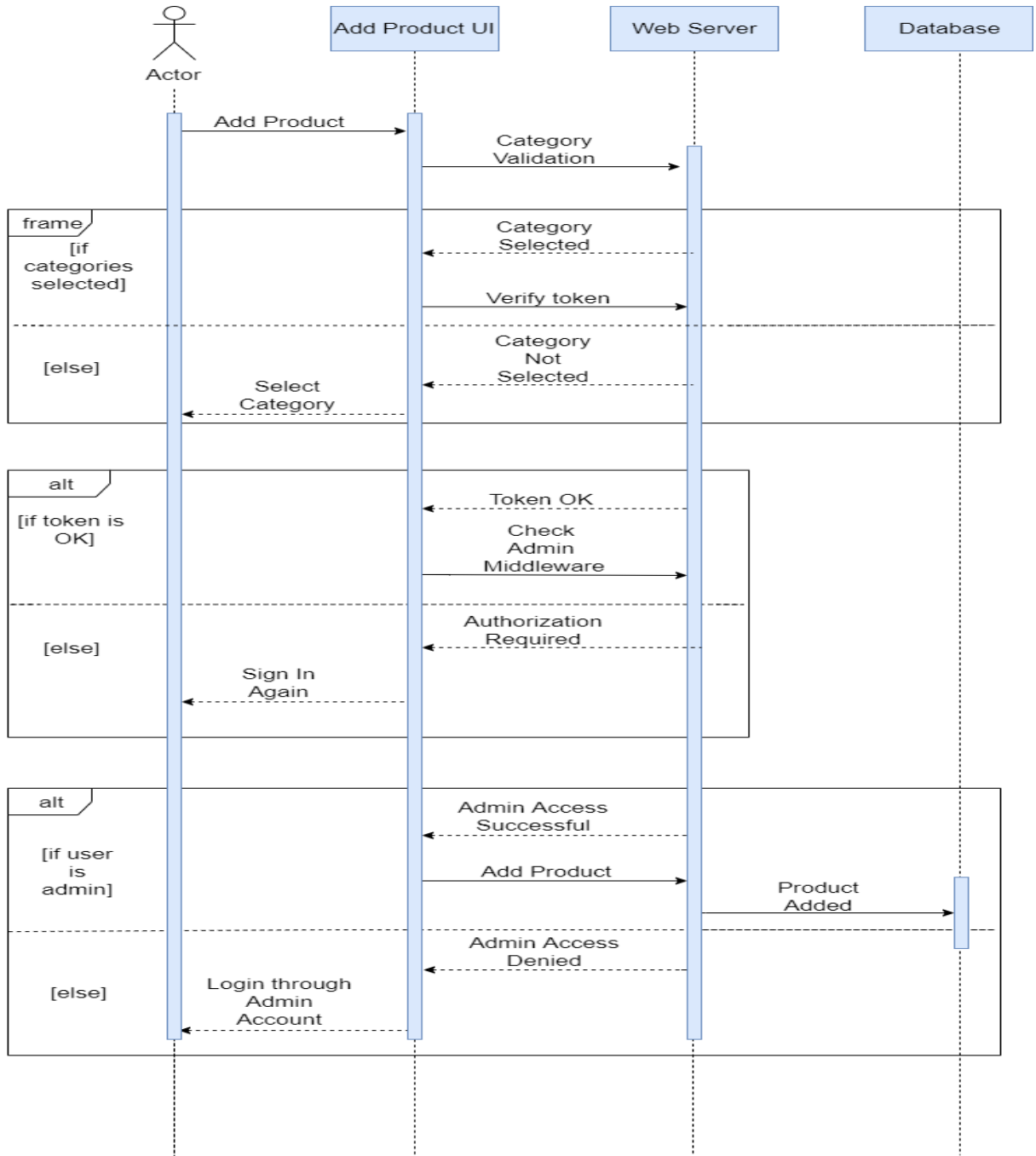


Figure 4.13: Sequence Diagram For Adding Products

In figure 4.13 the interaction of admin in the admin dashboard are shown in the form of a sequence diagram. The admin adds the product in the system and if the category details are valid the product is added in the database and if the details are invalid the admin is returned an error message on the screen.

4.6 Schema Diagram

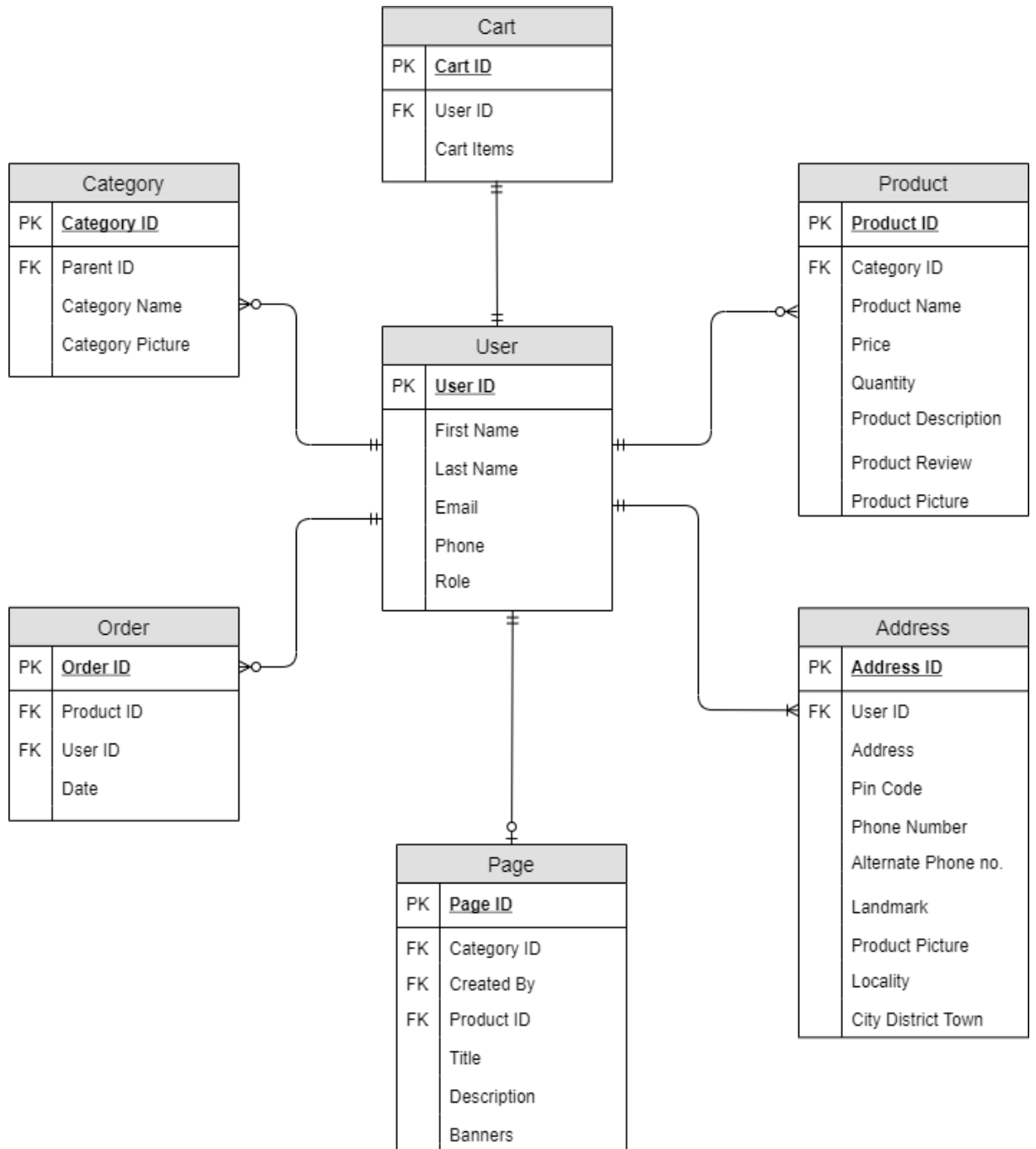


Figure 4.14: Schema Diagram

In figure 4.14 we have illustrated the different data models that are initialized in our mongo database cluster and we have shown the relationship between these

models in the schema diagram.

4.7 Class Diagram

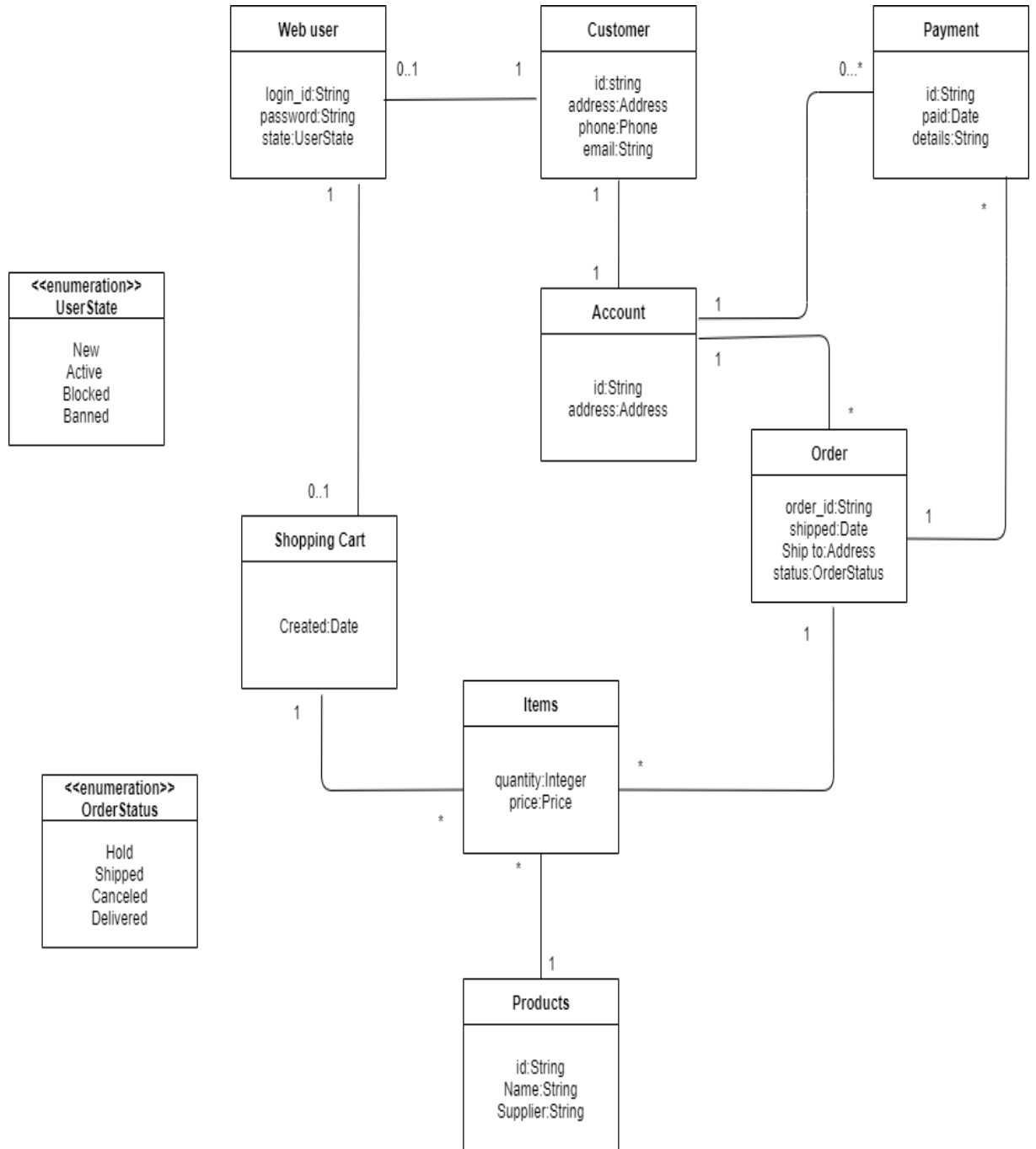


Figure 4.15: Class Diagram

In figure 4.15 different components of our system are given in the form of classes and the relationship among these components and their attributes is illustrated. In our proposed system there are total 8 different kinds of classes that are logged off user, customer, cart account, payment, order, items and products. These classes contain attributes and these are linked with other attributes by using a class relationship. Class diagram makes it easy for us to understand the system attributes and the relationship among them.

