**Fall 2022**

**CIS 694 – Object-oriented Software Engineer**

**Final Report**

# Project: Restaurant Management System

**Presented By:**

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# Chapter One

# Introduction

## 1.1 Overview:

Online Restaurant Management System is a web application to manage activities of restaurant. This is a process to order food from a restaurant by using online system. Running a restaurant is hectic enough as it is, so why not make the day-to-day processes easier by having a system that will help ease the workload for you. There are so many day-to-day processes that restaurants must deal with. These can range from scheduling in employees, managing HR, monitoring employee attendance to preparing for payroll and to keep record of transactions and database. In current marketplace, there is a great value for food, restaurants, and its management. There is day by day increment on the number of restaurants and food places that are emerging today. It can be considered as a rapid growth in the field of business and food restaurants and its management system. The management system applied for every restaurant is different from the other one. Some restaurants may be bigger while the other may be smaller, but every restaurant or hotel requires a management system, and this is termed as Restaurant Management System.

RMS that is, Restaurant Management Systems are the crucial technologies that enables a single outlet or enterprise to better serve its customers and aid employees with food and beverage transactions and controls. Restaurant management System is database program that keeps record of all transaction carried out in the restaurant on daily bases. The Restaurant Management System helps the restaurant management to keep adequate record of all transactions carried out and does that will still be carried out by the restaurant and maintain the database of the restaurant.

Every great restaurant has many parts that contribute to its success: delicious food, excellent customer service, an inviting atmosphere, and competent staff. But restaurant management is the glue that holds it all together. Restaurant Managers take on many responsibilities, including effectively recruiting and managing employees, overseeing operations, handling customer complaints, and generating financial reports. Other important aspects of a Restaurant Manager's duties are to ensure health and safety regulations and manage inventory.

## 1.2 Background study and Requirements:

The main objective is to maximize the profit by increasing efficient and decreasing the mistakes that takes place in the kitchen, this will be done without compromising customer satisfaction. At this moment of time, there are still numerous restaurants that still use paper-based system to get messages across between the restaurant and the kitchen, this way of communication is one of the least efficient methods. However, this approach may be implemented and designed in a successful profitable restaurant but there are numerous problems which might be seen as reducing the restaurants efficiency, they are the following:

- The lack of communication that is caused by handwriting.
- Uncontrolled order logging (poor order taking).
- Unproductive communication between restaurant and kitchen.
- Faults with order taking and lack of time management.
- Lack of good quality stock management.
- Limited statistical output. So, to overcome these problems, we have made an application that is restaurant management system that mainly focuses on the above given problems. We have tried to build a user-friendly interface.

To revoke these types of problem we need this software. It is very logical to handle the above problems. This system will not be complex, very easy to understand (user friendly interface). In current marketplace, upper and middle-class restaurants will have much demand of this system.

The project will then use architectural design to generate a broad vision for the evolving system. it moves on to system modeling, which involves creating design models to comprehend the limitations and characteristics of the system. Finally, effective user interface design methods are covered. We have used HTML, CSS, python for frontend and for backend management we have used flask framework and MySQL. We have used the python language for coding part, and we used visual studio code to do some commits.

The use case diagram of restaurant management system is as follows.

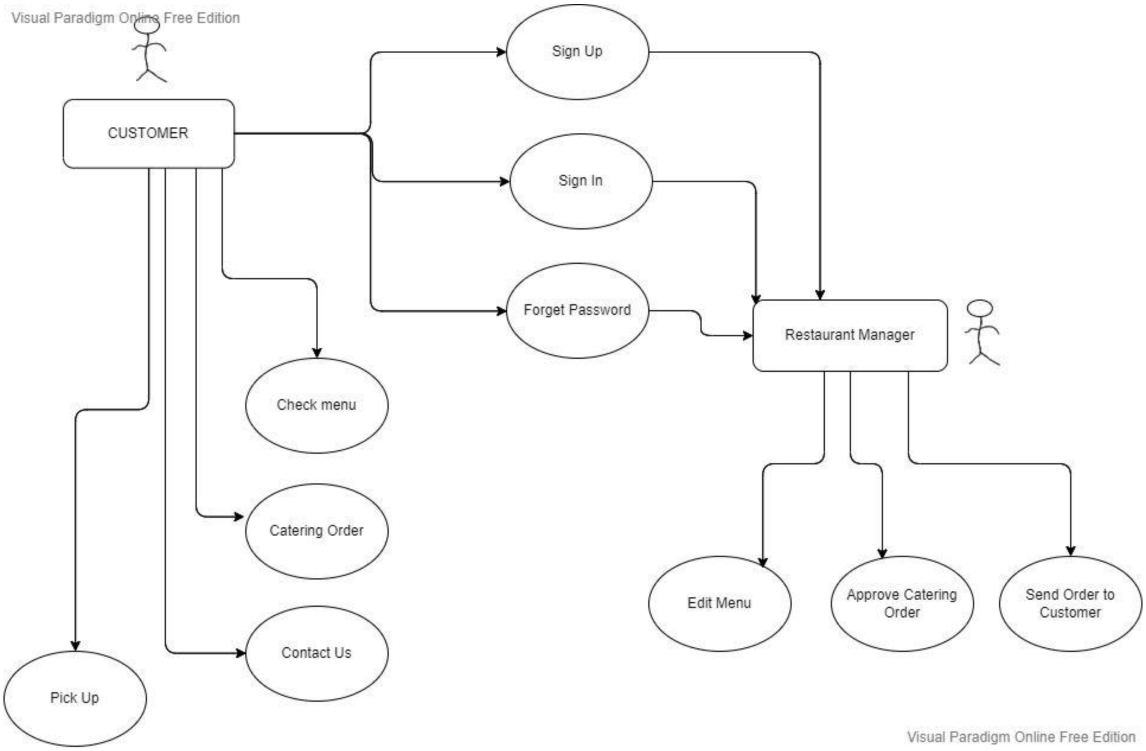


Fig: Use-Case Diagram for Restaurant Management System.

The following is the Software Requirement Specification document. Software Requirements Specific

# Chapter Two

# System Design

## 2.1 Software Design:

The web application will have two interfaces. Each for Restaurant Manager and Customer. Customer's interface will consist of a scrollable menu listing available items, and their price. When the customer selects some dishes and place the order, it will be stored in "Cart". Whenever there is a party order customers can add/modify/delete accordingly to their requirement. And they can add/modify/delete number of people. And they can specify their instructions and add up to their spice levels.

MVC or model view controller architecture was used to develop this system. As a software design pattern for developing web applications MVC is popular. MVC architecture divides web application in to three parts. All those parts are interconnected. It is fully capable to support rapid web application development and dynamic interactivity with the database.

