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BCA 606:- PRACTICAL ON ANDROID APPLICATION DEVELOPMENT

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1.Installation and setup of Java Development Kit (JDK), setup Android SDK, setup Eclipse IDE, setup Android Development Tools (ADT) plugins & create android virtual device.

A] JDK installation and setup:

Step 1: Visit the Official Website: Go to the **Official JDK website** to download the file:
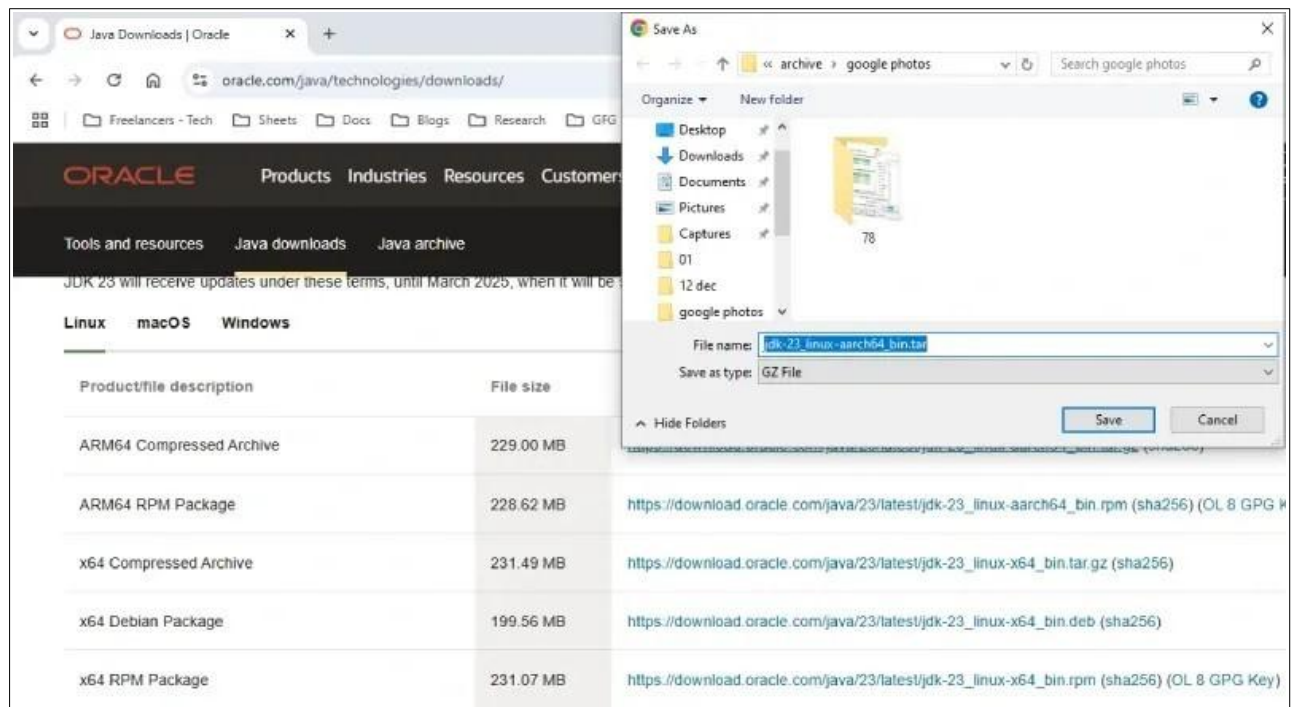

Step 2: Select the Appropriate Version: As of 2025, the latest stable versions are **JDK 23** (SE) and **JDK 21** (LTS). Select the compatible version as per your operating system (Windows, Mac or Linux):
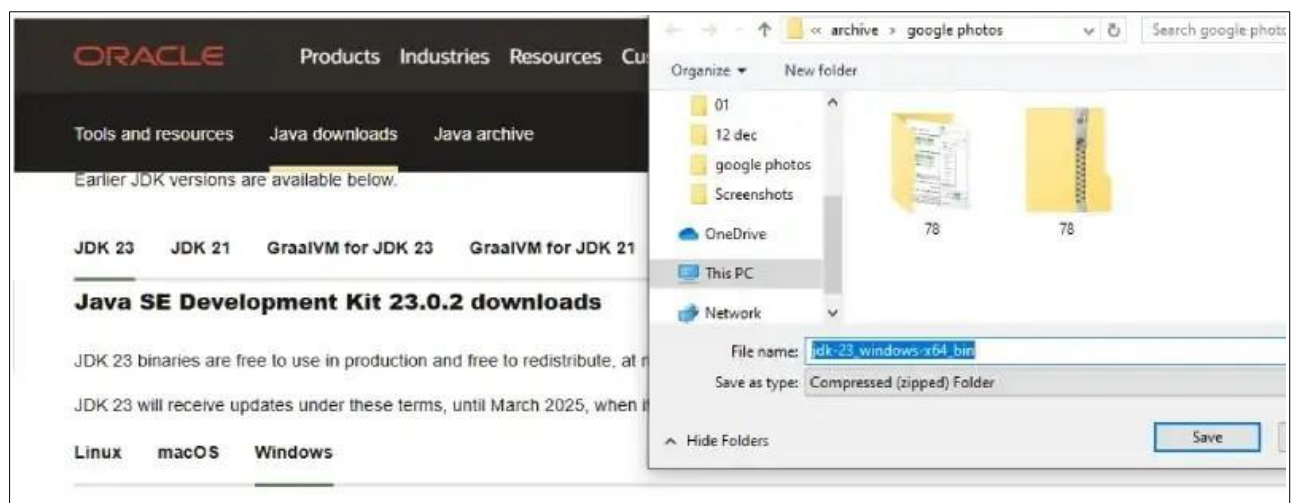

Step 3: License & Agreement: Go through all the License and Agreement before downloading (from Oracle website), it will not ask if you'll download it from OpenJDK website.

Step 4: Run the Java Development Kit (JDK) Installer: Locate the downloaded .exe file (e.g. jdk-23-windows-x64_bin.exe) and make the double click to begin the Installation process. Follow the installation wizard prompts to complete the installation process:
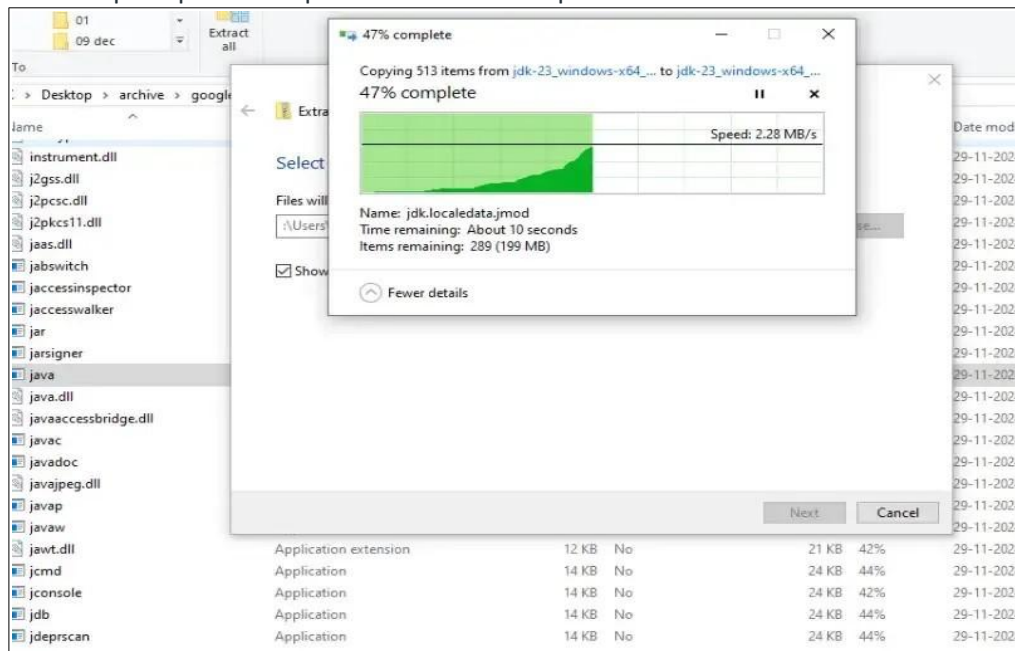
Step 5: Setup the Environment Variables: Once the installation gets completed, you need to configure environment variables to notify the system about the directory in which the JDK files are located. Proceed to C:\Program Files\Java\jdk-{YOUR_JDK_VERSION} \bin (replace {-} with your JDK version):
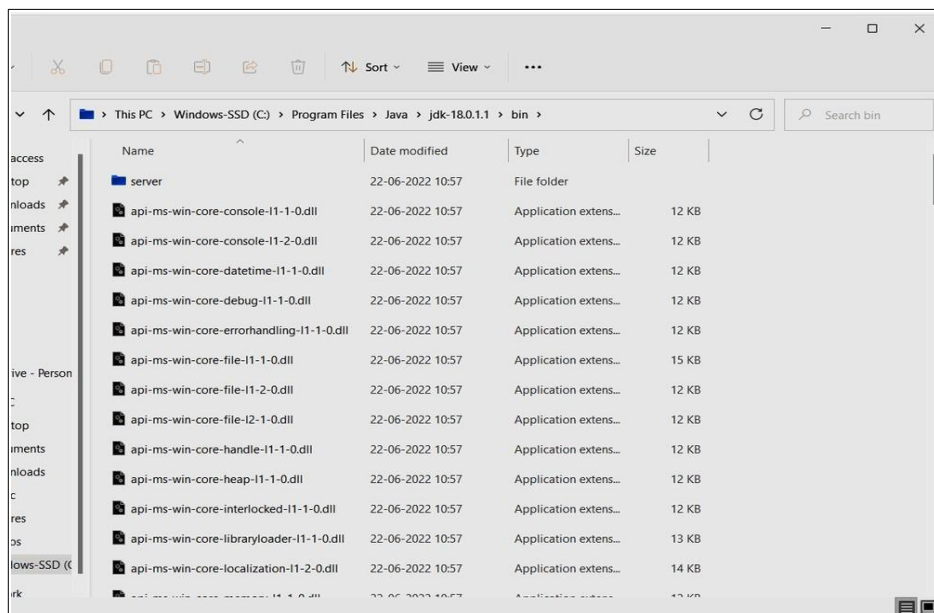
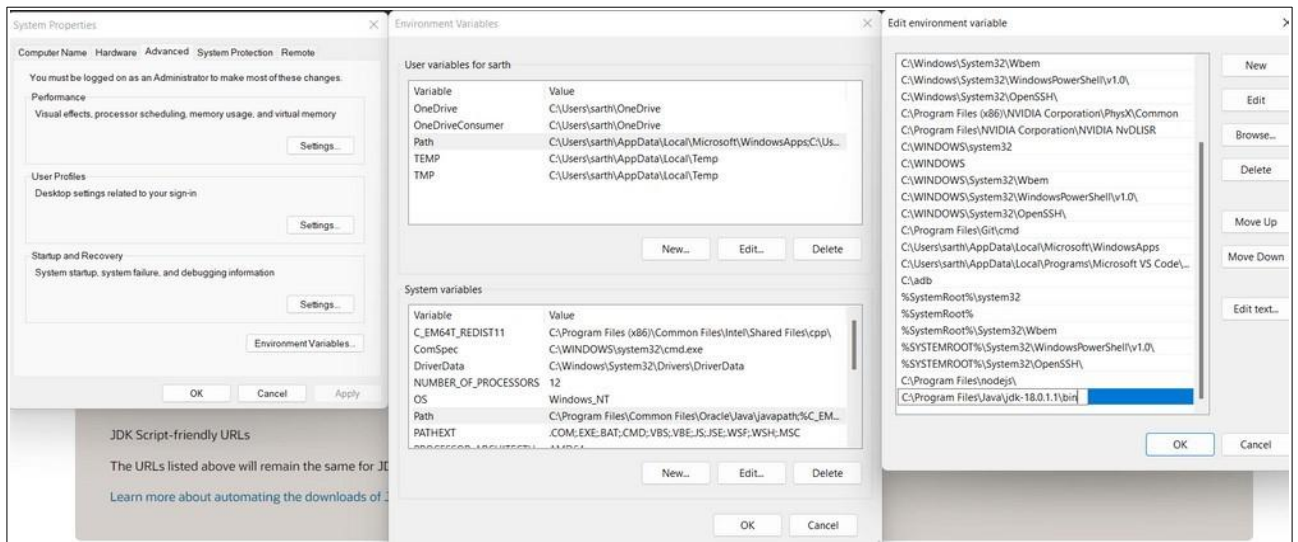Step 5.1: To set the Environment Variables, you need to search Environment Variables in the Taskbar and click on "Edit the system environment variables":
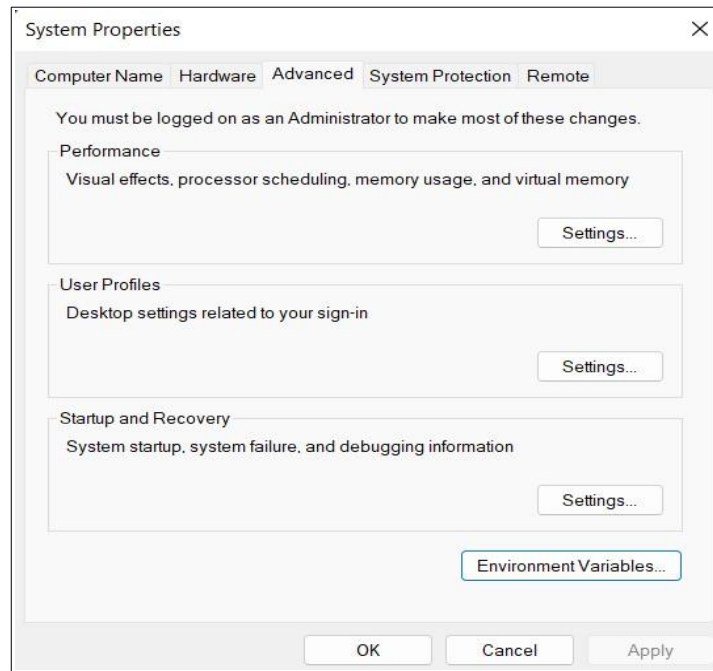
Step 5.2: Under the Advanced section, Click on "Environment Variables".:
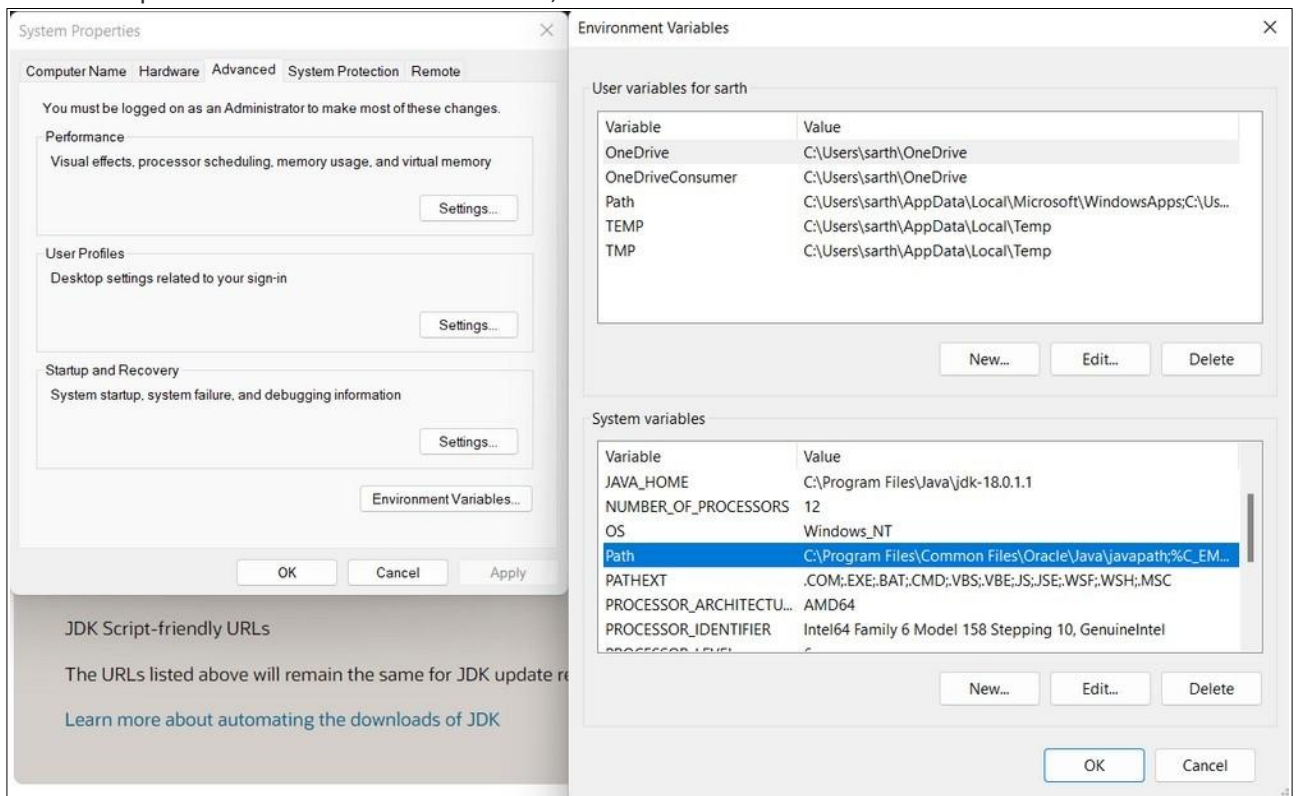
Step 5.3: Under System variables, select the "Path" variable and click on "Edit". Click on "New" then paste the Path Address i.e. C:\Program Files\Java\jdk{YOUR_JDK_VERSION}\bin. Click on "OK":

