CSCI 765: Project On Inventory Management System of Online Grocery Store

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Abstract

An online grocery system is either a brick-and-mortar supermarket or grocery store that allows online ordering, or a standalone e-commerce service that includes grocery items.There is usually a delivery charge for this service. The online ordering is made through e-commerce websites or mobile apps.

The COVID-19 pandemic greatly accelerated the growth of online grocers, and in the first few months of the pandemics online grocery shopping increased by 300%.In addition, first-time online grocery shoppers accounted for 41% of online grocery shoppers.The epidemic of COVID-19 has hastened the uptake of online grocery shopping. Pre-COVID-19 food shopping activity accounted for 9% of the market, but 63 percent of consumers worldwide purchased more groceries online after the outbreak than they did before they were socially isolated.

Introduction

Initially my plan was to create a python application about a Inventory management system of a online grocery store which can connect to a MySQL database system (created from scratch) and display operation related pages on the web. E-commerce is getting popular in my country (Bangladesh) but the existing applications are not much developed for the southasian needs and demands yet. That motivates me to choose this idea as my project.

The existing applications are doing great in their respective fields but to work with people like from my country, the applications need to be more user friendly and less complicated. As i have worked with e-commerce system previously, i have a clear idea what higher management demands from our system.

Here is an overview of what my dashboard page, I have only included the basic features here so it can be operationally more useful.

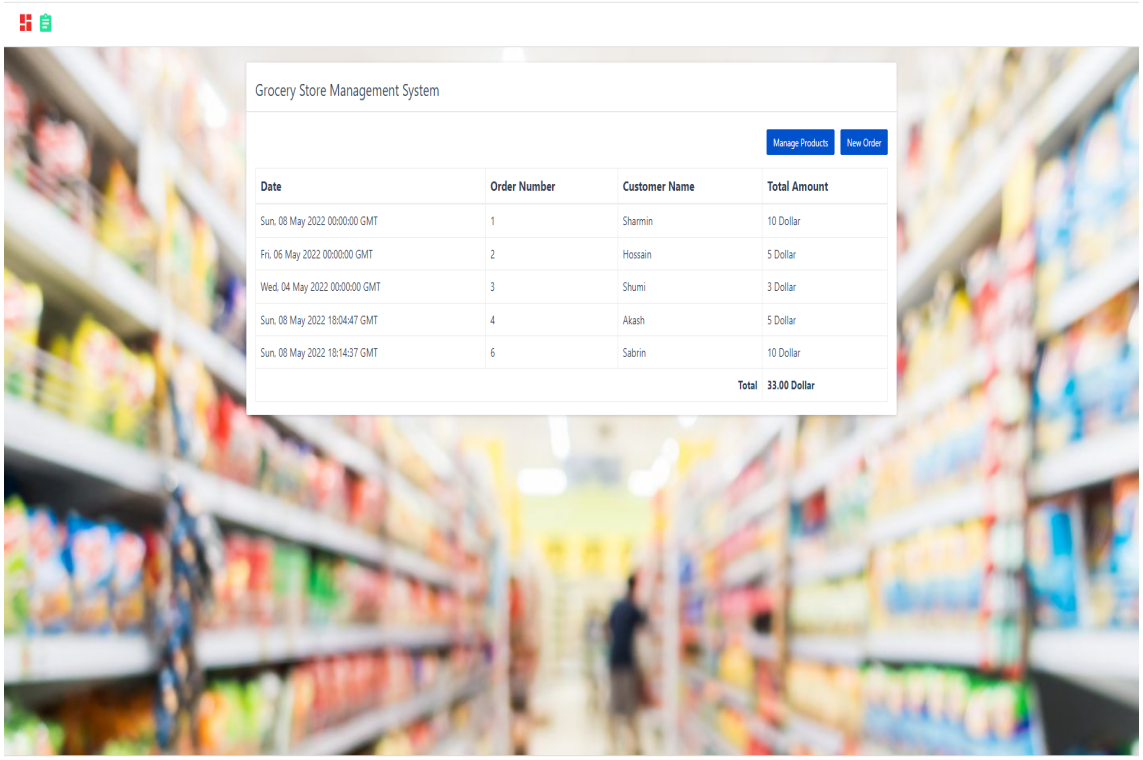


Figure 1: Dashboard Page

Course Relevance

Topic 1: Enhanced Entity Relationship (EER Modeling)

