

PRODUCT AUTHENTICATION AND VERIFICATION

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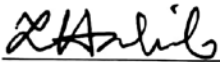
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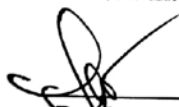
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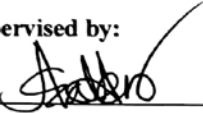
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DECLARATION

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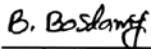
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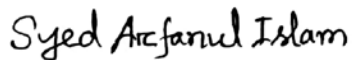
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ABSTRACT

The purpose of “**Product Authentication and Verification System**” is to create a mobile application and user friendly system to verify the genuine products. We have hundred and sixty millions of population. And we are using billions of product in daily life. Now adulterant of product’s one of the major issue in our country. Foods, medicine, garments accessories all types of product is going to drossy.

So avoid this great problem, we are going to implement the project named “Product Authentication and Verification” for ensuring to use safe products. We developed a mobile application that can identify a particular product’s gentility. According to this application a user can also notified product specification like Product name, weight, date of production, expire date, Price etc. Main outcome of the project is ensuring to use genuine products.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Now in our daily life, adulteration of products is one of main problem. Adulteration of foods, drugs, and cosmetics etc. with toxic chemicals harmful to health has reached a pestilence, proportion in Bangladesh. The newspapers are already noticed it as the 'silent killer'. Now in this situation It is very difficult to find a sector of food, drug, and cosmetic industry which is free of adulteration. And it's going to be Epidemic. Even a new born child is affected it by birth. A new birth child takes child foods or medicine but unfortunately it can be imitating products and its very harmful for his/her health.in this situation the company and farm does not take proper attention or necessary steps.so we develop a system that can identify the products. we develop an application where a user register by email Date of birth and name. And then login by name and password.

1.2 Motivation

It's saidthat a great solution becomes from a pestilence problem. Now in Bangladesh peoples use billions of products. But millions of products are not jenuine.one day we purchased a coca cola, when we open it then we saw its fully covered with bad smell, then we realize that it's fake product. Then we searched in google at "adulteration of products in Bangladesh". And its shows that millions of foods, drugs, chemicals, cosmetics are imitating. and it's an alarming problem in our country. On the other side the company and farm does not take proper step to solve the problems. So somehow we have to find a solution. With the altitude of science and technology we can try to find a solution to make the situation better.

1.3 Objective

Now a day's adulteration of product is an epidemic problem. There are 46% of food products is not genuine [1]. More of them is drugs, foods, baby foods, cosmetics. when we take these kinds of products, our daily life is going to harmful. Every day children are died to take fake products, fake drugs. And the companies or farms not take necessary steps to authentic their products. Sometime government try to take some steps like quick expedition into the markets and Seize products. But it's not enough. So we are developing a system for companies to authenticate their products. And the consumer can verify the products. And it will insure to take safe products for consumers. If the supply of fake product can be prevented, company will get more revenue. Our is Duplication free productivity and make a faithful, healthy World.

1.4 Expected Outcome

After an accomplished development of this project, it is prospective to produce a mobile base application system to manage the product with followings outcomes-

- To solve the adulteration of product's problem.
- Change the typical authentication system for the products.
- To help the consumer to verify the products.
- Ensure the safe products.
- To help for making a faithful, healthy World.

1.5 Report Layout

This report consists of six chapters, and this section provides insight of all six chapters.

1. First Chapter provides introduction, Objectives, motivation and expected outcome of the study.
2. Second chapter we discussed about related research work is discussed on. It also provides Scope of the Problem, problem research and Comparative Studies.
3. In third chapter, requirements of the proposed system, Business Process Modeling Requirement Collection, analysis system architecture and system flow diagram is provided.
4. Chapter four of this document describe our proposed system design, User interface(UI) design, back-end design Database design.
6. On the fifth chapter we discuss about Database Implementation, Implementation of Front-end Design Implementation of Interactions and Debugging and testing.
5. Lastly, chapter six is on conclusion, limitations, comparison and future study.

CHAPTER 2

BACKGROUNDS

In this chapter, we discussed about Related research work is discussed on. It also provides Scope of the Problem, problem research and Comparative Studies.

2.1 Introduction

According to Daily Newspaper there are 46% types of food products is adulterated [1]. Every kinds of products are adulterate like foods, drugs, cosmetics etc. Even a ten taka's products like chips can be fake. So we are living with heavy misgiving. Now companies also fail to maintain their product gentility. To ensuring the product gentility they are using typical authentication policy. But it's not useful to consumers. Sometime a fake product's can be identified by the lab test. And companies or firms are losing the acceptability to consumers. Companies use a bar coding system and product logo to authenticate their products. But it's not useful policy.

2.2 Related Works

Mainly companies use a bar coding system to authenticate their products. According to DGDA every kinds of drugs have a unique code number. And they are developing an application named drug admin [2]. But this application is working with existing unique coding and barcoding system. And it's not meet the actual goal. It's can't identify the fake products. When we use a product's and through the packets. Then some unfair people take the packets and reuse it.so it can difficult to identify genuine products.

But some of companies work to authenticate their products in world wide. Most of Tech Company use a special company use the authentication system. And now the electronic industry uses authentication system like as Laptops, mobile phone etc. Apple, Samsung, Xiaomi use the barcode and 20-25 digits to secure their products [3] also use the IMEI, S/N number.

One of company named certilogo is working for Authentication of products. It works with the digital authentication system from Certilogo when user never have to guess if a product is authentic or a forged [4]. It uses two types of authentication one is CERTILOGO CODE and another is QR coding system. If a user uses their application and scan the QR code then a user has to submit some information with it like the purchase information, purchase store, and share the picture of products. When a user uploads some photos of products then the intelligence

ofCERTILOGO take the decision that is it fake or genuine. So it's the long process and not as much user efficient solution.

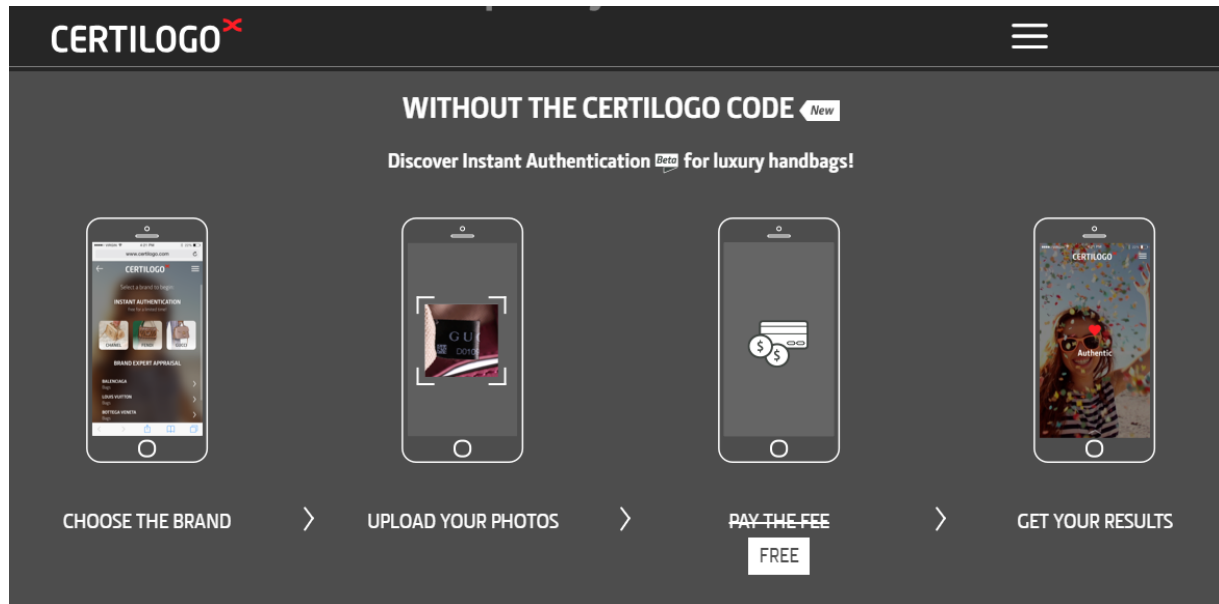


Figure 2.1: certilogo authentication without certilogo code [4].

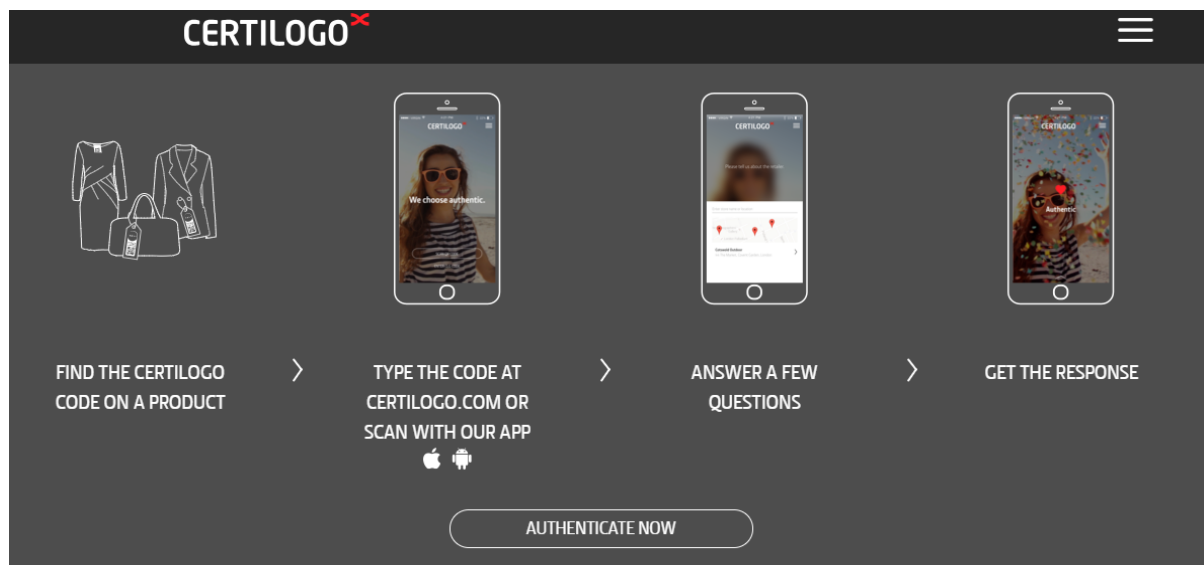


Figure 2.2: Authentication with CERTILOGO code [4].