Step 5.4: Now, in the Environment Variables dialogue, under System variables, click on "New" and then under Variable name: JAVA_HOME and Variable value: paste address i.e. *C:\Program Files\Java\jdk-{YOUR_JDK_VERSION}.* Click on OK => OK => OK:
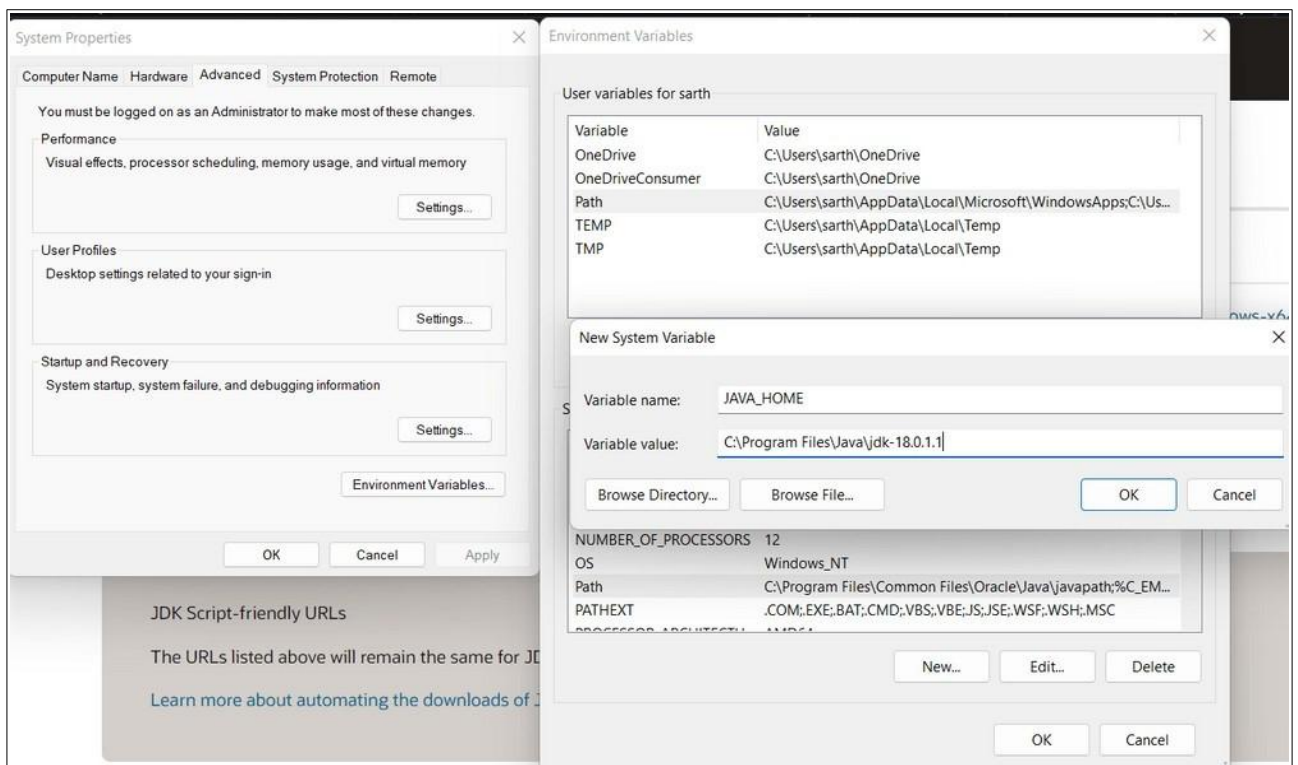
Step 3: Check the Java Version: *Open Command Prompt and enter the following commands:*

java -version
javac -version

```
Command Prompt
Microsoft Windows [Version 10.0.22000.675]
(c) Microsoft Corporation. All rights reserved.

C:\Users\sarth>java -version
java version "18.0.1.1" 2022-04-22
Java(TM) SE Runtime Environment (build 18.0.1.1+2-6)
Java HotSpot(TM) 64-Bit Server VM (build 18.0.1.1+2-6, mixed mode, sharing)

C:\Users\sarth>javac -version
javac 18.0.1.1

C:\Users\sarth>
```
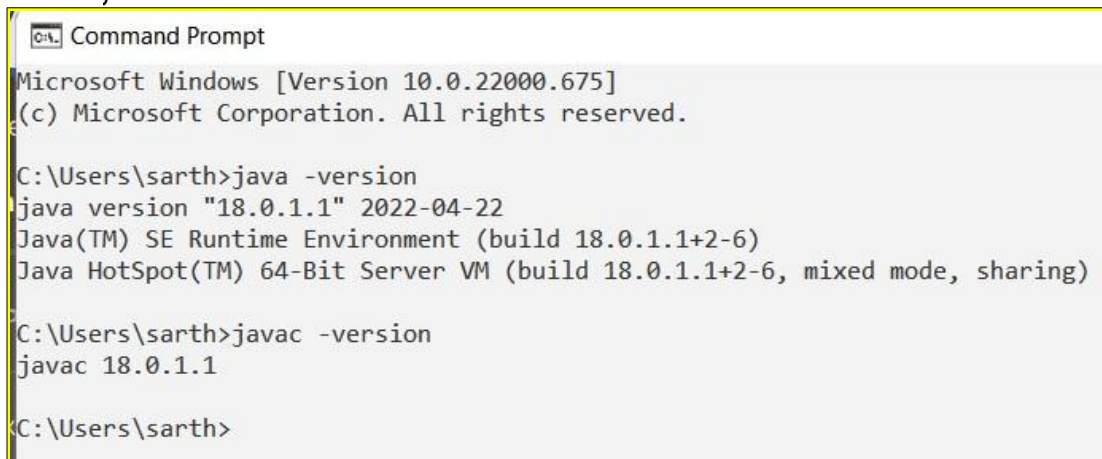
B] Setup Android SDK:

1. Android SDK now comes built in with Android's official IDE called "Android Studio".
2. Download Android Studio from here.
3. After downloading the setup for your respective OS, run the installer and the wizard will guide you through the installation steps.
4. You can now run the IDE to create Android apps.

C] Install Eclipse IDE:

1. To install Eclipse IDE, click on Download Eclipse

2. Download JDK (Java Development Kit) and Android Studio as well.

3. In File Explorer, go to Downloads – "Eclipse IDE" will be downloaded.

4. Open Eclipse IDE, choose Eclipse IDE for Java Developers and Install.

5. Eclipse IDE environment is ready, now it's time to set up Android Development.

D] Setup Android Development Tools (ADT):

Step 1: Open Eclipse IDE.

Step 2: Select Help, Click on "Install New Software":
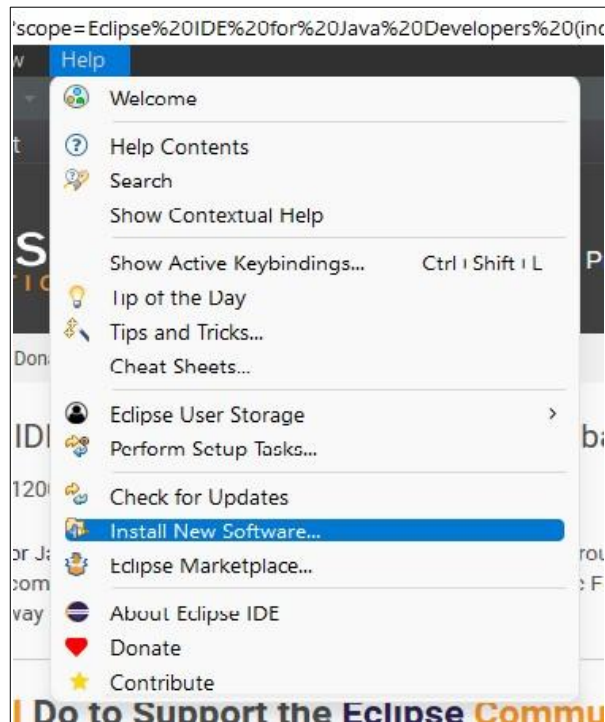
Step 3: Type "**https://dl-ssl.google.com/android/eclipse/**" in the "Work With" section and click on Add. Further, a new Dialog box will appear, type Name – ADT Repository and Click on Add:
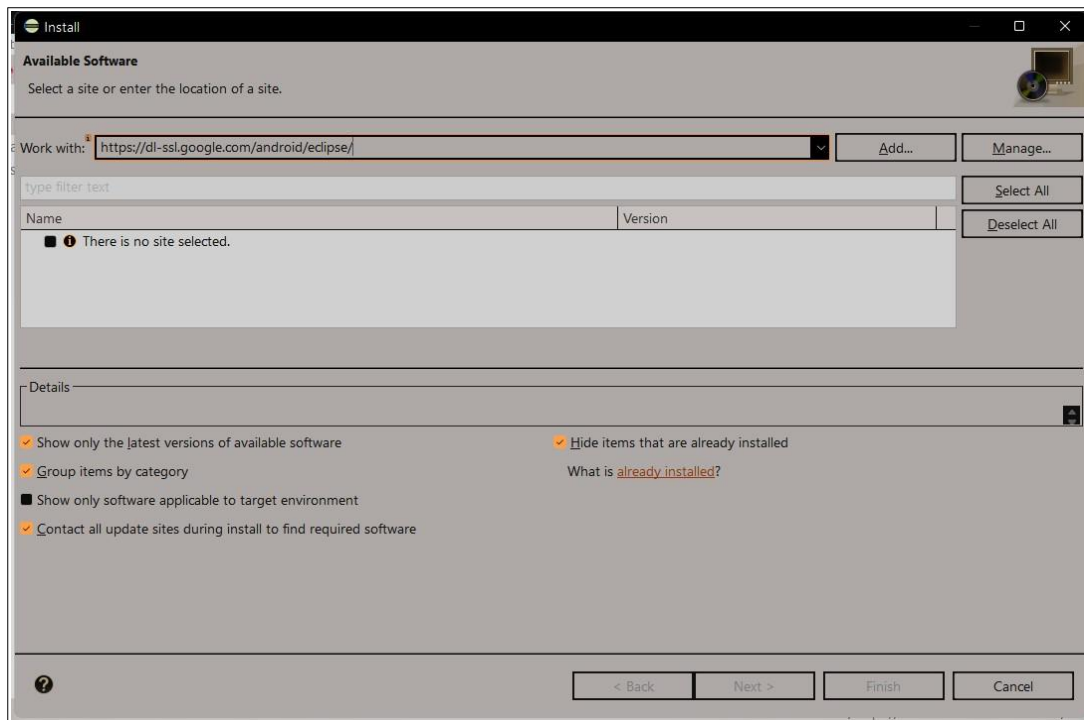
Step 4: You can see Developer Tools under Name – tick the box, then click Next. A dialog box will appear, click on Next and then click on Finish. After that, Installation will begin:
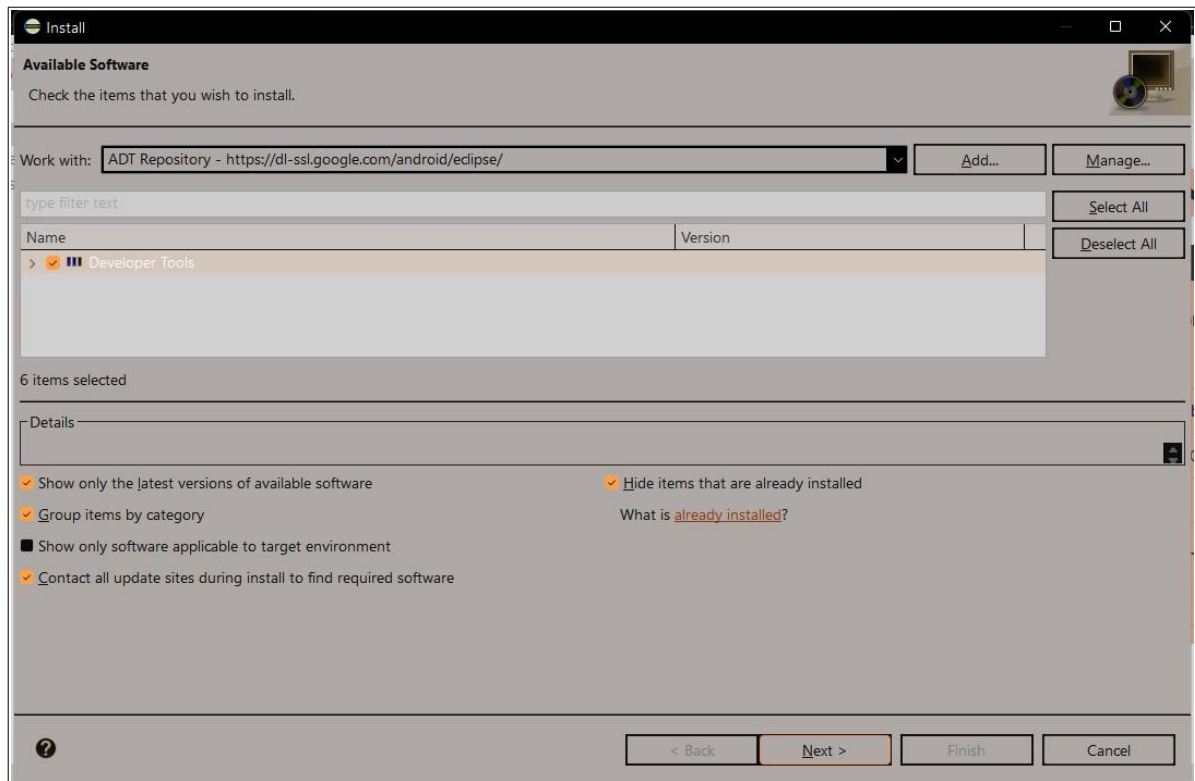
The installation will take some time:
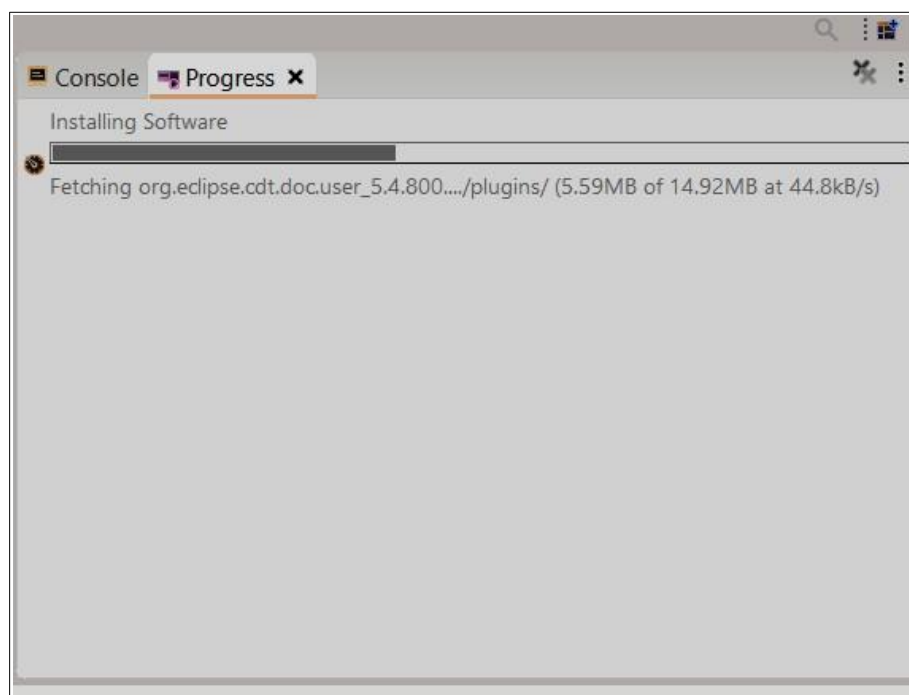
Step 5: After the installation is completed, Eclipse will be restarted. After the restart, a dialog box will appear for setting up the Preferences. Click on Open Preferences then Click on Proceed. If the dialog box does not appear then go to Eclipse -> Window -> Preferences:
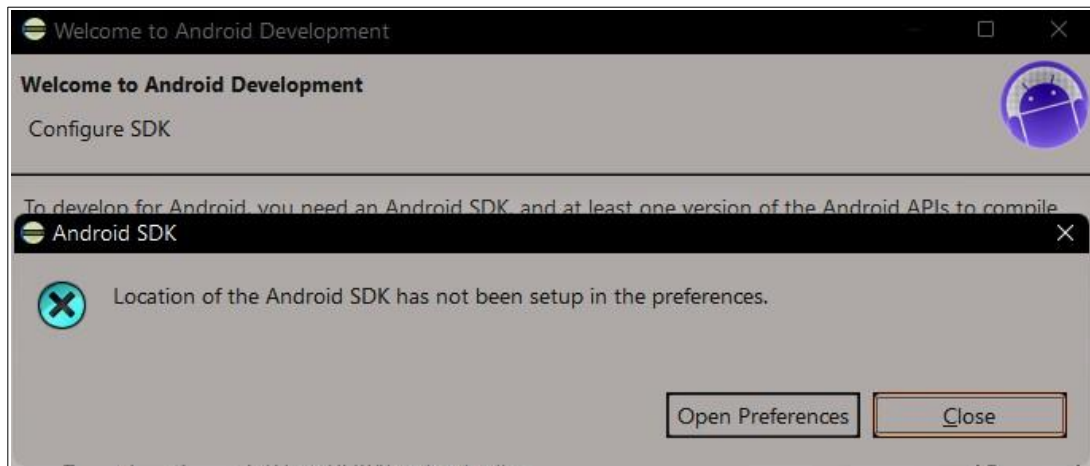
Step 6: Browse the SDK Location of Android (C:\Program Files\Android\androidsdk) and Click Apply:

Note: SDK Path is also present in Android Studio -> Tools -> SDK Manager -> Copy the Android SDK Location path and paste it here:
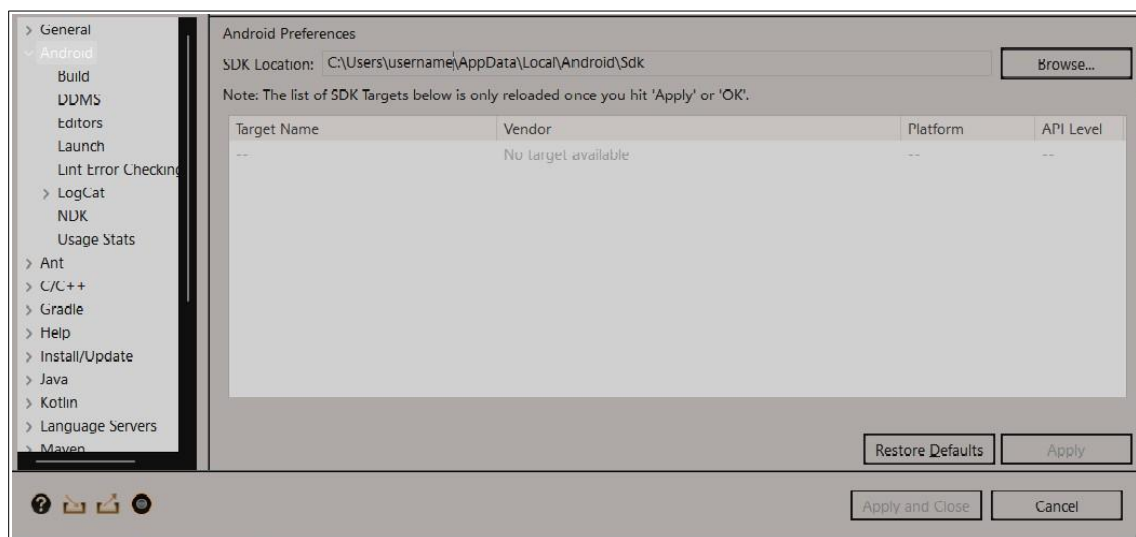
Step 7: Click on Install new SDK then Next. Another dialog box will appear, Accept all three packages and Click on Install:
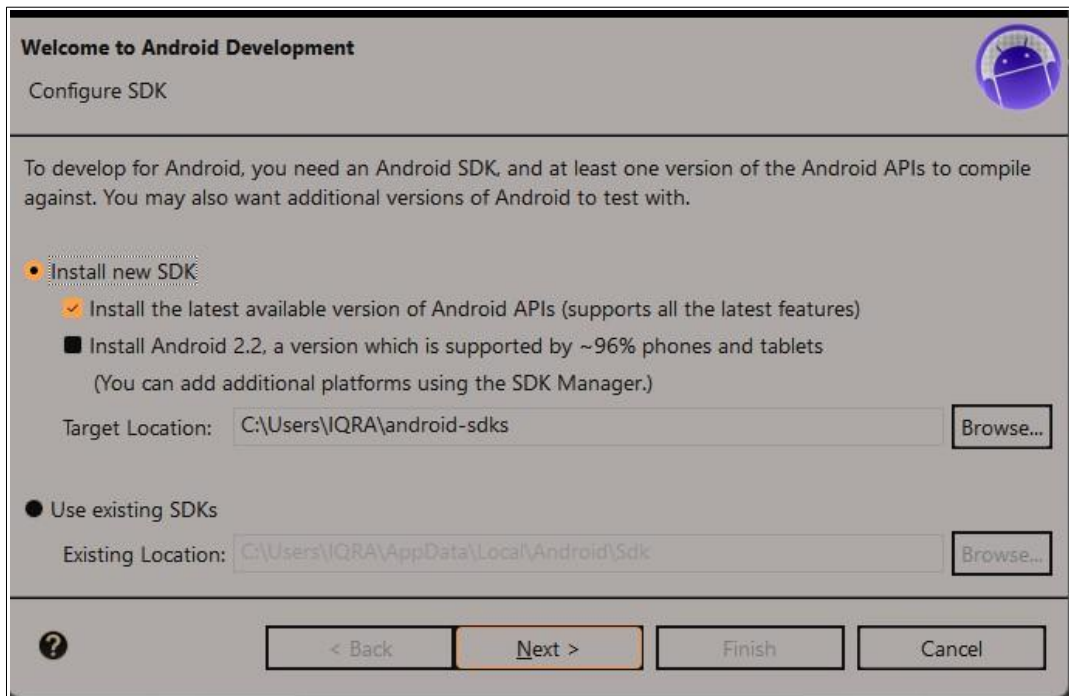
After installation of packages, SDK Manager will appear for API Level Build Tools and System Images installation. Click on Install.

Step 8: After installation is completed, Go to Eclipse then Select Window then Click on Android Virtual Device Manager. A dialog box will appear, Select existing AVD and Click on Edit:

Fill in all the details as per the below image. Click OK.
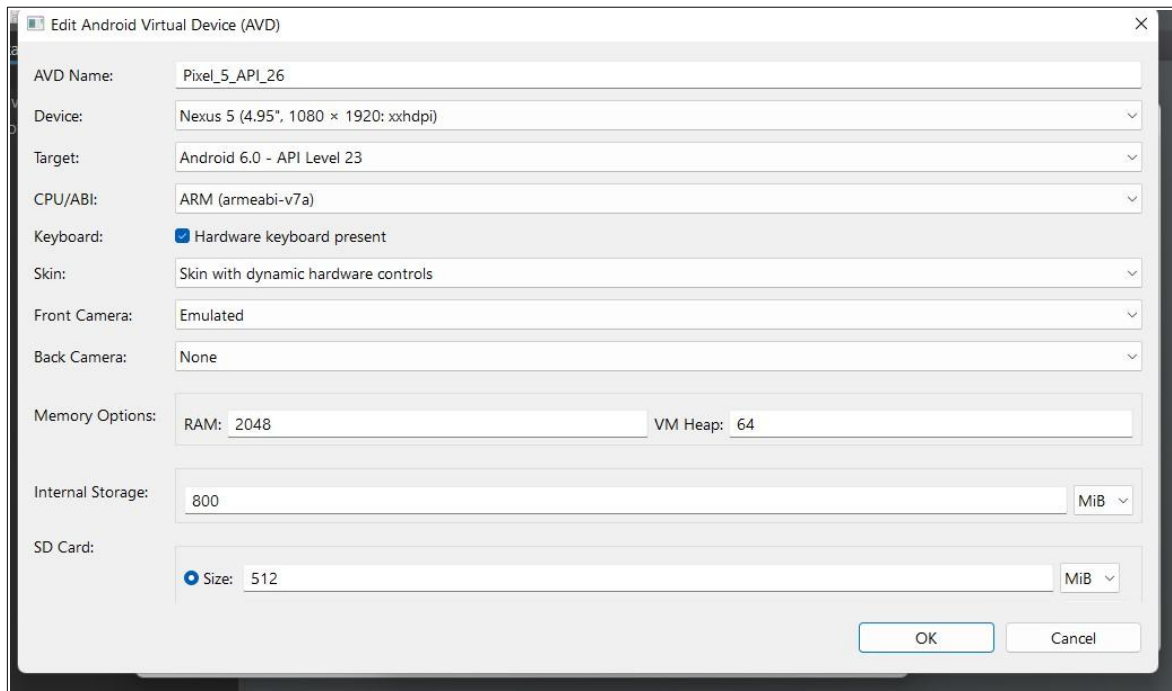
Step 9: To create an android application, Select File -> New -> Other, and then the below dialog box will appear Select Android -> Android Application Project then Click on Next. Follow the steps and then click on Finish:
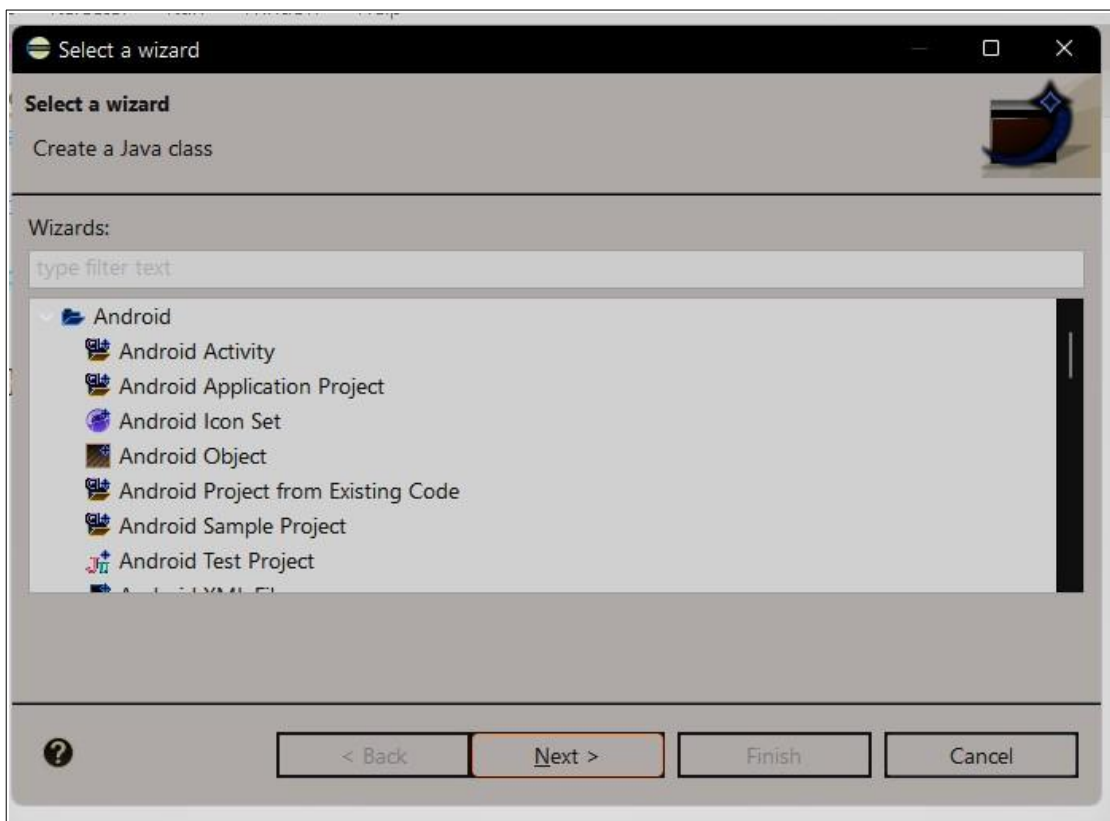
Step 10: Eclipse IDE setup is completed for Android Application Development:
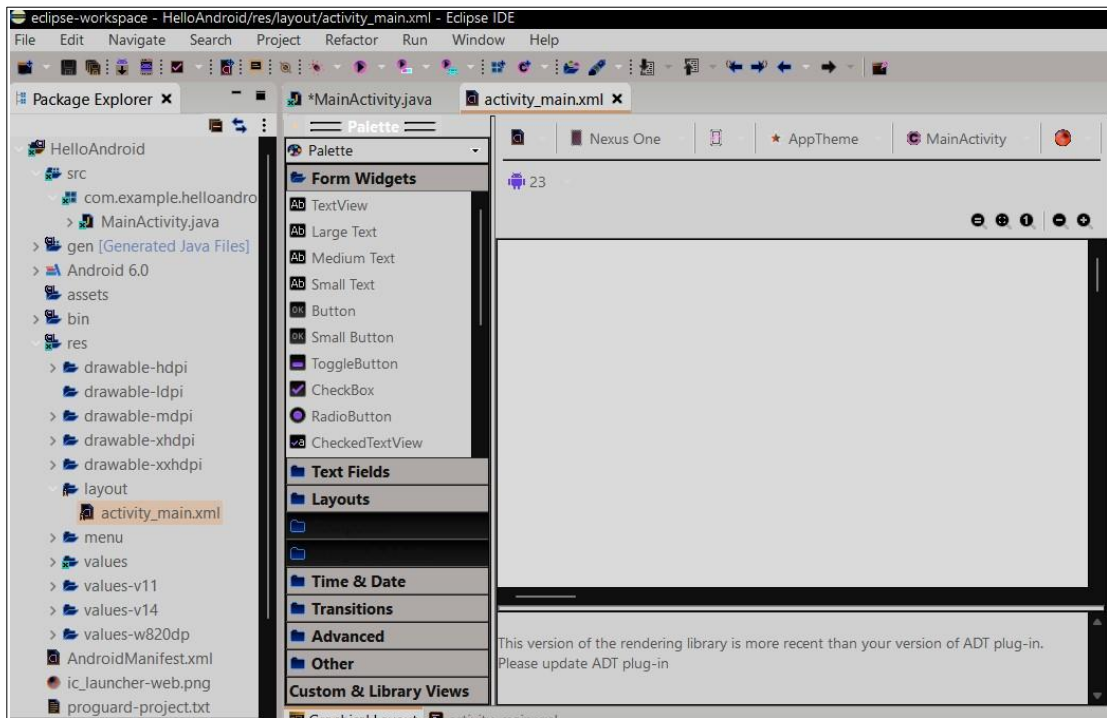
E] Create Android Virtual Device (AVD):

1. To test your Android applications you will need a virtual Android device. So before we start writing our code, let us create an Android virtual device.

2. Launch Android AVD Manager using Eclipse menu options Window > AVD Manager> which will launch Android AVD Manager.

3. Use New button to create a new Android Virtual Device and enter the following information, before clicking Create AVD button:

4. If your AVD is created successfully it means your environment is ready for Android application development.

2.Create "Hello World" application. That will display "Hello World" in the middle of the screen using Text View Widget in the red color.

