A report on capstone project

Of

Shop for Home

Submitted By

Thara T

Gowsiga K

Swarnamala Gandra

Sanjana Kanavi

Suraksha Shetty

Shubham Acharekar

Of batch – Java_GCP_IP_C3 – **Group 10**

Under the guidance of

Mr. Parth Shukla

Abstract

E-commerce brings convenience for customers as they do not have to leave home and only need to browse website online, especially for buying the products which are not sold in nearby shops. It could help customers buy wider range of products and save customers' time. The Shop for Home is an E-Commerce Web Application which is used to shop required products like home décor stuffs, idols, furniture, tables etc. This project is developed to make order of required products through online without direct interaction of the customer to the seller. The project is developed by using the technologies like Angular, spring boot and PostgreSQL. The front is developed by using Angular, the backend is developed by using spring boot and PostgreSQL is the database which is used for data storing. . In this project, we can add different products and can delete them also. We have developed administrative functions for the website such as create a product, create categories, Admin dashboard, Manage products, and Manage categories. For customers, they can quickly add their items to the cart. Based on the items in the cart then the bill gets generate.

Table of Contents

Introduction

We all know that technology has become an essential tool for online marketing these days. If we see all over the world most of the people are showing interest to buy things in online. However, we can see that there are many small shops and grocery stores are selling their things offline. With this type of selling most of us will face bad experience. For instance, in some shops seller has the product to sell in the offer but the buyer may not know about it, or the customer may need the product urgently then he will go to the shop, but the product is out of stock, in that case, he will face bad experience. Moreover, in online shopping customers can select a wide range of products based upon their interests and their price also, one can compare prices also from one store to another by using online shopping.

By encountering the all problems and weaknesses of the offline shopping system, creating an Ecommerce web application is necessary for searching and shopping in each shop. These days we have seen so many e-commerce websites are created like Flipkart, Amazon, Myntra one can easily buy their necessary products by using these websites. By using these types of websites one can buy their products by staying in their home. Eventually, we can see the difference between the prices of products also as if we see the cost of the product will be slightly high in offline shopping when compared to online shopping.

For creating these types of E-commerce web applications, Java, spring boot, Angular will be the best option that can help us for creating the most effective and powerful web applications.

Problem Statement

ShopForHome is a popular Store in the market for shopping the home décor stuff. Due to Covid 19 all the offline shopping stopped. So, the store wants to move to the cloud platforms and wants their own web application.

There are 2 users on the application: -

1. User

2. Admin

User Stories:

1. As a user I should be able to login, Logout and Register into the application.

2. As a user I should be able to see the products in different categories.

3. As a user I should be able to sort the products.

4. As a user I should be able to add the products into the shopping cart.

5. As a user I should be able to increase or decrease the quantity added in the cart.

6. As a user I should be able to add “n” number of products in the cart.

7. As a user I should be able to get the Wish list option where I can add those products which I want but don’t want to order now.

8. As a user I should get different discount coupons.

Admin Stories:

1. As an Admin I should be able to login, Logout and Register into the application.

2. As an Admin I should be able to perform CRUD on Users.

3. As an Admin I should be able to Perform CRUD on the products.

4. As an Admin I should be able to get bulk upload option to upload a csv for products details

5. As an Admin I should be able to get the stocks.

6. As an Admin I should be able to mail if any stock is less than 10.

7. As an Admin I should be able to get the sales report of a specific duration.

8. As an Admin I should be able to set the discount coupons for the specific set of users

Technologies Used

Backend

Java:

Java is a **programming language** and a **platform**. Java is a high level, robust, object-oriented and secure programming language.

Java was developed by *Sun Microsystems* (which is now the subsidiary of Oracle) in the year 1995. *James Gosling* is known as the father of Java. Before Java, its name was *Oak*. Since Oak was already a registered company, so James Gosling and his team changed the name from Oak to Java.

Platform: Any hardware or software environment in which a program runs, is known as a platform. Since Java has a runtime environment (JRE) and API, it is called a platform.

According to Sun, 3 billion devices run Java. There are many devices where Java is currently used. Some of them are as follows:

1. Desktop Applications such as acrobat reader, media player, antivirus, etc.
2. Web Applications such as irctc.co.in, javatpoint.com, etc.
3. Enterprise Applications such as banking applications.
4. Mobile
5. Embedded System, etc.

Spring Boot:

Java Spring Boot (Spring Boot) is a tool that makes developing web application and micro services with Spring Framework faster and easier through three core capabilities:

1. Auto configuration

2. An opinionated approach to configuration

3. The ability to create standalone applications

These features work together to provide you with a tool that allows you to set up a Spring-based application with minimal configuration and setup. Spring is widely used for creating scalable applications. For web applications Spring provides Spring MVC which is a widely used module of spring which is used to create scalable web applications. But main disadvantage of spring projects is that configuration is really time-consume and can be a bit overwhelming for the new developers. Making the application production-ready takes some time if you are new to the spring. Solution to this is Spring Boot. Spring Boot is built on the top of the spring and contains all the features of spring. And is becoming favorite of developer's these days because of it's a rapid production-ready environment which enables the developers to directly focus on the logic instead of struggling with the configuration and set up. Spring Boot is a micro service-based framework and making a production-ready application in it takes very less time. Prerequisite for Spring Boot is the basic knowledge Spring framework.

