GROUP-2

Project Report

Book My Seat - Restaurant Seat Reservation App

SUBJECT: CSE299- JUNIOR DESIGN
SECTION: 04

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Table of Content (Index):

Introduction:

Restaurant Booking System is a simple and easy-to-use online restaurant reservation system with all the functionality needed to reserve a table online. You can easily manage guest inquiries, send emails and SMS reminders, and accept online payments and much more.

A restaurant reservation application with an easy application based and password protected user timeline accessible from any android smart phone with an internet connection. Through the users with no programming skills can manage reservations, table availability and payments and set email auto responder. The main purpose of the application is to minimize waiting delay in restaurant while having dinner or any meal.

Purposes behind the App:

EXISTING SYSTEM:

Restaurant services such as making reservations, processing orders, and delivering meals generally require user to call and reserve. When the customer pays the bill, the amount due is calculated by the cashier. Although this procedure is simple, it may significantly increase the workload of customer and even cause errors in meal ordering or in prioritizing customers, especially when the number of customers suddenly increases during busy hours, which can seriously degrade the overall service quality.

A very commonly implemented system, currently being used by numerous restaurants and chains all over the world, is the call and reserve system.

DISADVANTAGES OF EXISTING SYSTEM:

Although a huge improvement over the pen and paper still prevalent over the world, this does not have much value addition for the customer .The result may be biased .There is a hassle during this process.

It may significantly increase the workload of manager and even cause errors in meal ordering or in prioritizing customers, especially when the number of customers suddenly increases during busy hours, which can seriously degrade the overall service quality.

PROPOSED SYSTEM:

The system will consist of the following main components: The backend, which is made up of the java, web server and the database, and the frontends that include both the patron frontend (delivered as a native mobile application).

This system is based on the Google firebase database. We propose an app named BOOK MY TABLE which has a smooth user interface and functions as a Restaurant Table Reservation App, where you can add

restaurants to your database and can be found in the app and for each reservation made through the app will be sent as a request to the restaurants.

ADVANTAGES OF PROPOSED SYSTEM:

- The most important components of this system are the database and the patron frontends.
- An amazing and easy payment method.
- Easy login and signup.
- Providing value to both the business and its patron is an important objective, but we believe that one follows the other.
- Following that belief, the customer is given a whole lot of importance.

HARDWARE INTERFACES

Book my table operates similarly on various mobile devices with different physical characteristics that run on Android operating system. Since the Android client will be implemented as a thin client, meaning the most of the computing and data storing will be done on the server side, the mobile application will not consume a lot of CPU or phone memory. The GPS will be needed for the purpose of locating the user and getting the nearest Restaurant around him in a radius specified by use. It provides the exact location all the time and will be integrated with Google Maps, so the users can see their location and the location of the Restaurant on the map.

Communication Interfaces

The communication interface between the Android phone and web server is achieved through the web service firebase SERVER.

Mobile application graphic user interface

The main graphic content will be implemented using embedded basic layouts and widgets which ADT provides. One of the design decisions is that the user's screen orientation will be locked in a portrait mode view. The user will start the application by selecting the Book my seat icon in the application menu. Error and help messages pop up when they have initially occurred.

A good GUI has to be:

- Intuitive
- User-friendly
- Fast

The following figures illustrate just an example for a possible GUI for the Book my table application.

Features:

- To have run the app user need to install it and permit user permissions such as location, internet, storage, message storage.
- To run the app user need touch the app icon. The 1st screen will show every time of lunching the app only for 3 seconds.
- User need to sign-in to access the app content. If anyone new to the app then he/she can create an account to login.
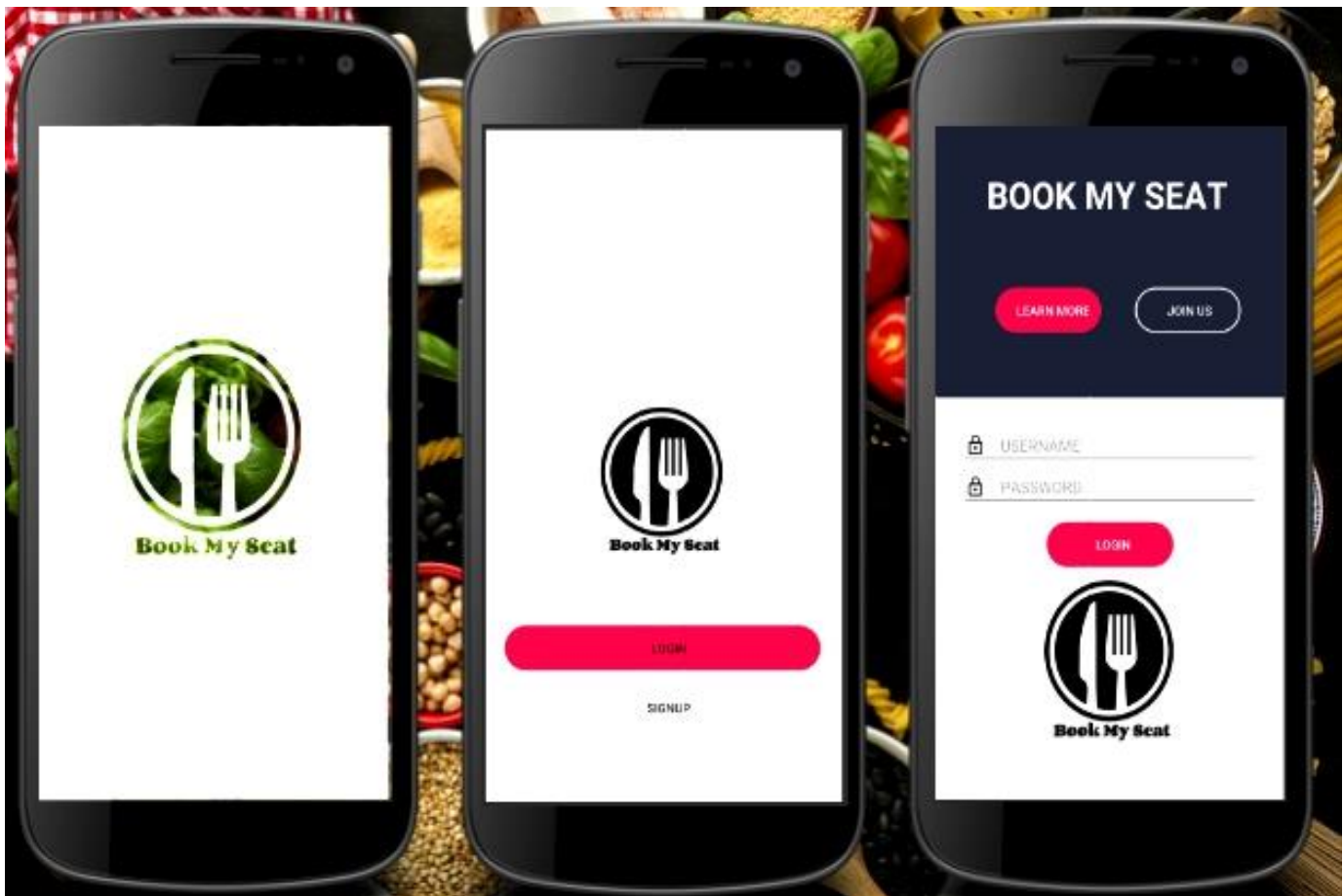- If one lost his/her password, can get the account recover by clicking forget password.