A] Code: a]

MainActivity.java:

```java
package com.example.helloworld;

import android.os.Bundle;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
  @Override
  protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
  }
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
  xmlns:app="http://schemas.android.com/apk/res-auto"
  xmlns:tools="http://schemas.android.com/tools"
  android:id="@+id/main"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  tools:context=".MainActivity">
  <TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Hello World!"
    android:textColor="#D32f2f"
    android:textSize="50sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintLeft_toLeftOf="parent"
    app:layout_constraintRight_toRightOf="parent"
    app:layout_constraintTop_toTopOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

B] O/P:
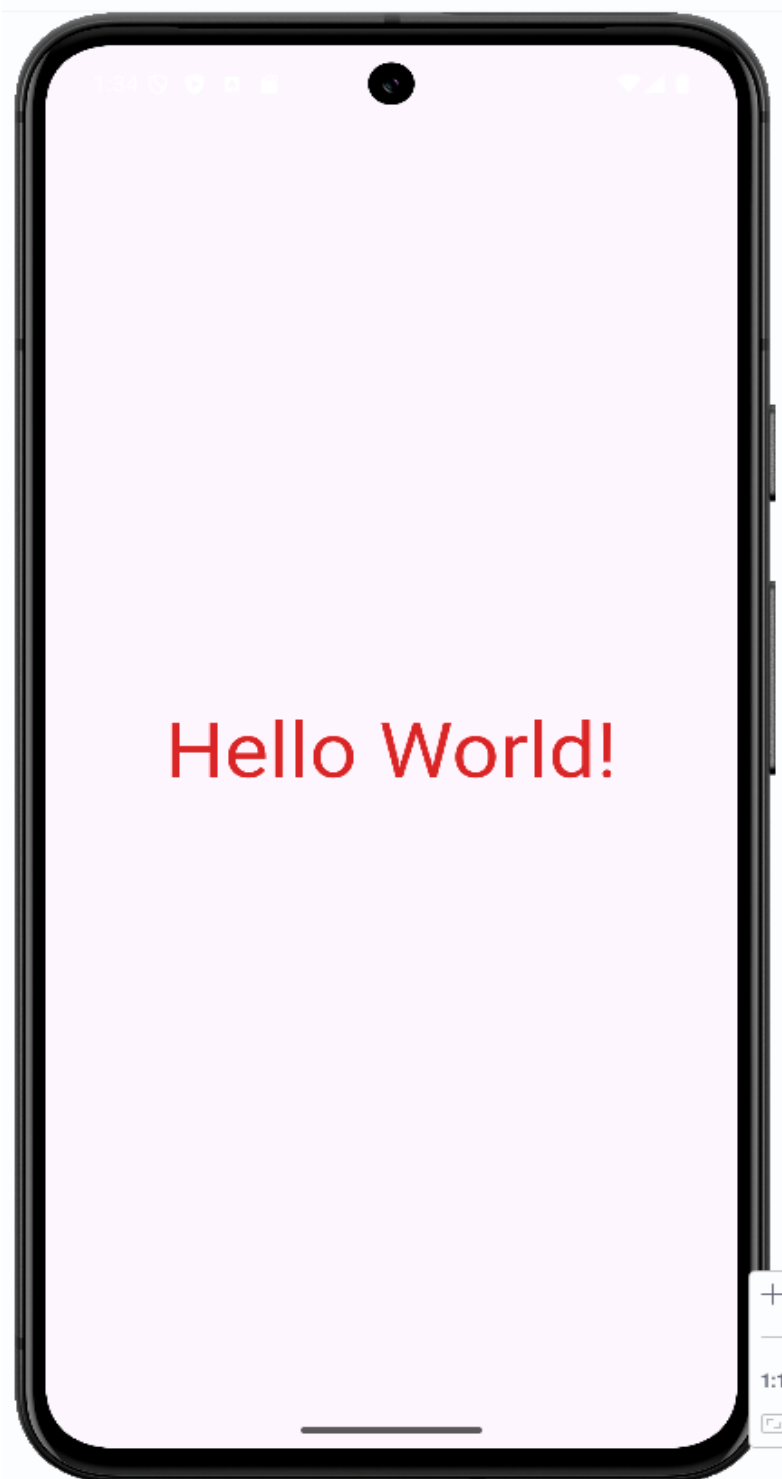
3.Create registration page to demonstrate basics of widgets available in Android.

A] Code: a]
MainActivity.java:

```java
package com.example.registrationpage;

import android.os.Bundle;
import androidx.annotation.Nullable;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(@Nullable Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:orientation="vertical"
        android:padding="10dp"
        tools:ignore="MissingConstraints">
        <TextView
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="20dp"
            android:fontFamily="serif"
            android:gravity="center"
            android:text="@string/registration"
            android:textColor="#e65100"
```

```xml
        android:textSize="40sp"/>
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:orientation="vertical"
        android:padding="2dp">
        <com.google.android.material.textfield.TextInputLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content">
            <com.google.android.material.textfield.TextInputEditText
                android:id="@+id/nm"
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_marginLeft="20dp"
                android:layout_marginTop="2dp"
                android:layout_marginRight="20dp"
                android:hint="@string/name"
                android:padding="10dp"
                android:textColorHint="#546E7A"
                tools:ignore="TextContrastCheck,TouchTargetSizeCheck,VisualLintTextFieldSize"
/>
        </com.google.android.material.textfield.TextInputLayout>
        <com.google.android.material.textfield.TextInputLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content">
            <com.google.android.material.textfield.TextInputEditText
                android:id="@+id/mob"
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_marginLeft="20dp"
                android:layout_marginRight="20dp"
                android:hint="Mobile"
                android:padding="10dp"
                android:textColorHint="#546E7A"

tools:ignore="HardcodedText,TextContrastCheck,TouchTargetSizeCheck,VisualLintTextField
Size" />
        </com.google.android.material.textfield.TextInputLayout>
        <com.google.android.material.textfield.TextInputLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content">
            <com.google.android.material.textfield.TextInputEditText
                android:id="@+id/email"
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_marginLeft="20dp"
```

```xml
            android:layout_marginRight="20dp"
            android:hint="@string/email"
            android:padding="10dp"
            android:textColorHint="#546E7A"

    tools:ignore="TextContrastCheck,TouchTargetSizeCheck,VisualLintTexize,VisualLintTextField
    Size" />
        </com.google.android.material.textfield.TextInputLayout>
        <com.google.android.material.textfield.TextInputLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content">
            <com.google.android.material.textfield.TextInputEditText
                android:id="@+id/pass"
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_marginLeft="20dp"
                android:layout_marginRight="20dp"
                android:hint="@string/password"
                android:inputType="textPassword"
                android:padding="10dp"
                tools:ignore="TextContrastCheck,TouchTargetSizeCheck,VisualLintTextFieldSize"
    />
        </com.google.android.material.textfield.TextInputLayout>
        <com.google.android.material.textfield.TextInputLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content">
            <com.google.android.material.textfield.TextInputEditText
                android:id="@+id/rollNo"
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_marginLeft="20dp"
                android:layout_marginTop="2dp"
                android:layout_marginRight="20dp"
                android:hint="@string/roll_no"
                android:padding="10dp"
                tools:ignore="TextContrastCheck,TouchTargetSizeCheck,VisualLintTextFieldSize"
    />
        </com.google.android.material.textfield.TextInputLayout>
        <com.google.android.material.textfield.TextInputLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content">
            <com.google.android.material.textfield.TextInputEditText
                android:id="@+id/age"
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_marginLeft="20dp"
                android:layout_marginTop="2dp"
```

```xml
            android:layout_marginRight="20dp"
            android:hint="@string/age"
            android:padding="10dp"
            android:textColorHint="#546E7A"

            tools:ignore="TextContrastCheck,TouchTargetSizeCheck,VisualLintTextFieldSize"
    />
        </com.google.android.material.textfield.TextInputLayout>
        <RadioGroup
            android:id="@+id/rd_gen"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:layout_marginTop="10dp"
            android:layout_marginRight="10dp"
            android:orientation="horizontal">
            <RadioButton
                android:id="@+id/right_male"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_marginLeft="50dp"
                android:gravity="center"
                android:text="@string/male"
                android:textSize="20sp"
                tools:ignore="RtlHardcoded" />

            <RadioButton
                android:id="@+id/right_female"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_marginStart="20dp"
                android:text="@string/female"
                android:textSize="20sp"
                tools:ignore="TouchTargetSizeCheck,VisualLintBounds" />
        </RadioGroup>
    </LinearLayout>
    <Button
        android:id="@+id/btnsub"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:layout_marginTop="5dp"
        android:layout_marginBottom="30dp"
        android:backgroundTint="#e65100"
        android:padding="20dp"
        android:text="@string/submit"
        android:textColor="#fff"
```

```
        android:textSize="20sp" />
    </LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

c] strings.xml:
```xml
<resources>
    <string name="app_name">Registrationpage</string>
    <string name="registration">Registration</string>
    <string name="name">Name</string>
    <string name="email">Email</string>
    <string name="password">Password</string>
    <string name="roll_no">Roll_no</string>
    <string name="age">Age</string>
    <string name="male">Male</string>
    <string name="female">Female</string>
    <string name="submit">Submit</string>
</resources>
```

B] O/P:
a] With data not entered:
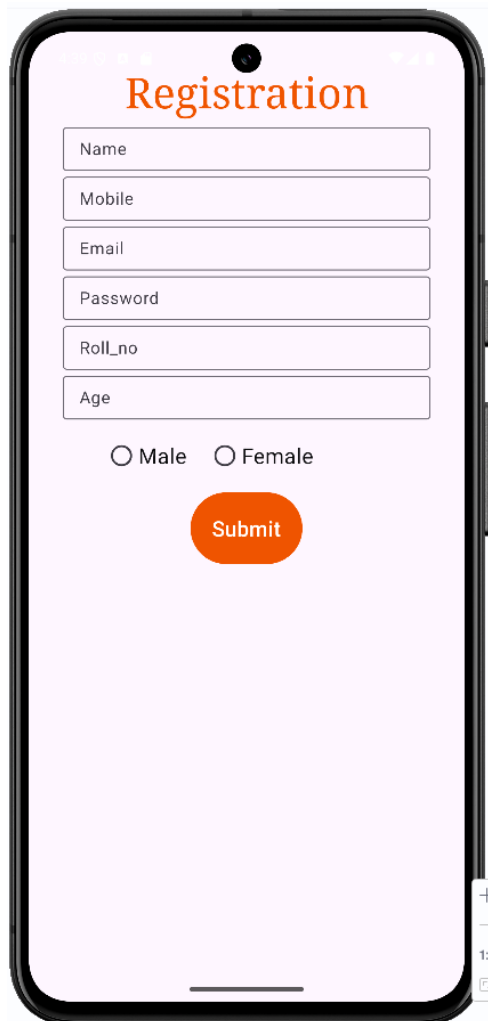
b] With data entered:

Registration

Name
Shraddha Satish khare

Mobile
7378725110

Email
shraddhak2104@gmail.com

Password
●●●●●●●●●●●●

Roll_no
60

Age
20

○ Male ⦿ Female

Submit

4.Create sample application with login module (check username and password) & on successful login, change TextView to "Login Successful" and on failed login, alert user using Toast "Login fail".

A] Code:

a] MainActivity.java:

```java
package com.example.loginpage;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;
import androidx.annotation.Nullable;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity implements View.OnClickListener {
    TextView txtheadline;
    EditText edteemail1, edtpw1;
    Button btnlog;
    @Override
    protected void onCreate(@Nullable Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        // Initialize UI components
        txtheadline = findViewById(R.id.txthead);
        edteemail1 = findViewById(R.id.edt_email1);
        edtpw1 = findViewById(R.id.edt_passwd1);
        btnlog = findViewById(R.id.btnLog);
        // Set click listener
        btnlog.setOnClickListener(this);
    }
    @Override
    public void onClick(View v) {
// Check login credentials
        if ((edteemail1.getText().toString().equals("user@gmail.com")) &&
            (edtpw1.getText().toString().equals("1234"))) {
            Toast.makeText(this, "Login Successful",
                Toast.LENGTH_SHORT).show();
        } else {
            Toast.makeText(this, "Login Failed", Toast.LENGTH_SHORT).show();
        }
    }
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#FA80CAD5">
    <TextView
        android:id="@+id/txthead"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginLeft="20dp"
        android:layout_marginTop="40dp"
        android:layout_marginRight="20dp"
        android:text="@string/login_form"
        android:textAlignment="center"
        android:textColor="#616161"
        android:textStyle="bold"/>
    <EditText
        android:id="@+id/edt_email1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@+id/txthead"
        android:layout_marginLeft="20dp"
        android:layout_marginTop="20dp"
        android:layout_marginRight="20dp"
        android:autofillHints="true"
        android:text="@string/enter_email"
        tools:ignore="LabelFor,TextFields,TouchTargetSizeCheck,VisualLintTextFieldSize"/>
    <EditText
        android:id="@+id/edt_passwd1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@+id/edt_email1"
        android:layout_marginLeft="20dp"
        android:layout_marginTop="22dp"
        android:minHeight="48dp"
        android:text="@string/enter_password"
        android:textColorHint="#37474F"

tools:ignore="Autofill,LabelFor,RtlHardcoded,SpeakableTextPresentCheck,TextFields,VisualLintTextFieldSize"/>
    <Button
        android:id="@+id/btnLog"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
```

```
        android:layout_below="@+id/edt_passwd1"
        android:layout_marginLeft="60dp"
        android:layout_marginTop="40dp"
        android:layout_marginRight="60dp"
        android:background="#0B8B9B"
        android:text="Login"
        android:textColor="#fff"
        android:textSize="25sp"
        tools:ignore="HardcodedText,VisualLintButtonSize"/>
</RelativeLayout>
```

c] strings.xml:
```
<resources>
    <string name="app_name">Loginpage</string>
    <string name="login_form">Login Form</string>
    <string name="enter_email">Enter your email</string>
    <string name="enter_password">Enter your password</string>
</resources>
```
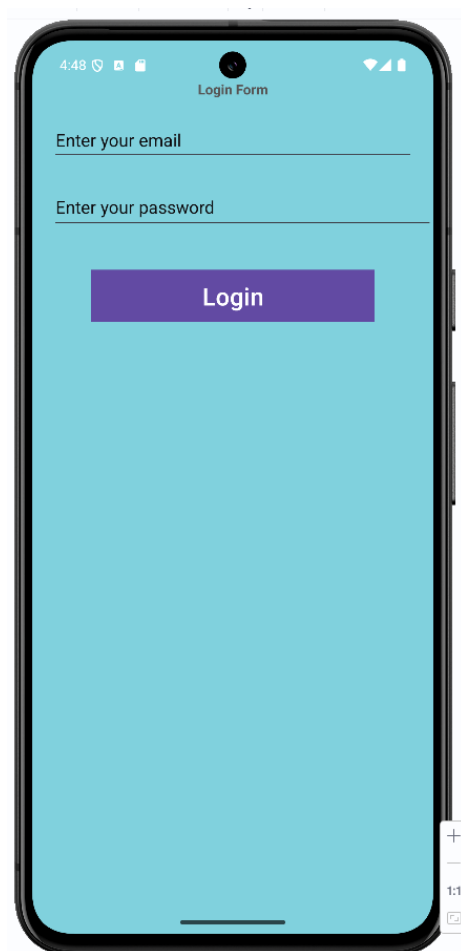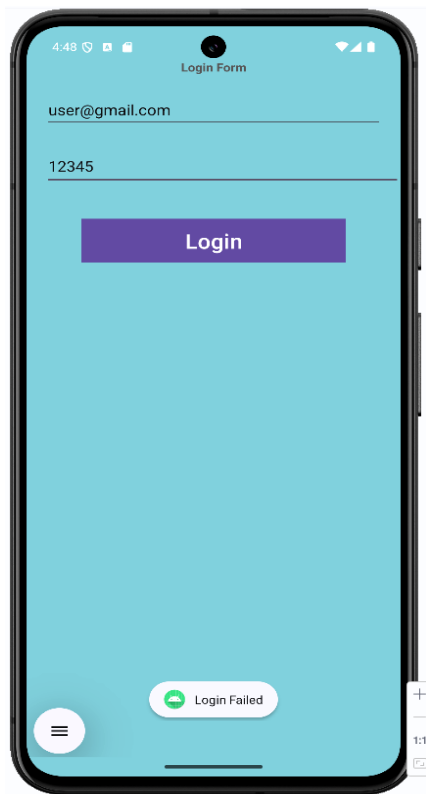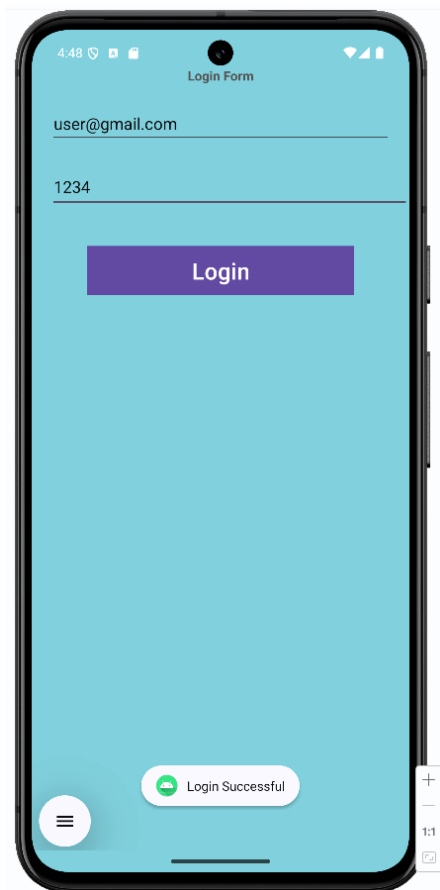
B] O/P:
a] With data not entered:

b] With login failed:

b] With login successful:

5.Create an application for demonstration of ScrollView in Android.

