G-Mart

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***Abstract*—G-Mart provides user-friendly interface for people who want to buy groceries online and get them delivered home. On an everyday basis, people have to use a grocery shop to get their livelihood items. To buy the necessary products, people visit a grocery shop to collect the products from different shelves and then pay for the items and checkout. But many times this process does not seem very convenient. In their busy schedule they always forget to make time for grocery shopping.**

I. Introduction

This G-Mart web application can be used both through phone or desktop and makes ordering of groceries a much more easier process. In this web application, user need to login into the application in order to buy and get the items delivered. Users can add the items into the cart and finally check out when ready. Users will also have an option to add items to the cart and come back later to buy them. All these functionalities would be handled backend in the database where it will consist of different tables and different schemas. We are going to make all the functionalities easier by using different kinds of queries and using those queries to hit the database and get the output data. The database is going to play a vital role in this web application as it makes it possible for end users to create, protect, read, update and delete data in a database. This system can make people life very easy, safe and time-saving especially in the e-commerce demanding period after a crisis such as COVID-19.

This application offers a platform for consumers or potential customers of the grocery store or shop to order the goods they want online. This project's main goal is to enable customers to purchase their food without visiting a shop or store. All products with stock will be listed by the system, and customers may add the items they want to their shopping cart and then check out when they're done. The system is user-friendly and offers a straightforward user interface.

The G-Mart has been developed to override the problems prevailing in the practicing manual system. This software is supported to eliminate and in some cases reduce the hardships faced by this existing system. Moreover this system is designed for the particular need of the company to carry out operations in a smooth and effective manner. This application is reduced as much as possible to avoid errors while shopping. It also provides error messages if something goes wrong which explains that there is error handling happening as well. Thus, this G-Mart application can lead to error free, secure, reliable and fast management system.

II. Database Design

Database design is the organization of data according to a database model. The designer determines what data must be stored and how the data elements interrelate. With this information, they can begin to fit the data to the database model.

A. Schema of our system

This schema explains the tables created in the database. Refer to Fig 1.

- admin_list: In this, a table is created with attributes such as admin_id, fullname, username, password, status, date_created. Here, the primary key being used is admin_id.
- order_items: In this, a table is created with attributes such as order_id, fullname, inventory_id, product_id, quantity, date_created. In this table, the foreign keys which we are using are order_id, inventory_id, product_id and these are from the tables order_list, inventory_list and product_list respectively.
- order_list: In this, a table is created with attributes such as order_id, customer_id, transaction_code, fee_id, delivery_address, total_amount, status, date_created. Here, the primary key being used is order_id. In this table, the foreign keys which are using are fee_id, customer_id and these are from the tables fees_list, customer_list respectively.
- cart_list: In this, a table is created with attributes such as customer_id, product_id, quantity, date_created. In this table, the foreign keys which we are using are customer_id, product_id and these are from the tables customer_list, product_list respectively and both has a delete cascade operation performed on them.
- category_list: In this, a table is created with attributes such as category_id, name, status,

date_created. Here, the primary key which is been used is category_id.

- customer_list: In this, a table is created with attributes such as customer_id, fullname, username, password, email, contact, address, status, date_created, date_updated. Here, the primary key which is being used is customer_id.
- fees_list: In this, a table is created with attributes such as fee_id, location, amount, status, date_created. Here, the primary key which is been used is fee_id.
- inventory_list: In this, a table is created with attributes such as inventory_id, product_id, quantity, date_created. Here, the primary key which is been used is inventory_id. In this table, the foreign key which we are using is product_id this is from the table product_list and it also has a delete cascade operation performed on it.
- product_list: In this, a table is created with attributes such as product_id, category_id, name, description, price, status, date_created, date_updated. Here, the primary key which is been used is product_id. In this table, the foreign key which we are using is category_id this is from the table category_list and it also has a delete cascade operation performed on it.

