

A

PROJECT REPORT ON

**“RESTAURANT MANAGEMENT SYSTEM”**

SUBMITTED BY

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TO THE PARTIAL FULFILMENT OF

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## ACKNOWLEDGEMENT

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I express my profound thanks to our Head of Department “**Mr. VIKAS RAUT**” and Project Guide and Project In-charge “**Ms. ARCHANA KAMBLE**” and all those who have indirectly guided and helped me towards development of this project.

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## Project Synopsis

**Restaurant management** is the profession of managing a restaurant. It includes the major function of planning, organizing, staffing, directing, developing an attitude in food and beverage control systems and to efficiently and effectively plan menus at profitable prices, taking into consideration constraints, preparation and other variables affecting food and beverage outlets.

If we are trying to cope with QuickBooks or a series of Excel Spreadsheets, we are undoubtedly spending countless hours making crucial decisions with questionable data. If we are struggling with some other very expensive and complicated form of software, Restaurant Management System will give us something that desperately needs “MORE TIME TO GROW YOUR BUSINESS”! It is designed to avoid paper work. It is designed to increase operational efficiency, saving our money and time, maximizing profit and provide more security. This software is developed to manage the restaurant more effectively and efficiently by computerizing Meal Ordering, Billing, and Staff Record. This application is also designed for inventory control, menu, recipe and liquor costing, sales management.

There are lots of advantages of having quality restaurant management software. What it does is basically decreases the amount of work you have to do usually. Most of the restaurants these days deal larger amounts of cash along with credit cards being swiped, not to forget orders which make it quite difficult to keep up with everything. This is when restaurant management software becomes important.

This software can be used in any kind of restaurant like Bar, Sandwich Shop, Pizzeria, Steak House, and Cafe Shop, Deli, Buffet, and Catering business, Doughnut or Pastry Shop, Hotel restaurant/kitchen and more. It is not Web Based Application, it is standby Application.

## Requirement Specifications:

Name of Component	Specification
Operating System	Windows 7 and Above
Language Used	C#, SQL
Database	SQLServer
Development Platform	VisualStudio 2019 Community, Sql Management Studio 2018
Processor	2.0 Gigahertz with Dual Core or Above
Printer	Optional

# RESTAURANT MANAGEMENT SYSTEM

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## Ch.1 Introduction

### **1.1 Problem Statement**

Comprehending the current Restaurant Management Systems, they provide limited solutions to the Organisation. Current Softwares either focus on Status and Feedback of the Order, Accounting and Sales Records. They fail to deliver one stop solution that could address all the key values and execute all functions that are essential for monitoring Customer's, User's, records and administering Staff's performances. So, any organisation inclined towards automation is either levied upon with burden of adopting multiple softwares that not only becomes cumbersome but also turnouts to be very expensive or else is forced to content with orthodox manual methods. Organisation maintaining those multiple softwares simultaneously makes it difficult to access User's, Customer's, Menu's relative information at a go.

Also maintenance of Users or Staffs Records in the form of hardcopy makes it laborious to reproduce the necessary data as and when required since data filtering consumes time. Exercising Manual practices to map the Staff Members Salaries and pay on the basis of his pay scale, leaves and performance is challenging.

### **1.2 Limitations Of Existing Systems:**

- Need of extra manual efforts.
- Do not provide one-stop solution.
- Hard to retrieve relative information at a time.
- Complex with regards to user interaction.
- System may not work properly if Computer Suffers a defect.

## Ch.2 Need for New System

Proposed System is multi-user, so Organization Members can also participate in the system to Change Password view and search Menu Items, Customers, Users of the System, Bill Records.

There are lots of advantages of having quality restaurant management software. What it does is basically decreases the amount of work you have to do usually. Most of the restaurants these days deal larger amounts of cash along with credit cards being swiped, not to forget orders which make it quite difficult to keep up with everything. This is when restaurant management software becomes important

It enhances Manager's monitoring efficiency in Adding Menu Items, Customers, Users, Staffs, updating their details .

Thus proposed system is the right software to be incorporated into automation of Restaurant Management for helping the organisation needs with respect to skillful and effective Human Resource Management.

### **2.1 Features of New System**

- Easy to use GUI.
- This will minimize the number of employees at the back of the counter.
- The system will help to reduce the cost of labor.
- The system will be less probable to make mistake, since it's a machine.
- This will avoid long queues at the counter due to the speed of execution and number of optimum screens to accommodate the maximum throughput

### **Ch.3 Advantages of Proposed System**

1. It increases operational efficiency.
2. It is designed to help you cost your recipes and track inventory saving your Money and Time and maximizing profit.
3. It helps the restaurant manager to manage the restaurant more effectively and efficiently by computerizing Ordering, Billing
4. It is also designed for inventory control, menu, recipe and liquor costing, nutrition.
5. It increases the security.
6. It avoids paper work.
7. It is Simple to learn and easy to use.

## Ch.4 Feasibility Study

### **4.1 Technical Feasibility**

The minimum hardware requirement to implement the system is Pentium IV processor with 1 GB RAM. The whole system is being developed on Visual Studio 2017 Community IDE for GUI (Front End) and uses Microsoft SQL Management Studio 2018 for Database. These are the softwares which are very popular and easily available in market.

### **4.2 Economical Feasibility**

It is cost effective system. No extra efforts are needed to train for using the system. This system is quite beneficial with respect to its cost. The user shall be conversant with computer technology. The system is user friendly and thus easy to use and operate.

### **4.3 Operational Feasibility**

This system will reduce the workload and loss of vital information. It is time saving. Data retrieval and data presenting will be done by the system so the report generation will be automated.

## Ch.5 Technology Review

ASP.Net Framework is chosen for development of Restaurant Management System with Visual Studio Community 2017 (IDE) and Visual C# as core Programming language and SQL Server.

### **5.1 Framework**

ASP.Net framework is a revolutionary platform that allows to build the following types of applications –

Windows applications

Web applications

Web services

The .Net framework applications are multi-platform applications. The framework has been designed in such a way that it can be used from any of the following languages: C#, C++, Visual Basic, Jscript, COBOL, etc. All these languages can access the framework as well as communicate with each other. The .Net framework consists of an enormous library of codes used by the client languages such as C#.

Following two are important components of the .Net framework –

Common Language Runtime (CLR)

The .Net Framework Class Library

Other components are: Common Language Specification, Common Type System, Metadata and Assemblies, Windows Forms, ASP.Net and ASP.Net AJAX, ADO.Ne etc.

***5.1.1 Common Language Runtime (CLR):*** Common Language Runtime(CLR) is the basic and Virtual Machine component of the .NET Framework. It is the run-time environment in the .NET Framework that runs the codes and helps in making the development process easier by providing the various services. Basically, it is responsible for managing the execution of .NET programs regardless of any .NET programming language. Internally, CLR implements the VES(Virtual Execution System) which is defined in the Microsoft's implementation of the CLI(Common Language Infrastructure).The code that runs under the Common Language Runtime is termed as the Managed Code as CLR provides a managed execution environment for the .NET programs by improving the security, including the cross language integration and a rich set of class libraries etc.

**5.1.1 Framework Class Library (FCL):** It is the collection of reusable, object-oriented class libraries and methods etc that can be integrated with CLR. Also called the Assemblies. It is just like the header files in C/C++. Installing framework basically is the installation of CLR and FCL into the system.

Following are the commonly used namespaces that contains useful classes and interfaces and defined in Framework Class Library.

Following are the commonly used namespaces that contains useful classes and interfaces and defined in Framework Class Library:

1. System: It includes all common data-types, string values, arrays and methods for data conversion.
2. System.Data, System.Data.SqlClient: These are used to access a database, perform commands on a database and retrieve database.
3. System.Windows.Forms, System.Windows.Forms.Design: These namespaces are used to create Windows-based applications using Windows user interface components.

### **5.2 Integrated Development Environment**

For the project, Microsoft Visual Studio is used as a platform for system development. Microsoft Visual Studio is an Integrated Development Environment (IDE) from Microsoft. It is used to develop computer programs, as well as websites, web apps, web services and mobile apps. Visual Studio uses Microsoft software development platforms such as Windows API, Windows Forms etc.

Visual Studio supports 36 different programming languages and allows the code editor and debugger to support (to varying degrees) nearly any programming language, provided a language-specific service exists. Built-in languages include C,C++, C++/CLI, Visual Basic .NET, C#, F#, JavaScript, TypeScript, XML, XSLT, HTML, and CSS. Support for other languages such as Python, Ruby, Node.js, and M among others is available via plug-ins.

Visual Studio 2017 Community version has been used for developing RMS. 2017

Community version of Visual Studio has following added key features:

Syntax Highlighting

Visual Studio IntelliSense

Error in Visual Studio 2017

Code Fixes and Refactoring

Visual C# language has been used for the purpose.

### **5.3 Programming Language**

C# is one of the programming languages designed for the Common Language Infrastructure.

C# is a simple, modern, general-purpose, object-oriented programming language developed by Microsoft within its .NET initiative led by Anders Hejlsberg. It is designed for Common Language Infrastructure (CLI), which consists of the executable code and runtime environment that allows use of various high-level languages on different computer platforms and architectures. The language is chosen for the project because of following reasons:

It is a modern, general-purpose programming language.

It is a part of .Net Framework.

It is object oriented and component oriented.

It is structured and easy to learn.

It can be compiled on a variety of computer platforms.

It provides Automatic Garbage Collection and Standard Library.

It supports Properties and Events.

It also features Delegates and Events Management.

### **5.4 Database**

SQL Server Management Studio 2019 Express version is used to design database for the proposed Restaurant Management System. SQL language and Relational DataBase Management Systems(RDBMS) are used to set the foundation of system's back end.

RDBMS is the basis for SQL, and for all modern database systems such as MS SQL Server, Oracle, MySQL, and Microsoft Access.

The data in RDBMS is stored in database objects called tables. A table is a collection of related data entries and it consists of columns and rows.

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Structured Query Language or **SQL** is a standard Database language which is used to create, maintain and retrieve the relational database. It is particularly used to work with structured data where there are relations associated within the data itself.

Programmers embed SQL commands into their application programs to access the data. SQL is a client/server language. Programs use SQL to communicate over a network with database servers that store shared data.

SQL being distributed database language, Distributed Database Management Systems use SQL to distribute data across multiple connected computer systems.

In the proposed system, SQL serves as the link between “front-end” computer systems optimized for user interaction and “back-end” systems specialized for database management.

## Ch.6 Stakeholders

It is a complete product that retains its original simplicity yet offers comprehensive business functionalities such as search users customers menu items, add user customer menu item, purchase order, managing n numbers of customers and users, invoice etc are the functionalities uses there

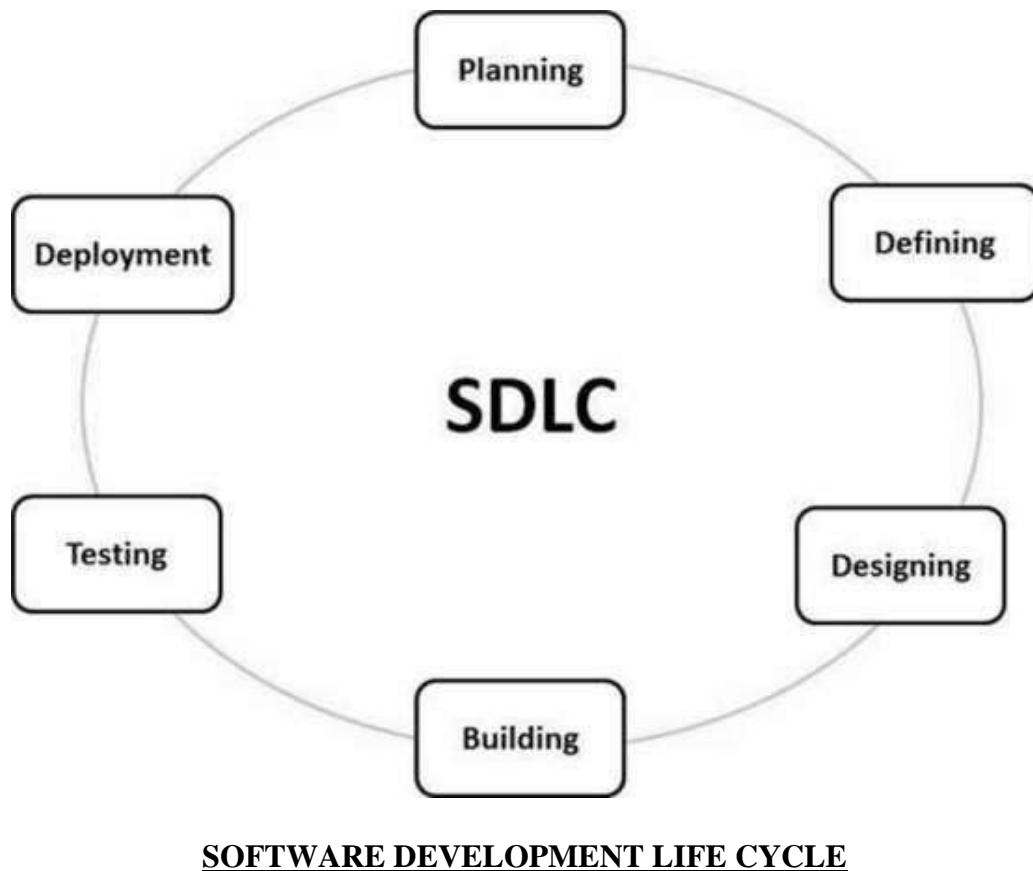
Following are the important stakeholders in our project:

- 1. Admin:** admin is owner and the manager of software. admin allowed to do any updated or modify
- 2. User:** They are the ones who uses software of per their requirement that is medicine.
- 3. Developer:** builds the whole application.
- 4. Tester:** this is the one who tests the software. In our project, we developed as well as tested our application.

## Ch.7 SDLC Life Cycle

SDLC is a process followed for a software project, within a software organization. It consists of a detailed plan describing how to develop, maintain, replace and alter or enhance specific software. The Software Development Life Cycle defines a methodology for improving the quality of software and the overall development process.

The following figure is a graphical representation of the various stages of a typical SDLC.



## Ch8. Software Development Model

To solve actual problems in an industry, it is imperative to adopt a development strategy that encompasses the process, methods and tool layers. The strategy is incorporated by software engineer and his team and is called Software Development Life Cycle (SDLC). It aims to produce high-quality software that meets or exceeds customer expectations, reaches completion within times and cost estimates.

Software Development Process Models are defined and designed and are meant to be followed during the software development process.

Following are the most important and popular SDLC models followed in the industry-

- Waterfall Model
- Iterative Model
- Spiral Model
- RAD Model
- Prototype Model etc.

### **1. Waterfall model:-**

This is the most basic software development life cycle process which is followed broadly in the industry. Here the developers follow a sequence of processes where the processes flow progressively downwards towards the ultimate goal. It is like a waterfall where there are a number of phases.

### **2. Iterative Model:-**

In the Iterative model, iterative process starts with a simple implementation of a small set of the software requirements and iteratively enhances the evolving versions until the complete system is implemented and ready to be deployed.

### **3. RAD Model:-**

The **RAD (Rapid Application Development)** model is based on prototyping and iterative development with no specific planning involved. The process of writing the software itself

involves the planning required for developing the product.

#### **4. Prototype Model:-**

The prototyping model is a systems development method in which a prototype is built, tested and then reworked as necessary until an acceptable outcome is achieved from which the complete system or product can be developed. This model works best in scenarios where not all of the project requirements are known in detail ahead of time.

**Spiral model is chosen for Restaurant Management System because it provides support for risk management. It is also recommended for complex projects and main advantage of implementing Spiral model is that Change in Requirements at later phase can be incorporated accurately by using this model. In addition to this, it also ensures customer satisfaction as the customer can see the development of the product at the early phase of the software development and thus, they habituated with the system by using it before completion of the total product.**

#### **8.1 Structure of Spiral Model:-**

Spiral model is a combination of iterative development process model and sequential linear development model i.e. the waterfall model with a very high emphasis on risk analysis. It allows incremental releases of the product or incremental refinement through each iteration around the spiral.