4.8 ERD Diagram

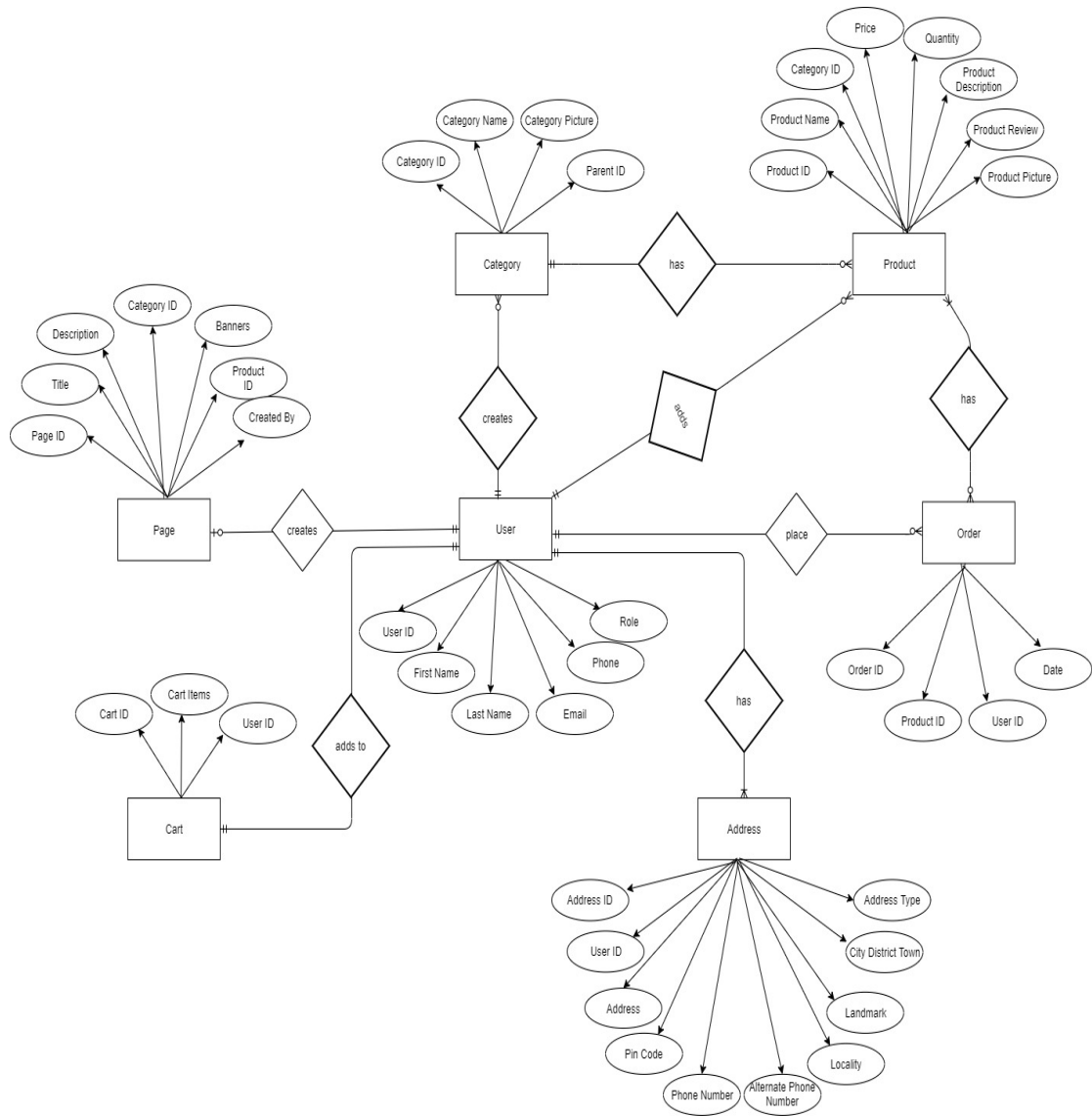


Figure 4.16: ERD Diagram

In figure 4.16 the entities their attributes and relationship between these entities is given. An entity diagram is used to show the relationship among the different entities to help us identify what kind of relationship exists between different entities present in our system and how will we implement these relationships.

4.9 Architecture Diagram

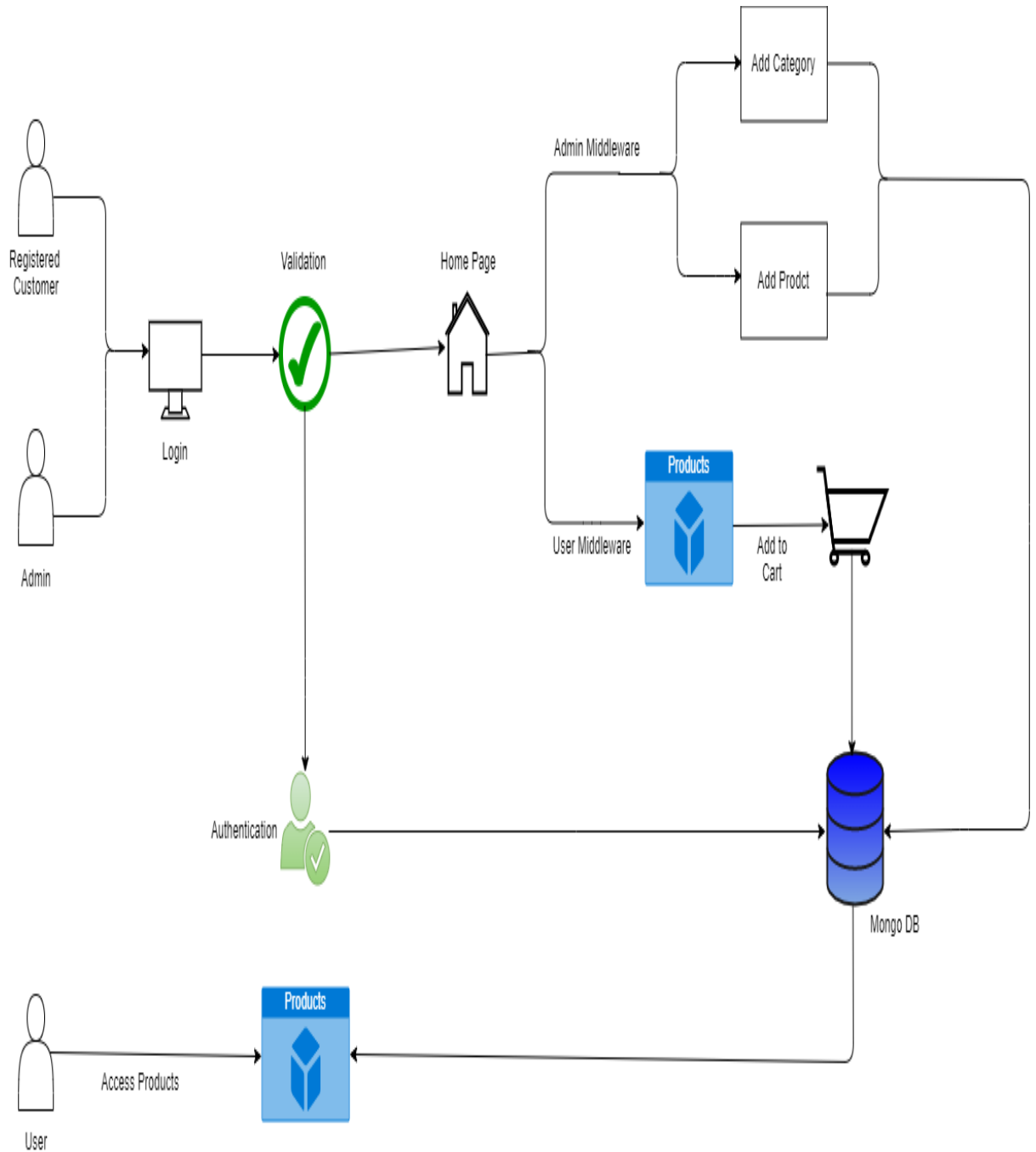


Figure 4.17: Architecture Diagram

In figure 4.17 the architecture the physical deployment of our system is given which includes the admin customers as the main users interacting with our system

and there are multiple react npm servers that hold the information for running the functionalities of our system. And all this information and data is stored in the cloud database of mongo database cluster that we are using as the primary database in our web system.

Chapter 5

System Implementation

5.1 System Components

Our system consists of three main components which are

- Back end Server
- Admin Server
- User Server

5.1.1 Back End Server

The back end server of our web application resides as a source of all the information that is stored in the mongo db and acts as a link that helps to communicate this data with the admin and user server. There is no front end view of back end server as it only acts as a link to store and communicate information

5.1.2 Admin Side Server

The admin side server holds all the components that are required by the admin to interact with our e-commerce web application

5.1.3 Front End Server

The Front End server contains the components required by the main front end application where the user will interact with the website

5.2 System Internal Components

5.2.1 Internal Components of Back End Server

The back end server contains the internal components that are required to communicate and store the data to mongo db and help the other system components to retrieve this information. The back end server consists of the following internal components

- Models(Here the database schema is defined for the different functions)
- Actions(In this internal component different functionality of actions is defined that will help to communicate information across both the admin and front end server)
- Routes(Provides the information required by components to create a pathway for the information to be sent and received)

5.2.2 Interface for Back end Server

There is no visual interface for the back end server as it only holds the information and helps as a central point for this information to be accessed and updated so there is no interface designed for the back end server.

5.2.3 Internal Components of Admin Side Server

The admin side server consists of the following internal components

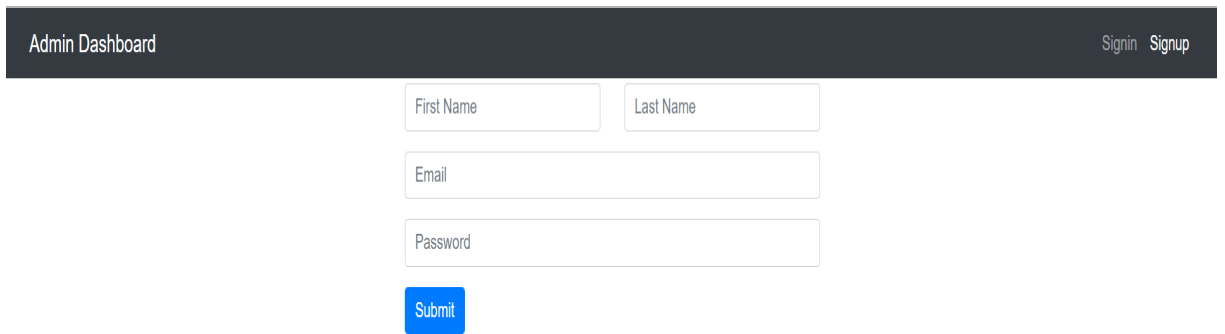
- Admin Sign Up
- Admin Log in
- Add Products
- Delete Products
- Add Categories
- Edit Categories
- Delete Categories
- Add Page view
- Track Orders
- Update Order Information
- Admin Logout

5.2.4 Interface of Admin Side Internal Components

The interface of the admin side is designed so that it is easy for the admin to perform the necessary actions required by the system from the admin side. The interface of the admin server internal components are given below

5.2.5 Sign Up

This is the starting interface where the admin will register themselves by providing their details and if the details are provided according to the instructions given by system the admin is successfully signed up in the system.

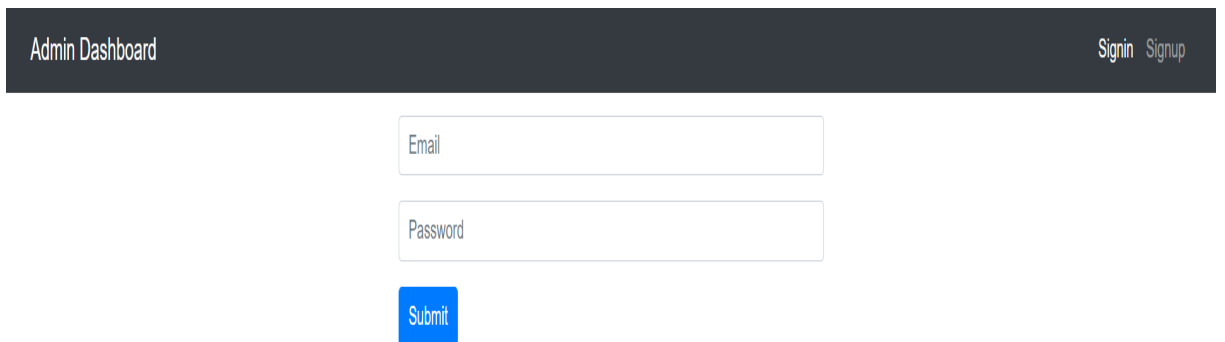


The image shows a dark grey header bar with 'Admin Dashboard' on the left and 'Signin Signup' on the right. Below the header, there is a sign-up form with four input fields: 'First Name', 'Last Name', 'Email', and 'Password'. A blue 'Submit' button is positioned below the 'Password' field.