Spring Security:

Spring Security is a framework which provides various security features like: authentication, authorization to create secure Java Enterprise Applications.

It is a sub-project of spring framework which was started in 2003 by Ben Alex. Later on, in 2004, it was released under the Apache License as Spring Security 2.0.0.

It overcomes all the problems that come during creating non spring security applications and manage new server environment for the application.

This framework targets two major areas of application are authentication and authorization. Authentication is the process of knowing and identifying the user that wants to access.

Spring Security framework supports wide range of authentication models. These models either provided by third parties or framework itself. Spring Security supports integration with all of these technologies.

- HTTP BASIC authentication headers
- HTTP Digest authentication headers
- HTTP X.509 client certificate exchange
- LDAP (Lightweight Directory Access Protocol)
- Form-based authentication

JWT Authentication:

JSON Web Token or JWT, as it is more commonly called, is an open Internet standard (RFC 7519) for securely transmitting trusted information between parties in a compact way. The tokens contain claims that are encoded as a JSON object and are digitally signed using a private secret or a public key/private key pair. They are self-contained and verifiable as they are digitally signed. JWT's can be signed and/or encrypted. The signed tokens verify the integrity of the claims contained in the token, while the encrypted ones hide the claims from other parties.

JWT's can also be used for the exchange of information though they more commonly used for authorization as they offer a lot of advantages over session management using in-memory random tokens. The biggest of them being the enabling the delegation of authentication logic to a third-party server like **AuthO** etc.

A JWT token is divided into 3 parts namely – header, payload, and signature in the format of

[Header].[Payload].[Signature]

Spring Data JPA:

Spring Data JPA API provides JpaTemplate class to integrate spring application with JPA.

JPA (Java Persistent API) is the sun specification for persisting objects in the enterprise application. It is currently used as the replacement for complex entity beans.

The implementation of JPA specification are provided by many vendors such as:

- Hibernate
- Toplink
- iBatis
- OpenJPA etc.

Hibernate:

Hibernate is a Java framework that simplifies the development of Java application to interact with the database. It is an open source, lightweight, ORM (Object Relational Mapping) tool. Hibernate implements the specifications of JPA (Java Persistence API) for data persistence.

An ORM tool simplifies the data creation, data manipulation and data access. It is a programming technique that maps the object to the data stored in the database.

PostgreSQL:

PostgreSQL (pronounced as **post-gress-Q-L**) is an open source relational database management system (DBMS) developed by a worldwide team of volunteers. PostgreSQL is not controlled by any corporation or other private entity and the source code is available free of charge.

PostgreSQL runs on all major operating systems, including Linux, UNIX (AIX, BSD, HP-UX, SGI IRIX, Mac OS X, Solaris, Tru64), and Windows. It supports text, images, sounds, and video, and includes programming interfaces for C / C++, Java, Perl, Python, Ruby, Tcl and Open Database Connectivity (ODBC).

PostgreSQL supports a large part of the SQL standard and offers many modern features including the following −

- Complex SQL queries
- SQL Sub-selects
- Foreign keys
- Trigger
- Views
- Transactions

PostgreSQL supports four standard procedural languages, which allows the users to write their own code in any of the languages and it can be executed by PostgreSQL database server.

Maven:

Maven is a project management and comprehension tool that provides developers a complete build lifecycle framework. Development team can automate the project's build infrastructure in almost no time as Maven uses a standard directory layout and a default build lifecycle.

In case of multiple development teams environment, Maven can set-up the way to work as per standards in a very short time. As most of the project setups are simple and reusable, Maven makes life of developer easy while creating reports, checks, build and testing automation setups.

Maven provides developers ways to manage the following −

- Builds
- Documentation
- Reporting
- Dependencies
- SCMs

Maven project structure and contents are declared in an xml file, pom.xml, referred as Project Object Model (POM), which is the fundamental unit of the entire Maven system.

Frontend:

Angular:

Angular is a platform and framework for building single-page client applications using HTML and TypeScript. Angular is written in TypeScript. It implements core and optional functionality as a set of TypeScript libraries that you import into your applications. The architecture of an Angular application relies on certain fundamental concepts. The basic building blocks of the Angular framework are Angular components that are organized into NgModules. NgModules collect related code into functional sets; an Angular application is defined by a set of NgModules. An application always has at least a root module that enables bootstrapping, and typically has many more feature modules.

● Components define views, which are sets of screen elements that Angular can choose among and modify according to your program logic and data

● Components use services, which provide specific functionality not directly related to views. Service providers can be injected into components as dependencies, making your code modular, reusable, and efficient. Modules, components and services are classes that use decorators. These decorators mark their type and provide metadata that tells Angular how to use them.

● The metadata for a component class associates it with a template that defines a view. A template combines ordinary HTML with Angular directives and binding markup that allow Angular to modify the HTML before rendering it for display.

● The metadata for a service class provides the information Angular needs to make it available to components through dependency injection (DI). An application's components typically define many views, arranged hierarchically. Angular provides the Router service to help you define navigation paths among views. The router provides sophisticated in-browser navigational capabilities

Angular CLI:

The Angular CLI is a command-line interface tool that you use to initialize, develop, scaffold, and maintain Angular applications directly from a command shell.