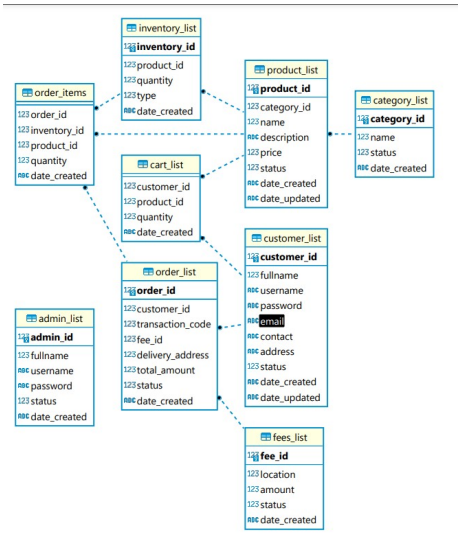

Fig. 1. Schema Diagram for our database.

B. Tables/Relations

There are 9 tables used in the database for the project G-Mart. These tables hold all the data related to the groceries/ items, customer and admin details as well. Refer to the figures 2 to 9.

Column Name	#	Data Type	Length	Not Null	Auto Increment	Default
admin_id	1	INTEGER		[v]	[v]	
fullname	2	INTEGER		[v]	[ ]	
username	3	TEXT		[v]	[ ]	
password	4	TEXT		[v]	[ ]	
status	5	INTEGER		[v]	[ ]	1
date_created	6	TIMESTAMP		[ ]	[ ]	CURRENT_TIMESTAMP

Fig. 2. Admin list table

Column Name	#	Data Type	Length	Not Null	Auto Increment	Default
admin_id	1	INTEGER		[v]	[v]	
fullname	2	INTEGER		[v]	[ ]	
username	3	TEXT		[v]	[ ]	
password	4	TEXT		[v]	[ ]	
status	5	INTEGER		[v]	[ ]	1
date_created	6	TIMESTAMP		[ ]	[ ]	CURRENT_TIMESTAMP

Fig. 3. Cart list table

Column Name	#	Data Type	Length	Not Null	Auto Increment	Default
category_id	1	INTEGER		[v]	[v]	
name	2	INTEGER		[v]	[ ]	
status	3	INTEGER		[v]	[ ]	1
date_created	4	TIMESTAMP		[ ]	[ ]	CURRENT_TIMESTAMP

Fig. 4. Category list table

Column Name	#	Data Type	Length	Not Null	Auto Increment	Default
customer_id	1	INTEGER		[v]	[v]	
fullname	2	INTEGER		[v]	[ ]	
username	3	TEXT		[v]	[ ]	
password	4	TEXT		[v]	[ ]	
email	5	TEXT		[v]	[ ]	
contact	6	TEXT		[v]	[ ]	
address	7	TEXT		[v]	[ ]	
status	8	INTEGER		[v]	[ ]	1
date_created	9	TIMESTAMP		[ ]	[ ]	CURRENT_TIMESTAMP
date_updated	10	TIMESTAMP		[ ]	[ ]	CURRENT_TIMESTAMP

Fig. 5. Customer list table

Column Name	#	Data Type	Length	Not Null	Auto Increment	Default
fee_id	1	INTEGER		[v]	[v]	
location	2	INTEGER		[v]	[ ]	
amount	3	REAL		[v]	[ ]	
status	4	INTEGER		[v]	[ ]	1
date_created	5	TIMESTAMP		[ ]	[ ]	CURRENT_TIMESTAMP

Fig. 6. Fees list table

Column Name	#	Data Type	Length	Not Null	Auto Increment	Default
inventory_id	1	INTEGER		[v]	[v]	
product_id	2	INTEGER		[v]	[ ]	
quantity	3	INTEGER		[v]	[ ]	
type	4	INTEGER		[v]	[ ]	1
date_created	5	TIMESTAMP		[ ]	[ ]	CURRENT_TIMESTAMP

Fig. 7. Inventory list table

Column Name	#	Data Type	Length	Not Null	Auto Increment	Default
order_id	1	INTEGER		[v]	[ ]	
inventory_id	2	INTEGER		[v]	[ ]	
product_id	3	INTEGER		[v]	[ ]	
quantity	4	REAL		[v]	[ ]	
date_created	5	TIMESTAMP		[ ]	[ ]	CURRENT_TIMESTAMP

