MOBILE E-COMMERCE APPLICATION

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Abstract: The Purpose of this paper is to present the research paper of Mobile Ecommerce Application. Mobile and e-commerce applications are tools for accessing the Internet and for buying products and services. These applications are constantly evolving due to the high rate of technological advances being made. This paper provides a new perspective on the types of applications that can be used. It describes and analyses device requirements, provides a literature review of important aspects of mobile devices that can use such applications and the requirements of websites designed for ecommerce. The design and security aspects of mobile devices are also investigated. The results suggest that effective mobile applications do exist for various Smartphones, and web applications on mobile devices should be effective. This project includes Java, xml language and Firebase.

Introduction:

The net has modified several aspects of society, from business to recreation, from culture to communication and technology, yet as searching and motion. This new type of communication has provided new ways that of doing business with the assistance of technological development. E-commerce is that the new manner of searching and doing business. Technology has allowed firms to push and sell their merchandise on new markets, overcoming geographical borders as ne'er before. shoppers have access to a wider market of merchandise after they use wireless and net technologies. Mobile devices with wide access to the net have allowed firms to achieve shoppers in a lot of various ways that, therefore making certain deep penetration.

The most vital factor once coming up with such applications is to style the appliance in such some way that it doesn't distract the user from the most purpose of the appliance. However, aspects regarding security and accessibility shouldn't be neglected. Even if storing sensitive information such as financial, or personal info on mobile devices will facilitate individuals, the risks of losing such info or of unauthorized access ar higher associate degreed ought to be thought-about once an ecommerce dealings begins. This paper can review the latest trends in mobile associate degreed e-commerce applications and can develop an application design that describes the inner design of each internet and mobile parts. Moreover, the focus can be on developing a lot of refined demonstration mobile application regime that can use internet-services to speak with Firebase. More over in this paper can discussed the main characteristics of devices used for e-commerce, the obtainable survey style pointers, and the vital role of these characteristics for increasing the potential of e-commerce are articulated. Today's business world is extremely competitive. each firm is within the race to win additional and additional customers. It appears like each enterprise is in sort of a virtual war with different wherever one organisation attacks another with their ways and therefore the other defends itself. This war is additionally evident within the e-commerce business as well, that is that the quickest growing business across the world.

E-commerce is that sphere wherever virtually each alternative organisation is attempting to mix itself up to so as to satisfy the competitive state of affairs.

Motivation:

Day by day technology is evolving simultaneously with human race, these ecommerce android applications are saving a lot of time and efforts for humans. Due to this reason mostly physical shopping is reducing in current society which is also very painless procedure to the people. Not only this, Uber, big basket, Pharmeasy are also following same procedure which are ruling the world in current century. Tremendous work has been done to look user interface somewhat similar to Flipkart. this motivated us to create an innovative mobile ecommerce application in which user can able to buy products very easily which are deployed in a very efficient sorted manner in application. Though there are a few better ecommerce applications in current digital world, this may differ from others because this has been created with very less team members and without investing single penny on creating and integrating all services and tools.

System Architecture:
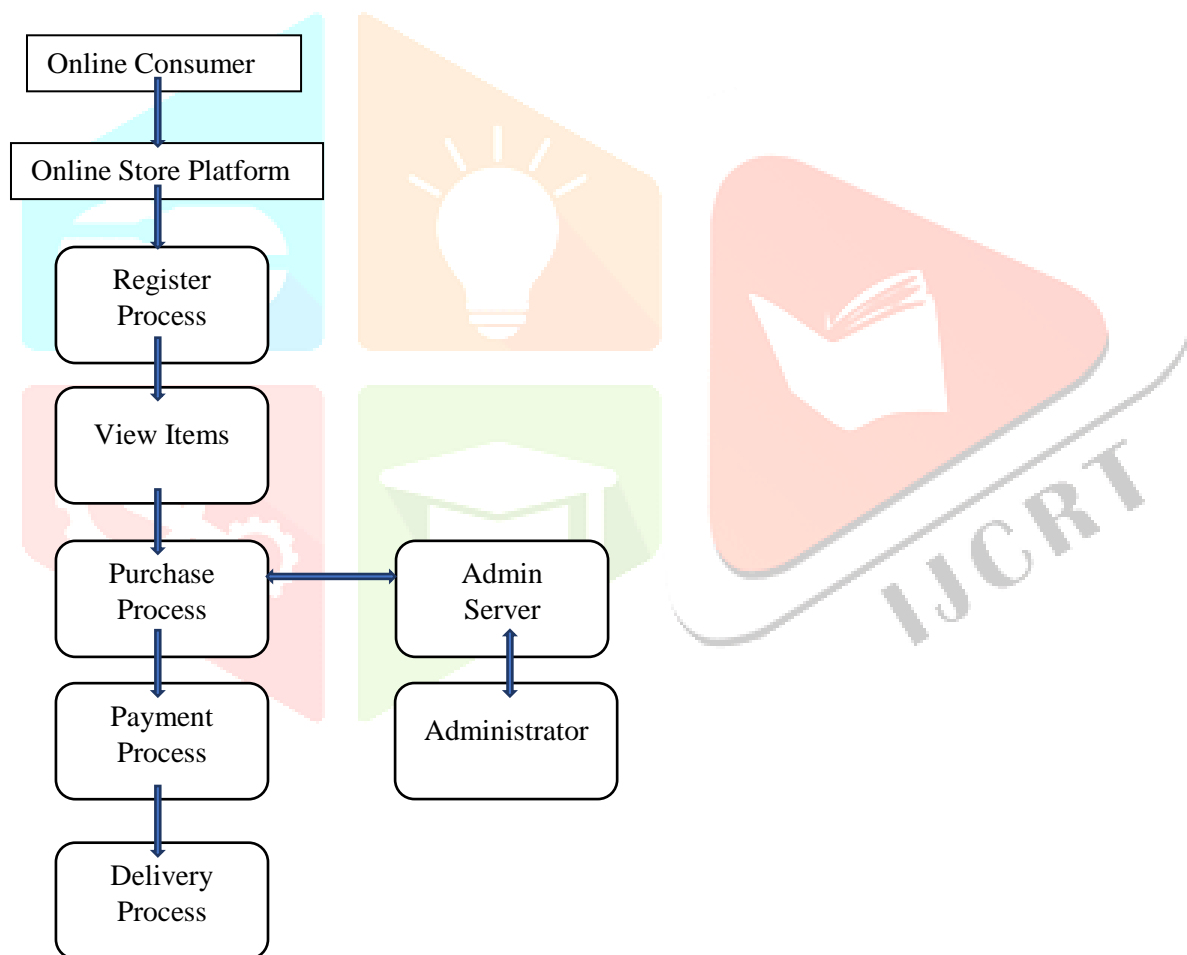
The above figure is the outline of the design of online shopping which also shows useful fundamental segments and commitment inside that framework. clearly it speaks that user can able to buy his/her enthusiastic products from anywhere in the world.