Angular CLI makes it easy to start with any angular project. Angular CLI comes with commands that help us create and start on our project very fast. Let us now go through the commands available to create a project, a component and services, change the port, etc.

Bootstrap:

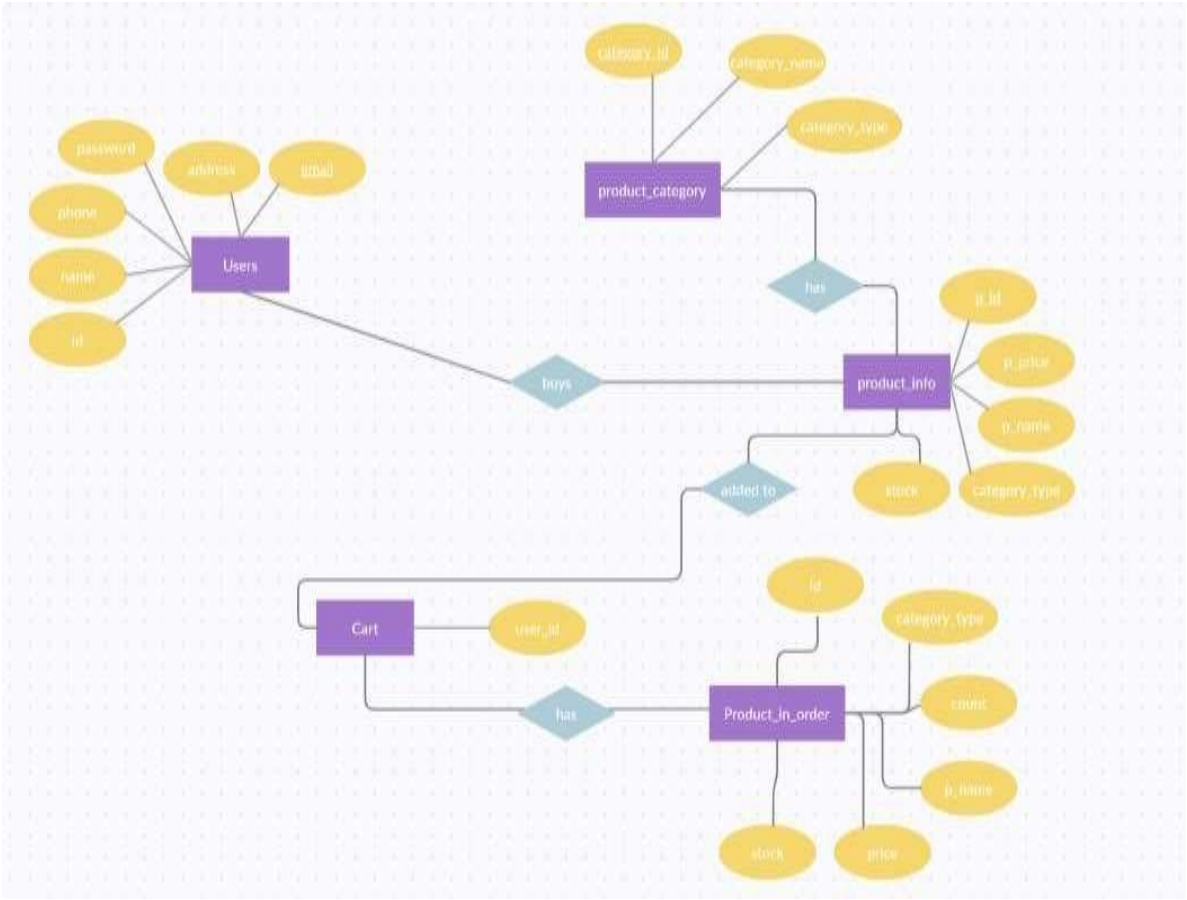
Bootstrap is a free and open-source tool collection for creating responsive websites and web applications. It is the most popular HTML, CSS, and JavaScript framework for developing responsive, mobile-first websites. Nowadays, the websites are perfect for all the browsers (IE, Firefox, and Chrome) and for all sizes of screens (Desktop, Tablets, Phablets, and Phones). All thanks to Bootstrap developers – Mark Otto and Jacob Thornton of Twitter, though it was later declared to be an open-source project.

Why we use Bootstrap?