Fig. 8. Order items list table

Column Name	#	Data Type	Length	Not Null	Auto Increment	Default
order_id	1	INTEGER		[v]	[v]	
customer_id	2	INTEGER		[v]	[ ]	
transaction_code	3	INTEGER		[v]	[ ]	
fee_id	4	INTEGER		[v]	[ ]	
delivery_address	5	INTEGER		[v]	[ ]	
total_amount	6	REAL		[v]	[ ]	
status	7	INTEGER		[v]	[ ]	0
date_created	8	TIMESTAMP		[ ]	[ ]	CURRENT_TIMESTAMP

Fig. 9. Order list table

Column Name	#	Data Type	Length	Not Null	Auto Increment	Default
product_id	1	INTEGER		[v]	[v]	
category_id	2	INTEGER		[v]	[ ]	
name	3	INTEGER		[v]	[ ]	
description	4	TEXT		[v]	[ ]	
price	5	REAL		[v]	[ ]	
status	6	INTEGER		[v]	[ ]	1
date_created	7	TIMESTAMP		[ ]	[ ]	CURRENT_TIMESTAMP
date_updated	8	TIMESTAMP		[ ]	[ ]	CURRENT_TIMESTAMP

Fig. 10. Product list table

III. Design Programming Tools

A. XAMPP

XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache

Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP. It's an open source package that is widely used for PHP development. XAMPP contains MariaDB, PHP, and Perl; it provides a graphical interface for SQL (phpMyAdmin), making it easy to maintain data in a relational database. XAMPP is regularly updated to the latest releases of Apache, MariaDB, PHP and Perl. It also comes with a number of other modules, including OpenSSL, phpMyAdmin, MediaWiki, Joomla, WordPress and more.

XAMPP is an abbreviation where **X** stands for Cross-Platform, **A** stands for Apache, **M** stands for MYSQL, and the **P**s stand for PHP and Perl, respectively. It is an open-source package of web solutions that includes Apache distribution for many servers and command-line executables along with modules such as Apache server, MariaDB, PHP, and Perl.

B. SQLite

SQLite is a database engine written in the C programming language. It is not a standalone app; rather, it is a library that software developers embed in their apps. As such, it belongs to the family of embedded databases. It is the most widely deployed database engine, as it is used by several of the top web browsers, operating systems, mobile phones, and other embedded systems. It's a software library that implements a self-contained, serverless, zero-configuration, transactional SQL database engine. SQLite is the most widely deployed SQL database engine in the world. The source code for SQLite is in the public domain. It's a C library that provides a lightweight disk-based database that doesn't require a separate server process and allows accessing the database using a nonstandard variant of the SQL query language. Some applications can use SQLite for internal data storage. It's also possible to prototype an application using SQLite and then port the code to a larger database such as PostgreSQL or Oracle.

C. Dbeaver

Dbeaver is a free, open source multiplatform database management tool and SQL client for developers and database administrators. DBeaver can be used to access any database or cloud application that has an ODBC or JDBC driver, such as Oracle, SQL Server, MySQL, Salesforce, or Mailchimp. It's a Free multi-platform database tool for developers, database administrators, analysts and all people who need to work with databases. Supports all popular databases: MySQL, PostgreSQL, SQLite, Oracle, DB2, SQL Server, Sybase, MS Access, Teradata, Firebird, Apache Hive, Phoenix, Presto, etc.

A brief list of basic features can be found below:

- Data viewer and editor: sorting, filtering, image displaying, export of selected data and much more.
- Metadata browser: possibility to view and edit existing tables, views, columns, indexes, procedures, triggers, storage entities (tablespaces, partitions, etc), security entities (users, roles, etc).
- Data transfer: export and import for files in various formats (CSV, HTML, XML, XLS, XLSX).
- ER diagrams: possibility to automatically generate ER diagrams for a database/schema (diagram will contain all schema tables) or for a single table and export the diagram in a suitable format.
- SQL editor: possibility to organize all your scripts in folders, reassign database connections for particular scripts.
- Data and metadata search: full-text data search using against all chosen tables/views.
- Database structure comparing: possibility to perform objects structure compare.