**Front End:**

Visual Studio

GUI Design

Database Modelling

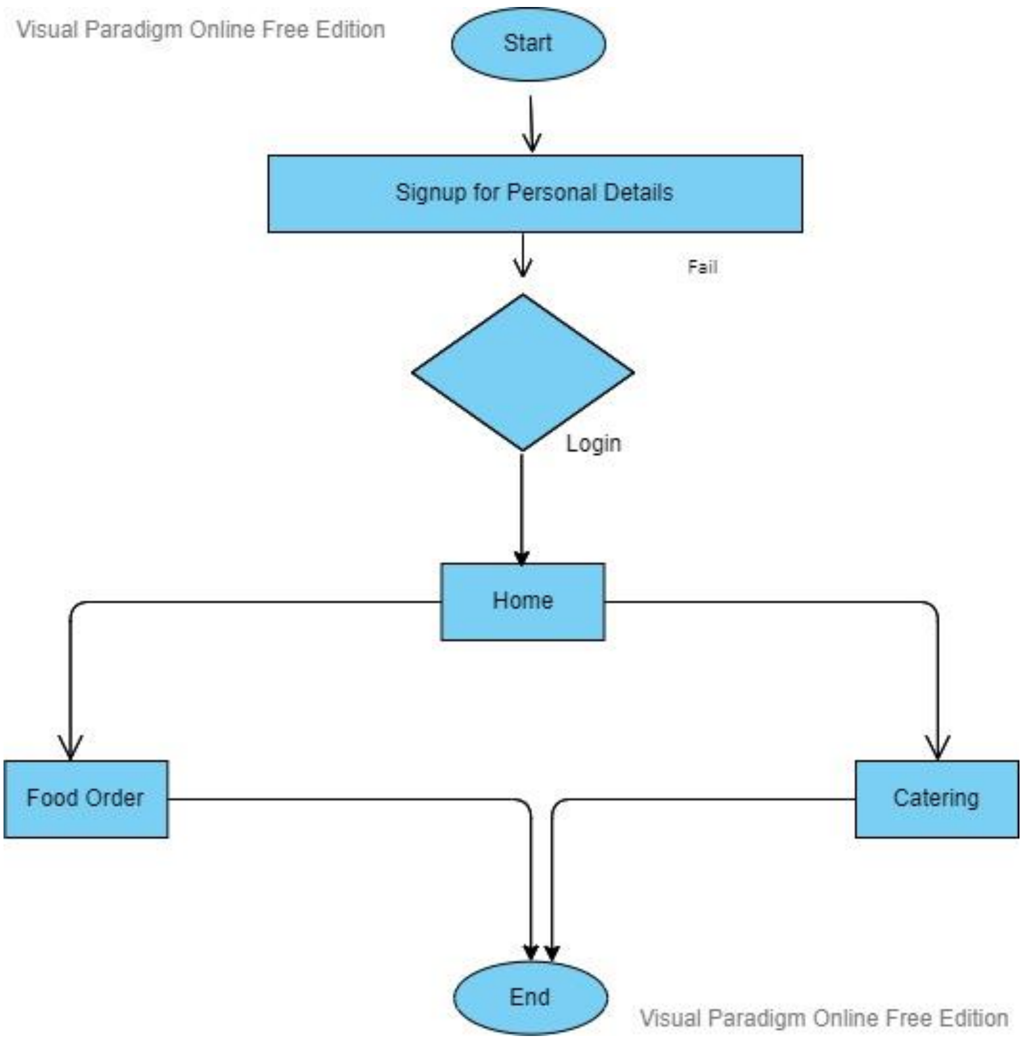
Design Control

**Back End:**

Design tables

Design forms

## Static Model:



Visual Paradigm Online Free Edition
Start
Signup for Personal Details
Fail
Login
Home
Food Order
Catering
End
Visual Paradigm Online Free Edition

Fig:8 Admin Workflow Process.

## Dynamic models

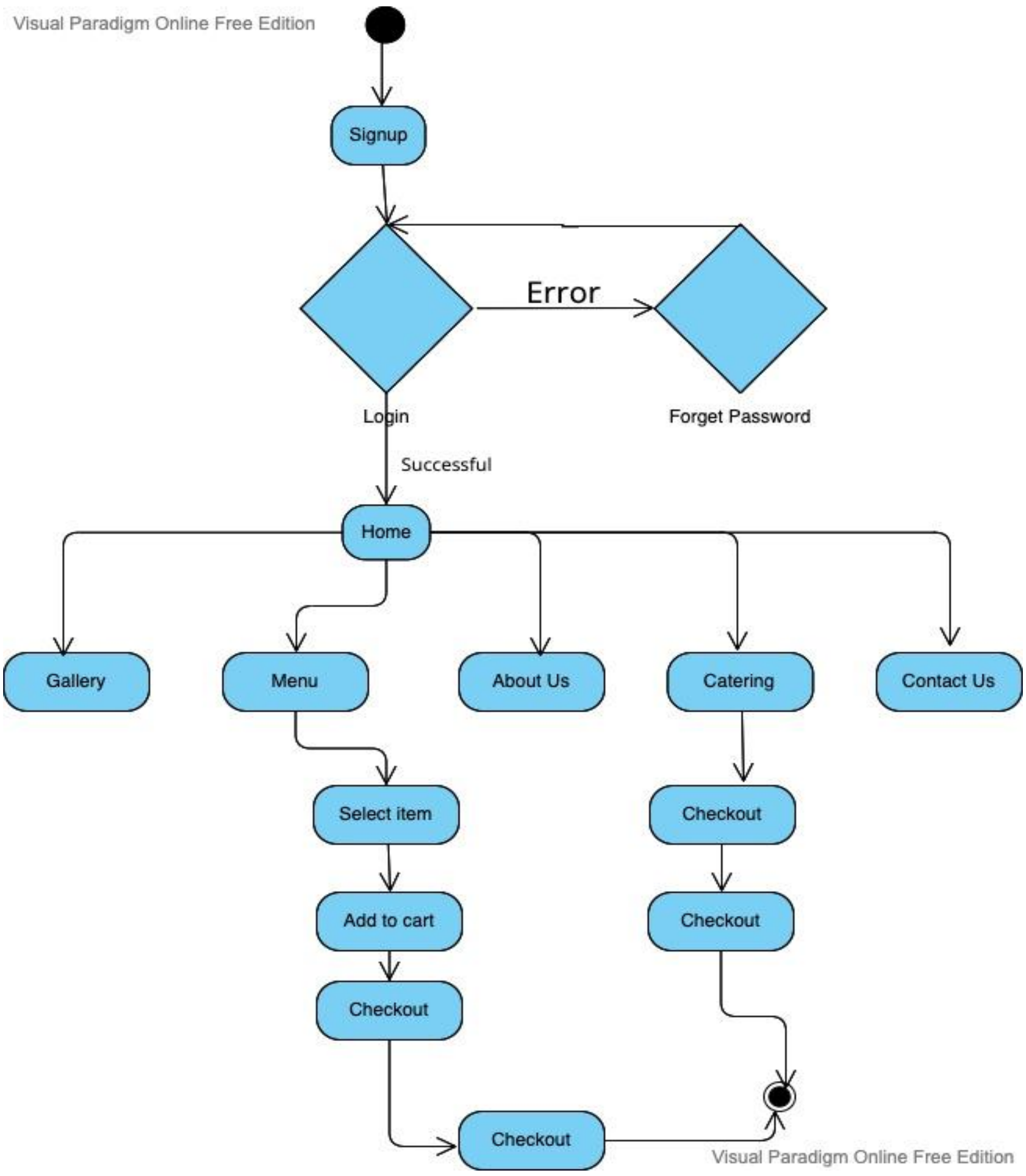
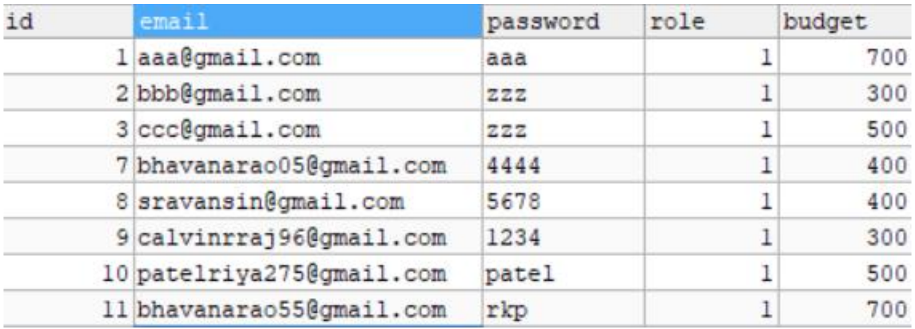


Fig:9 Activity Diagram for customer order.