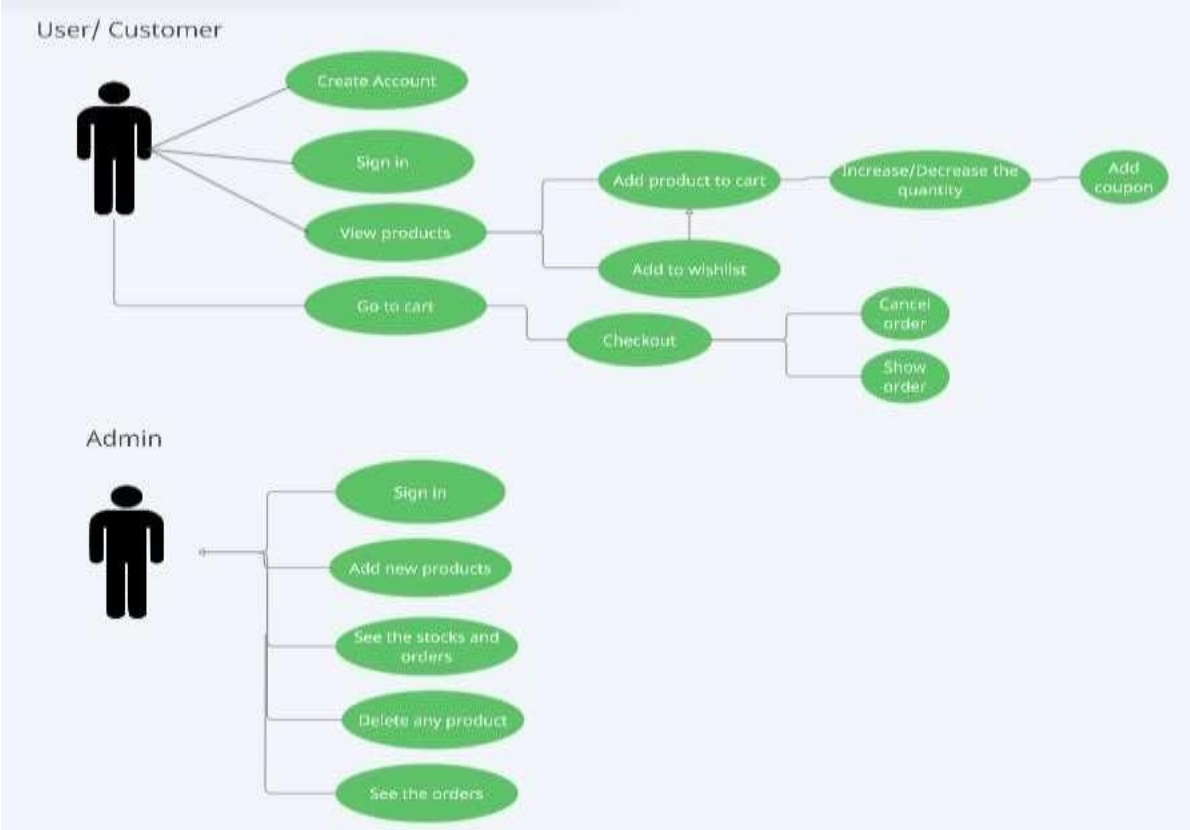
- It is Faster and Easier way for Web-Development.
- It creates Platform-independent web-pages.
- It creates Responsive Web-pages.
- It designs the responsive web pages for mobile devices too.
- It is Free and open-source framework available on www.getbootstrap.com

Design

Entity Relationship Diagram:



Use Case Diagram:



Installation Steps

Database Schema

Install PostgreSQL -> after installation -> search PGAdmin

Open Admin -> give password which you provide at the time of installation.

Create Database with name "shopforhome_db".

Start the backend server before the frontend client.

Backend

1. Install [PostgreSQL](https://www.postgresql.org/download/)
2. Configure datasource in `application.yml`.(Change database name, post number and password)
3. `cd backend`.
4. Run `mvn install`.
5. Run `mvn spring-boot:run`.
6. Spring Boot will import mock data into database by executing `import.sql` automatically.
7. The backend server is running on [localhost:8080]().