Figure: Splash Screen, Login, Sign-in window

- After login user will the Navigation window, where he/she ca n select where to check, review, payment, notification or share options.
- The user can select settings & exit option from the top bar of the navigation window
- The user can select the massage Fab bar for any inquiry or for contacting to the authority, located on the down right side.
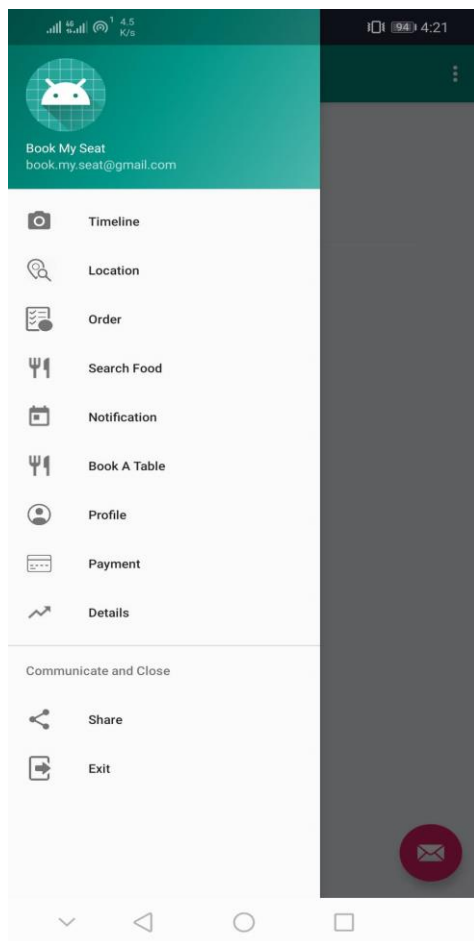- User can see his/her profile photo on the upper side of navigation bar.

Figure: Navigation Window & Fab bar

- User can view all categories, where all food list of every restaurant will be showing.
- User can check the food details by clicking the list.
- Food list can add food to the cart for reserving. User can select preferable time, restaurant, seat quality etc.
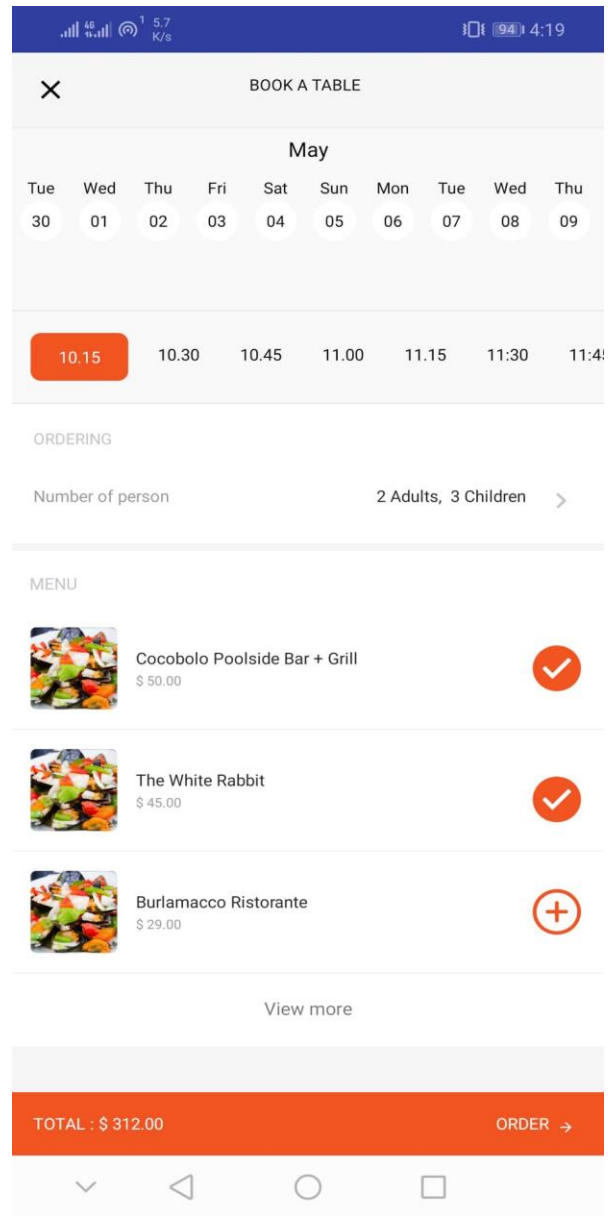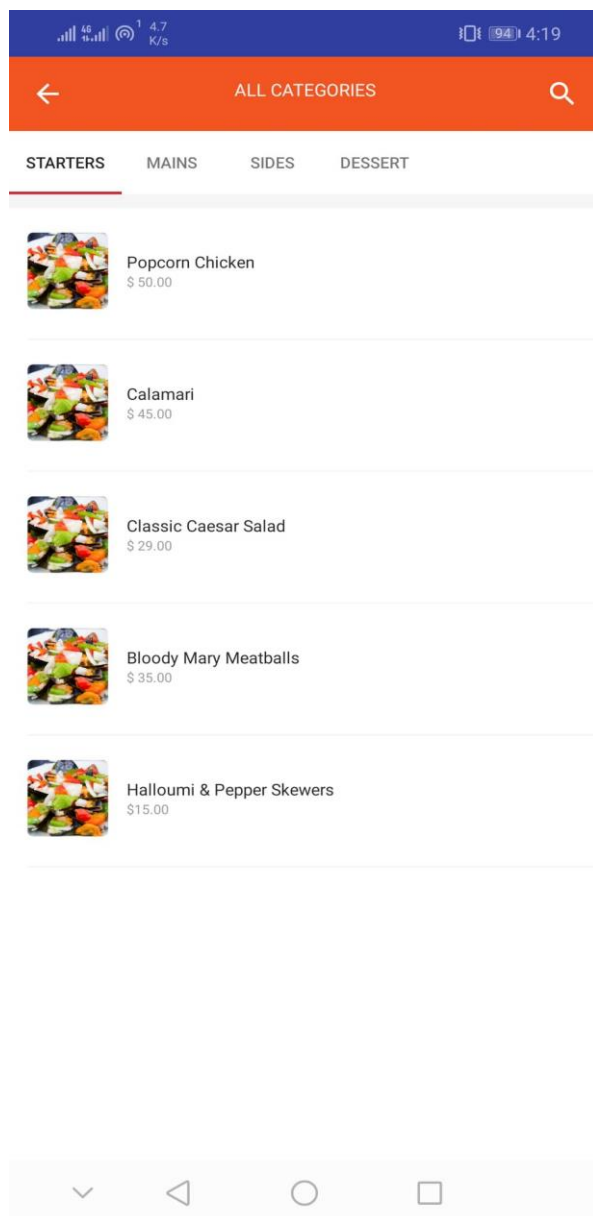

