A Project Report

On

Supermarket Billing System

Submitted in partial fulfillment of the requirement of

Project – I

Of

Bachelor of Information Technology

Submitted To

Purvanchal University

Biratnagar, Nepal

Submitted By

Subash Acharya

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Bikash Neupane

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Abstract

In business IT, billing software refers to programs that handle the tracking of billable products and services delivered to a customer or set of customers. These types of programs automate much of what used to be a time-consuming process of preparing invoices or other documentation.

The modern digital structures provided by billing software services and products are part of what has propelled businesses into the new digital era, allowing for more productivity and greater ease of business administration in general.

“Supermarket billing” is also one of the billing systems for stores to track the products and services. This report consists of background and significance of the project with objectives, features and problem-solving statement of the project which shows the detailed information about the research done, existing system and the limitations of them. The project’s main objective is to make a complete functioning program with c programming by avoiding the limitations in the existing project.

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Chapter 1: Introduction

1.1 Project Introduction

Supermarket billing system is a program that allows supermarkets to serve their customers with ease by conducting automatic calculation of products bought by the customers. The product's names, its exact prices and the automatic calculations are shown on the bill. This project aims to implement automatic calculations of the Goods and Service Tax (GST) amount and display it on the receipt after listing all the products. The user of this system, such as the store staff or the store manager, will also be able to apply the discount amount to the receipt after all the items are added to the bill. This project will create a system where this will be calculated automatically and the results of the discount are printed on the bill. After payment of the purchased goods, the receipt can be given to the customer as a record and a proof of their purchase. This is also helpful to customer if they need to do a refund for the products they bought.

Hence, this project for the supermarket billing system will ensure a good relationship between customer and the store by providing a fast and efficient customer service through the ease of payment when the customers purchase goods from the supermarket.

Moreover, this system will also allow the store manager and staff to login, change password, create bill, manage the stock of the supermarket such as updating, deleting, adding, editing and viewing products.

1.2 Problem Statement

This Supermarket Billing System is able to perform many tasks however, it has its limitations. Research on previous supermarket billing programs have the following drawbacks:

- There are programs with very good user interface and a lot of good features in them but they are not user-friendly and it is hard to understand the program to make full use out of it.
- These programs are only focused on printing bill and keeping record of the purchased products. They do not include refunding which should also be a part of the supermarket billing system.
- These programs are unable to provide proper stock management. It's hard to see the products on the store and to look up detailed info of a certain product or these features does not exist at all.
- They do not have a feature of storing the list of products which needs to be restocked.

In this project, these drawbacks are improved upon and additional features will be added to improve performance and will be created with user-friendliness every step of the way. The system is mainly designed to make healthy relationship between the customer and the store manager by providing a great customer service through the ease of payment at the end of a shopping. Along with it, further improvements will be implemented to this system that allows the user of the system to manage the stock of the shop without having to manually check each and every item which is very time consuming. This project will make it easier for the store manager to manage the stock in the shop because this system will automatically reduce the amount of product from the stock when an item has been successfully purchased by the customer. It also checks for any products that are low in quantity and when a product hits certain quantity, the system will alert the store manager and lists all the products that are low in stock so that the store manager restocks any products that are running low. This system allows the store manager to quickly find the list of products by searching category, by name, by product identification number (ID) or by viewing the entire products list in the supermarket.

However, just creating a system to bill products and manage stock is not enough as

anyone can access it without a password protection system. Therefore, this project will implement a protection to make it a secure system through the use of user accounts and a good password system. The store manager can add any user to the system when necessary and have the ability to change password within the system as well.

1.3 Objectives

The main objectives:

- To make user-friendly interface using graphics and to make it more aesthetically pleasing
- to make program easy to understand and use for all users
- To provide additional useful features such as the stock management, security, and notification system
- To allow users to create bill within the same billing system
- To allow users to refund for products already purchased in the billing system
- To allow users to modify their password for better security

The Sub objectives of the program are to make the billing system easier and satisfy both the customer and the shop manager by providing a fast and efficient customer service.

1.4 Significance of the Project

This main significance of this project is that it allows the project members to understand the use of c programming, including how useful c programming is and how it can be applied or implemented into their daily lives. In this project, c programming is used for creating the billing system in a supermarket, including managing stocks. Further significance of this project is to use c programming tools to make one's imagination into a reality such as making the job of supermarket staff much more convenient and to provide a better customer service more efficiently.

1.5 Project Features

Some of the features of the Supermarket billing system are as follows:

- User friendly interface
- Password security to make it more secure
- System will notify the user/manager about low quantity products in stock
- Shop manager access the product with ease by category, name or product ID
- Can manage products (add, update, remove, info)
- A better and more detailed bill for the customer as proof of purchase
- Allows users to refund customers if they have their proof of purchase

1.6 Assignment of Roles and Responsibilities

Team Member	**Task performed**
Subash Acharya	Coding lead, documentation
Sudeep Khadka	Coding, research
Pratima Basnet	Documentation, coding

1.6 Documentation Organization

This documentation is a comprehensive report on the project to create a supermarket billing system. It also includes all background information regarding the project under Chapter 1 so that even a new reader can understand what the project is about. Similarly, it also clarifies how the program works and its main features and objectives. Along side the functions of the program, it also shows how this program is different from other programs present on internet. It includes how the program is used in real life fields.