2.3 Comparative Studies & Scope of Problems

The existing authentication system of product is not much smart or updated. To make authenticate of product company use a barcoding system. But in this method, it's very difficult to protect the authentication. In our country foods industry likes (Pran-RFL, Fresh, Cocacola, Square foods and beverage, ACI beverage, Akij food and beverage etc.) use a barcode for same types of products. So the scope of identify each and every products is impossible. Cause some fraudulent man collect the used packet and reused it to adulterant. But if it's possible to use a different barcode for each of the products, it will help to identify each of products. But in barcoding system have to provide unique number. So it's quite tough to provide. If a system can be build that produce barcode automatically, it will be a better solution. But we can use QR code instead of barcode. Cause QR code is most responsive than the barcode. Actually QR code is designed for factory automation. And it's much responsive than typical barcoding system. QR code can interact with mobile application quite faster.



Figure 2.3: Typical barcoding authentication system

For the drug authentication works DGDA. DGDA presents Directorate General of Drug Administration under the Ministry of Health & Family Welfare. [19] And it's the Drug Regulatory Authority Bangladesh. This DGDA inspects and implements all regulating Drug Regulations in the country. In our country it's provide a DGDA unique number that use in the packet of drugs. But it's not unique for each and every product. Now some of drug industry use another system to authenticate their medical products. A company named Renata it's provide a

unique number into medicine strip. When a consumer purchases the drugs, a consumer has to send the unique code to the number 2777 with a SMS. [20] If the code matches the information stored in the system, then it notified to the consumer that the medicine is genuine.



Figure 2.4: Drug SMS verification system

In this system, if a fraudulent man collects the used packet and reuses it to adulterate. Then we can't find the exact solution that (it's not a genuine drug). If we can build a system where a user can verify the products. And when a consumer verifies the particular product, the consumer can get all information about the product. And the system erases all information of the verified products. Although someone collects the packets, he/she can't reuse it to adulterate.

2.4 Project Study

We are using Android to develop our application. Because Android is now a very popular operating system for users. Android is one of the most widely used mobile-based operating systems (OS) these days. Android is a mobile-based operating system (OS) that is currently developed by Google [6]. In 2003, Android software was founded in Palo Alto, California [6]. It is developed based on the Linux kernel. Actually, Android is designed for touchscreen display devices like smartphones, tablets, etc.



Java programming language is fully supported to Android development. The android is a stack of software components which is roughly divided into five sections and four main layers [7]. The basic four layers is -

1. Linux kernel
2. Libraries
3. Android Runtime
4. Application Framework

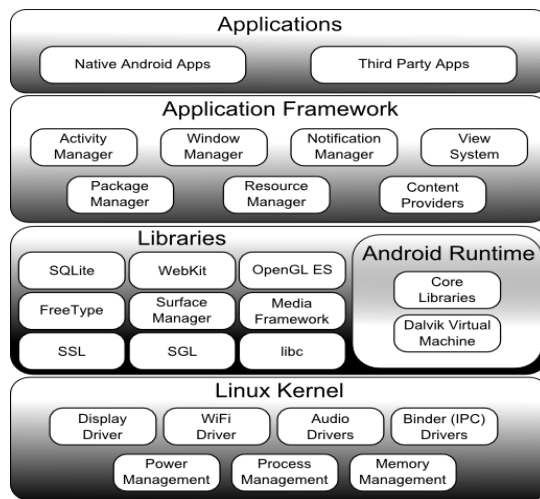


Figure 2.5: Base layer of android android architecture. [7]

2.4.1 Libraries

On top of the Linux kernel has a set of libraries including open-source Web browser engine Like as, android.database, android.opengl, android. Widget, library libc, SQLite database, SSL libraries etc. These libraries are responsible for record and play video and audio, database effective repository for saving and distributing of application data, accountable for Internet security etc. Some android libraries are [7]

- # android.webkit
- # android.SSL
- # android.widget
- # android.os
- # android.opengl
- # android.KTX
- # android.content# android.database

2.4.2 Application Framework

The Application Framework is the fourth and last layer in android architecture Application Framework gives many kinds of higher-level services to applications in the form of Java classes. It's provides the services to applications like as resource manager, package manager, windows manager, view systematic. Android application developers are used to these types of services in their application to develop the applications [7].The Android framework involves the key services like as-

- # View System
- # Content Providers
- # Activity Manager
- # Notifications Manage
- # Resource Manager

2.4.3 Market Analysis of Mobile Operating System



Figure 2.6 Market analysis of mobile OS Source: statcounter Feb 2019

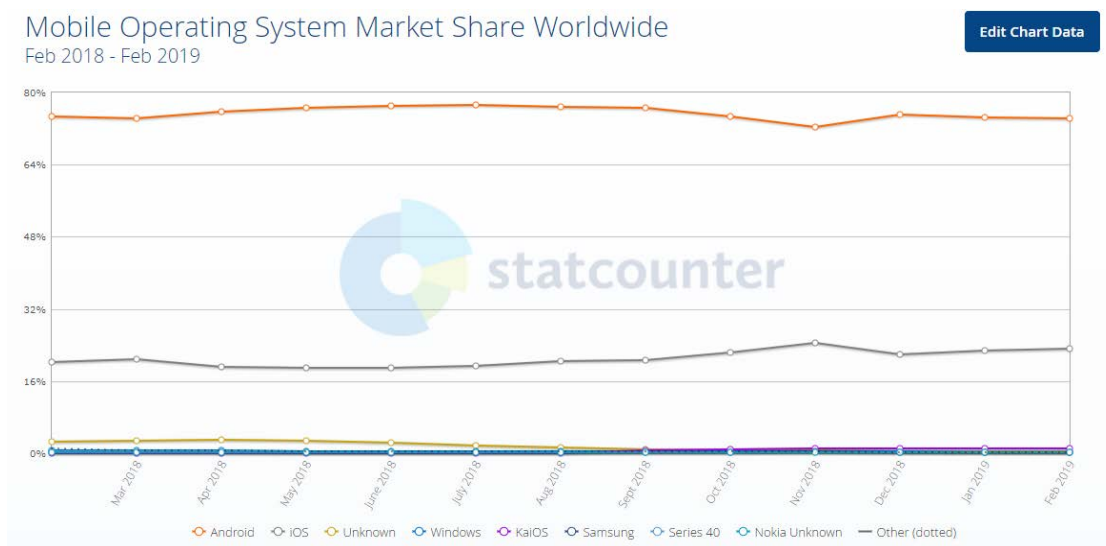


Figure 2.7 statistics of user OS analysis. Source: statcounter Feb 2019

Quarter	2016Q4	2017Q1	2017Q2	2017Q3	2017Q4	2018Q1	2018Q2	2018Q3
Android	81,4%	85,0%	88,0%	87,6%	80,3%	84,3%	87,8%	86,8%
iOS	18,2%	14,7%	11,8%	12,4%	19,6%	15,7%	12,1%	13,2%
Others	0,4%	0,2%	0,2%	0,1%	0,1%	0,0%	0,1%	0,0%
TOTAL	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Figure 2.8 IDC user popularity of mobile OS. Source, IDC Jan 2019

2.4.4 Android:

Android dominated the smartphone share will over with around 85% Volumes are hoped to grow at a 5 years' annual growth rate is (CAGR) of 1.8%. And expected shipments will be approaching 1.35 billion in 2022. Android operating system's smartphone ASPs (average selling prices) are estimated to rise up 9.6% in 2018. The market value is raised up from USD 235\$ in 2017 to USD 258\$. According to the IDC this upward growing will be continued through the forecast. Now it is in fluid rate from 2019 and beyond. And now it's a positive sign that customers are they likely previously owned. Samsung is the first Quarter on Quarter growth/profit (QOQ) and YoY (Year on Year)'source [IDC Jan 2018]'. That outcomes pull in the midst of an extraordinary performance by its new flagship releases Galaxy S8 and S8 Plus, S9 and S9 Plus.

2.4.5 IOS

According to the IDC, it is forecasting iOS to grow at a five-year compound annual growth rate (CAGR) around 0.1%. And the growing volumes of 217.3 million will be in 2022. According to the figure [2] the iOS market share for 2018Q3 decline by 13.2% QoQ. Apple continued to lead the global premium market segment and noted at 0.5% YoY accrual during Q3 2018 by the launching of larger screens and more premium models. The consumer popularity of the iPhone X, X Plus and apple watch continued in many key markets including USA, Europe and China.

2.4.6 Windows

According to net Market Share the Windows Phone market share downfall to 0.15% source [IDC Jan 2018]. Windows operating system's phone was first launched in October 2010 by Windows 7 [8]. And in January 2019 Microsoft declared that the support for Windows 10 Mobile would end in December 10 on this year. And Microsoft announced that all Mobile users of Windows 10 should migrate to android or mac OS phones. The Phone experienced a QoQ of only 0.29% with

a total of low units shipped this quarter. When Microsoft obtained Nokia in December 2014, it has been remapped the product into Lumia devices of Microsoft brand. And now Microsoft declared to stop windows phone in December 10, 2019 [9].

2.4.7 BlackBerry

Ten years ago in 2009 BlackBerry named as (née RIM) was riding high. BlackBerry Company gained almost 25% or more of the global smartphone market. And it was a higher share than any company like as Nokia. But now the BlackBerry's hardware business is in downs as the global market of share is 0.0% [10].