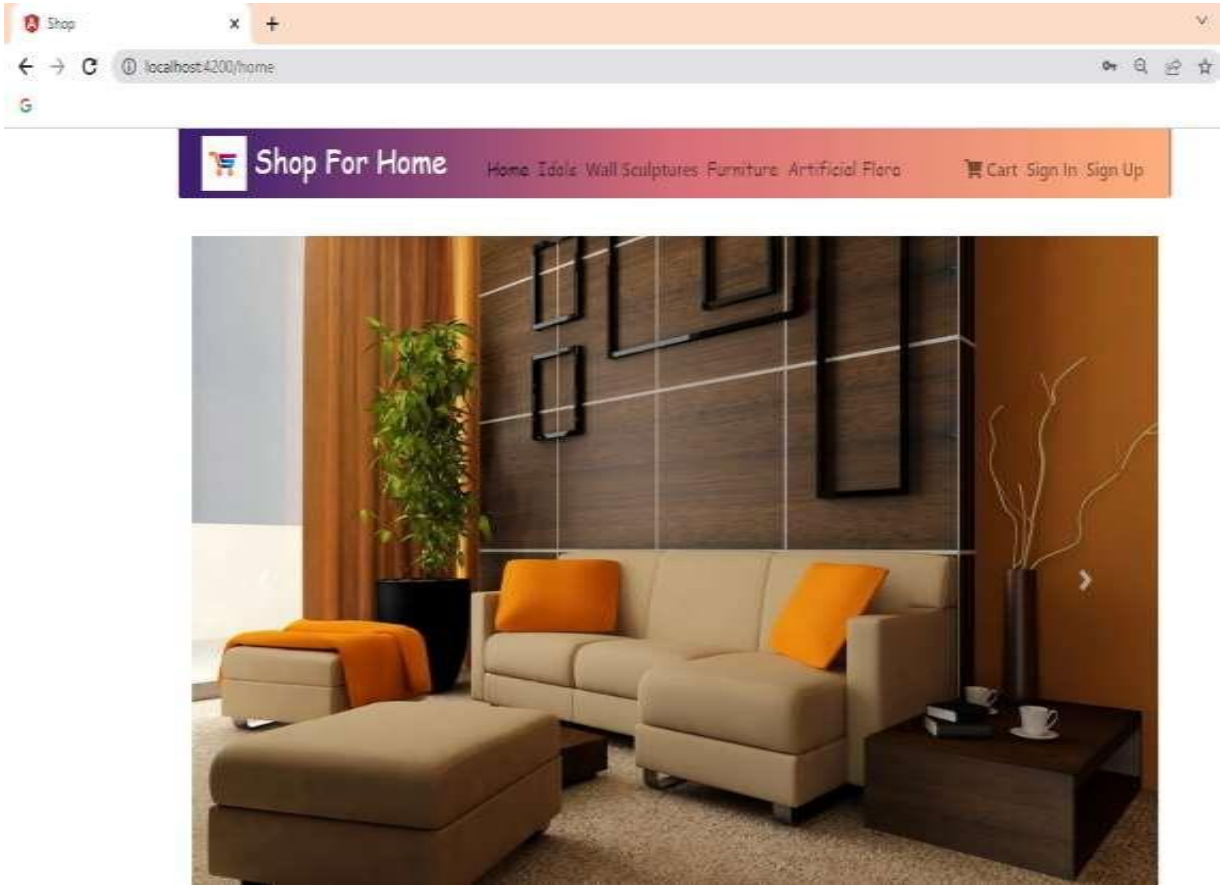
Frontend

1. Install [Node.js and npm](https://www.npmjs.com/get-npm)
2. `cd frontend`.
3. Run `npm install`.
4. Run `ng serve`
5. The frontend client is running on [localhost:4200]().

Implementation

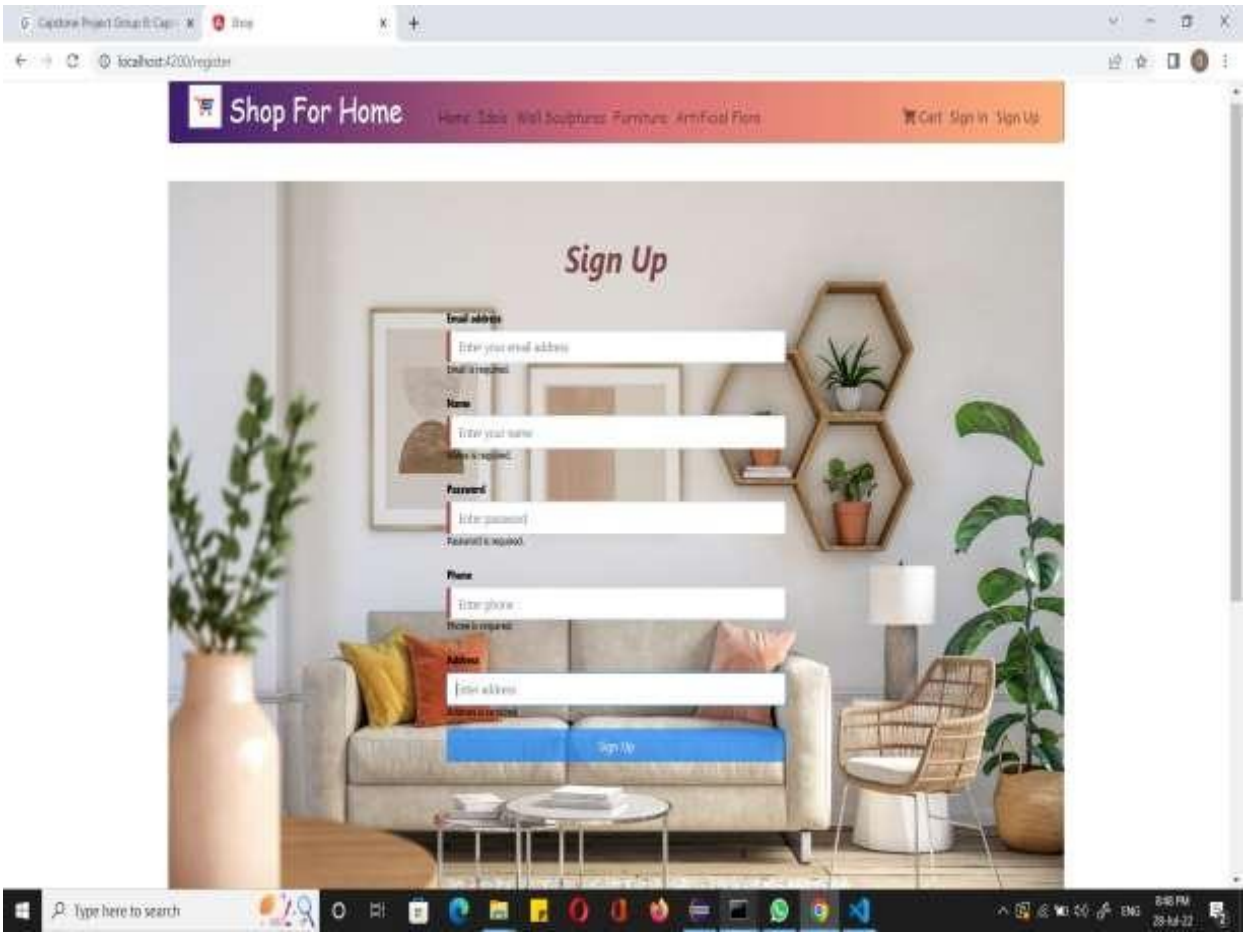
1. Home Page:

The home page of the web Application mainly contains a list of the products which are saved in the database. And there some options that will be in the menu bar if the user does not sign in/login in yet then "Sign in" and "Sign up" options will be there.