Figure 5.1: Admin Sign Up Interface

5.2.6 Sign In

After signing up on the admin side the admin can sign in by giving the credentials that he gave in the sign up process

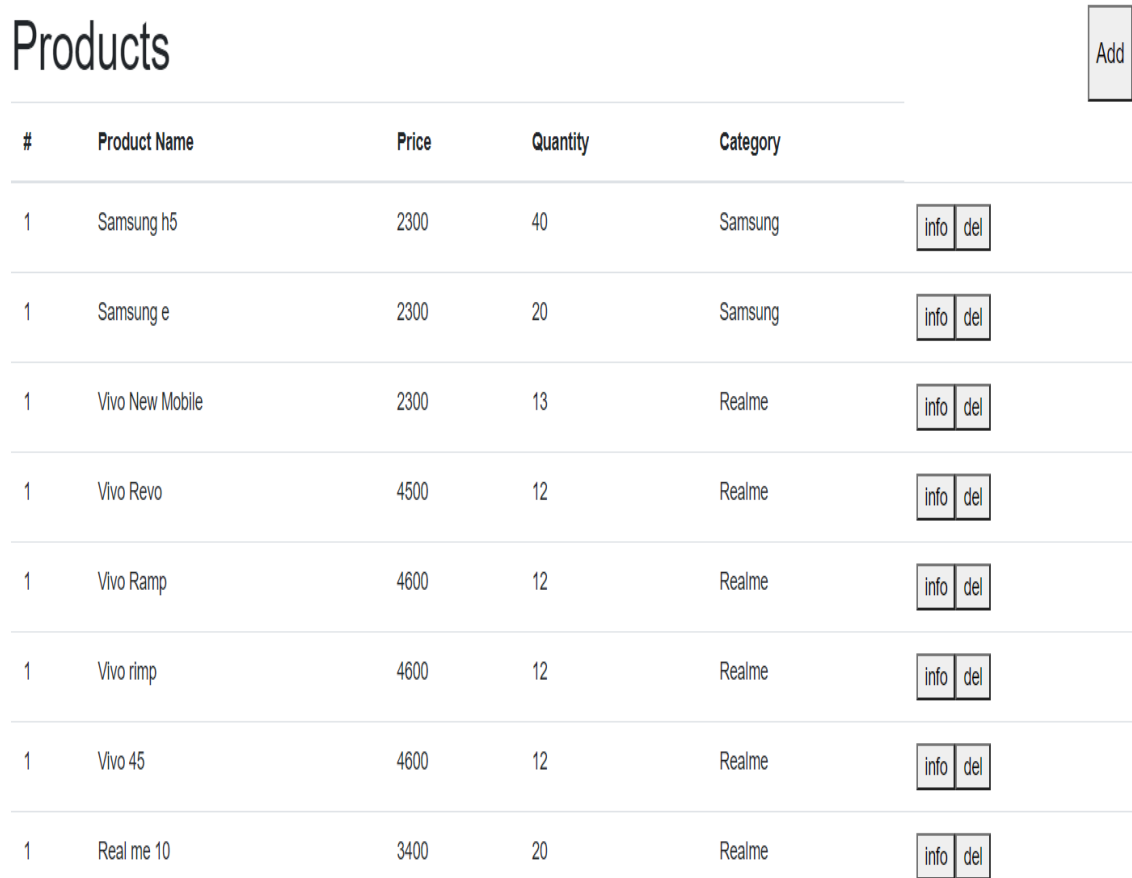


The image shows a dark grey header bar with 'Admin Dashboard' on the left and 'Signin Signup' on the right. Below the header, there is a sign-in form with two input fields: 'Email' and 'Password'. A blue 'Submit' button is positioned below the 'Password' field.

Figure 5.2: Admin Sign In Interface

5.2.7 Products Page

In this internal component the admin can view the existing products in the system



The screenshot shows a web interface for managing products. At the top left, the word "Products" is displayed in a large font. To the right of this header is a rectangular button labeled "Add". Below the header is a table with the following columns: "#", "Product Name", "Price", "Quantity", and "Category". Each row in the table represents a product and includes two small buttons labeled "info" and "del" at the end of the row.

#	Product Name	Price	Quantity	Category	
1	Samsung h5	2300	40	Samsung	info del
1	Samsung e	2300	20	Samsung	info del
1	Vivo New Mobile	2300	13	Realme	info del
1	Vivo Revo	4500	12	Realme	info del
1	Vivo Ramp	4600	12	Realme	info del
1	Vivo rimp	4600	12	Realme	info del
1	Vivo 45	4600	12	Realme	info del
1	Real me 10	3400	20	Realme	info del

Figure 5.3: Product Interface

5.2.8 Adding Products Interface

In the Product component view the admin can select the add button to add another product in the database by giving the required information

The image shows a modal window titled "Add new Product" with a close button in the top right corner. The form contains the following elements:

- Name:** A text input field with the placeholder text "Product Name".
- Quantity:** A text input field with the placeholder text "Quantity".
- Price:** A text input field with the placeholder text "Product Price".
- Description:** A text input field with the placeholder text "Product Description".
- Category:** A dropdown menu with the text "select category" and a downward arrow icon.
- File Upload:** A button labeled "Choose File" followed by the text "No file chosen".
- Save:** A dark blue button with the text "Save" in white.

Figure 5.4: Adding Product Interface

5.2.9 Admin Category Interface

In this internal component the admin can view the already existing products and can edit and delete the categories using the given interface buttons



Figure 5.5: Admin Category Interface

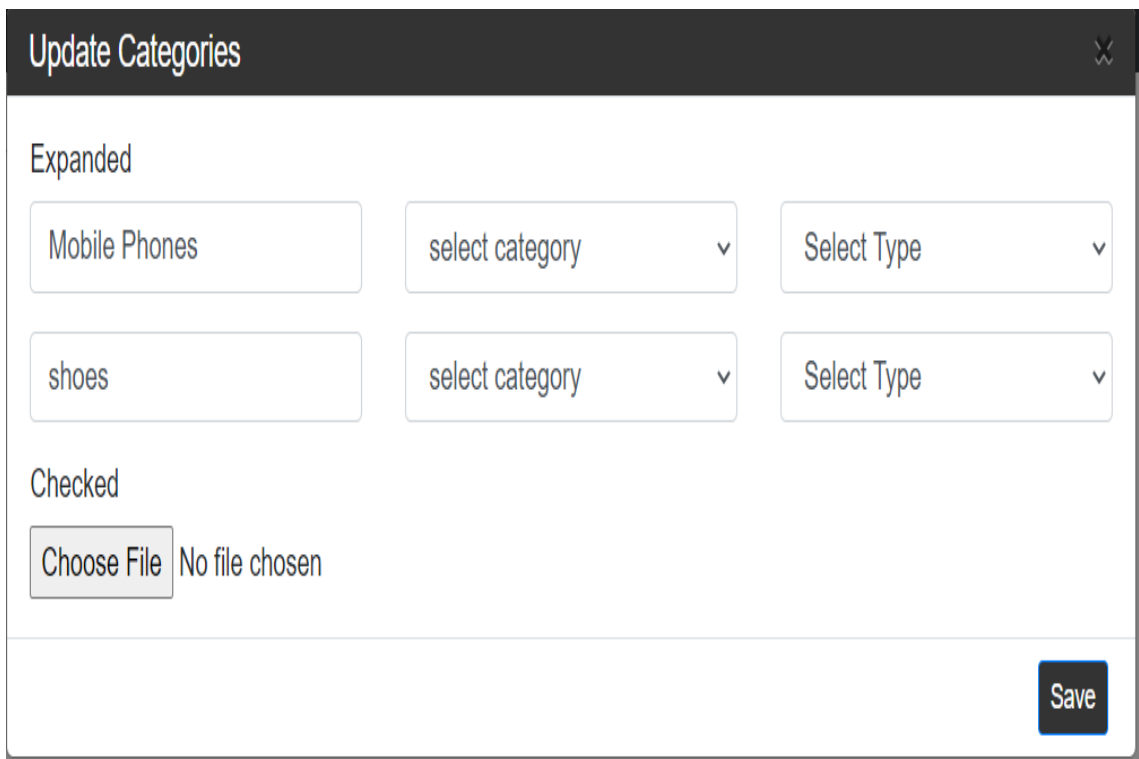


Figure 5.6: Admin Category Edit

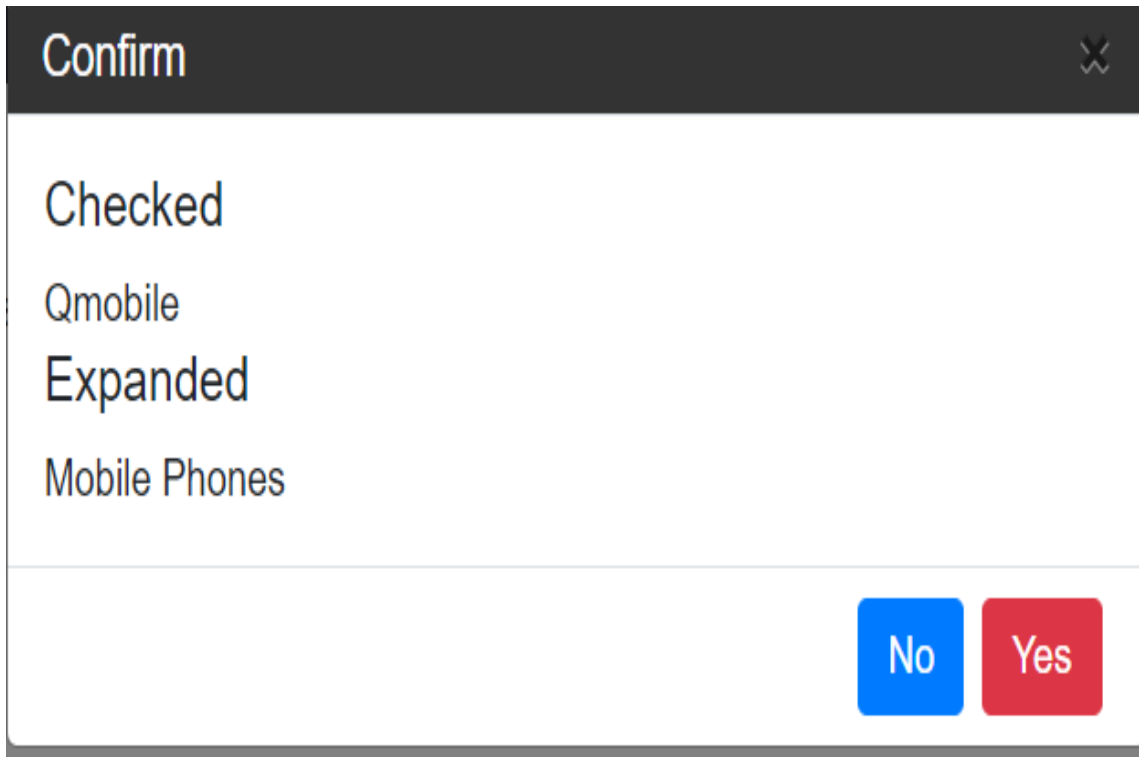


Figure 5.7: Admin Category Delete Interface

Admin Order Interface

In this internal component the admin can track the orders and can update the status of the order with the update in the order package information at which stage the order is till the final delivery