User interacted with architecture which consists of Register Process, view items, purchase process (which sends user selected items and details to Admin server and yet then to Administrator), Payment process and Delivery Process.

Consumer should add his/her username with secret key to use this application which goes under register process. These kind of staggered exchanges build connection between client and server. If there is any

purchasing process takes place then consumer desired activities and details goes to admin server and then check for vulnerabilities send back it outcomes to the Application at run time stage.

Methodology:

Methodology of this paper is resolved in following stages:

Stage 1: Strategy

Stage 2: Analysis and planning

Stage 3: Prerequisites

Stage 4: Data Collection

Stage 5: App Development Mechanism

Stage 6: Application Testing

Stage 1: Strategy

The first phase of our contribution to this project is defining strategy of our idea to make a successful app. we have been gone through some other applications to create but at some point we got stuck. then we started by choosing Ecommerce application. Because ecommerce business is ruling these days.by this we got more exposure to android studio and Firebase. We are created and deployed this application with more friendly to user interface and works very efficiently. which means no ads, no external Activities and created admin panel database with zero cost. Any user can access this application from any country which requires only a smart phone and internet, and also we have gone through android not to apple, because other than apple there are lot more Android users so, by this we can get a huge network.
Following are some strategies at beginning:
- More exposure
- Cost Savings
- No ADS
- Allow for considerable profit
- Admin Panel

Stage 2: Planning and Analysis:

After the strategies we gone through an analysis regarding functional requirements, run time activities from beginning to end and frontend and backend parts. first of all we need software requirements which have been highlighted above. We have been selected this application domain name as 'StreetMart' which is very unique and also not at all present in app store till date. Then we started planning by drawing each and every activities point to point on noted sheet. After that we learned some skills regrading about usage of android tools, firebase services like Firebase Authentication, database, Cloud Firestore, Integration of payments, Database management during runtime, some efficient layouts, and abstracted classes, Interfaces and advance methods.

We initiated a plan in which first involving with runtime activities which are xml files by taking reference as of our drawings and assumptions and slowly enter into backend part. And then we are added some key points in our plan which are

- should compulsorily design one or two activities and designs within two or three days span.
- testing the application should be done once in a week.
- monitoring the performance of application daily by using firebase,.
- If there are any bugs involved should debug instantly on that day,

- Integrated code check should be done weekly once which overcomes the complexity between each activities.
- Each Teammate should work daily atleast one hour on this very intensively.
- Should use less operations as much as possible to get efficient output (if number of operations increases application performance decreases)
- eventually must and should integrate payment transaction in staggered or productive way by the end of March 2021.

Stage 3: Prerequisites

It is assumed that all this project is done on a freshly installed Windows machine for the sake of consistency. First of all we organised our project material in a dedicated directory structure with a unique package name. by using this same package name we have been created firebase account. After that we imported firebase directories and libraries in gradile file to connect the firebase to our project. Eventually, enabled all the services in firebase such as firebase authentication, real time database, Cloud Firestore and added corresponding libraries and dependencies in gradile.

Software requirements:

Software architecture was developed based on this research. The results of the analysis enabled the initial scope of the research to be additional precise and doable. varied computer code development methodologies were utilised since computer code engineering could be a various field and encompasses several various factors and contexts. Experimental computer code engineering was used in the initial development part in order that risk and uncertainty were reduced. the repetitious computer code model was used because it is that the most suitable option for image development.

Android:

- Latest version of JDK
- Android SDK (Software Development Kit)
- An Opensource tool that automates aspects of the Android build process such as APACHE, Lollipop (Android 5).
- Gradle: An Advanced build toolkit that manages dependencies and allows user to define custom logic such as Android Studio.

Windows:

- Minimum .Net framework 2.0 & 3.5 - For the Build Release mode
- Minimum .Net framework 2.0 & 3.5 4.6.1
- Offline Objects feature for both Debug and Release modes

Hardware Requirements:

- Processor: Minimum 1 GHz
- Ethernet connection (LAN) OR a wireless adapter (Wi-Fi)
- Hard Drive: Minimum 32 GB
- Memory (RAM): Minimum 1 GB

Stage 4: Data Collection

It is the process of congregating and measuring information on variables of interest in a systematic manner. The present research is based on **Secondary Data** (in which data is gathered from a source which has been already published) and **Qualitative Data** (in which collected data is non-numerical and usually descriptive and nominal in nature). The Available data would be reviewed and assured that it covers all the significant criteria of ecommerce designing like product Image URLs, current costs, Details and their Specifications. It is highly desirable that data should be collected from sources which are extremely reputed research platforms. Sources used are Flipkart, Amazon, Pinterest websites over Internet. Collected data is stored at Cloud Firestore admin account in the form of collection with our own preferred names, which are pulled to Application interface by calling a method to get the data.

Stage5: App Development Mechanism

This stage divided into three categories which are

1. UI/UX Design (Frontend) and App Development (Backend)
2. Testing
3. Deployment

## 1.UI/UX Design (Frontend) and App Development (Backend):

Frontend: In this project xml coding comes under frontend part in which we can use integrate layouts, styles, colours, values, images(drawable), animations, widgets, views and many more.

Backend: In this project Java coding and firebase comes under Backend part in which we can override number of classes, interfaces, methods, instances in case of any need.

What is Firebase?

Firebase is a Google developed mobile platform that helps you quickly develop or improve or grow high quality mobile and web applications.it is categorized as a no SQL database program which stores huge amount of data in JSON documents in private server if needed. Some of the features which gives to any user very efficiently are Authentication (Email, Google, Facebook, Twitter, Mobile, Github), Real Time Database, Storage, Cloud Messaging, Remote Config, Test lab, Crash Reporting, Hosting, Specific APIs, Big query and Cloud Functions. Separately it Provides both android and IOS Services.

