WAITER-LESS RESTAURANT SYSTEM

Introduction

In the era of digitization, all small and big industries are moving towards automation. Ever industry, today, is seeking methods and technology through which they can work efficiently with very less number of men power. As computers are reliable, efficient and come under the categories of one time investment the industries are adopting them right into their care processes.

The project 'Waiter less Restaurant System' introduces a restaurant which has a very minimal staff, a restaurant in which customer's orders could reach the kitchen without the aid of waiters.

In the project java is used in front-end to design a user interface which interacts with MySQL database at back-end.

For the implementation of project, the owner will have to invest four types of devices –

1. A server where all the data will be stored and all other devices will communicate with each other through their server.
2. A computer for manager to manage all the processing of the restaurant.
3. Devices on table, these will be used by the customer, to place their order.
4. A device which will be used to flash orders in the kitchen and to take input signal when the order is done.

All four devices will have certain software running, so, that they co-ordinate with each other in proper manner. Software for manager's device, for device in kitchen and for customer's device is designed separately in independent sub projects/modules. The structure of project will be discussed in details under project structure heading.

Processes in Restaurants

Table Tracking

In a restaurant the manager must know which tables are occupied and which are unoccupied. Also the manager must know, which table can accommodate how much seating.

Order Taking

When the customer are seated they are provided with menu from which the customer chooses his/her food and places order. These orders are conveyed to kitchen.

Kitchen Processing

The order is processed as conveyed by the waiter. When the processing is over, the waiter serves the food.

Serving

Most of the restaurants have serving on the table service but some hotels follow self-serving system where customer is intimated that his/her order is ready and the customer grabs his order and comes back to the table.

Billing and Payment Collection

The orders are conveyed to the manager on which the bill is generated as per the orders. The customer can be provided the bill on table or he/she must have to go to the counter for bill and payment. When the customer pays his bill, he leaves and the table is empty again.

All these processes are repeated for every customer.

The Problems

This traditional way of functioning makes the job harder for manager. In a big restaurant where several tables are operating at once, the task of tracking the status of each and every table becomes tough, leading to inefficient management, wastage of time.
Also the customer faces problems when the management is inefficient. If the number of waiters is decreased, the work load of each waiter increases and attention to each table reduces. For better working, sufficient waiters are required, hence increasing the monthly cost to the owner. As a result, the food rates are directly affected. All these things leads to poor business profits. Hence, the problem is clearly noticeable.

Automation: The Solution

All those problems can be solved by automating and digitizing the processes of restaurant system. What if manager could look at a screen and tell which tables are occupied and which are not. Even he could tell what is going on in the kitchen and what are the status of orders of each table, just from his screen.
What if the customer could order and get status of their order in real time from their tables itself without the aids of waiters. And clearly, no waiters, no monthly cost, hence, lower food rates leading to more business as well as more profit.
Hence, the problem can be solved by the means of digital devices.

Advantages of Implementing Waiter-less Management System

Cost Reduction
As the salary given to each waiter adds up into monthly cost of the restaurant firm while using the system, will have a one-time cost which will produce profits by cutting monthly cost of the restaurant.

Increase in Profit
When the cost decreases, the direct effects will be seen as reduction in item prices. Hence, demand will rise as the restaurant will provide food at lower prices. Hence, profit will surely increase.

Reliability
As computers are machines and humans are humans, they perform task efficiently in split seconds with 100% accuracy. Hence, the system will be highly reliable as compared to the old one.

The Starting Boost
As soon as the system gets functional, the restaurant will witness a boost in their sales, this is because the new technology and lower food price will make people to visit the restaurant once to see new technology.

Management Becomes lot More Easy and Efficient
As the manager can keep his eye on every process happening in restaurant from one place, it will be in his scope to see each and every processing closely.

Disadvantages of Implementing the System
For the owner's perspective the only disadvantage is that it may receive manifold capital expenditure of what his monthly cost is as one-time investment.

Reduces Jobs
It is true that with the introduction of this system many jobs may become redundant. Hence, this may be one of the social disadvantage of the project's implementation.

Requirements

For implementing the project we will need a server machine which should be able to run MySQL server edition.

 A device for manager which can run Java Runtime Environment. It can be custom tablet or a computer system as preferred.

A device in kitchen which can run java application and take input signal (click or touch) too.

A device on each table that can run java application.

All four devices must be on a network as data is required to communicate to server and from server to other devices.

The network can be wireless or wired as preferred. But wireless will increase device mobility.

Project Structure

I developed the whole project 'Waiter-less Restaurant System' as three different sub-projects. All these three projects can be seen as three modules. The user interface in the front-end is developed using JAVA and it interacts with MySQL database management system in the back-end. Originally the project was developed as a single project which had three different JAVA packages. As the Idea of making three different projects was clear right from the beginning, all three packages were developed in such a manner that each one can function independently.

The three projects have one application each which would work on three devices, server will have MySQL running on it. One is for Manager's device, the second is for the device placed on each table i.e. for customer, and last one is for the screen in kitchen.

