BISTRO

A Project Report

Submitted by

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DECLARATION

We, **Divyam Sanghvi, Arjun Suri, Kanishk Tatiya**, Roll No. **N071, N055, N056** MBATech(Computer Engineering), IV semester understand that plagiarism is defined as anyone or combination of the following:

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Signature of the Students:

Names: Divyam Sanghvi, Arjun Suri, Kanishk Tatiya

Roll Nos. N071, N055, N056

Place: Mumbai

Date: 27/03/19

CERTIFICATE

This is to certify that the project entitled "**BISTRO Restaurant Management System**" is the bonafide work carried out by **Divyam Sanghvi, Arjun Suri, Kanishk Tatiya** of MBATech, MPSTME (NMIMS), Mumbai, during the IV semester of the academic year 2018-19, in partial fulfillment of the requirements for the Course Programming Laboratory II/ Implementation of Technology.

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Prof. Snehal Karia

Internal Mentor

_____   _____

Examiner 1   Examiner 2

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INTRODUCTION

BISTRO is an Android developed Application that is designed, developed & maintained by our team of three young developers which we collectively refer to as **Bourlab**.

The concept of this project is to develop a Computerized-System to help all-sized Restaurant's and their personnel's co-ordinate their activities. The app also helps them improve their services and assists the management to track business growth and pro-create future plans.

The main idea behind **BISTRO** is to break the utopian daydream that Restaurant Automation Systems (RAS) are costly & demanding. It is a common misconception that RAS's require a huge budget, costly hardware, experienced and trained staff to be operated.

Breaking myth's is our key goal and that is the reason why we designed and implemented a simple intuitive Android-App, An application that doesn't Burn-A-Hole through your pocket nor does it need post-graduates to operate.

Our Tagline is Simple & Self-Explanatory:

"A Simple UI & A Simple Interface for A Simple Restaurant"

The motivation & impetus for us to create an application like **BISTRO** was the dominance in this market by costly, restricted and unappealing applications. The market applications had many downfalls ranging from its functionality, capability, performance, user-interface and an everlasting list. To sum it up the market software's had these major constraints like:

- Need for Trained Staff with Knowledge of Operating the System

- Need of External Smart-Cards & Biometric Readers

- Restriction to Linux & Windows Based Systems

- Big Initial Investments + Maintenance Costs

- Difficult to Operate & Adapt

- Need of POS Systems

- Need of a File Server

Hence it was manifestly clear that there was the need for a new market application that not only worked on the following problems but also could cover for five to dix different applications available in the market. Ergo birth is given to **BISTRO,** A modern, bold & practical approach to Restaurant Automations.

BISTRO is built to embody the following aspects:

- Food Queuing and Management
- Realtime Food Ordering
- Financial Management
- Tablet Platform
- Digital Display
- Staffing

SOFTWARES USED

- **Android Studio**

  Android Studio is the paramount IDE that is officially owned and run by Android and provides developer's like us a lot of functionality and allows us to create our own gripping apps.

  Android Studio is where the coding of the application is done. Java was the language which was used to develop the application. And because of Android Studio's large built-in library of thousands of ready functions the time taken to achieve a good application was reduced to a fraction.

  Our reason for choosing Android Studio & Android as Software itself was because:

  - Large Market Share
  - Easily-Available Products
  - Low-Cost Products
  - Excellent Services

- **Google Firebase**

  Google Firebase is an In-The-Era and the most versatile cloud-based database storage facility available on the market. Google Firebase has an upper-hand over the old school competitors like MySQL & SQL making correlation of your app to a database very simple and agile.

  Firebase was majorly used by us to store all of our data on to a cloud-based service to reduce the size of the application and reduces the need of a bigger memory disk, Firebase has a lot to offer and we expect that we can make full use of its Real-time Database, Analytical Services & Cloud Computing in the future.

  Firebase helped us to save costs and completely eliminate the use of a file server in the Restaurant to store the data and distribute to the other Applications.

  We chose Firebase because it supersedes its opponents because of the following advantages:

  - Elimination of Physical Infrastructure
  - Guaranteed Performance
  - Real-time Database
  - Latest Technology
  - Failover Support
  - Cost Savings

API USED WITH DESCRIPTION

It is well said that *"Do not Judge a Book by a Cover"* but when it comes to Software Development I believe that everyone judges an App by its Cover, In this case its Graphical User Interface.