A] Code:

a] MainActivity.java:

```java
package com.example.scrollview;

import android.os.Bundle;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <ScrollView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        tools:ignore="MissingConstraints">
        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="vertical">
            <ImageView
                android:layout_width="match_parent"
                android:layout_height="200dp"
                android:layout_marginTop="8dp"
                android:background="#9C27B0"
                tools:ignore="ContentDescription,ImageContrastCheck"/>
            <Button
                android:layout_width="417dp"
                android:layout_height="121dp"
                android:background="#ff5722"
                android:text="@string/hello_world_1"
                android:textColor="#212121"
```

```xml
            tools:ignore="HardcodedText,SpeakableTextPresentCheck,TextContrastChec
k,VisualLintButtonSize" />
        <TextView
            android:layout_width="match_parent"
            android:layout_height="200dp"
            android:background="#00BCD4" />
        <Button
            android:layout_width="match_parent"
            android:layout_height="200dp"
            android:background="@color/black"
            tools:ignore="SpeakableTextPresentCheck,VisualLintButtonSize" />
        <Button
            android:layout_width="match_parent"
            android:layout_height="200dp"
            android:background="#673AB7"
            android:text="@string/hello_world_2"
            android:textColor="#C5CAE9"
            tools:ignore="VisualLintButtonSize" />
        <ImageView
            android:layout_width="match_parent"
            android:layout_height="200dp"
            android:background="#9C27B0"
            tools:ignore="ContentDescription,ImageContrastCheck" />
        <TextView
            android:layout_width="match_parent"
            android:layout_height="200dp"
            android:background="#E91E63" />
        <Button
            android:layout_width="match_parent"
            android:layout_height="200dp"
            android:background="#F44336"
            tools:ignore="VisualLintButtonSize" />
        <Button
            android:layout_width="match_parent"
            android:layout_height="200dp"
            android:background="#03A9F4"
            android:text="@string/hello_world_3"
            tools:ignore="VisualLintButtonSize" />
        <ImageView
            android:layout_width="match_parent"
            android:layout_height="200dp"
            android:background="#FF5722"
            tools:ignore="ContentDescription" />
        <TextView
            android:layout_width="match_parent"
            android:layout_height="200dp"
            android:background="#FF9800" />
```

```xml
<Button
    android:layout_width="match_parent"
    android:layout_height="200dp"
    android:background="#FFEB3B"
    android:text="@string/hello_world_4"
    tools:ignore="HardcodedText,VisualLintButtonSize" />
<ImageView
    android:layout_width="match_parent"
    android:layout_height="200dp"
    android:background="#FF5722"
    tools:ignore="ContentDescription" />
<TextView
    android:layout_width="match_parent"
    android:layout_height="200dp"
    android:background="#FFA000" />
<Button
    android:layout_width="match_parent"
    android:layout_height="200dp"
    android:background="#981874"
    tools:ignore="VisualLintButtonSize" />
<Button
    android:layout_width="match_parent"
    android:layout_height="200dp"
    android:background="#6A7C6B"
    android:text="@string/hello_world_5"
    tools:ignore="VisualLintButtonSize" />
<ImageView
    android:layout_width="match_parent"
    android:layout_height="200dp"
    android:background="#3F51B5"
    tools:ignore="ContentDescription" />
<TextView
    android:layout_width="match_parent"
    android:layout_height="200dp"
    android:background="#FF0000" />
<Button
    android:layout_width="match_parent"
    android:layout_height="200dp"
    android:background="#819012"
    android:text="@string/hello_world_6"
    tools:ignore="VisualLintButtonSize" />
<Button
    android:layout_width="match_parent"
    android:layout_height="200dp"
    android:background="#00FF1A"
    tools:ignore="VisualLintButtonSize"/>
    </LinearLayout>
```
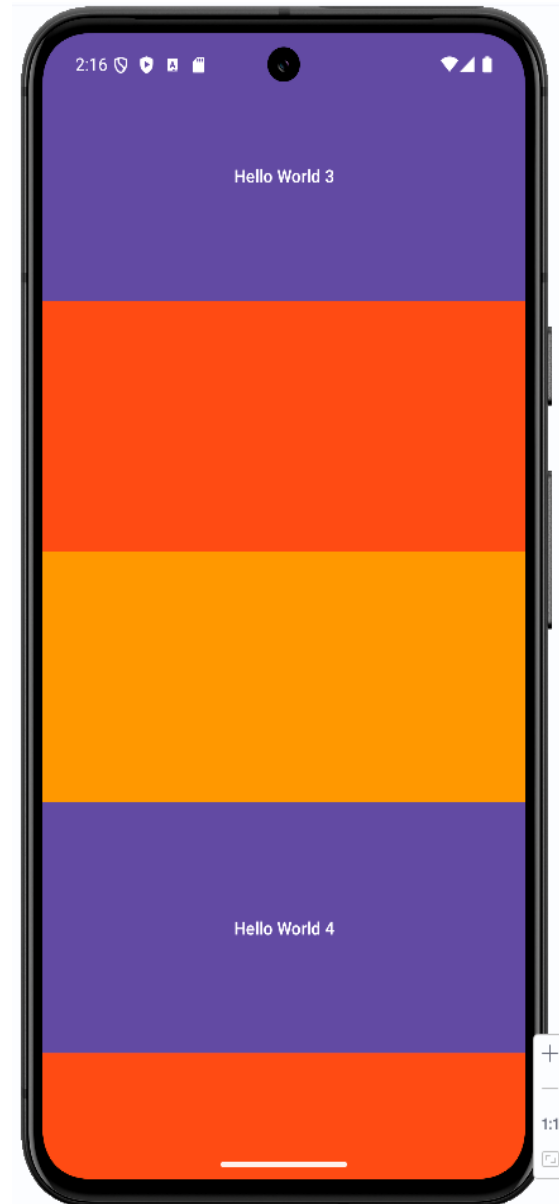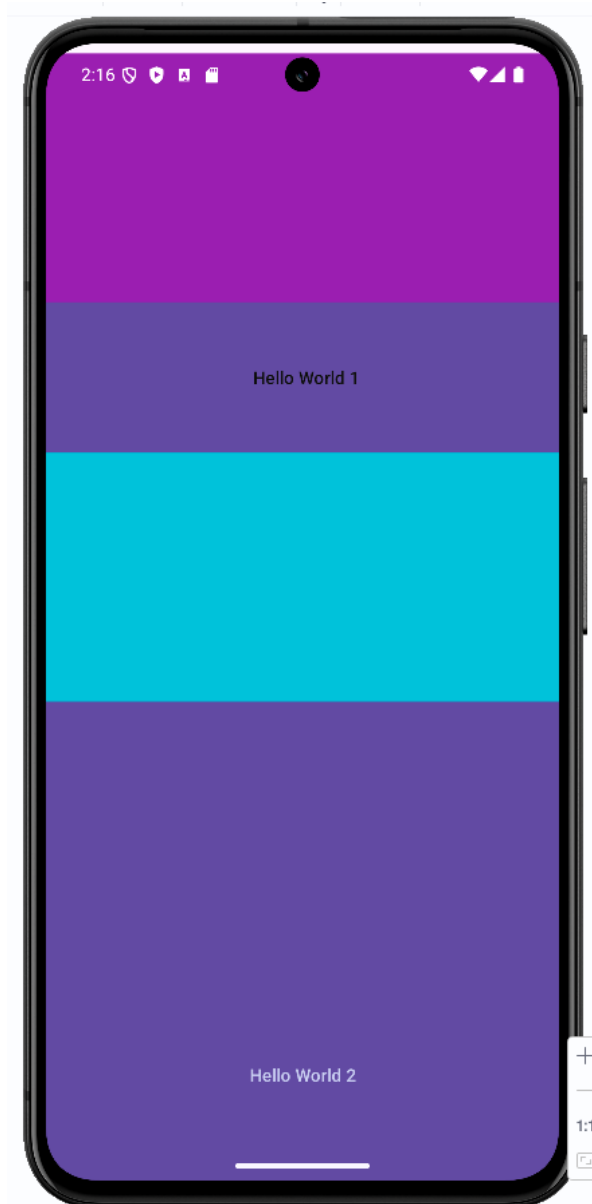
```xml
    </ScrollView>
</androidx.constraintlayout.widget.ConstraintLayout>
```

c] strings.xml:

```xml
<resources>
    <string name="app_name">Scrollview</string>
    <string name="hello_world_1">Hello World 1</string>
    <string name="hello_world_2">Hello World 2</string>
    <string name="hello_world_3">Hello World 3</string>
    <string name="hello_world_4">Hello World 4</string>
    <string name="hello_world_5">Hello World 5</string>
    <string name="hello_world_6">Hello World 6</string>
</resources>
```

B] O/P:

6.Create login application where you will have to validate username and password till the & username and password is not validated, login button should remain disabled.

A] Code:
a] MainActivity.java:

```java
package com.example.disabledlogin;

import android.os.Bundle;
import android.text.Editable;
import android.text.TextWatcher;
import android.widget.Button;
import android.widget.EditText;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    private EditText edittextUN;
    private EditText edittextPass;
    private Button btnLog;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        edittextUN = findViewById(R.id.edittxt_Username);
        edittextPass = findViewById(R.id.edittxt_Password);
        btnLog = findViewById(R.id.button_Login);
        edittextUN.addTextChangedListener(loginTextWatcher);
        edittextPass.addTextChangedListener(loginTextWatcher);
    }
    private final TextWatcher loginTextWatcher = new TextWatcher() {
        @Override
        public void beforeTextChanged(CharSequence s, int start, int count, int after) {
        }
        @Override
        public void onTextChanged(CharSequence s, int start, int before, int count) {
            String usernameInput = edittextUN.getText().toString();
            String passwordInput = edittextPass.getText().toString();
            btnLog.setEnabled(!usernameInput.isEmpty() && !passwordInput.isEmpty());
        }
        @Override
        public void afterTextChanged(Editable s) {
        }
    };
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
```

```xml
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_margin="20dp"
    android:layout_gravity="center_horizontal"
    android:orientation="vertical"
    android:padding="15dp"
    tools:context=".MainActivity">
    <EditText
        android:id="@+id/edittxt_Username"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="70dp"
        android:autofillHints=""
        android:hint="@string/username"
        android:inputType="text"
        android:textColorHint="#78909C"
        android:textSize="20sp"
        tools:ignore="VisualLineTextFieldSize,VisualLintTextFieldSize" />
    <EditText
        android:id="@+id/edittxt_Password"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="@string/password"
        android:importantForAutofill="no"
        android:inputType="textPassword"
        android:textColorHint="#78909C"
        android:textSize="20sp"
        tools:ignore="VisualLintTextFieldSize" />

    <Button
        android:id="@+id/button_Login"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:enabled="true"
        android:text="@string/login"
        android:textSize="30sp" />
</LinearLayout>
```

c] strings.xml:

```xml
<resources>
    <string name="app_name">Disabled Login</string>
    <string name="username">Username</string>
    <string name="password">Password</string>
    <string name="login">Login</string>
</resources>
```
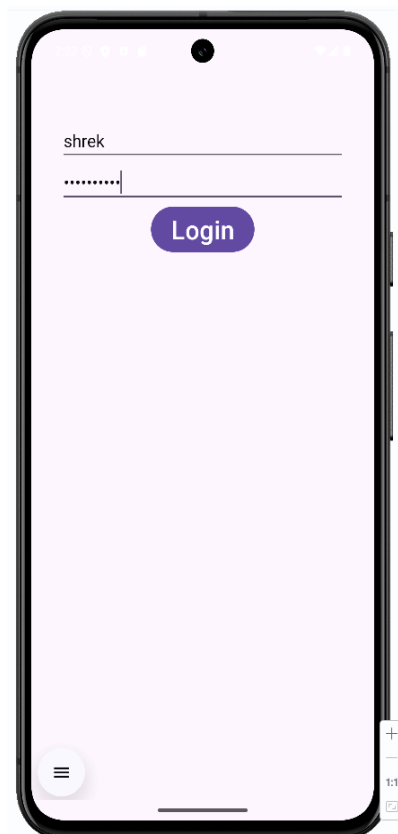
B] O/P:
a] With no data entered:
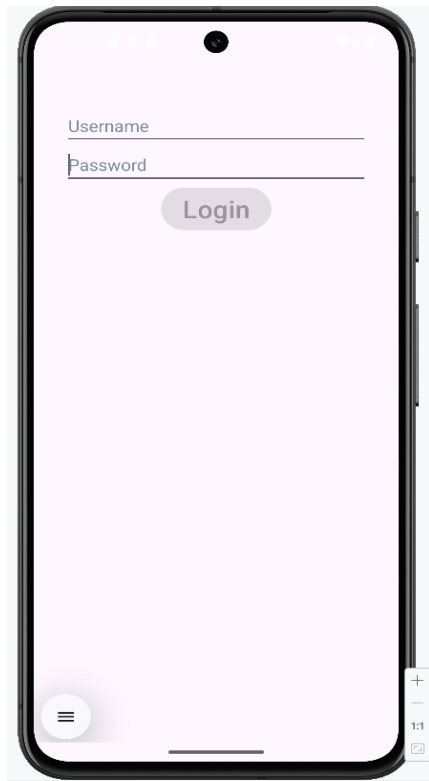
b] With data entered:

7.Create an application for calculator.