Manager
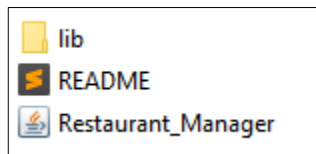
Customer
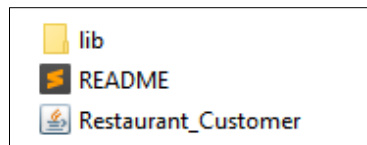
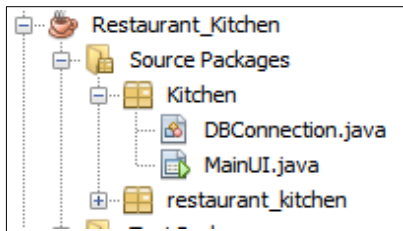Kitchen
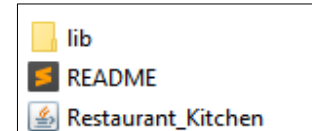
- **Manager Module:**
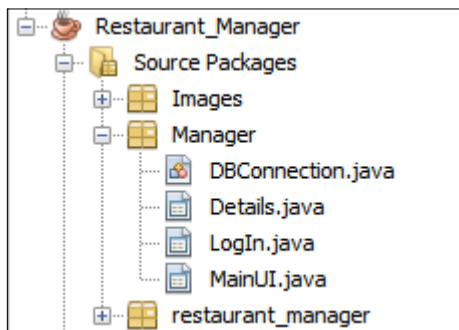
Manager module contains 2 JFrames(LogIn, MainUI), 1 pop(Details). LogIn frame is authentication check the manager will have to login to proceed working. After login the manager will see MainUI frame open. Through which he can manage all the processing of the restaurant.

- **Customer Module:**
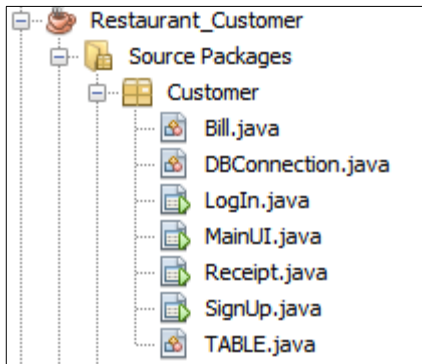
Customer module contains 4 JFrames(LogIn, MainUI, SignUp, Receipt). LogIn frame can be used by registered members, customers can register themselves or just skip log in and proceed. After login frame the customer will see MainUI frame open. Using this frame he will be able to place order and track his order status in real time. User generates the bill and comes to the Receipt frame where he sees the summary of his bill and sees the payment to be done.

- **Kitchen Module:**

Kitchen module contains only one JFame(MainUI).On this frame the device shows the next order and tells the number of remaining orders. The frame takes input when the displayed order is done, and he next order shows.

Database

MySQL database management system is used to interact with user interface and scripts created using JAVA.

- **Tables:**
  - **Bills:** contains data about payment and bills.
  - **member_login:** Login details of registered members.
  - **Members:** Details of all the registered members.
  - **Menu:** Contains the full menu list and all related fields.
  - **Orders:** contains list of orders from all tables.
  - **Staff:** Details of staff.
  - **staff_login:** Contains login details of staff members.
  - **table_stat:** Contains the status of different eating table in the restaurant.