## **8.2 Spiral Model - Design**

The spiral model has four phases. A software project repeatedly passes through these phases in iterations called Spirals.

### **8.2.1 Requirement Gathering:**

This phase starts with gathering the business requirements in the baseline spiral.

This phase also includes understanding the system requirements by continuous communication between the customer and the system analyst. At the end of the spiral, the product is deployed in the identified market.

### **8.2.2 Prototyping:**

The Prototyping phase starts with the conceptual design in the baseline spiral and involves architectural design, logical design of modules, physical product design and the final design in the subsequent spirals.

### **8.2.3 Engineering:**

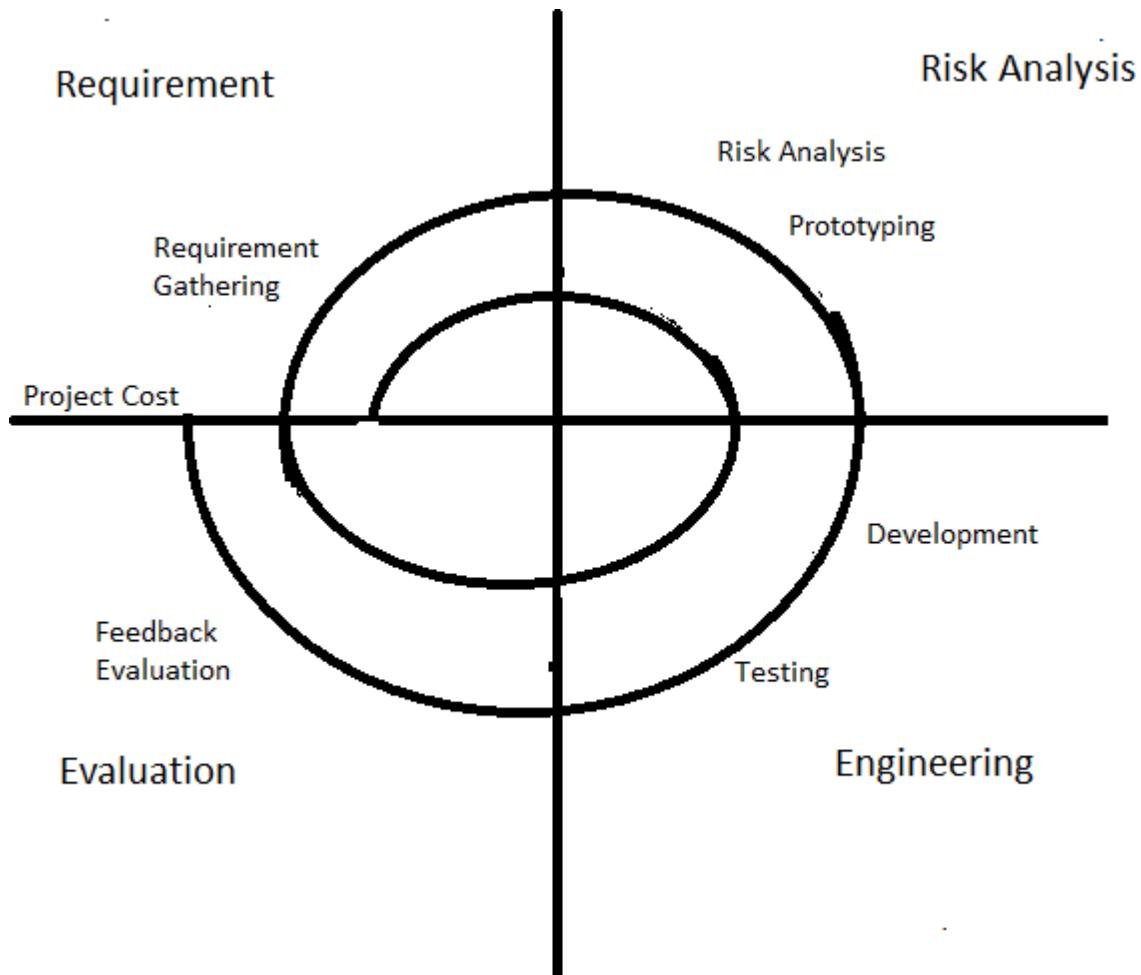
The Engineering phase refers to production of the actual software product at every spiral. In the baseline spiral, when the product is just thought of and the design is being developed a POC (Proof of Concept) is developed in this phase to get customer feedback.

Then in the subsequent spirals with higher clarity on requirements and design details a working model of the software called build is produced with a version number. These builds are sent to the customer for feedback.

### **8.2.4 Evaluation and Risk Analysis:**

Risk Analysis includes identifying, estimating and monitoring the technical feasibility and management risks, such as schedule slippage and cost overrun. After testing the build, at the end of first iteration, the customer evaluates the software and provides feedback.

**Spiral Model**



**8.3 The advantages of the Spiral SDLC Model are as follows -**

- Changing requirements can be accommodated.
- Allows extensive use of prototypes.
- Requirements can be captured more accurately.
- Users see the system early.
- Development can be divided into smaller parts and the risky parts can be developed earlier which helps in better risk management.

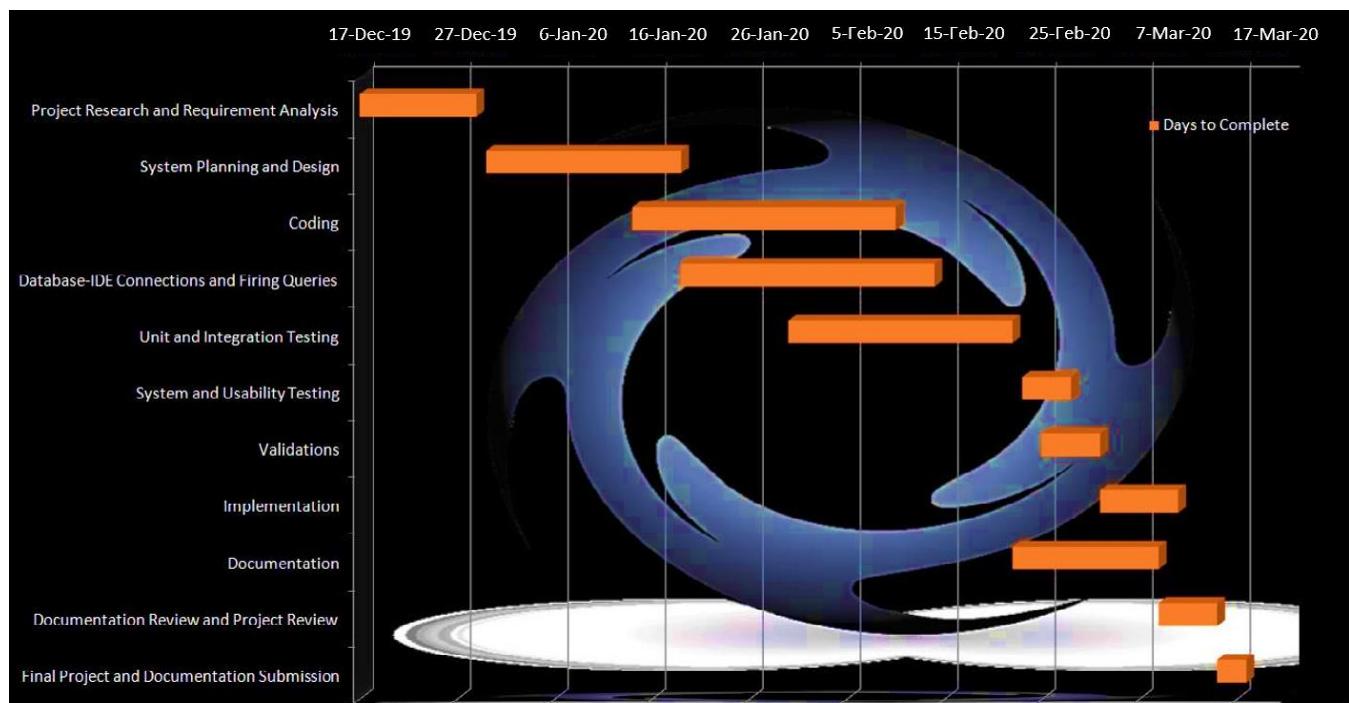
## Ch.9 Gantt Chart

Gantt chart provides a graphical illustration of a schedule that helps to plan, coordinate, and track specific tasks in a project.

A Gantt chart is constructed with a horizontal axis representing the total time span of the project, broken down into increments (months) and a vertical axis representing the tasks that make up the project: **Restaurant Management System**.

It depicts our Project Development Road Map based on task scheduling right from Preliminary Research upto Project Submission. Timelines are indicated that show the time required for the completion of each and every module. It gives a clear idea as to how our project development is phased out on modules to summarise the entire Project Assessment.

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This Gantt chart illustrates the Phases in which the “Restaurant Management System” Project was carried out. It gives a systematic overview as to how each task was scheduled and the time required to complete the task. Thus, it summarises the entire Project Assessment.

## Ch.10 UML DIAGRAMS

The Unified Modelling Language is a standard visual modelling language intended to be used for modelling business and similar processes, analysis, design, and implementation of software-based systems

UML is a common language for business analysts, software architects and developers used to describe, specify, design, and document existing or new business processes, structure and behaviour of artifacts of software systems.

UML defines various kinds of diagrams to cover most of the aspects of a system. There are two broad categories of diagrams and they are again divided into subcategories –

### **Structural Diagrams:**

The structural diagrams represent the static aspect of the system. These static aspects represent those parts of a diagram, which forms the main structure and are therefore stable.

1. Class diagram
2. Object diagram
3. Component diagram
4. Deployment diagram

### **Behavioural Diagrams:**

Behavioural diagrams basically capture the dynamic aspect of a system. Dynamic aspect can be further described as the changing/moving parts of a system.

UML has the following five types of behavioural diagrams:

1. Use-Case Diagram
2. Sequence Diagram
3. Collaboration Diagram
4. State-Chart Diagram
5. Activity Diagram

## 10.1 E-R Diagram

The ER or (Entity Relational Model) is a high-level conceptual data model diagram. Entity-Relation model is based on the notion of real-world entities and the relationship between them.

ER modelling helps to analyze data requirements systematically to produce a well-designed database. So, it is ideal to complete ER modelling before implementing your database.

Entity relationship diagram displays the relationships of entity set stored in a database. This model is based on three basic concepts:

1. **Entities:** A real-world thing either living or nonliving that is easily recognizable and unrecognizable.
2. **Attributes:** It is a single-valued property of either an entity-type or a relationship-type. However there exist multi-valued attributes too.
3. **Relationships:** Relationship is nothing but an association among two or more entities.

### 10.1.1 Cardinalities:

Cardinality defines the number of entities in one entity set, which can be associated with the number of entities of other set via relationship set.

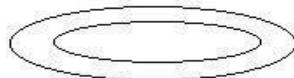
One-to-One – One entity from entity set A can be associated with at most one entity of entity set B and vice versa.

One-to-Many – One entity from entity set A can be associated with more than one entities of entity set B however an entity from entity set B, can be associated with at most one entity.

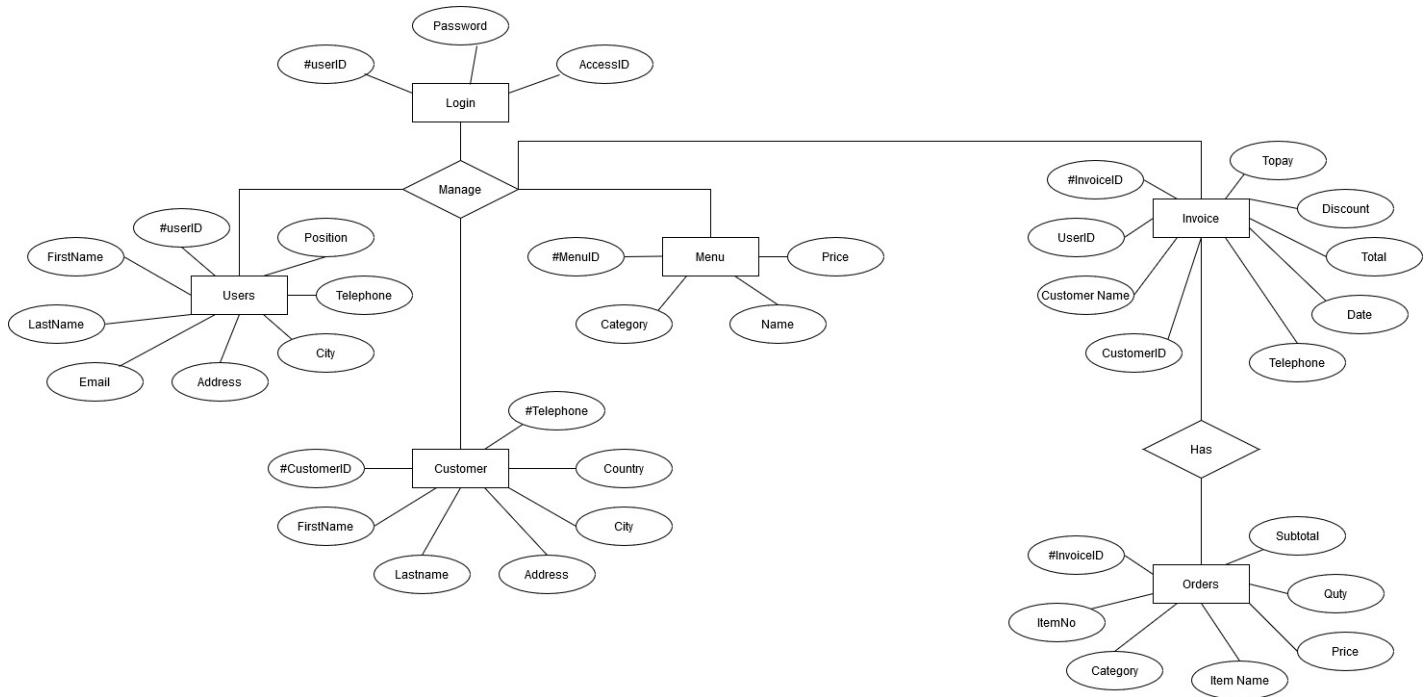
Many-to-One – More than one entities from entity set A can be associated with at most one entity of entity set B, however an entity from entity set B can be associated with more than one entity from entity set A.

Many-to-Many – One entity from A can be associated with more than one entity from B and vice versa.