It contains all period of development along with the problems that were faced by developers while building this program. It helps to understand the limitations that were seen on this program. Similarly, it includes the detailed information on how the program was made.

This documentation includes figures listed in Appendix 1 to help readers to visualize the output of this program

Chapter 2: System Analysis

2.1 Requirement Gathering Process

Requirement No.	Requirement Name	Requirement Description	Process of gathering	Function number
1	Notification	It sends notification to the user about the low stocks	Reading the stock and listing the product with low quantity	8
2	Create Bill	It creates bill and does all the calculations automatically	Going through the stock and getting product info	9
3	Add Product	It adds new products to the stock	Getting inputs from user and storing them in a file	12
4	Edit Product	It edits the details of product from the stock	Getting inputs and replacing them with the new details	20
5	Get Product	It helps to get info on any product that exists. Allowing users to search by ID, name, category or list all	Accessing the files and printing it using listing methods	16
6	Delete Product	It deletes products from the stock	Storing stock in a file that doesn't include the product with given ID	21
7	Change Password	It allows to change password	Getting old login details from user and replacing password with new one	11

2.2 Feasibility Study

This program is compiled on TURBO C++ and the program is written in C programming language. There are many compilers for a C program but TURBO C++ was necessary for this project. This project fully depends on a C library which is called Graphic.h. It allows us to use Graphics in c program. TURBO C++ was found to be the best graphic compiler online.

2.2.1 Software & Hardware Specification

Operating System: Win 10

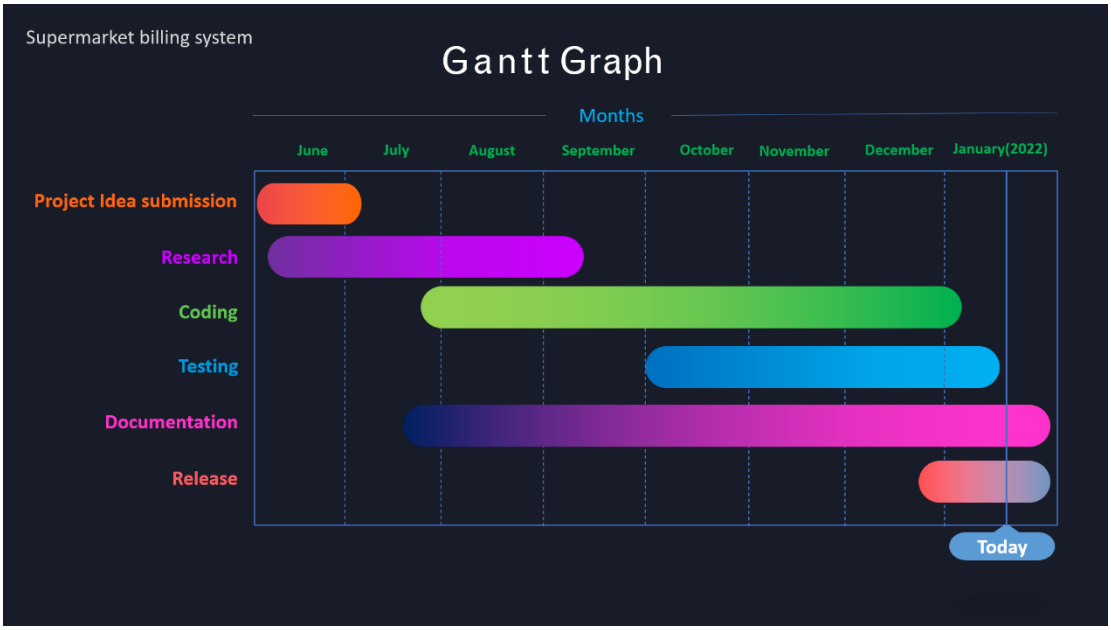
Developing software: Turbo C

Language used: c

Processor: i7

Memory: 16 GB RAM

2.2.3 Gantt Chart



Chapter 3: System Design

3.1 Program Component

These program component helps the program to function and run like it should. It includes different functions, header files that are included in coding and different functionality of them, there are over 20 user-defined functions and one main function. All the preprocessors used in the program are listed below with their characteristics:

Preprocessors	Characteristics
#include <stdio.h>	All standard library function for file input and output are included in stdio.h
#include <conio.h>	All console input/output function are included in conio.h
#include <graphic.h>	All graphic functions are included on graphic.h
#include <string.h>	It allows us to use string functions which helps in storing and getting string variables

Some of the user defined function are listed below with their functionality:

Function No.	Function	Characteristics
1	Void alert()	This function is used to show an alert on screen.
2	Void info()	This function is used to show info/text on screen or confirmation
3	Void theme()	This function is used to set theme on the program

4	Void registerUser()	It registers the user if the program doesn't find any users to login with
5	int askPassword()	This function shows the login screen and the login form And returns whether the given info is correct or not
6	Void checkSelection(nt,int)	This function is used for selection in the menu. It shows green If the option is selected and white if its not
7	Void redirect(int)	This redirects users to the next page according to the selected menu
8	Void viewLowStock()	This function shows all the products that are low on stock
9	Void CreateBill()	It shows the billing interface and lets the user create bills
10	Void manageStock(int)	It shows the stock management menu. It consists of Add, Edit, Delete and Get options.
11	Void changePass()	This function is used to change password of the user
12	Void addProduct()	This function is used to add new products to the stock
13	Void stockRedirect(int)	This function redirects the user from stock management according to their selection in menu