Figure: Category List, Book a Table Menu

- User can see the notifications of restaurant.
- User can see his/her location on map.
- User can select any restaurant in map.

Figure: Notification, Location
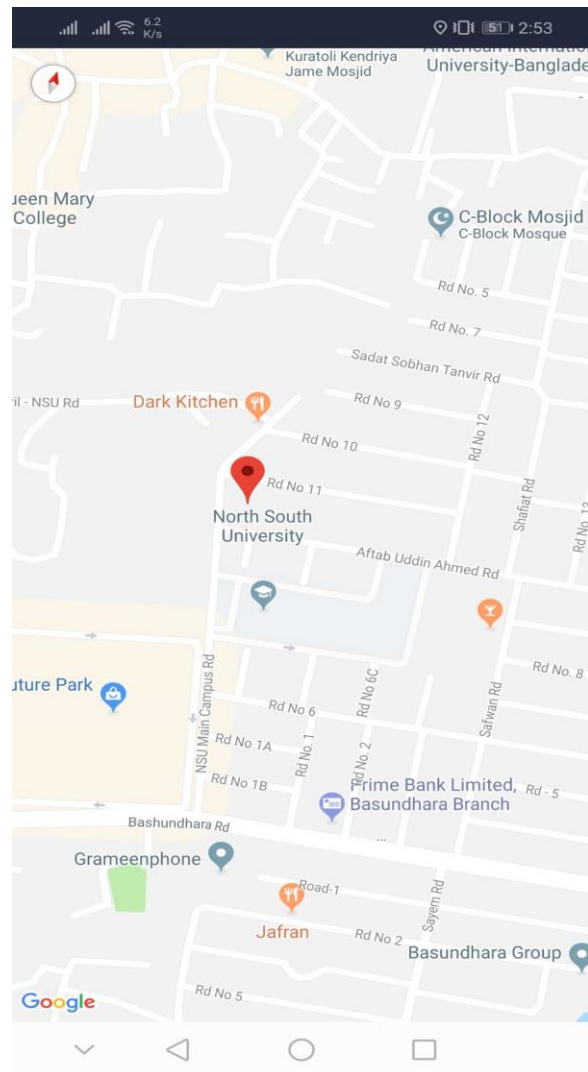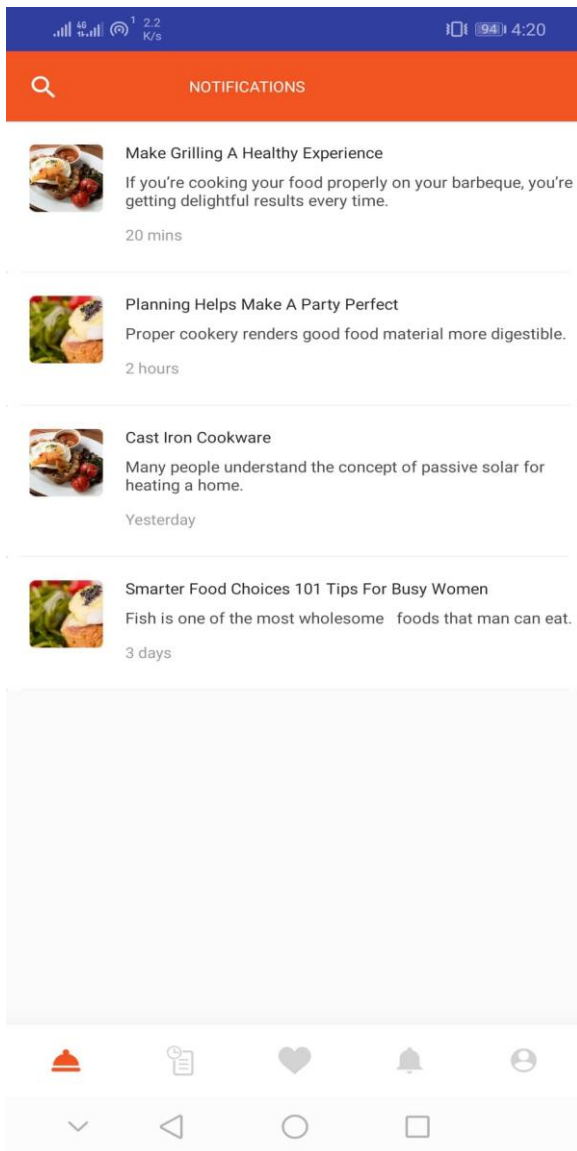
- User can pay the bill via Bkash, MasterCard, and visa card.
- User can check their card number.