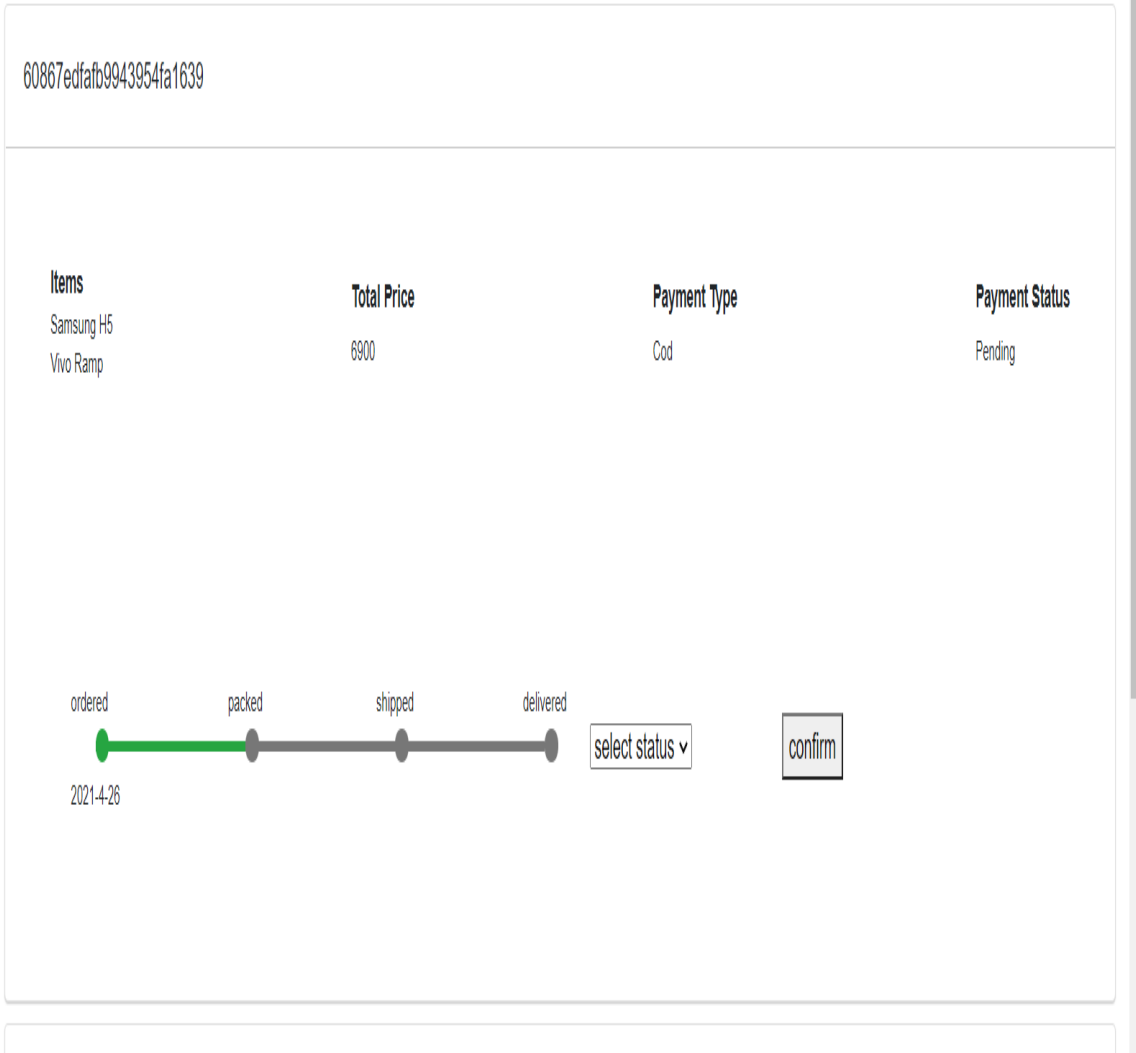


Figure 5.8: Admin Order Interface

5.2.10 Admin Sign Out Interface

By interacting with this component the admin can sign out from the admin dashboard and will be returned to the sign in screen after successful sign out.



Figure 5.9: Admin Sign Out

5.2.11 Internal Components of Front End Side

The following are the internal components of the front end side that helps the user to interact with the application

- User Sign in
- User Sign Up
- Order Page
- Track orders page
- Homepage
- Products Page
- Product Details Page
- Add to Cart Page
- Checkout Page
- Logout Page

5.3 Interface of Front End Side

This is our main web application front end where the user will interact with the website and perform different interactions from sign up to finally receiving the order. The interface of all these components is given below in detail.

5.3.1 Homepage

This is the main page where every user will come and select the desired option and after selecting the option by the user choice it will be redirected to the products page.

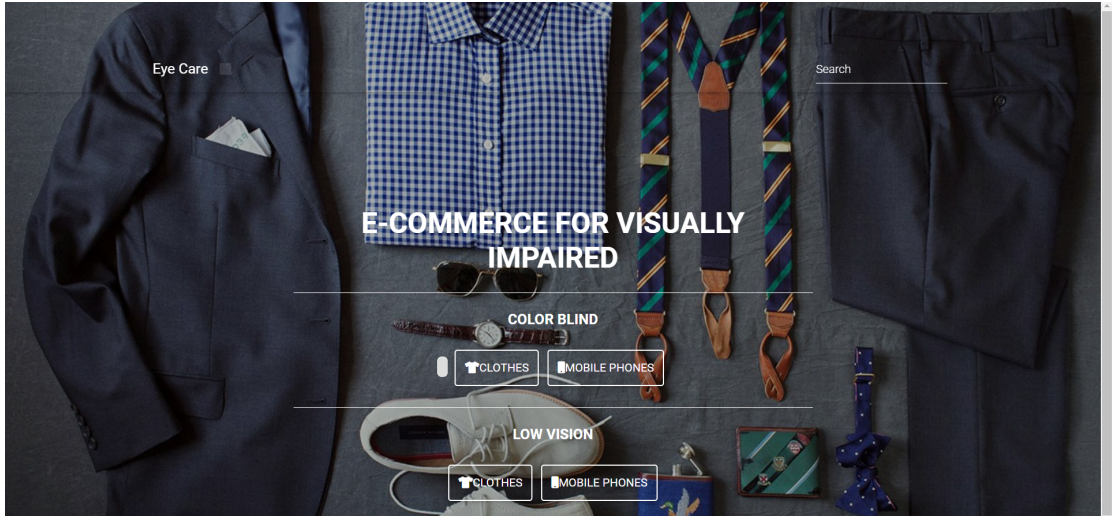


Figure 5.10: User Homepage

5.3.2 Product Page

The product page will be based on the user choice. There are multiple options for the user to choose from and the product page will be changed according to that. Some Interfaces of the product page are shown below

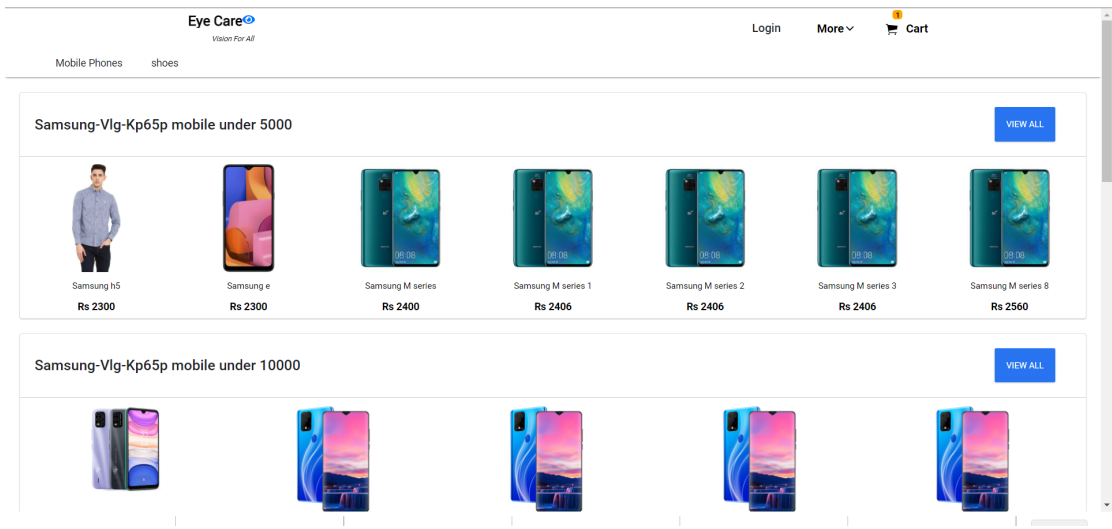


Figure 5.11: Color Blind Product Page

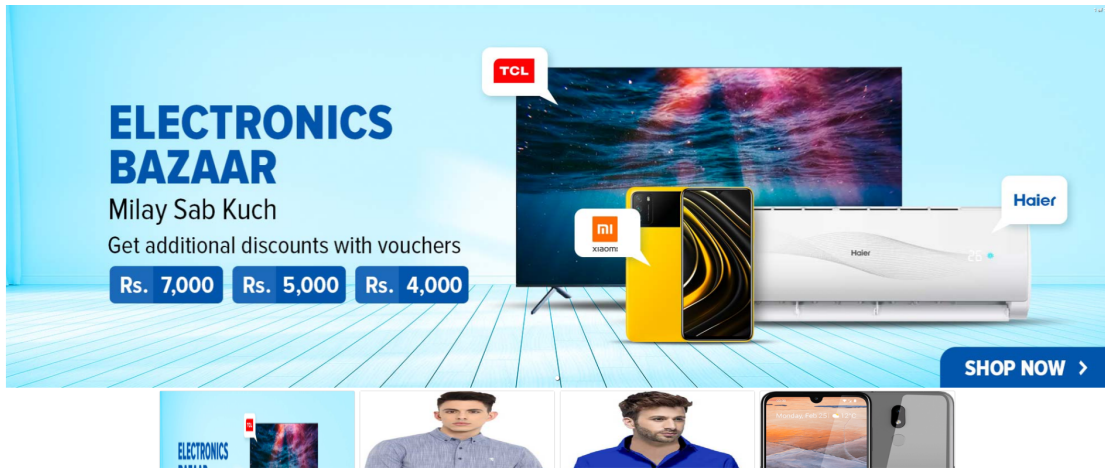


Figure 5.12: Low Vision Product Page

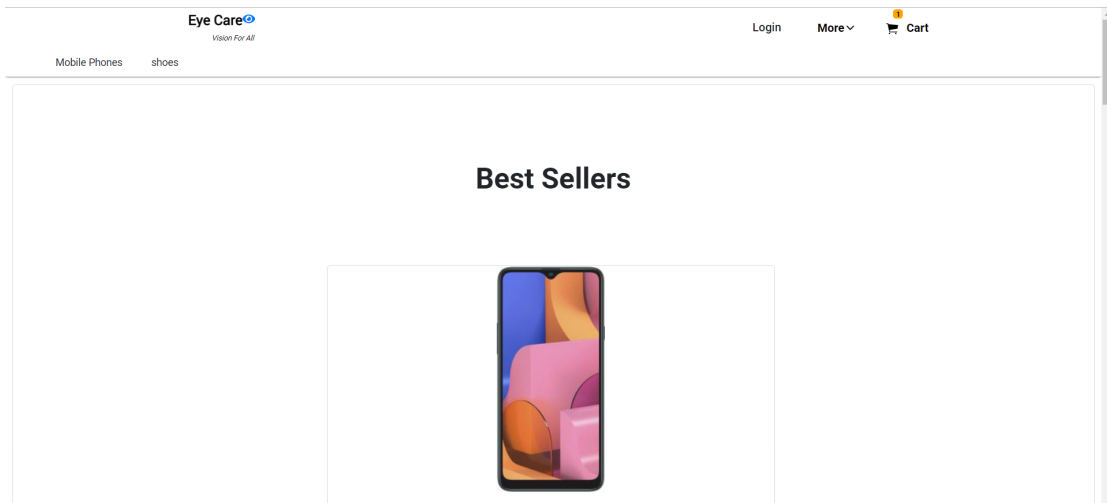


Figure 5.13: Blind Page Interface

5.3.3 Product Details Page

After selecting the product the user is routed to the product details page. Here the user can check the product details and some secondary images of the product and add it to the cart.

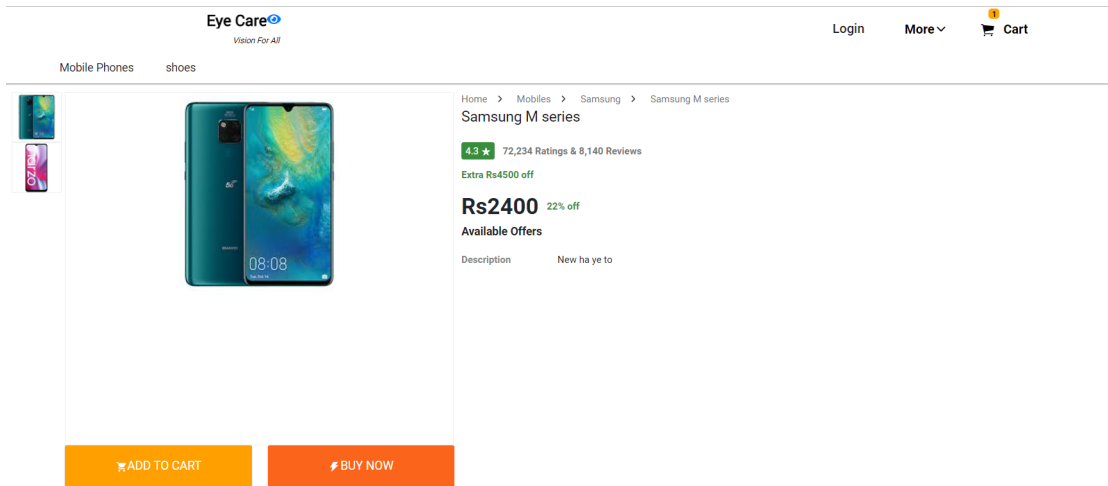


Figure 5.14: Product Details Page

5.3.4 Add to Cart Page

After adding the desired number of products in the cart the user comes into the cart page where the user can access all the items in the cart and can check the total price of the products added in the cart. The user can also increase or decrease the amount of products based on the user choice.