- **ER-Diagram:**
 The diagram shows the structure of whole database 'Restaurant'.
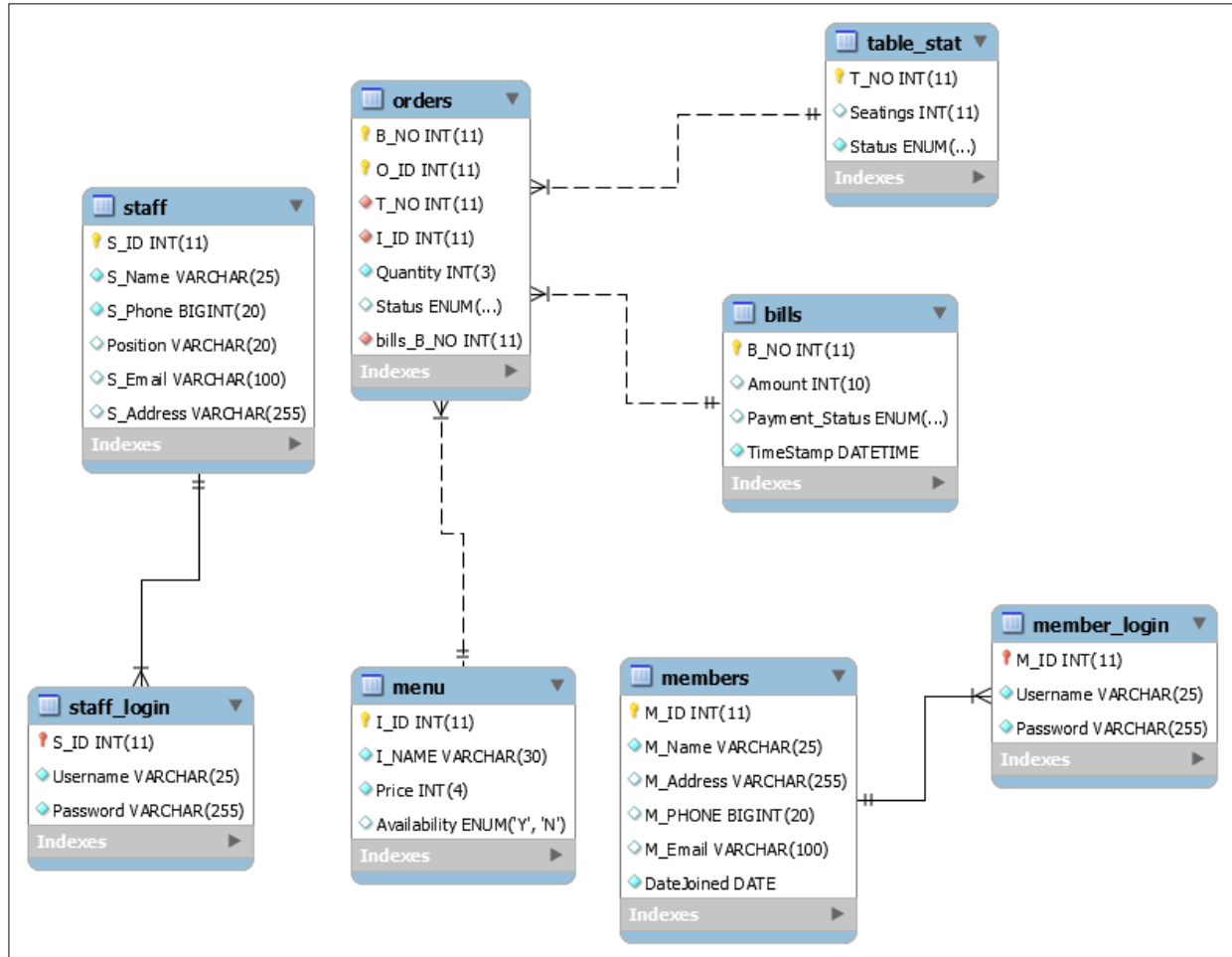
Working of Project

For the project to function properly, All four kinds of devices are required to be on same LAN. All the processes of an orthodox restaurant system were discussed earlier. Now the functioning of all those processes will be seen in 'Waiter-less Restaurant System'.