Bkash is the leading payment system in Bangladesh. User can pay via Bkash. After successful payment Bkash sends a transaction id on both user and recipient. We will store that particular transaction id on firebase. After matching both id we will confirm payment
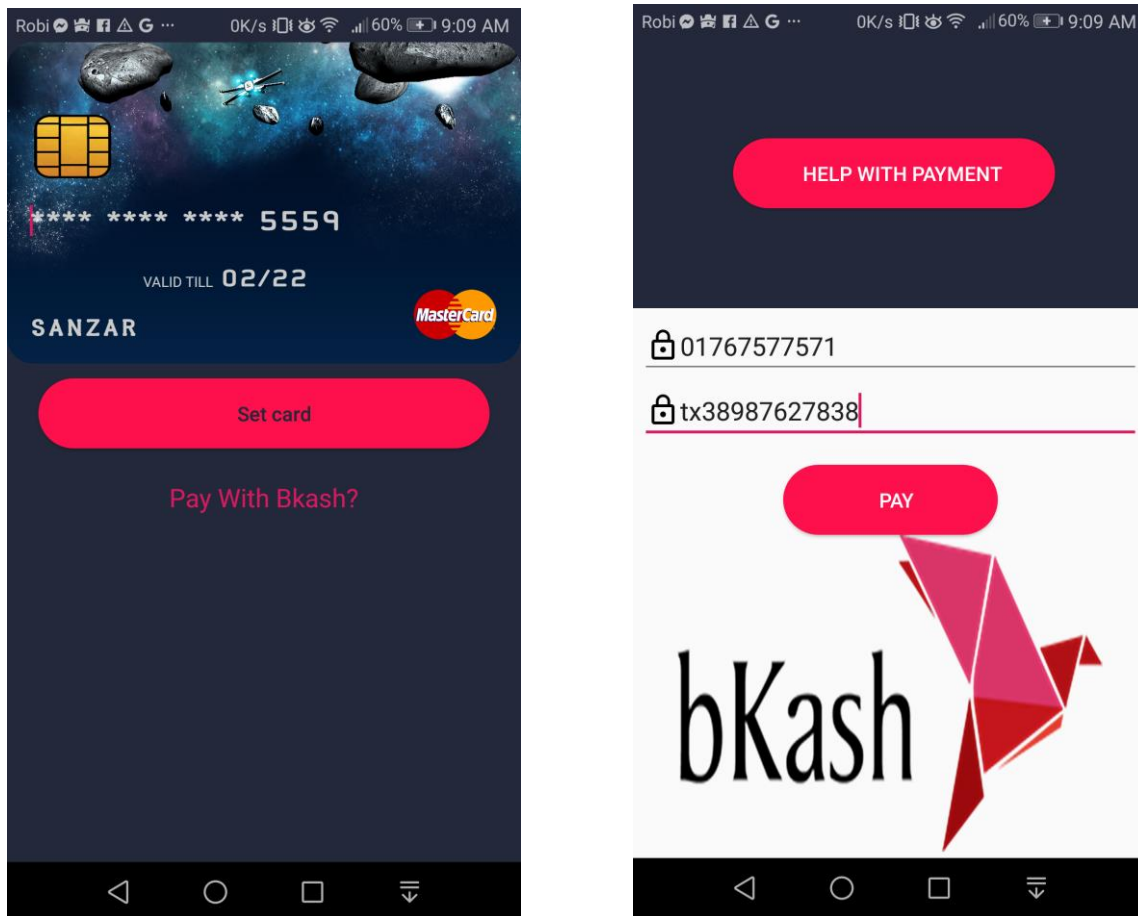
Figure: Payment with Card & Bkash

- User can share the app, review food, and share post, screenshot of their order.
- User can share the app externally via android share system.
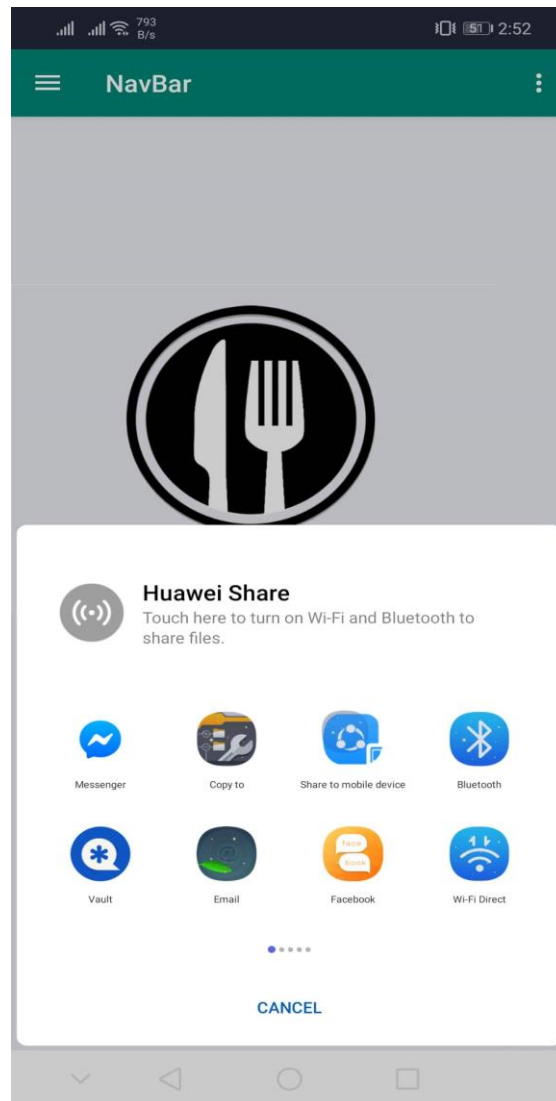
Figure: Android Share