Splash Activity:
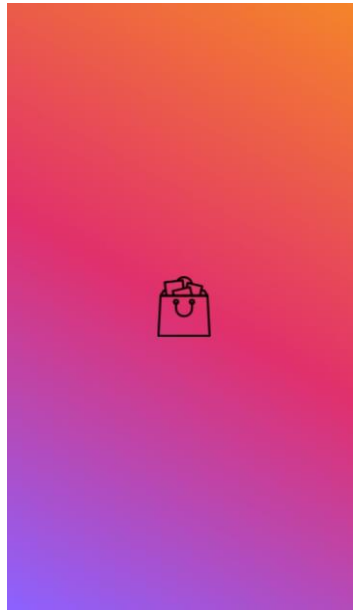
The activity which holds the layout for a few seconds constantly is called splash activity.

Gradient: In this project designed unique gradient to set as a background colour by using xml shape, corners, first coour, middle colour and end colour code in Drawable. This is the main gradient which is imported in whole application.

XML(Frontend): Added Gradient as background colour and image at the centre of the activity by using ImageView widget. This image has been taken as main Icon of our whole application.

Java (Backend): Handler and Thread objects has been in this to hold the activity for two seconds and used intent in run method to enter into another activity.

What are Intents?

Intents has been used to enter from one activity to another activity effieciently.it consists of two types one is Interior Intents-User can able to enter into any activity in his/her mobile like camera, Chrome, Storage and to any application which is involved in mobile. Another one is Exterior Intents- these are used to pass the data from one activity to another in the form of Strings, objects or bundles.

Login Activity:
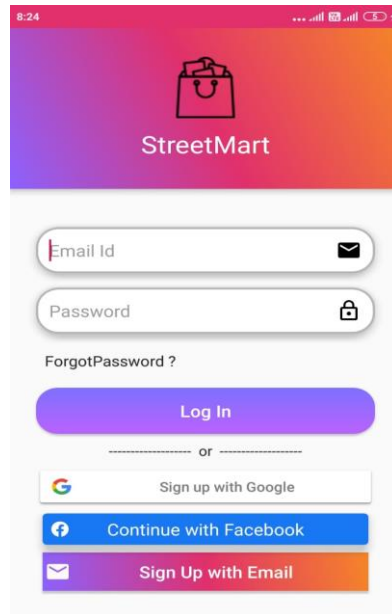
This is the activity in which user can login by using his/her credentials given before. User has a few options to login like, Google, Facebook, Email accounts. This application has been connected to firebase, so if user enters wrong credentials then it pops up and does not allow to go furtherly.

XML(Frontend): it consists of a Linear layout at the top to showcase our application icon with Name. after that added two edit texts to enter email id and password of user and Login Button with other gradient colour background. Implemented google and Facebook API s from their existing developers account which shows two buttons similar to their designs.

Java (Backend):

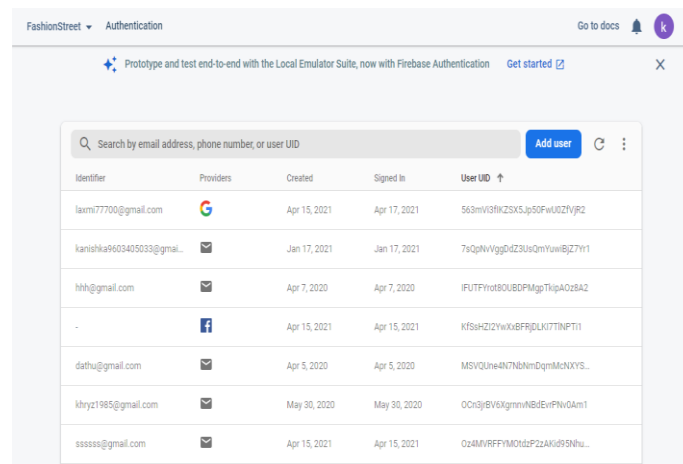Details entered by user has been taken in string format and verified by using FirebaseAuth object.

FirebaseAuth: This is the reference of the class which is imported from the firebase. By using this instance user credential data has been stored in our firebase private account during runtime and also it verifies user given details if its correct then it allows to further activities if not pops up alert Message which shows error.

Syntax: FirebaseAuth f_name=FirebaseAuth.getInstance();

Google Login API: after importing libraries, by using Google client Abstract class we integrate user google credentials by a unique token when user clicks on google sign up button. With this token not only credentials we can import user's all details which has been stored in google account till date. By using firebaseAuth, Google client instances and some overridden methods user can access google account to sign in with this application.

Facebook Login API: Facebook callback object has been used to get runtime unique user's Facebook account token. Before that we need to import our application details and packages in Facebook developers account which connects both. Facebook developers account has one more benefit which is it gives daily performance of users who are sign up with Facebook account. That token has been handled and gives the sign up access to user by his/her Facebook account.

If user clicks on forgot password then activity goes to reset password activity or if user clicks on sign up with email button then it enters into register Activity.

The above figure is the Authentication Admin page in Firebase which shows if any user enrolled in this application From anywhere in the world then the email, Password, Type of Login (Google, Facebook or Email) Used details are stored at here with Unique ID, Account time, Sign in time and Provider details. If we need any new user from the Admin Panel just clicking on Add user button it creates account with our desire details during run time.

Reset Password: this is the separate activity in which user can able to reset his/her password instantly. When user clicks on reset button then he/she receives an email from StreetMart with reset password link which expires in one hour.

Register Activity:

XML(Frontend): Added five edittexts in which user can enter his/her email ID, First Name, Mobile no, Password and Confirm Password. and also one custom button for registration.

Java (frontend): Similarly used firebase auth instance to store user credentials into firebase account during runtime when user clicks on that button. if user enter wrong details then gives custom error focus message to the user.