ER model stands for an Entity-Relationship model.It is used to define the data elements and relationship for a specified system. It develops a very simple and easy to design view of data.EER is a high-level data model that incorporates the extensions to the original ER model.The Extended Entity-Relationship (EER) model is a conceptual (or semantic) data model, capable of describing the data requirements for a new information system in a direct and easy to understand graphical notation.
I have EER modeling for my database "grocery". I did not create the model by hand. As I am using MYSQL, after creating tables, the ER model was automatically created based on my Primary & Foreign key constraints. As I am making a grocery app, its important to have multiple order, product & delivery related tables for my database. And these tables will relate to each other to make the connection for future querying. My EER model has 'one to one' relation, 'one to many' relation as well as 'many to many' relations.

Topic 2: Data Definition Language & Data Manipulation Language

Data definition language is a syntax for creating and modifying database objects such as tables, indices, and users.Data manipulation is the process of changing or altering data in order to make it more readable and organized.
I have created tables using "Create Table" option of SQL. Inserted values in the table using "Insert Into Values" option. Added multiple data types (INT, DOUBLE, DATETIME, VARCHAR) in the tables. From the tables, I have made so far, I can easily fetch some data by writing query using join keyword which belongs to the "Data Manipulation" part. I can also change column name of a table in SQL.

Topic 3: Applications and Security

The Python programming language has powerful features for database programming. Python supports various databases like SQLite, MySQL, Oracle, Sybase, PostgreSQL, etc. Python also supports Data Definition Language (DDL), Data Manipulation Language (DML) and Data Query Statements.
For programmatically accessing database, I have used "Python". To connect with database, I have used "mysql.connector.connect" function. Imported "datetime" and "mysql.connector" packages so the relevant functions work properly. Had to use Java script and HTML to make the frontend of the application.

Implementation

Figure 1: Enhanced Entity Relationship (EER Modeling)