The first page which the users(customers, manager, kitchen worker) will see is shown below.

- **Customer:**
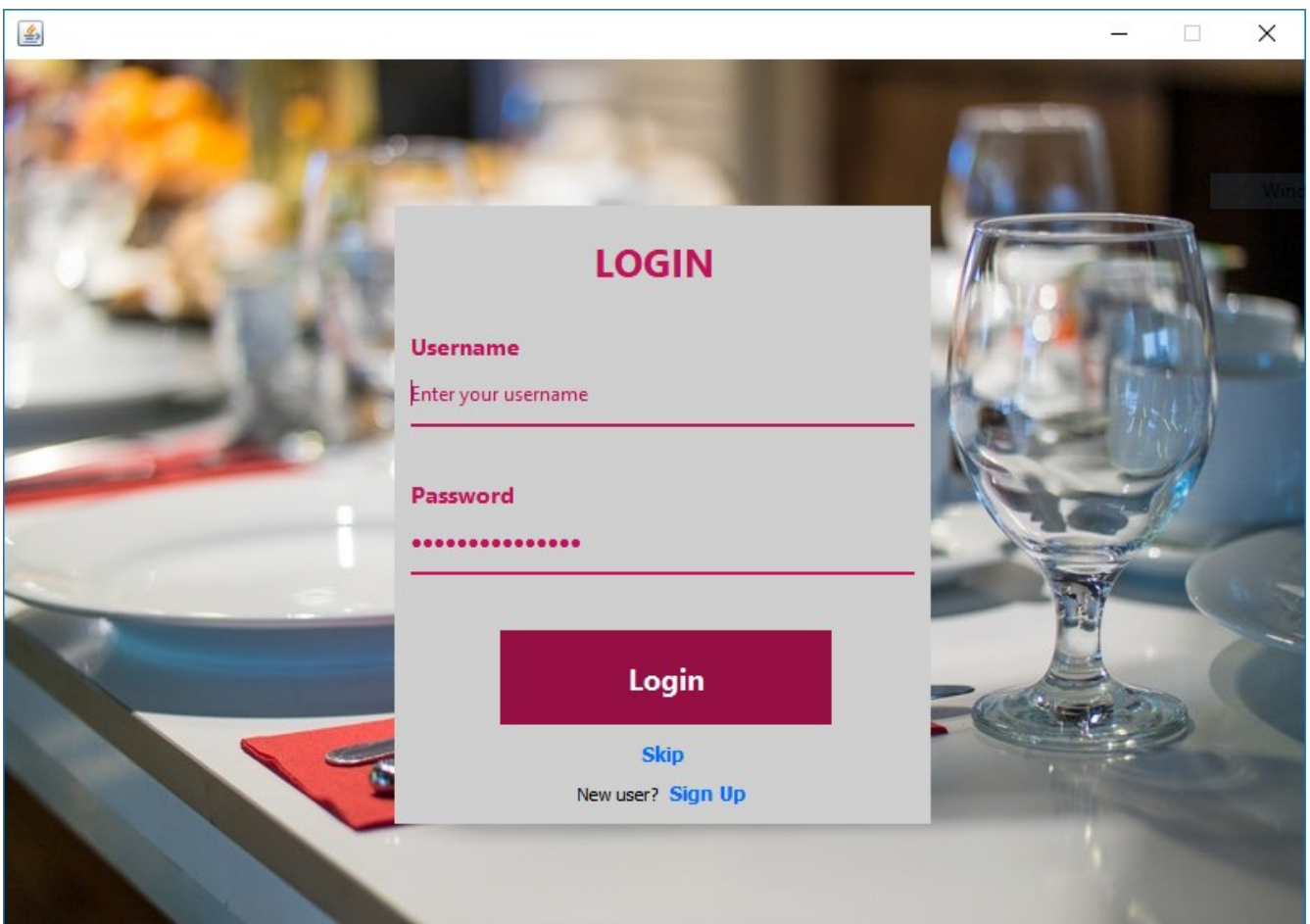
On this window the registered customers can login. The customers who are not registered and want to get registered can click on Sign Up to proceed to SignUp frame. Also if any customer don't want to register he/she can skip the login and proceed directly to MainUI of customer module.