Main Activity:
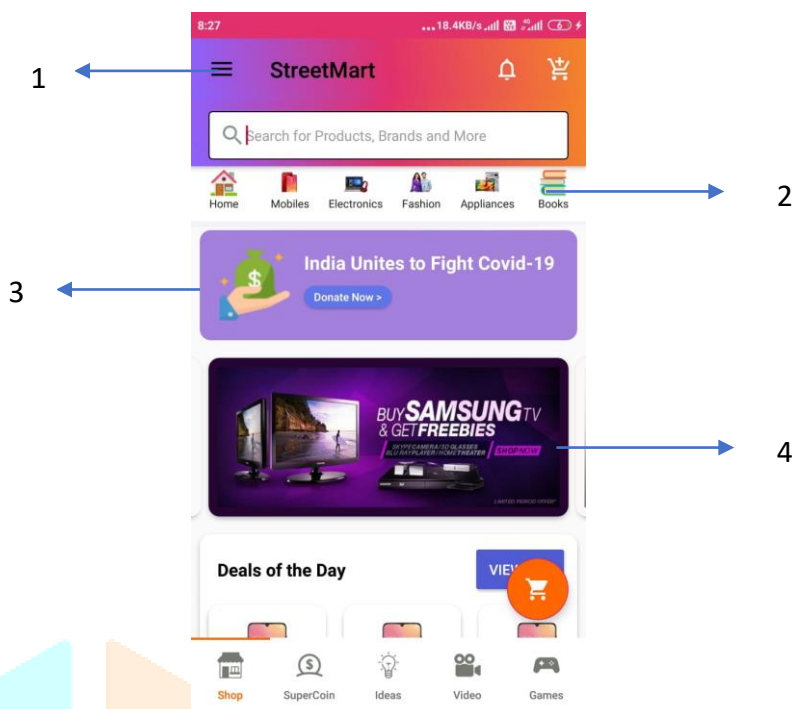
1. Navigation Drawer
2. Category Items
3. Donation Page
4. Banner Slider

Navigation Drawer:

The Navigation Drawer slides in from the left contains some navigation destinations in which user can able to navigate to different sections of the application.

It consists of user Image with Name at the header part and contains sections like Home, Choose Language, My Orders, My Rewards, My Wishlist, My Cart, My Account and Logout.
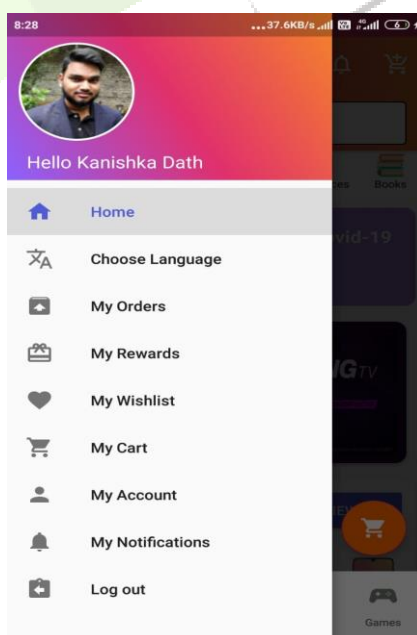
If user sign in with google or Facebook then by using firebase Auth and current user classes we can retrieve the user whole data which have been given in both the platforms. On this header it shows user image with name which has been retrieved by following above mentioned classes during run time.

In the Designing part frame layout has been used and for on click response action Navigation view class with on click listener method are used. Action bar Drawer toggle class is used for the purpose of open and close toggled actions when user clicks on icon.

My Account Section:

This is the section in which user can able to see his/her personal details like user name, email, address, pincode, state, mobile number. If there is any order is being going on then it shows the product status in four ways which are ordered, packed, shipped, delivered.

XML(Frontend): Two layouts has been used in which first layout contains background gradient and User Image, second layout is Linear contains Username and Email id in the form of textviews.below contains a big text view which reflects when there is an order been under delivery process.Image view and Horizontal Progress bar has been used to display the status of the current ongoing order. At the end of the linear layout it consists setting float action button by clicking on it user enter into update details activity.

At the middle and end of the activity it contains recent orders – user recent orders has been stored at here in the form of circle images and My details section-used separate linear layout to store the user details which has been used text view widgets.

Most Significantly these all layouts are included under scroll view layout in which user can able experience scrolling technique.
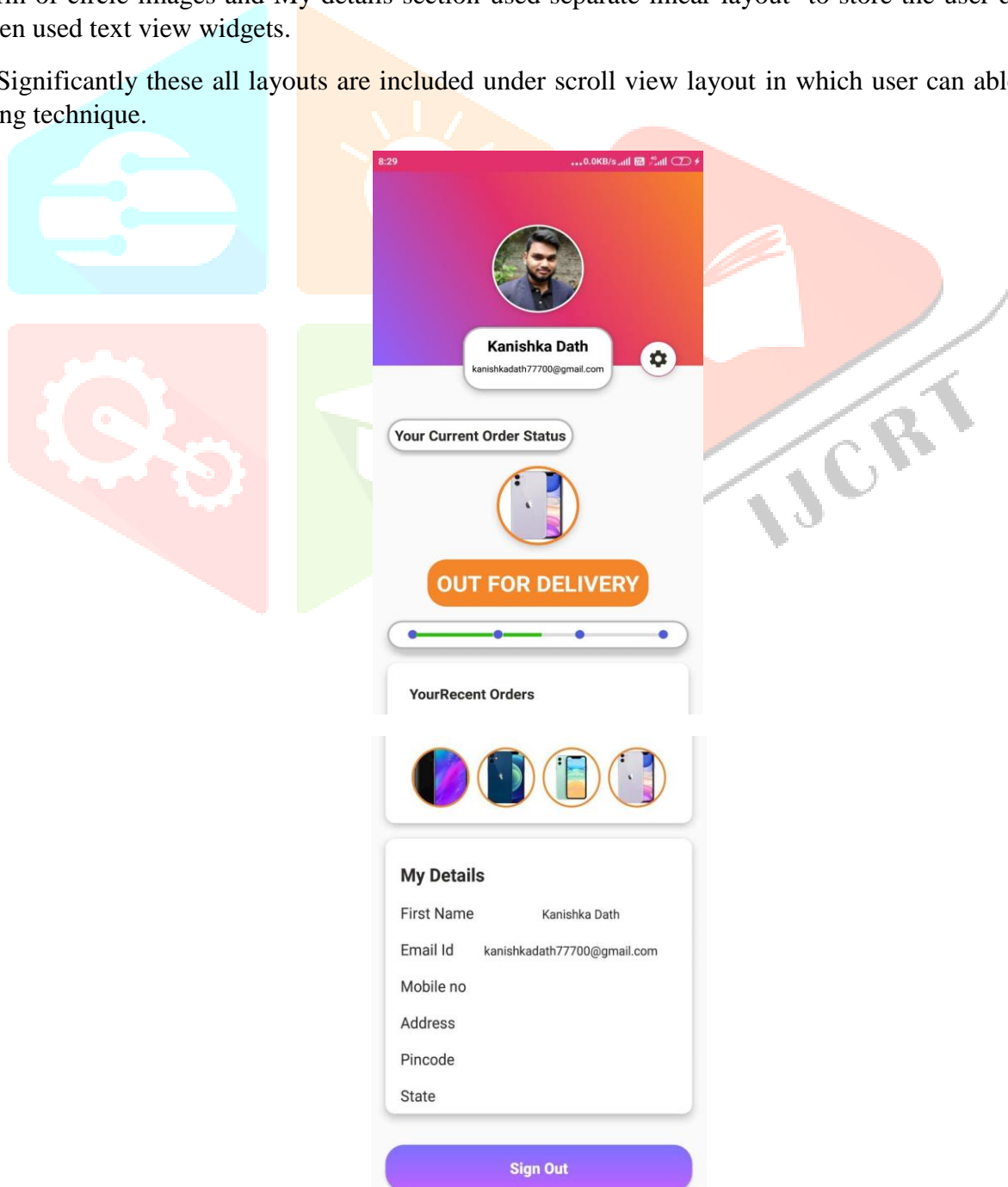
Java (backend): user email, name and image is stored by using firebase auth and current user classes with integrated methods. if this order progress reaches delivery point then it enter into recent orders section by using basic java code. Firebase auth class is also used to sign out from the current account.by using intent when user clicks on settings floating action button then update details activity comes under the view.