14	Void getProductRedirect(int)	This function is used to redirect users to search by id, search by category, search by name, search all
15	Void getProduct()	This function displays the product on screen according to the given ID
16	Void getProductMenu()	This function shows the menu of getProducts functions
17	Void searchByC()	This function lets the user search products by category
18	Void searchByName()	This function lets the user search product by their name
19	Void searchAllProduct()	This function lets the user to display all products in the stock
20	Void editProduct()	This function is used to edit the existing product in the stock
21	Void deleteProduct()	This function is used to remove products from the stock
22	Void addrow(int,int)	This function adds items on the bill
23	Void getText()	This function allows us to get input from user in graphic.h

3.2 Algorithm

We have made a step-by-step process of our program. It does not contain all functionality but it covers almost all the main functions of the program. The algorithm of the program is given below:

Step 1: Start

Step 2: Read password(ps)

Step 3: if Stored password = ps THEN goto step6 Otherwise goto step4

Step 4: display “Wrong password! Try again”

Step 5: Goto step step2

Step 6: Display “Enter your choice”

Display “1. Create bill”

Display “2. Manage Stock”

Display “3. Change Password”

Step 7: Read choice

Step 8: if choice = 1 Then

Step 8.1 : Read product id and quantity

Step 8.2: total amount = total amount + (product.price* quantity)

Step 8.3: Display “add more?”

Step 8.4: if input = y goto step 8.1 Otherwise goto step8.5

Step 8.5: Amount after GST = total amount + 13% total amount

Step8.6: Read discount amount

Step8.8: Final amount = amount after Gst – discount amount

Step 8.8: Display product list

Display Amount after GST

Display discount amount

Display final amount

Step 8.9: input confirmation

Step 8.10: If Conformation = ‘y’ THEN Stock=stock – product list

Otherwise goto step 6

Else if choice = 2 THEN

Step 8.1: Display “What do you want to do?”

Display “1. Update product”

Display “2. Delete product”

Display “3. Add product”

Display “4. Product Details”

Step 8.2: Read choice as c

Step 8.3: if c=1 THEN

Step 8.3.1: Read productID

Step 8.3.2: if stock has productID THEN

Step 8.3.2.1: Display product id, name, price, quantity, category

Step 8.3..2.2: Read new Product Details

Step 8.3.2.3: Old product details = new product details

Step 8.3.2.4: Goto step8.1

Otherwise:

Step 8.3..2.1: Display “input valid id!”

Step 8.3.2.2: Goto step8.3.1

Else if c = 2 THEN

Step 8.3.1: Read productID

Step 8.3.2: if stock has productID THEN

Step 8.3.2.1: Stock = stock – product

Step 8.3.2.2: Goto step8.1

Otherwise:

Step 8.3..2.1: Display “input valid id!”

Step 8.3.2.1: Goto step8.3.1

Else if c = 3 THEN

Step 8.3.1: Read newProduct (id, name, price, quantity, category)

Step 8.3.2: Stock = stock + new product

Step 8.3.3: Goto 8.1

Else if c = 4 THEN

Step 8.3.1: Read productID

Step 8.3.2: if stock has productID THEN

Step 8.3.2.1: Display price, id, quantity, name, category

Step 8.3.2.2: Goto 8.1

Otherwise Goto 8.1

Othewise

Step 8.3.1: Display “Input valid choice”

Step 8.3.2: Goto 8.1

Else if choice = 3 THEN

Step 8.1: Read password

Step 8.2: if password = realPassword THEN

Step 8.2.1: Read newPassword

Step 8.2.2: realPassword = newPassword

Step 8.2.3: Display “Successfully set new password!”

Step 8.2.4: Goto Step 6

Otherwise

Step 8.2.1: Display “Wrong password, Try again!”