D. HyperText Markup Language or HTML

The **HyperText Markup Language or HTML** is the standard markup language for documents designed to be displayed in a web browser. Web browsers receive HTML documents from a web server or from local storage and render the documents into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document. Originally, it was developed with the intent of defining the structure of documents like headings, paragraphs, lists, and so forth to facilitate the sharing of scientific information between researchers. Now, HTML is being widely used to format web pages with the help of different tags available in HTML language. The advantages of HTML are as follows:-

- Create Web site - You can create a website or customize an existing web template if you know HTML well.
- Become a web designer - If you want to start a carrer as a professional web designer, HTML and CSS designing is a must skill.
- Understand web - If you want to optimize your website, to boost its speed and performance, it is good to know HTML to yield best results.
- Learn other languages - Once you understands the basic of HTML then other related technologies like javascript, php, or angular are become easier to understand.

E. Cascading Style Sheets (CSS)

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML or XML. Cascading Style Sheets (CSS) is a stylesheet language used to describe the presentation of a document written in HTML or XML (including XML dialects such as SVG, MathML or XHTML). CSS describes how elements should be rendered on screen, on paper, in speech, or on other media.

CSS is among the core languages of the open web and is standardized across Web browsers according to W3C specifications. Previously, the development of various parts of CSS specification was done synchronously, which allowed the versioning of the latest recommendations. You might have heard about CSS1, CSS2.1, or even CSS3. There will never be a CSS3 or a CSS4; rather, everything is now CSS without a version number.

After CSS 2.1, the scope of the specification increased significantly and the progress on different CSS modules started to differ so much, that it became more effective to develop and release recommendations separately per module. Instead of versioning the CSS specification, W3C now periodically takes a snapshot of the latest stable state of the CSS specification and individual modules progress. CSS modules now have version numbers, or levels, such as CSS Color Module Level 5.

F. PHP

PHP is a general-purpose scripting language geared toward web development.[5] It was originally created by Danish-Canadian programmer Rasmus Lerdorf in 1994. PHP code is usually processed on a web server by a PHP interpreter implemented as a module, a daemon or as a Common Gateway Interface (CGI) executable. PHP started out as a small open source project that evolved as more and more people found out how useful it was. Rasmus Lerdorf unleashed the first version of PHP way back in 1994.

Some of the key advantages of PHP are as follows:-

- PHP is a recursive acronym for "PHP: Hypertext Preprocessor".
- PHP is a server side scripting language that is embedded in HTML. It is used to manage dynamic content, databases, session tracking, even build entire e-commerce sites.
- It is integrated with a number of popular databases, including MySQL, PostgreSQL, Oracle, Sybase, Informix, and Microsoft SQL Server.
- PHP is pleasingly zippy in its execution, especially when compiled as an Apache module on the Unix side. The MySQL server, once started, executes even very complex queries with huge result sets in record-setting time.
- PHP supports a large number of major protocols such as POP3, IMAP, and LDAP. PHP4 added support for Java and distributed object architectures (COM and CORBA), making n-tier development a possibility for the first time.
- PHP is forgiving: PHP language tries to be as forgiving as possible.
- PHP Syntax is C-Like.

G. JavaScript

JavaScript is a lightweight, interpreted programming language. It is designed for creating network-centric applications. It is complimentary to and integrated with Java. JavaScript is very easy to implement because it is integrated with HTML. It is open and cross-platform.

The key advantages of JS are listed down as follows:-

- Javascript is the most popular programming language in the world and that makes it a programmer's great choice. Once you learnt Javascript, it helps you developing great front-end as well as back-end softwares using different Javascript based frameworks like jQuery, Node.JS etc.
- Javascript is everywhere, it comes installed on every modern web browser and so to learn Javascript you really do not need any special environment setup. For example Chrome, Mozilla Firefox , Safari and every browser you know as of today, supports Javascript.
- Javascript helps you create really beautiful and crazy fast websites. You can develop your website with a console like look and feel and give your users the best Graphical User Experience.
- JavaScript usage has now extended to mobile app development, desktop app development, and game development. This opens many opportunities for you as Javascript Programmer.
- Due to high demand, there is tons of job growth and high pay for those who know JavaScript. You can navigate over to different job sites to see what having JavaScript skills looks like in the job market.
- Great thing about Javascript is that you will find tons of frameworks and Libraries already developed which can be used directly in your software development to reduce your time to market.