## 2.2 Database Design Concepts:

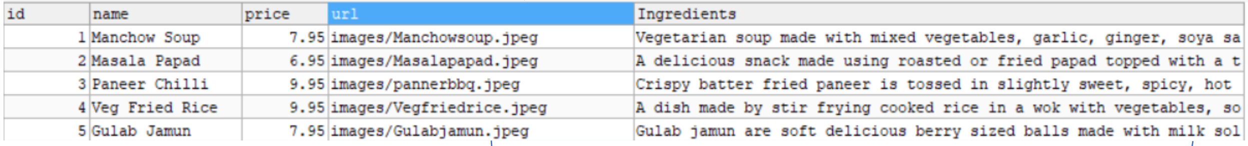
The database was the backbone to some highly important functional requirements, therefore the schema needed to have the structure to deal with them. Some important design concepts of the database are Ability to store prepared ingredients to reduce the size of the meal ingredient list. Recall, that a prepared ingredient is a collection of ingredients. Ability to allow numerous options for optional ingredients within meals so that every ingredient (or prepared ingredient) is part of a category. If an ingredient is optional, then that ingredient should be able to be removed or swapped with any other ingredient in the same category. Ability to control the stock levels by allocating a variable to all prepared ingredients and meals with the variable reacting in real time to the status of the item's ingredient stock level. Ability to cope with new supplies where the price differs to the current price within the database**.**

User Table:



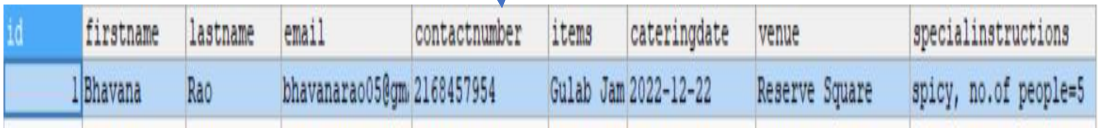
| id | email | password | role | budget |
|---|---|---|---|---|
| 1 | aaa@gmail.com | aaa | 1 | 700 |
| 2 | bbb@gmail.com | zzz | 1 | 300 |
| 3 | ccc@gmail.com | zzz | 1 | 500 |
| 7 | bhavanarao05@gmail.com | 4444 | 1 | 400 |
| 8 | sravansin@gmail.com | 5678 | 1 | 400 |
| 9 | calvinrraj96@gmail.com | 1234 | 1 | 300 |
| 10 | patelriya275@gmail.com | patel | 1 | 500 |
| 11 | bhavanarao55@gmail.com | rkp | 1 | 700 |

Restaurant Table:



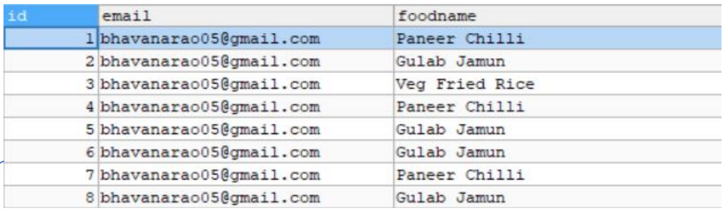
| id | name | price | url | Ingredients |
|---|---|---|---|---|
| 1 | Manchow Soup | 7.95 | images/Manchowsoup.jpeg | Vegetarian soup made with mixed vegetables, garlic, ginger, soya sa |
| 2 | Masala Papad | 6.95 | images/Masalapapad.jpeg | A delicious snack made using roasted or fried papad topped with a t |
| 3 | Paneer Chilli | 9.95 | images/pannerbbq.jpeg | Crispy batter fried paneer is tossed in slightly sweet, spicy, hot |
| 4 | Veg Fried Rice | 9.95 | images/Vegfriedrice.jpeg | A dish made by stir frying cooked rice in a wok with vegetables, so |
| 5 | Gulab Jamun | 7.95 | images/Gulabjamun.jpeg | Gulab jamun are soft delicious berry sized balls made with milk sol |

Carter Table:



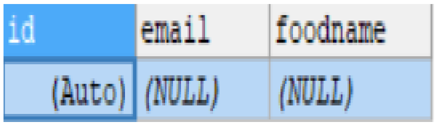
| id | firstname | lastname | email | contactnumber | items | cateringdate | venue | specialinstructions |
|---|---|---|---|---|---|---|---|---|
| 1 | Bhavana | Rao | bhavanarao05@gm | 2168457954 | Gulab Jam | 2022-12-22 | Reserve Square | spicy, no.of people=5 |

Cart Table:



| id | email | foodname |
|---|---|---|
| 1 | bhavanarao05@gmail.com | Paneer Chilli |
| 2 | bhavanarao05@gmail.com | Gulab Jamun |
| 3 | bhavanarao05@gmail.com | Veg Fried Rice |
| 4 | bhavanarao05@gmail.com | Paneer Chilli |
| 5 | bhavanarao05@gmail.com | Gulab Jamun |
| 6 | bhavanarao05@gmail.com | Gulab Jamun |
| 7 | bhavanarao05@gmail.com | Paneer Chilli |
| 8 | bhavanarao05@gmail.com | Gulab Jamun |

Checkout Table:



| id | email | foodname |
|---|---|---|
| (Auto) | (NULL) | (NULL) |

Fig: Class diagram of Restaurant Management System.

## Workflow Process:

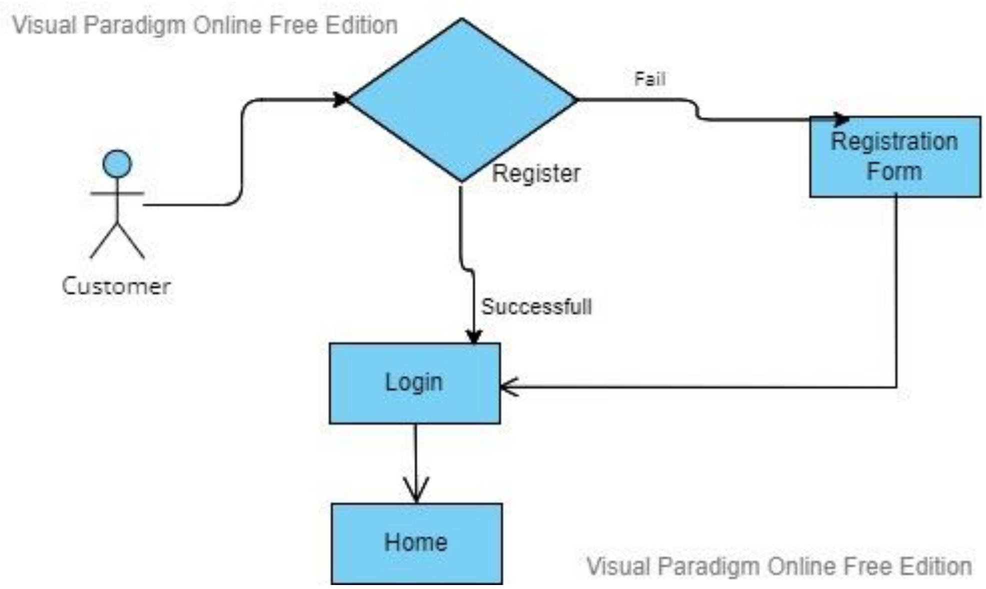

Visual Paradigm Online Free Edition
Fail
Registration Form
Register
Customer
Successfull
Login
Home
Visual Paradigm Online Free Edition