2.5 QR Coding System

QR means the quick response. QR code is the trademark for a type of matrix barcode like two-dimensional barcoding system. The QR code is designed first in 1994 for the automatic industry in Japan. Actually QR code is an effective way to use industry automation. It's repeatedly hold the data for an identifier, locator or a tracker that points to a website or application. In QR coding system use four types of standardized encoding modes they are alphanumeric, numeric, byte/binary, and kanji and its use to store data effectively. [14]

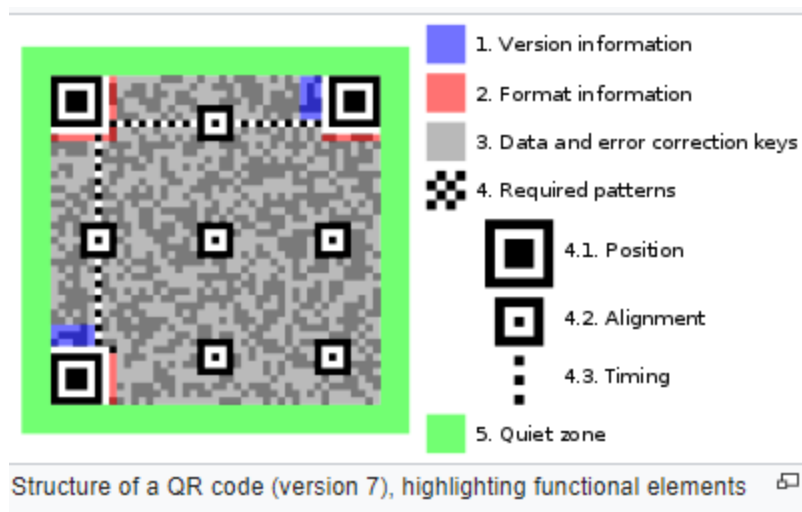


Figure 2.9: QR code structure. Source [13]

2.6 Challenges

In the typical authentication system, use single barcode for a company that's represent the company logo and some information of company. Sometime company use different barcode for different types of products.it means one kind of product use a same barcode.so it's not possible to identify each and every product's. And when company prints the packet for products, use the same types of packet. So company generate a packet and then copy it for packing the products. If company use a unique QR code for each and every product's, then it will be increasing production cost. It's the main challenge for companies or farms. Now in our country huge number of people doesn't conscious to use the technology. If major number of consumer doesn't verify their daily uses products. Then it creates a scope to fail the success.

CHAPTER 3 REQUIREMENT SPECIFICATION

3.1 Business Process Modeling

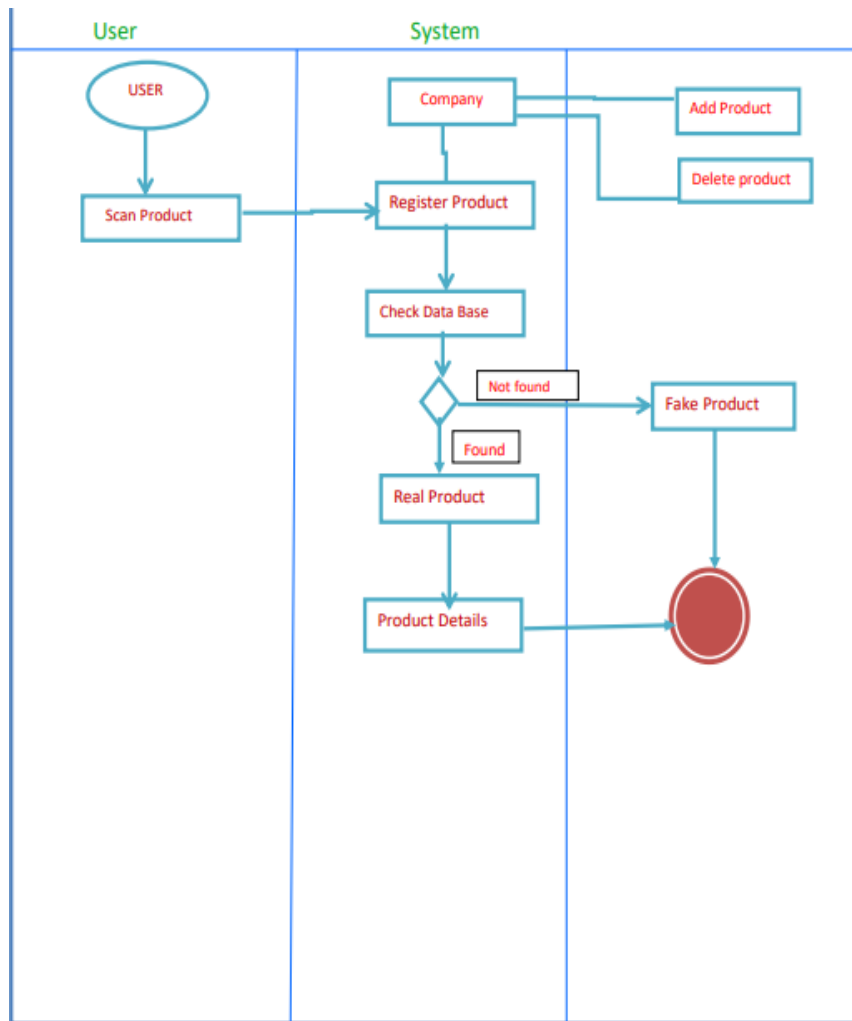


Figure 3.1.1: Business process modeling

3.2 Use Case Diagram



Figure 3.2.1: Use Case diagram

3.3 Use Case Description

Table 3.3.1 Use Case Specification for User Registration in Function.

Use case Name:	User registration
Pre-Condition:	
Actors:	User
Purpose:	Use this product scan system
Main Flow:	<ol style="list-style-type: none">1. Dashboard will show registration form.2. Require Username, Phone Number, and Date of Birth.3. Now click on register.

Table 3.3.2 Use Case Specification for Company Profile/Account in Function.

Use case Name:	Company Profile/Account
Pre-Condition:	
Actors:	Company
Purpose:	Use for register products and QR code Generate.
Main Flow:	<ol style="list-style-type: none">1. Click on Create Profile.2. Put Company Name, Email, Password.3. Now click on Create Account.

Table 3.3.3 Use Case Specification for Company Sign in Function.

Use case Name:	Company Sign In
Pre-Condition:	Create Company Account
Actors:	Company
Purpose:	Sign In in Company Account
Main Flow:	<ol style="list-style-type: none"> 1. Click on Sign In. 2. Put Email, Password. 3. Now Click on Sign In.

Table 3.3.4 Use Case Specification for Product QR Code Generate in Function.

Use case Name:	QR Code Generate
Pre-Condition:	Create Company Account
Actors:	Company
Purpose:	Generate QR Code
Main Flow:	<ol style="list-style-type: none"> 1. Click on Create QR Code 2. Put Company Name, Product Name, Number of Code, Produce Code, Expired Code, Price, Weight with Unit. 3. Now Click on Generate Code for QR code.

Table 3.3.5 Use Case Specification for Scan Product in Function.

Use case Name:	Scan Product
Pre-Condition:	User Registration
Actors:	User
Purpose:	Scan Product for Detect Fake or Real.
Main Flow:	<ol style="list-style-type: none"> 1. Click on Scan Icon 2. Scan Product With The System and Give Result.