Update details page: it consists of six edit texts in designing part which are name, email, mobile number, address, pincode, state and atlast with save button. If user wants to update his/her details then this action would be done here by entering desired details and clicking on save button all the updated details have been hit back to my account page in details section by using exterior intents process.

Category Items:

What is Recycler view?

It is a UI component and Advance version of list view which allows developer to create scroll list in a very flexible manner. By using viewholder class, data source is attached to adapter in any view like horizontal, vertical, linear, Grid, and Staggered and atlast this adapter is added at recycler view.

What is Firebase Storage?

It is also called as Cloud Storage.it is a simple, powerful, cost effective storage service which is used for uploading Admin desired images, videos URL files in separate folders at a large scale. It is designed particularly for scale- uploaded file is backed by google cloud storage, security- uploaded files are under secured section all the time, Network resiliency- if there is poor network connection automatically uploaded files are retired**.**

What is Cloud Firestore?

Cloud firestore is a cloud hosted, NoSQL, real time database. Data is structured in the form of collections at here. Even in that collections there are documents and yet inside it fields are present. It is used to sync the given data to the application during run time. Images and videos URLs are stored separately in collections with unique index value to each and every fields. By using cloud firestore object we can sync this cloud firestore to our application and process the data.

XML (Frontend):   created a linear layout view which accepts only horizontal recycler view. Another layout has been designed for recycler view items contains Image and Text view.

Firebase work: Created an Array List and by using collection method which is in Firebase firestore class added image URLs and names to the array list which comes in sort of index values from cloud firestore.

Java (Backend):   Created a category Model class and Category Adapter class. In Category Model class declared corresponding data variables which are needed. In Category adapter initainally extended Recycler view Adapter class and overided required methods and atlast created view holder class and initialized IDs with the variables. The above created list is redirected to the adapter class and binded this data to the layout in OnBindViewHolder method. Eventually, this adapter is added to recyclerview. For each and every category consist a small page which is category page and inside it product details activity is included.

Donation Page:

This is a layout which has been designed with some already integrated layouts with one button. When this button activated user redirected to the PM cares Fund page in Paytm to donate some revenue. This process is done by using interior intents.

Banner Slider:

This is the section in which some fresh product banners are shown to the consumers in automated horizontal scrolling way by infinite number of times.XML (Frontend): Designed two layouts one consists only one image view another contains view pager widget.

Firebase Work: uploaded some image urls to the banner folder which is present in firebase storage. these Image urls added to fields along with giving consecutive index values in separate banner document collection folder in cloud firestore. By using firebase firestore class these are sequentially added to the list**.**

Java (Backend):   created banner Model class, Banner adapter class, extended pager Adapter to adapter class and binded above created list items with the layout by using Glide.Eventually in adapter class created bannersliderviewHolder method and overided onPageScrollStateChange method.in this method, used thread to sustain each banner for 2 seconds with current banner integer variable. After 2 seconds this variable incremented and gets another banner. if it reaches last banner then its value becomes one which means after all banners are processed then again first banner will comes on board.
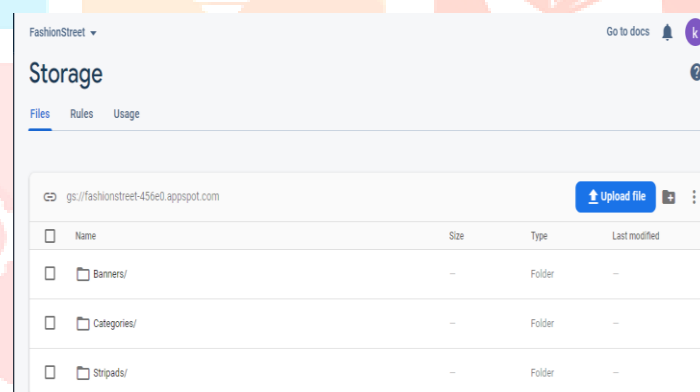
The above image is the Admin Cloud storage which contains Image URLs of banner and category products in their corresponding folders.
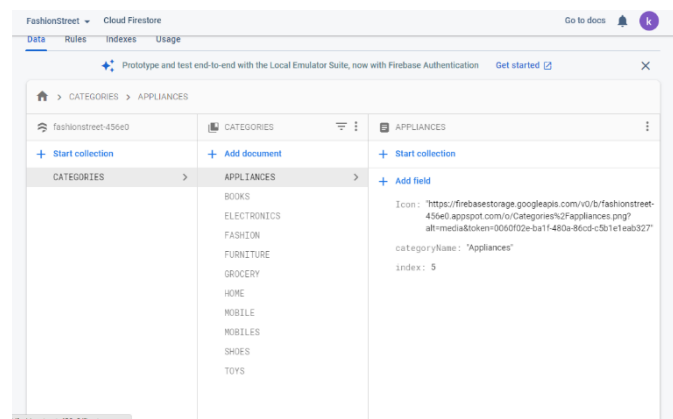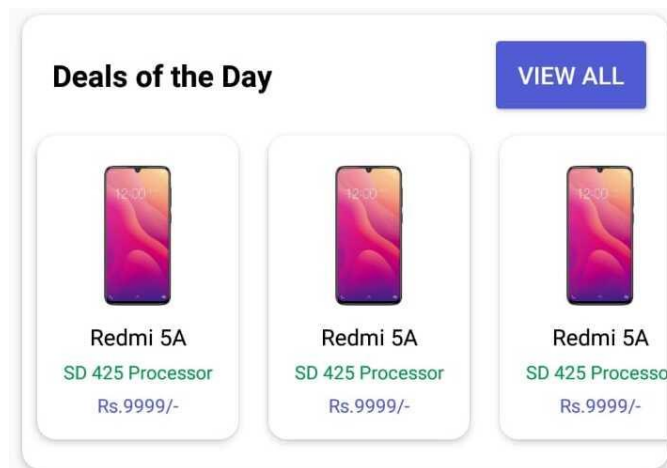