IV. Implementation and Discussion

The Admin and Customer modules make up the two sections of this web application. G-Mart can handle all of their products, stocks, and customer orders using the Admin Module on the system side. Customers and visitors can browse, explore, add things to their carts, and place orders on the Customer Module side of the website. The system will automatically add a delivery fee to the total that the consumer must pay at delivery when they check out. This approach produces a sales report that can be printed.

A. Admin Module Features

- Secure Login
- Home Page
- Manage Category List
- Manage Product List
- Regulate Order List
- Regulate Customer List
- Manage Users List
- Regulate Account Credentials
- Logout

B. Customer Module Features

- Secure Login and Registration
- List Search Products
- Filter Product
- Add Product to Shopping Cart
- Checkout
- List all Orders View orders
- Manage Account Credentials
- Logout

The above mentioned modules and their features are explicitly discussed below.

1) Admin - Secure Login: This is a module (Fig. 11) where admin will be able to login into the system by entering username and password. If the credentials entered are correct, it will login successfully and will take the person to the home page. Else, it will display an error saying username or password are incorrect.

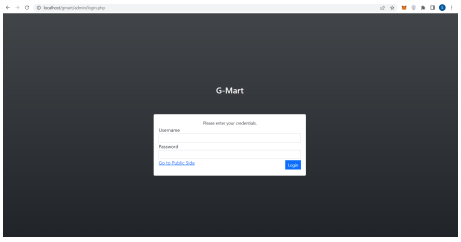

Fig. 11. Login Page of Admin side G-Mart

2) Admin - Home Page: This is a page (Fig. 12) where admin will be able to see the counts of total number of products, orders which are in pending status, delivered status and cancelled status. He can also redirect to pages where the person can manage categories, products, orders and many more.

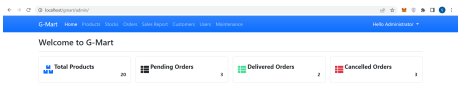

Fig. 12. Home Page of Admin side G-Mart

3) Admin - Manage Category List: In this module (Fig. 13), admin will be able to manage the category list of the application. Here, admin will be able to add a new category and also will be able to edit or delete the category which is already available in the list. While adding a new category, two fields will be displayed. One is the name of the new category and second is to choose the status of the category whether it will be active or inactive.

4) Admin - Manage Product List: In this module (Fig. 14), admin will be able to manage the product list of the application. Here, admin will be able to add a new product

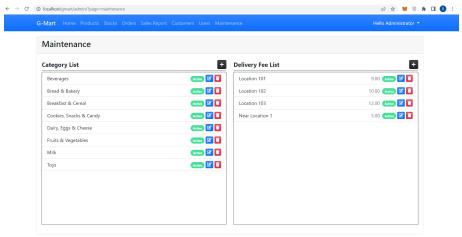

Fig. 13. Category Page of Admin side G-Mart

and also will be able to edit or delete the product which is already available in the list. While adding a new product, it will be asking the name of the new product,description, it's category, price and the image of the product.

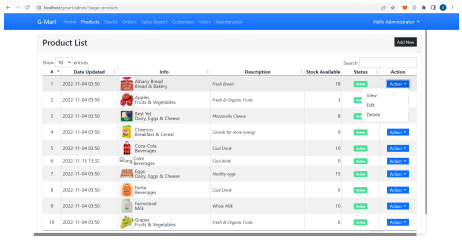

Fig. 14. Products Page of Admin side G-Mart

5) Admin - Regulate Order List: In this module (Fig. 15), admin will be able to regulate the order list of the application. Here, admin will be able to edit and delete the order record. In the edit option, admin will able to update the status of the order to delivered or pending or cancelled.