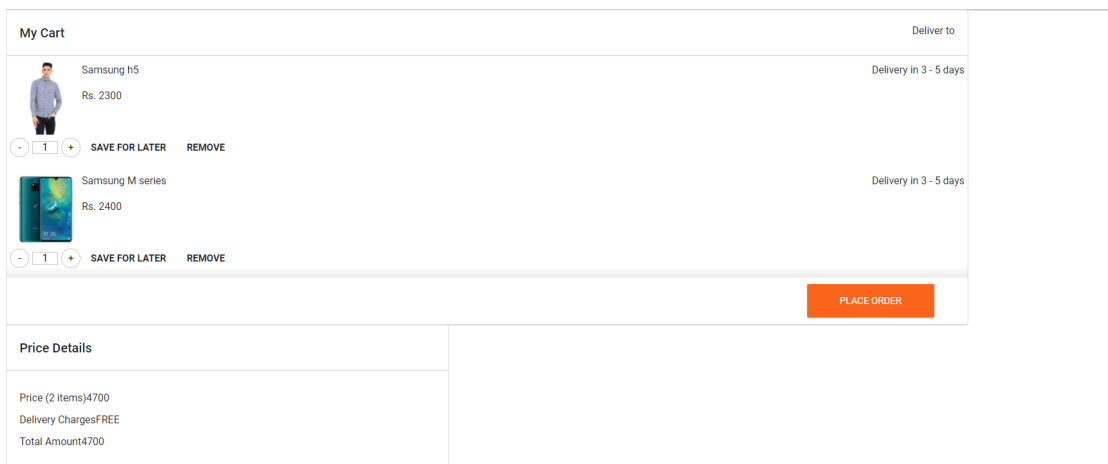


Figure 5.15: User Add to Cart Page

5.3.5 Checkout Page

After confirming the items in the Cart the user can select the place order button to come into the checkout page where the user needs to provide the address he wants the product to be delivered at and again confirm the quantity of the items. Here the user needs to login in case he already has an account or sign up if he is the new user. Without signing in the user cannot place the order.

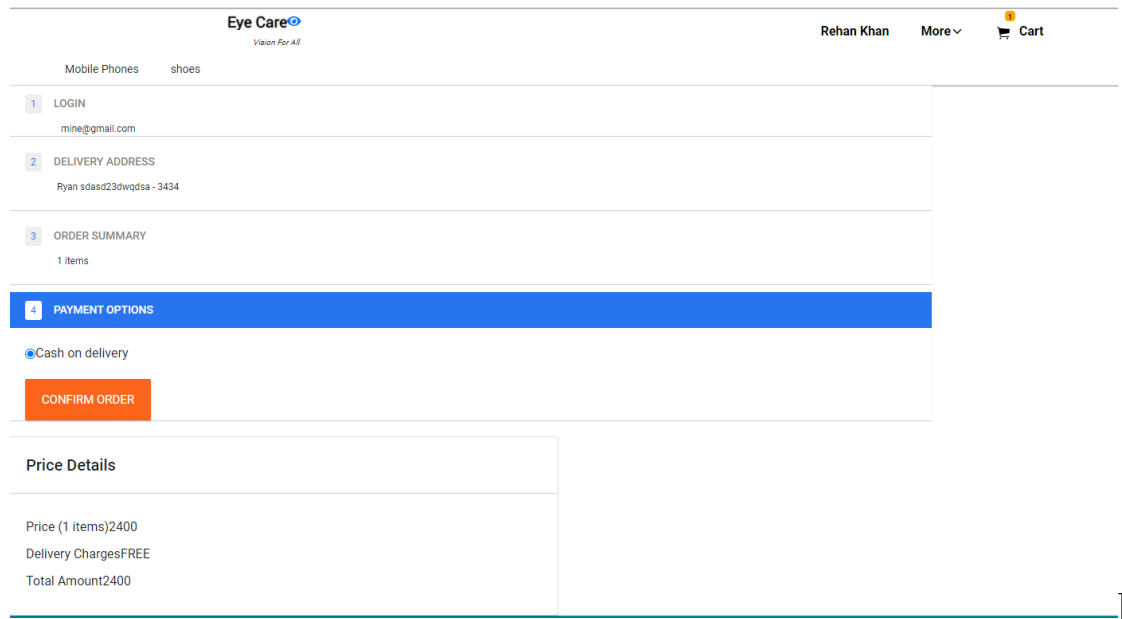


Figure 5.16: Checkout Page

5.3.6 User Login page

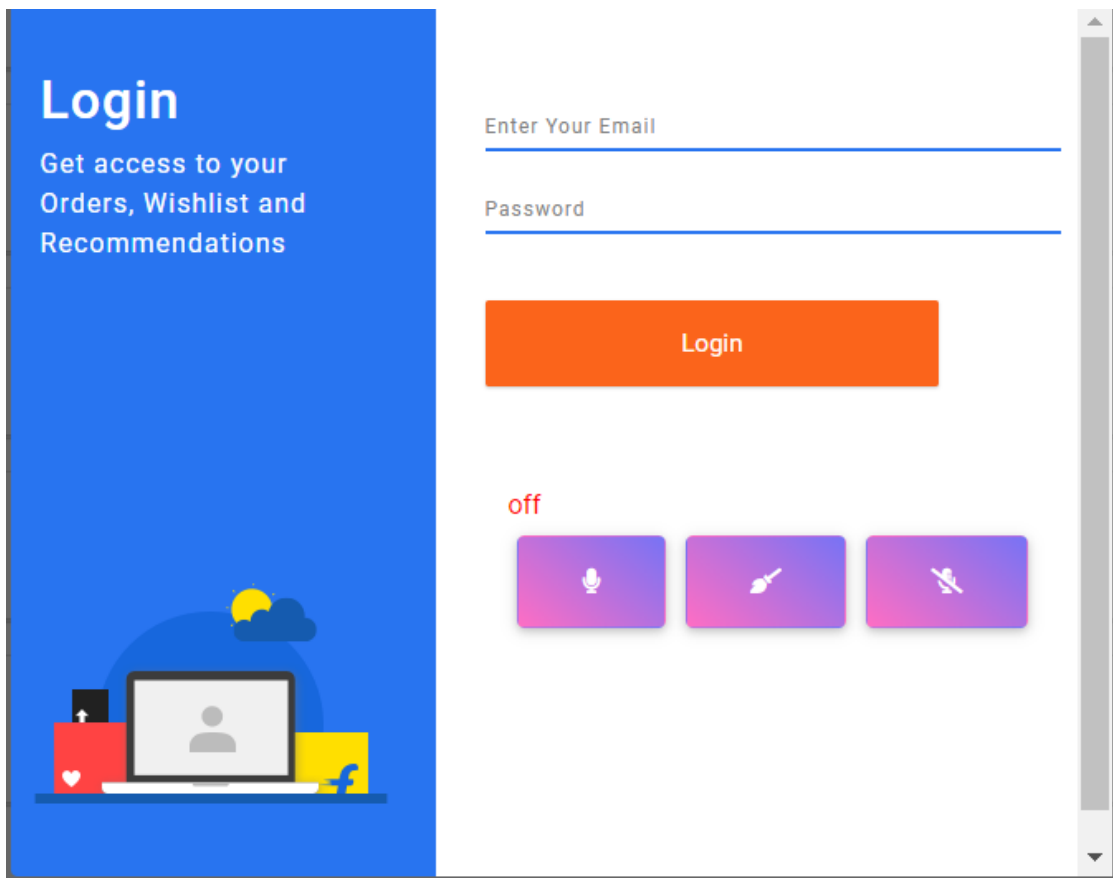


Figure 5.17: User Login Page

In user login page the customer can enter the email and password used for the sign up process during registration. This will allow the customer to view order history and place orders.

5.3.7 Order Details Page

After successfully Placing The order the user can check the order details and the status of the order that is being shipped and track the order.

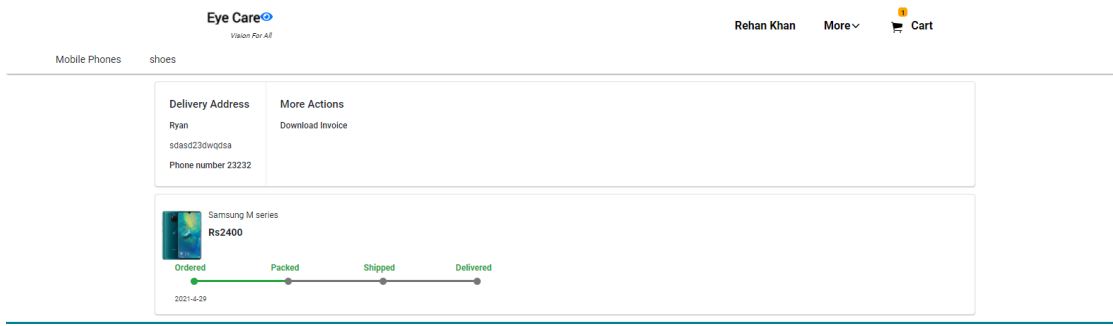


Figure 5.18: Order Details Page

5.3.8 Order Page

The user can check the orders page at anytime and view the status of his orders in this interface.

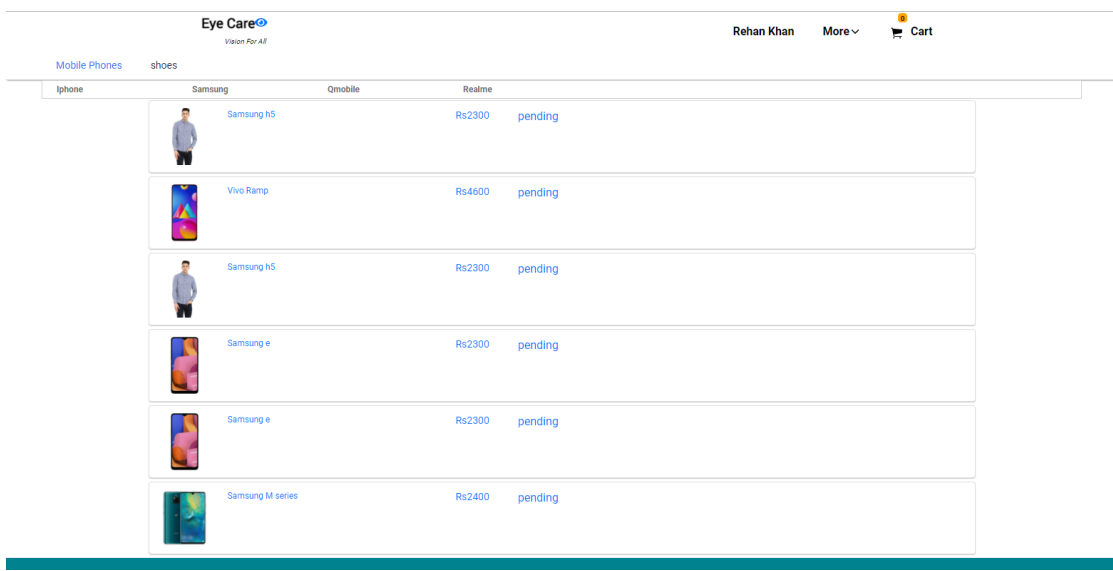


Figure 5.19: Order Page

5.3.9 LOGOUT

The user can click this link anytime to logout from the web application

5.4 Tools And Technology

- Visual Code
- MongoDB(Mongoose)
- Express.js
- Node.js
- React for Front End
- Herouko(For deployment)

5.5 Languages Used

- JavaScript
- JavaScript Object Notation(JSON)
- HTML
- CSS
- Bootstrap
- Shell Scripting

Chapter 6

System Testing And Evaluation

As our project is a large scale application so without proper testing and evaluation the working of the system based on the specified requirements is not possible. The testing and evaluation of our system was carried in the based on the following testing scenarios.