### 10.1.2 ER DIAGRAM NOTATIONS

<u>Shape</u>	<u>Represents</u>
	Strong Entity
	Weak Entity
	Attribute
	Multivalued Attribute
	Relationship
	Weak Relationship

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## 10.2 Use-Case Diagram

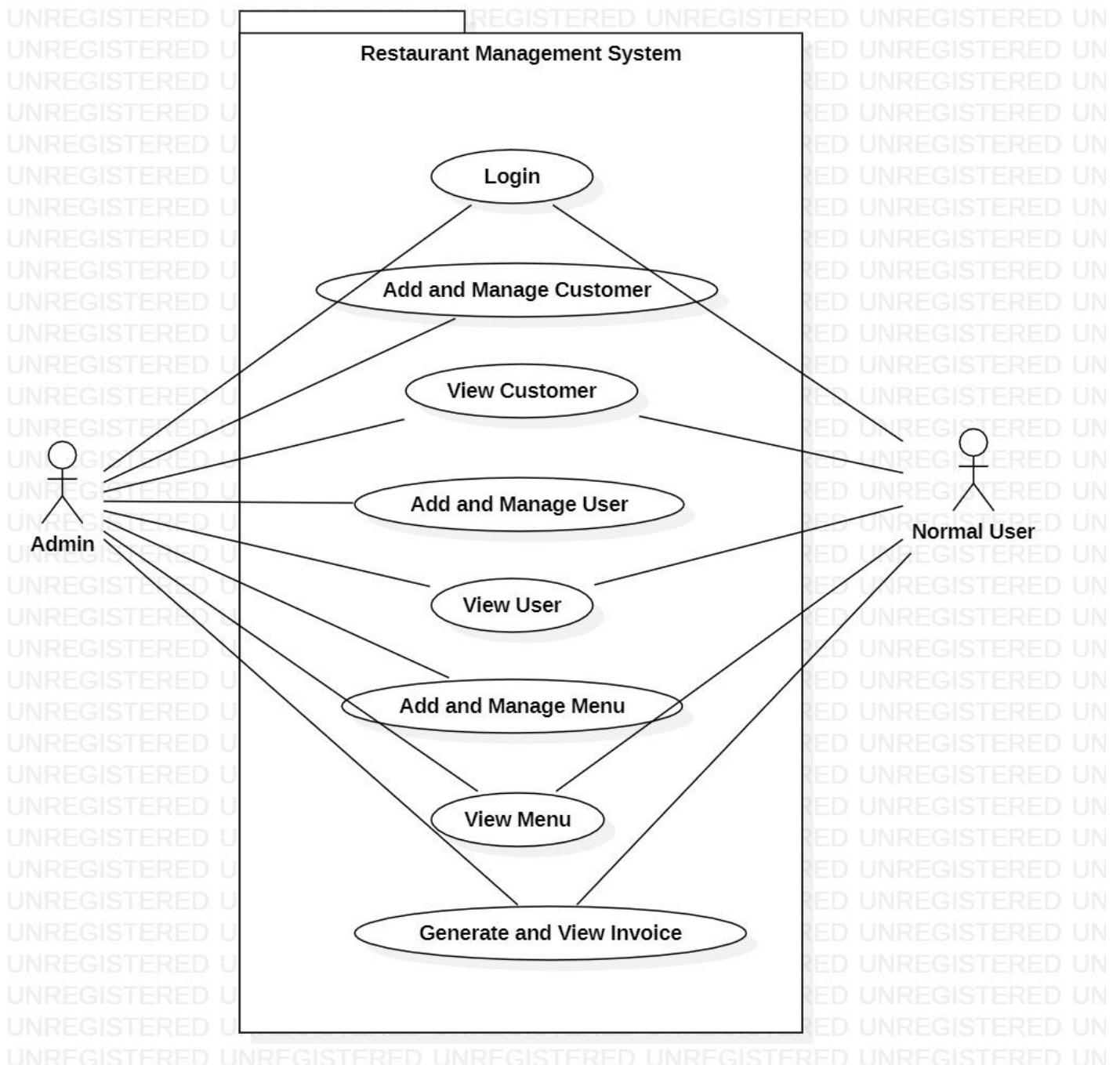
Use case diagrams are a set of use cases, actors, and their relationships. They represent the use case view of a system.

A use case represents a particular functionality of a system. Hence, use case diagram is used to describe the relationships among the functionalities and their internal/external controllers. These controllers are known as actors.

When the requirements of a system are analyzed, the functionalities are captured in use cases.

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## UseCase Diagram:



## 10.3 Class Diagram

Class diagram is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.

A UML class diagram is made up of:

1. Set of classes
2. Set of relationships between classes

A class notation consists of three parts:

1. Class Name: The name of the class appears in the first partition.

2. Class Attributes:

Attributes are shown in the second partition.

The attribute type is shown after the colon.

Attributes map onto member variables (data members) in code.

3. Class Operations (Methods)

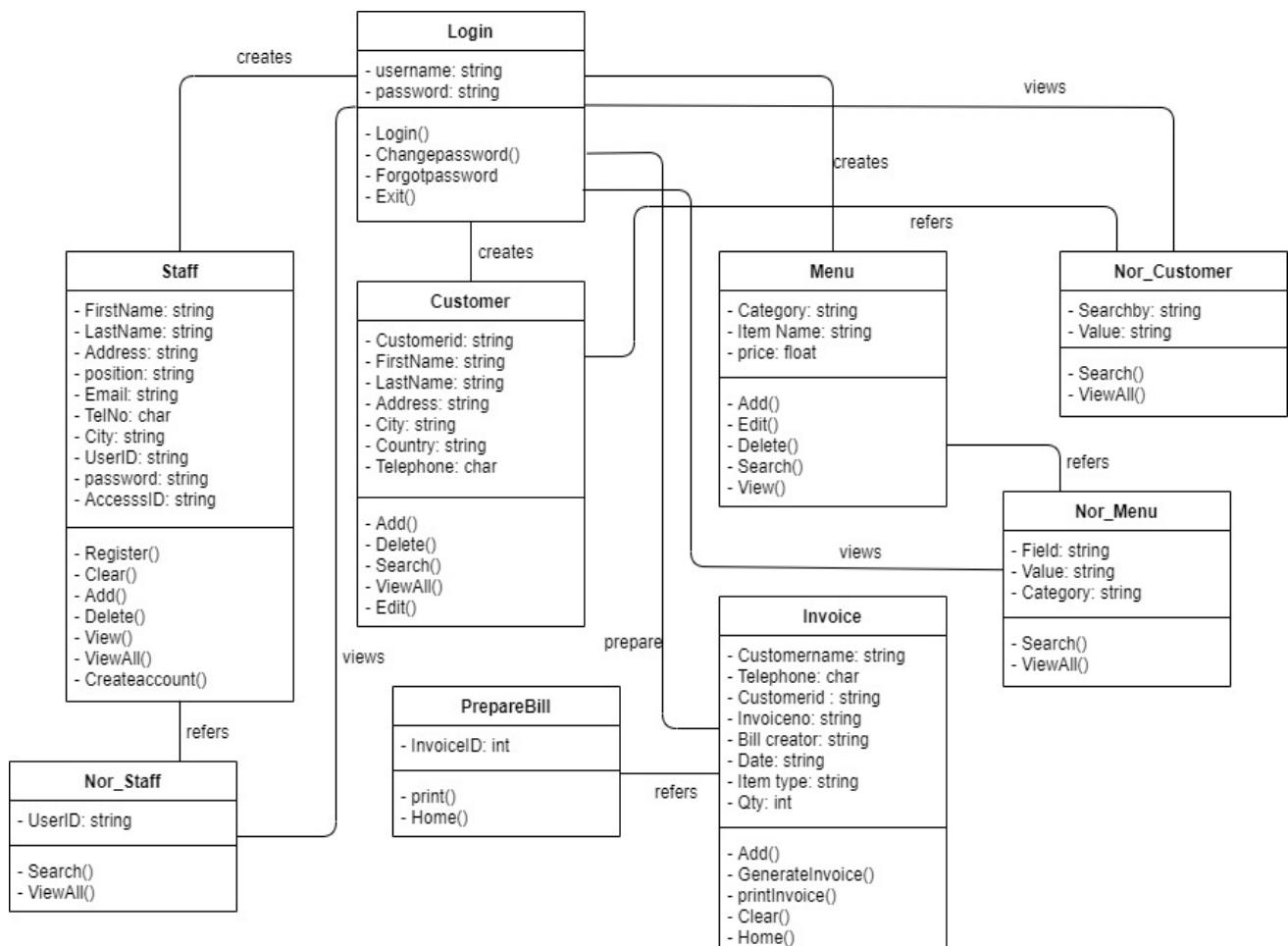
Operations are shown in the third partition. These are the services a class provides.

The return type of a method is shown after the colon at the end of the method signature.

The return type of method parameters are shown after the colon following the parameter name.

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## Class Diagram:



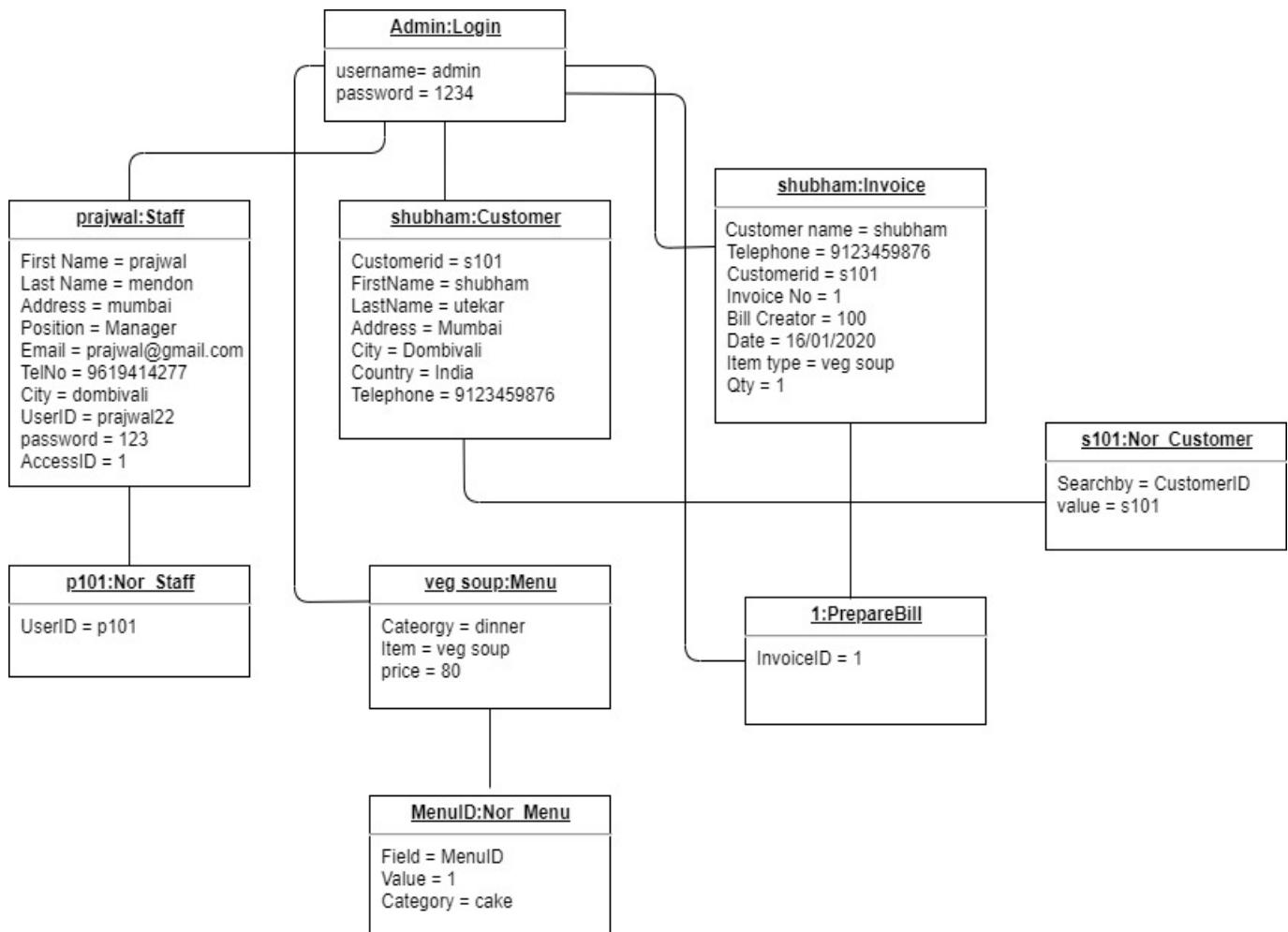
## 10.4 Object Diagram

Object is an instance of a particular moment in runtime, including objects and data values. A static UML object diagram is an instance of a class diagram; it shows a snapshot of the detailed state of a system at a point in time, thus an object diagram encompasses objects and their relationships at a point in time. It may be considered a special case of a class diagram or a communication diagram.

Object Diagram is used to verify the accuracy and completeness of the class diagram. An object diagram shows this relation between the instantiated classes and the defined class, and the relation between these objects in the system. They are useful to explain smaller portions of your system, when the system class diagram is complex.

# RESTAURANT MANAGEMENT SYSTEM

## Object Diagram

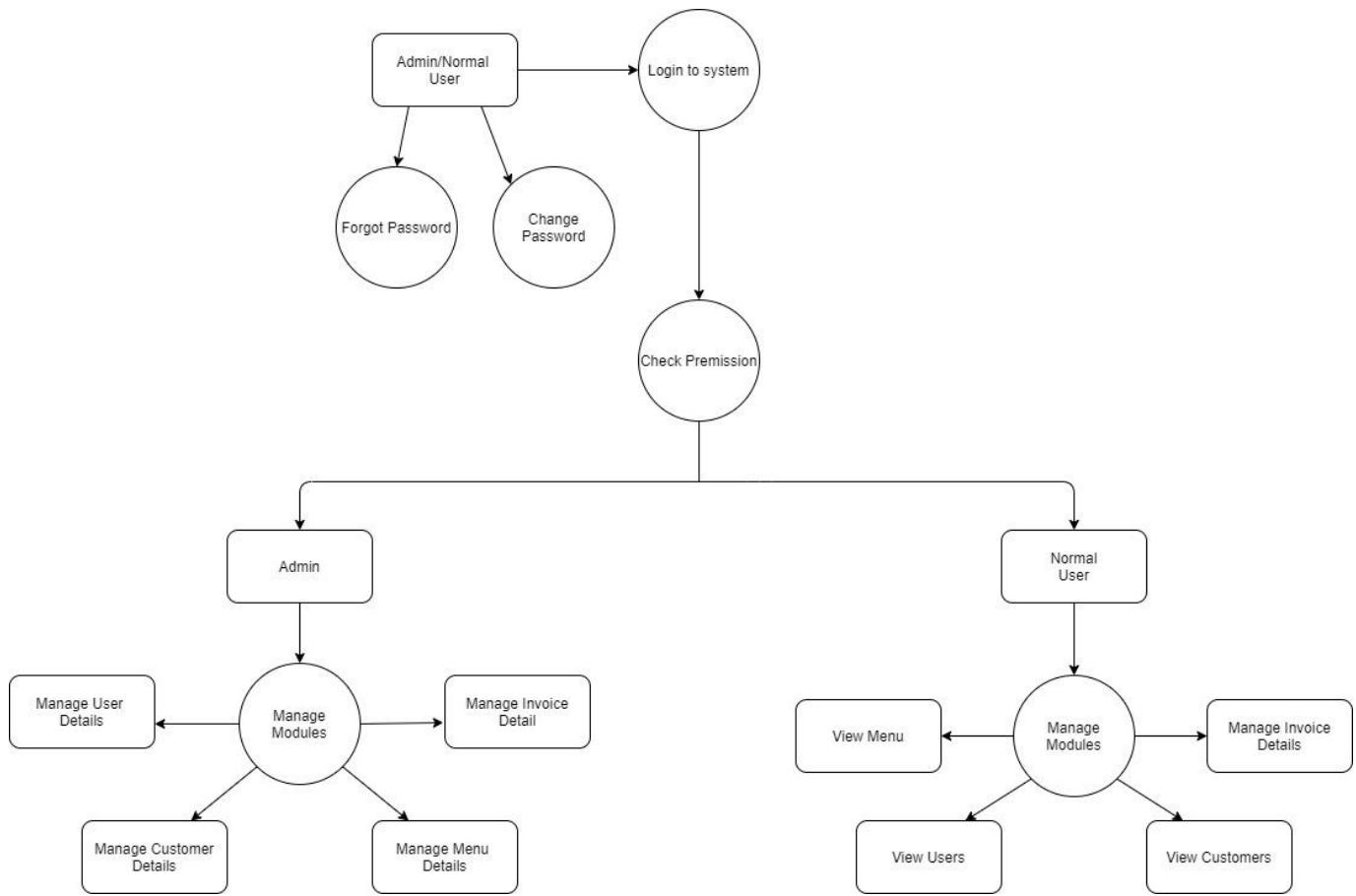


## 10.5 Data Flow Diagram

Data Flow Diagrams (DFD) are used to graphically represent the flow of Data in a business information system. DFD describes the processes that are involved in a system to transfer data from the input to the file storage and reports generation. A Data Flow Diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles, arrows, etc. to show data inputs, outputs, storagepoints and the routes between each destination.

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## Data Flow Diagram



## 10.6 Sequence Diagram

A sequence diagram simply depicts interaction between objects in a sequential order i.e. the order in which these interactions take place. Sequence diagrams describe how and in what order the objects in a system function.

These diagrams are widely used by businessmen and software developers to document and understand requirements for new and existing systems.