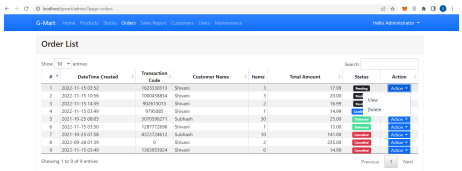

Fig. 15. Orders Page of Admin side G-Mart

6) Admin - Regulate Customer List: In this module (Fig. 16), admin will be able to manage the customer list of the application. Here, admin will be able to add a new customer and also will be able to edit or delete the existing customer details. While adding a new customer, he should enter the customer details such as Full name, email, contact, address, username and password.

7) Admin - Manage Users List: In this module (Fig. 17), admin will be able to manage the users list of the application. Here, admin will be able to add a new admin user and also will be able to edit or delete the existing admin details. While adding a new user, he should enter the customer details such as Full name and username.

8) Admin - Regulate Account Credentials: In this module (Fig. 18), admin will be able to edit his account

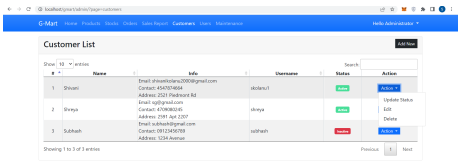

Fig. 16. Customers Page of Admin side G-Mart

Fig. 17. User Page of Admin side G-Mart

credentials by clicking on Manage Account option on the page. There the admin will be able to edit Full name, User Name, New Password and Old Password.

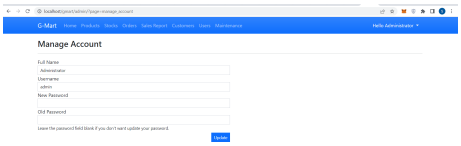

Fig. 18. Manage Account of Admin side G-Mart

9) Admin - Logout: In this module (Fig. 19), admin will be having a logout option. When Logout is clicked, admin session will be completed and will be redirected back to login page.

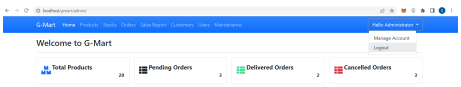

Fig. 19. Logout of Admin side G-Mart

10) Customer - Secure Login and Registration: This is a module (Fig. 20 21), where customer will be able to login into the system by entering username and password. If the credentials entered are correct, it will login successfully and will take the person to the home page. Else, it will display an error saying username or password are incorrect. Customer will also be able to register as a new user. Here he need to give his details such as Full name, Contact, address, Username and password.

11) Customer - Filter Product: This is a module (Fig. 22), where customer will be able to enter some text in the Search field and click on Search Button. Then the application filters for all the products which have their name or description or category with that filtered text and will be giving us the resultant output.

12) Customer - Add Product to shopping cart: In this module (Fig. 23), we select an item and click on Add to

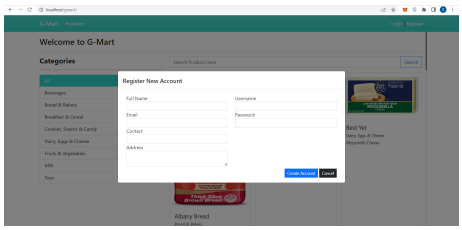

Fig. 20. Registration page of Customer side G-Mart

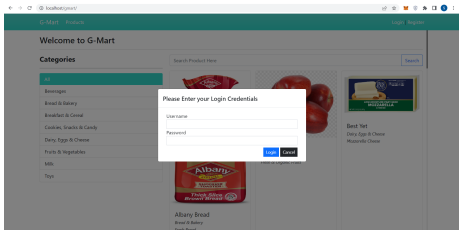

Fig. 21. Login page of Customer side G-Mart

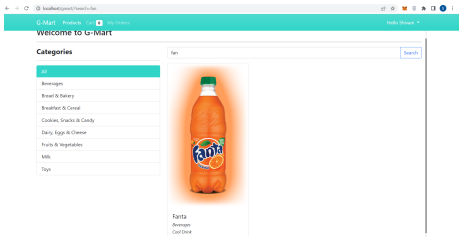

Fig. 22. Filter Module Customer side G-Mart

cart option. Then, it will move to cart. When we press on Cart option which is available in the top of the main page, we will be redirected to the cart page where we will be able to see the products which are in our cart and also will be able to customize them.