3.4 Class Diagram

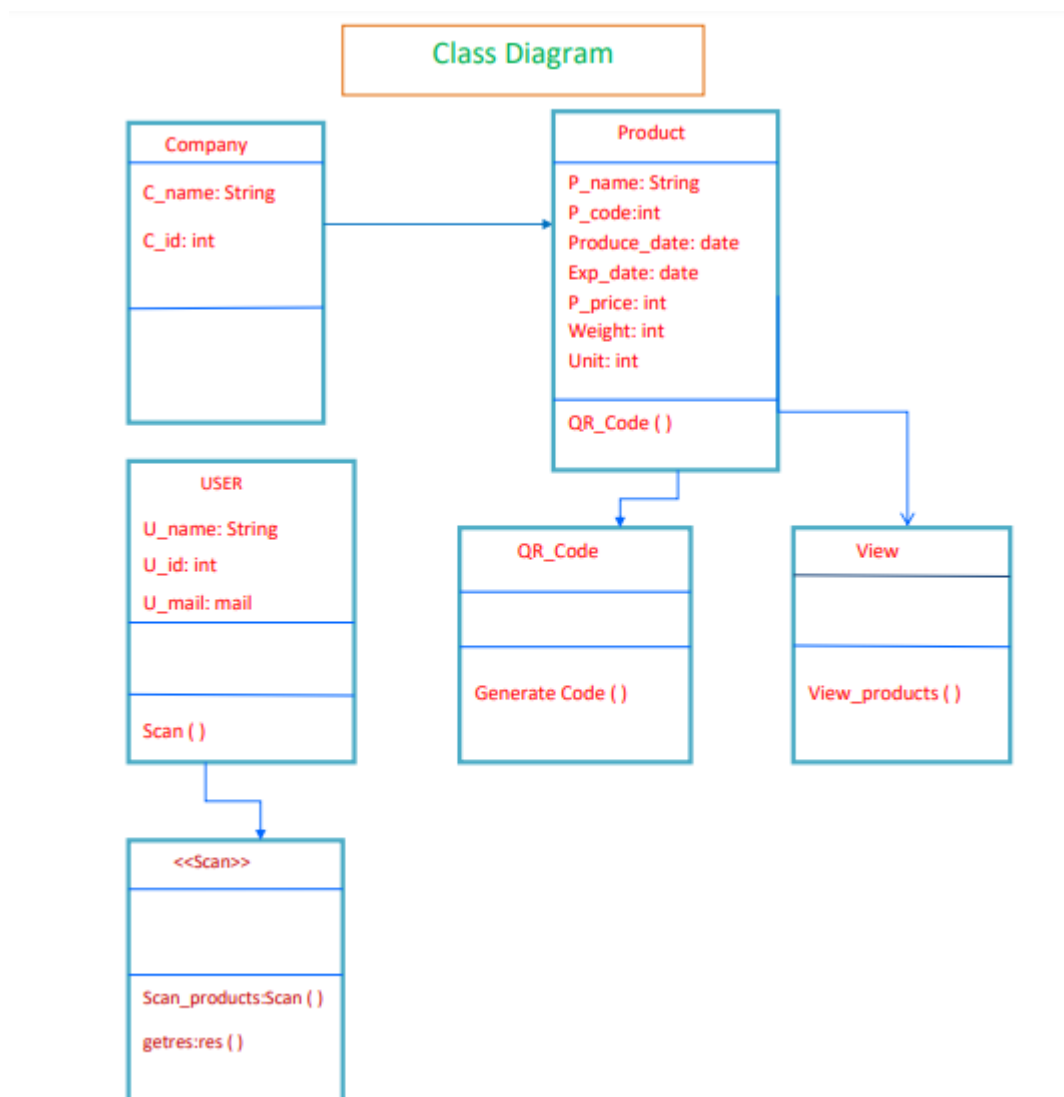


Figure 3.4.1: Class diagram

3.5 Logical Data Model

3.5.1 User's Activity Diagram

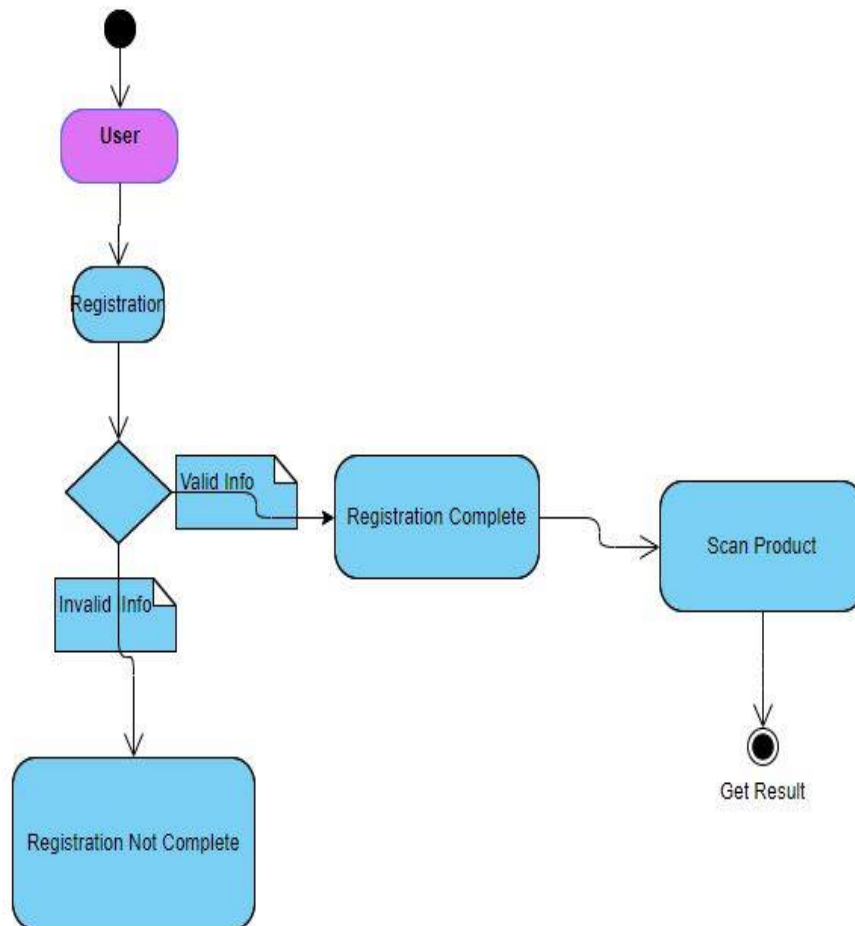


Figure 3.5.1.1: User activity diagram.

3.5.2 Company's Activity Diagram

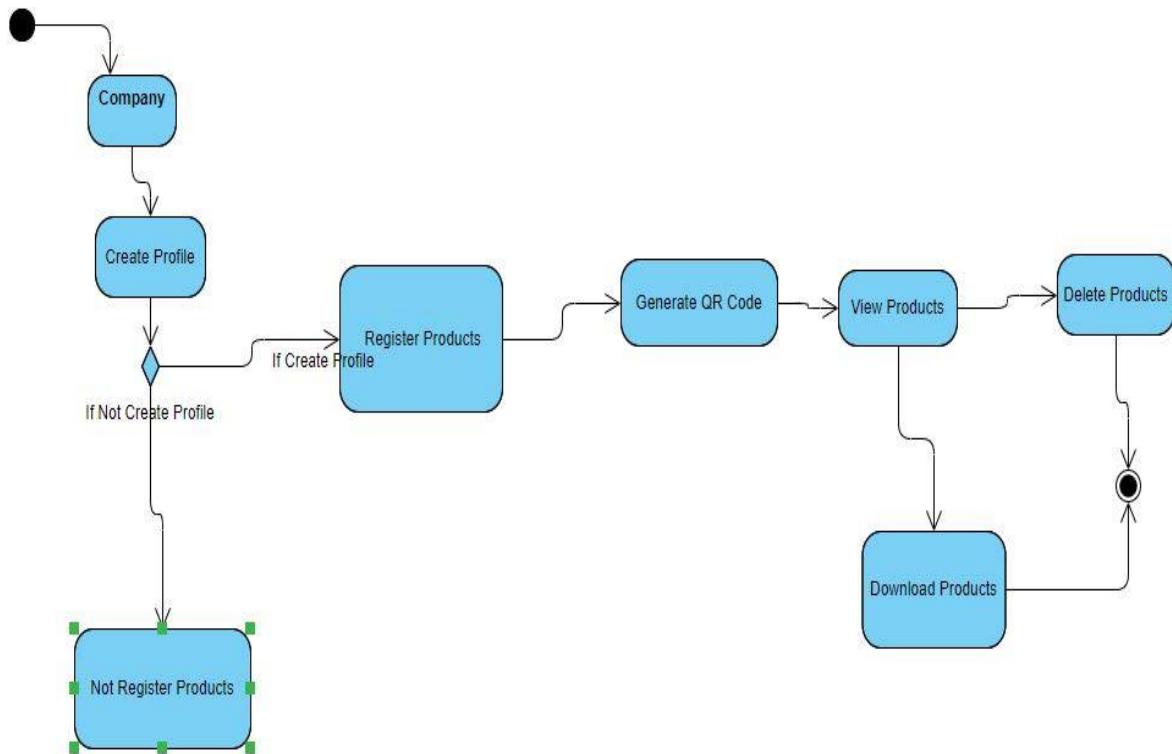


Figure 3.5.2.1: Company activity diagram

3.5.3 System Activity Diagram

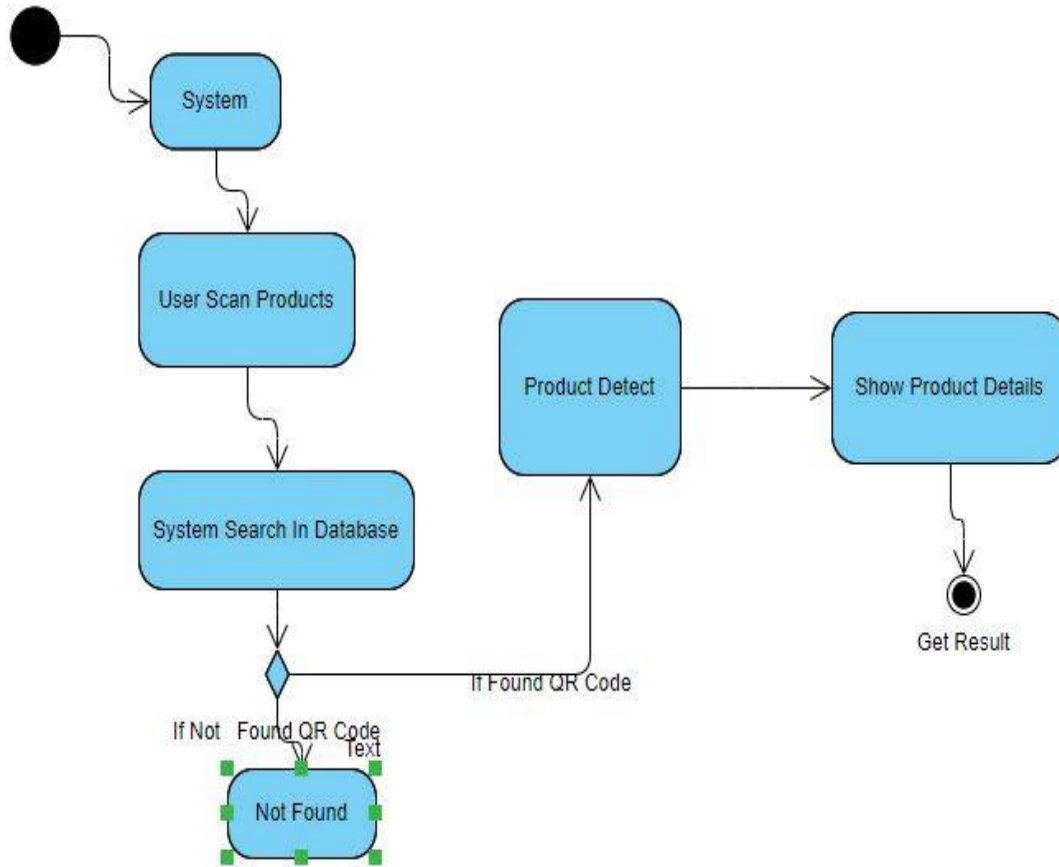


Figure 3.5.3.1: System activity diagram

3.6 Requirement Collection and Analysis

The system development methodology that we are using to develop our system is name as Waterfall model. It's the easiest system development methodology. Waterfall model is a linear sequential model. It's the earliest software development life cycle approach. Actually its first SDLC model to be introduced. Waterfall model is very facile to understand and simple to use.