6.1 Graphical Interface Testing

The graphical interface of our application was built as a web application for PC and laptop users. The application was checked for scaling problems in the graphical interface. There were some buttons and navbars that were moving out of position on changing scale positions and they were fixed after every scaling test. One Test Process is given below

6.1.1 Graphical Interface Test Case

In this test case the product page was supposed to align items automatically on decreasing the width of the page. The default page was

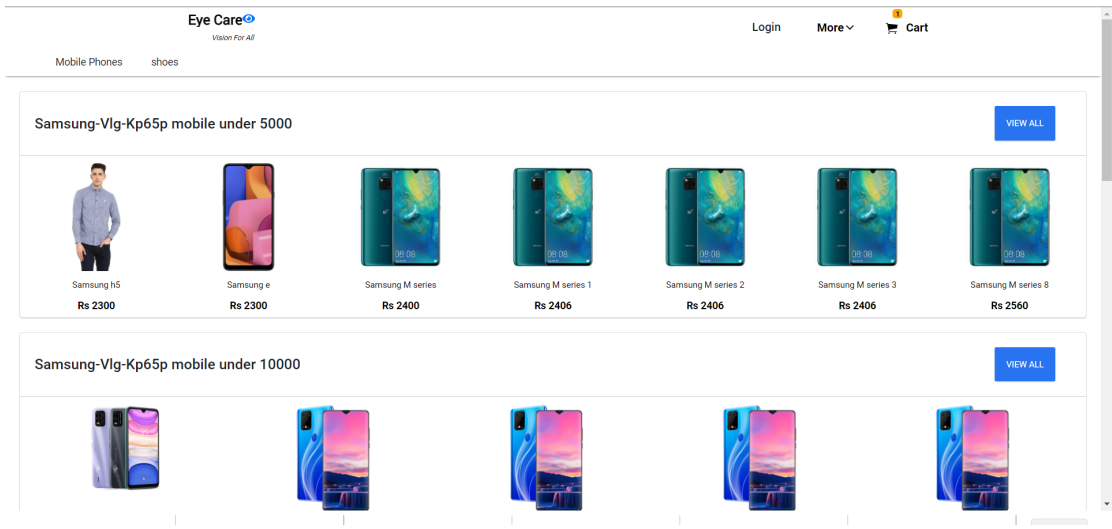
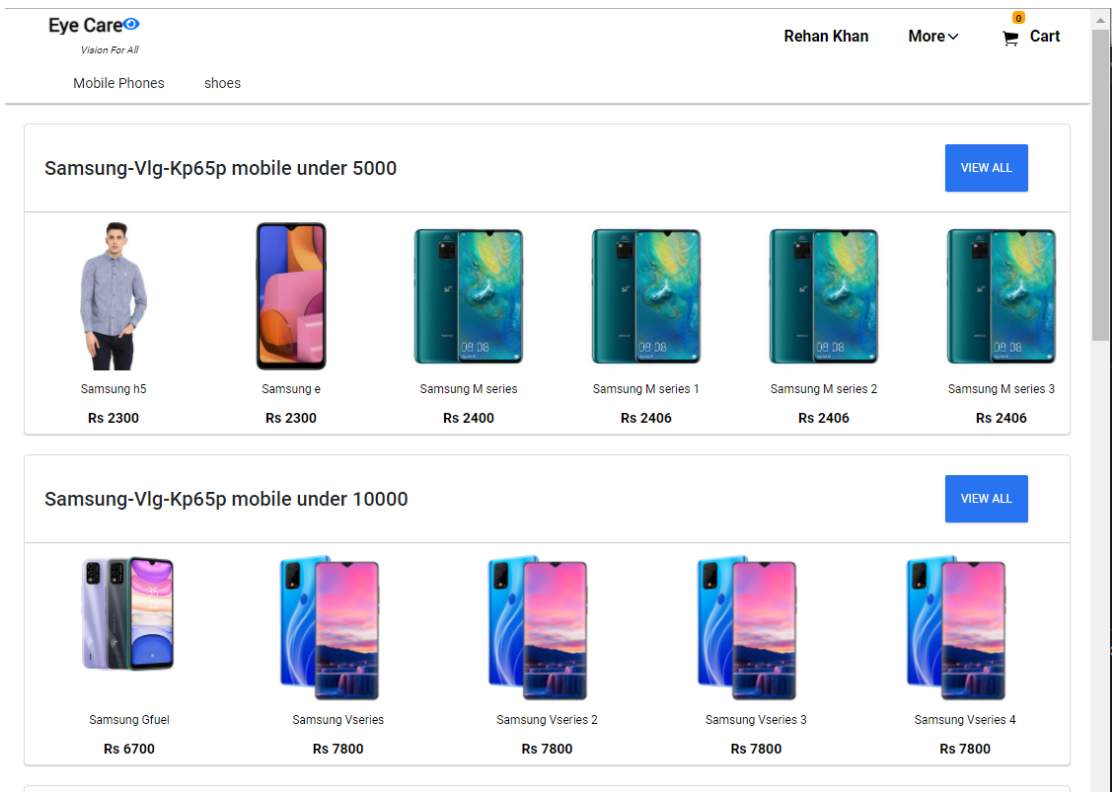


Figure 6.1: Product Page Graphical Interface Testing

The result after scaling down the width of the page is



]

Figure 6.2: Scaled Down Product Page Testing

From the result the images, Navbars and buttons scaled with the decrease in

window size which passed the test case.

6.1.2 Compatibility Testing

Our system was developed as a web application and should be compatible with every device that is capable of accessing the internet. After deploying the website on heroku the application was tested on different platforms ranging from a mobile phone laptop and pc. The web application was working compatibility with all devices with some scaling issues because it was not designed for such devices.

6.2 Test Cases

6.2.1 Back End Server Testing

As our back end server contained all the database actions and acted as a link between the other main component's of system to store and retrieve information we needed to evaluate the proper working of each api working at the backend. For this reason we checked the working of apis using a popular google chrome extension called as postman which helps to identify whether the api in the system is functioning properly and the data is being sent or not. We performed these checks on multiple apis by sending different types of information through the api and evaluated the expected result. The testing scenario carried out for the back end server is discussed below

6.2.2 BackEnd Login API

We first check the working of user login api and tested the api by giving different data in the body of postman and expected system to return the details if the information provided matched the information in our database.

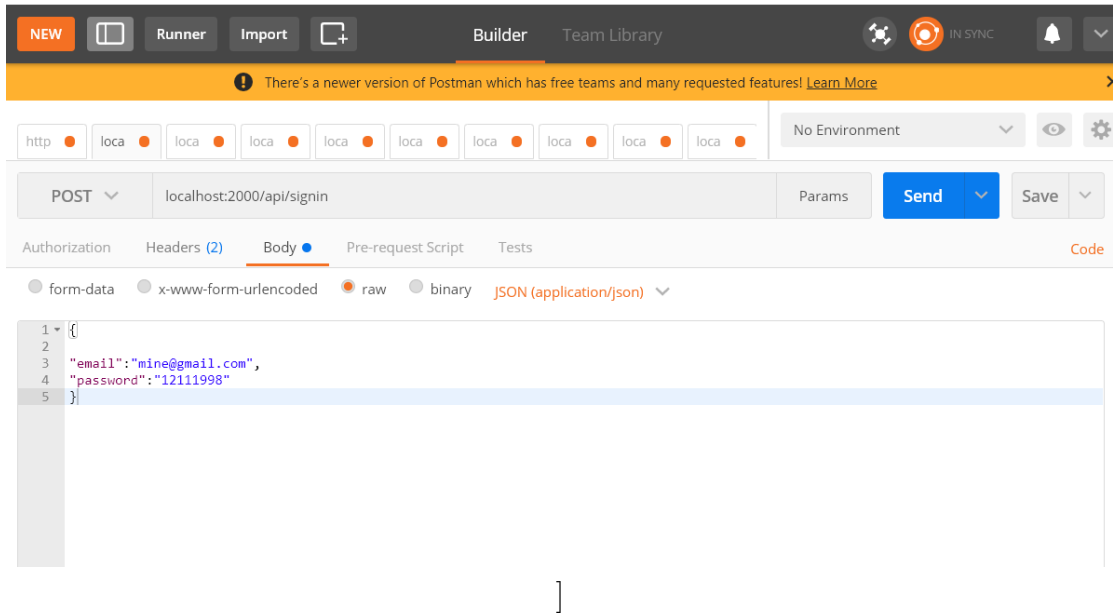


Figure 6.3: Input For Sign In Api

Result



Figure 6.4: Sign In Api Result

From the result we can evaluate that after providing the proper information in the body of postman we are getting the stored result of user through the api so the testing of sign in API at the back end is successful.

6.2.3 Back End Get Categories

We are using the get category api in the back end to retrieve all the categories from our database and provide this information to other components of our system. As our system is heavily dependent on the data of categories we need to test the api for proper functioning. We again used postman to confirm the working of this api and as it is a get request we are not sending any data through the main body of the postman application.

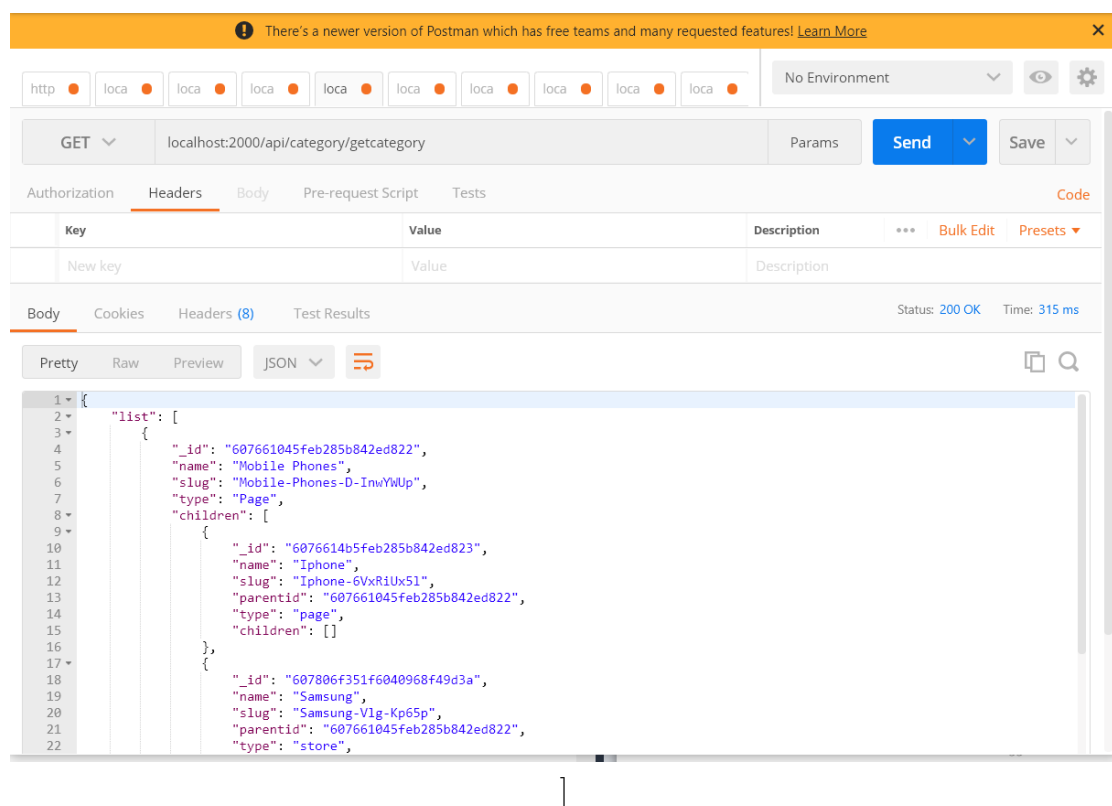


Figure 6.5: Get Category API

From the figure given above we sent a get request to getcategories api using postman and in the result we obtained all the categories that are available in our mongo db database. So we can conclude that the get categories api at our backend server is working per requirement.

6.2.4 Admin Sign In Api

This api helps the admin server side to retrieve and store the information about the admin regarding the sign in process. We tested this api on postman by sending the admin username and password through the postman body.

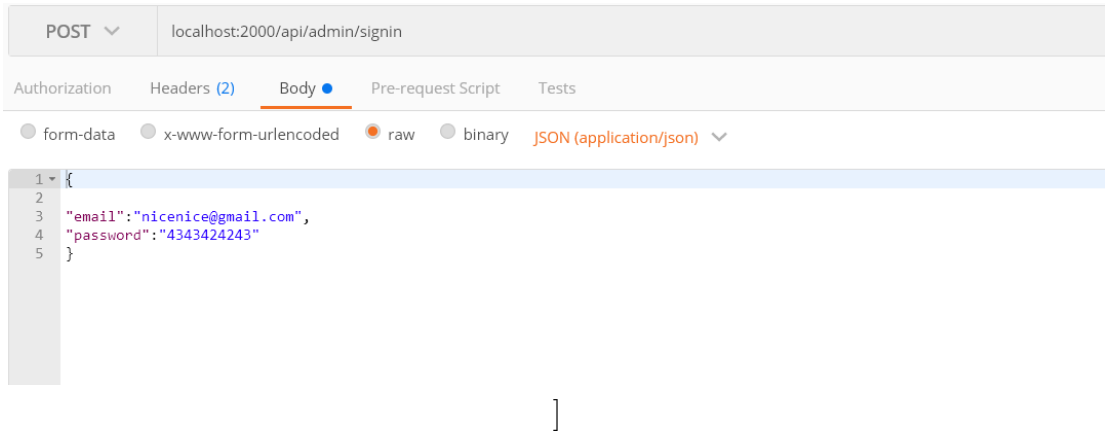


Figure 6.6: Admin Sign In Api Input Data



Figure 6.7: Admin Sign In Api Result

In the result the api returned the admin session token and the admin details which passed the test of the api working according to the defined requirements.