- **Manager:**
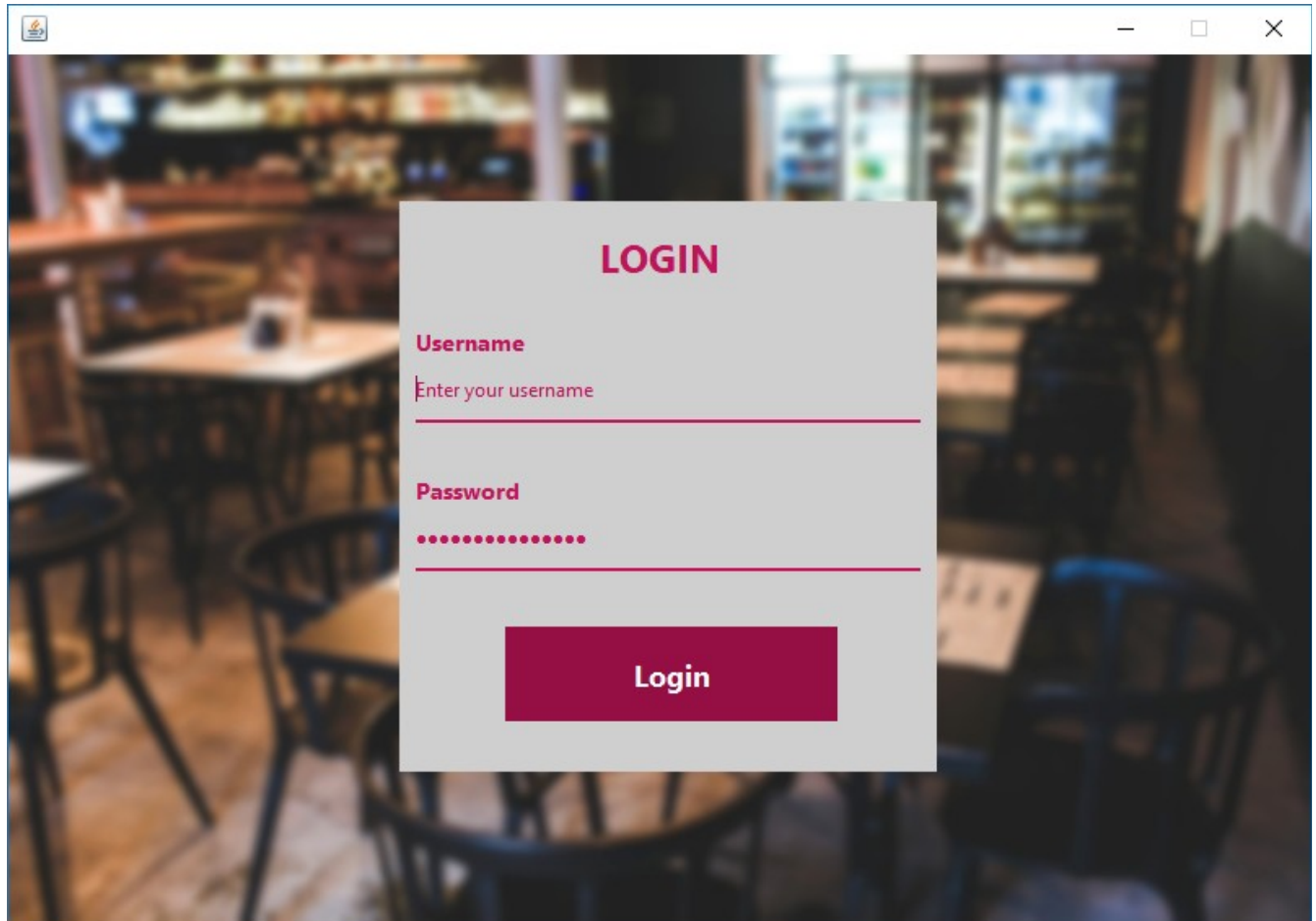
Here the manager has only one option and that is to enter his Username which is provided by restaurant and enter his password to login and proceed to MainUI to continue his work.