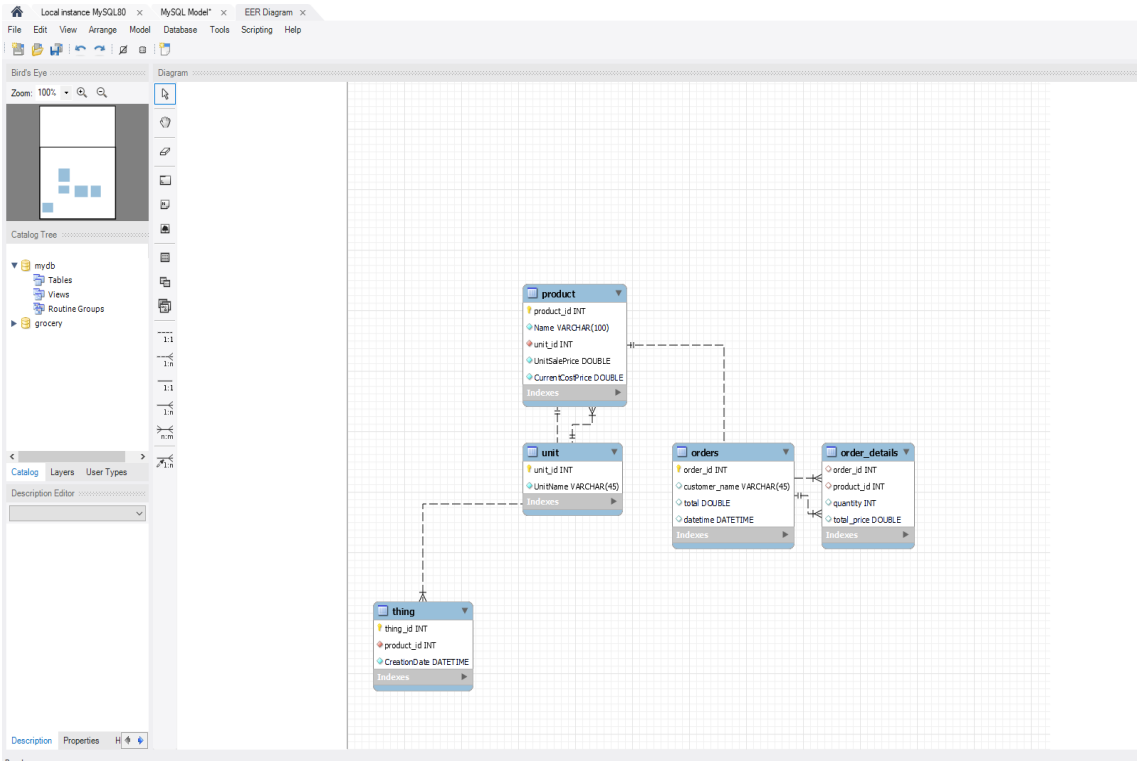


Figure 2: EER Diagram

Figure 2: Data Definition Language & Data Manipulation Language

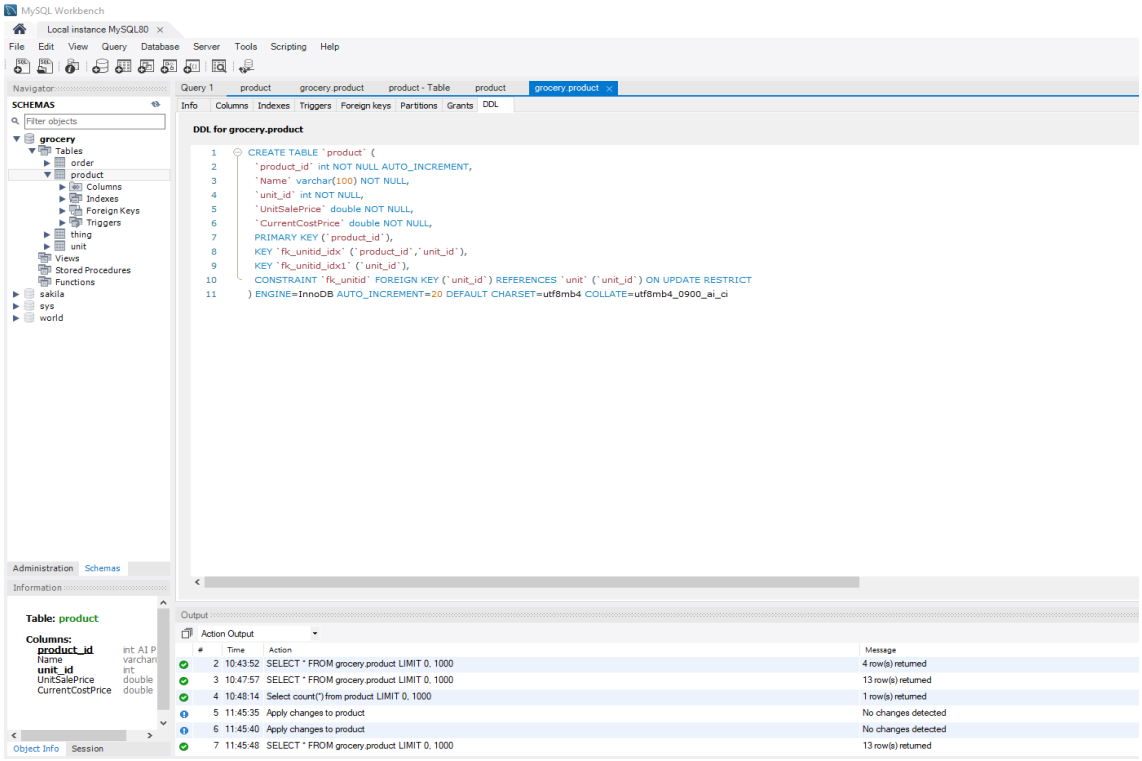


Figure 3: Create Table

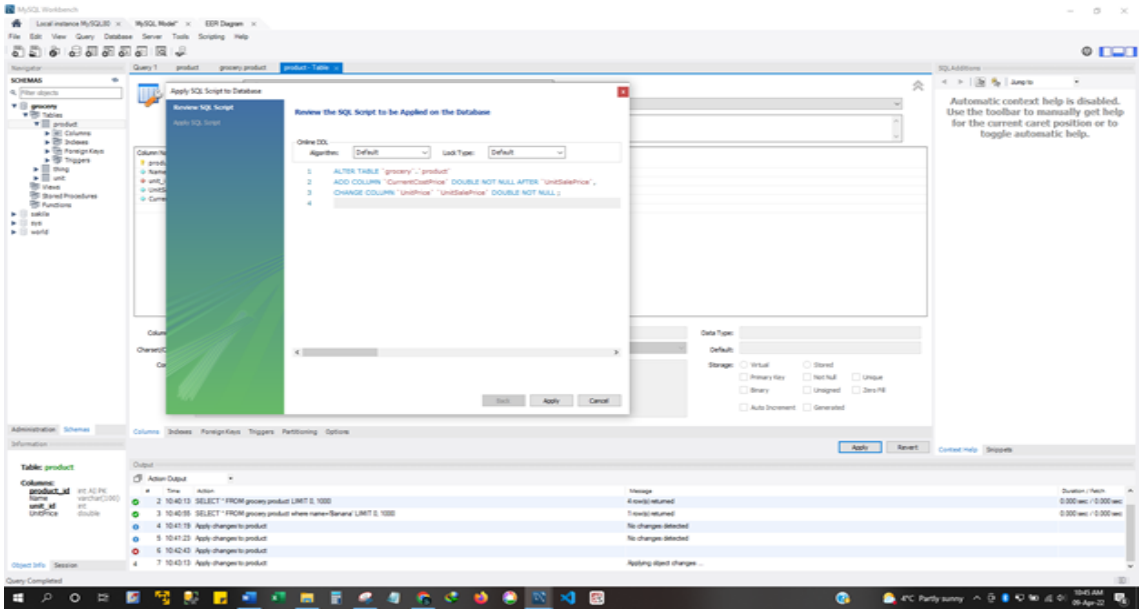


Figure 4: Alter Table