Image of Admin cloud firestore which has been storing data in the form of collections, documents and fields.

Horizontal Scroll View:

it is a part of Main activity which maintains infinite products horizontally. Used Horizontal recycler view, model class and Adapter. When any action takes place on these any items then consumer enters into product details Activity.

Grid View Items:
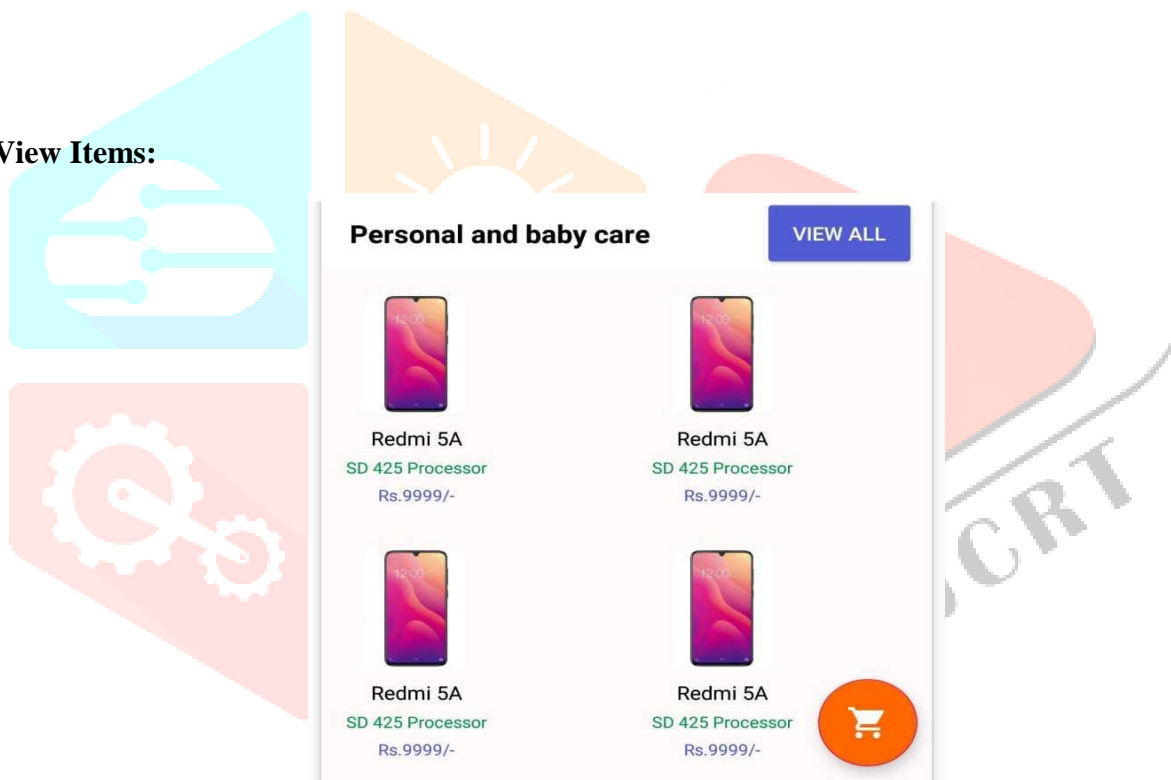
It is also a part of Main Activity in which items are displayed in gird view. Created by using recycler view, Model and Adapter Classes. There is a floating action button which describes about cart, when user clicks on it then it enters into my cart Activity.

Banner sliders, Strip ads, Horizontal scroll view items, Grid view items are been integrated in one unique recycler view, by using this recycler view we can represent above mentioned views infinite number of time very efficiently in an any activity.

Product Details Activity:

In this activity user can able to look on product all direction images- created by using view pager and tab layout, Product title, total number of ratings given to that product, original price, previous price, coupon redemption – by using existing coupon it will reduces the price, rewards, Description- Specifications- More info of the product- created by using View pager and Tab Layout, number of Ratings given by other consumers to that product from 1 to 5 star – few linear layouts and Horizontal progress bars have been used.
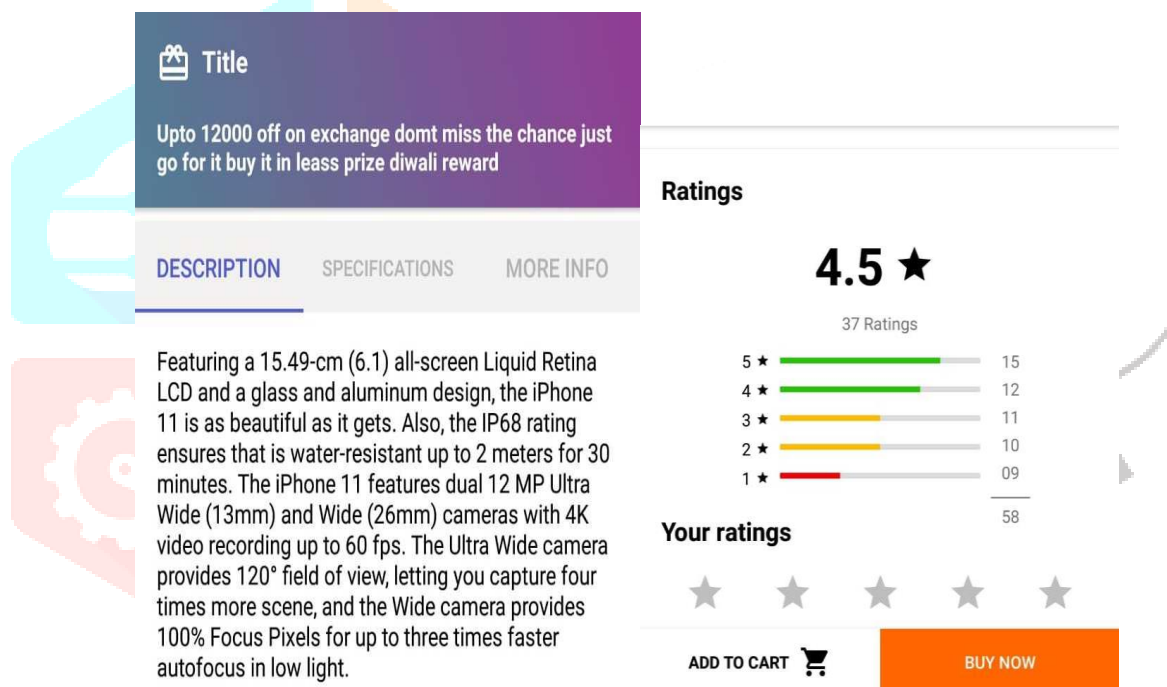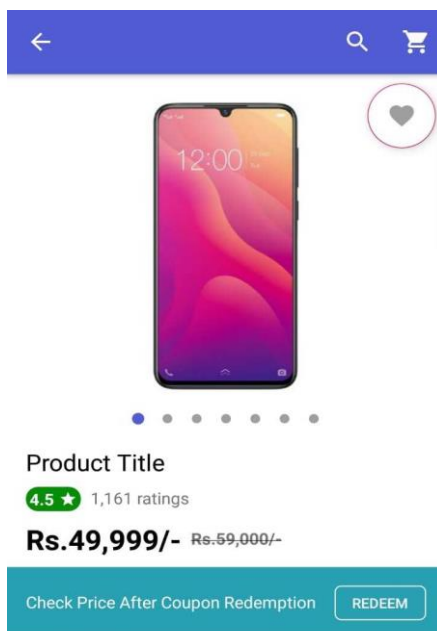
Finally created two buttons, Add to cart button- when customer clicks on it then this product details will be fetched to my cart activity, buy Now button- it will redirect to payment gateway with that original price.

My Cart Activity:
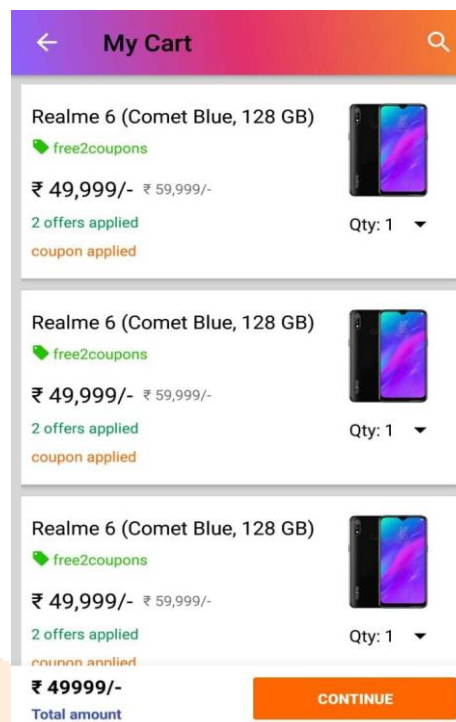
This is the activity in which consumer can able to look on the products (which are comes from product details activity when add o cart button action takes place), number of offers applied, coupon applied or not, able to select quantity of that particular product and number of offers applied. Atlast it displays the total amount after clicking on continue it is redirected to payment gateway page.

Payment Gateway Page:

Initially, to deploy payment in application, created business account in Paytm developers website. After that received m id, customer id, Paytm checksum URL, call back URL from that website.by using String request class with Paytm check sum URL retrieved Payment gateway information in the form of JSON object. This object details are stored in Hash map. And then this hashmap is passed as a Parameter to the class Paytm order. Eventually this Paytm order object is initialized to PaytmPGService class.
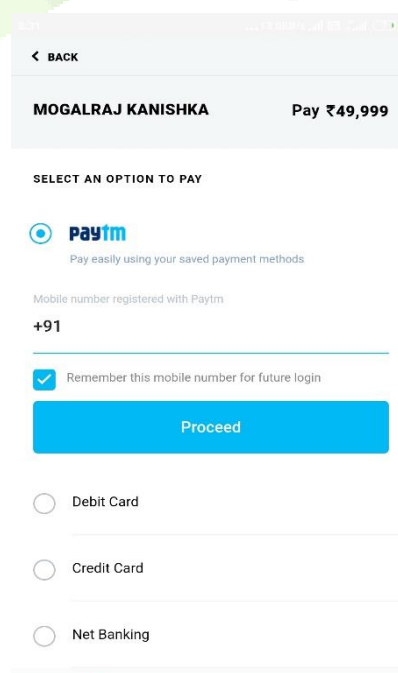
PaytmPGService:

This is a class which accepts paytm order object as parameter and overrides method called ontransactionResponse method. Transaction response will be in the form of string value. If this value equals to "Success" then transaction would be succeeded and enters into order placed activity with unique order id (which comes from transaction response string value) , if not it displays error message.
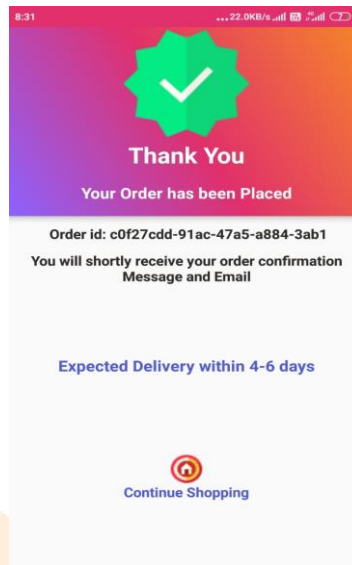
Order Placed Activity:

It consists unique order id and expected delivery date of the purchased product and continue shopping button-it will redirect to Main Activity when user clicks on it.