**Fig:** Registration Workflow Process

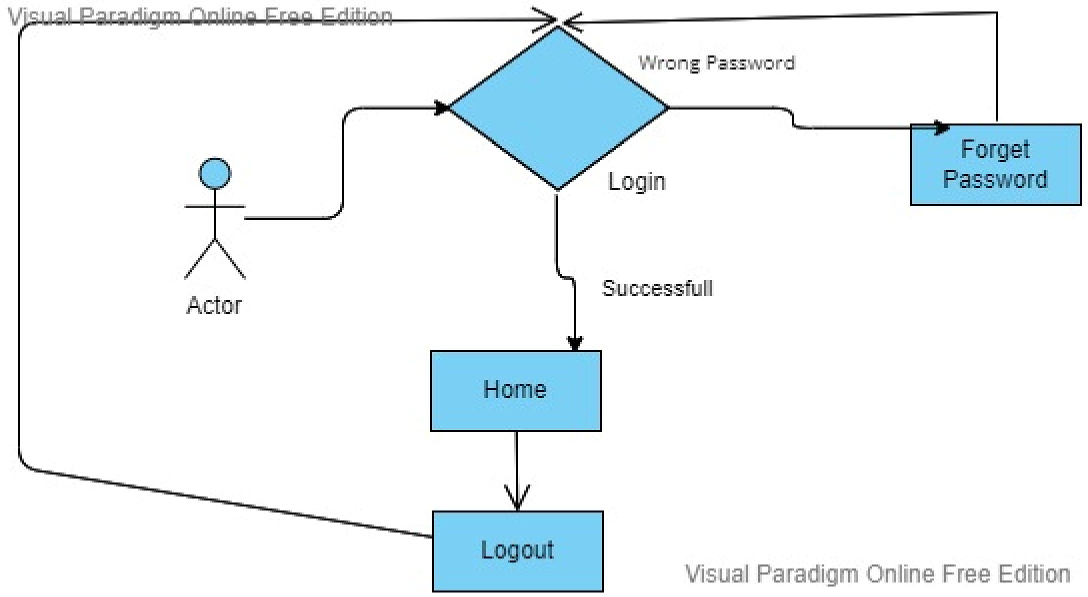

Visual Paradigm Online Free Edition
Wrong Password
Login
Forget Password
Actor
Successfull
Home
Logout
Visual Paradigm Online Free Edition

**Fig:** Login Workflow Process

**2.3 User Characteristics:**

**Admin:** The administrator has all the rights to access the system. He is the one who has all rights to view the members and product details, modify those details. He can add various product based on the category. He can also set the available quantity of a product and its reasonable price. Also he canalso set discount in various occasion.

**Users:** The user can log in to the system by using his specific email and password. User can view the products and order the products according to their own needs. He can view his profile and update his details. User can find various product by using search option easily. update his details. He can update his personal information by logging into the system. User can find various product by using search option easily.

The software design specification document of our project is Software Design Specification_Updatec

# Chapter Three

# Guidelines

## 3.1 User Guidelines:

In this project, we need to install python from our command prompt after downloading the python updated version zip file and then extract the files. After that install the required imports so that the project runs correctly.

Download the source code from the GitHub https://github.com/patelriyak/Group5-Oops-Project/tree/develop from this link. So that you obtain the source code in a zip file and extract it and we need to install MySQL for gathering the data of database and running the database code which is “ restaurantDB.sql , in the MySQL Community Server. Then run using MySQL server and make sure it is up and running since we need to connect the database to the localhost for the project to run without any errors. Then in the terminal open the corresponding directory path of the project and run the command “python app.py”.

After that you can open any web browser of your choice and then open https://localhost:5000. And you are good to access the restaurant management system which we have implemented.

- **Planning & Requirements:** As with most any development project, the first step is gone through an initial planning stage to map out the specification documents, establish software or hardware requirements, and generally prepare for the upcoming stages of the cycle.
- **Analysis & Design:** Once planning is complete, an analysis is performed to nail down the appropriate business logic, database models, and the like that will be required at this stage in the project. The design stage also occurs here, establishing any technical requirements (languages, data layers, services, etc) that will be utilized to meet the needs of the analysis stage.
- **Implementation:** With the planning and analysis out of the way, the actual implementation and coding process can now begin. All planning, specification, and design docs up to this point are coded and implemented into this initial iteration of the project.
- **Testing:** Once this current build iteration has been coded and implemented, the next step is to go through a series of testing procedures to identify and locate any potential bugs or issues that have cropped up.

- **Evaluation:** Once all prior stages have been completed, it is time for a thorough evaluation of development up to this stage. This allows the entire team, as well as clients or other outside parties, to examine where the project is at, where it needs to be, what can or should change, and so on.

# Chapter Four

# Testing

## 4.1 What is Testing:

In computer hardware and software development, testing is used at key checkpoints in the overall process to determine whether objectives are being met. For example, in software development, product objectives are sometimes tested by product user representatives. Software testing is very important because of the following reasons: Software testing is really required to point out the defects and errors that were made during the development phases. It's essential since it makes sure of the customer reliability and their satisfaction in the application.

## 4.2 Test Plan:

This section describes the overall testing strategy, and the project management issues that are required to properly execute effective tests. Three goals were identified for the test plan: reliability, security, and usability. Reliability and security testing was accommodated by constructing test cases and comparing expected and actual results. Usability testing, however, is completely different. Usability testing would require some domain experts to use the software and perhaps even deploy the software in a restaurant environment. Due to the time constraints of the project, we were unable to perform any formal usability testing using persons external to the development team. Test cases were created to test adding, deleting, and editing both items and employees. Specifically, these test cases make certain that employee and items are stored and retrieved from the database correctly. Test cases were also generated to perform boundary testing on how many entries could be successfully added or updated. In addition, test cases where created to verify the function of the compare class, which is used to validate input.

### 4.2.1 Software to be tested

The online websites will be tested in Amazon Web Services. And we can check it from the admin’s laptop whether the localhost is up and running.

### 4.2.2 Testing tools and environment

The test environment for tools is before running the python shell and compiling the app.py, we need to make sure whether the MySQL database is up and running. And then we can compile the app.py and wait for the localhost:5000 and the webpage starts running. There we can login, signup and then go deep into the website to see the Menu,

testimonials and adding items to cart, etc.

Coming to Hardware we need to make sure MySQL and python are installed in the admin's laptop and make sure the internet connection is stable.

### 4.2.3 Test schedule

A detailed schedule for testing is described. For this application, the waterfall model is used. So, after the application is created, testing will take place. However, during development, each developer will carry out unit testing.

## 4.3 Test Cases:

This section enumerates a complete list of test cases for the software. The template of test cases is as follows in the below table.

Testing such system requires testers to create menu items with different combinations and validating the changes are pushed correct to the system.