### **10.6.1 Sequence Diagram Notations:**

**Actors**—An actor in a UML diagram represents a type of role where it interacts with the system and its objects

**Lifelines** – A lifeline is a named element which depicts an individual participant in a sequence diagram.

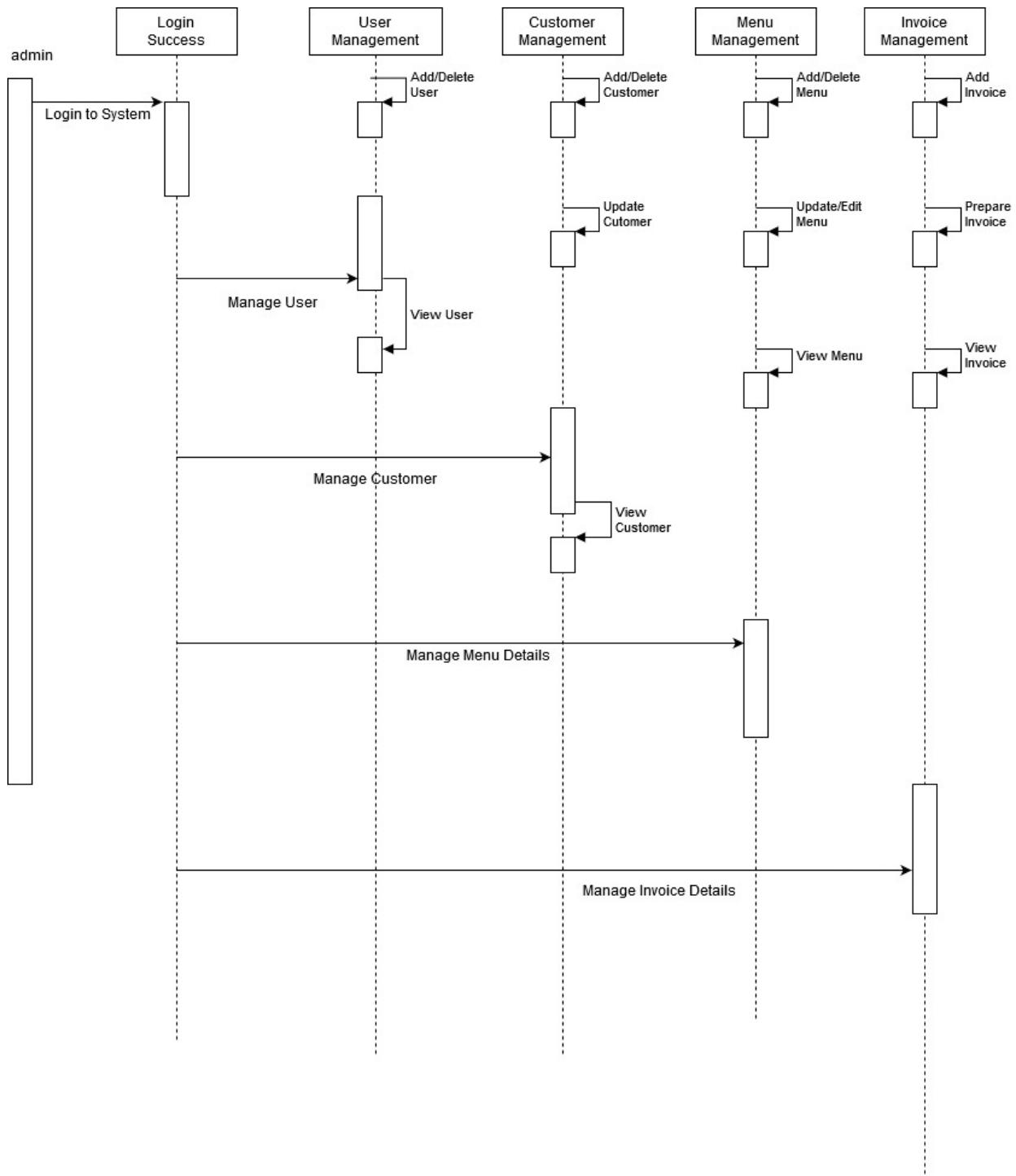
**Messages** – Communication between objects is depicted using messages. The messages appear in a sequential order on the lifeline.

### **10.6.2 Use of Sequence Diagrams:**

1. Used to model and visualise the logic behind a sophisticated function, operation or procedure.
2. They are also used to show details of UML use case diagrams.
3. Used to understand the detailed functionality of current or future systems.
4. Visualise how messages and tasks move between objects or components in a system.

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## Sequence Diagram :



## 10.7 Activity Diagram

Activity diagram is basically a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system.

The control flow is drawn from one operation to another. This flow can be sequential, branched, or concurrent. Activity diagrams deal with all type of flow control by using different elements such as fork, join, etc

Activity is a particular operation of the system. They are used to construct the executable system by using forward and reverse engineering techniques.

### **10.7.1 The purpose of an activity diagram is:**

1. To Draw the activity flow of a system.
2. Describe the sequence from one activity to another.
3. Describe the parallel, branched and concurrent flow of the system.

### **10.7.2 Activity Diagram consists of following elements –**

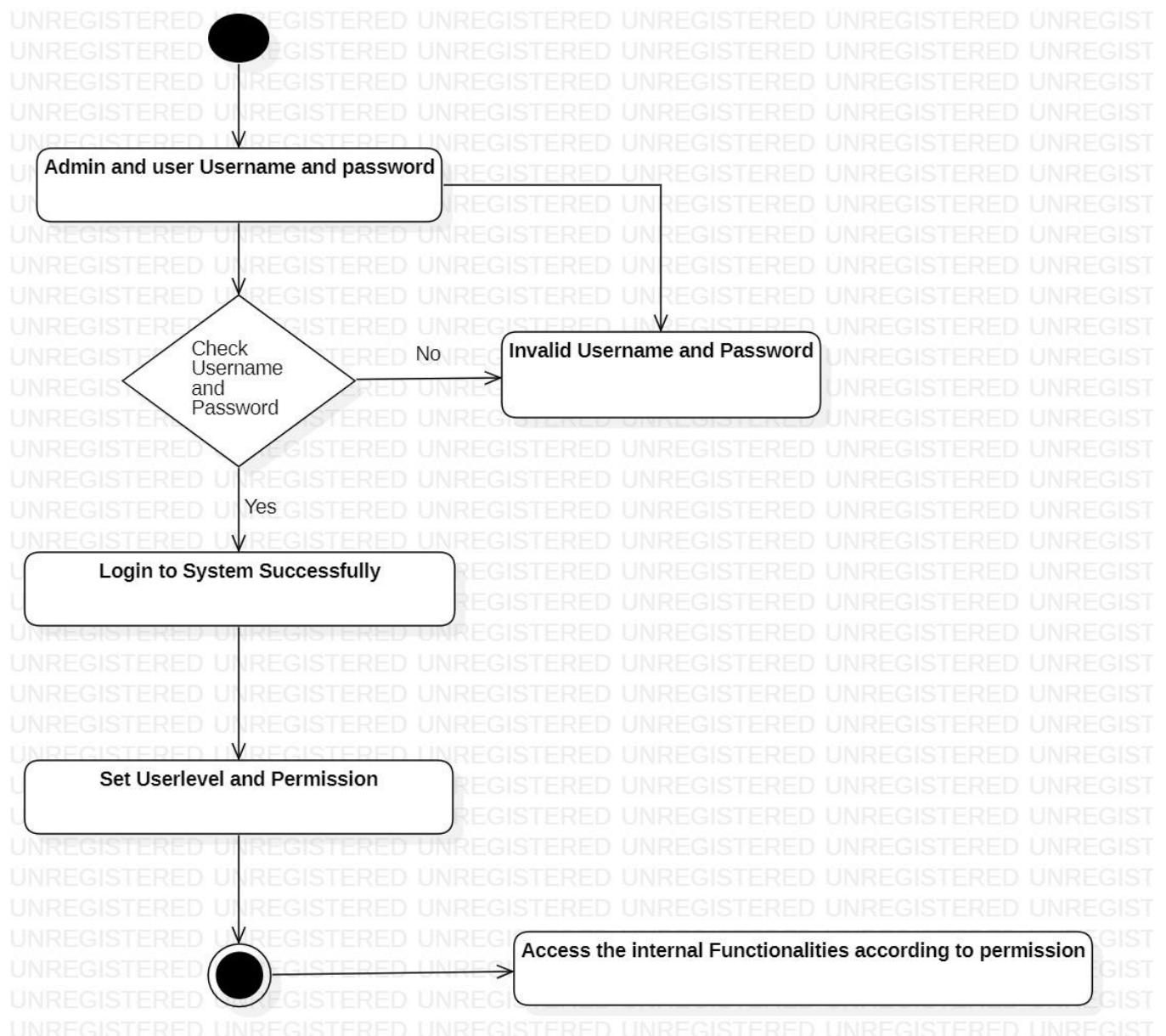
4. Activities
5. Association
6. Conditions
7. Constraints

Activity diagram is suitable for modeling the activity flow of the system. Activity diagram also captures these systems and describes the flow from one system to another. This specific usage is not available in other diagrams. These systems can be database, external queues, or any other system.

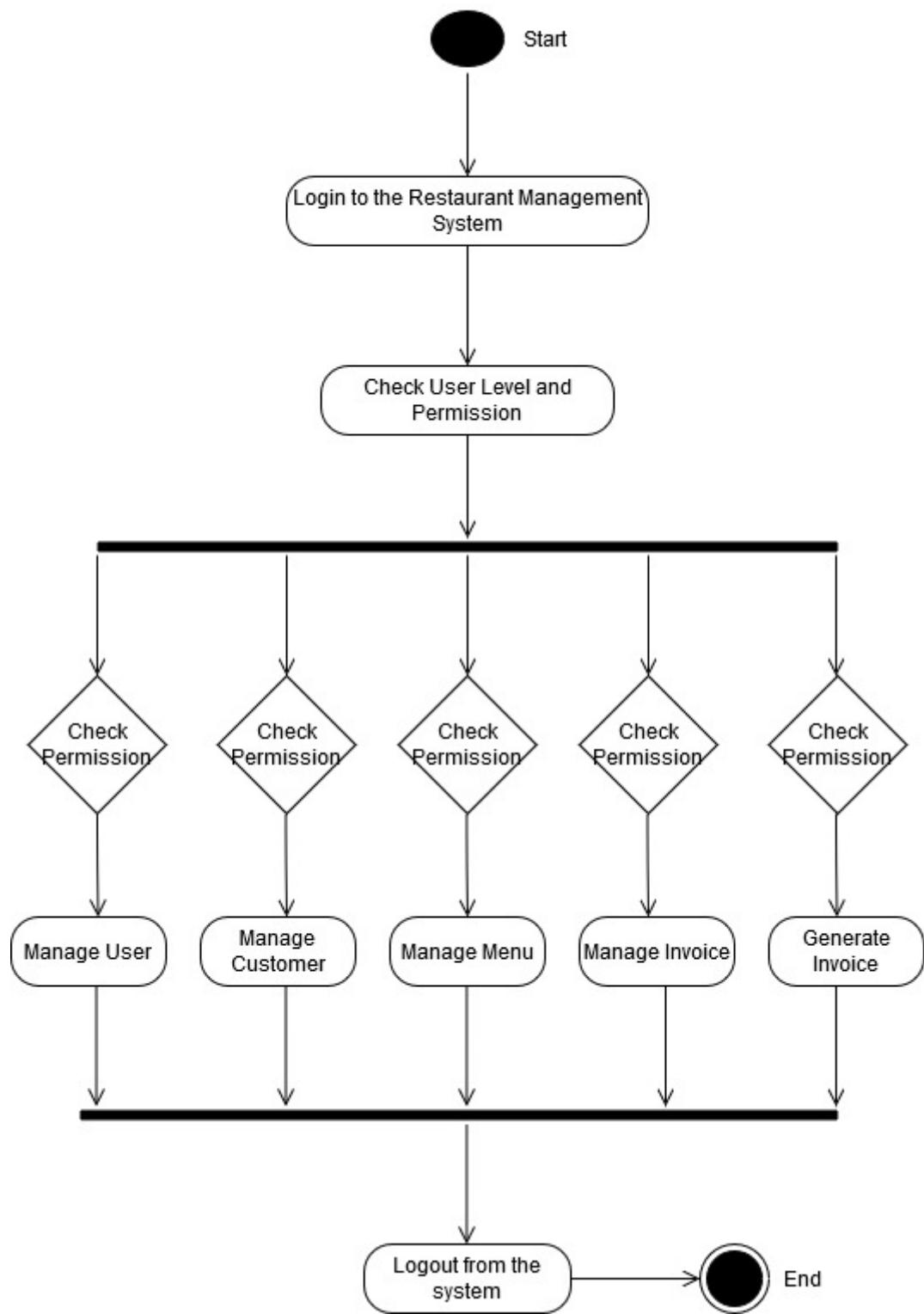
Activity diagram can be used for –

1. Modeling workflow by using activities.
2. Modeling business requirements.
3. High level understanding of the system's functionalities.
4. Investigating business requirements at a later stage.

## Activity Diagram



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## Ch.11 Testing and Validations

### **11.1 Why Is Testing Important?**

This is the most important part of the software life cycle. It provides better quality of software to end users; therefore, those end users won't come across software issues. Testing of any software is very important for validating functionality of the software. Testing will provide the following information: It finds issues during early phases, which can be fixed before finalization. It assures stability and reliability of software in different conditions. It helps to provide issue-free software for delivery. Any application must be tested with different methodologies. If the application is not tested properly, then some faulty application will be delivered to customers. Delivering such quality of application will reduce credibility, and the customers will be not delighted with application. Testing is usually conducted by development and quality assurance teams. This testing validates the functionality of the application.

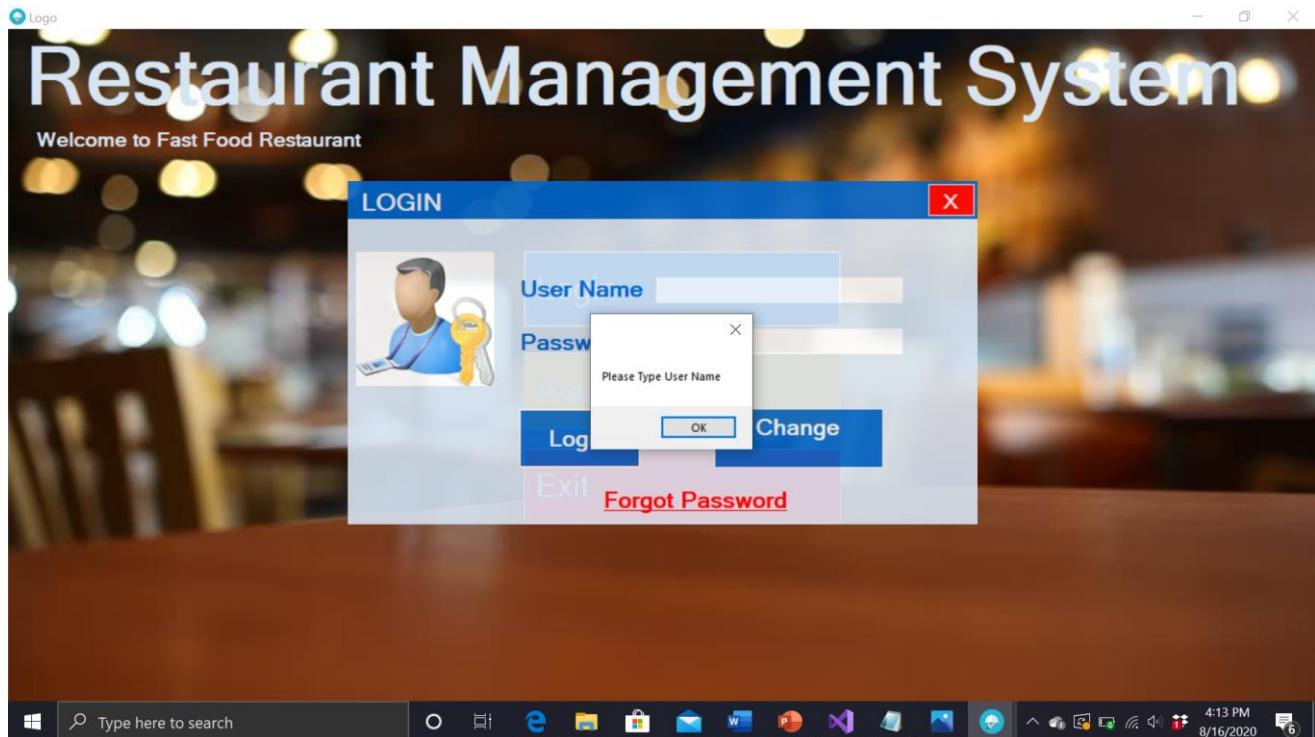
For this **Restaurant Management System**, Validation Testing is performed. Various validation checks are implemented to ensure efficient and apt functioning of the System.