Implementation coding, designing Flow:

- Splash
- Login
- Register
- Navigation Bar
- Map
- Firebase
- Payment System
- Restaurant List
- Review Food & Restaurant
- Payment With bash, MasterCard, Visa card
- Food Booking menu
- Timeline

Activity Details:

Splash Screen: We used multithreading to sleep the activity and then switch to the login activity.

```java
Thread background = run() → {

    try {
        // Thread will sleep for 3 seconds
        sleep( millis: 3*1000);

        Intent intent = new Intent( packageContext: SplashScreenActivity.this,Registration.class);
        startActivity(intent);

        // After 3 seconds redirect to another intent
        //Remove activity

        finish();
    } catch (Exception e) {

    }
};

// start thread
background.start();

}
@Override
protected void onDestroy() {

    super.onDestroy();

}
```

Sign-in: Everyone loves a beautiful login screen, and since it's usually the very first impression people have about an app its super important to get it right. On the design and layout side of things, the focus here is on balancing the screen elements in a way that's pleasing to the eye. To add the finishing touches we will also be styling the top status bar on newer devices.

In this module a user can easily sign in by using their email address. Here user have to use a valid email address or it will popup error message. After giving a valid email and password user will be matched from firebase database and if matched as registered user it will redirected to the newsfeed. If the user is not registered, a toast message will pop up to register as new member.

Here will be two more option:

- JOIN-This will redirect to signup page.
- Learn more-Details of our app.

Signup: In this module a user can easily signup by using their email address. Here user have to use a valid email address or it will popup error message. Here password must be more than 6 characters. After giving a valid email and password user will be registered and redirected to newsfeed .The user information will be forwarded to Google firebase.

Payment Activity: This activity has the payment collecting features. The payment system we are building with the concept of SSLcommerz payment system. Though it is tough to get their API, but we have implemented the coding and UI part of it. User can pay payment through Bkash, Rocket, MasterCard, visa American Express.

Food & Restaurant Review Activity: This activity has the review and choice part. The desired food item from any restaurant that the user want to order or has already ordered once will be shown here.

Resource files have added from web. We collected image (jpeg, png, list etc.) mainly from by searching on google. Important files are stored in Mockup folder and others are in drawable folder.

Food Menu List has collected & created with doing some research on well-known restaurant and shop. From there we collected menu list and food list, time schedule of cooking, delivery time. We will analysis the data and will give feedback based on those data to our user. It will help every user to get accurate time seat & food.

Navigation Bar: We have created and design list menu with image resources downloaded from google. We set every image with a unique id to call that option with that resource. We have joined all activities in Navigation with the help of intent Library.

```java
@Override
public boolean onNavigationItemSelected(MenuItem item) {
    // Handle navigation view item clicks here.
    int id = item.getItemId();

    if (id == R.id.nav_timeline) {
        Intent navMap = new Intent( packageContext: NavBar.this, AllcategoriesMainactivity.class);
        startActivity(navMap);

    } else if (id == R.id.nav_map) {
        Intent navMap = new Intent( packageContext: NavBar.this, MapsActivity.class);
        startActivity(navMap);

    } else if (id == R.id.nav_order) {
        Intent navMap = new Intent( packageContext: NavBar.this, Food7.class);
        startActivity(navMap);

    } else if (id == R.id.nav_search) {
        Intent navMap = new Intent( packageContext: NavBar.this, FavoriteActivity.class);
        startActivity(navMap);

    } else if (id == R.id.nav_notification) {
        Intent navMap = new Intent( packageContext: NavBar.this, NotificationsActivity.class);
        startActivity(navMap);

    } else if (id == R.id.nav_book) {
        Intent navMap = new Intent( packageContext: NavBar.this, BookATableMainactivity.class);
        startActivity(navMap);

    } else if (id == R.id.nav_profile) {
        Intent navMap = new Intent( packageContext: NavBar.this, NevigationActivity.class);
        startActivity(navMap);

    } else if (id == R.id.nav_payment) {
        Intent Paymentk = new Intent( packageContext: NavBar.this, payment.class);
```

Android Sharing option: we have set the android default sharing option for our app. By tapping that option a pop up window will appear for sharing with different platform.

```java
    } else if (id == R.id.nav_share) {
        //sending feed back to via others
        Intent sharingIntent = new Intent(android.content.Intent.ACTION_SEND);
        sharingIntent.setType("text/plain");
        String shareBody = "\nBook My Seat!:\n\n ";
        sharingIntent.putExtra(android.content.Intent.EXTRA_SUBJECT,  value: "Share Book My Seat App!");
        sharingIntent.putExtra(android.content.Intent.EXTRA_TEXT, shareBody);
        startActivity(Intent.createChooser(sharingIntent,  title: "Share via"));
```

Map Activity: We implement the map activity using phone's GPS system. For using full map we have to pay for the API key. We search for alternative methods for all methods are costly. But only for 2month I have buy the API key from an online source. It costs a few bucks. The API key is set to the manifesto xml. We use the coordinates of _latitude & longitude_ to pin point any place on map and used a function named _addmarker_ to mark the point.

```java
} else {

    if (ContextCompat.checkSelfPermission( context: this, Manifest.permission.ACCESS_FINE_LOCATION) != PackageManager.PERMISSION_GRANTED) {

        ActivityCompat.requestPermissions( activity: this, new String[]{Manifest.permission.ACCESS_FINE_LOCATION}, requestCode: 1);

    } else {

        locationManager.requestLocationUpdates(LocationManager.GPS_PROVIDER, minTime: 0, minDistance: 0, locationListener);

        Location lastKnownLocation = locationManager.getLastKnownLocation(LocationManager.GPS_PROVIDER);

        LatLng userLocation = new LatLng(lastKnownLocation.getLatitude(), lastKnownLocation.getLongitude());
        mMap.clear();

        mMap.addMarker(new MarkerOptions().position(userLocation).title("Your Location"));
        mMap.moveCamera(CameraUpdateFactory.newLatLng(userLocation));

    }
}
```