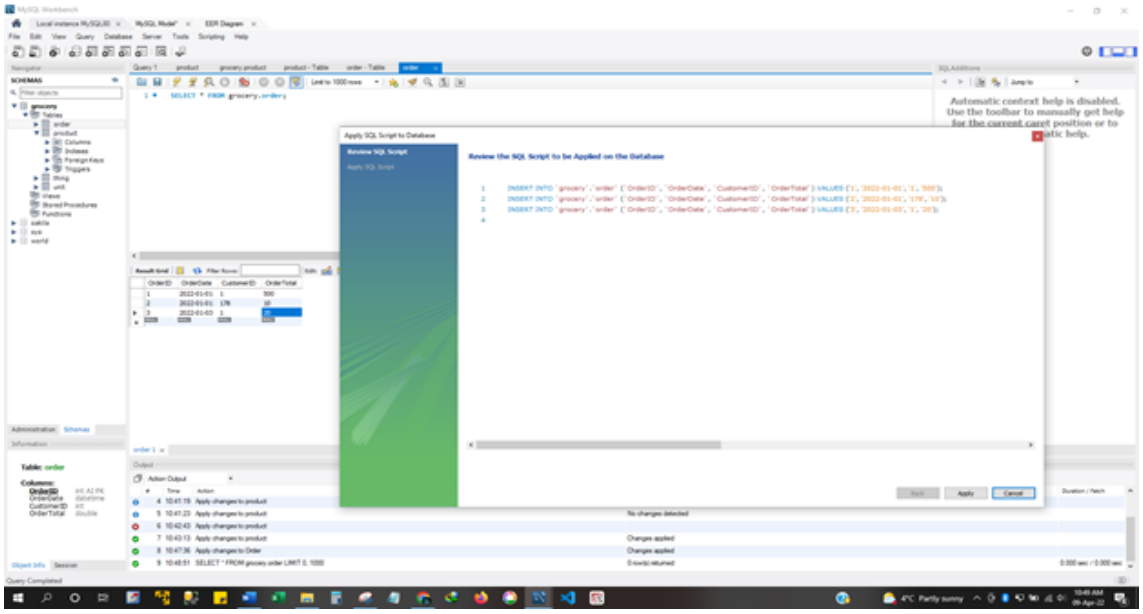


Figure 5: Insert values into tables

Figure 3:Applications and Security

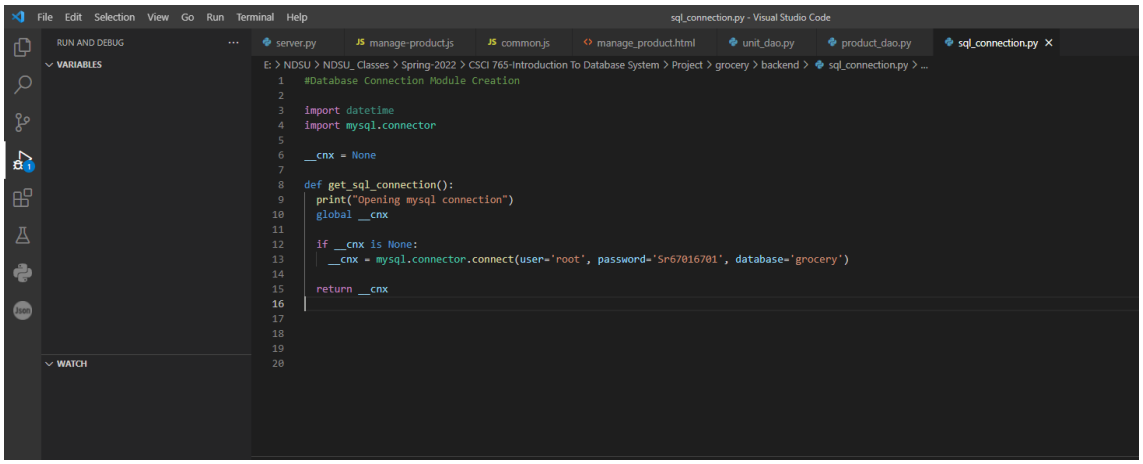


Figure 6: SQL Connection

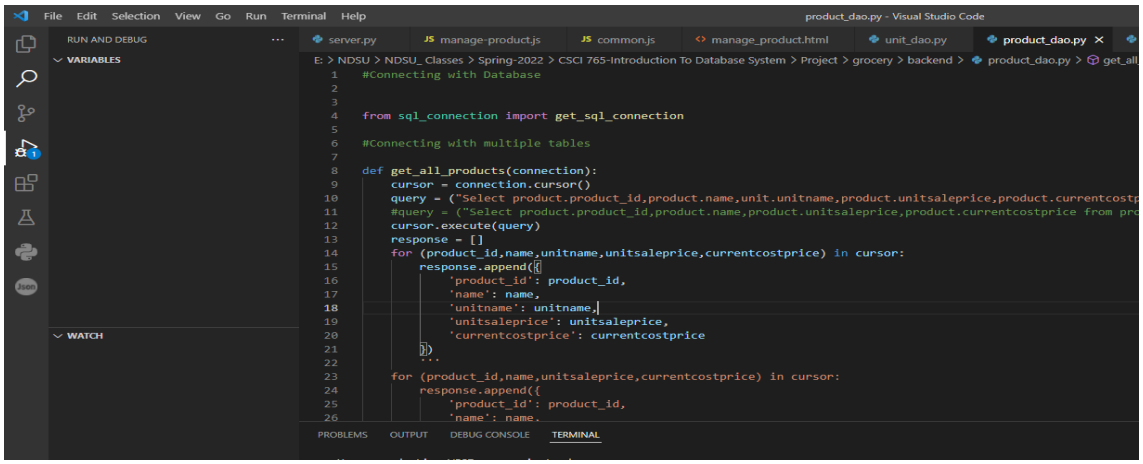


Figure 7: SQL Connection

Result

Here are the final two pages (Product Manage & Order Pages) of my project. I have also included the server page code screenshot to show how its working.

In this project, i have included features like adding products, deleting products, adding new orders, removing products from orders, creating a dashboard based on inputs.