6.3 Admin Side Testing

In the admin side we had all the functionalities for the admin where the admin can sign up sign in view the orders, change the status of the order, add categories, delete categories and adding and deleting products. As this is an important part of our

system we had to check many test cases on these functionalities and confirm that our admin side is working as per the system requirements.

6.3.1 Admin Sign Up Test Case

Test Case ID	Test Case 1
Function To be Tested	Admin Sign Up
Precondition	Back End server should be running on the local system
Action	Enter valid Details for Sign Up
System Action	Admin is successfully created in the database and redirected to sign in page
Status	Pass

Table 6.1: Valid Admin Sign Up Test Case

Test Case ID	Test Case 2
Function To be Tested	Admin Sign Up
Precondition	Back End server should be running on the local system
Action	Enter invalid Details For Sign Up
System Action	Error Is shown to the admin
Status	Fail

Table 6.2: Invalid Admin Sign Up Test Case

6.3.2 Admin Sign In Test Case

Test Case ID	Test Case 3
Function To be Tested	Admin Sign In
Precondition	Back End server should be running on the local system
Action	Enter valid Email And Password
System Action	Admin is successfully created in the database and redirected to dashboard
Status	Pass

Table 6.3: Valid Admin Sign Up Test Case

Test Case ID	Test Case 4
Function To be Tested	Admin Sign In
Precondition	Back End server should be running on the local system
Action	Enter invalid Email And Password
System Action	Error Is shown to the admin
Status	Fail

Table 6.4: Invalid Admin Sign In Test Case

6.3.3 Adding Product Test Case

Test Case ID	Test Case 5
Function To be Tested	Adding Products in Database
Precondition	Back End server should be running on the local system
Action	Enter valid details for the product to be added
System Action	Product is successfully created in the database
Status	Pass

Table 6.5: Adding products in Database positive test case

Test Case ID	Test Case 6
Function To be Tested	Adding Products in database
Precondition	Back End server should be running on the local system
Action	Enter Wrong or leaving the details empty for new product
System Action	Error Is shown to the admin
Status	Fail

Table 6.6: Adding Products Negative Test Case

6.3.4 Deleting Product Test Case

Test Case ID	Test Case 7
Function To be Tested	Deleting Products From Database
Precondition	Back End server should be running on the local system
Action	Click the product to be deleted
System Action	Product is successfully deleted from the database
Status	Pass

Table 6.7: Deleting products from Database test case

6.3.5 Adding Categories Test Case

Test Case ID	Test Case 8
Function To be Tested	Adding Categories in Database
Precondition	Back End server should be running on the local system
Action	Enter valid details for the category to be added
System Action	Category is successfully created in the database
Status	Pass

Table 6.8: Adding Category in Database positive test case

Test Case ID	Test Case 9
Function To be Tested	Adding Category in database
Precondition	Back End server should be running on the local system
Action	Enter Wrong details for the category to be added
System Action	Error Is shown to the admin
Status	Fail

Table 6.9: Adding Category Negative Test Case

6.3.6 Editing Categories Test Case

Test Case ID	Test Case 10
Function To be Tested	Editing Categories in Database
Precondition	Back End server should be running on the local system
Action	Click the category to be updated and adding valid details
System Action	Category is successfully updated in the database
Status	Pass

Table 6.10: Updating Category in Database positive test case

Test Case ID	Test Case 11
Function To be Tested	Editing Products in database
Precondition	Back End server should be running on the local system
Action	Click the category to be updated and enter wrong details
System Action	Error Is shown to the admin
Status	Fail

Table 6.11: Updating Category Negative Test Case

6.3.7 Deleting Category Test Case

Test Case ID	Test Case 12
Function To be Tested	Deleting Products From Database
Precondition	Back End server should be running on the local system
Action	Click the category to be deleted and clicking confirm
System Action	Category is successfully deleted from the database
Status	Pass

Table 6.12: Deleting Category from Database test case

6.3.8 Creating New Page Test Case

Test Case ID	Test Case 13
Function To be Tested	Adding New Page in Database
Precondition	Back End server should be running on the local system
Action	Add valid information for the new page to be created
System Action	Page is Successfully created in database
Status	Pass

Table 6.13: Creating Page in Database positive test case

Test Case ID	Test Case 14
Function To be Tested	Adding New Page in database
Precondition	Back End server should be running on the local system
Action	Enter wrong details for the page to be created
System Action	Error Is shown to the admin
Status	Fail

Table 6.14: Adding New Page Negative Test Case

6.3.9 Checking Orders Test Case

Test Case ID	Test Case 15
Function To be Tested	Checking Orders From Database
Precondition	Back End server should be running on the local system
Action	Click the orders page
System Action	Orders are successfully shown on screen from the database
Status	Pass

Table 6.15: Showing Orders from Database test case

6.3.10 Updating Order Status Test Case

Test Case ID	Test Case 16
Function To be Tested	Updating Order Status
Precondition	Back End server should be running on the local system
Action	Click the status button against the order
System Action	Order status is successfully updated
Status	Pass

Table 6.16: Updating Order Status test case

6.4 Front End Testing

This is the main integral component of our system where all the users will interact with our system so we need to make sure every component in our front end is functioning properly. For this reason we implemented and evaluated different test cases on each step of our development and after application production to confirm our system is working as per the set requirements. These test cases are given below

6.4.1 User Sign Up Test Case

Test Case ID	Test Case 1
Function To be Tested	User Sign Up
Precondition	Back End server should be running on the local system
Action	Enter valid Details for Sign Up
System Action	User is successfully created in the database and redirected to Product page
Status	Pass

Table 6.17: Valid User Sign Up Test Case

Test Case ID	Test Case 2
Function To be Tested	User Sign Up
Precondition	Back End server should be running on the local system
Action	Enter invalid Details For Sign Up
System Action	Error Is shown to the User
Status	Fail

Table 6.18: Invalid User Sign Up Test Case

6.4.2 User Sign In Test Case

Test Case ID	Test Case 3
Function To be Tested	User Sign In
Precondition	Back End server should be running on the local system
Action	Enter valid Email And Password
System Action	User is successfully created in the database and redirected to dashboard
Status	Pass

Table 6.19: Valid User Sign In Test Case

Test Case ID	Test Case 4
Function To be Tested	User Sign In
Precondition	Back End server should be running on the local system
Action	Enter invalid Email And Password
System Action	Error Is shown to the User
Status	Fail

Table 6.20: Invalid User Sign In Test Case

6.4.3 Homepage Test Case

Test Case ID	Test Case 5
Function To be Tested	User Homepage
Precondition	Back End server should be running on the local system
Action	Enter valid website address in the search bar
System Action	User is successfully redirected to the Homepage
Status	Pass

Table 6.21: User Homepage Test Case

6.4.4 Low Vision Page Test Case

Test Case ID	Test Case 6
Function To be Tested	User Homepage
Precondition	Back End server should be running on the local system
Action	User Clicks the low Vision button in the Homepage Menu
System Action	User is successfully redirected to the Low Vision Product page
Status	Pass

Table 6.22: Low vision product page Test Case

6.4.5 Blind User Product Page Test Case

Test Case ID	Test Case 7
Function To be Tested	Blind Product Page
Precondition	Back End server should be running on the local system
Action	User Clicks the Blind Products button in the Homepage Menu
System Action	User is successfully redirected to the Blind Product page
Status	Pass

Table 6.23: Blind product page Test Case

6.4.6 Color Blind Product Page Test Case

Test Case ID	Test Case 8
Function To be Tested	Color Blind Product Page
Precondition	Back End server should be running on the local system
Action	User Clicks the Color Blind Products button in the Homepage Menu
System Action	User is successfully redirected to the Color blind Product page
Status	Pass

Table 6.24: Color blind product page Test Case

6.4.7 Product Details Page Test Case

Test Case ID	Test Case 9
Function To be Tested	Product Details Page
Precondition	Back End server should be running on the local system
Action	User Clicks the Products in the Product pages
System Action	User is successfully redirected to the Product Details page
Status	Pass

Table 6.25: Product Details page Test Case

6.4.8 Cart Page Test Case

Test Case ID	Test Case 10
Function To be Tested	Cart Page
Precondition	Back End server should be running on the local system
Action	User Clicks the Add to cart Button in the product Details page
System Action	User is successfully redirected to the Cart page
Status	Pass

Table 6.26: Cart Page Test Case

Test Case ID	Test Case 11
Function To be Tested	Increase Item quantity in Cart Page
Precondition	Back End server should be running on the local system
Action	User Clicks the Increase Quantity Button in the Cart page
System Action	Quantity of the item is successfully increased
Status	Pass

Table 6.27: Increase item Quantity Test Case

Test Case ID	Test Case 12
Function To be Tested	Decrease Item quantity in Cart Page
Precondition	Back End server should be running on the local system
Action	User Clicks the Decrease Quantity Button in the Cart page
System Action	Quantity of the item is successfully Decreased
Status	Pass

Table 6.28: Decrease item Quantity Test Case

6.4.9 User Checkout Page Test Case

Test Case ID	Test Case 13
Function To be Tested	Checkout Page
Precondition	Back End server should be running on the local system
Action	User Clicks the Place Order Button in the Cart page
System Action	User is successfully redirected to the Checkout page
Status	Pass

Table 6.29: Checkout page Test Case

6.4.10 Order Details Page Test Case

Test Case ID	Test Case 14
Function To be Tested	Order Details Page
Precondition	Back End server should be running on the local system, User should be logged in and proper address details should be provided
Action	Add the proper address and user details and click place order button
System Action	Order is successfully created in the database and user is redirected to the order Details Page
Status	Pass

Table 6.30: Order Details Page Test Case

Test Case ID	Test Case 15
Function To be Tested	Order Details Page
Precondition	Back End server should be running on the local system, user should be logged in and proper address details should be provided
Action	Enter the incorrect address details and click the confirm order button
System Action	Error Is shown to the User
Status	Fail

Table 6.31: Invalid Order Details Page Test Case

6.4.11 User Log Out Test Case

Test Case ID	Test Case 16
Function To be Tested	User Log Out
Precondition	Back End server should be running on the local system and user is signed in the system
Action	User Clicks Log out button in the menu header
System Action	User is successfully logged out from the system
Status	Pass

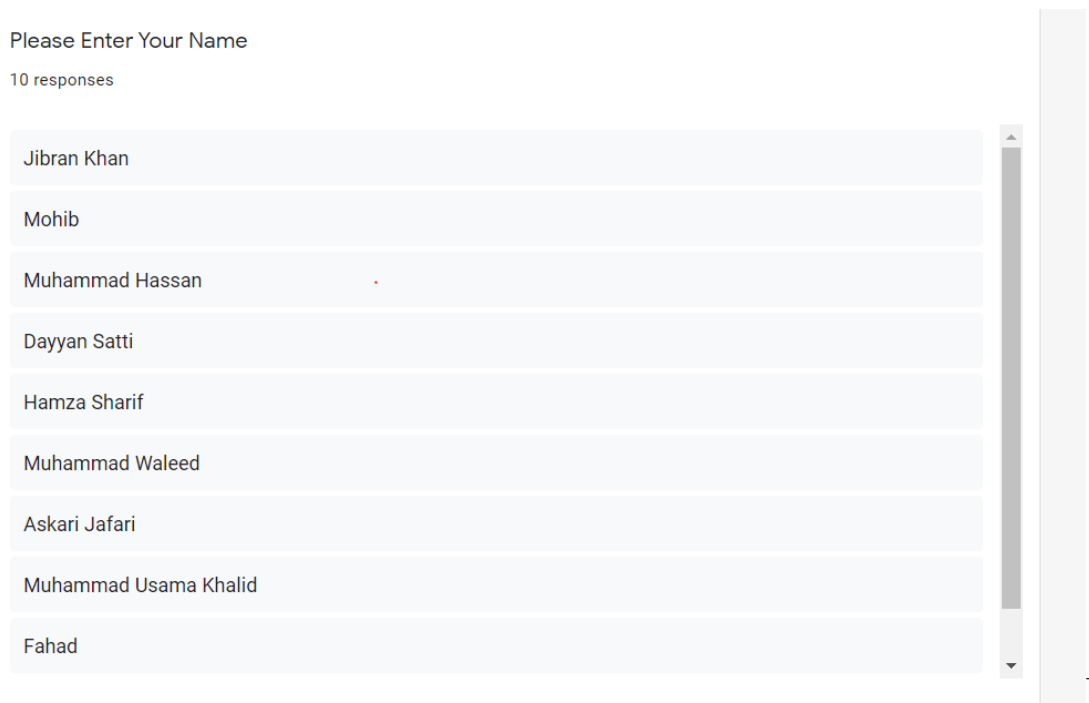
Table 6.32: User Log Out Test Case

6.5 Stress Testing

As our web application is deployed on a free cloud platform called heroku we were able to do the stress testing of our application by providing the link to some student fellows and asking them to perform some operation on our application and give their feedback to us through a google form. The questions asked in the google form were related to the working of our application and were made to check whether the application was performing normally when some users were doing operations on it at the same time.