Countless efforts have been put in to develop a User Interface that makes the app look attractive & appealing to use. A GUI should merge with the API so well that a user feels like his interaction with the App is almost effortless and seamless.

Thus, this is what we have tried to achieve, here are a few snapshots of a few screens and with the components used in android studio.

SPLASH SCREEN
- Image View for top & bottom background.
- Image View for BISTRO logo.
- Image View for Bourlab logo.
- Text View fields to display the information.

RESTAURANT AUTHENTICATION PAGE
- Image View for top background.
- Numerous Text View fields to display the information.
- Numerous Edit Text fields to enter the information.
- Button to link to the next activity.

EMPLOYEE AUTHENTICATION PAGE
- Image View for top background.
- Numerous Text View fields to display the information.
- Edit Text fields to enter the information.
- Auto-Complete Text Fields to enter the information.
- Spinner as a drop down list.
- Button to link to the next activity.

EMPLOYEE WELCOME PAGE
- Image View for top background.
- Image View for employee photograph.
- Text View fields to display the information.
- Button to link to the next activity.
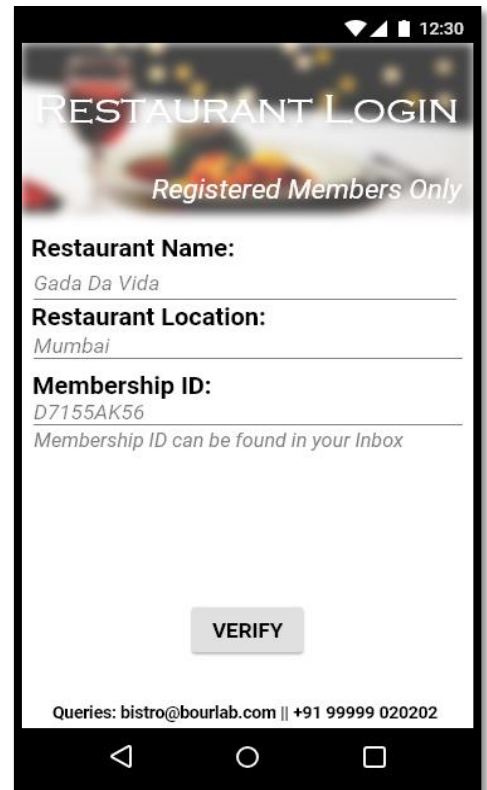
FOOD PREPARATION QUEUE PAGE
- Recycler View to display the preparation queue.
- Numerous Buttons with their own functions.
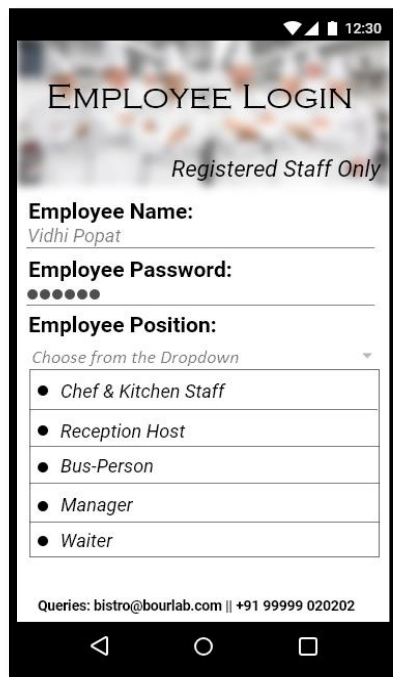
ORDER SESSION PAGE

- Image Buttons to link to activities.
- Text View to display information.
- Button to perform their functions.
- Image View in the top and bottom backgrounds.