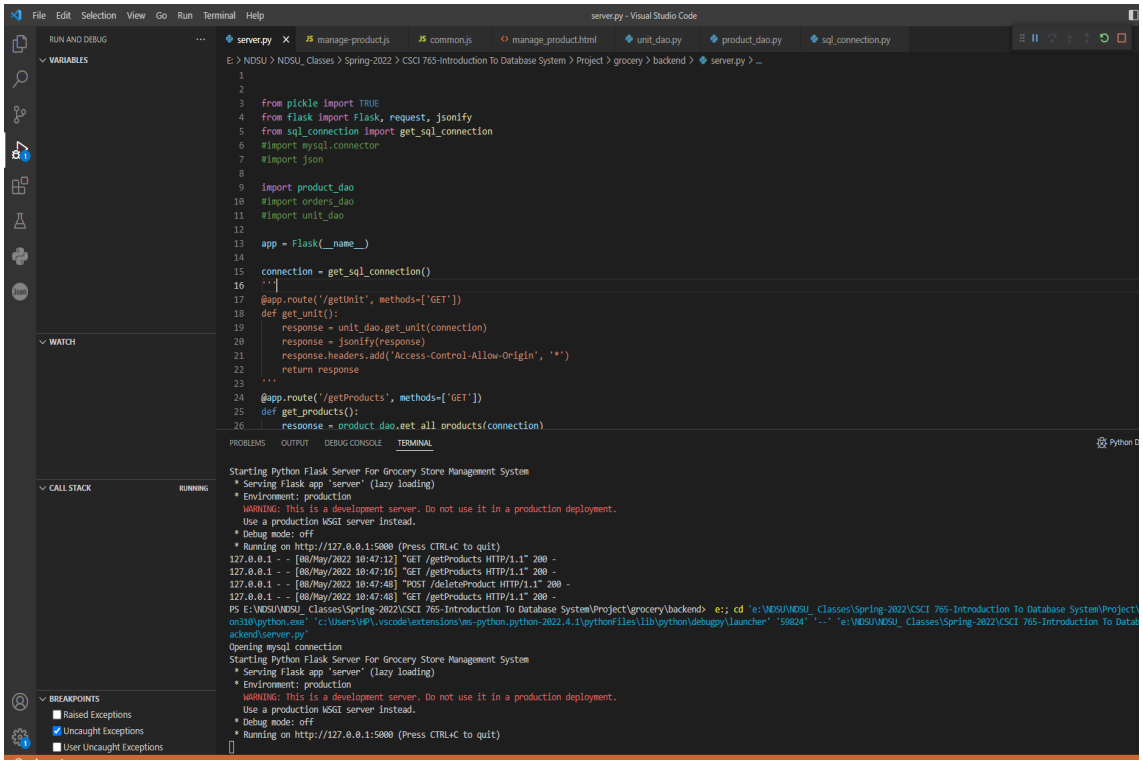
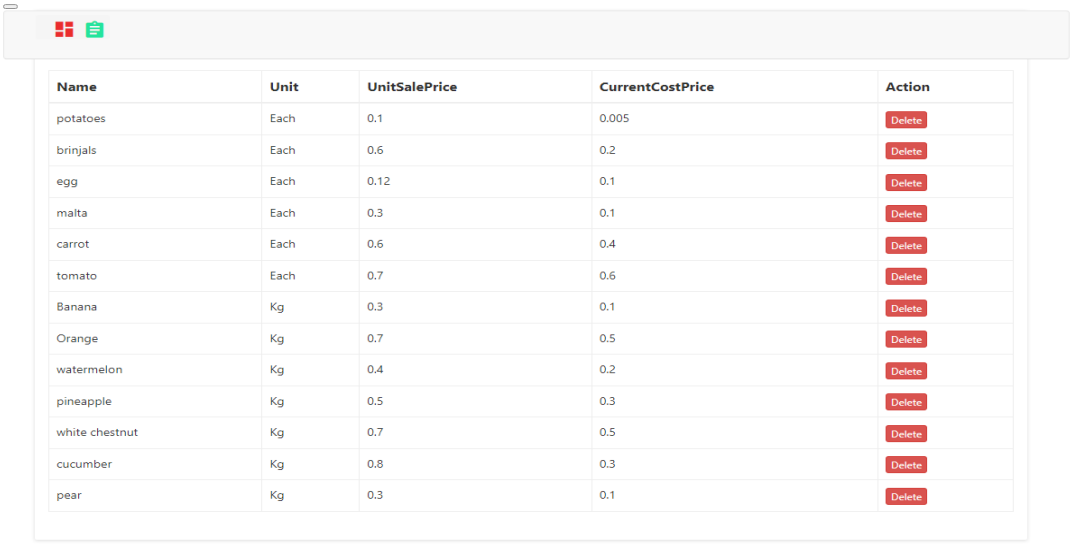