Here are the below test cases for our project.

| Test Case Name | Test Steps | Action | Test Data | Expected Result | Test Result |
|---|---|---|---|---|---|
| Launch site and login | 1 | http://localhost:5000/ | | Login page display | Login page display |
| Login | 2 | http://localhost:5000/ | username=aaa@gmail.com<br>password=aaa | Login successfully and goto main login page | Login successfully and goto main login page |
| Signup | 3 | http://localhost:5000/signup | username=ccc@gmail.com<br>password=ccc<br>confirm password = ccc | Signup successcully and goto login page | Signup successcully and goto login page http://localhost:5000/login |
| Forgot password | 4 | http://localhost:5000/forget | | Goto forgot page | Goto forgot page |
| Forgot password | 5 | http://localhost:5000/forgetpassword | username=ccc@gmail.com | Goto forgot page | Goto forgot page |

| | | | | | |
|---|---|---|---|---|---|
| Forgot password | 6 | http://localhost:5000/forgetpassword | Password=fff | Change password successfully and goto login page | Change password successfully and goto login page |
| Main pages | 7 | http://localhost:5000/res/home/ | | After login goto main page | After login goto main page |
| Menu pages | 8 | http://localhost:5000/res/res_list/ | | Click menu in menu bar, goto menu page | Click menu in menu bar, goto menu page |
| Details | 9 | http://localhost:5000/res/add_cart/?name=Manchow%20Soup | Manchow Soup | Goto add_cart page | Goto add_cart page |
| Add Cart | 10 | http://localhost:5000/res/add_cart/ | | Add cart page | Add cart page |
| Checkout | 11 | http://localhost:5000/res/my_cart/ | | My cart page | My cart page |
| Checkout | 12 | http://localhost:5000/res/checkout/?name=Manchow%20Soup | | Checkout page | Checkout page |
| Checkout | 13 | http://localhost:5000/res/my_cart/ | | After checkout, goto mycart page | After checkout, goto mycart page |
| Gallery | 14 | http://localhost:5000/gallery/gallery | | Gallery Page | Gallery Page |
| Catering | 15 | http://localhost:5000/catering/catering | | Catering Page | Catering Page |
| Cater Placed | 16 | http://localhost:5000/caterplace | | Catering Placed successfully | Catering Placed successfully |
| About us | 14 | http://localhost:5000/about/about | | About us page | About us page |
| Contact us | 15 | http://localhost:5000/contact/contact | | Contact us page | Contact us page |

Test Case details.xlsx

The updated test cases document provided in the Microsoft Excel sheet.

The updated simple test plan document. Simple Test Plan_Updated.pdf

# Chapter 5

# Implementation

## 5.1 Project Implementation:

This project used an agile methodology called Extreme Programming (XP). This type of methodology utilizes an iterative process involving customer communication and feedback. The iterations were short with a new software version built at the end of each phase. Version control helped with debugging as the versions could be rolled back to find the iteration that caused the bug. when implementing the code to retrieve data from the database, we must consider the case that in the future this system will need maintenance and added features to keep the product competitive within the market. The problem is we cannot predict the future; all we can do is rely on a well-structured code base written using all the skills and techniques from the field to ensure easy readability of the code. Along with this database object, inheritance played an important role as a generic class created the SQL statements using an array of table field names and input values. Any object that required to send or retrieve data to the database could extend this generic class giving that object the functionality to insert, delete and update any table within the database.

We were able to create a computerized system for Silk Route to maintain billing & Restaurant records. This system can store billing records securely and retrieve the records whenever needed easily. Data entering of customers and employees are also included in this system along with the order and the billing process. Customers, restaurant records and employees are interconnected to maintain the accuracy of this system. This system can also be further improved adding many other features and including the other systems as well. Finally, we believe that we were able to launch an effective computerized system to the restaurant causing the restaurant to perform well in the future regarding the billing and restaurant records.

## 5.2 Implementation Tools for the project.

- HTML
- CSS
- Bootstrap
- Python
- MySQL
- Flask

- Localhost – https://127.0.0.1:5000/

### 5.2.1 HTML

Every webpage you look at is written in a language called HTML. You can think of HTML as the skeleton that gives every webpage structure. In this course, we'll use HTML to add paragraphs, headings, images and links to a webpage. In the editor to the right, there's a tab called test.html. This is the file we'll type our HTML into. Like any language, it has its own special syntax. A browser's job is to transform the code in test.html into a recognizable webpage! It knows how to lay out the page by following the HTML syntax.

### 5.2.2 CSS

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language.[1] Most often used to set the visual style of web pages and user interfaces written in HTML and XHTML, and is applicable to rendering in speech, or on other media. Along with HTML and JavaScript, CSS is a cornerstone technology used by most websites to create visually engaging webpages, user interfaces for web applications, and user interfaces for many mobile applications. CSS is designed primarily to enable the separation of document content from document presentation, including aspects such as the layout, colors, and fonts.[3] This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple HTML pages to share formatting by specifying the relevant CSS in a separate .CSS file, and reduce complexity and repetition in the structural content.

### 5.2.3 Python

Python is a very popular open-source software development language that offers enhanced process control capabilities. It can develop complex multi-protocol network applications while also maintaining simple and straightforward syntax. Platforms like Google, Instagram, Spotify, and Reddit all use Python. The first thing to realize when making a comparison is that ‘Python’ is an interface. There’s a specification of what Python should do and how it should behave (as with any interface). And there are multiple implementations (as with any interface).

The second thing to realize is that ‘interpreted’ and ‘compiled’ are properties of an implementation, not an interface.

### 5.2.4 MySQL

MySQL is a database management system. A database is a structured collection of data. It may be anything from a simple shopping list to a picture gallery or the vast amounts of information in a corporate network. To add, access, and process data stored in a computer database, you need a database management system such as MySQL Server. Since computers are very good at handling large amounts of data, database management systems play a central role in computing, as standalone utilities, or as parts of other applications.