- **Kitchen:**

Shown below is the MainUI of kitchen Module. This will be the opened window on devices on kitchen. The Frame shows the order ID, Item name, quantity of the current order. Also a field tells how many more orders are waiting to get completed. The Done button sends the signal to Manager as well as customer's device that order is ready.
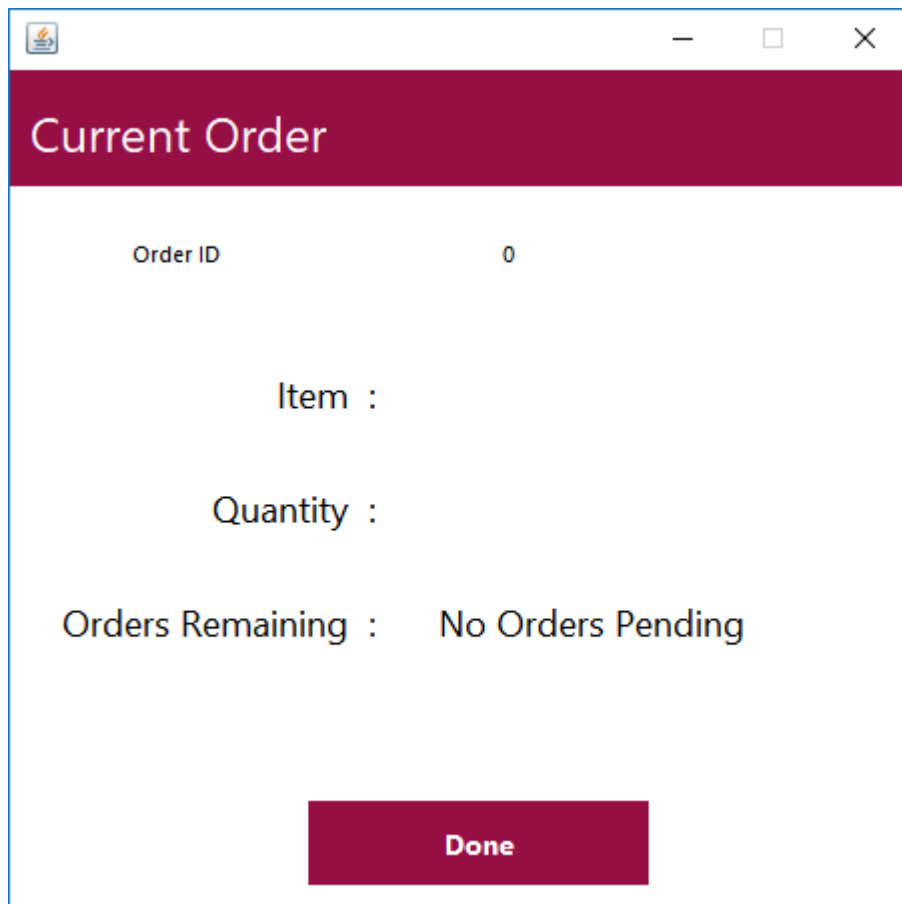
This was all about functioning of Kitchen module.

MainUI of Customer Module:

The frame on next page is the main frame from where customers will choose and send their orders to the kitchen. It is this frame on which they can see the real time status of their orders.

There are three tables on the frame. One on the left side is Menu table it shows the Items, their prices and availability. The second table which is on right side is order table it is an area where customer can design his/her order. The third and last table shows the status of placed orders.

The add button given on the middle of the frame, is used to add orders from menu to order table. If any order in the order table is needed to be removed from the order table, it can be selected and Delete button is clicked. The selected order is removed from the order table. Next, when the order to be placed is ready the Place order button on the right side of the frame is used to send order to the kitchen.

All the placed orders are shown in the placed order table and the Status column tells the real-time status of the order.

DIGI RESTAURANT

Menu

Availability	Item	Price
Y	Samosa	10
Y	PETTIES	15
Y	BREAD POKARA	25
Y	HOT DOG	25
Y	Cold Coffee	25
Y	Pasta	55
Y	Chillie Potato	50
Y	Burger	20
N	Casata	120
Y	PopCorn	15
Y	PopCorn Butter	25
Y	Masala Chai	10
Y	Chole Bhature	1

>> Add >>

New Order

Name	Quantity	Cost

Delete

Place Order

Generate Bill

Placed Orders

Status	Name	Quantity	Cost

When the customer is done eating he/she can click on generate bill to exit and see their bill summary on the Receipt frame. The receipt frame is shown below.