Step 8.2.2: Goto 8.1

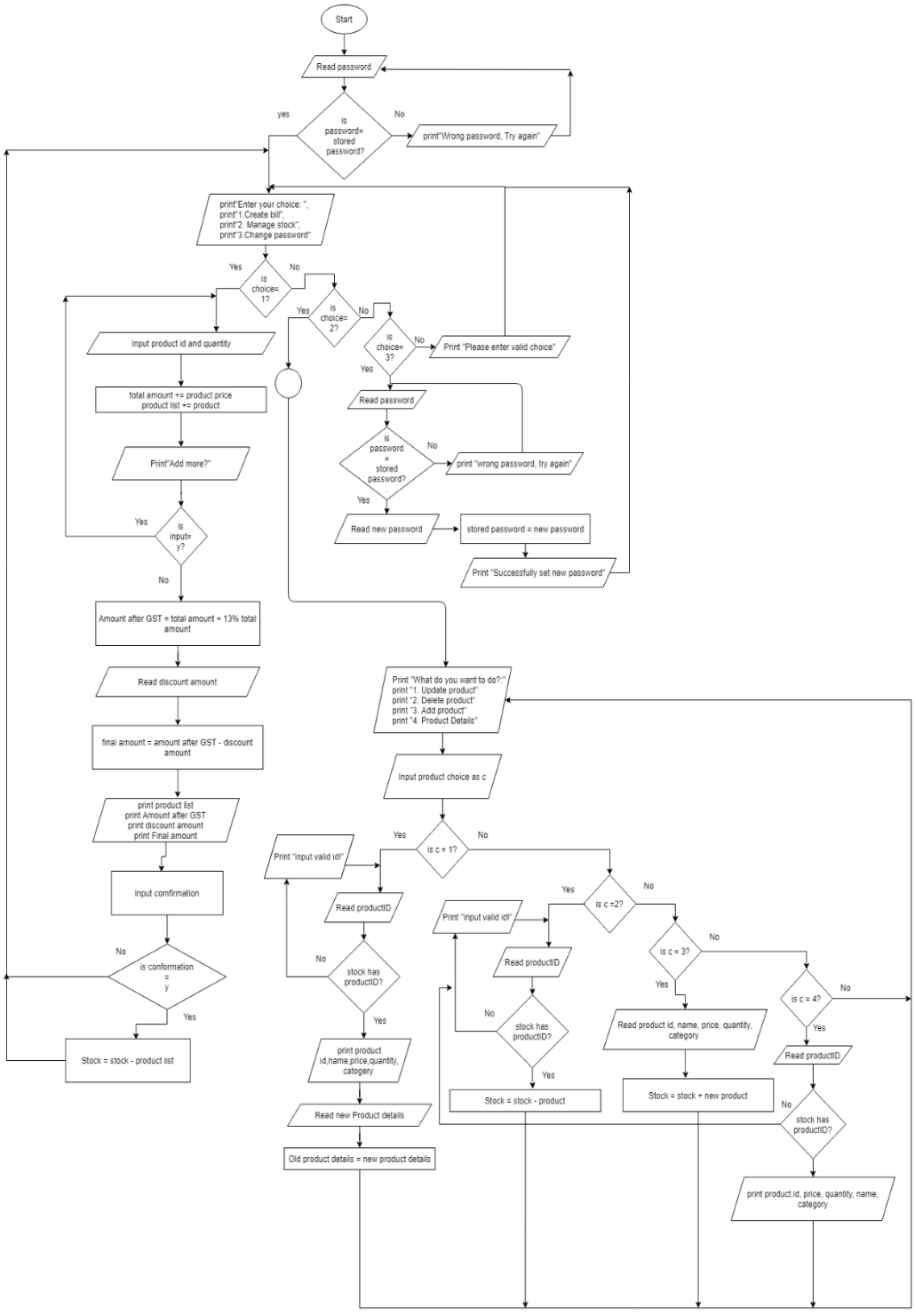
Otherwise

Step 8.1: Display “Please enter valid choice!”

Step 8.2: Goto 6

Step 9: Stop

3.3 FlowChart



3.4 UI/UX Mechanisms

This project's user interference (UI) utilizes the keyboard for navigation. This allows the user to have ease of access to all navigations within the system without having to take their hands off the keyboard. This provides a smooth and convenient use of the system for the user and saves time. The supermarket billing system is user-friendly with its simplistic designs and easy to navigate menu. This allows any first-time users to quickly adapt to this new system without much training. They will be able to use and navigate the billing system with ease due to the nature of easy-to-understand instructions displayed on it thus improving their user experience (UX) of the software.

For example, once the user has logged in, they will see three options on their screen Appendix 1, *figure (a).* Instead of taking their hand off the keyboard to reach for the mouse, they can immediately choose one of those option by pressing the keys; 1, 2 or 3 in their keyboard. At the moment, there is an instruction that says, '*Use 1,2,3…keys to navigate options.*' This is self-explanatory as not much more is required to navigate the menu.

In this same screenshot, Appendix 1, *figure (a),* there is notification of low stock in a yellow box on the bottom right corner. To view the list of the products low in stock, the user only needs to press the key 'e' on their keyboard. This notification is very handy as it lets the user know immediately if any products are running low. It pulls its data from stock list where auto deduction of product quantity is recorded as soon as a product is successfully purchased.

One of the main features of this program is to create a bill as seen in Appendix 1, *figure (b).* The program allows the user to add items to the bill using the product ID, add discounts [Appendix 1, *figure (c)*] and choose payment method [Appendix 1, *figure (d)*] of customer's choice. The system will automatically calculate GST and discounts applied to the bill, Appendix 1, *figure (d),* and once payment has been made, the system can also give out change if payment was done through cash, see Appendix 1, *figure (e).* If the payment was done with card, there will be no change.

The user can also pull various information regarding the products in stock by simply navigating the menus as seen in Appendix 1 *figure (f), (g), (h)* and *figure (i).* Another example of UI mechanism is seen on Appendix 1, *figure (i)*. This screenshot is the list of all products currently in stock. Number of products per page is dynamic according to the resolution of the screen and in order to see the rest of the list, the user is given the options 'Prev(a)' and 'Next(d)'. The user needs to press 'a' on their keyboard to see the previous page and to see the next page, they need to press 'd'. The user can also easily login and change password to their account, Appendix 1, *figure (k)* and *(l).*

Chapter 4: System Development and Implementation

4.1 Programming Platform

This program was developed using TURBO C++ compiler. It depends on libraries of C Programming. Graphic.h library is used for the User Interface.