## 5.3 Implemented Screenshots

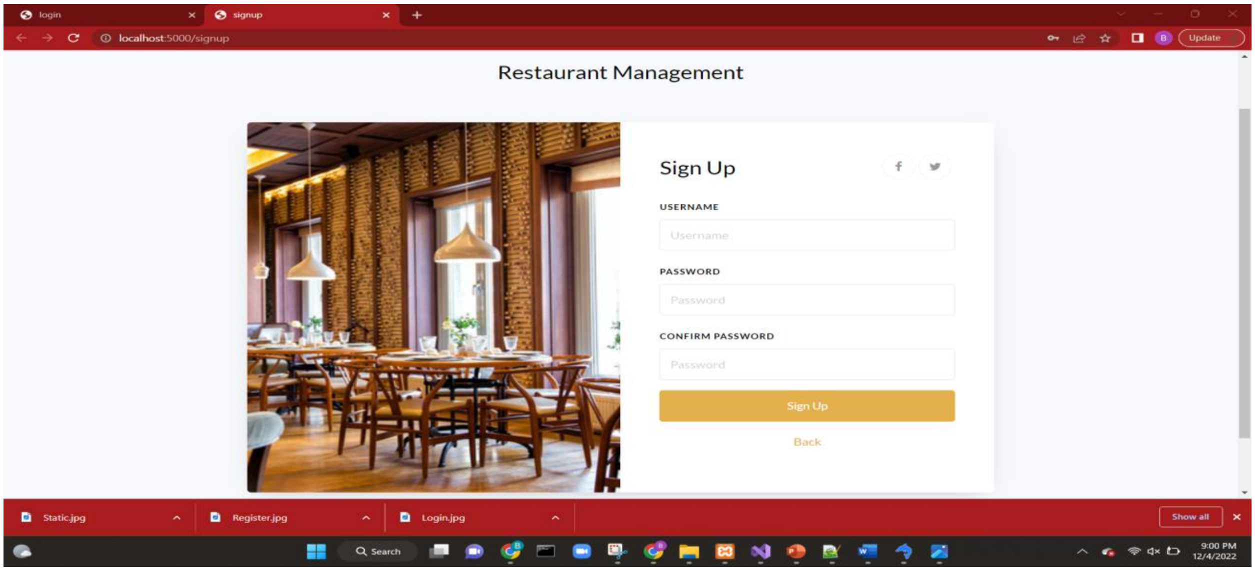


Fig: Sign Up Page

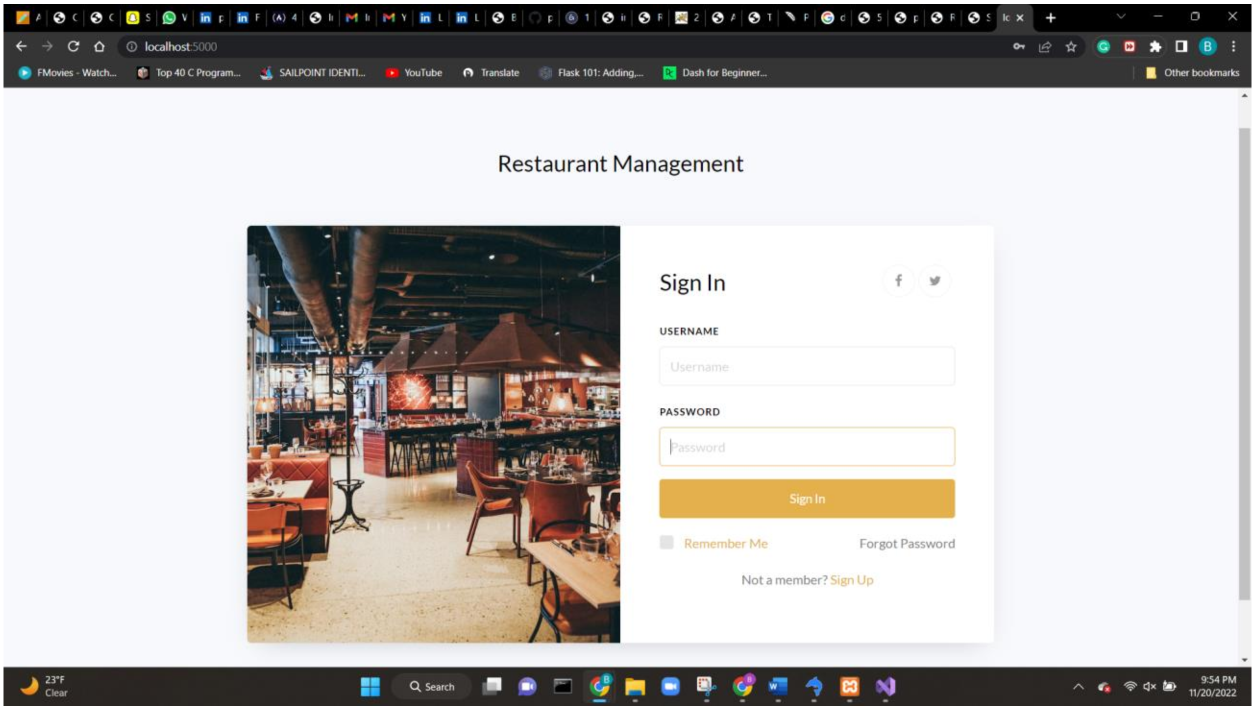


Fig: Sign in Page

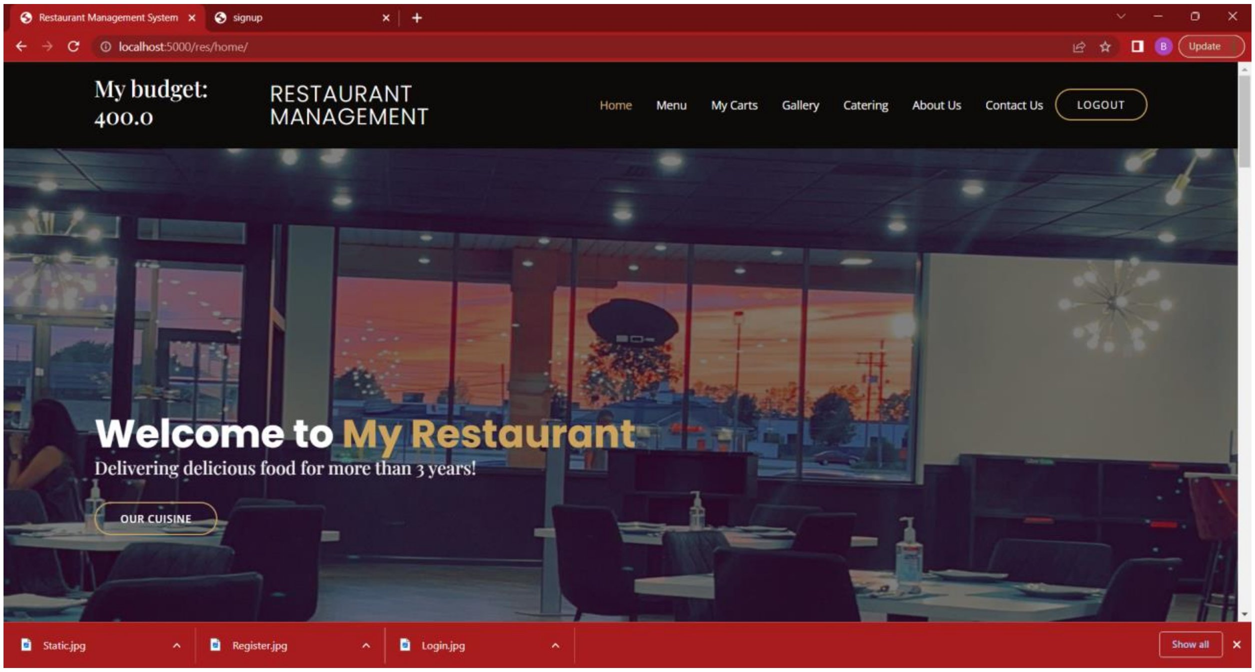
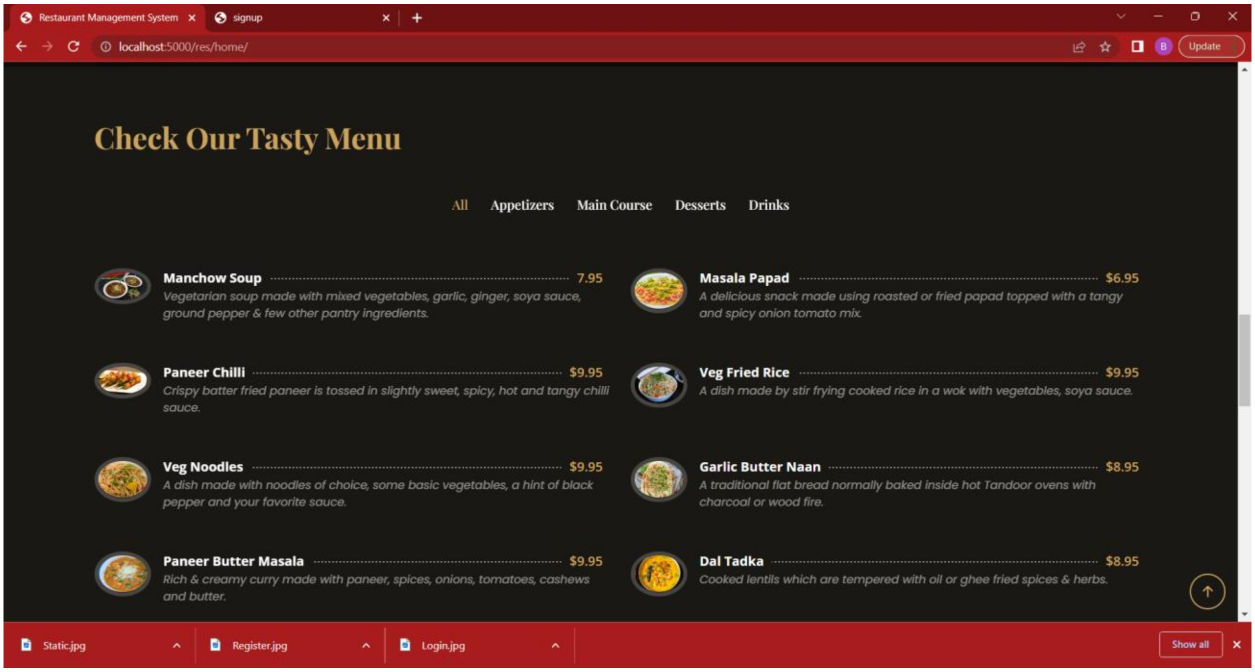