Main Validation Checks that are performed are:

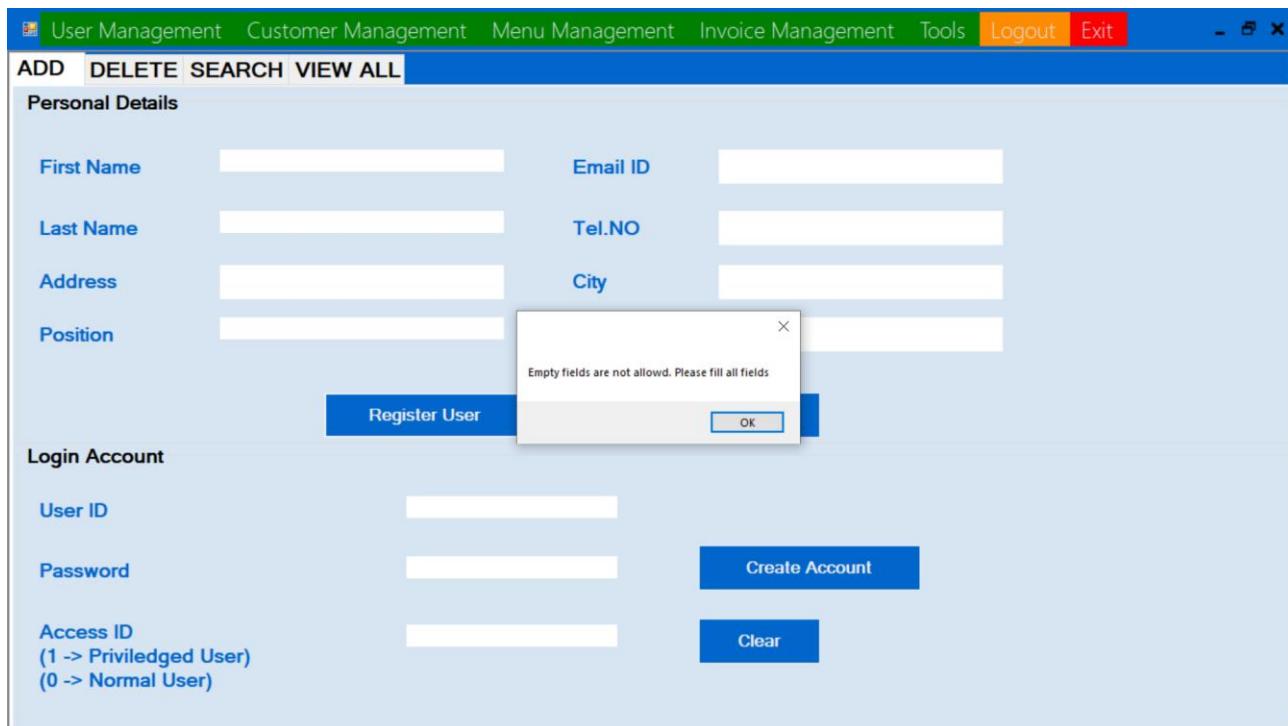
- a. RequiredField Validation: It ensures that the field on which this particular error-provider has been assigned, should not be left void.
- b. RangeValidation: It ensures that the number of characters that a textbox can take should be within the specified Range.
- c. Custom Validation: This Validation can be customized to check on the desired input. It is executed for E-mailID and ContactNumber (so that textbox accepts only digits).
- d. CompareValidation: This validation is used to compare and check whether the user has entered the authentic Password.

Below are the ScreenShots that depict the implementation of Validations in our System:

**Validation ScreenShot No. 1:**



RequiredField Validation is performed on UserName Field and Password. They cannot be left blank.

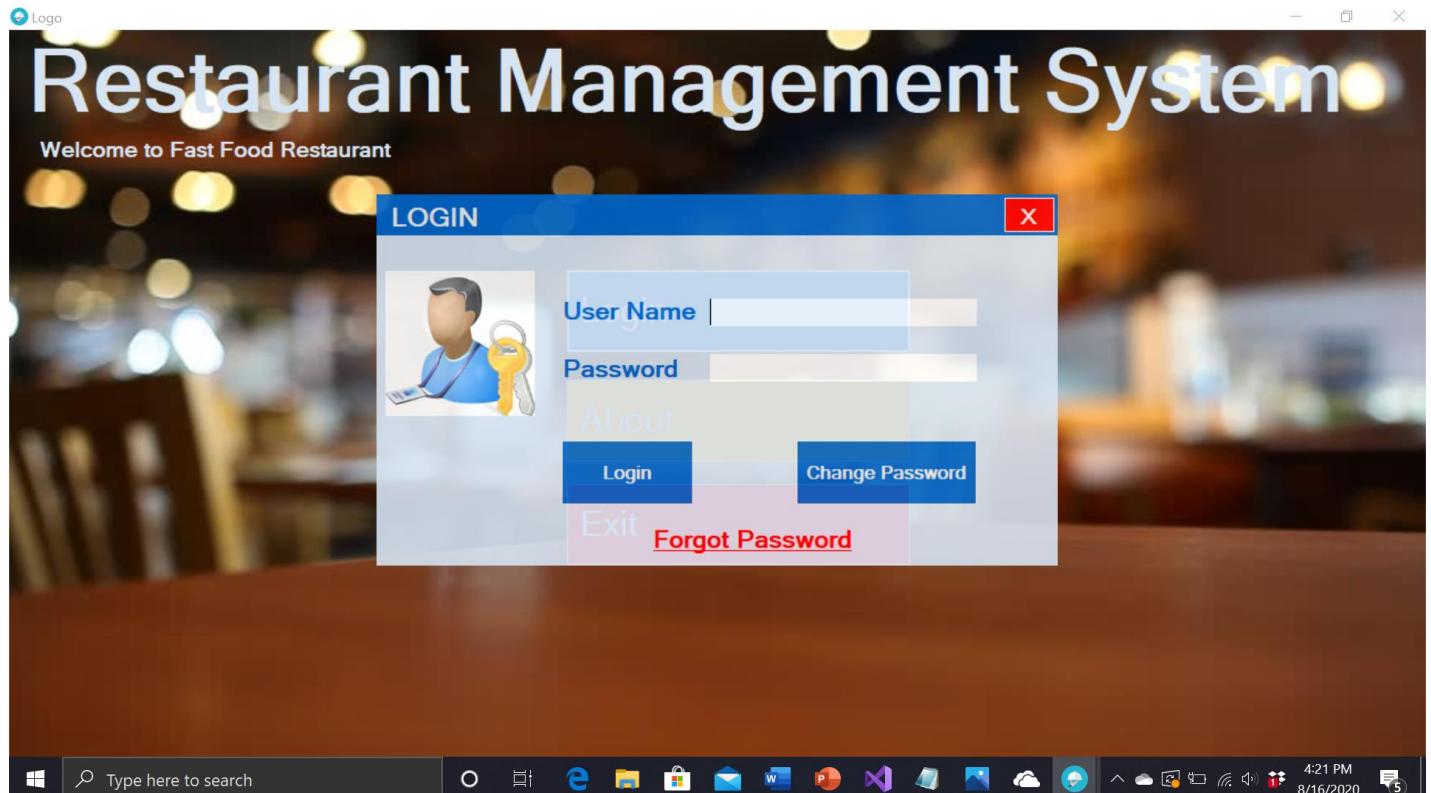
**Validation ScreenShot No. 2:**

RequiredFieldValidations are performed on: First Name, Last Name, EmailID, City, Country and Contact Number

Custom Validation is checked for ContactNumber such that it accepts 10 digit Number Only.

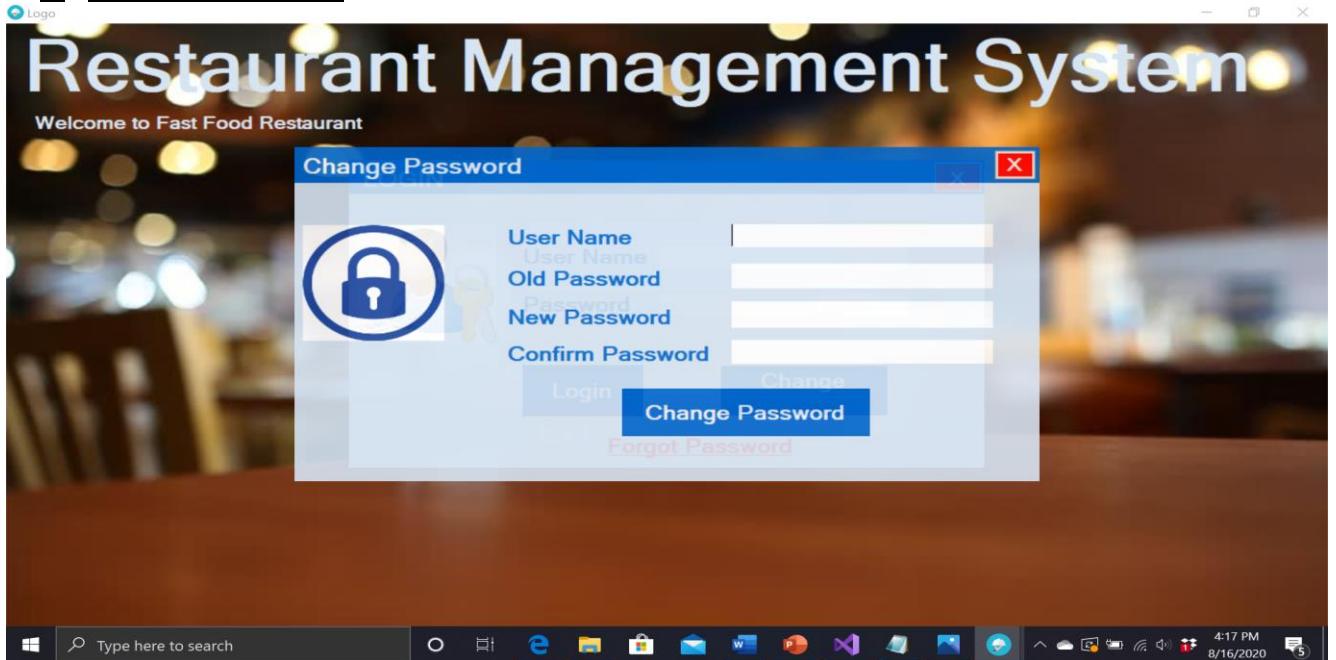
## Ch.12 Project ScreenShots

### 1. Log-In



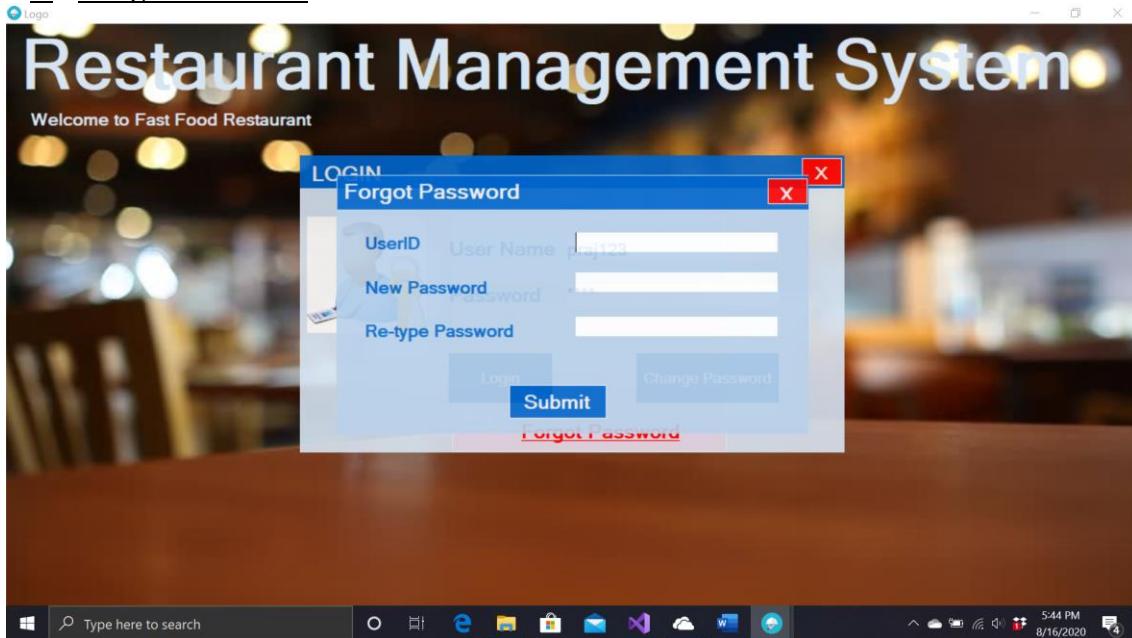
## RESTAURANT MANAGEMENT SYSTEM

### 2. Change Password:



Admin and Normal Users can Change the Password of the System.

### 3. Forgot Password:



Admin and Normal Users cant get New Password If Forgot

**4. Add User Details:**

The screenshot shows the 'User Management' section of the Restaurant Management System. The top navigation bar includes links for User Management, Customer Management, Menu Management, Invoice Management, and Tools, along with Logout and Exit buttons. Below the navigation is a toolbar with buttons for ADD, DELETE, SEARCH, and VIEW ALL. The main area is titled 'Personal Details' and contains five input fields arranged in two rows: First Name and Email ID, Last Name and Tel.NO, and Address and City. There are also fields for Position and User ID. Below these fields are two blue buttons: 'Register User' and 'Clear'. A separate section titled 'Login Account' contains three input fields: User ID, Password, and Access ID (with options 1 for Privileged User and 0 for Normal User). To the right of the Password field is a 'Create Account' button, and to the right of the Access ID field is another 'Clear' button.