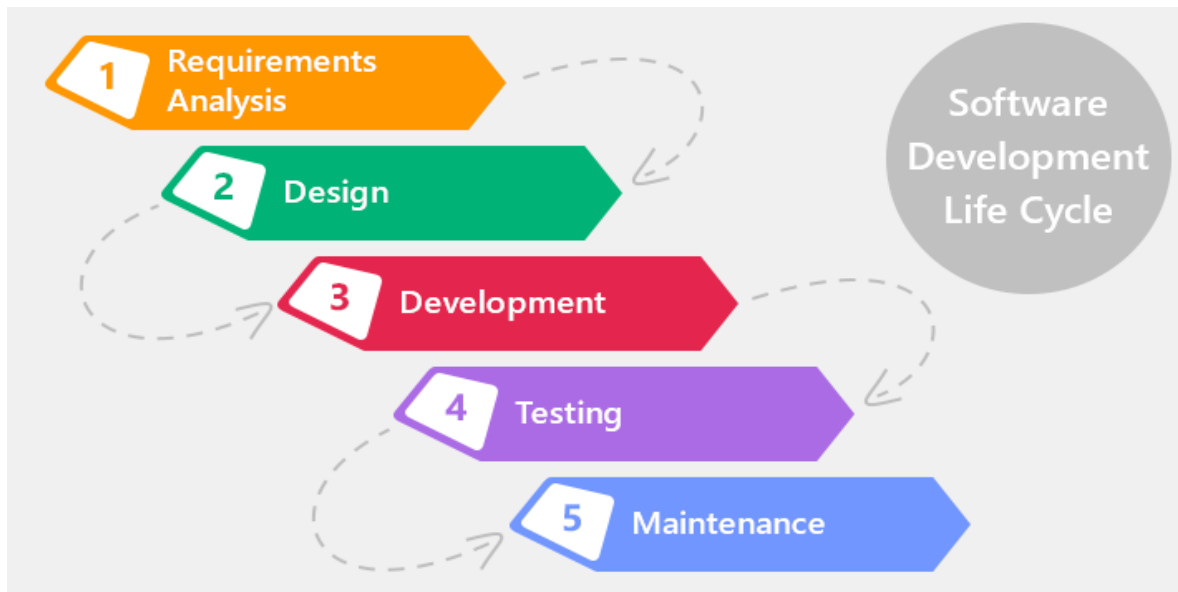


Figure 3.6.1: Waterfall system development methodology.

3.7 Android Design Requirement:

All Android users expect that, the applications to look and behave in a way that's consists with the platform. And it's not only following material design guideline to visualization but also the quality guidelines for security, performance and others [12].

Android basic material designs are-

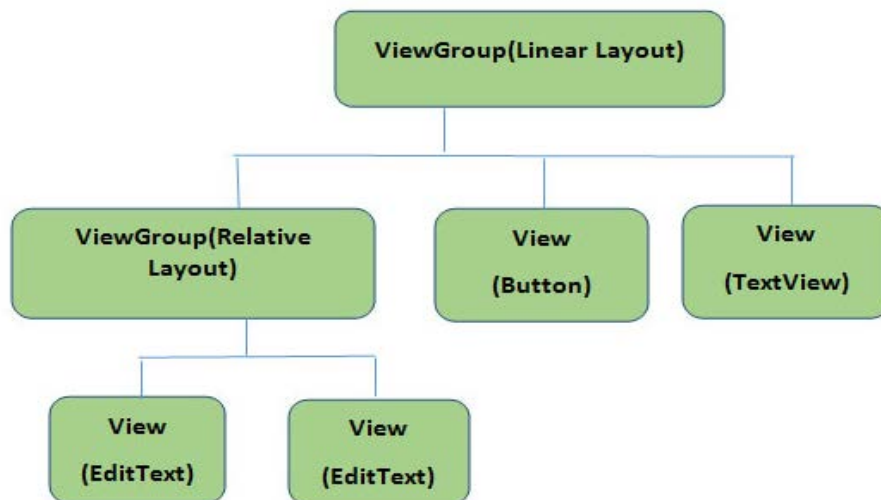
- Layout
- Component
- Style
- Patterns
- Animations
- Usability

Android quality guidelines are-

- Core application quality
- Auto application quality
- Wear OS by Google app quality

3.8 XML Code in Android

XML means Extensible Markup Language. The XML or Extensible Markup Language is a markup language just like as HTML. XML used to describe data. The Xml is well readable for both human and machine. And it is also simple and scalable to develop. We use Extensible Markup Language for designing our layouts in Android cause its lightweight language. So it doesn't build our layout much heavy. By Using the Android's XML vocabulary, we can easily design the screen elements and User Interface (UI) layouts. These comprise, in the same way to generate the web pages in HTML. The basic concept of UI is defined using the hierarchy of View or ViewGroup objects. And each of the layout file must be taken exactly one root element. And its must be a ViewGroup or View object .A ViewGroup is an imperceptible



container that organizes the child views.

Figure 3.8.1: Basic user interface architecture. [15]

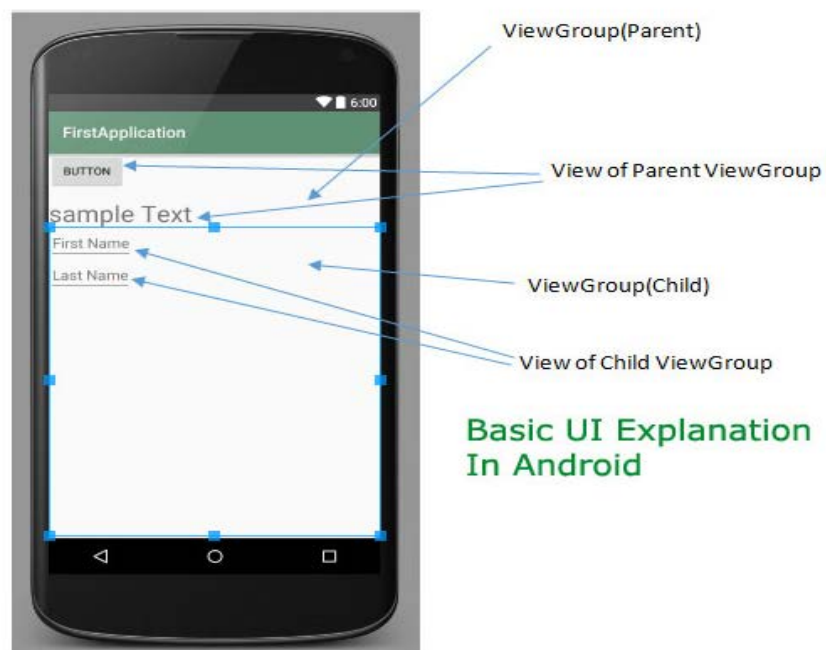


Figure 3.8.2: user interface design in android. [12]

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-end Design

4.1.1 Layout XML Files:

Layout XML file used to identify the actual User interface (UI) of Android application. It contains all the views (elements) or the tools that users want to use in android application just like the Buttons, Text View, Edit Text and other UI elements.

4.1.2 Linear Layout

The Linear layout is a view group which classified all children in vertically, horizontally or a single direction. Actually it means that it can organize views in a single row or in a single column.

```
<Button
    android:layout_width="100dp"
    android:layout_height="wrap_content"
    android:layout_gravity="right"
    android:text="@string/send" />
</LinearLayout>
```

4.1.3 Relative Layout

In Android, Relative Layout is a view group which shows all child views in the relative positions. Its enable to specify how child views are displayed into relative to each other positions. The position of view can be marked as relative to the parent or sibling elements.

```
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:paddingLeft="16dp"
    android:paddingRight="16dp" >

    <EditText
        android:id="@+id/name"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:hint="@string/reminder" />

    <LinearLayout
        android:orientation="vertical"
        android:layout_width="fill_parent"
        android:layout_height="fill_parent"
        android:layout_alignParentStart="true"
        android:layout_below="@+id/name">
```

4.1.4 Edit Text

Edit text is a user interface element that using for entering and modifying text. In Android, it's is a standard entry widget in application. Edit text is an overlay over TextView and its configure itself to editable. Its text editing operations. And it's a subclass of TextView.

```
<EditText
    android:id="@+id/edittext"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:layout_alignLeft="@+id/button"
    android:layout_below="@+id/textView1"
    android:layout_marginTop="61dp"
    android:ems="10"
    android:text="@string/enter_text" android:inputType="text" />
```

4.1.5 Button

In Android Button illustrates as a push-button. Button is a user interface element the user can tap or click to perform an action.

```
<Button
    android:id="@+id/button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/editText2"
    android:layout_centerHorizontal="true"
    android:layout_marginTop="109dp"
    android:text="ADD"
    tools:layout_editor_absoluteX="148dp"
    tools:layout_editor_absoluteY="266dp" />
```

4.1.6 Android Grid system

A grid is apparently conferred in the design, and the details of the grid are described all types of technical specification like positions, icons, width, number of columns etc. The android application designer keeps the grid in a transparent layer. And he/she can use it on all his projects.

4.1.7 Android Grid Layout

GridLayout

```
public class GridLayout
    extends ViewGroup

    java.lang.Object
    ↳ android.view.View
      ↳ android.view.ViewGroup
        ↳ android.widget.GridLayout
```

Figure 4.1.7.1: basic Android grid layout [13]

4.1.8 Colors



Basically the ‘Color’ class in android provide all methods for producing, manipulating and converting colors. This color class is works with android color system. In android Colors have three different types of representation- [14]

- Color ints. it’s the most common presentation system
- Color longs
- Color instances

4.2 Back-end Design

4.2.1 ER Diagram

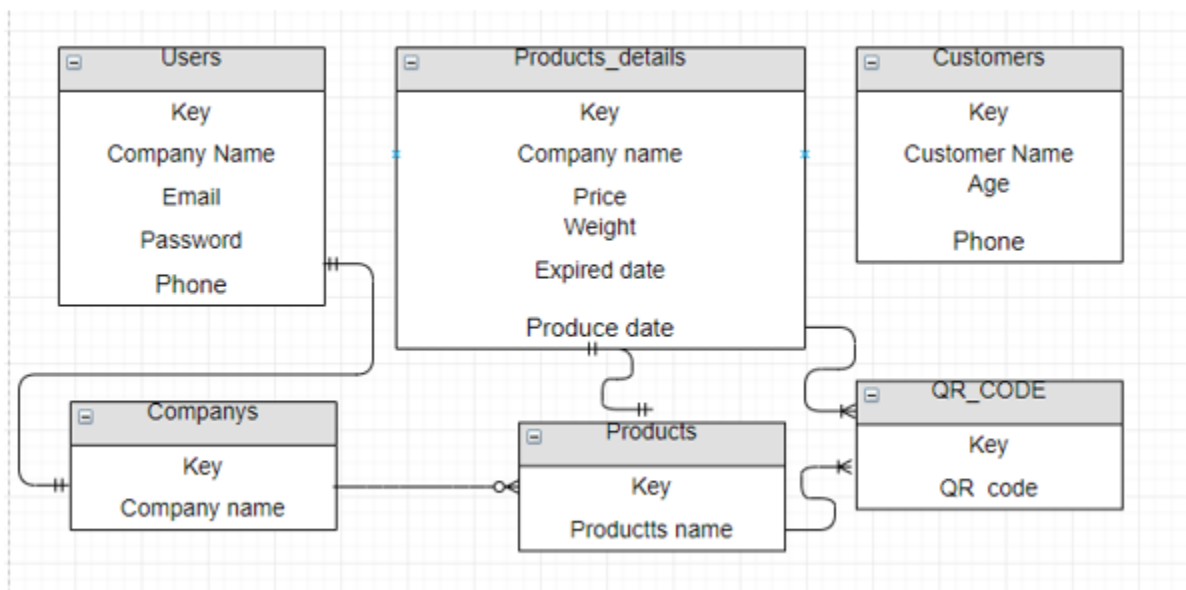


Figure 4.2.1.1: ER diagram.