Fig: Home Page



Check Our Tasty Menu

All | Appetizers | Main Course | Desserts | Drinks

**Manchow Soup** ........ 7.95
*Vegetarian soup made with mixed vegetables, garlic, ginger, soya sauce, ground pepper & few other pantry ingredients.*

**Masala Papad** ........ $6.95
*A delicious snack made using roasted or fried papad topped with a tangy and spicy onion tomato mix.*

**Paneer Chilli** ........ $9.95
*Crispy batter fried paneer is tossed in slightly sweet, spicy, hot and tangy chilli sauce.*

**Veg Fried Rice** ........ $9.95
*A dish made by stir frying cooked rice in a wok with vegetables, soya sauce.*

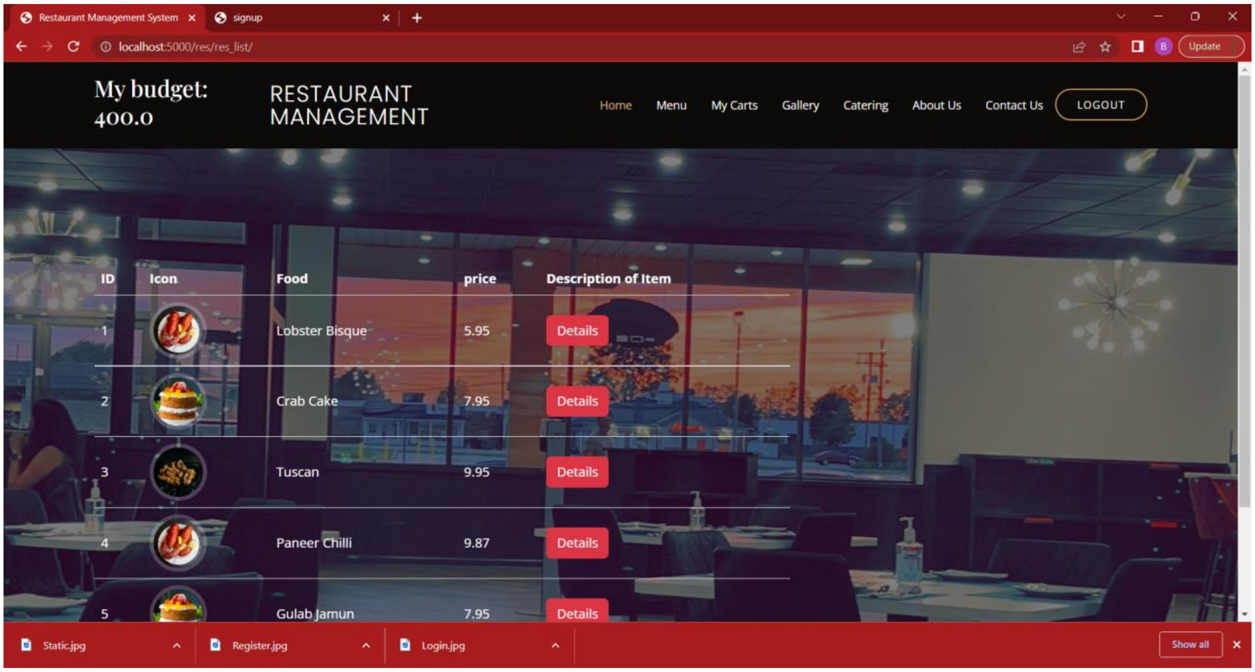
**Veg Noodles** ........ $9.95
*A dish made with noodles of choice, some basic vegetables, a hint of black pepper and your favorite sauce.*

**Garlic Butter Naan** ........ $8.95
*A traditional flat bread normally baked inside hot Tandoor ovens with charcoal or wood fire.*

**Paneer Butter Masala** ........ $9.95
*Rich & creamy curry made with paneer, spices, onions, tomatoes, cashews and butter.*

**Dal Tadka** ........ $8.95
*Cooked lentils which are tempered with oil or ghee fried spices & herbs.*

Fig: Home Menu



My budget:
400.0

RESTAURANT MANAGEMENT

| ID | Icon | Food | price | Description of Item |
|---|---|---|---|---|
| 1 | | Lobster Bisque | 5.95 | Details |
| 2 | | Crab Cake | 7.95 | Details |
| 3 | | Tuscan | 9.95 | Details |
| 4 | | Paneer Chilli | 9.87 | Details |
| 5 | | Gulab Jamun | 7.95 | Details |