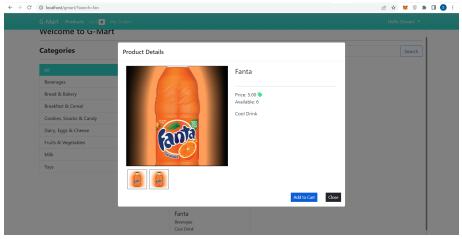

Fig. 23. Cart Module Customer side G-Mart

13) Customer - Checkout: In this module (Fig. 24), customer will be able to checkout with what all the products are there in the cart. When customer clicks on checkout, he will be popped up asking for delivery location and address and then will finally click on submit.

14) Customer - View Orders: In this module (Fig. 25), customer will be able to view and check orders. Here, the person will be able to check the transaction code, number of items, total amount and the status of the delivery if it's

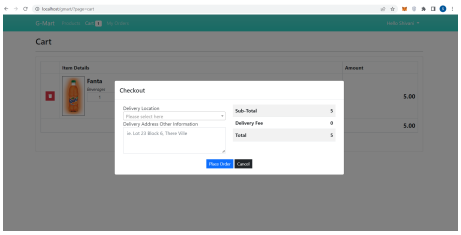

Fig. 24. Checkout Module Customer side G-Mart

pending or delivered or cancelled.

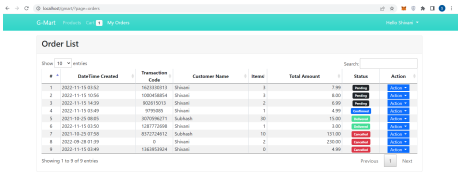

Fig. 25. Orders List Module Customer side G-Mart

15) Customer - Manage Account Credentials: In this module (Fig. 26), customer will be able to edit his account credentials by clicking on Manage Account option on the page. There the customer will be able to edit Full name, User Name, New Password and Old Password.

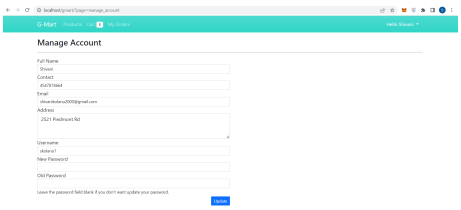

Fig. 26. Manage Account Module Customer side G-Mart

16) Customer - Logout: In this module (Fig. 27), customer will be having a logout option. When Logout is clicked, customer session will be completed and will be redirected back to home page.

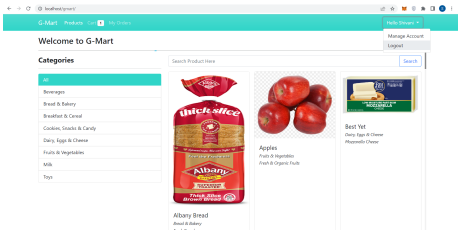

Fig. 27. Logout of Admin side G-Mart

V. Conclusion and Future Enhancements

Consumers now have access to technology that offers a superior online grocery shopping experience, and this trend will only increase in the future. People have predicted that internet shopping will eventually surpass in-store purchasing due to the swift rise of products and companies. This application will help buyers to reach wide range of products anytime anywhere. It provides flexible payment and delivery options to the buyers. This application will shadow buyers shopping experience. G-Mart will also promote local vendors to reach to direct customers and provide them with sales reports and stocks. However, the accessibility of online purchasing has resulted in a better informed consumer who can compare and shop quite easily, without having to invest a lot of time. Thanks to online grocery shopping as many small shops that would never be in business now have access to an excellent market for their business.

The future enhancements for this application is provide future recommendations and their monthly grocery expenditure. We also plan to show the sales report for the admin to understand the business happening day to day basis.

VI. Team Member Contribution

Shivani Kolanu - Contributing to the database by creating and designing the tables needed for the application, as well as by working on the web part of the application.

Sai Subhash Manam - Contributing to the database by establishing the tables needed for the application and designing the ones that aren't already there. Also working on some part of the documentation.

Sujit Reddy Gaddam - Contributing towards Database by writing SQL queries required to do all read and write operations needed for the application and also working on the documentation.

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