Firebase (Database): It's a cloud real time database provided by google. Authentication, simple database options are free. But implementing a large database AWS, EC2 Bitmani server is needed.

```java
progressBar.setVisibility(View.VISIBLE);

mAuth.createUserWithEmailAndPassword(email, password).addOnCompleteListener((task) → {
        progressBar.setVisibility(View.GONE);
        if (task.isSuccessful()) {
            finish();
            startActivity(new Intent( packageContext: SignUpActivity.this, NavBar.class));
        } else {

            if (task.getException() instanceof FirebaseAuthUserCollisionException) {
                Toast.makeText(getApplicationContext(), text: "You are already registered", Toast.LENGTH_SHORT).show();

            } else {
                Toast.makeText(getApplicationContext(), task.getException().getMessage(), Toast.LENGTH_SHORT).show();
            }

        }
});
```

All Categories activity: It shows all food from different restaurant by using recycle view. We have added some food dummy data into some Strings. Every time the loops runs, one by one item from the Strings will appear to the UI with the help of Recycle Adapter.

```java
Integer[] nearbyimg1 = {R.drawable.foodimg4,R.drawable.img2,R.drawable.foodimg3,R.drawable.img1};
Integer[] nearbyimg2 = {R.drawable.ic_like,R.drawable.ic_like,R.drawable.ic_like,R.drawable.ic_like};

String[] nearbytext1 = {"Cocobolo Poolside \nBar + Grill","Wild Honey at Scotts Square","Palm Beach Seafood Restaurant","Shin Mi
String[] nearbytext2 = {"60 Kub Pines Apt. 797","473 Keeling Station","55 Dicki Point Suite 867","833 Kuhn Mission Suite 860"};
String[] nearbytext3 = {"238 reviews","238 reviews","238 reviews","238 reviews"};


private RecommendedAdapter homepageAdapter;
private RecyclerView recyclerview;
private ArrayList<RecommendedModel> homepageModelList;
@Nullable
```

Major Android Libraries & Dependencies:

- ***Volley:*** Volley is a networking library for Android that manages network requests. It bundles the most important features you'll need, such as accessing JSON APIs, loading images and String requests in an easier-to-use package.

- ***Picasso:*** Displaying images is easiest using a third party library such as Picasso from Square which will download and cache remote images and abstract the complexity behind an easy to use DSL.

- ***Retrofit:*** Retrofit is a REST Client library (Helper Library) used in Android and Java to create an HTTP request and also to process the HTTP response from a REST API. It was created by Square, you can also use retrofit to receive data structures other than JSON, for example SimpleXML and Jackson.

- ***Firebase:*** For database used those two dependency library.

```
'com.google.firebase:firebase-auth:16.1.0'
'com.google.firebase:firebase-core:16.0.6'
```

- ***Support*** *Library*
- ***Resource*** *Library named by 'R'*
- *Android* ***GSM*** *library* ***and Play services*** *library for implementation for Map.*
- ***Recycler view*** *Library*

App Monetization:

We did some works on Monetization. We set such codes on manifesto for indexing our app on googles SEO database. The code is <action android:name="android.intent.action.VIEW" />

```xml
<activity android:name=".SplashScreenActivity">
    <intent-filter>
        <action android:name="android.intent.action.VIEW" />
        <action android:name="android.intent.action.MAIN" />

        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
</activity>
<activity android:name=".SignInActivity" />
```

Technologies used:

- Android Studio (Main IDE)
- XML for Front-end
- Java for Back-end
- Trello
- Slack for Communication
- GitHub
- Ipiccy for Content Making
- Adobe Illustrator for Logo Design
- Adobe XD and Sketch-Up for UI Design

Problem Faced:

- We have faced 1st problem while building the project is the merging of different branch. We have watched many tutorials but every time after merging into the master branch, something wrong happened.

- The 2nd problem we have faced many time is the Dependency version mismatched with the Gradle version or other Dependency's version.

- While implementing the Map we faced problem as because the Map API is not free and high costly.

- There is no free payment gateway API or online function of any bank or portal. It will cost approx. 5000 taka for implementing of any Bangladeshi payment gateway.

- Sometimes app automatically crashes for no reason and it's hard to debug the problem as our project is pretty large.

- We have faced some problem using firebase as the main database. The AWS Server is the best solution for any cloud database system. But the AWS Bitmani EC2 Server is paid yearly.

Benefits of an online reservation system:

Traditionally, restaurants have managed their reservation systems with a reservation book, which means they received the reservations via telephone calls and wrote them down in a book. Nowadays, as a consequence of the massive use of the Internet and its benefits, experts have seen the opportunity and great added value of creating online reservation systems, and already many restaurants have replaced the traditional format with these new systems.

An important advantage of online reservation systems is the flexibility they offer when making a reservation. When reservations are managed in the traditional way, patrons will only be able to call a restaurant to make a reservation during operational hours. On the contrary, when reservations are managed through an online reservation system, customers will be able to make their reservation at any time and from any place they choose. In general, patrons will have a better experience when making an online reservation, because it will be a quick process, the service will be available 24/7, and the system will provide all the necessary information in order to make the desired reservation with tranquility.

Restaurants will experience a great number of benefits when using an online reservation system. Some of these benefits translate into a decline in incoming phone calls, a better control of the capacity of the restaurant and the number of reservations one will be able to accept, and a number of handy statistics and reports that will help to analyze the business in interesting ways.