First Name	Email ID

Last Name	Tel.NO

Address	City

Position	User ID

**Personal Details**

First Name Email ID

Last Name Tel.NO

Address City

Position User ID

**Register User** **Clear**

**Login Account**

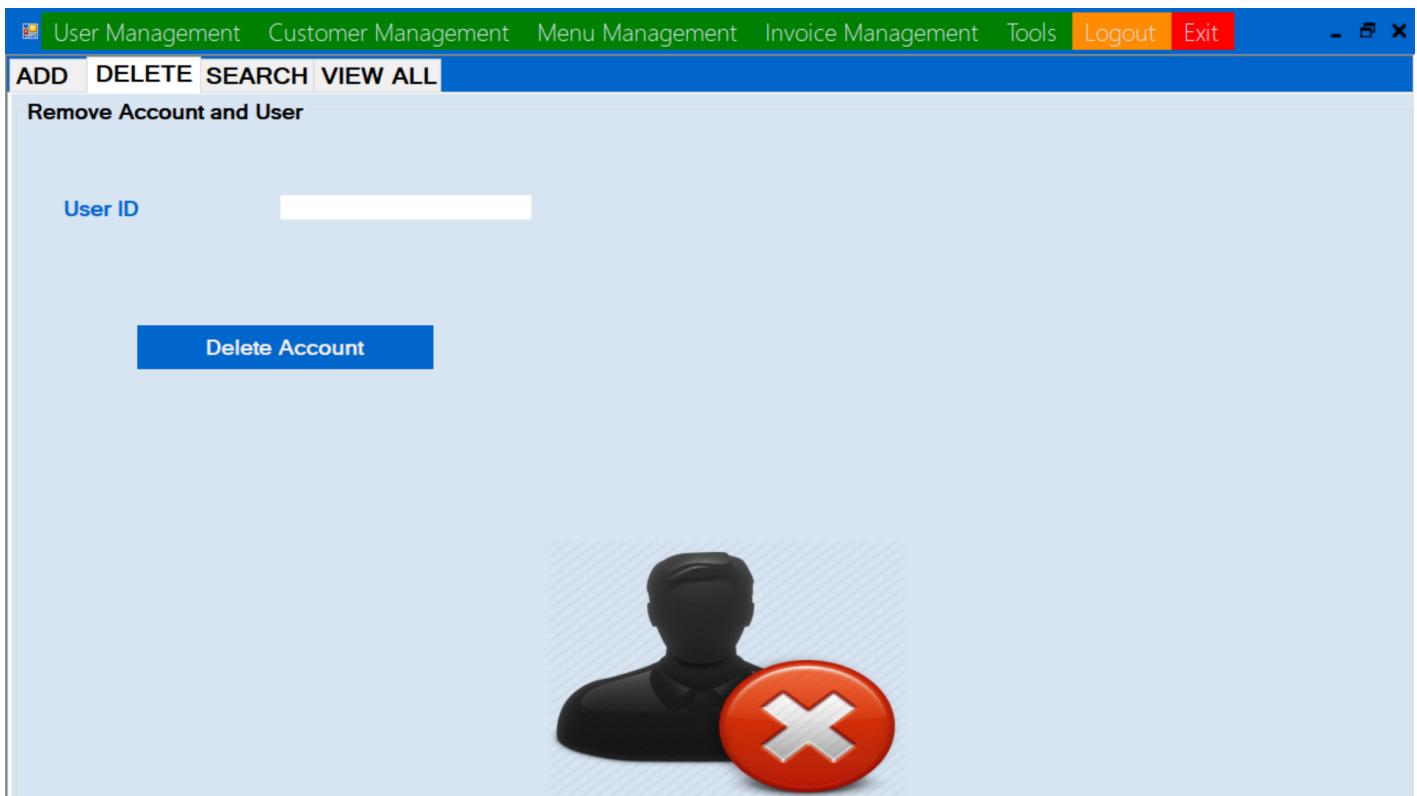
User ID

Password **Create Account**

Access ID  
(1 -> Privileged User)  
(0 -> Normal User) **Clear**

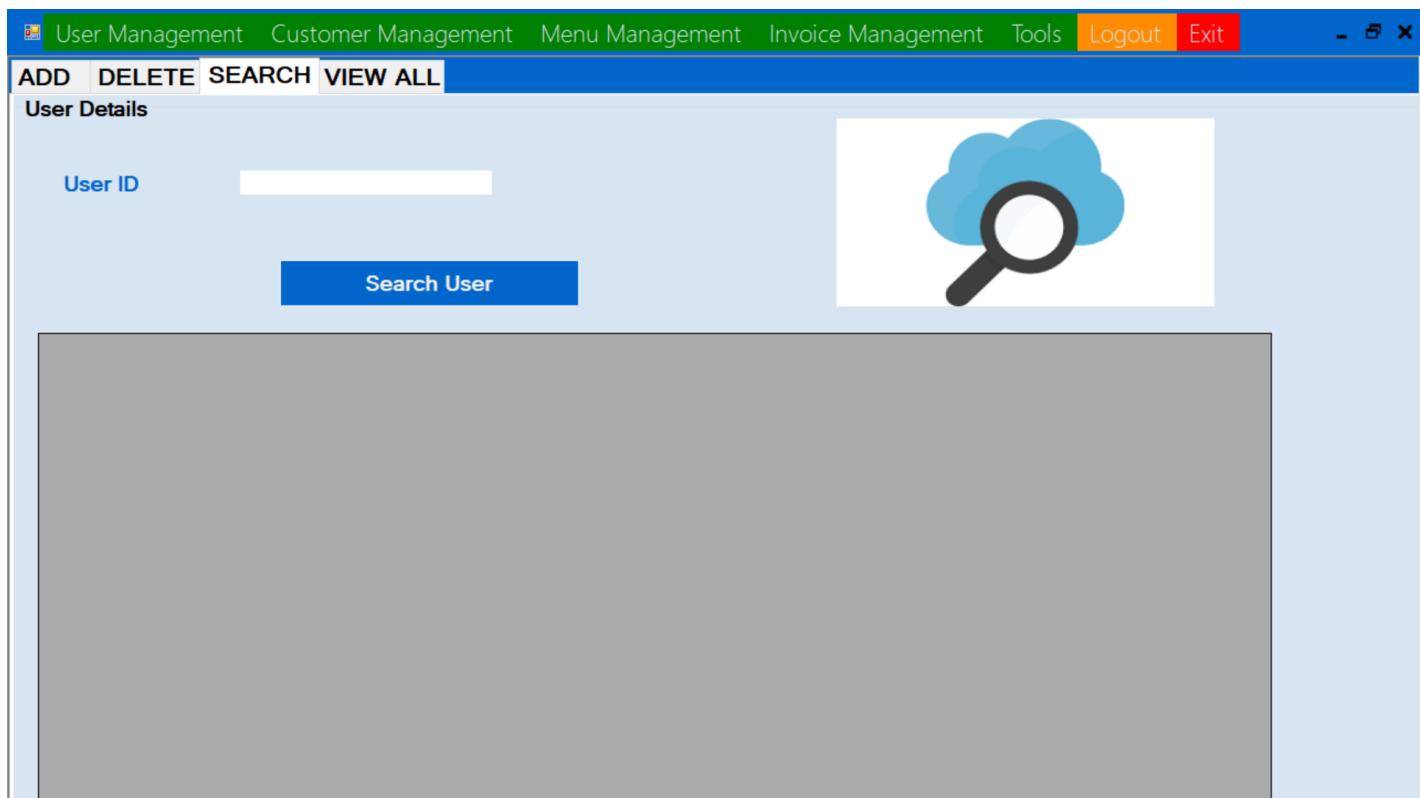
Only Admin and privilege users can add the Detail of the User or Staff Members working in the Organization.

## 5. Delete User:

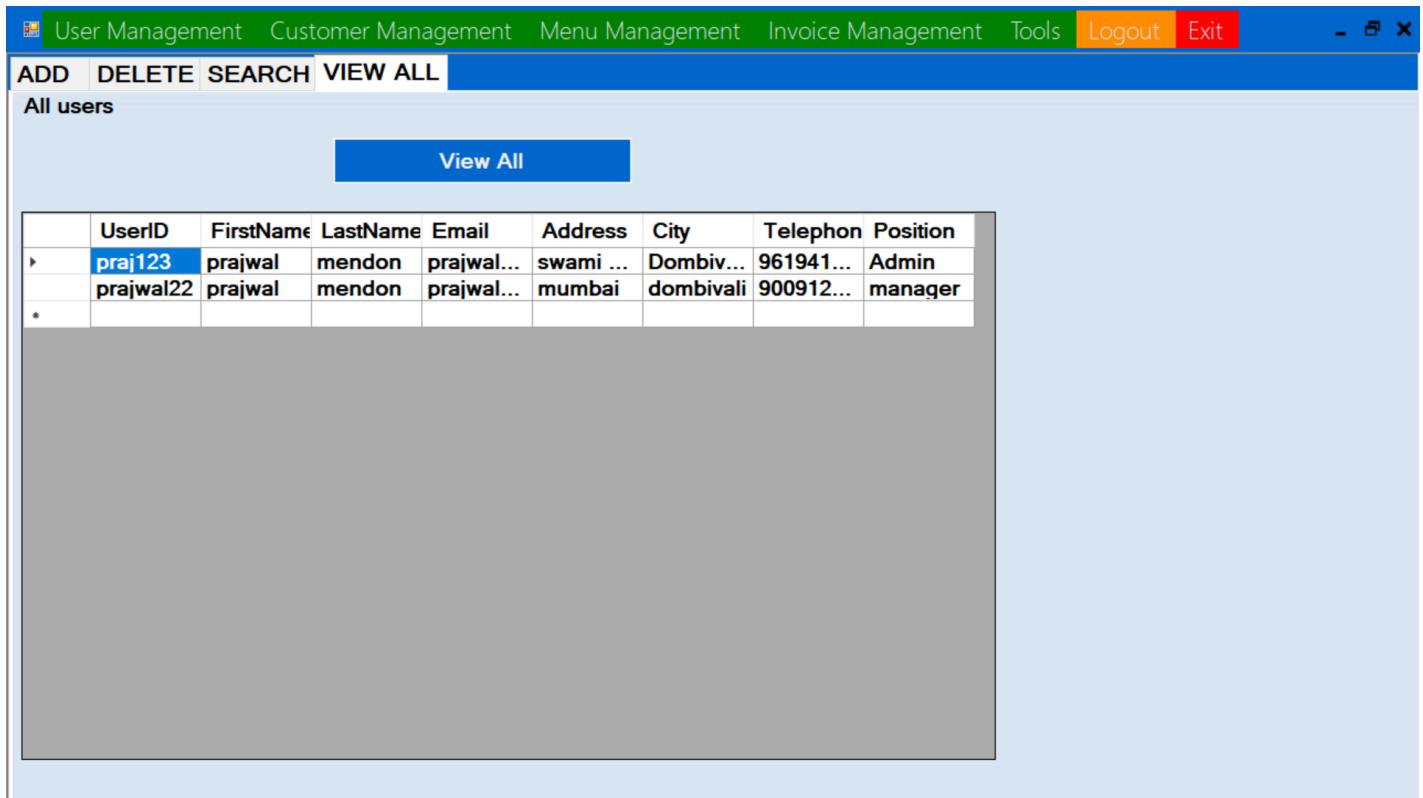


Only Admin and privilege users can Delete a Particular User or Staff Member from the System.

## 6. Search User:



Admin can Search a Particular User or Staff Member form the System.

**7. ViewAll User:**

The screenshot shows a Windows application window titled 'RESTAURANT MANAGEMENT SYSTEM'. The menu bar includes 'User Management', 'Customer Management', 'Menu Management', 'Invoice Management', 'Tools', 'Logout', and 'Exit'. Below the menu is a toolbar with buttons for 'ADD', 'DELETE', 'SEARCH', and 'VIEW ALL'. The 'VIEW ALL' button is highlighted in blue. The main content area is titled 'All users' and contains a table with the following data:

	UserID	FirstName	LastName	Email	Address	City	Telephon	Position
1	praj123	prajwal	mendon	prajwal...	swami ...	Dombiv...	961941...	Admin
2	prajwal22	prajwal	mendon	prajwal...	mumbai	dombivali	900912...	manager
3								

Admin can View All Users or Staff Members.

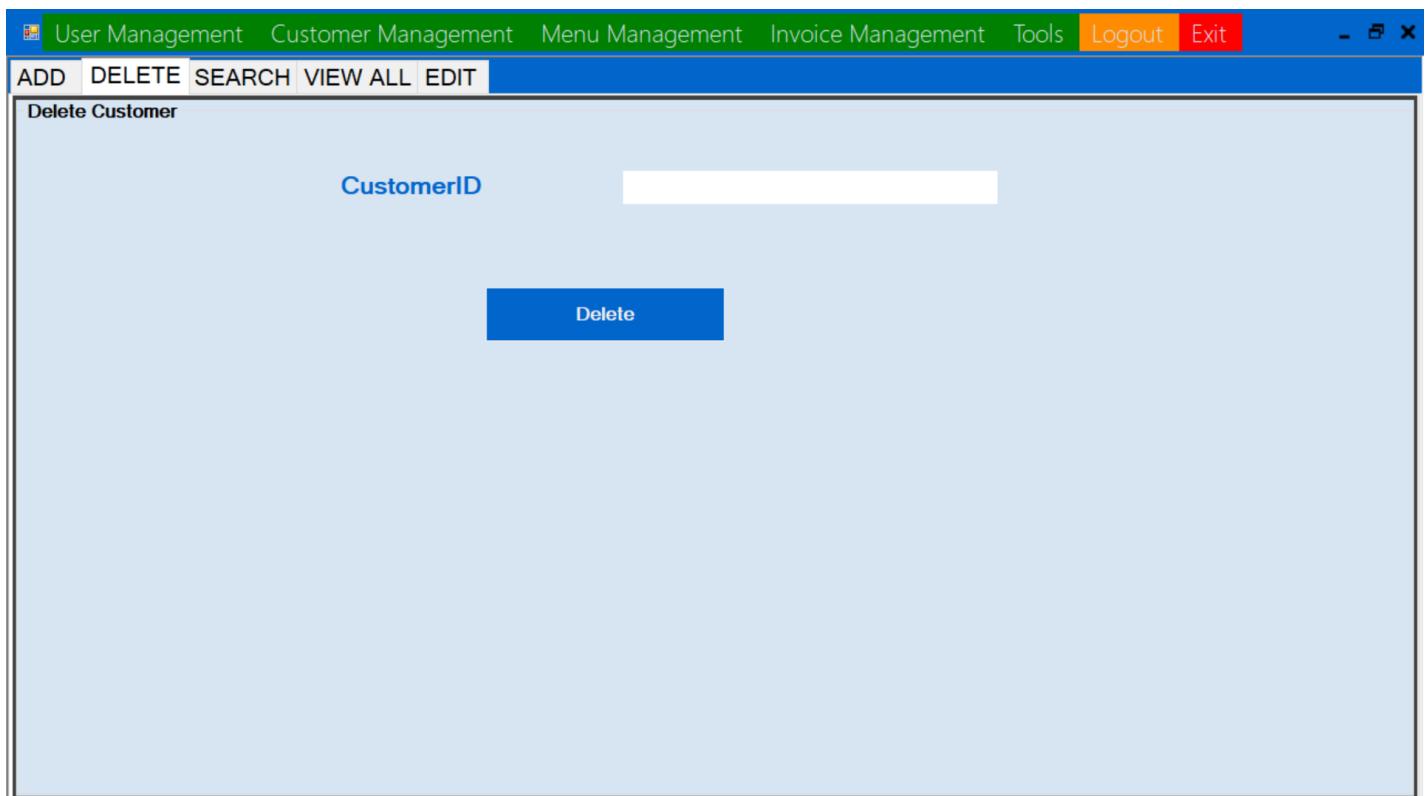
## 8. Add Customers:

The screenshot shows a window titled 'Customer Management' within a 'Restaurant Management System'. The window has a blue header bar with buttons for 'User Management', 'Customer Management', 'Menu Management', 'Invoice Management', 'Tools', 'Logout', and 'Exit'. Below the header is a toolbar with buttons for 'ADD', 'DELETE', 'SEARCH', 'VIEW ALL', and 'EDIT'. The main area is titled 'Customer Details' and contains fields for 'First Name', 'Last Name', 'CustomerID', 'Address' (with a note '(Optional)'), 'City', 'Country', and 'Telephone'. At the bottom are 'ADD' and 'Clear' buttons.