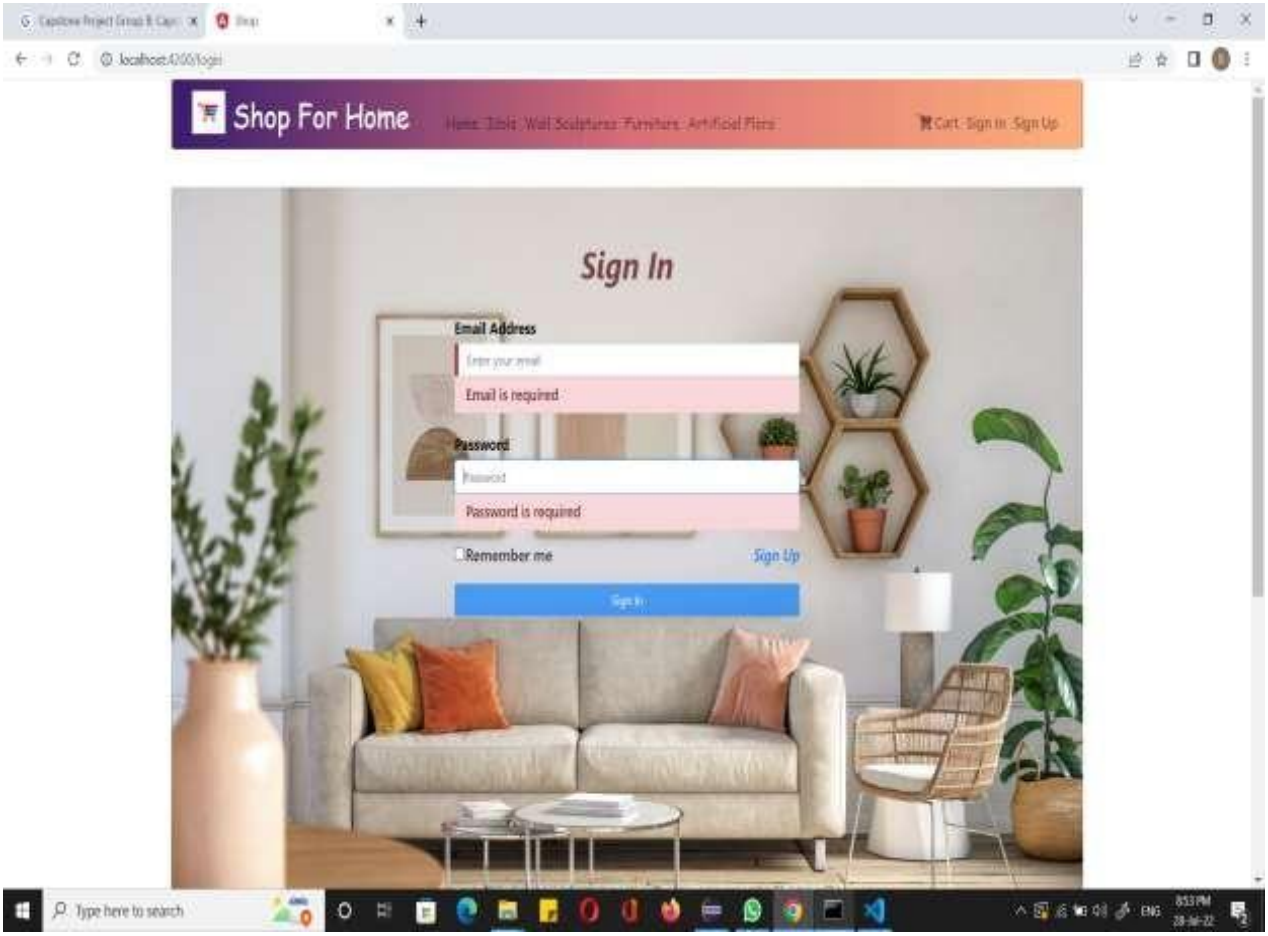
2. Sign Up Page:

If the user does not have an account he can create an account by providing his/her credentials. The account created will be a user account.