SPLASH SCREEN

RESTAURANT AUTHENTICATION
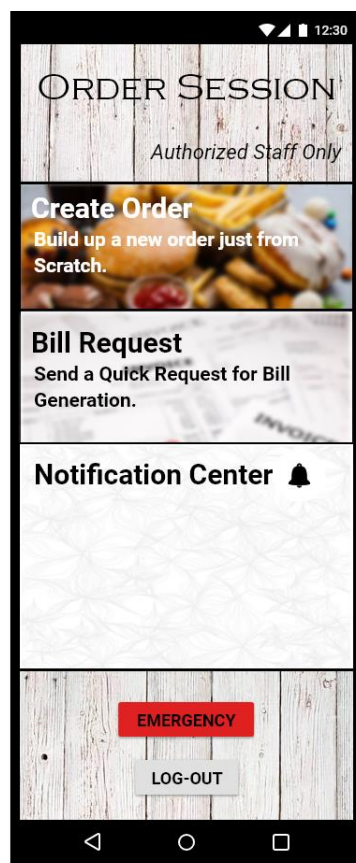
EMPLOYEE LOGIN

EMPLOYEE WELCOME

ORDER SESSION

METHODS IMPLEMENTED

Across the Applications there are a few major methods that we have implemented, and their functioning is as following:

- **AUTHENTICATION**

  The Security of the application should be Robust and Impenetrable that's why we have implemented a complete and foolproof 2-Step Authentication system.

  The working of it is as such:
    - The Employee first reaches a Restaurant Authentication Page.
    - Every Employee of the Restaurant has been provided with a Membership-ID generated for every restaurant individually.
    - The Employee enters the Restaurant Name, Location & Membership-ID and clicks on Verify.
    - On doing so our state-of-the-art authentication system establishes a secure connection with firebase database. And authenticates the veracity behind the credentials and if they match with the parent parameters. It creates a new activity and leads the user to the EMPLOYEE AUTHENTICATION.
    - At this page an Employee is expected to remember his/her personal credentials and details which are generated for individuals specifically.
    - The Employee enters his Name, Password and chooses from a Spinner-Drop down list his position in the restaurant.
    - Again the system interacts with firebase database and verifies the employee credentials.
    - If there is nothing fishy with the details provided the Employee has successfully logged into the application and a new activity leads the user to the WELCOME PAGE.

- **ORDER MANAGEMENT**

  Ordering of food is the most basic functionality of the application. And involves co-ordination between various employee types.

  The working of it is as such:
    - At the Authentication Page the whole Application gets branched into various sectors and the further pages and functions can be accessed by only a selected employee type.
    - Order Management is the function which can be accessed by a Waiter / Chef & Kitchen Staff.
    - The function starts by taking in the details of an order from the waiter who chooses the Dish Name, Quantity and Inputs the Table Number.
    - At this point the function of real-time database clicks in when the process over here establishes a new node in the bill-database with the respective details and

also that tuple contains the price of the product it got from the order-database which stores the items and its costs.

- The real time database has a great advantage that a second user can read and get the data that is being instantaneously synced once a waiter uploads the data.
- The Chef & Kitchen Staff can view the data flowing in and can prepare the items that are coming in being displayed in an Array adapted as a Queue in a Recycler-View Holder on a First In First Out basis.
- The Chef & Kitchen Staff can choose the item that they want to prepare and remove that item that is taken for preparation from the queue by clicking on it which is implemented by removing the head value of the array or reducing the top value.
- This is the process by how the Ordering Process is managed and implemented.

- **FOOD PROCESSING & BILLING**
  From where the responsibility of cooking the food begins and the process of giving the customer the printed check is where this function does its work.

  - As the Chef & Kitchen Staff finish preparing an order they have an option of pressing a button which says CALL WAITER.
  - This button rings an external peripheral which can indicate the order which is ready and the waiter can come to collect it.
  - Once you ask for the check of your meal, that's when the waiter sends a request to the manager to prompt the generation of a bill with the details of the bill like the table number again being uploaded and being read from a Real-Time Database.
  - Once the Manager sees the request, From the Bill-Database he can attain the details of that particular table number in a text box.
  - We plan on including a further modification where you can press the Print Bill Option and as of now what you see is a Toast Message but that command gives an externally connectable printer the permission to actually print that bill.

- **TABLE STATUS MANAGEMENT**
  Table Status Management is a Simple-Efficient Functionality that helps a guest that arrives at a Restaurant know whether a table is free or not.

  - This is the module that can be accessed by the Bus-Person and the Receptionist only.
  - This method basically displays a complete layout of the restaurant on a digital display and the associated employees can edit the status of the tables.
  - In the screen layout we will have various buttons that are edited to give them a soft cornered square table shape which is achieved by editing the XML properties of a button.