4.2 Test Plan

While development, there were many tests. Some gave expected results. However, some gave errors and unexpected output.

Some test cases were:

- Product per Page count:

Accurate number of pages was expected from the code according to the resolution of output screen. However, the outcome of the code was one product off from the expected count. This issue was fixed by manipulating the height where each product was listed.

- Quantity reduction after purchase:

The stock management was expected to reduce the quantity of products when purchased. However, the output created showed new bug which duplicates purchased product instead. This was improved by fixing the code for structure.

- Searching all product:

Coding was similar to other shorting options in getProduct however, the outcome of the similar code for searching and listing all product would break every other file handling. Once all the product are listed, the program would break and won't function like it should until we restart the program.

Chapter 5: Conclusion and Recommendation

5.1 Conclusion

The project members gained a good experience of using c programming language in real life projects and also got to experience the practical use of these projects. The team members feel that they are prepared and experienced enough to start another better project in the future. Some of the important things learned from this project includes structure and management of data in a program, graphical interface in a program and practical use of c programming language in real projects. This project allows its users to login, create bill, add or delete products, edit product info as well as pull all product info by searching through category, product ID or product name. The users can also change their password to keep their account more secure and as soon as they log in, the system can alert them immediately if any products are low in stock.

5.2 Limitations

In the beginning of this project, Dev ++ was used to code for this project but it brought its own limitation. Early on, this project team found that with Dev ++, it is much harder to create a software that is aesthetically user-friendly. Hence, Turbo C++ was used instead to create a graphically appeasing and aesthetically user-friendly system. However, none of the team members had used Turbo C++ before so everything had to be learned from scratch.

Another limitation during this project was time management due to the pandemic. The project members were unable to meet physically to discuss and work on the project due to the pandemic. Classes were all online we had responsibilities and duties outside of class which made it much harder to come together physically due to the pandemic.

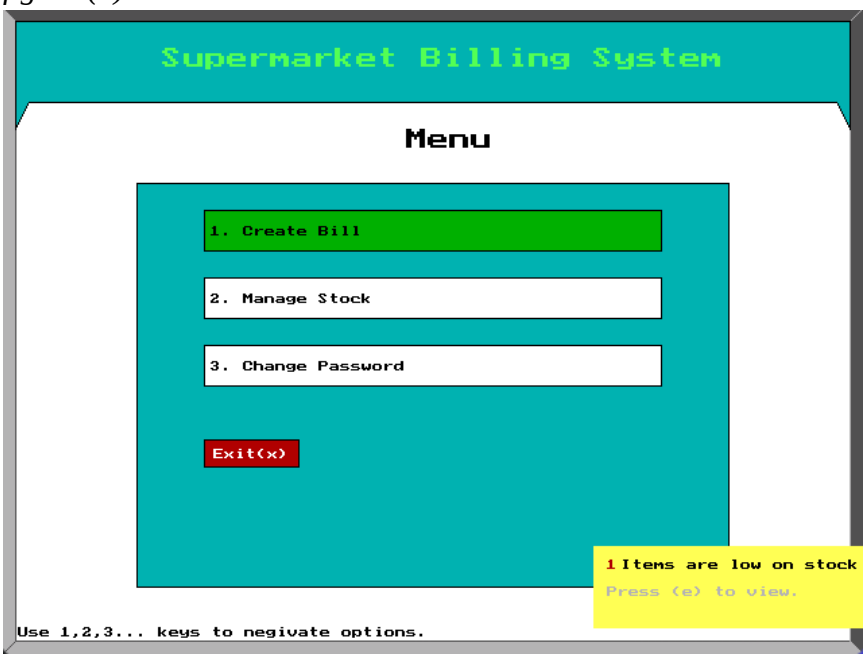
It also did not help that the constant loadshedding meant Wi-Fi were mostly down which made it even more difficult to find suitable time for all team members to have a virtual meeting.
Further limitation included gaps in acquired skill sets between the project team members, it meant distributing the workload of this project was not very easy to do.
Due to these limitations, out of all the objectives of this project, refunding of products customers brings back to the store was not yet implemented into the system.

5.1 Future Enhancements

For future enchantments of this project, the limitation found during this project will be improved upon. The team members will make sure they are all update with the required programming languages and skills sets in order to be a valued member of the project team so that they can contribute towards the success of the project.
Refunding of the products customers bring back to the store, due to various reason, can be used to enhance the customer service experience thus further improving the retaliation between the store the customer. Better time management will be worked out by discussing virtual meetings beforehand and by following up each time after the meetings. The team members will also be constantly updating each other in regards to their availability so that everyone can have their input on the project.

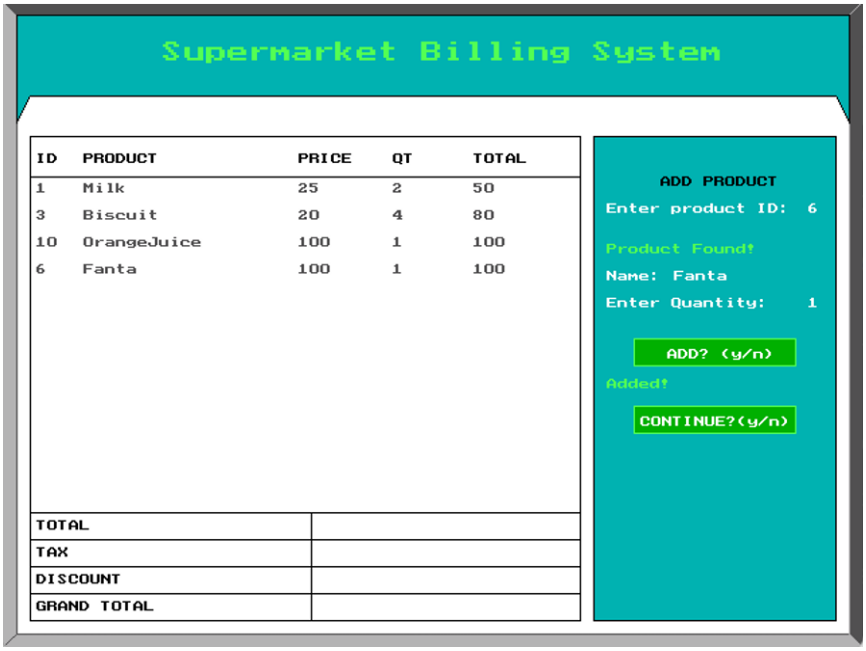
APPENDIX 1 - Screenshots of O/P

figure (a)



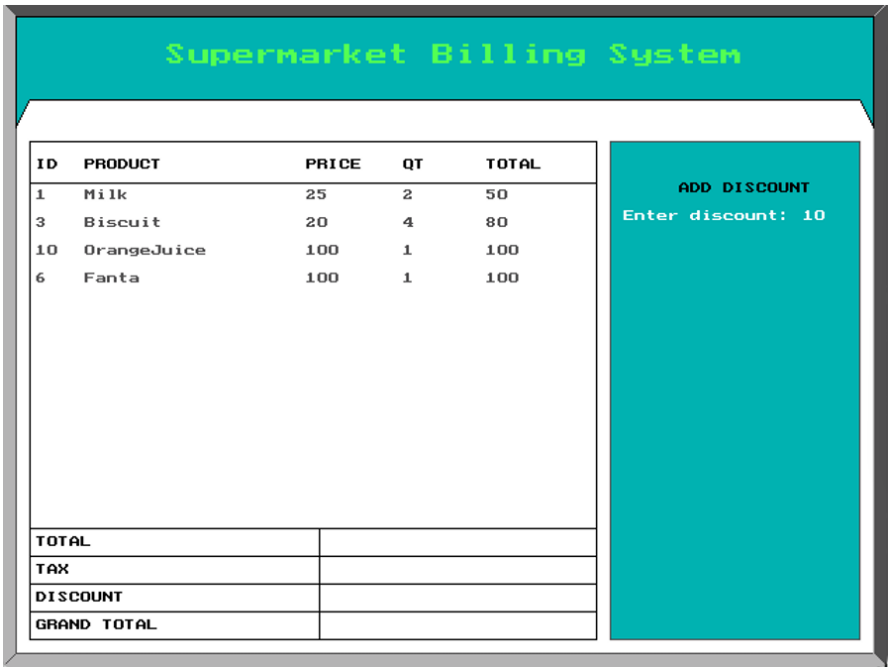
Main Menu

figure (b)



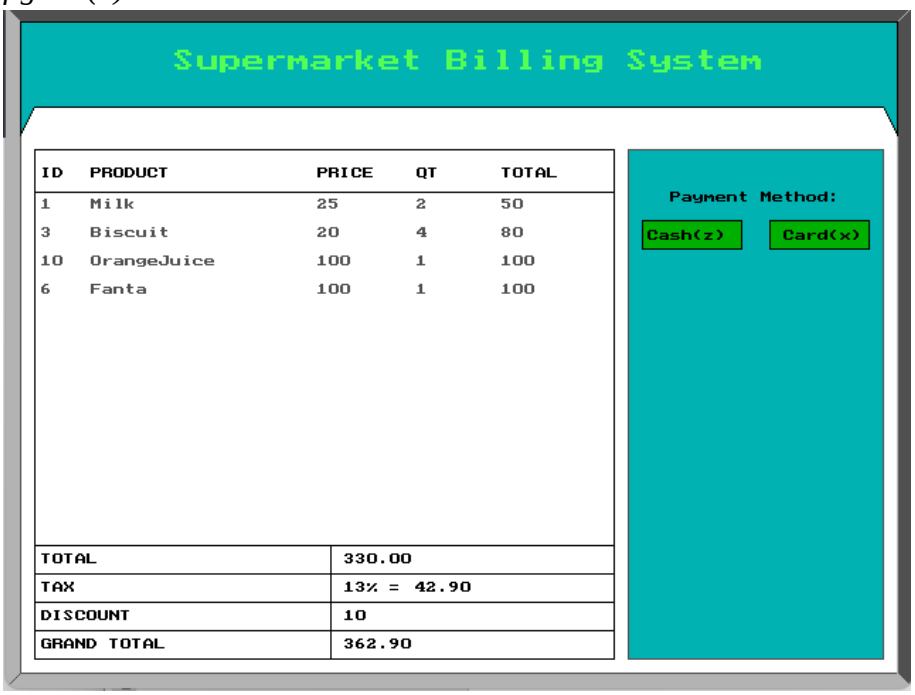
Creating new bill

figure (c)