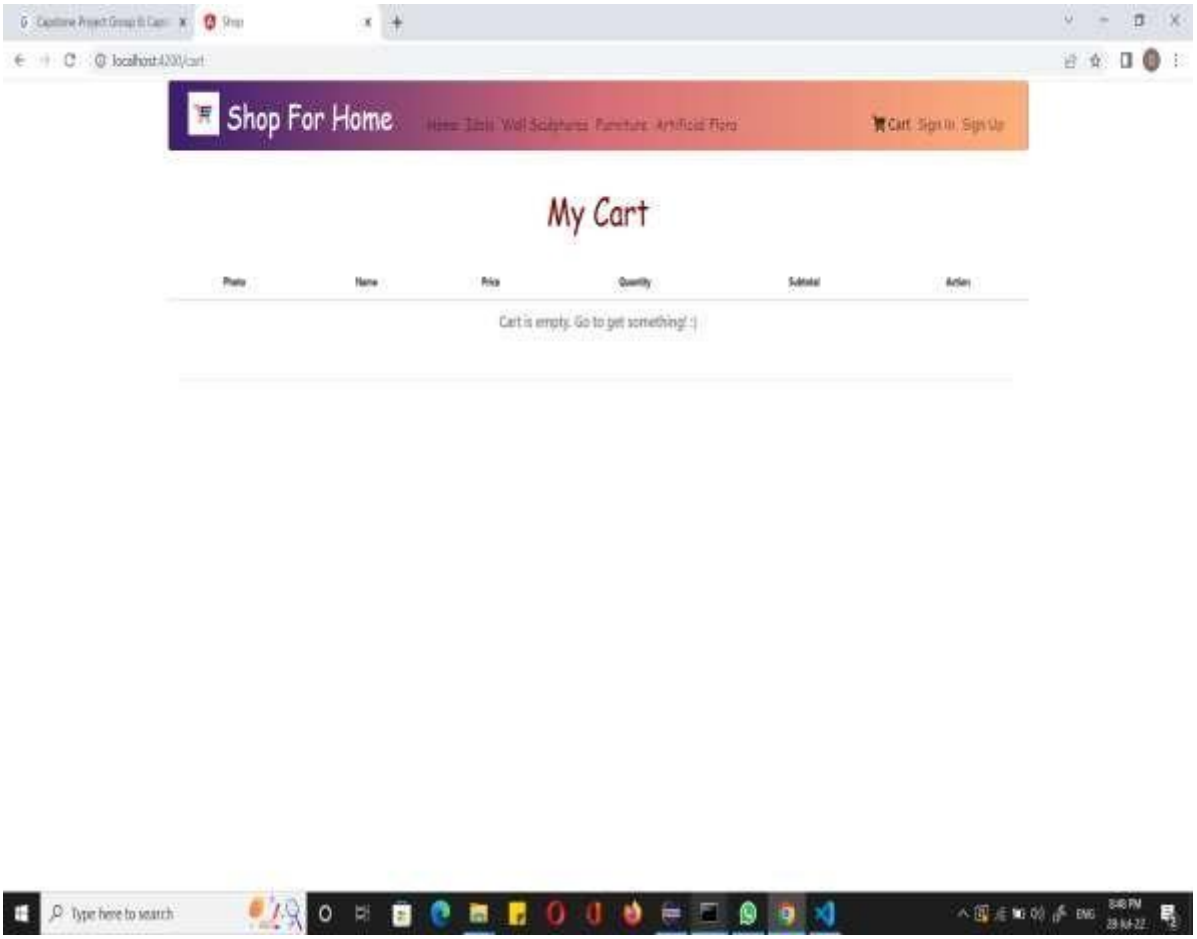
3. Sign In Page:

Here a user can login into his account. If the user have Admin privileges, he will login in to Admin Panel else, he will be login into User Panel.



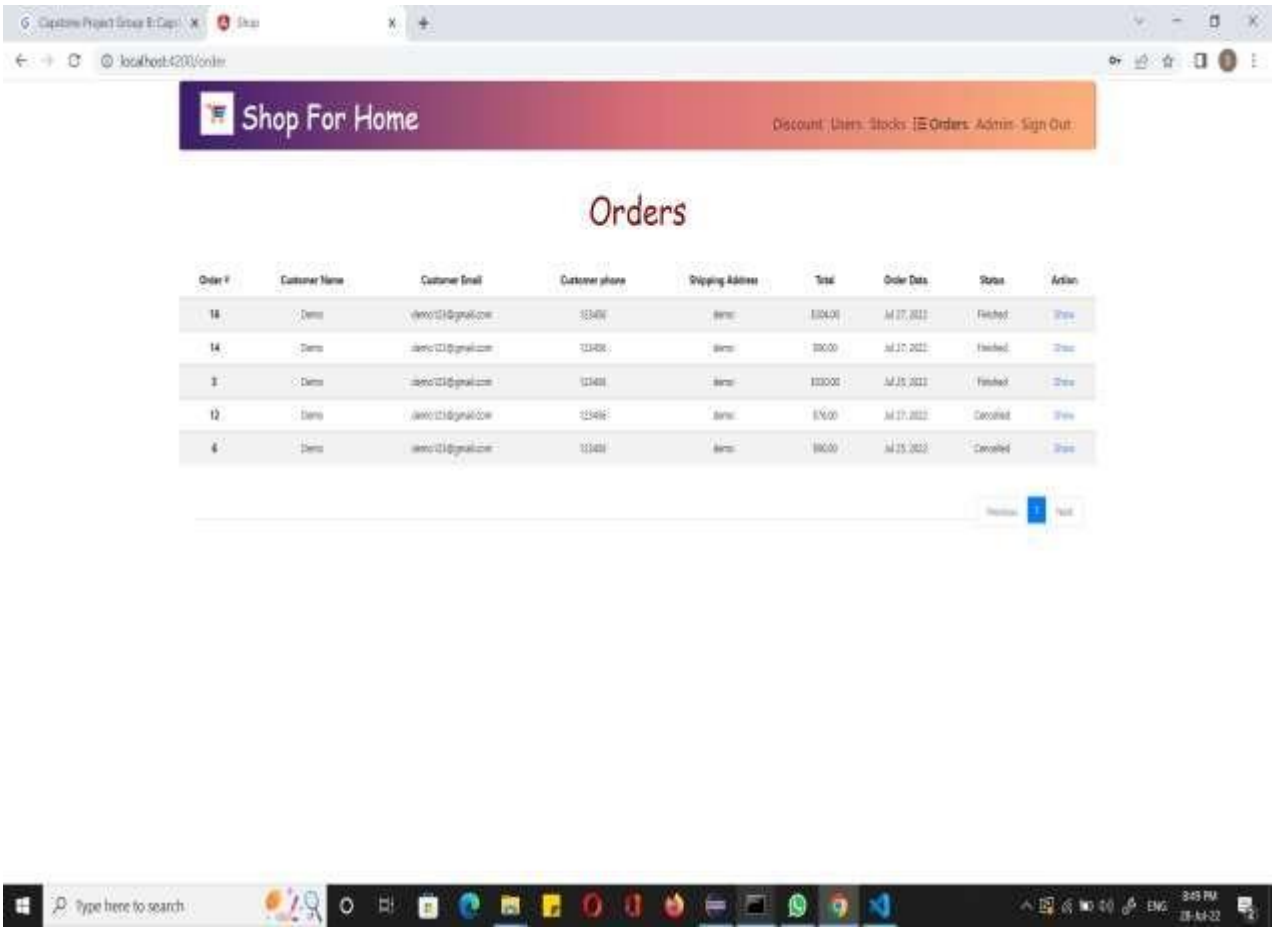
4. Cart Option:

Here User can add the products in Cart As shown in figure below:



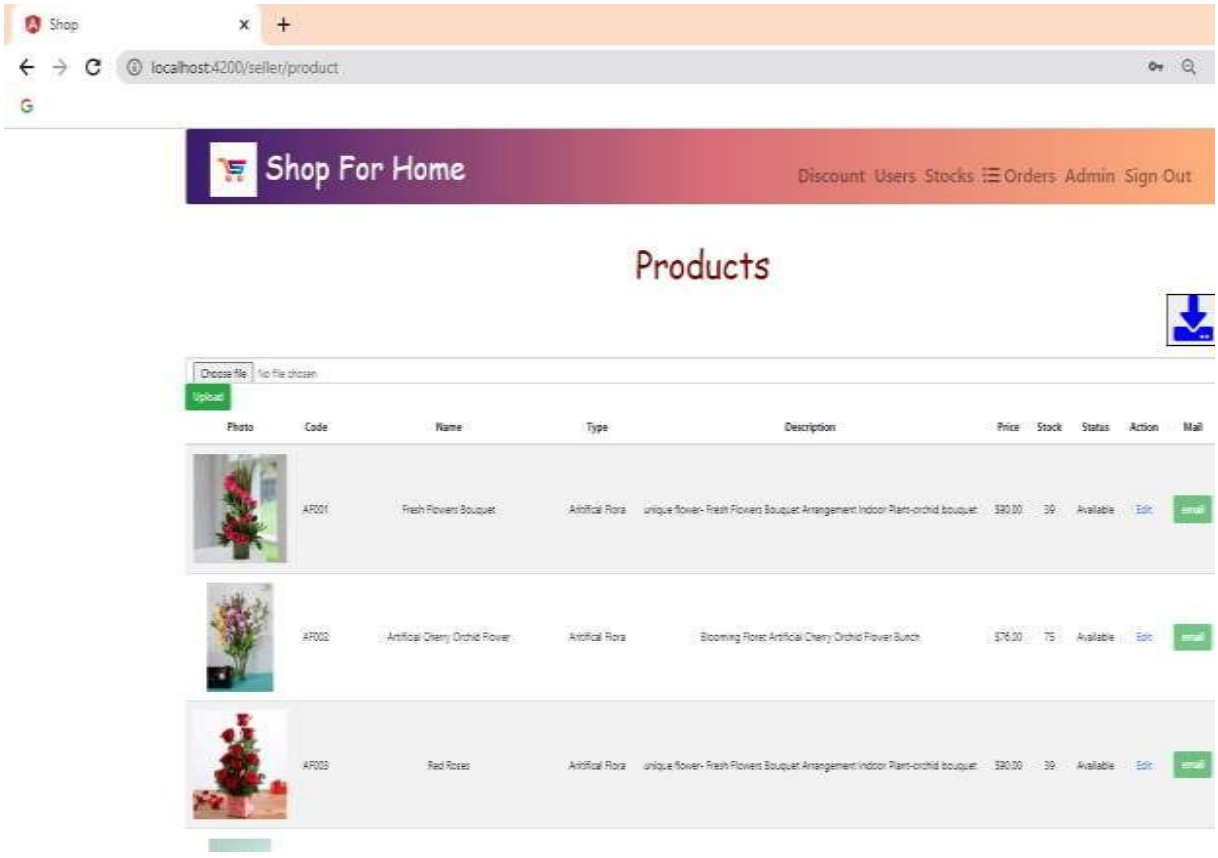
5. **Orders:**

This option is available to admin, where he can see all the orders and take actions on it.



6. Products:

This is option available to Admin, from where he can upload product and manage them. Also, he can download products report by clicking download button.



Conclusion

Web application made using described technologies is efficient and reliable in solving the problems faced by people during this pandemic time. Also, it adds many functionalities to make it easier for both customers and sellers. And this web application can be proved to be useful in future time.