These benefits arise from a wide range of management tools provided by online reservation systems, like operational reports, floor management software, customer reservation histories, and customer databases that include customer data and preferences, and grow with each new table booking. Restaurants will also be able to track cancellations, and manage walk-in and waitlists in a better way, eliminate overbookings, and create target email and postal mailings with the information from the customer database. Some online reservation systems include integrated email marketing tools:

Better idea of how busy a night will be: Whether or not a restaurant will have a dinner rush with open tables is an unknown fact, but taking reservations will give owners a better idea of how busy or quiet their nights will be. And, if in fact, they have a low number of reservations, this will give them enough time to come up with a special to market on social media accounts to encourage customers to come out and spend money.

Prepare chefs for a rush: On the contrary, if the reservation schedule is showing that they're going to be packed, chefs and kitchen staff will have a fair warning to be prepared for an incoming rush at a specific time. Also, hostesses making the reservations, or seating walk-in customers, will also be able to space the seating times out enough so that the kitchen doesn't get slammed all at once.

Reduce waiting time: Not only are restaurant reservations beneficial to owners and kitchen staff, but they help make the dining experience for customers more enjoyable. When a party books a table for 6:00 p.m. on a Friday, they can expect to be seated pretty close to that time, reducing their wait. Remaining on top of reservations and getting guests seated as closely to their time slot as possible will result in happy customers that are sure to return!

Analysis of our App with customer view point:

There is no shortage of excellent restaurant apps on the Android platform, but we are going to develop an extremely unique and useful one. Yes, our project name is Restaurant Reservation System based on location.

We loves delicious food and cuisine crazily. However, like many other big funs of food, we sometimes find it hard and time consuming to find a featured and unforgettable food restaurant. So developing a Restaurant Reservation System app is absolutely a good idea for all food funs.

Our app is a great restaurant app to have on hand when visiting a new city. The app uses the Android Phones built-in GPS to find nearby restaurants. So after you have installed our app, it will acquire your current GPS location information from the GPS device. After you log in our app, you will have a welcome flash. Then you will be displayed with the main menu of our app. Now, you could make a choice if you want to use your current location to search the nearby restaurants or you want to use the keyword address you type in to search the restaurants. After you have made your decision and press the search button, the result will be displayed with a lot of highly recommended restaurants. Then you can see the excellent and distinguish features of our app, you could browse a full list of restaurants by cuisine styles you prefer, price range and customers' feedback rate. After you have chosen a specific restaurant and tab that restaurant, you could get detailed information about it, for example, its location, its telephone number, its food menu, its promotion activity, its available coupons, etc. In all, you could make decision according to the list which you like and then enjoy delicious food provided by our Restaurant Reservation System.

If you are hesitating about so many attractive restaurants and could not make a decision, do not worry. Our app could provide a random pick function to help you make a decision. You could choose several restaurants you like most or you do not choose just use all the restaurants on the full list, our app would give you an answer by randomly choosing a restaurant for you.

Another key feature of our app is that after you have chosen the restaurant you like, our app would search for available coupons or promotion activities related with this restaurant on the Internet. If you like the coupons gathered by our app, you could chose to download it and print it out. By using these coupons and knowing these promotion activities, you could plan your deals and make a choice more flexibly and wisely.

After you have enjoyed the wonderful food in our Restaurant Reservation System, you may want to record this unforgettable experience by some photos. Yes, we have prepared this service for you on our app. You could take a photo of the delicious food or the beautiful restaurant by using our app. Then you could easily upload these photos to your Facebook or twitter and share the happiness with your friends and family.

Finally, you are welcome to give a rating or leave a feedback on our app about the restaurant after you have finished enjoying the food. You could write down your feel, your opinion and your advice about the restaurant or you could just give a rate to indicate it is a five star or zero star restaurant. After you publish these information, other customers could see it and make a decision according to it. In this way, you could communicate and share information with other big funs of food.

Target User:

- Person with aged 25 – 40 is our main target.
- University students also a good target.
- We research with some restaurants menu, timing, location those purposes.

Project Implementation Cost:

The cost is a few. We have paid for The Google Map API for two months. Though we didn't use the premium API, but we tried the method. For not having international MasterCard we could not go further with that idea.

Conclusion:

In our daily life, mobile devices became an important part of our life. Every day we use many mobile apps to make our life easier. Restaurant Booking System is a fully supported, affordable, and scalable solution for anyone who needs an online table reservation.
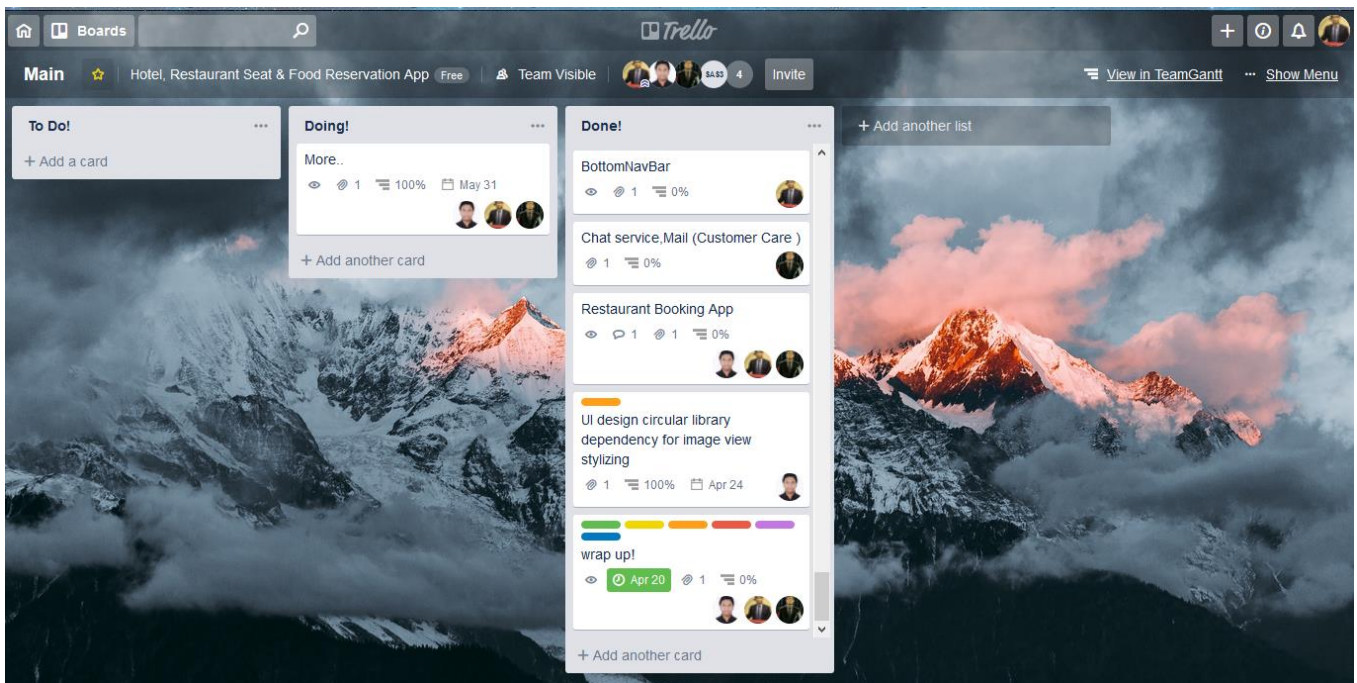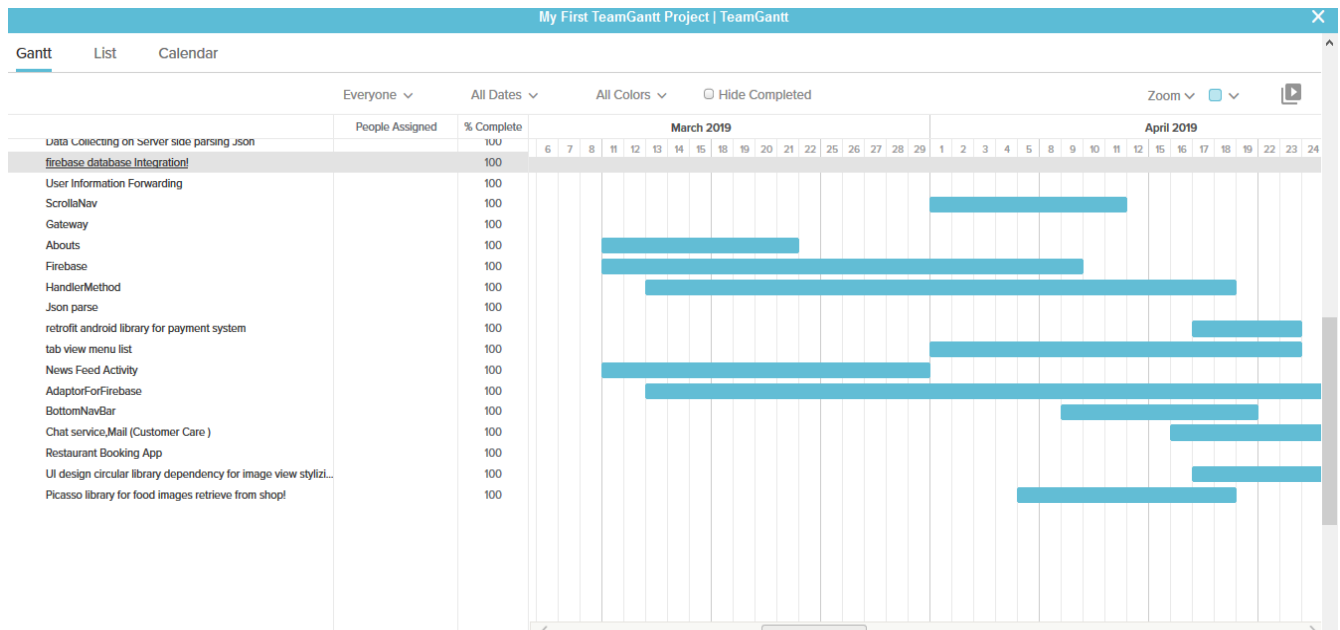
Trello Board & Gantt chart:

Figure: Gantt chart & Trello Board

Acknowledgment:

We would like to thank our respected course instructor Shaikh Shawon Arefin Shimon (SAS3) sir for allowing us to do this project. By doing this project, we have got many idea on the work flow of a developer. We have learnt

- how to use Git branching merging
- how to communicate on Slack
- how to use Trello Board for Activity Management
- how to crate Gantt chart with Trello.

Those techniques will help us in getting future our jobs on Software Company and also in CSE499 Capstone project.

Essential Links:

- **GitHub:** https://github.com/nsuspring2019cse299sec4/Group-2

- **Trello Board:** https://trello.com/b/WOLFauFB/main

- **Slack Channel:** https://fall2019cse299sec4g2.slack.com

- **Piazza:** https://piazza.com/class/jr36ta3ep186nc?cid

References:

- Used Firebase documentation for implementing database and user login Authentication methods. We have also used sample codes from console.google.com

- We have viewed, researched on GitHub with those types of same sample program. There we got ideas who to use Volley, Recycle View adapter.
- https://github.com/hieuapp/delimeal

- MVP coding style from MVP developers group on Facebook.

- For asking any problems https://bn.quora.com/

- https://stackoverflow.com/questions/31056037/firebase-authentication-using-android-accountmanager
- https://github.com/vinc3m1/RoundedImageView

- https://github.com/siyamed/android-shape-imageview

- https://stackoverflow.com/questions/48654355/failed-to-resolve-com-android-volleyvolley1-1-0-glide3-7-0

- https://github.com/hdodenhof/CircleImageView

- Google Image, behance.net for UI designing concept generating

- https://developer.android.com/topic/libraries/support-library/packages

- https://www.quora.com/What-are-the-best-payment-gateway-SDKs-available-to-integrate-with-Android-applications

- https://developers.google.com/pay/api/android/overview

Thank You.