Field	Type	Notes
First Name	Text	
Last Name	Text	
CustomerID	Text	
Address	Text	(Optional)
City	Text	
Country	Text	
Telephone	Text	

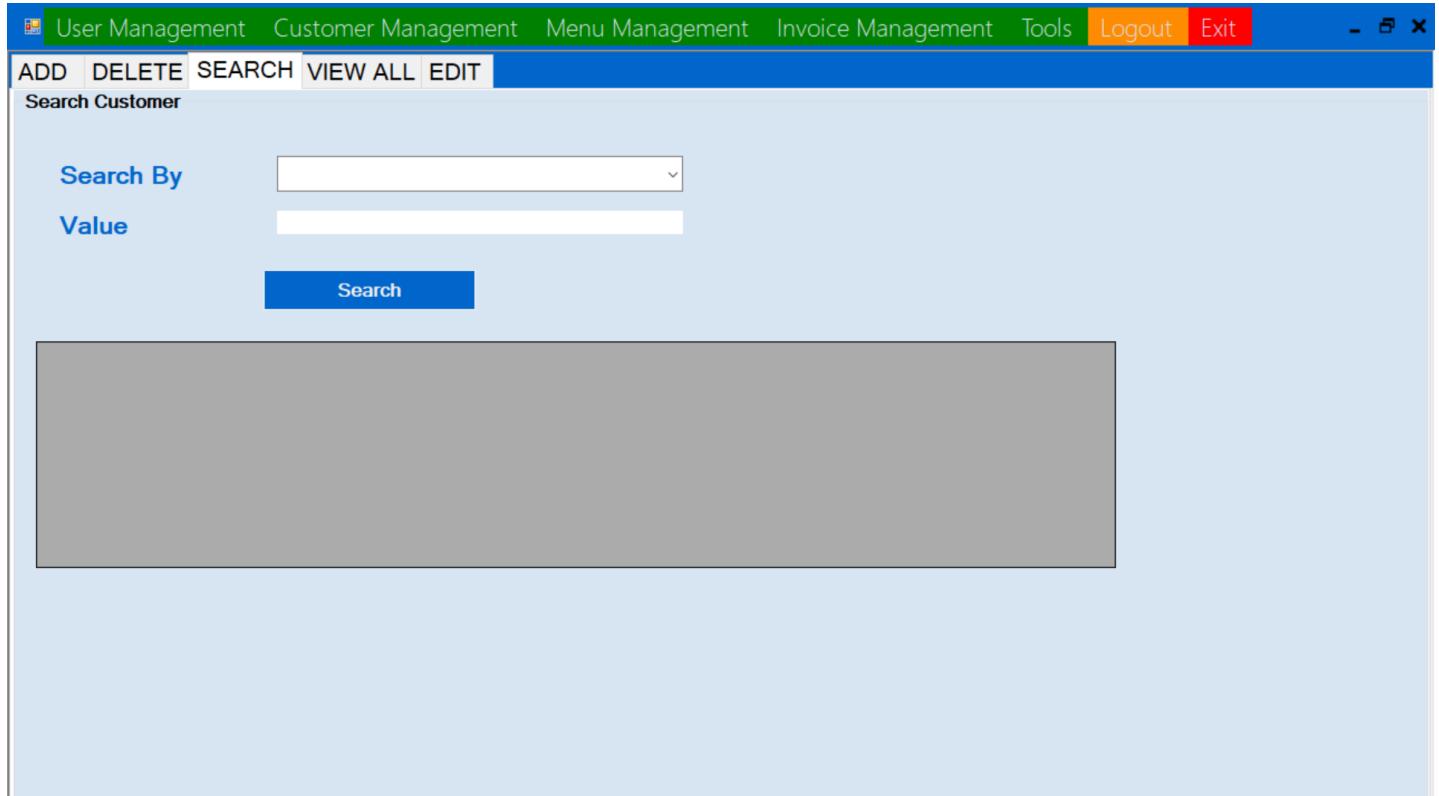
Only Admin and privilege user can insert Record of the Customer in the Database.

## **9. Delete Customer:**



Admin and Privilege Users can delete the particular customer.

## **10. Search Customer:**



The screenshot shows a web-based application for managing a restaurant. At the top, there is a navigation bar with links for User Management, Customer Management, Menu Management, Invoice Management, and Tools. There are also Logout and Exit buttons. Below the navigation bar, a blue header bar contains buttons for ADD, DELETE, SEARCH, VIEW ALL, and EDIT. The main content area is titled "Search Customer". It features a "Search By" dropdown menu and a "Value" input field. A blue "Search" button is located below these fields. A large, empty rectangular area is present below the search controls, likely for displaying search results.

Admin and privilege users can search customers from the System.

# RESTAURANT MANAGEMENT SYSTEM

## 11. View All Customers:

User Management Customer Management Menu Management Invoice Management Tools Logout Exit

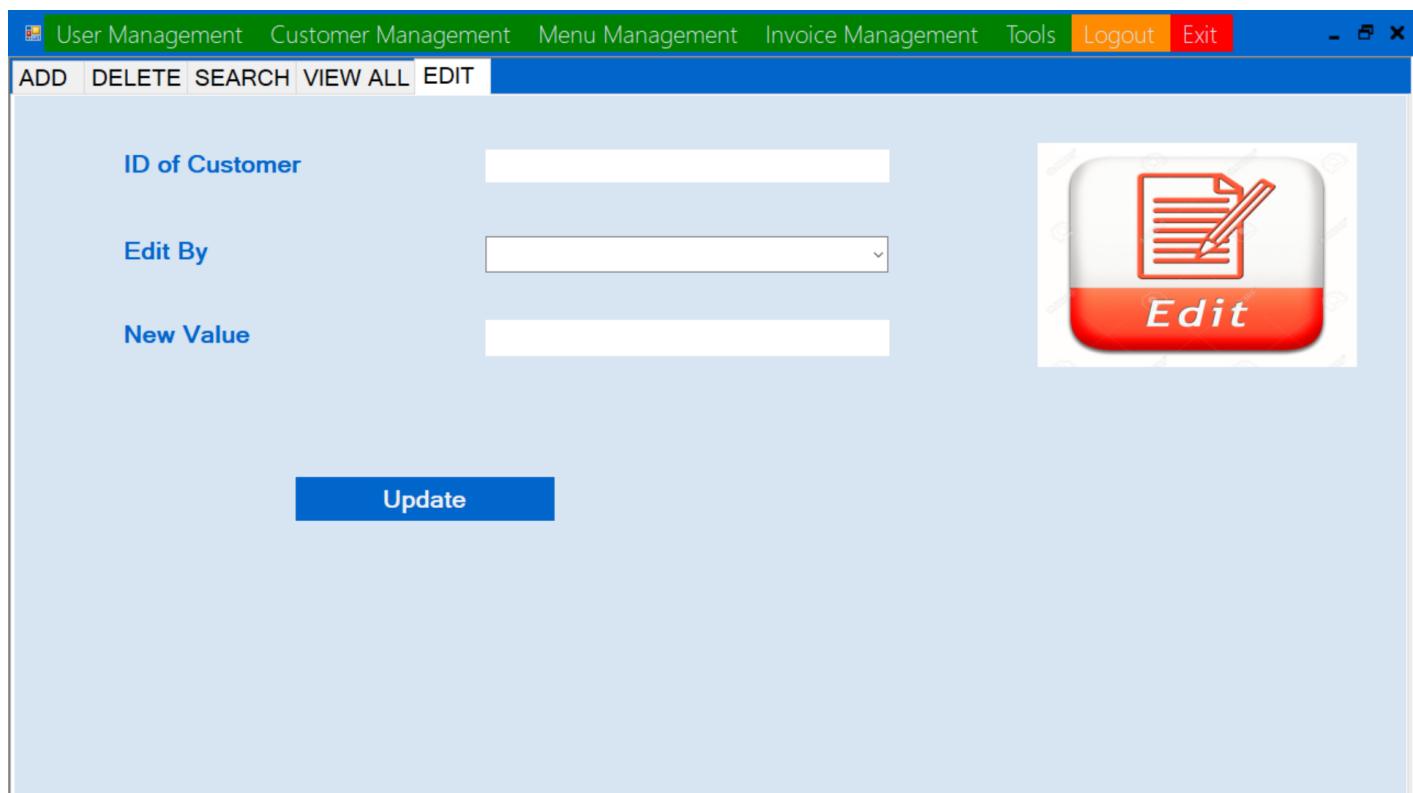
ADD DELETE SEARCH VIEW ALL EDIT

View Details

View

	CustomerID	FirstName	LastName	Address	City	Country	Telephone
▶	r100	Roshan	Indap	mumbai, ...	dombivali	India	9988776...
▶	s100	Shubham	Utekar	mumbai, ...	dombivali	india	9234567...
*							

## **12. Edit Customer:**



User Management Customer Management Menu Management Invoice Management Tools Logout Exit

ADD DELETE SEARCH VIEW ALL EDIT

ID of Customer

Edit By

New Value

Update

Edit

Admin and Privilege users can edit and update the Customer Details in the System.

**13. Add Menu:**

User Management Customer Management Menu Management Invoice Management Tools Logout Exit

Add Edit Delete Search View

**Category**

- Break Fast
- Desserts
- Lunch
- Coffee
- Dinner
- Tea
- Short - Eats
- Soup
- Cool Drinks
- Cake

**Add Menu**

Item Name

Price

**Clear** **Add**



Admin and Privilege User can add Menu item in the System.

## **14. Edit Menu:**

User Management Customer Management Menu Management Invoice Management Tools Logout Exit

Add Edit Delete Search View

Update

Menu ID

Change

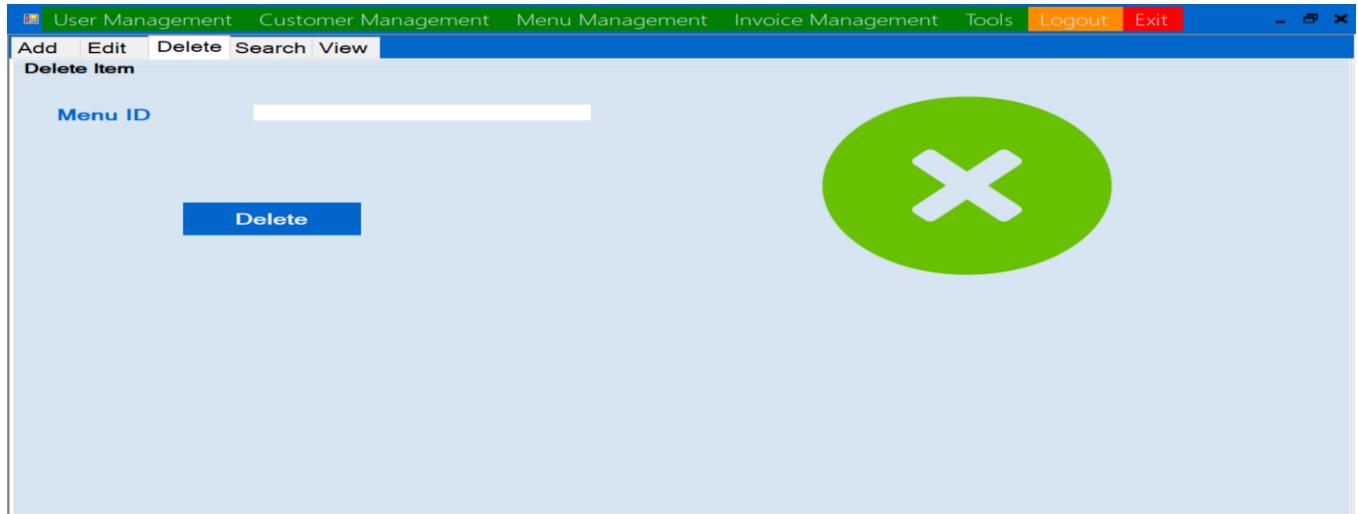
Value

Update

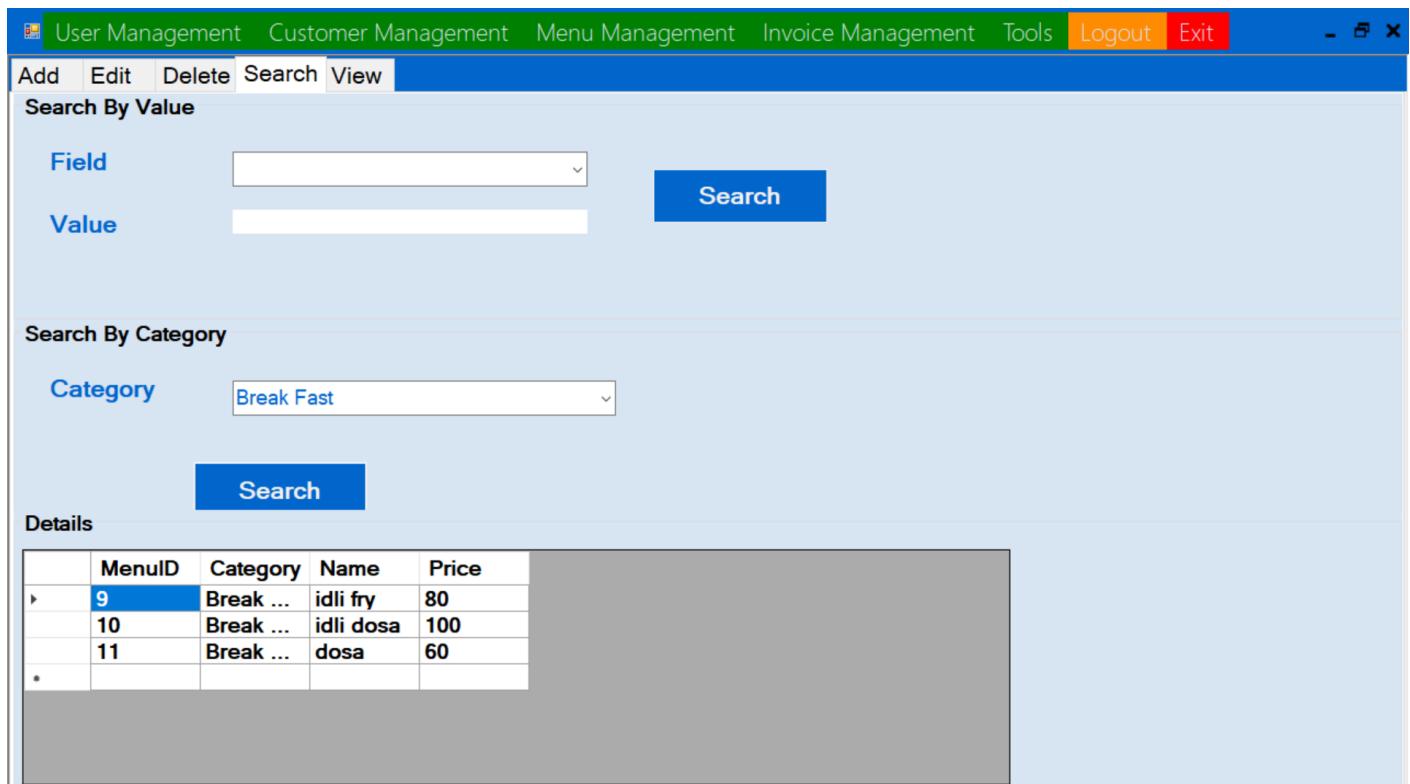
Only Admin and Privilege Users can edit the Menu Details in the System.

## Project ScreenShots

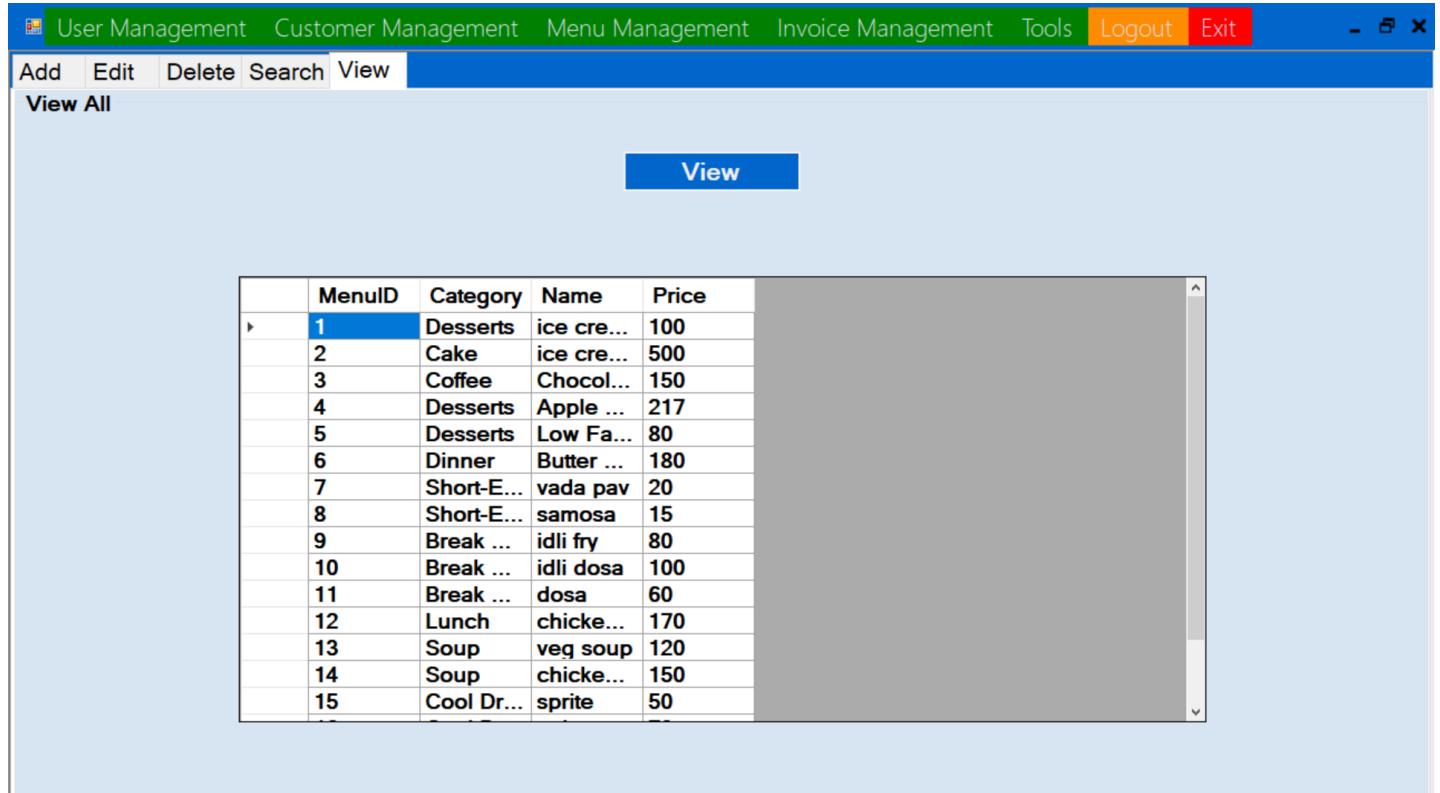
### 15. Delete Menu:



### 16. Search Menu:



Only Admin and Privilege users can delete and Serach the Menu item.