A] Code:
a] MainActivity.java:

```java
package com.example.calculator_pr7;

import android.annotation.SuppressLint;
import android.os.Bundle;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
import java.text.DecimalFormat;
public class MainActivity extends AppCompatActivity {
    private EditText num1EditText, num2EditText;
    private TextView resultTextView;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        num1EditText = findViewById(R.id.num1EditText);
        num2EditText = findViewById(R.id.num2EditText);
        resultTextView = findViewById(R.id.resultTextView);
        Button addButton = findViewById(R.id.addButton);
        addButton.setOnClickListener(v -> performCalculation('+'));
        Button subtractButton = findViewById(R.id.subtractButton);
        subtractButton.setOnClickListener(v -> performCalculation('-'));
        Button multiplyButton = findViewById(R.id.multiplyButton);
        multiplyButton.setOnClickListener(v -> performCalculation('*'));
        Button divideButton = findViewById(R.id.divideButton);
        divideButton.setOnClickListener(v -> performCalculation('/'));
        Button sqrtButton = findViewById(R.id.sqrtButton);
        sqrtButton.setOnClickListener(v -> calculateSquareRoot());
    }
    @SuppressLint("SetTextI18n")
    private void performCalculation(char operator) {
        String num1Str = num1EditText.getText().toString();
        String num2Str = num2EditText.getText().toString();
        if (num1Str.isEmpty() || num2Str.isEmpty()) {
            Toast.makeText(this, "Please enter both numbers", Toast.LENGTH_SHORT).show();
            return;
        }
        double num1 = Double.parseDouble(num1Str);
        double num2 = Double.parseDouble(num2Str);
        double result = 0;
        switch (operator) {
```

```java
        case '+':
            result = num1 + num2;
            break;
        case '-':
            result = num1 - num2;
            break;
        case '*':
            result = num1 * num2;
            break;
        case '/':
            if (num2 != 0) {
                result = num1 / num2;
            } else {
                Toast.makeText(this, "Cannot divide by zero", Toast.LENGTH_SHORT).show();
                return;
            }
            break;
    }
    DecimalFormat df = new DecimalFormat("#.##");
    resultTextView.setText("Result: " + df.format(result));
}
@SuppressLint("SetTextI18n")
private void calculateSquareRoot() {
    String num1Str = num1EditText.getText().toString();
    if (num1Str.isEmpty()) {
        Toast.makeText(this, "Please enter a number", Toast.LENGTH_SHORT).show();
        return;
    }
    double num = Double.parseDouble(num1Str);
    double sqrtResult = Math.sqrt(num);
    DecimalFormat df = new DecimalFormat("#.##");
    resultTextView.setText("Square Root: " + df.format(sqrtResult));
}
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp"
    tools:context=".MainActivity">
    <EditText
        android:id="@+id/num1EditText"
```

```xml
        android:layout_width="0dp"
        android:layout_height="48dp"
        android:layout_marginTop="44dp"
        android:hint="Enter number 1"
        android:inputType="numberDecimal"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="1.0"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        tools:ignore="Autofill,HardcodedText,TextContrastCheck,VisualLintTextFieldSize" />
    <EditText
        android:id="@+id/num2EditText"
        android:layout_width="0dp"
        android:layout_height="48dp"
        android:layout_marginTop="32dp"
        android:hint="Enter number 2"
        android:inputType="numberDecimal"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="1.0"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/num1EditText"
        tools:ignore="Autofill,HardcodedText,TextContrastCheck,VisualLintTextFieldSize" />
    <Button
        android:id="@+id/addButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp"
        android:background="#5C07F0"
        android:text="+"
        android:textColor="@color/white"
        android:textSize="16sp"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/num2EditText"
        tools:ignore="HardcodedText" />
    <Button
        android:id="@+id/subtractButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp"
        android:background="#5C07F0"
        android:text="-"
        android:textColor="@color/white"
        android:textSize="16sp"
        app:layout_constraintEnd_toStartOf="@+id/multiplyButton"
        app:layout_constraintHorizontal_bias="0.582"
        app:layout_constraintStart_toEndOf="@+id/addButton"
        app:layout_constraintTop_toBottomOf="@+id/num2EditText"
```

```xml
            tools:ignore="HardcodedText" />
        <Button
            android:id="@+id/multiplyButton"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginTop="20dp"
            android:background="#5C07F0"
            android:text="x"
            android:textColor="@color/white"
            android:textSize="16sp"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintTop_toBottomOf="@+id/num2EditText"
            tools:ignore="HardcodedText" />
        <Button
            android:id="@+id/divideButton"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginTop="20dp"
            android:background="#5C07F0"
            android:text="/"
            android:textColor="@color/white"
            android:textSize="16sp"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toBottomOf="@+id/addButton"
            tools:ignore="HardcodedText" />
        <Button
            android:id="@+id/sqrtButton"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginTop="20dp"
            android:layout_marginEnd="140dp"
            android:background="#5C07F0"
            android:text="Sqrt"
            android:textColor="@color/white"
            android:textSize="16sp"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintTop_toBottomOf="@+id/subtractButton"
            tools:ignore="HardcodedText" />
        <TextView
            android:id="@+id/resultTextView"
            android:layout_width="84dp"
            android:layout_height="41dp"
            android:layout_marginStart="4dp"
            android:layout_marginTop="40dp"
            android:text="Result: "
            android:textSize="18sp"
            app:layout_constraintStart_toStartOf="parent"
```
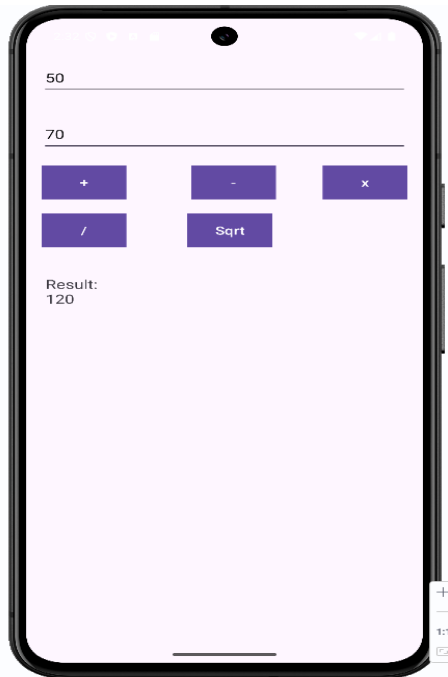
```
        app:layout_constraintTop_toBottomOf="@+id/divideButton"
        tools:ignore="HardcodedText" />
</androidx.constraintlayout.widget.ConstraintLayout>
```
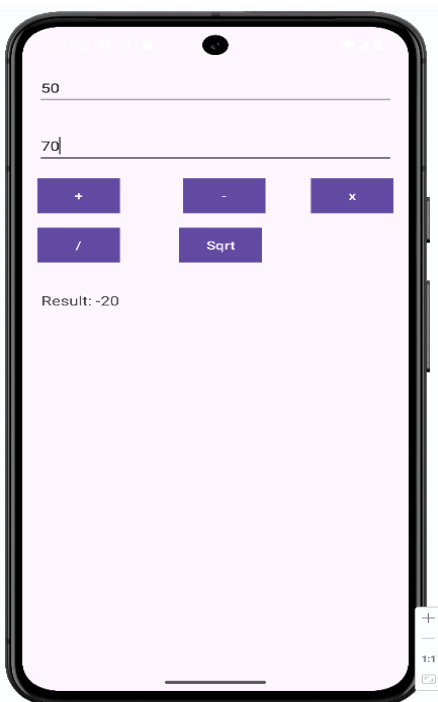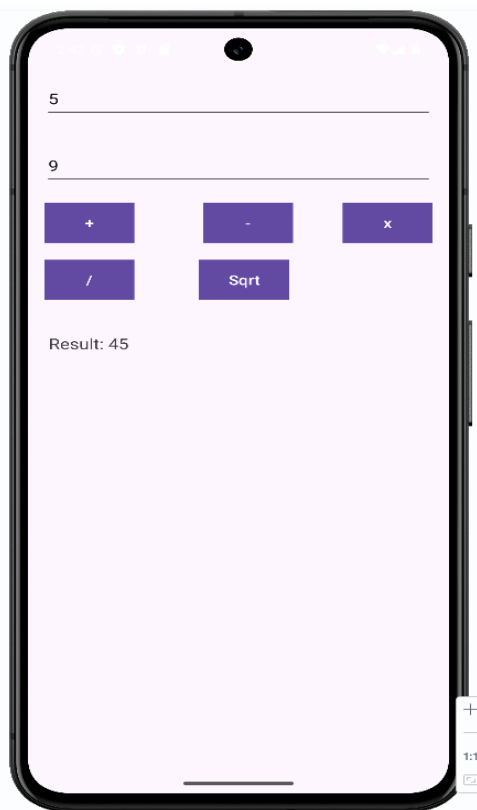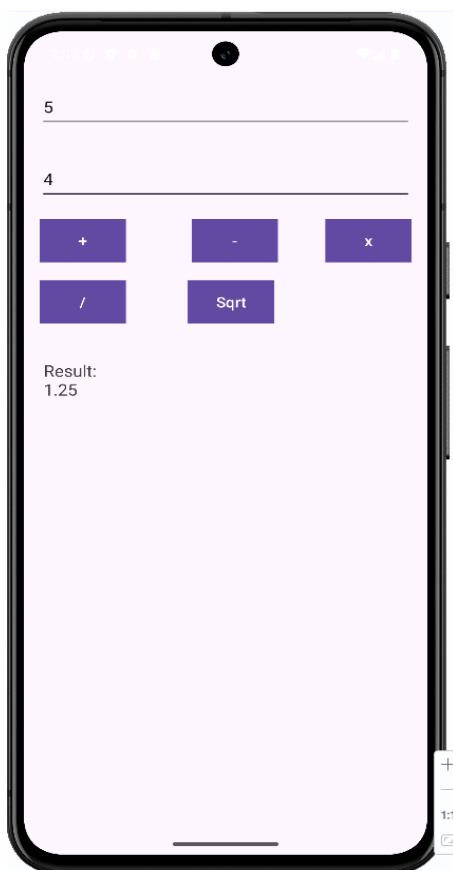
B] O/P:

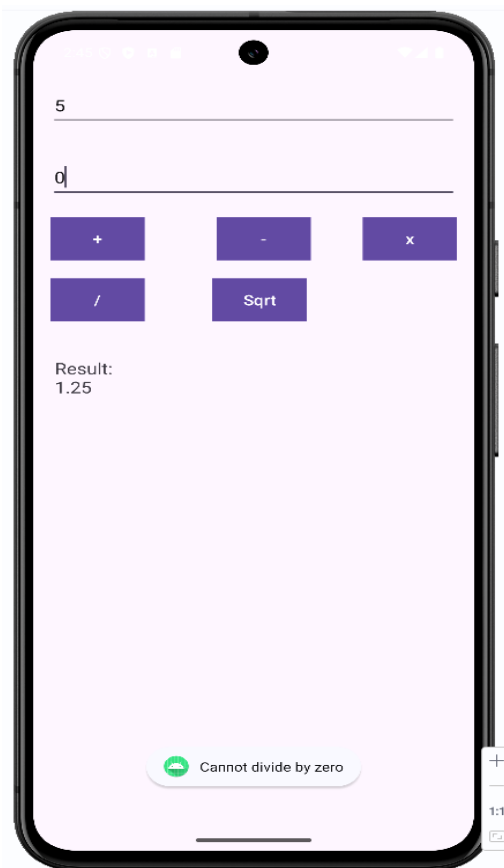## a] Addition:

b] Subtraction:

c] Multiplication:

d] Division:
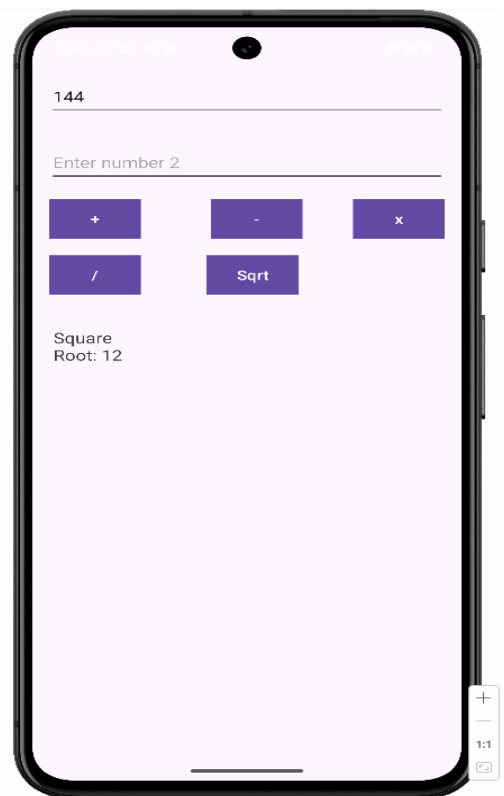## 1. Normal division:

2. Division by zero:

e] Square Root:

8.Demonstrate use of ScrollView.

1. Vertical ScrollView:
1.A] Code:
a] MainActivity.java:

```java
package com.example.verticalscrollview;

import android.os.Bundle;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<!--suppress ALL -->
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity">
    <ScrollView
        android:id="@+id/scrollView"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp"
        tools:ignore="UselessParent">
        <LinearLayout
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:orientation="vertical">
            <Button
                android:layout_width="fill_parent"
                android:layout_height="wrap_content"
                android:background="@color/design_default_color_primary"
                android:text="vertical_scroll_view"
                android:textAlignment="center"
                android:textColor="#ffffff"
                tools:ignore="VisualLintButtonSize" />
```

```xml
<Button
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="10sp"
    android:background="@color/design_default_color_primary"
    android:text="@string/button_2"
    android:textAlignment="center"
    android:textColor="#ffffff"
    tools:ignore="VisualLintButtonSize" />
<Button
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="10sp"
    android:background="@color/design_default_color_primary"
    android:text="@string/button_3"
    android:textAlignment="center"
    android:textColor="#ffffff"
    tools:ignore="VisualLintButtonSize" />
<Button
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="10sp"
    android:background="@color/design_default_color_primary"
    android:text="@string/button_4"
    android:textAlignment="center"
    android:textColor="#ffffff"
    tools:ignore="VisualLintButtonSize" />
<Button
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="10sp"
    android:background="@color/design_default_color_primary"
    android:text="@string/button_5"
    android:textAlignment="center"
    android:textColor="#ffffff"
    tools:ignore="VisualLintButtonSize" />
<Button
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="10sp"
    android:background="@color/design_default_color_primary"
    android:text="@string/button_6"
    android:textAlignment="center"
    android:textColor="#ffffff"
    tools:ignore="VisualLintButtonSize" />
<Button
    android:layout_width="fill_parent"
```

```xml
        android:layout_height="wrap_content"
        android:layout_marginTop="10sp"
        android:background="@color/design_default_color_primary"
        android:text="@string/button_7"
        android:textAlignment="center"
        android:textColor="#ffffff"
        tools:ignore="VisualLintButtonSize" />
    <Button
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10sp"
        android:background="@color/design_default_color_primary"
        android:text="@string/button_8"
        android:textAlignment="center"
        android:textColor="#ffffff"
        tools:ignore="VisualLintButtonSize" />
    <Button
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10sp"
        android:background="@color/design_default_color_primary"
        android:text="@string/button_9"
        android:textAlignment="center"
        android:textColor="#ffffff"
        tools:ignore="VisualLintButtonSize" />
    <Button
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10sp"
        android:background="@color/design_default_color_primary"
        android:text="@string/button_10"
        android:textAlignment="center"
        android:textColor="#ffffff"
        tools:ignore="VisualLintButtonSize" />
    <Button
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10sp"
        android:background="@color/design_default_color_primary"
        android:text="@string/button_11"
        android:textAlignment="center"
        android:textColor="#ffffff"
        tools:ignore="VisualLintButtonSize" />
    <Button
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10sp"
```

```xml
        android:background="@color/design_default_color_primary"
        android:text="@string/button_12"
        android:textAlignment="center"
        android:textColor="#ffffff"
        tools:ignore="VisualLintButtonSize" />
    <Button
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10sp"
        android:background="@color/design_default_color_primary"
        android:text="Button 13"
        android:textAlignment="center"
        android:textColor="#ffffff"
        tools:ignore="HardcodedText,VisualLintButtonSize" />
    <Button
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10sp"
        android:background="@color/design_default_color_primary"
        android:text="@string/button_14"
        android:textAlignment="center"
        android:textColor="#ffffff"
        tools:ignore="VisualLintButtonSize" />
    <Button
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10sp"
        android:background="@color/design_default_color_primary"
        android:text="@string/button_15"
        android:textAlignment="center"
        android:textColor="#ffffff"
        tools:ignore="VisualLintButtonSize" />
    <Button
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10sp"
        android:background="@color/design_default_color_primary"
        android:text="@string/button_16"
        android:textAlignment="center"
        android:textColor="#ffffff"
        tools:ignore="VisualLintButtonSize" />
    <Button
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10sp"
        android:background="@color/design_default_color_primary"
        android:text="@string/button_17"
```

```xml
                    android:textAlignment="center"
                    android:textColor="#ffffff"
                    tools:ignore="VisualLintButtonSize" />
                <Button
                    android:layout_width="fill_parent"
                    android:layout_height="wrap_content"
                    android:layout_marginTop="10sp"
                    android:background="@color/design_default_color_primary"
                    android:text="@string/button_18"
                    android:textAlignment="center"
                    android:textColor="#ffffff"
                    tools:ignore="VisualLintButtonSize" />
                <Button
                    android:layout_width="fill_parent"
                    android:layout_height="wrap_content"
                    android:layout_marginTop="10sp"
                    android:background="@color/design_default_color_primary"
                    android:text="@string/button_19"
                    android:textAlignment="center"
                    android:textColor="#ffffff"
                    tools:ignore="VisualLintButtonSize" />
                <Button
                    android:layout_width="fill_parent"
                    android:layout_height="wrap_content"
                    android:layout_marginTop="10sp"
                    android:background="@color/design_default_color_primary"
                    android:text="@string/button_20"
                    android:textAlignment="center"
                    android:textColor="#ffffff"
                    tools:ignore="VisualLintButtonSize" />
            </LinearLayout>
        </ScrollView>
</LinearLayout>
```

c] strings.xml:

```xml
<resources>
    <string name="app_name">Vertical Scroll View</string>
    <string name="Vertical_scroll_view">Vertical Scroll View</string>
    <string name="button_2">Button 2</string>
    <string name="button_3">Button 3</string>
    <string name="button_4">Button 4</string>
    <string name="button_5">Button 5</string>
    <string name="button_6">Button 6</string>
    <string name="button_7">Button 7</string>
    <string name="button_8">Button 8</string>
    <string name="button_9">Button 9</string>
    <string name="button_10">Button 10</string>
```

```xml
    <string name="button_11">Button 11</string>
    <string name="button_12">Button 12</string>
    <string name="button_13">Button 13</string>
    <string name="button_14">Button 14</string>
    <string name="button_15">Button 15</string>
    <string name="button_16">Button 16</string>
    <string name="button_17">Button 17</string>
    <string name="button_18">Button 18</string>
    <string name="button_19">Button 19</string>
    <string name="button_20">Button 20</string>
</resources>
```