4.3 Android Implementation Requirements

4.3.1 Java Development Kit (JDK)

Oracle released The Java Development Kit (JDK). It is implemented for either one of the Java Standard Edition (Java SE), Java Platform Micro Edition (Java ME), and Java Platform, Enterprise Edition (JAVA EE) platforms builder by Oracle Corporation. [17] Since the introduction of the Java platform, it has been by far the most widely used SDK (Software Development Kit). The Java Development Kit comprises a special Java virtual machine also other resources to finish the recipe to a Java Application.

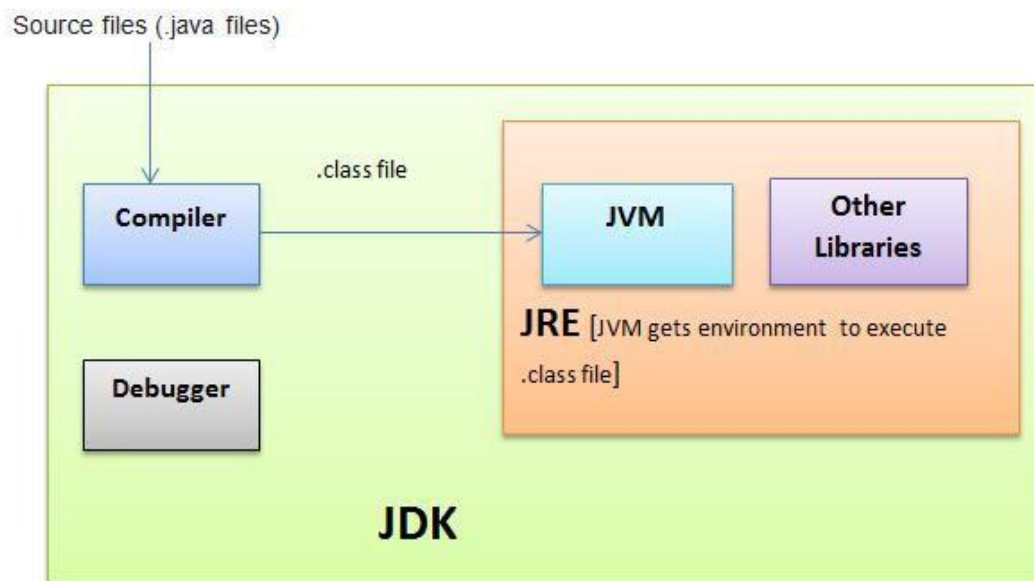


Figure 4.3.1.1: Android compilation system [18].

4.3.2 IDE

IDE define as Integrated Development Environment. In Android IDE refers Eclipse Android studio, Microsoft Visual Studio and NetBeans). The IDE is the set of programming tools for implementing or executing all applications like as compiler source code editor, testing, debugger, etc. And all of this activated from a similar menus and common user interface. The Integrated Development Environments are standard procedure for developing and executing programs.

4.3.3 Software Development Kit (SDK)

The Android (SDK) includes an extensive set of development tools. These include a handset emulator based on QEMU, a debugger, libraries, a complete documentation, tutorials and sample code. Now in shortly supported development platforms are including computers running in Mac OS X 10.5.8 or later version, Linux any kinds of modern desktop in Linux distribution, Windows XP or later. The Software Development Kit is not obtainable on Android itself as of March 2015. But software development is probable by applying in specialized Android applications.

4.3.4 Virtual Emulator

The Virtual Emulator is usingfor Debugging. Android SDK comprehend a mobile device emulator its means a virtual mobile device that executes on our computer. The emulator lets us test and develop Android applications without any physical device.

CHAPTER 5 IMPLEMENTATION AND TESTING

5.1 Implementation of Database

We are creating database with JSON. JSON means JavaScript object Notation. The JSON is an independent data exchanging format. JSON is the best alternative for XML. So we work with JSON file and extract necessary information into it. Now JSON is popular method for file storing system because we can use JSON data in various environment like Web application to mobile application or mobile application to Web application. In android provides four types of classes to manipulate JSON data.



Figure 5.1.1: Retrieve data from server using JSON

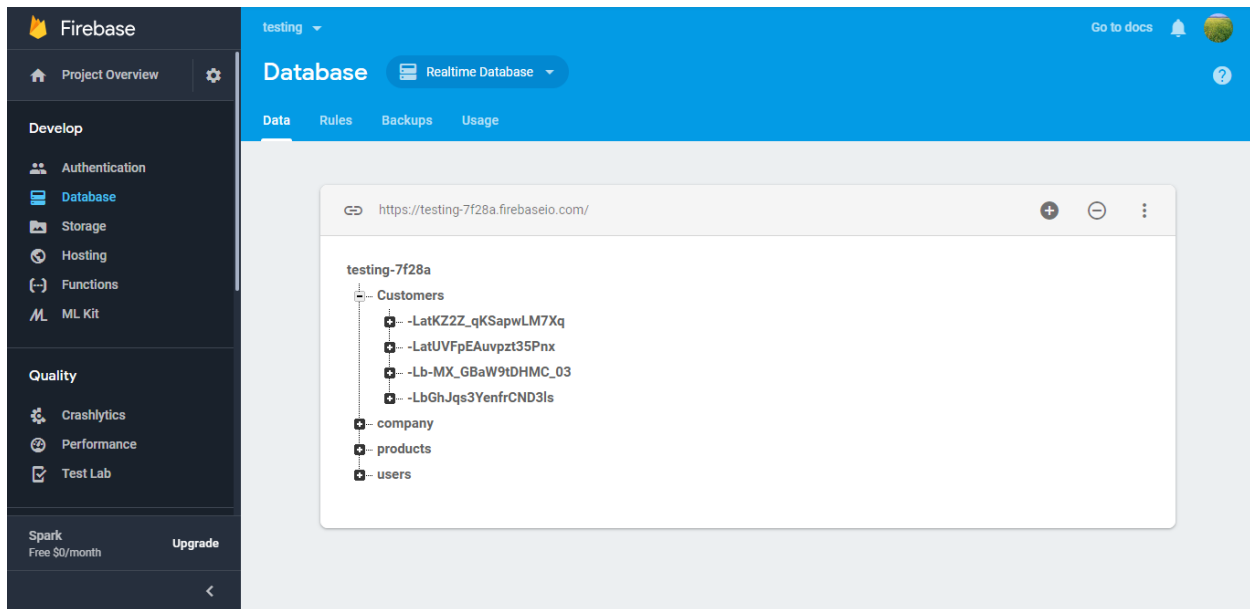


Figure 5.1.2: Database implementation in firebase

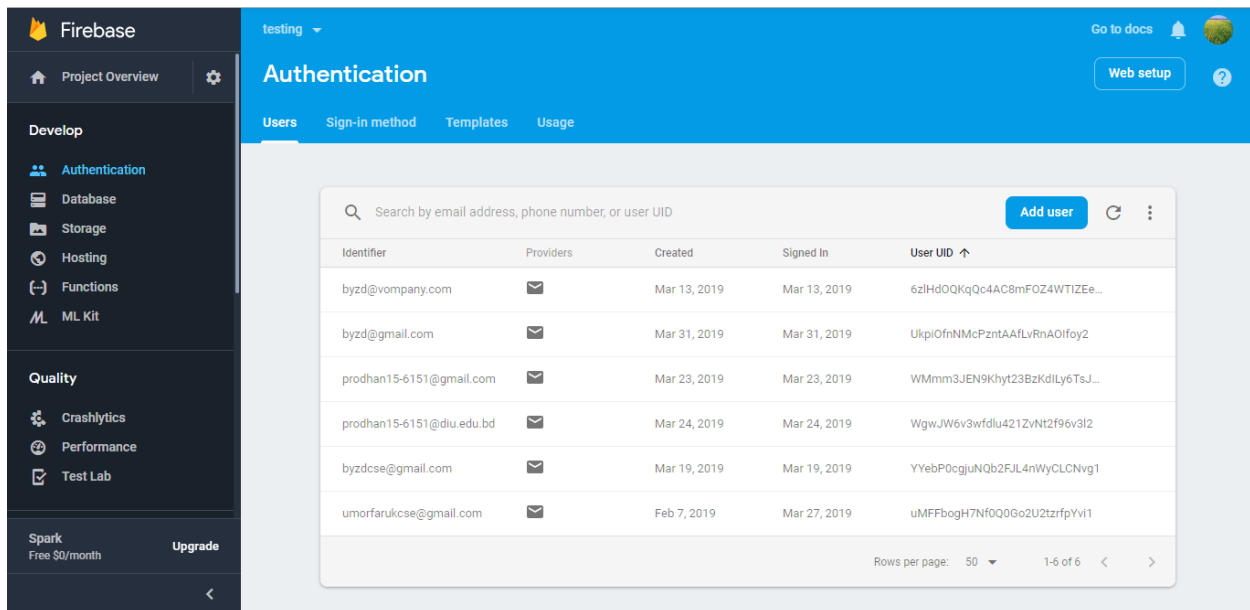
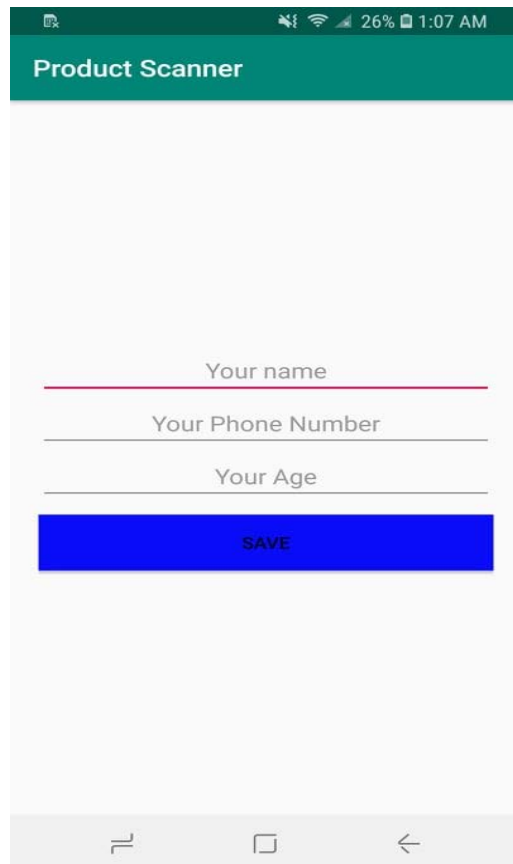


Figure 5.1.3: Data storing with firebase

5.2 Implementation of Front-end Design

5.2.1 User Registration UI

This interface is designing for user registration. Where a user can register with his/her Name, Phone Number, Age. When a user downloads this application then a user gets this user interface first.