BILL SUMMARY

Bill Number: 2000063

S. No.	Item	Quantity	Cost
1	Casata	1	120
2	BREAD POKARA	2	50

Total : Rs. 170

Status : PENDING

Close
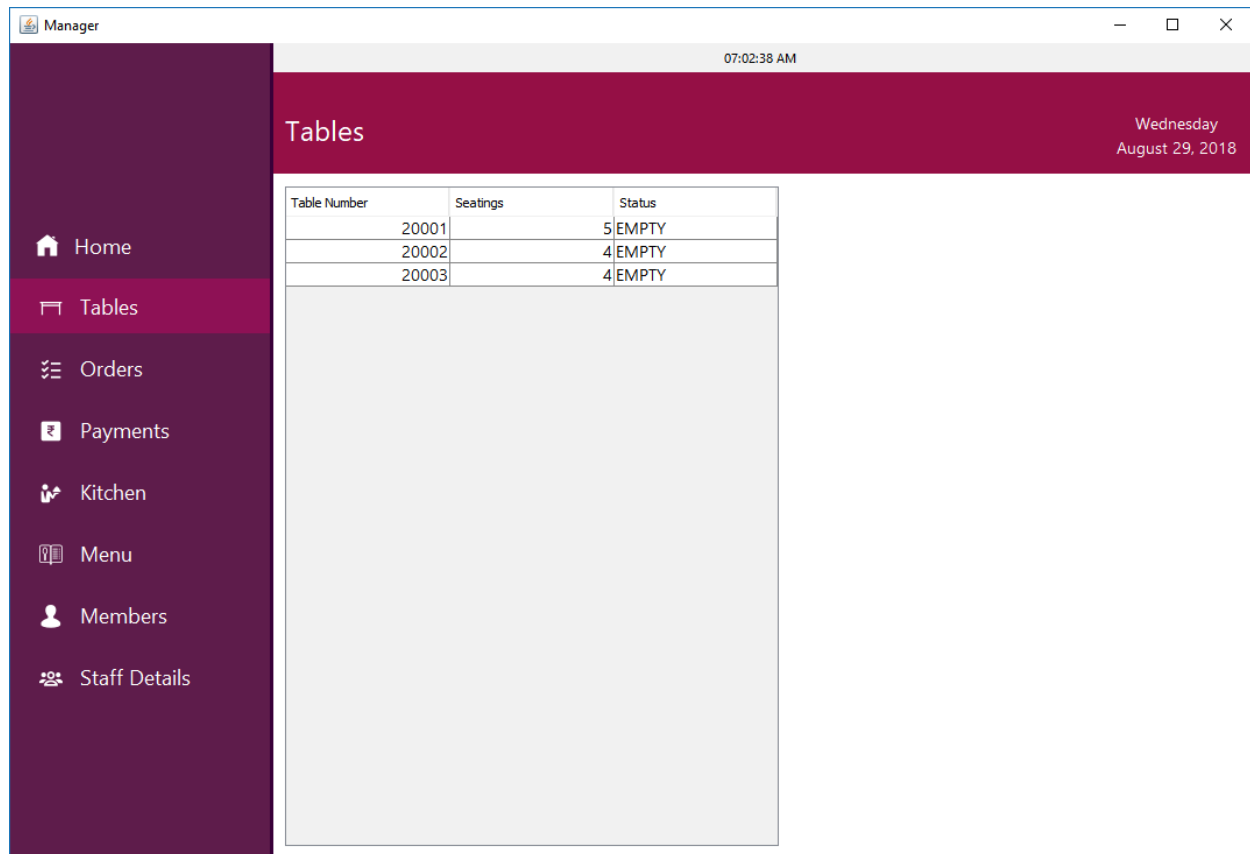
MainUI of Manager Module:
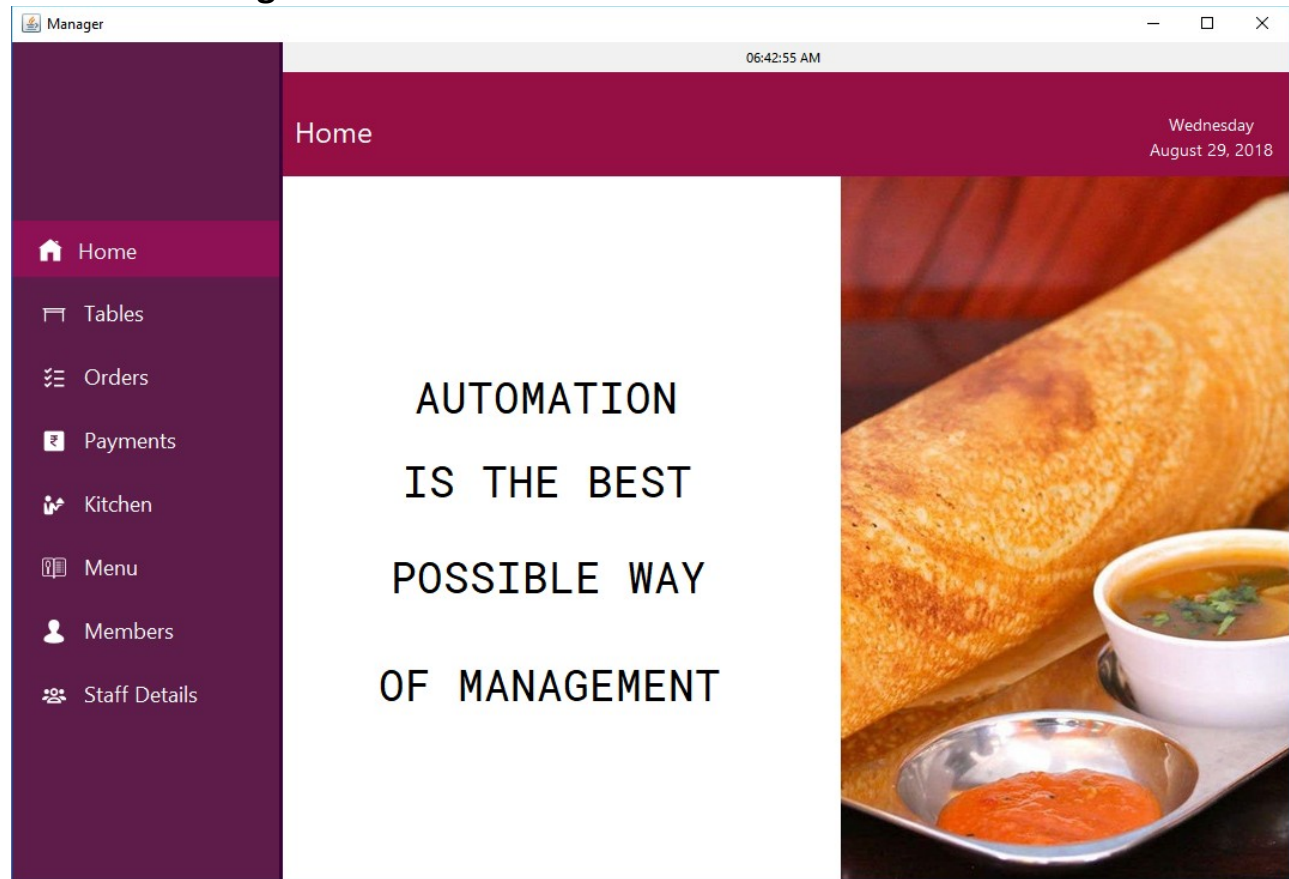
On the right hand side we have a navigation pane, which can be used to open tab which shows information about a particular thing.