Stage 6: Application Testing

Application testing should be done in real android mobile or else in virtual devices. Testing should be done very frequently when new services or techniques are added in application. Application should also be tested on both portrait and landscape mobiles, different networks, different versions of android mobiles for cross checking the performance and usability.

Flow Chart:

```
                          ( Start )
                             |
                             |<──────────────────┐
                             v                    │
                         /Login ?\   Failed ──────┘
                         \       /
                             |
                          Success
                             |
                             v
      ┌──────────────> [ Home Page ] <──────────┐
      │                      |                   │
      │                      v                   │
      │                 /  Item   \    NO ───────┘
      │                 \Selected?/
      │                      |
      │                     Yes
      │                      v
      │         [ Enter Product Details Activity ] <───┐
      │                      |                          │
      │                      v                          │
      │                  / Add To \      No ────────────┘
      │                  \ Cart?  /
      │                      |
      │                     Yes
      │                      v
      │    No      /Produ...    Cart\
      │ <──────────\  Shopping       /
      │            \   Over         /
      │                  |
      │                 Yes
      │                  v
      └──────────> [ Enter To Cart Activity ] <────┐
                         |                          │
                         v                          │
                   / Continue \      No ────────────┘
                   \    ?     /
                         |
                        Yes
                         v
               [ Redirect To Paytm Web Page ]
                         |
                         v
                  [ Pay the Bill ]
                         |
   Unsuccessful          v
                   / Transacti \
                   \ on Status /
```

Successful

(Stop)
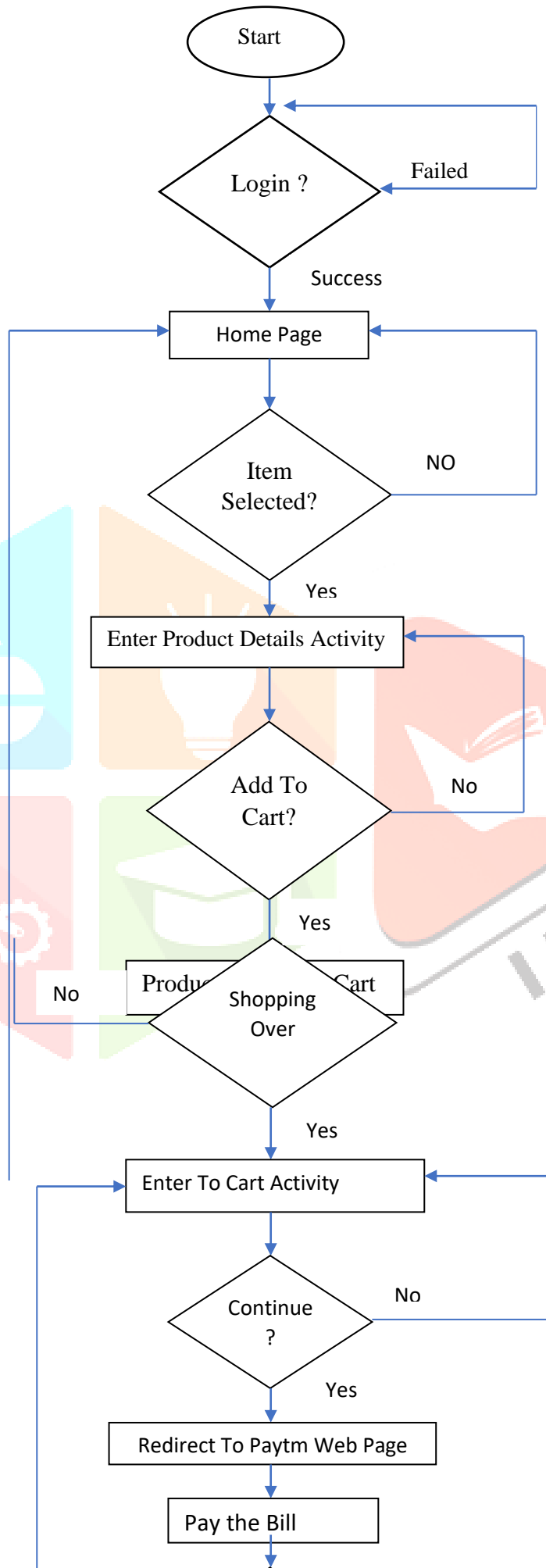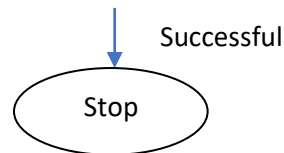
Libraries Used:

- ➤ 'androidx.appcompat:appcompat:1.1.0
- ➤ 'androidx.constraintlayout:constraintlayout:1.1.3'
- ➤ 'com.google.firebase:firebase-auth:17.0.0'
- ➤ 'com.google.firebase:firebase-bom:27.0.0'
- ➤ 'com.google.android.gms:play-services-auth:19.0.0'
- ➤ 'com.shobhitpuri.custombuttons:google-signin:1.1.0'
- ➤ 'androidx.legacy:legacy-support-v4:1.0.0'
- ➤ 'androidx.navigation:navigation-fragment:2.2.1'
- ➤ 'androidx.navigation:navigation-ui:2.2.1'
- ➤ 'androidx.lifecycle:lifecycle-extensions:2.2.0'
- ➤ 'com.google.firebase:firebase-firestore:22.1.2'
- ➤ 'com.google.android.material:material:1.0.0'
- ➤ 'androidx.test.espresso:espresso-core:3.2.0'
- ➤ 'com.facebook.shimmer:shimmer:0.5.0'
- ➤ 'com.android.support:design:29.0.0'
- ➤ 'com.android.support:coordinatorlayout:29.0.0'
- ➤ 'com.android.support:viewpager:29.0.0'
- ➤ 'com.squareup.picasso:picasso:2.71828'

Permissions Needed:

- ➤ android.permission.INTERNET"

- ➤ android.permission.ACCESS_NETWORK_STATE

- ➤ android.permission.READ_SMS

- ➤ android.permission.RECEIVE_SMS

Conclusion:

In general, Today's world Ecommerce applications constantly growing and becoming more and more significant to improve digital technology. From the establishment of the internet and ecommerce, opportunities became endless for both business and consumers. Technology became a continuous progress over the years to provide consumers a better shopping experience. Eventually, this is the project in which we are also to be a part of that amazing world.

References:

[1] https://firebase.google.com/docs

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