The image shows a mobile application interface for user registration. At the top, there is a green header with the text "Product Scanner". Below the header, there are three input fields, each with a horizontal line underneath. The first field is labeled "Your name", the second is labeled "Your Phone Number", and the third is labeled "Your Age". Below these fields is a blue button with the text "SAVE" in white. At the bottom of the screen, there is a grey navigation bar with three icons: a home icon, a square icon, and a back arrow. The status bar at the top of the phone shows the time as 1:07 AM, 26% battery, and signal strength.

Figure 5.2.1.1 User registration UI

5.2.2 User Scanning UI

After the registration user will get this user interface. And user have to click the camera icon's button to scan a QR code. And in the top right side there have a menu bar for company.

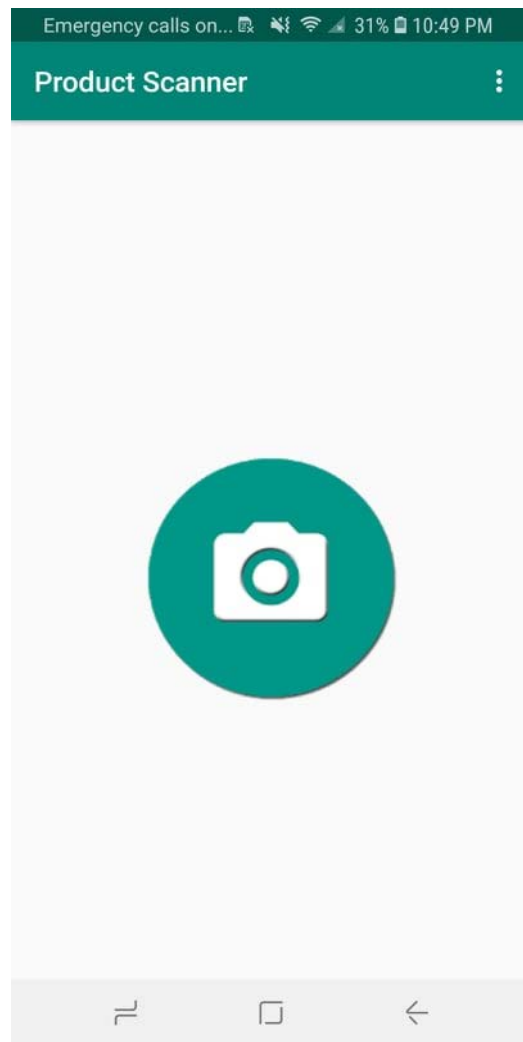


Figure 5.2.2.1 User Scanning UI

5.2.3 Scanning QR Code UI

When a user clicks on the button then open the camera to scan a QR code.

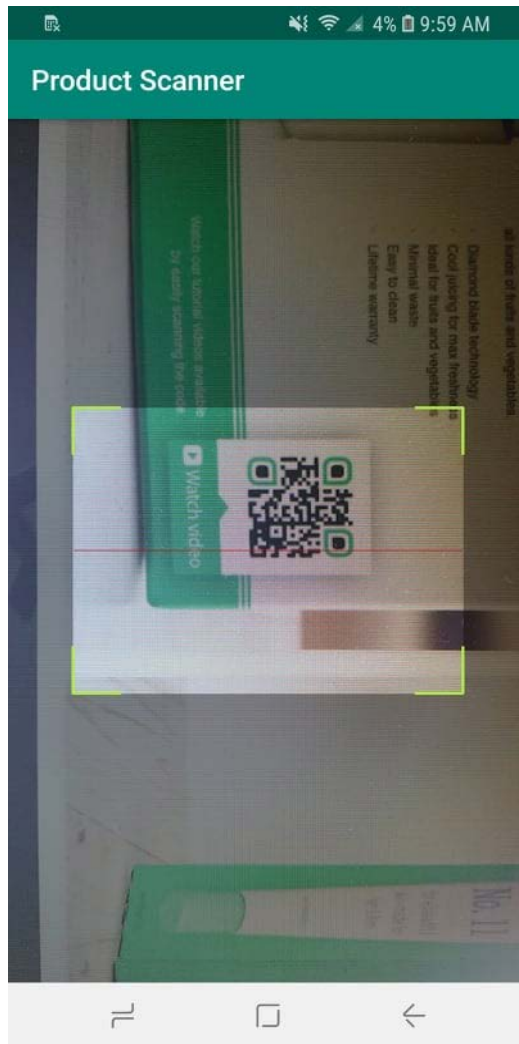


Figure5.2.3.1: Scanning QR code UI.

5.2.4 Fake Product's Scanning UI.

If the product is not genuine, it means the QR code not store in our database. Then it presents its an anonymous product.



Figure 5.2.4.1: fake product's scanning UI.

5.2.5 Original Product's Scanning UI

If the product is genuine then it presents all information of products like company name, product name, unit, price, production date, expire date etc.

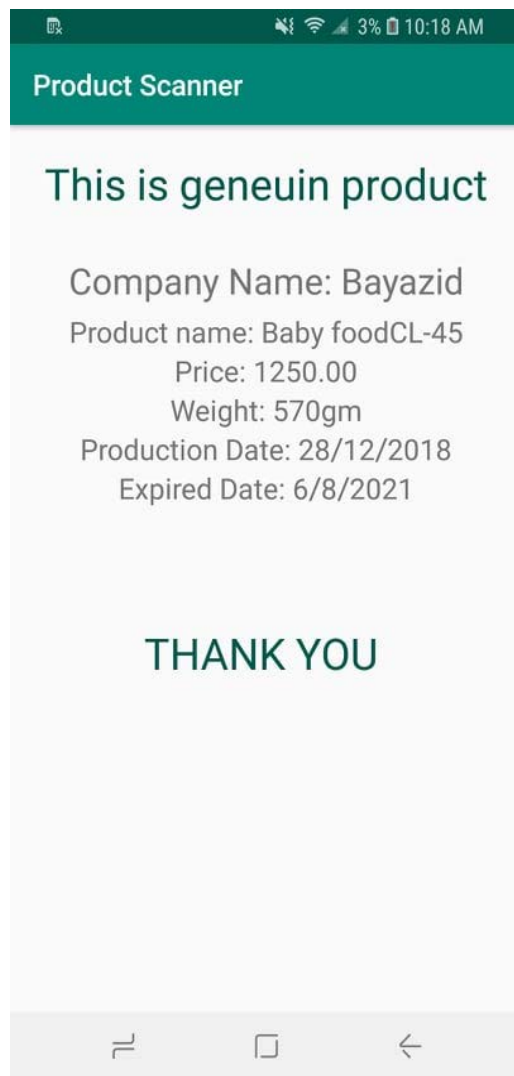


Figure 5.2.5.1: Original product's scanning UI

5.2.6 Company Section

Firstly, a company or organization has to create a profile through the company name, Email and password.

After the registration company has to login with the system and can create the QR code through product name, price, weight, production date, expire date and number of code needed. And company can also view or download code.

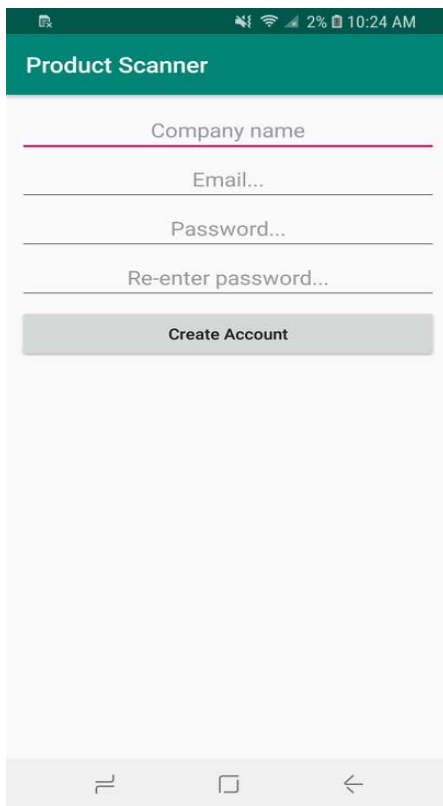


Figure 5.2.6.1: Company registration UI

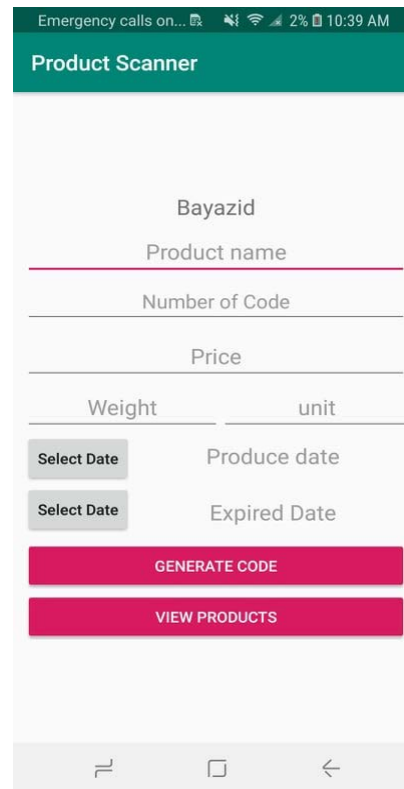


Figure 5.2.6.2: Code generator UI

5.2.7 Company Profile

Company can view its profile and delete or download the QR codes.