1.B] O/P:

2. Horizontal ScrollView:

2.A] Code:
a] MainActivity.java:

```java
package com.example.horizontalscrollview;

import android.os.Bundle;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="15dp"
    tools:context=".MainActivity">

    <HorizontalScrollView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        tools:ignore="SpeakableTextPresentCheck,UselessParent">
        <LinearLayout
            android:layout_width="wrap_content"
            android:layout_height="match_parent"
            android:orientation="horizontal"
            tools:ignore="VisualLintBounds">

            <ImageView
                android:layout_width="150dp"
                android:layout_height="150dp"
                android:layout_marginTop="120dp"
                android:layout_marginEnd="5dp"
                android:scaleType="centerCrop"
                android:src="@drawable/image1"
                tools:ignore="ContentDescription,ImageContrastCheck" />
            <ImageView
                android:layout_width="150dp"
```

```xml
            android:layout_height="150dp"
            android:layout_marginEnd="5dp"
            android:layout_marginTop="120dp"
            android:scaleType="centerCrop"
            android:src="@drawable/image2"
            tools:ignore="ContentDescription" />
        <ImageView
            android:layout_width="150dp"
            android:layout_height="150dp"
            android:layout_marginTop="120dp"
            android:layout_marginEnd="5dp"
            android:scaleType="centerCrop"
            android:src="@drawable/image3"
            tools:ignore="ContentDescription" />
        <ImageView
            android:layout_width="150dp"
            android:layout_height="150dp"
            android:layout_marginEnd="5dp"
            android:layout_marginTop="120dp"
            android:scaleType="centerCrop"
            android:src="@drawable/image4"
            tools:ignore="ContentDescription" />
        <ImageView
            android:layout_width="150dp"
            android:layout_height="150dp"
            android:layout_marginRight="5dp"
            android:layout_marginTop="120dp"
            android:scaleType="centerCrop"
            android:src="@drawable/image5"
            tools:ignore="ContentDescription,RtlHardcoded" />
    </LinearLayout>
  </HorizontalScrollView>
</LinearLayout>
```

2.C] O/P:
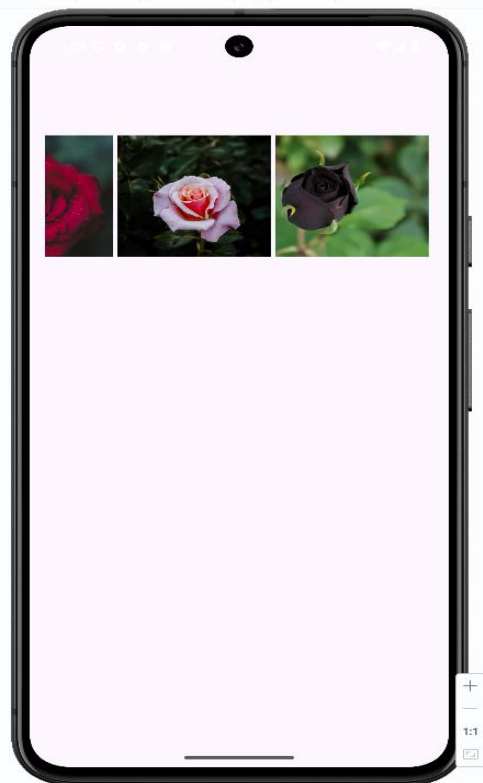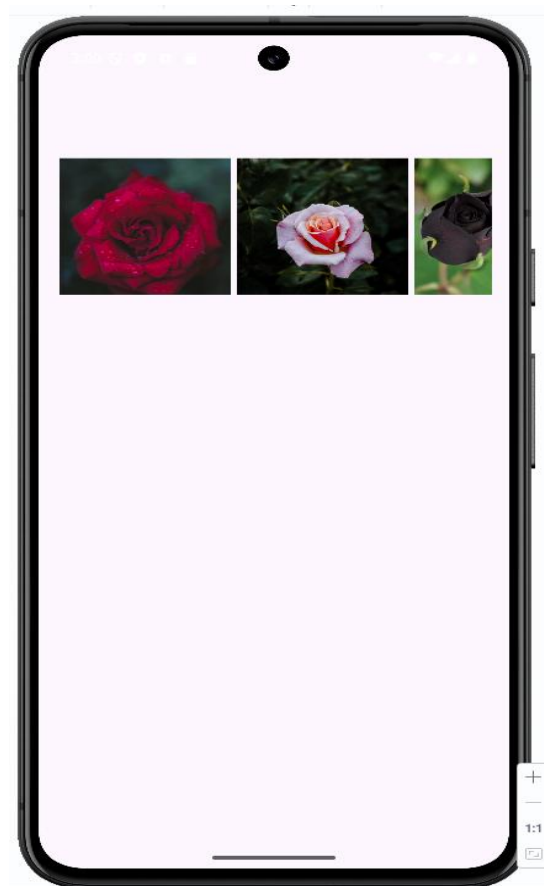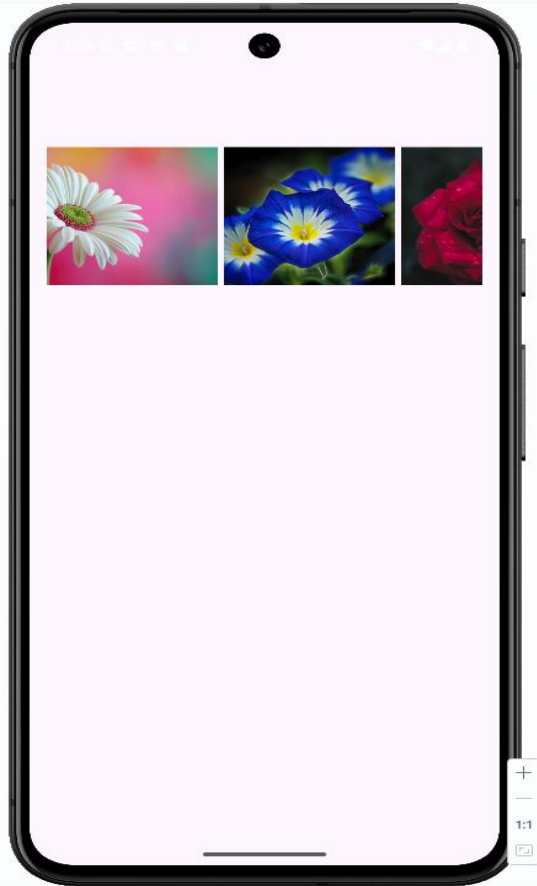
9.Demonstrate use of Intent in Android.
A] Code:
a] MainActivity.java:

```java
package com.example.intent;

import android.os.Bundle;
import androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import android.net.Uri;
import android.view.View;
import android.widget.Button;
/**
 * @noinspection ALL
 */
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Button email = findViewById(R.id.openEmail);
        Button gallery = findViewById(R.id.openGallery);
        Button dialer = findViewById(R.id.openDialer);
        email.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent intent = new Intent(Intent.ACTION_SENDTO);
                intent.setData(Uri.parse("mailto:"));
                intent.putExtra(Intent.EXTRA_EMAIL, "Dnc@gmail.com");
                intent.putExtra(Intent.EXTRA_SUBJECT, "Android App Practice");
                startActivity(intent);
            }
        });
        gallery.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent intent = new Intent();
                intent.setAction(android.content.Intent.ACTION_VIEW);
                intent.setType("image/*");
                intent.setFlags(Intent.FLAG_ACTIVITY_NEW_TASK);
                startActivity(intent);
            }
        });
        dialer.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent intent = new Intent(Intent.ACTION_DIAL);
```

```java
        intent.setData(Uri.parse("tel:2613401000"));
        startActivity(intent);
      }
    });
  }
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <Button
        android:id="@+id/openEmail"
        android:layout_width="177dp"
        android:layout_height="48dp"
        android:backgroundTint="#2962FF"
        android:text="@string/open_email_app"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.467"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.197" />
    <Button
        android:id="@+id/openGallery"
        android:layout_width="177dp"
        android:layout_height="48dp"
        android:backgroundTint="#D50000"
        android:text="@string/open_gallery_app"
        app:layout_constraintBottom_toTopOf="@+id/openDialer"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.465"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/openEmail" />
    <Button
        android:id="@+id/openDialer"
        android:layout_width="176dp"
        android:layout_height="49dp"
        android:layout_marginTop="4dp"
        android:backgroundTint="#64DD17"
        android:text="@string/open_phone_dialer"
```
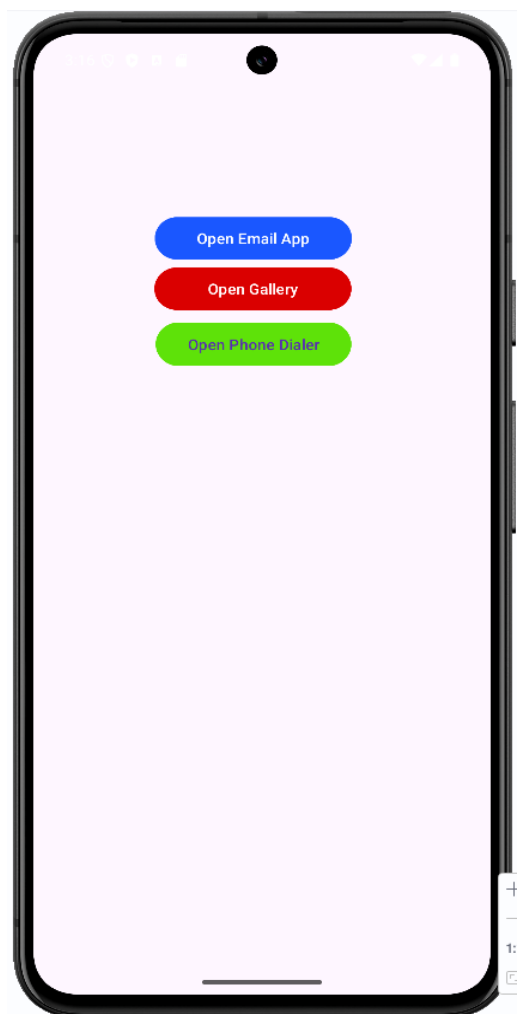
```xml
        android:textColor="#5E35B1"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.468"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/openGallery" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

c] strings.xml:

```xml
<resources>
    <string name="app_name">Intent</string>
    <string name="open_email_app">Open Email App</string>
    <string name="open_gallery_app">Open Gallery</string>
    <string name="open_phone_dialer">Open Phone Dialer</string>
</resources>
```
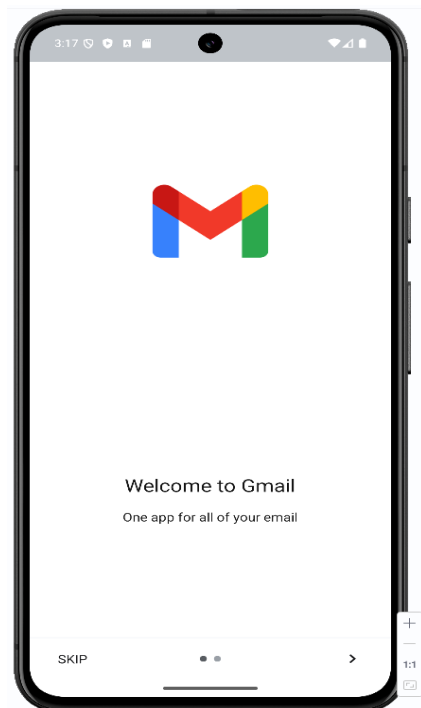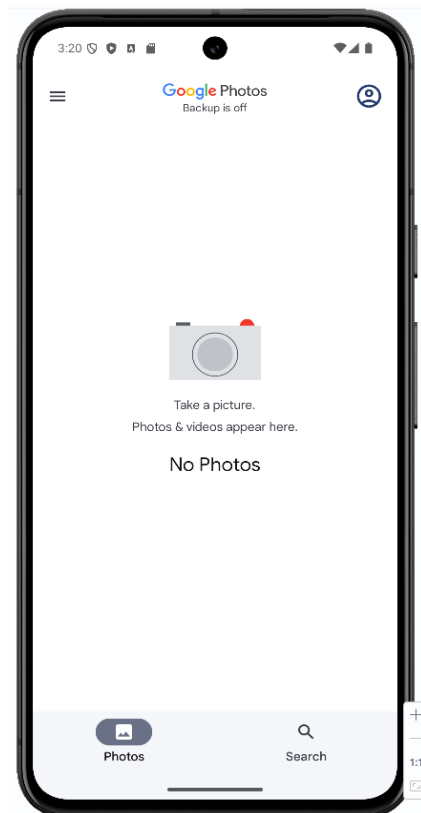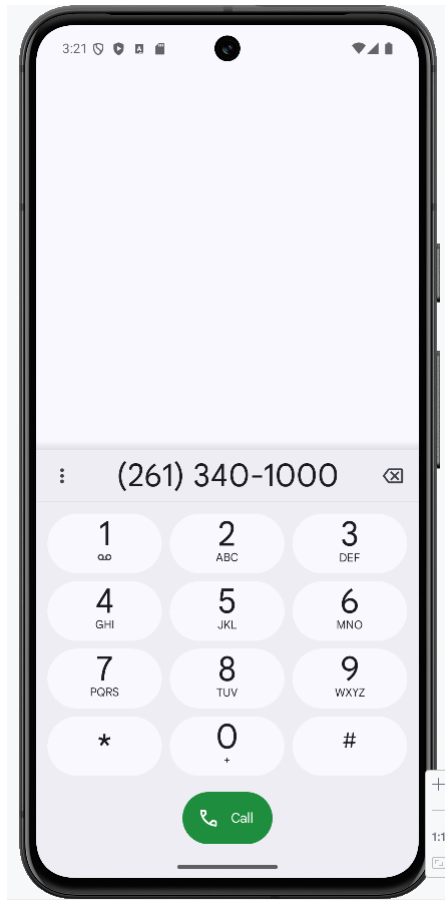
B] O/P:
a] Homepage:

b] Opening Gmail:

c] Opening Gallery:

d] Opening Phone Dialer:

10.Create application to demonstrate menu option.
1.Options Menu:
1.A] Code:
a] MainActivity.java:

```java
package com.example.menuoptions;

import android.os.Bundle;

import android.view.Menu;
import android.view.MenuItem;
import android.widget.Toast;
import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        // return super.onCreateOptionsMenu(menu);
        getMenuInflater().inflate(R.menu.menu, menu);
        return true;
    }
    @Override
    public boolean onOptionsItemSelected(@NonNull MenuItem item) {
        int id = item.getItemId();
        if (id == R.id.item1) {
            Toast.makeText(this, "Item 1 selected", Toast.LENGTH_SHORT).show();
        } else if (id == R.id.item2) {
            Toast.makeText(this, "Item 2 selected", Toast.LENGTH_SHORT).show();
        } else if (id == R.id.item3) {
            Toast.makeText(this, "Item 3 selected", Toast.LENGTH_SHORT).show();
        } else {
            return super.onOptionsItemSelected(item);
        }
        return true;
    }
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
```