- Each table/button has a Boolean flag inside of it which stores the primary color of the table, which is Green indicating it is Unoccupied.
- Now when the Receptionist wants to update the status of the table, he/she can press the button of that table and the click of that button registers as a change in the flags value to a false, which causes it to change its color to Red indicating it is Occupied now.
- This Method hence completely reduces the need for maintaining a table chart or a physical layout in the restaurant at all.
- Once a table gets free, the receptionist can tap on that button again to indicate on a larger display that the table is now free again.
- For a Bus-Person his table layout is the exact same but with a different color coding.
- The value of the table turns yellow after a bill generation for the table is made and that indicates that the table needs to be cleaned so that another set of customers can occupy it again.
- On finishing his/her respective work, When the button is pressed again using the same Boolean flag it changes its color to red, indicating the table is clean and cleared.
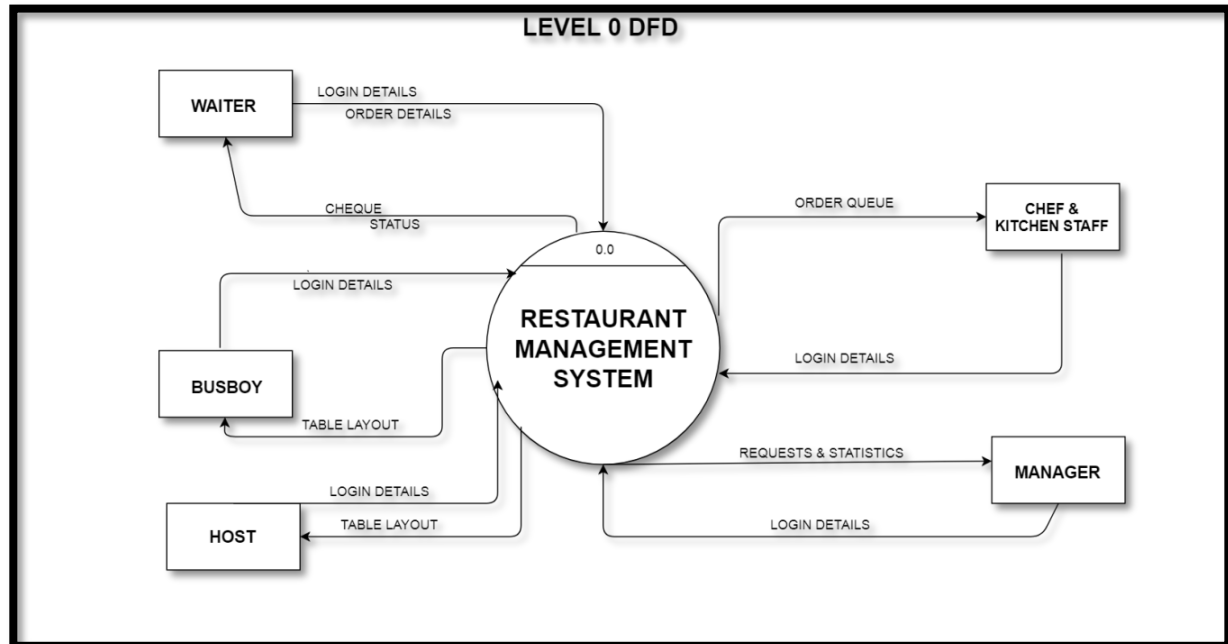
- **COORDINATION , PROCESSING & MANAGEMENT**
  The parts covered in this module are still under development as it requires a lot more knowledge and ability to use Artificial Intelligence & Machine Learning.
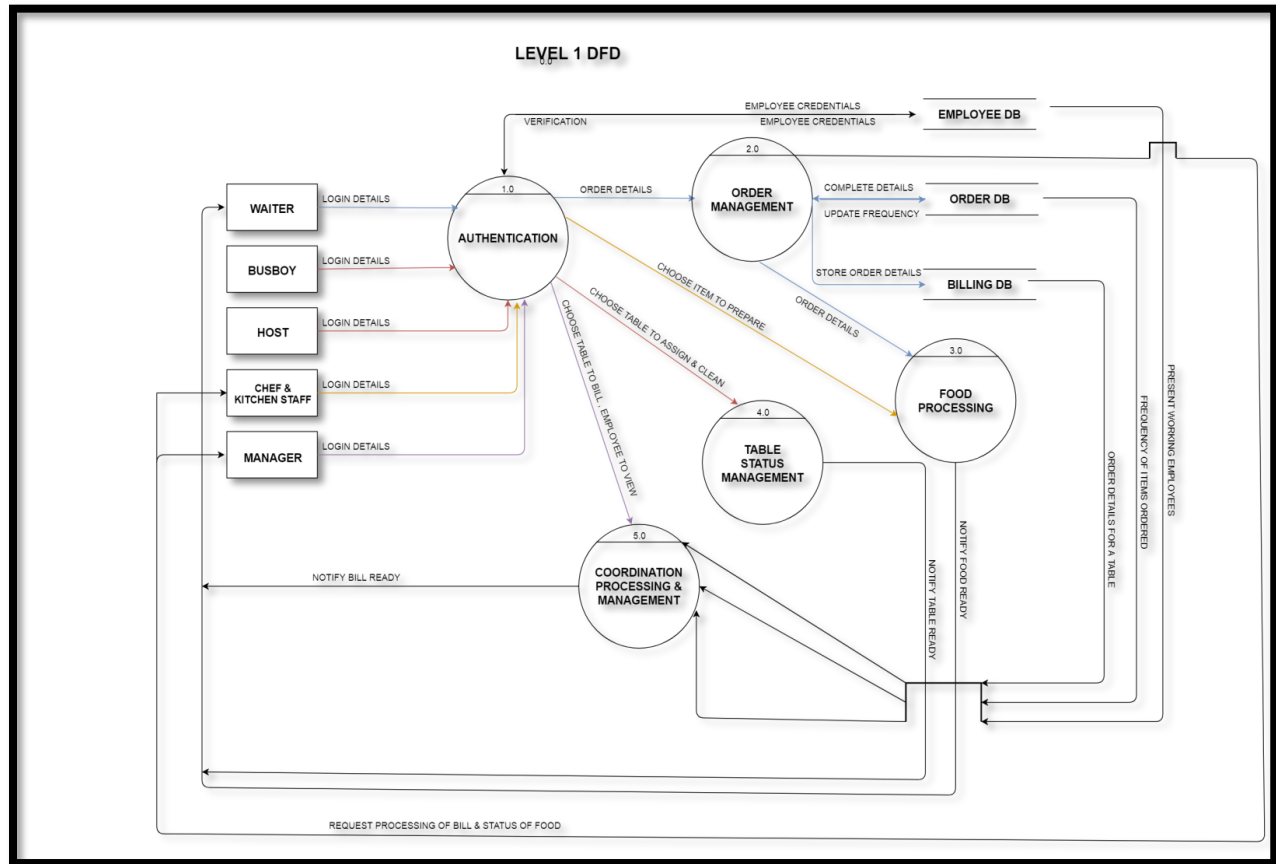
  - The Manager is the person who will be able to access this Module of Financial Management, Food Management & Analysis Center.
  - This method will basically function by taking in and consuming all of the data that is flowing amongst the different modules.