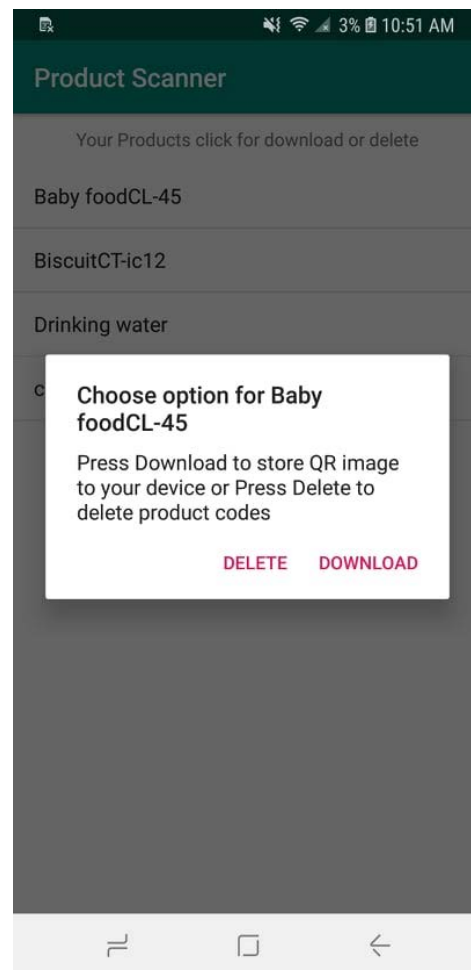
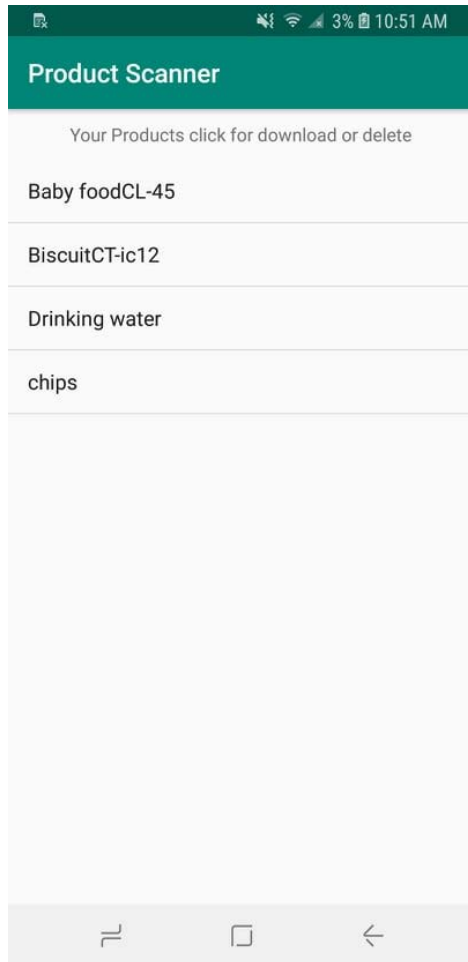



Figure 5.2.7.1: Company profiling UI Figure 5.2.7.2: Company code managing UI

5.3 Android Application Testing and Debugging

Debugging: Android Debugging is the process of identifying and eliminating of existing and influential errors. This types of error also called as 'bugs' in a software or application code. These bugs can cause it to operate unexpectedly or destroy in an application. To prevent incorrect or unexpected operation of an application or system, debugging is used to identify and solve the bugs or defects

5.3.1 ApplicationRunning in Debug Mode

Debugging stat to click on the  Debug button in the toolbar. The Android Studio develops an APK and signs it with a debugging key. And its install on the selected device (as a developer wish). Then it runs and opens the Debug pane with the Debugger and Console tabs. [16]

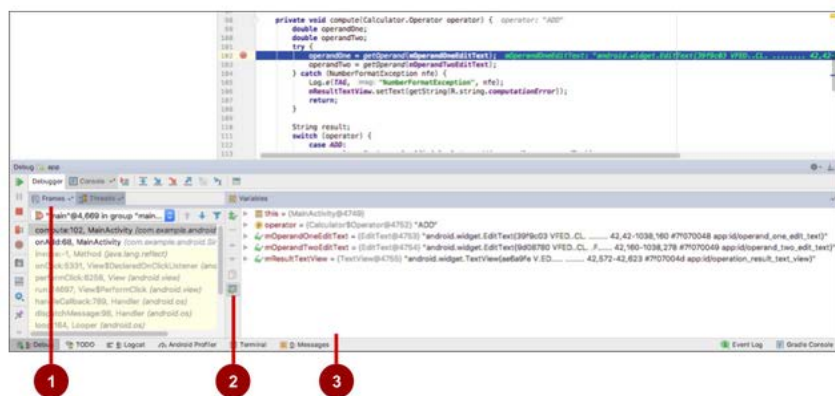


Figure 5.3.1.1: Application running with debugging mode

1. Frame tab: Frames tabs click to show with the current execution stack frames for an exact given thread. The execution stack presents each of the class and method that have been called in application and in the Android runtime.
2. Watch button: The Watches Button Click to show the Variables pane, which presents the values for any variable watches watch have to set. Watches allow to keep track of a specific variable in application program, and presents how the variable changes as application runs.
3. Variables: the variable pane presents the variables in running scope and their values into it.

5.3.2 Debugging by Using Breakpoints

In android breakpoint is a specific place where a user wants to pause the normal execution of their application. And to execute the other actions such as working with variables or examining the expressions, or running the application's code line by line to identify the exact reason for runtime errors. [16]

Adding the breakpoint into an application use these steps:

1. Allocate the exact line of code where to pause execution.
2. Then use the command Run > Toggle Line Breakpoint or Control-F8 to set a breakpoint at a line.

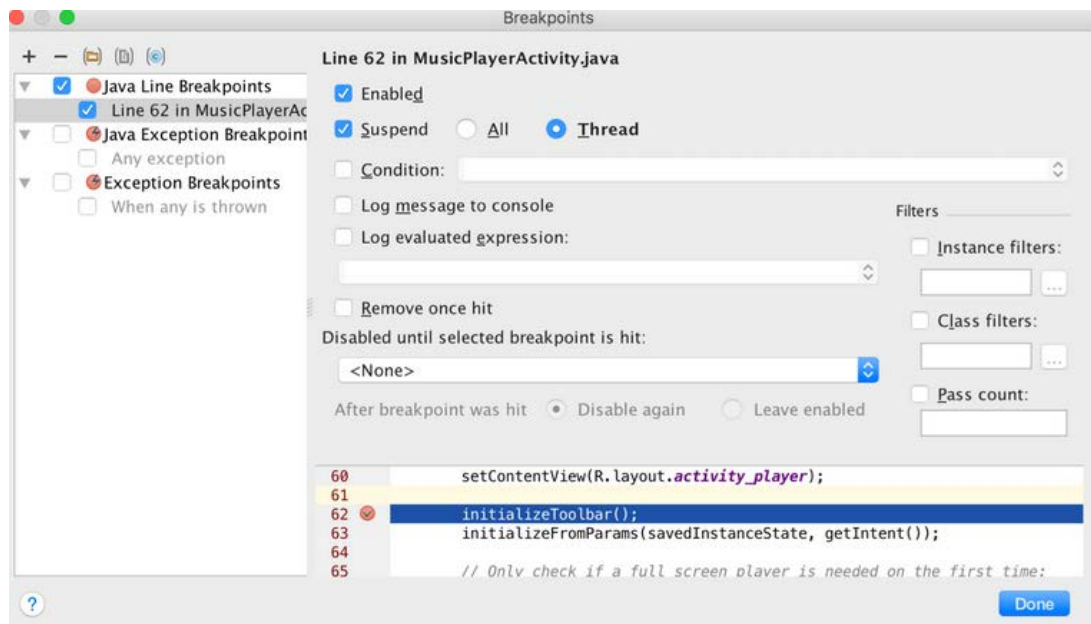


Figure 5.3.2.1: Application Debugging by using Breakpoints

5.4 Test Case

Test Case ID:

Test Priority: Medium.

Module Name: Scan product verify.

Test Title: Register product and scan product for verify.

Test Execution Date: 03-31-19

Pre-Condition: User registration and company product register mandatory.

Step	Test Steps	Test Data	Expected Result	Actual Result	Status (Pass/Fail)
1	User navigate to scan dashboard.	Navigate dashboard	User should be able to navigate	User is navigated to dashboard	pass
2	Click for scan product	Scan product	User should be able to scan product	User scan product successfully	pass
3	Create Company Profile	Email:rr@gmail.com Pass:1234 Company Name:RRR	Should be create profile	Profile create successfully	pass
4	Product Register	Product all info provide	Should be register product	Product register successfully	Pass
5	QR code generate	Click QR code generator	Should be generate QR code	QR code generate successfully	Pass
6	Product delete/download	Click for Product delete/download	Should be Product delete/download	Product delete/download successfully	Pass

Figure 5.4.1 Test case design and description

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Conclusion

We have finished our studies in Computer science and engineering at Daffodil International University. And we completed a project also with the aim to improve our technical skills and abilities in Information technology, computer science, mobile application and also Programming languages. We think our application will help to identify the genuine daily uses products. In this application we are trying to change the typical authentication system of products. Actually we do not plant anything into this realization and we applaud all those who have assumed such a thing enforceable.

6.2 Limitations of Project

- To run this application, the device must have to connect with Internet
- The application can't work below API 16.
- It's quite difficult and costly to paste unique QR code to every packet.

6.3 Future Work

- Using unique authentication number.
- Attach SMS service verification.
- Use these feature into a web application.
- Use a feature to collect consumer rating and review.
- Consumers review and rating analysis.
- Add some advance feature for companies to market analysis.
- Easily implementation of status update.

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