Figure 8: Running the local server via Python



Name	Unit	UnitSalePrice	CurrentCostPrice	Action
potatoes	Each	0.1	0.005	Delete
brinjals	Each	0.6	0.2	Delete
egg	Each	0.12	0.1	Delete
malta	Each	0.3	0.1	Delete
carrot	Each	0.6	0.4	Delete
tomato	Each	0.7	0.6	Delete
Banana	Kg	0.3	0.1	Delete
Orange	Kg	0.7	0.5	Delete
watermelon	Kg	0.4	0.2	Delete
pineapple	Kg	0.5	0.3	Delete
white chestnut	Kg	0.7	0.5	Delete
cucumber	Kg	0.8	0.3	Delete
pear	Kg	0.3	0.1	Delete

Figure 9: Manage Product Page

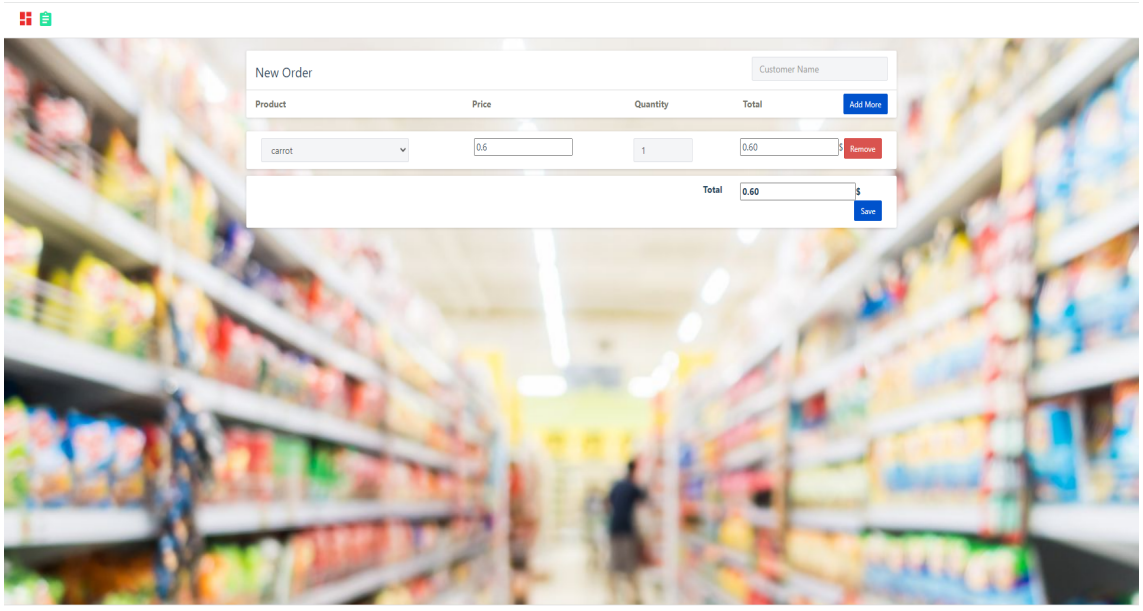


Figure 10: New Order Page

Conclusions

I wanted to make a inventory management system for online grocery store. Here i have created two basic pages (Product & Order Page) for this project. Future work can be done by implementing other pages and by creating a user friendly operational environment for non-tech people and also for management. Codes used for this project are attached with a different file.

References

1. https://www.sciencedirect.com/science/article/pii/S1567422318300085
2. https:ieeexplore.ieee.org/abstract/document/9489108