  - Collecting the data from these modules and passing it to a Research and Analysis Service like Google Analytics (Firebase).
  - That analysis done by that module will be passed down to our application again and we will be able to display that in our Application.
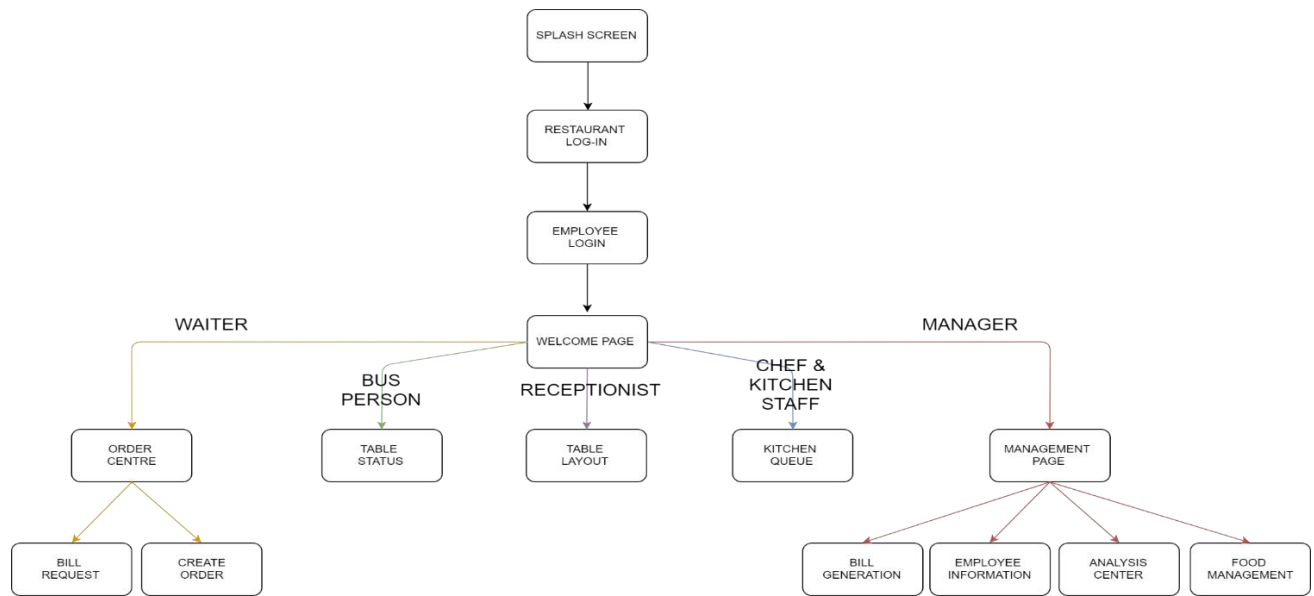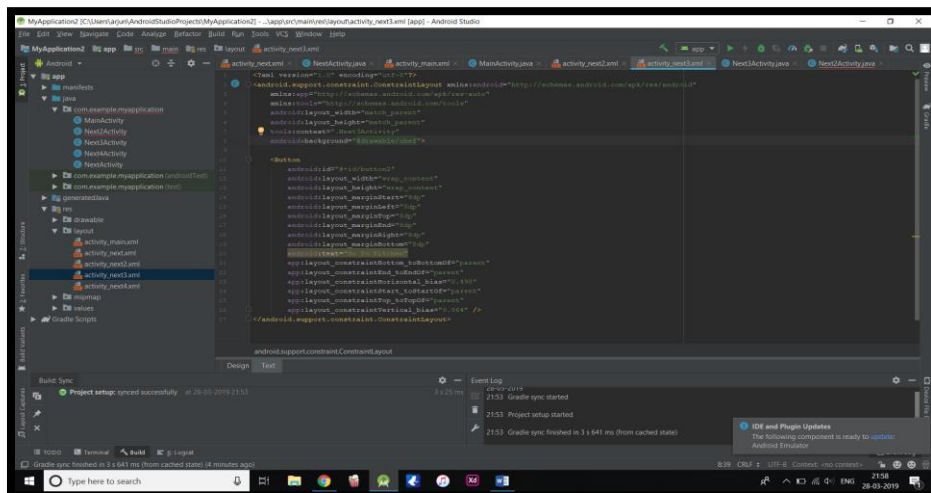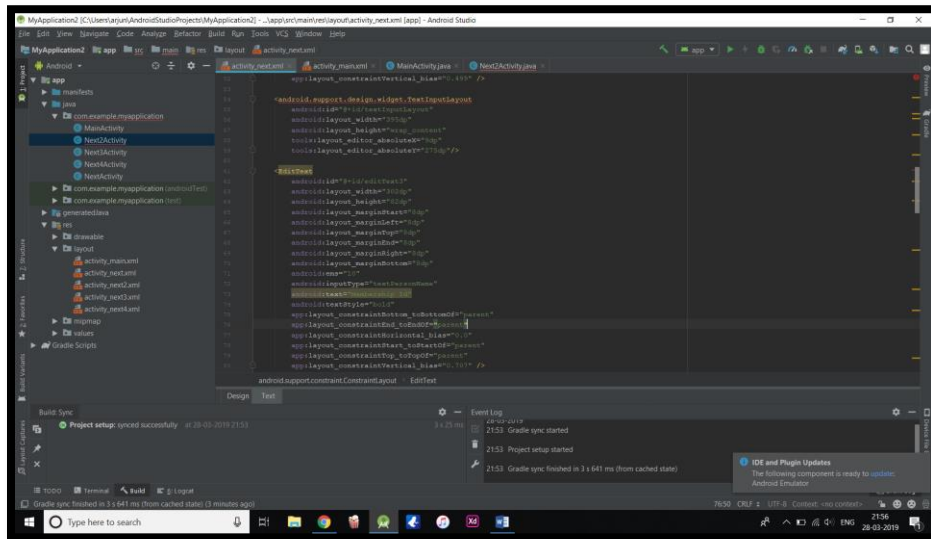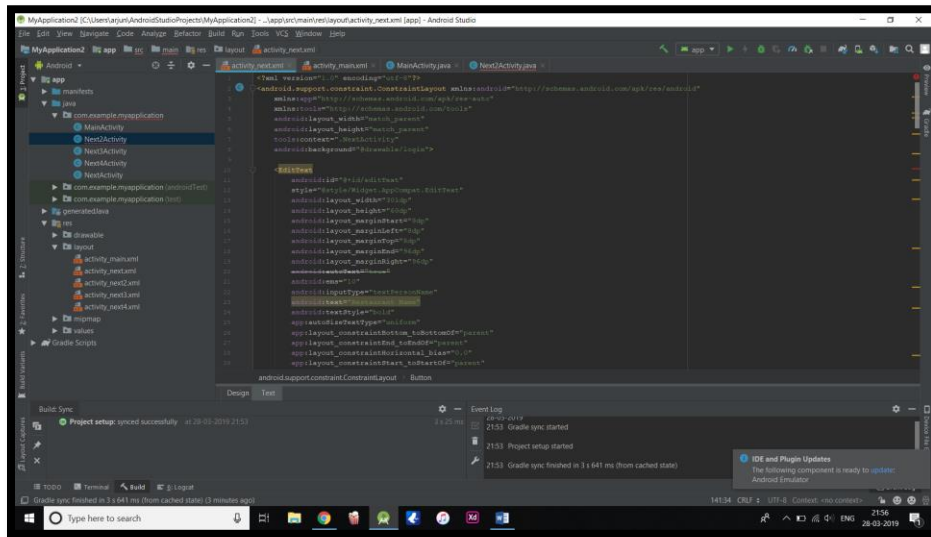
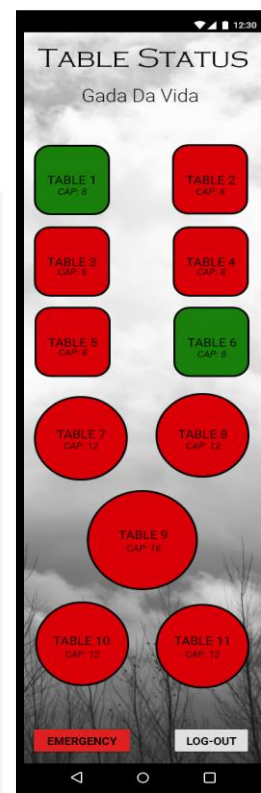A Flow Chart of Application Activities
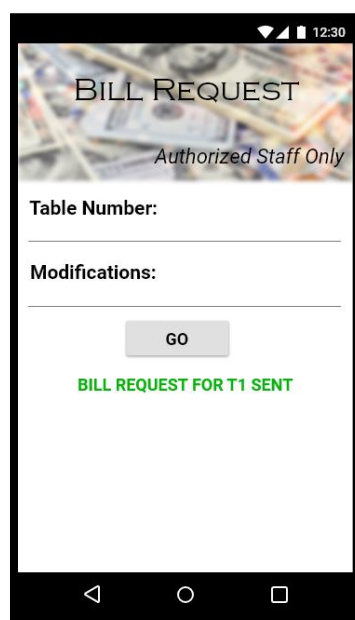

A Level-0 Data Flow Diagram

A Level-1 Data Flow Diagram

SCREENSHOTS

MANAGEMENT
Managers Only

Staff Information
Check your Present Working Shift and their Information.

Bill Generation
Quickly Generate a Check.

Analysis Center
View the most Noteworthy Observations of your Restaurant.

Food Management
Minimize your Wastage & Losses.

EMERGENCY

LOG-OUT

STAFF INFORMATION
Managers Only

Current Shift

Manan Mehta
Sous-Chef de Cuisine

+91-99998202020
mananmehta@gadadavida.com

Vidhi Popat
Reception Host

+91-8937460190
vidhipopat@gadadavida.com

Bhavika Chopra
Bus-Person

+91-9875603431
bhavikachopra@gadadavida.com

Saketh Murli
Waiter

+91-7563204820
sakethmurlitur@gadadavida.com

FOOD MANAGEMENT
Managers Only

Today's Food Wastage

Food Wastage Chart

Table

Food Wastage in Kilos

ORDER CREATION
Authorized Staff Only

Item Name:
Virgin Cuban Libre

Item Quantity:
Four

Table Number:

GO

Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
?123

BILL REQUEST
Authorized Staff Only

Table Number:
One

Modifications:

GO

BILL REQUEST
Authorized Staff Only

Table Number:

Modifications:

GO

BILL REQUEST FOR T1 SENT

TABLE STATUS
Gada Da Vida

TABLE 1 — CAP: 8
TABLE 2 — CAP: 8
TABLE 3 — CAP: 8
TABLE 4 — CAP: 8
TABLE 5 — CAP: 8
TABLE 6 — CAP: 8
TABLE 7 — CAP: 12
TABLE 8 — CAP: 12
TABLE 9 — CAP: 16
TABLE 10 — CAP: 12
TABLE 11 — CAP: 12

EMERGENCY

LOG-OUT

CONCLUSION & FUTURE SCOPE

From the beginning of the planning process, to designing the flowcharts, designing the GUI and implementing the coding, we realized one major thing that this application is one that is worth putting in efforts into. By choosing the Food Industry we have targeted the fastest growing and the most established market segment where there are millions of users waiting to upgrade to a new technology.

With our Honorable Prime Minister Shri Narnedra Modi taking steps like modifying the countries old manual systems and upgrading them to a New India, A Digital India it is very clear that applications like these are soon going to be in demand.

BISTRO the word itself that means a Small Café will get to every Small Café and will benefit every user in this colossal market.

BISTRO will achieve the goal it set out on.

As to our Future Scope and Plans, We have a long way to go. The present module of our application only includes simple functionality and still has some manual operations. Our aim is to take advantage of the technology available in the market and be an In-The-Era Application.

We are looking forward to learn and develop our app in the following sectors:

- Connectivity with External Devices like Printer.

- Table Management using Real-time Database.

- Robust Authentication with Fingerprint.

- Cloud-Based Storage for all Images.

- Connect to Emergency Services.

- Analysis of Food & Employees.

- Embedded Payment Gateway.

SOCIETAL APPLICATIONS

While we were doing some groundwork and basic research about the market structure for which our application has been designed and to see where we stand next to our competition.

We came across such results,

Concisely there are three types of Restaurant Establishments:

- Cafes & Bistros – Small scale Establishments
- Lounge's , Clubs & Bars – Medium to Large Establishments
- Restaurants & Fine Dines – Medium to Large Establishment

Out of these three types of Restaurants only the ones which have a huge operation budget , have a qualified staff , have long operational hours and also have that large crowd coming in choose to and can afford a Restaurant Automation System.

And that is true because the rivals have always portrayed this as a 'Luxury' not as a 'Necessity' as the amount to be invested is really huge and the software is very costly and demanding.

The list of external hardware devices like a windows computer or a POS machine, the need of authentication peripherals & smart cards, presence of a file server and a server room and also a qualified staff for using this software makes it very difficult to operate and sell and hence becomes a luxury item which is favourable only to the top tier.

With the introduction of **BISTRO** it is our strongest instinct that our low priced application along with its low requirements and needs, Will come out soon as a strong market leader and will be able to help many establishments irrespective of their size, operation budget, operational staff or their disposable cash they have in hand.

We are waiting to see a fully developed, implemented, strong and bold **BISTRO** Application that establishes itself as a leader and becomes a Monopoly in this Oligopolist Market.