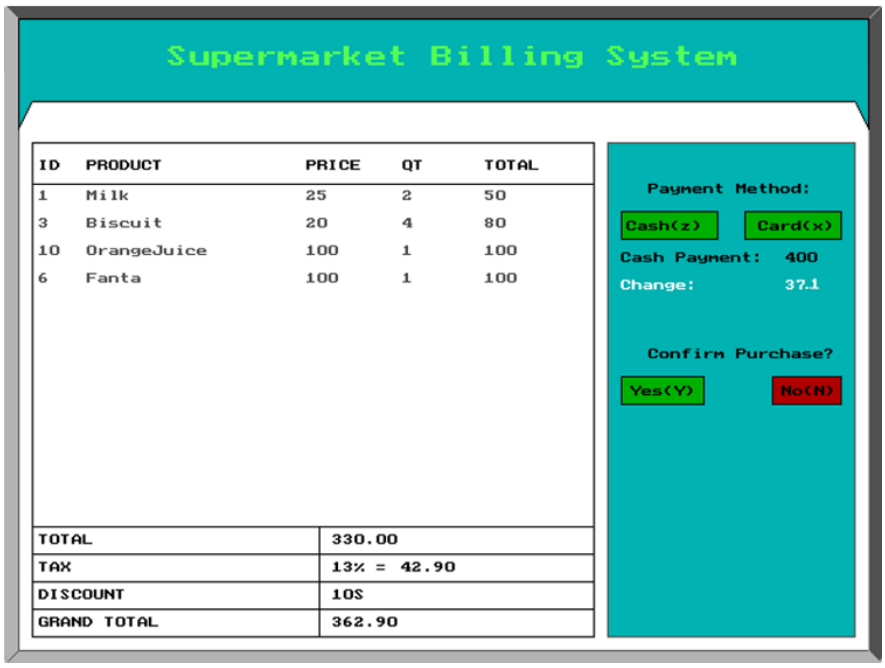
Adding Discount

figure (d)



Choosing payment method

figure (e)

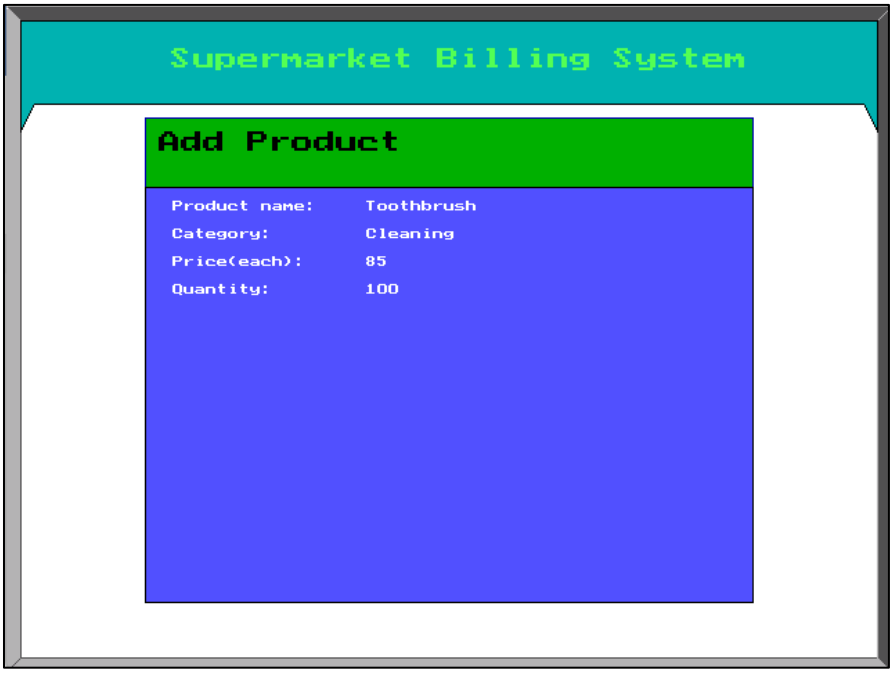


Auto calculation of GST and Payment change

figure (f)

Stock Management Menu

figure (g)

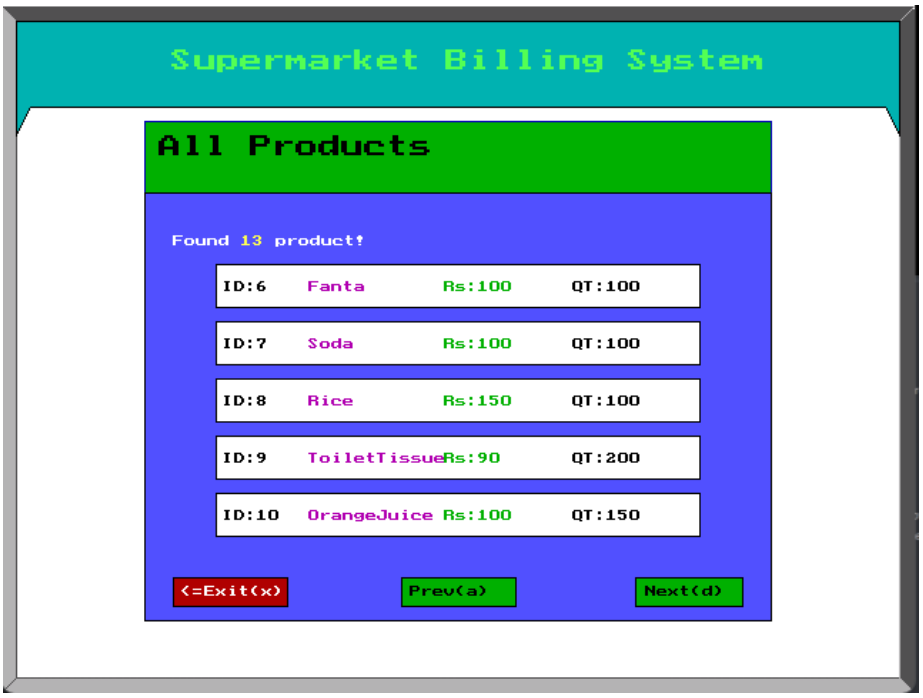


Adding new product

figure (h)

Get Product Menu

figure (i)

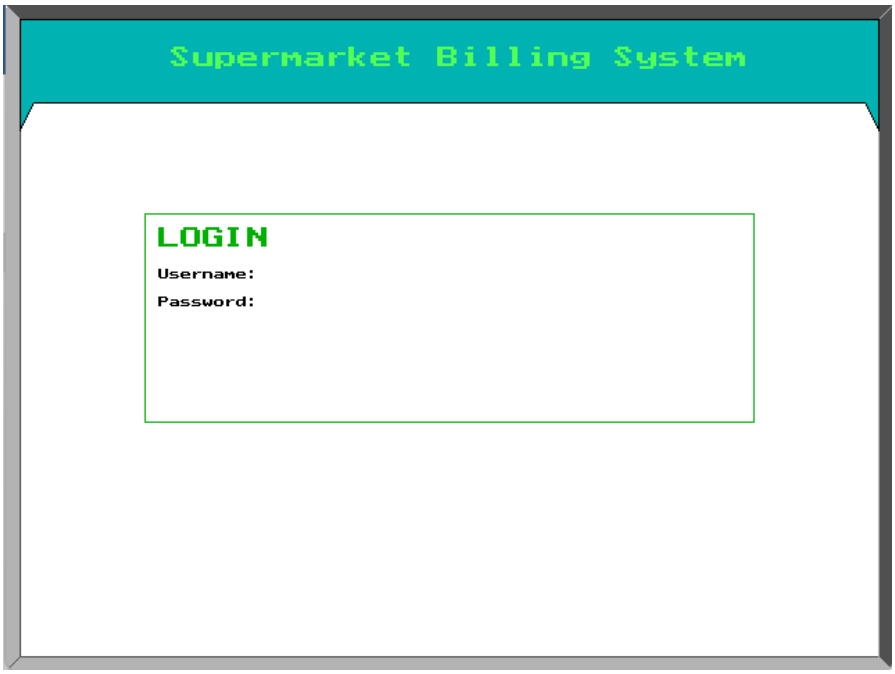


List of products in stock

figure (j)

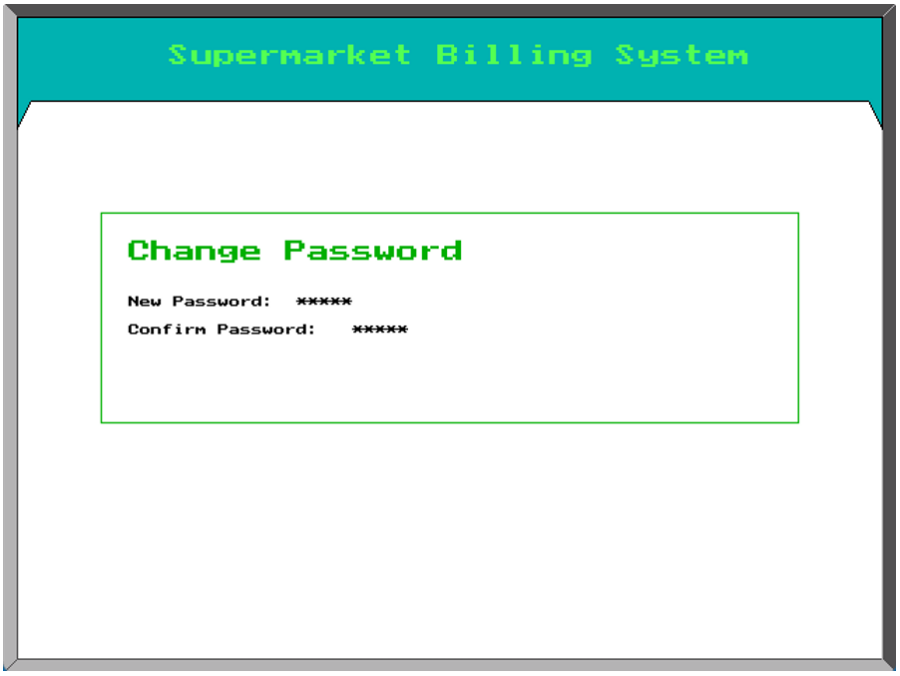
Get the Product information before deleting

figure (k)



Secure login with username and password

figure (l)



Changing password

APPENDIX 2 - References

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