**17. View Menu:**

The screenshot shows a web-based application interface for a Restaurant Management System. The top navigation bar includes links for User Management, Customer Management, Menu Management, Invoice Management, Tools, Logout, and Exit. Below the navigation is a toolbar with buttons for Add, Edit, Delete, Search, and View. A 'View All' link is also present. A large central area displays a table of menu items with columns for MenuID, Category, Name, and Price. The table contains 15 rows of data. The first row (MenuID 1) is highlighted with a blue background.

	MenuID	Category	Name	Price
▶	1	Desserts	ice cre...	100
	2	Cake	ice cre...	500
	3	Coffee	Chocol...	150
	4	Desserts	Apple ...	217
	5	Desserts	Low Fa...	80
	6	Dinner	Butter ...	180
	7	Short-E...	vada pav	20
	8	Short-E...	samosa	15
	9	Break ...	idli fry	80
	10	Break ...	idli dosa	100
	11	Break ...	dosa	60
	12	Lunch	chicke...	170
	13	Soup	veg soup	120
	14	Soup	chicke...	150
	15	Cool Dr...	sprite	50

Admin and privilege users can search particular Menu Item.

**18. Bill Management:**

INVOICE DETAILS

Customer Name :

Invoice No :

Telephone No :

Bill Creator :

CustomerID :

Date:

ITEMS PURCHASED

Item Type :

Qty :

Select Item

AMOUNT

Total :

Discount :

To Pay :

Admin, Privilege users and Normal users can Generate Invoice and Print Invoice from the System.

**19. View Bill Detail:**

User Management Customer Management Menu Management Invoice Management Tools Logout Exit

Invoice Details Purchased Items

Invoice No

Search

	InvoiceID	UserID	CustomerN	CustomerID	Telephone	Date	Total	Discount	ToPay
▶	1	praj123	shubham	101	1234567...	2020-08-...	1200	0	1200
*									

Anyone can search the detail of the Billing.

# RESTAURANT MANAGEMENT SYSTEM

## **20. View Purchased Items:**

Screenshot of the Restaurant Management System showing the 'Purchased Items' view. The top navigation bar includes links for User Management, Customer Management, Menu Management, Invoice Management, Tools, Logout, and Exit. The main content area has tabs for 'Invoice Details' and 'Purchased Items'. A search bar at the top right includes fields for 'Invoice No.' and a 'Search' button. Below is a table with the following data:

	ItemNo	Category	ItemName	Price	Qty	SubTotal
▶	1	Desserts	ice cream	100	12	1200
*						

## **21. Print Invoice:**

Screenshot of the Restaurant Management System showing the 'Print Invoice' view. The top navigation bar includes links for User Management, Customer Management, Menu Management, Invoice Management, Tools, Logout, and Exit. The main content area features a large printer icon. Below it is a search bar with a field for 'Invoice ID' and a 'Print' button. A 'Home' button is also present.

## RESTAURANT MANAGEMENT SYSTEM

### 22. Normal User Dash Board:

This screenshot shows the Normal User Dash Board. The top navigation bar includes links for View User, View Customer, View Menu, Invoice Management, Tools, Logout, and Exit. Below the navigation is a toolbar with Search and View buttons, and a sub-menu for View Staff. A large central area displays a table of user data with columns: UserID, FirstName, LastName, Email, Address, City, Telephone, and Position. Two user entries are visible: one for 'praj123' and another for 'prajwal22'. A blue 'View All' button is located at the bottom of this table area. The entire interface is set against a light blue background.

	UserID	FirstName	LastName	Email	Address	City	Telephone	Position
▶	praj123	prajwal	mendon	prajwalm...	swami sa...	Dombivali	9619414...	Admin
▶	prajwal22	prajwal	mendon	prajwal@...	mumbai	dombivali	9009123...	manager
*								

### 23. Search User:

This screenshot shows the Search User interface. The top navigation bar is identical to the previous dashboard, with links for View User, View Customer, View Menu, Invoice Management, Tools, Logout, and Exit. Below the navigation is a toolbar with Search and View buttons, and a sub-menu for Search User. The main area features a search form with a 'User ID' input field and a 'Search' button. A large, empty rectangular area is positioned below the search form, likely intended for displaying search results. The interface has a light blue background.

## RESTAURANT MANAGEMENT SYSTEM

### 24. Search Customer:

The screenshot shows a search interface for a customer. The search parameters are set to 'CustomerID' and the value is 'r100'. The search button is blue. The result table shows one row for customer r100, with details: FirstName 'Roshan', LastName 'Indap', Address 'mumbai, ...', City 'dombivali', Country 'India', and Telephone '9988776...'. The 'CustomerID' column is highlighted in blue.

	CustomerID	FirstName	LastName	Address	City	Country	Telephone
▶	r100	Roshan	Indap	mumbai, ...	dombivali	India	9988776...
*							

### 25. View Customer:

The screenshot shows a list of customers. The 'View All' button is blue. The table lists two customers: r100 (FirstName 'Roshan', LastName 'Indap') and s100 (FirstName 'Shubham', LastName 'Utekar'). The 'CustomerID' column is highlighted in blue.

	CustomerID	FirstName	LastName	Address	City	Country	Telephone
▶	r100	Roshan	Indap	mumbai, ...	dombivali	India	9988776...
*	s100	Shubham	Utekar	mumbai, ...	dombivali	India	9234567...
*							

## RESTAURANT MANAGEMENT SYSTEM

### 26. Search Menu:

View User View Customer View Menu Invoice Management Tools Logout Exit

Search View

Search By Value

Field: MenuID Value: 5

Search

Search By Category

Category

Search

Details

	MenuID	Category	Name	Price
▶	5	Desserts	Low Fa...	80
*				

### 27. View Menu:

View User View Customer View Menu Invoice Management Tools Logout Exit

Search View

View All

View

	MenuID	Category	Name	Price
▶	1	Desserts	ice cre...	100
2	Cake	ice cre...	500	
3	Coffee	Chocol...	150	
4	Desserts	Apple ...	217	
5	Desserts	Low Fa...	80	
6	Dinner	Butter ...	180	
7	Short-E...	vada pav	20	
8	Short-E...	samosa	15	
9	Break ...	idli fry	80	
10	Break ...	idli dosa	100	
11	Break ...	dosa	60	
12	Lunch	chicke...	170	
13	Soup	veg soup	120	
14	Soup	chicke...	150	
15	Cool Dr...	sprite	50	

Home

## Ch.13 Sql DataStructures Screen-Shots

### 13.1 Login:

	Column Name	Data Type	Allow Nulls
PK	UserID	varchar(50)	<input type="checkbox"/>
	Password	varchar(50)	<input type="checkbox"/>
	AccessID	varchar(10)	<input type="checkbox"/>

### 13.2 Users:

	Column Name	Data Type	Allow Nulls
PK	UserID	varchar(50)	<input type="checkbox"/>
	FirstName	varchar(50)	<input type="checkbox"/>
	LastName	varchar(50)	<input type="checkbox"/>
	Email	varchar(50)	<input checked="" type="checkbox"/>
	Address	varchar(50)	<input type="checkbox"/>
	City	varchar(30)	<input type="checkbox"/>
	Telephone	char(10)	<input type="checkbox"/>
	Position	varchar(50)	<input checked="" type="checkbox"/>

# RESTAURANT MANAGEMENT SYSTEM

## 13.3 Customer:

Column Name	Data Type	Allow Nulls
CustomerID	varchar(50)	<input type="checkbox"/>
FirstName	varchar(50)	<input type="checkbox"/>
LastName	varchar(50)	<input type="checkbox"/>
Address	varchar(50)	<input type="checkbox"/>
City	varchar(30)	<input type="checkbox"/>
Country	varchar(30)	<input checked="" type="checkbox"/>
Telephone	char(10)	<input type="checkbox"/>

## 13.4 Menu:

Column Name	Data Type	Allow Nulls
MenuID	int	<input type="checkbox"/>
Category	varchar(50)	<input type="checkbox"/>
Name	varchar(50)	<input type="checkbox"/>
Price	float	<input type="checkbox"/>

## RESTAURANT MANAGEMENT SYSTEM

### 13.5 Invoice:

	Column Name	Data Type	Allow Nulls
▶	InvoiceID	int	<input type="checkbox"/>
	UserID	varchar(50)	<input type="checkbox"/>
	CustomerName	varchar(50)	<input checked="" type="checkbox"/>
	CustomerID	varchar(50)	<input checked="" type="checkbox"/>
	Telephone	char(10)	<input checked="" type="checkbox"/>
	Date	varchar(30)	<input checked="" type="checkbox"/>
	Total	float	<input checked="" type="checkbox"/>
	Discount	float	<input checked="" type="checkbox"/>
	ToPay	float	<input checked="" type="checkbox"/>

### 13.6 Orders:

	Column Name	Data Type	Allow Nulls
▶	InvoiceID	int	<input type="checkbox"/>
	ItemNO	int	<input type="checkbox"/>
	Category	varchar(50)	<input checked="" type="checkbox"/>
	ItemName	varchar(50)	<input checked="" type="checkbox"/>
	Price	float	<input checked="" type="checkbox"/>
	Qty	int	<input type="checkbox"/>
	SubTotal	float	<input checked="" type="checkbox"/>

## Ch. 14 System Maintenance

System Maintenance stands for all the modifications and updatations done after the delivery of software product. The software requirements vary according to client needs. Hence the software must be customizable to be able to meet Client Needs.

### **14.1 The Need for Modification in our System can be of the following form:**

**14.1.1 Market Conditions** - Policies, which changes over the time, such as taxation and newly introduced constraints like, how to maintain bookkeeping, may trigger need for modification.

**14.1.2 Client Requirements** - Over the time, customer may ask for new features or functions in the software.

**14.1.3 Host Modifications** - If any of the hardware and/or platform (such as operating system) of the target host changes, software changes are needed to keep adaptability.

**14.1.4 Organization Changes** - If there is any business level change at client end, such as reduction of organization strength, acquiring another company, organization venturing into new business, need to modify in the original software may arise.

In Restaurant Management System lifetime, type of maintenance may vary based on its nature. It may either be just a routine maintenance task as some bug discovered by some user or it may be a large event in itself based on maintenance size or nature. Following are some types of maintenance based on their characteristics:

**14.1.5 Corrective Maintenance** - It includes modifications and updatations done in order to correct or fix problems, which are either discovered by user or concluded by user error reports.

**14.1.6 Adaptive Maintenance** - It includes modifications and updatations applied to keep the software product up-to date and tuned to the ever changing world of technology and business environment.

**14.1.7 Perfective Maintenance** - It includes modifications and updates done in order to keep the software usable over long period of time. It includes new features, new user requirements for refining the software and improve its reliability and performance.

**14.1.8 Preventive Maintenance** - It includes modifications and updatations to prevent future problems of the software. It aims to attend problems, which are not significant at this moment but may cause serious issues in future.

## Ch.15 Limitations and Future Enhancements

### **15.1 Limitations:**

The Restaurant Management System makes use of Crystal Reports which are not portable. For the clients, the plug-in needs to be installed on their machine with Visual Studio and Sql Management Studio compatible versions. System design is hard to be customized for Client Needs. Since RMS is Desktop application, remote access is not possible.

### **15.2 Future Enhancements:**

Although the restaurant industry is very competitive, the lifestyle changes created by modern living continue to fuel its steady growth. More and more people have less time, resources, and ability to cook for themselves. Trends are very important and this software is well positioned for the current interest in lighter, healthier foods at moderate to low prices.

So while we keep in mind the fact that there is no software that is perfect, which would also mean there is no perfect restaurant software, I put in an endless effort to improve my restaurant management software. There are abundant features that are not included in this project, so I'm mentioning those features that can be added in my project in future. Those features are listed below-

The Software can be used with a Web Based Interface.

We offer flexible tax (VAT) for every item separately; my restaurant software can also supports multiple sales taxes in future which have the need to tender more than just one tax with their restaurant software. Speaking of taxes, this restaurant system can accommodates multiple sales tax systems (i.e. USA, VAT, PST, ST, HST and much more).

In future, when speaking of international features, this restaurant software can accommodates

## RESTAURANT MANAGEMENT SYSTEM

all world currencies. And if by any chance, your currency is not readily available in this restaurant software, you can simply add it yourself, by using our restaurant software's "add currency" feature.

In future, this restaurant software can be "multilingual" and "self translating" as well.

## Ch. 16 Conclusion

In my Project entitled “**RESTAURANT MANAGEMENT SYSTEM**” I have tried my best to fulfill all the requirements of restaurant. The project being simple and flexible is running successfully. The main advantage of my project is that its simplicity attracts a lot of users. It can be easily run by a novice user. This software can be used in any kind of restaurant (Bar, Sandwich Shop, Pizzeria, Steak House, Café Shop, Deli, Buffet, and Catering business, Doughnut or Pastry Shop, Hotel restaurant/kitchen and more).

The Restaurant Management System helps the restaurant manager to manage the restaurant more effectively and efficiently by computerizing meal ordering, billing and inventory control. The system processes transaction and stores the resulting data. Reports will be generated from these data which help the manager to make appropriate business decisions for the restaurant. For example, knowing the number of customers for a particular time interval, the manager can decide whether more waiters and chefs are required.

This project when implemented it will remove all the security issues. Also, there will be speedy and secured authentication procedure for the maintenance of records. Data entry is fast and simple because it automatically picks up information about a customer from the database on subsequent visits.

Therefore, this software will definitely prove to be a successful stepping stone in replacing the outdated manual method of maintaining secure records. The work plan also includes the detailed features of the technology used in the project defining the front end and back end. The objectives and scope of the project in future have been elaborated.

## Ch. 17 Bibliography

**For Icons:** <https://www.flaticon.com>

<https://www.iconfinder.com>

**For Sql Queries:** <https://www.w3schools.com/sql/default.asp>

**For Synopsis Reference:** <https://nevonprojects.com>

<https://final-year-projects.in>

**For Coding Reference:** C#: The Complete Reference Book. Author: Herbert Schildt

[https://www.youtube.com\(Vettrivel D. UI Academy, Fox Learn\)](https://www.youtube.com(Vettrivel D. UI Academy, Fox Learn))

<https://stackoverflow.com>

<https://github.com>

<https://www.quora.com>

<https://www.c-sharpcorner.com>

**Shared Libraries(.dll) used:** SAP Crystal Reports in Visual Studio

**Color Theme reference:** <https://www.color-hex.com>

[https://www.w3schools.com/colors/colors\\_picker.asp](https://www.w3schools.com/colors/colors_picker.asp)

## RESTAURANT MANAGEMENT SYSTEM

**For UML Diagrams:** staruml and drawio:

<https://staruml.io>

<https://www.draw.io>