- **Tables Tab**

- **Orders Tab**

- **Payments Tab**

- **Kitchen Tab**

- **Menu Tab**

- **Members and Staff Tab**

Tables Tab: This tab shows information about the tables, either they are empty or occupied. Each table has a unique table number, corresponding to it is the number of seating it can accommodate and the status field shows if the table is EMPTY or OCCUPIED.
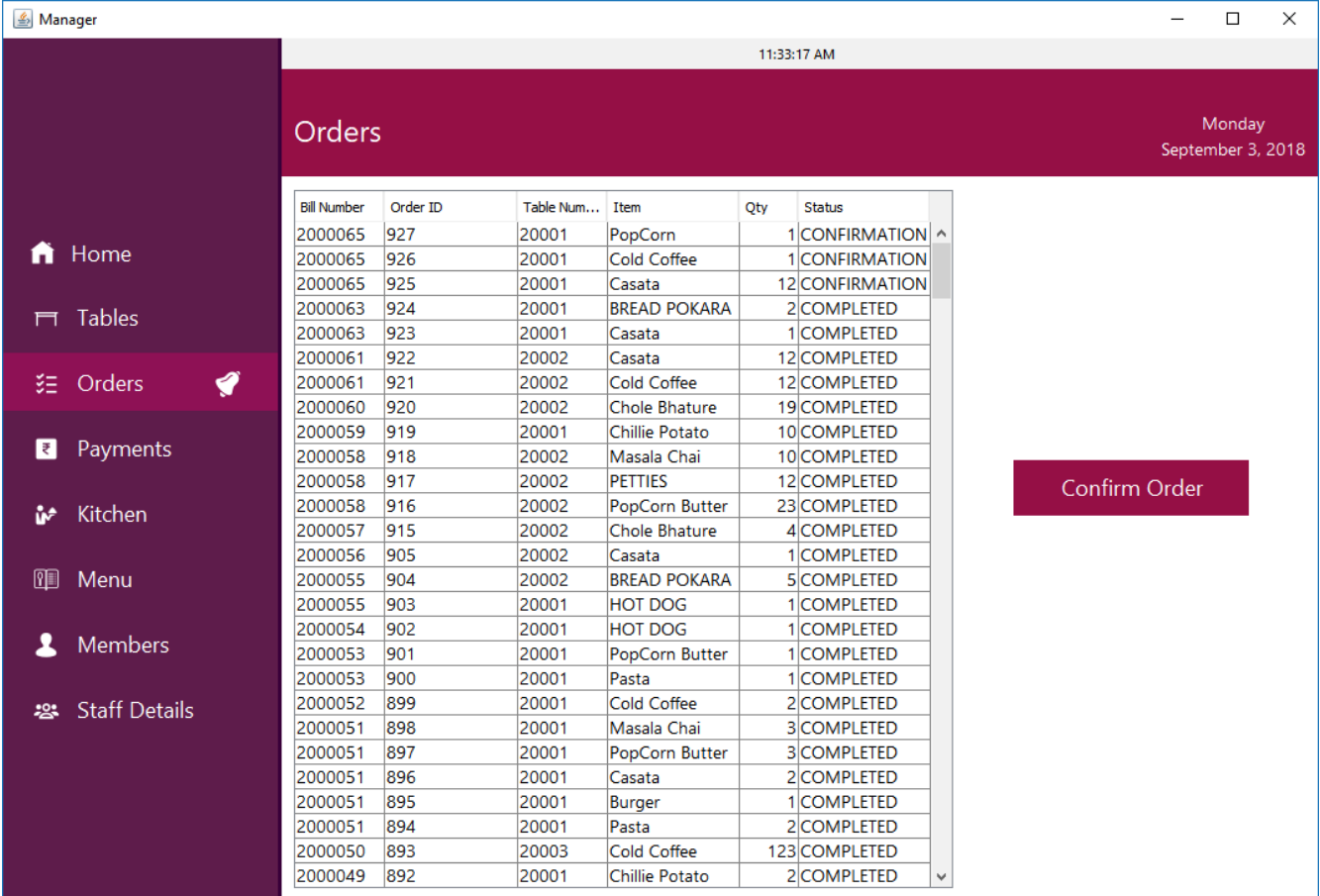
This enables the manager to track tables from his seat only. This helps in better management in restaurant.

Orders Tab: This tab shows all the past orders in full detail. Any new order will trigger a windows notification and a bell icon will be visible as shown in figure. Which tells the manager that new orders are pending for confirmation by him.

Confirm Order Button is used by manager to confirm the selected order. Only the orders Confirmed will be sent to kitchen fur further processing.
Also he can get details of any past order from the tab.

Manager can track the real time status of orders from this tab. The Status field shows status to be CONFIRMATION if the confirmation on order is pending. The status is WAITING when the order is confirmed by manager but waiting in kitchen. The status is COMPLETED when the order is ready in kitchen.

Payments Tab: From this tab manager can view the bill summary of every past bill. And if any new payment is triggered the bell icon gets visible and notifies the manager that a bill is generated on a table.

The first button is to mark the payment as done. This updates the payment status from PENDING to DONE also the manager can view details of any past payment using Get Details button.

Menu Tab: This tab allows manager to add new items and edit previous items from the menu.

Item ID	Name	Price	Availability
12	Samosa	10	Y
13	PETTIES	15	Y
14	BREAD POKARA	25	Y
15	HOT DOG	25	Y
17	Cold Coffee	25	Y
9000	Pasta	55	Y
9001	Chillie Potato	50	Y
9002	Burger	20	Y
9003	Casata	120	N
9004	PopCorn	15	Y
9006	PopCorn Butter	25	Y
9007	Masala Chai	10	Y
9008	Chole Bhature	1	Y

Add Item

Item ID   9009

Item Name

Price

☐ Available

Done

Edit Item

Item ID   14

Item Name   BREAD POKARA

Price   25

☑ Available

Save Changes

Staff/Members Tab: These tabs are used to show details of registered customers and staff members respectively. In staff tab manager can add staff members too using add button.

Name	Phone	Email	Position
AJAY	7404240635	99aps99@gmail.com	OWNER
APS	7202229870	ajay.snp99@gmail.c...	Manager
Vinay	6635489352	vinchef@gmail.com	chef
Varun	7583893209	varun@email.com	Watchman

Add Staff

Show Details

New Staff Member

ID	19006
Name	
Userame	
Position	
Phone	
Email	
Address	

Done

Staff Details

ID	19001
Name	APS
Userame	aps
Position	Manager
Phone	7202229870
Email	ajay.snp99@gmail.com
Address	

Done

Serving

Now when the restaurant system is waiter less, there will be no one to serve the food to the tables, so, the restaurant can follow two approaches-

- **Self-servicing**

Whenever the device on table shows the status of order to be completed, the customer will come to know that his order is ready, so, he can go to the servicing area and get his/her order.

- **Automation**

A proper conveyor belt system can be designed to send the food to the intended table. Railway track type paths can be set to each table where the train (carrier) can be programmed to stop at the table where the project is needed to be delivered.
Line following robots with property lined flooring can be used to serve the food to the table.