Fig: Menu Page

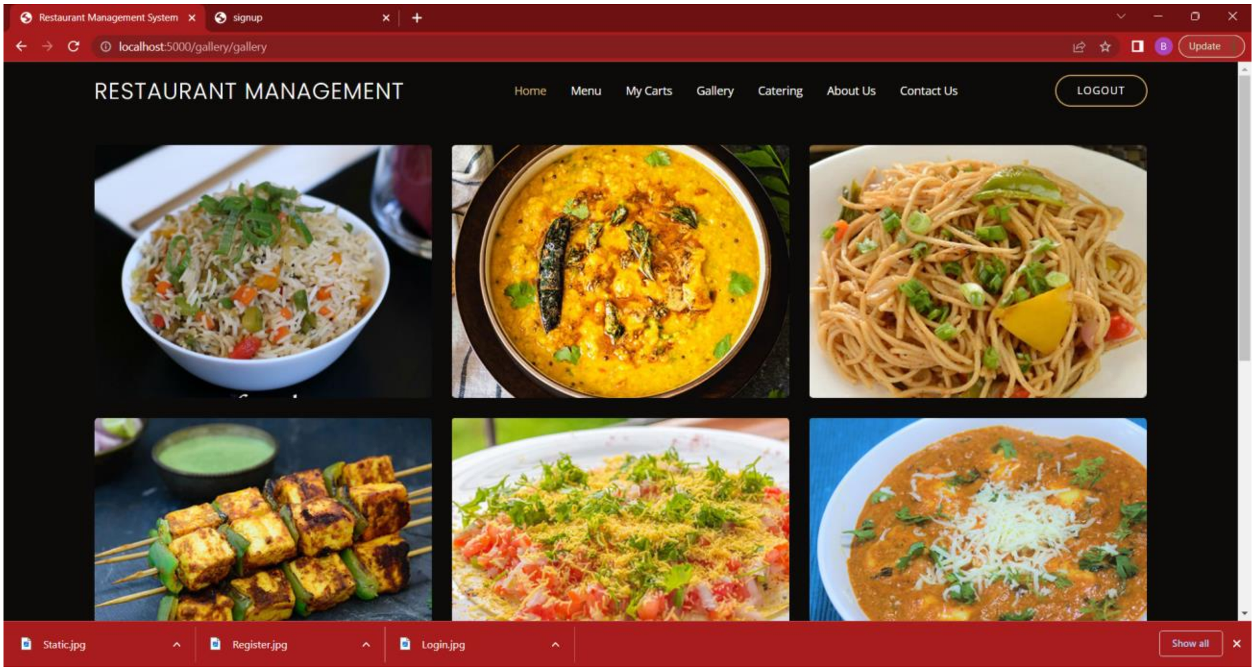
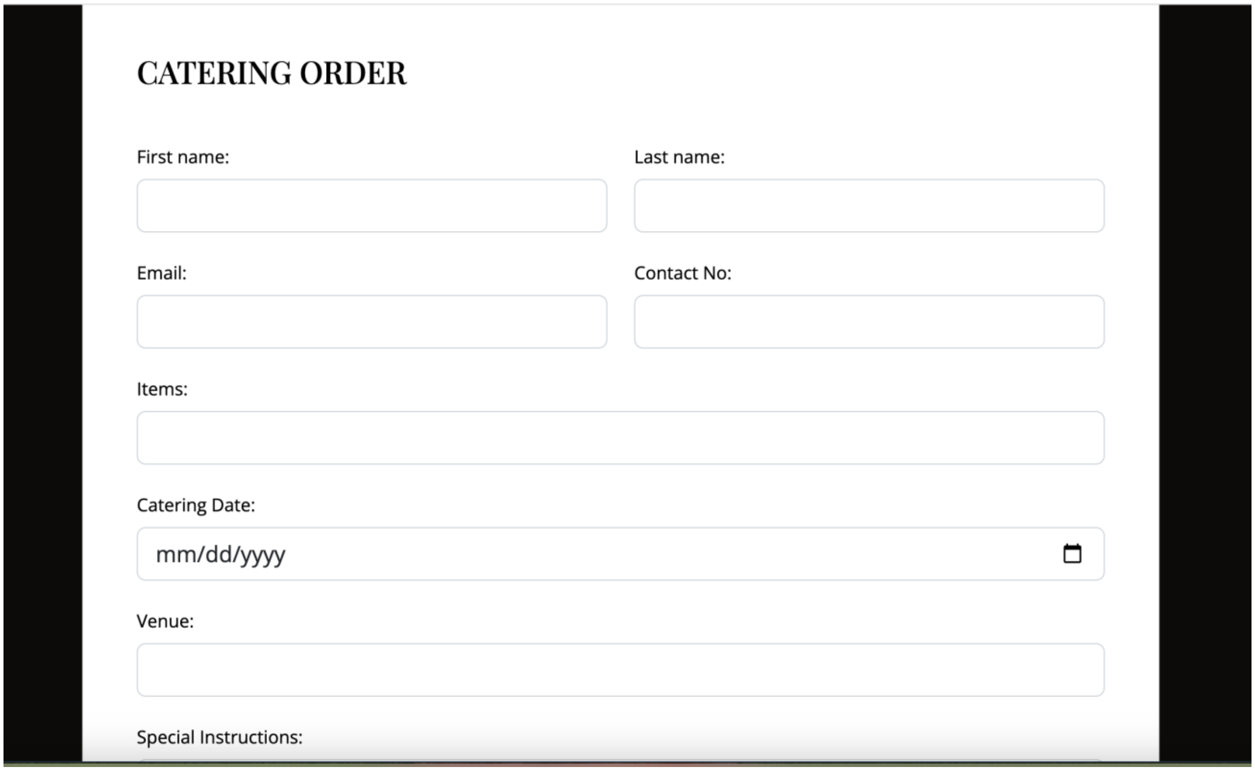


Fig: Gallery Page



CATERING ORDER

First name:

Last name:

Email:

Contact No:

Items:

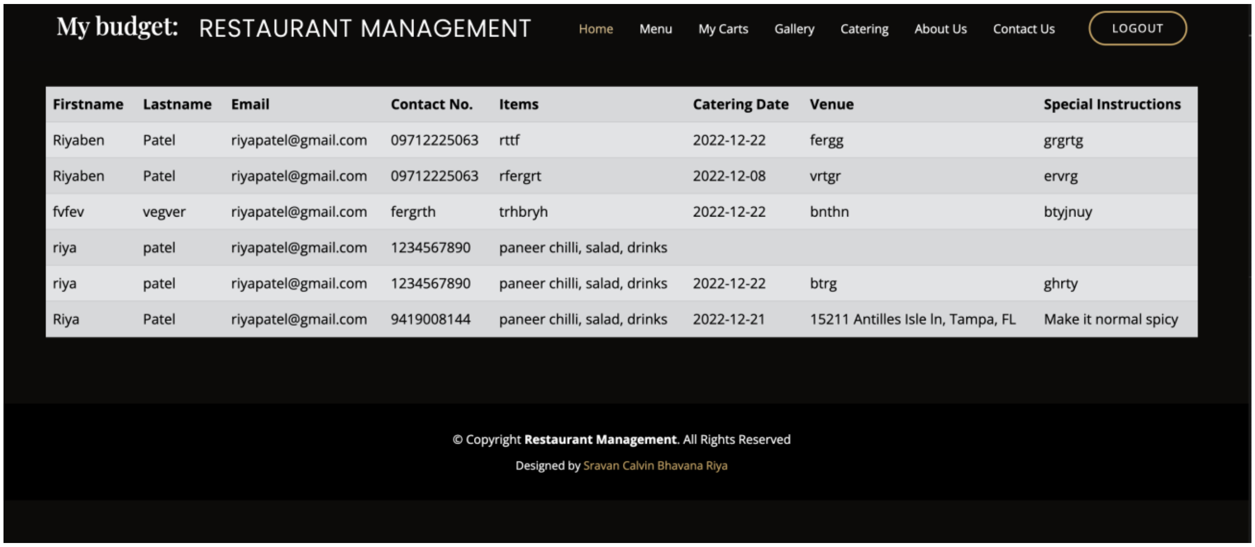
Catering Date:

mm/dd/yyyy

Venue:

Special Instructions:

Fig: Catering Page



| Firstname | Lastname | Email | Contact No. | Items | Catering Date | Venue | Special Instructions |
|---|---|---|---|---|---|---|---|
| Riyaben | Patel | riyapatel@gmail.com | 09712225063 | rttf | 2022-12-22 | fergg | grgrtg |
| Riyaben | Patel | riyapatel@gmail.com | 09712225063 | rfergrt | 2022-12-08 | vrtgr | ervrg |
| fvfev | vegver | riyapatel@gmail.com | fergrth | trhbryh | 2022-12-22 | bnthn | btyjnuy |
| riya | patel | riyapatel@gmail.com | 1234567890 | paneer chilli, salad, drinks | | | |
| riya | patel | riyapatel@gmail.com | 1234567890 | paneer chilli, salad, drinks | 2022-12-22 | btrg | ghrty |
| Riya | Patel | riyapatel@gmail.com | 9419008144 | paneer chilli, salad, drinks | 2022-12-21 | 15211 Antilles Isle ln, Tampa, FL | Make it normal spicy |

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Designed by Sravan Calvin Bhavana Riya

Fig: Catering Page

# Chapter 5

# Implementation

## 6.1 Future Enhancement

In addition to the unfinished requirements, there are other possibilities of further improving the project. The improvements may include:

1. Presenting graphical floor plan for table management and reservation.

2. Support food order delivery and driver tracking.

3. Extension of pricing methods for individual or multiple recipes.

4. Advanced inventory control with material storage and expiry information; and

5. Managing customer loyalty membership and discount voucher. Another interesting possibility is to host the entire system on Cloud-based services. If the restaurant business model expanded to multiple outlets, the restaurant manager could access the data of different restaurants to view their performance reports or order materials from suppliers.

6. We plan to do checkout with online card Payment.

7. We change to add more functionality in catering, like No of people and count food like that way. Update order within 1 day.

8. Admin GUI