6.5.1 Stress Test Feedback

The response was recorded by 10 users who used the website using the link provided and their response is given below



Please Enter Your Name
10 responses

Jibran Khan
Mohib
Muhammad Hassan
Dayyan Satti
Hamza Sharif
Muhammad Waleed
Askari Jafari
Muhammad Usama Khalid
Fahad

Figure 6.8: Feedback Form Question 1 response

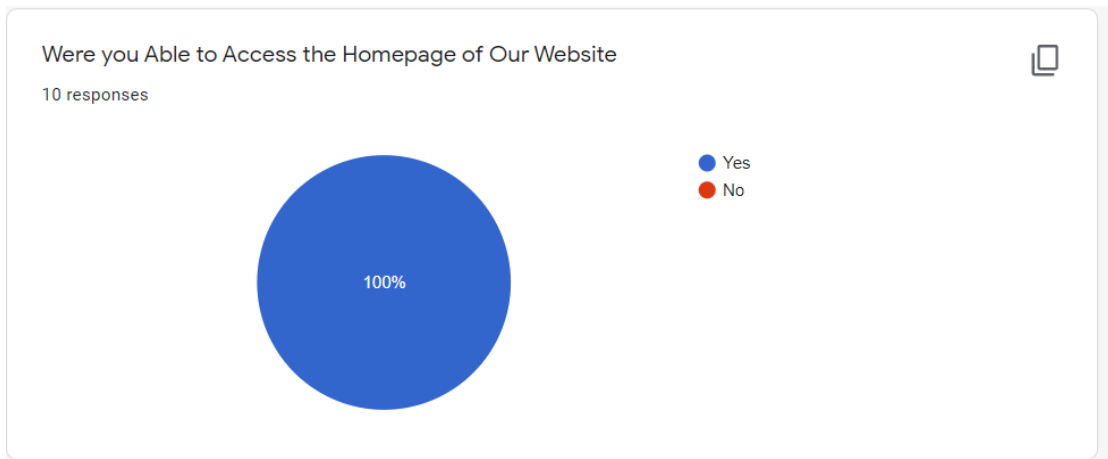


Figure 6.9: Feedback Form Question 2 response

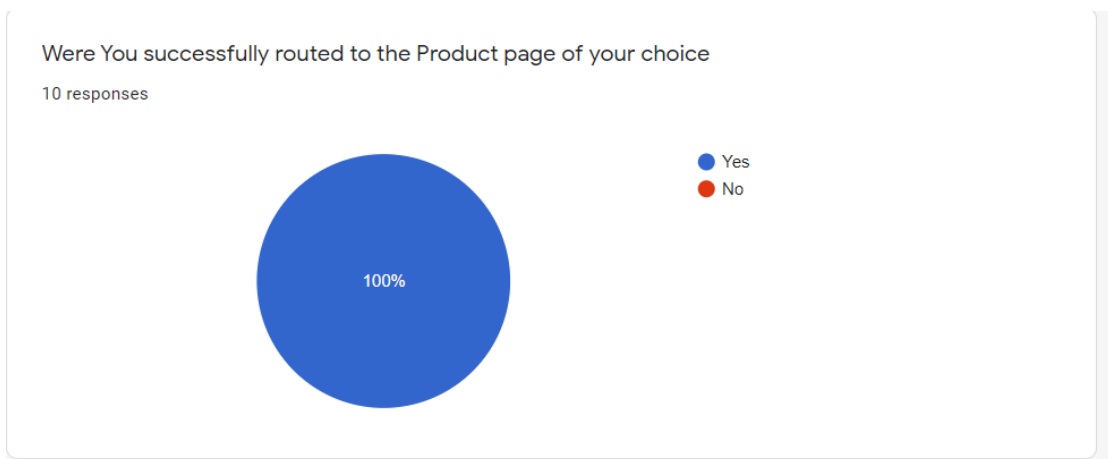


Figure 6.10: Feedback Form Question 3 response

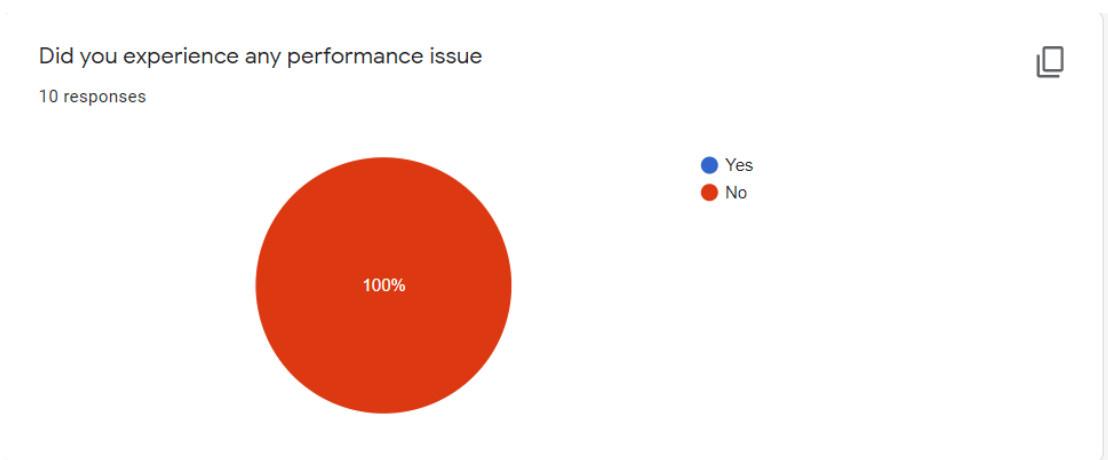


Figure 6.11: Feedback Form Question 4 response

Was the loading time of Website too slow

10 responses

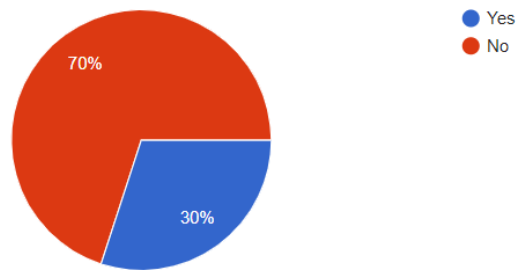


Figure 6.12: Feedback Form Question 5 response

Were You able to Sign Up on our application

10 responses

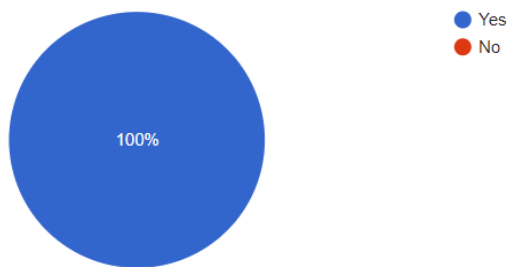


Figure 6.13: Feedback Form Question 6 response

Were you able to add items in the cart using our web application

10 responses

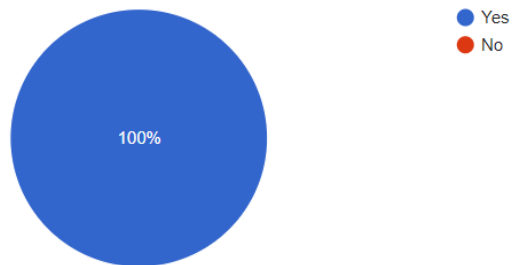


Figure 6.14: Feedback Form Question 7 response



Figure 6.15: Feedback Form Question 8 response



Figure 6.16: Feedback Form Question 9 response

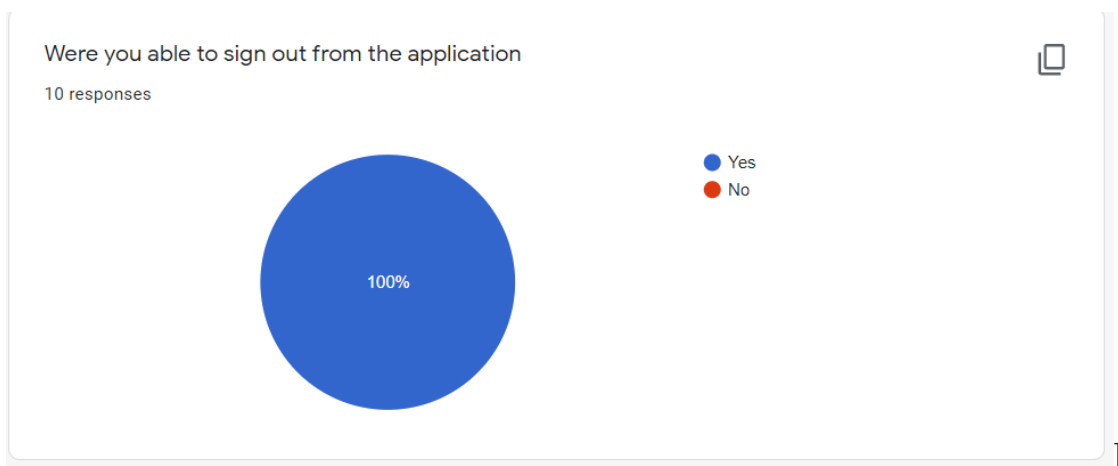


Figure 6.17: Feedback Form Question 10 response

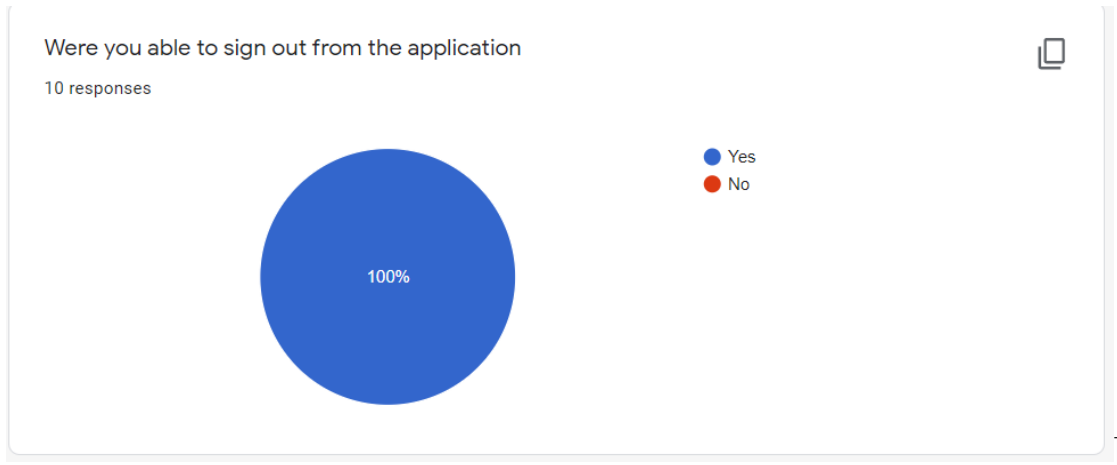


Figure 6.18: Feedback Form Question 11 response

6.5.2 Feedback Result

After evaluating the data from the feedback it can be seen that all other test cases were successful except the loading time of the website. The reason for that issue is as we are hosting on heroko the servers that were only available on this cloud based platform were only from US and because of the long distance between server it takes more time for the data to be accessed from this website. This problem can be easily solved by hosting our own domain.

Chapter 7

Conclusion

With the advancement of technology and internet all the businesses are moving towards an online buy and sell system where they can easily attract a large community online instead of being restricted to their local area or province but just building a product on website is not sufficient for it to be successful. All the community that will interact with the system should be kept in mind because if the all the users are not satisfied the website will cease to function. In our website we tried to not only make a feasible online shopping system where the user can order and buy items online but we also catered the visually impaired community that cannot buy items in the current websites which are fully blended with items and images.

7.1 Recommendations

Our system targeted the visually impaired community and although the color blind and low vision community will be satisfied with out application the functionality we provided to the blind people is still not sufficient for them to buy the products with ease because there are many accessibility gaps between the blind person and our application. A system that enables the blind community to interact

with an ecommerce application as a normal user needs to be created and we are working on such system in the coming future by updating the system and improving the accessibility aspect of our web application and we will also work on the implementation and scalability of our application across different platforms because at current time it is only limited to the laptop and pc users.

7.2 Learning Outcomes

The main reason we decided to design and develop this application was because we needed to learn the technologies that are being used currently in the market instead of just choosing a project that has no learning curve in the current market and will not help us to learn the skills that are required. After completing this project we learned new frameworks that are used widely these days especially in Pakistan market and this project will definitely prove as a valuable learning based asset in our future real world job experience.

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