```xml
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello World!"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

c]menu.xml:
```xml
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android">
    <item
        android:title="@string/item1"
        android:id="@+id/item1"/>
    <item
        android:title="@string/item2"
        android:id="@+id/item2"/>
    <item
        android:title="@string/item3"
        android:id="@+id/item3"/>
</menu>
```

c] strings.xml:
```xml
<resources>
    <string name="app_name">MenuOptions</string>
    <string name="item1">Item 1</string>
    <string name="item2">Item 2</string>
    <string name="item3">Item 3</string>
</resources>
```

d] themes.xml:

```xml
<resources xmlns:tools="http://schemas.android.com/tools">
    <!-- Base application theme. -->
    <style name="Base.Theme.MenuOptions"
parent="Theme.AppCompat.DayNight.DarkActionBar">
        <!-- Customize your light theme here. -->
        <!-- <item name="colorPrimary">@color/my_light_primary</item> -->
    </style>

    <style name="Theme.MenuOptions" parent="Base.Theme.MenuOptions" />
</resources>
```

e] themes.xml:

```xml
<resources xmlns:tools="http://schemas.android.com/tools">
    <!-- Base application theme. -->
    <style name="Base.Theme.MenuOptions"
parent="Theme.AppCompat.DayNight.DarkActionBar">
        <!-- Customize your dark theme here. -->
        <!-- <item name="colorPrimary">@color/my_dark_primary</item> -->
    </style>
</resources>
```
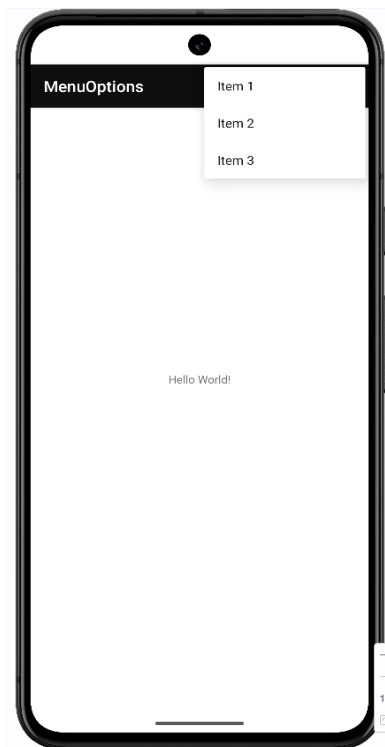
B] O/P:
a] Homepage:

b] After clicking Menu button:

c] After clicking one of the menu buttons:

2.Context Menu:

2.A] Code:
a] MainActivity.java:

```java
package com.example.contextmenu;

import android.os.Bundle;
import android.view.ContextMenu;
import android.view.MenuInflater;
import android.view.MenuItem;
import android.view.View;
import android.widget.ArrayAdapter;
import android.widget.ListView;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
/** @noinspection RedundantCast, CStyleArrayDeclaration */
public class MainActivity extends AppCompatActivity {
    ListView listView;
    String contacts[]={"Abhishek","Ashish","Piyush","Shraddha","Chaitali"};
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        listView=(ListView)findViewById(R.id.listView);
        ArrayAdapter<String> adapter= new ArrayAdapter<>(this,
android.R.layout.simple_list_item_1, contacts);
        listView.setAdapter(adapter);
        registerForContextMenu(listView);
    }
    @Override
    public void onCreateContextMenu(ContextMenu menu, View v,
ContextMenu.ContextMenuInfo menuInfo) {
        super.onCreateContextMenu(menu, v, menuInfo);
        MenuInflater inflater = getMenuInflater();
        inflater.inflate(R.menu.mainmenu, menu);
        menu.setHeaderTitle("Select The Action");
    }
    @Override
    public boolean onContextItemSelected(MenuItem item){
        if(item.getItemId()==R.id.call) {
            Toast.makeText(getApplicationContext(), "calling code",
Toast.LENGTH_LONG).show();
        }
        else if(item.getItemId()==R.id.sms){
            Toast.makeText(getApplicationContext(),"sending sms
code",Toast.LENGTH_LONG).show();
        }else{
```

```java
            return false;
        }
        return true;
    }
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity"
    tools:ignore="VisualLintBounds">
    <ListView
        android:id="@+id/listView"
        android:layout_width="334dp"
        android:layout_height="441dp"
        android:layout_marginStart="8dp"
        android:layout_marginTop="132dp"
        android:layout_marginEnd="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.295"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

c] mainmenu.xml:
```xml
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android">
    <item
        android:id="@+id/call"
        android:title="@string/call" />
    <item android:id="@+id/sms"
        android:title="@string/sms" />
</menu>
```
d] strings.xml:

```xml
<resources>
    <string name="app_name">ContextMenu</string>
    <string name="call">Call</string>
    <string name="sms">SMS</string>
</resources>
```
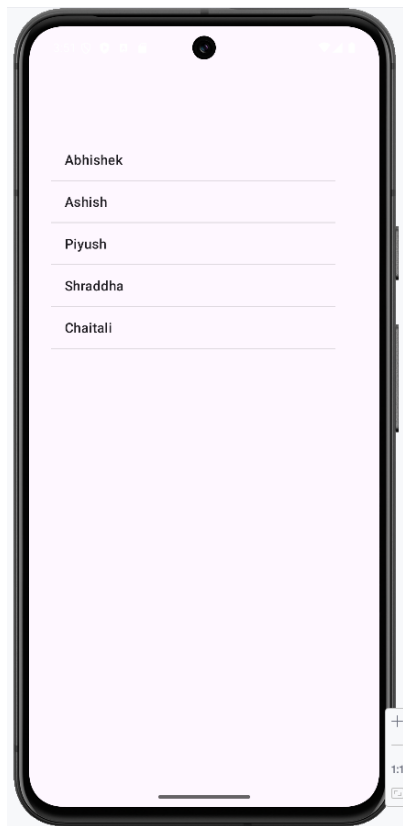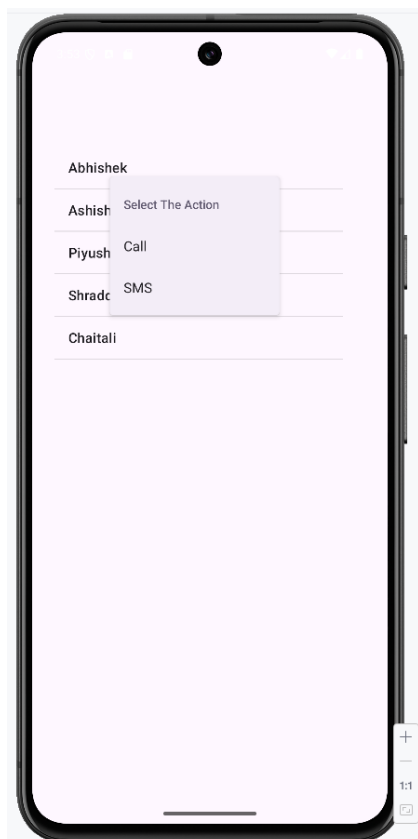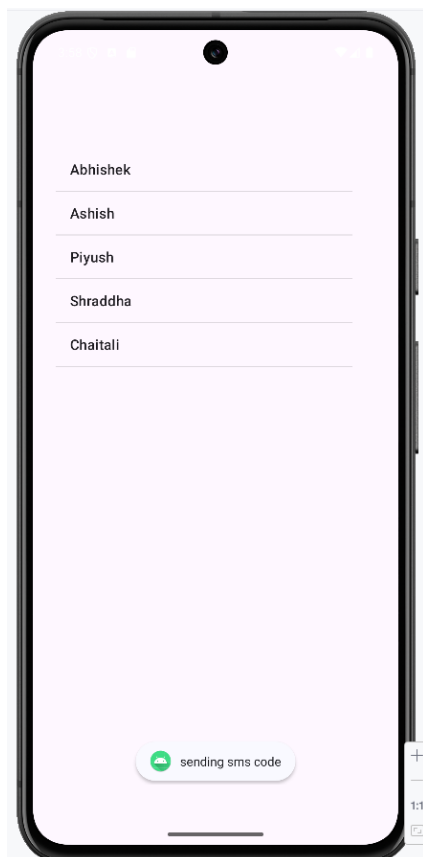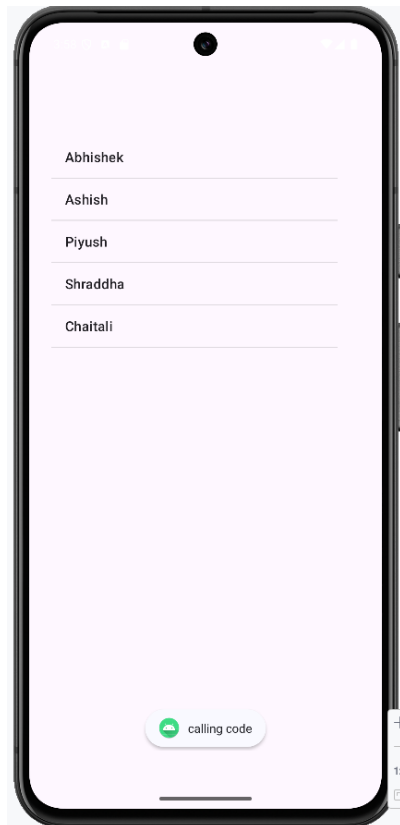
B] O/P:

a] Homepage:

b] After clicking Contex-Menu button:

c] After clicking one of the menu buttons:

Abhishek
Ashish
Piyush
Shraddha
Chaitali

calling code

Abhishek
Ashish
Piyush
Shraddha
Chaitali

sending sms code

3.Popup Menu:

3.A] Code:

a] MainActivity.java:

```java
package com.example.popup_menu;

import android.os.Bundle;
import android.view.MenuItem;
import android.view.View;
import android.widget.Button;
import android.widget.PopupMenu;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
/** @noinspection Convert2Lambda*/
public class MainActivity extends AppCompatActivity {
    Button button;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        button = findViewById(R.id.button); // Casting is not needed
        button.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                PopupMenu popupMenu = new PopupMenu(MainActivity.this, button);
                popupMenu.getMenuInflater().inflate(R.menu.popup_menu,
popupMenu.getMenu());
                popupMenu.setOnMenuItemClickListener(new
PopupMenu.OnMenuItemClickListener() {
                    @Override
                    public boolean onMenuItemClick(MenuItem menuItem) {
                        Toast.makeText(MainActivity.this, "You Clicked " + menuItem.getTitle(),
Toast.LENGTH_SHORT).show();
                        return true;
                    }
                });
                popupMenu.show();
            }
        });
    }
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
```

```xml
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:gravity="center"
    android:orientation="vertical">
    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/show_popup_menu" />
</LinearLayout>
```

c] popup_menu.xml:
```xml
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android">
    <item android:id="@+id/one" android:title="@string/one" />
    <item android:id="@+id/two" android:title="@string/two" />
    <item android:id="@+id/three" android:title="@string/three" />
</menu>
```

d] strings.xml:

```xml
<resources>
    <string name="app_name">POPUP_MENU</string>
    <string name="show_popup_menu">Show Popup Menu</string>
    <string name="one">One</string>
    <string name="two">Two</string>
    <string name="three">Three</string>
</resources>
```
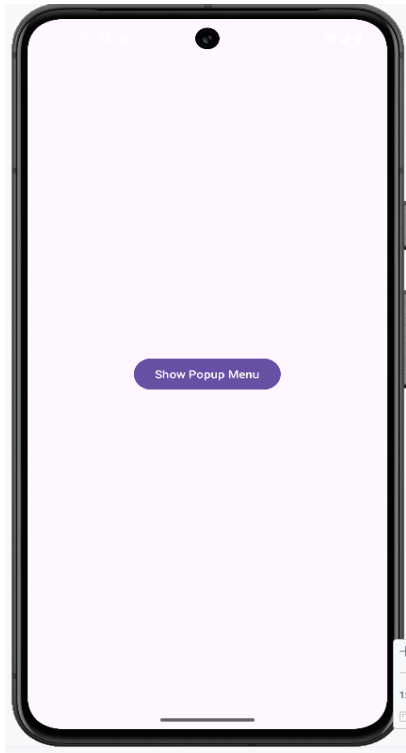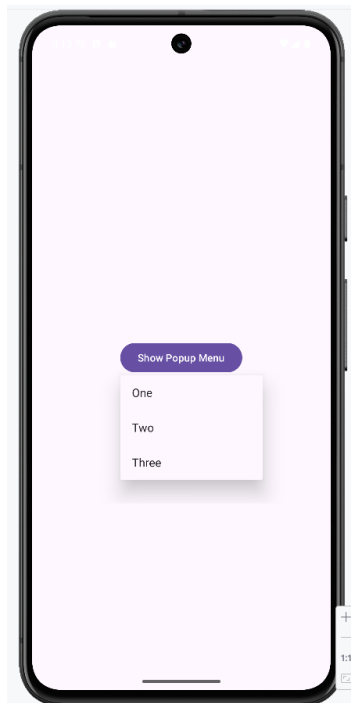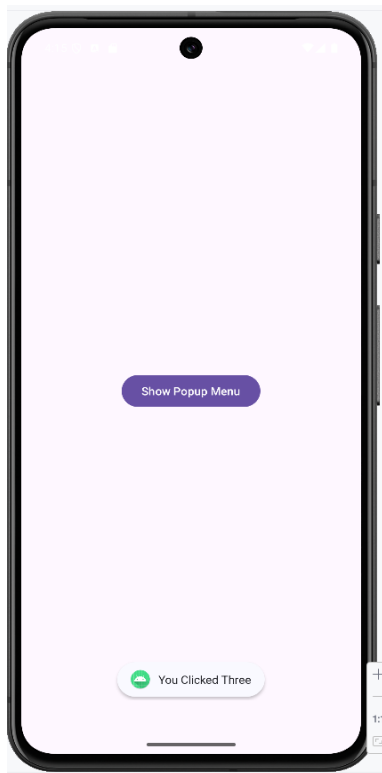
B] O/P:

a] Homepage:

b] After clicking Popup-Menu button:

c] After clicking one of the menu buttons:

11. Create application to demonstrate progress bar.

A] Code:
a] MainActivity.java:

```java
package com.example.progress_bar;

import android.os.Bundle;
import android.app.ProgressDialog;
import android.os.Handler;
import android.view.View;
import android.widget.Button;
import androidx.appcompat.app.AppCompatActivity;
/** @noinspection ALL*/
public class MainActivity extends AppCompatActivity {
    Button btnStartProgress;
    ProgressDialog progressBar;
    private int progressBarStatus = 0;
    private Handler progressBarHandler = new Handler();
    private long fileSize = 0;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        addListenerOnButtonClick();
    }
    public void addListenerOnButtonClick() {
        btnStartProgress = findViewById(R.id.button1);
        btnStartProgress.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                progressBar = new ProgressDialog(MainActivity.this);
                progressBar.setCancelable(true);
                progressBar.setMessage("File downloading.....");
                progressBar.setProgressStyle(ProgressDialog.STYLE_HORIZONTAL);
                progressBar.setProgress(0);
                progressBar.setMax(100);
                progressBar.show();
                progressBarStatus = 0;
                fileSize = 0;

                new Thread(new Runnable() {
                    @Override
                    public void run() {
                        while (progressBarStatus < 100) {
                            progressBarStatus = doOperation();
                            try {
```

```java
                    Thread.sleep(1000);
                } catch (InterruptedException e) {
                    e.printStackTrace();
                }
                progressBarHandler.post(new Runnable() {
                    @Override
                    public void run() {
                        progressBar.setProgress(progressBarStatus);
                    }
                });
            }
            if (progressBarStatus >= 100) {
                try {
                    Thread.sleep(1000);
                } catch (InterruptedException e) {
                    e.printStackTrace();
                }
                progressBar.dismiss();
            }
        }
    }).start();
    }
});
}

public int doOperation() {
    if (fileSize < 10000) {
        fileSize += 1000;  // Increment by 1000 for a smoother progress
        return (int) ((fileSize / 10000.0) * 100); // Return percentage
    }
    return 100;  // Once fileSize reaches 10000, return 100%
    }
}
```

b] activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentTop="true"
```

```
            android:layout_centerHorizontal="true"
            android:layout_marginTop="116dp"
            android:text="@string/download_file"/>
</RelativeLayout>
```

c] strings.xml:
```
<resources>
    <string name="app_name">Progress_Bar</string>
    <string name="download_file">Download File</string>
</resources>
```

B] O/P:
a] Homepage:

b] After clicking the download button: