Course Details

Course Name :Mobile Application Development

Course Code : 18CSMP68

Course prerequisite: Core Java

Course Objectives

Upon completion of this course, students are expected to:

1. Learn and acquire the art of Android Programming.
2. Configure Android studio to run the applications.
3. Understand and implement Android's User interface functions.
4. Create, modify and query on SQLite database.
5. Inspect different methods of sharing data using services.

Course Outcomes

After successful completion of the Course, the participants will be able to

Course Outcomes	
18CSMP68.1	Learn and acquire the art of Android Programming.
18CSMP68.2	Configure Android studio to run the applications.
18CSMP68.3	Understand and implement Android's User interface functions.
18CSMP68.4	Create, modify and query on SQlite database.
18CSMP68.5	Inspect different methods of sharing data using services.
18CSMP68.6	Design and develop a mini project to demonstrate various android application.

Course Outcomes – Program Outcomes Correlation Matrix																
COURSE OUTCOMES		**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
C18CSMP68.1	**CO1**	3	1	2		3				3				2	2	
C18CSMP68.2	**CO2**	3	1	2		3				2				1		
C18CSMP68.3	**CO3**	2	1	3		3				3				2	2	
C18CSMP68.4	**CO4**	3	2	3		3				3				1	2	
C18CSMP68.5	**CO5**	3	2	3		3				3				2	2	
C18CSMP68.6	**CO6**			3	3	2				2	2	1	2			2

Procedure to Conduct Practical Examination

Experiment distribution

- For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

Change of experiment is allowed only once and marks allotted for procedure to be madezero of the changed part only.

Marks Distribution (Coursed to change in accordance with university regulations)

- For laboratories having only one part –
  Procedure + Execution + Viva-Voce: 15+70+15= 100 Marks
- For laboratories having PART A and PART B
  Part A – Procedure + Execution + Viva = 6 + 28 + 6 = 40 Marks
  Part B – Procedure + Execution + Viva = 9 + 42 + 9 = 60 Marks

SYLLABUS
MOBILE APPLICATION DEVELOPMENT

Subject Code: 18CSMP68	**IA Marks: 40**
No. of Practical Hrs. / Week: 0:0:2	**Exam Marks: 60**
Total No. of Practical Hrs: 3 Hours/Week	**Exam Hours: 03**
	No. of Credits: 02

Descriptions (if any):

1. The installation procedure of the Android Studio/Java software must be demonstrated and carried out in groups.
2. Students should use the latest version of Android Studio/Java/ Kotlin to execute these programs. Diagrams given are for representational purposes only, students are expected to improvise on them.
3. Part B programs should be developed as an application and are to be demonstrated as a mini project in a group by adding extra features or the students can also develop their application and demonstrate it as a mini-project. (Projects/programs are not limited to thelist given in Part B).

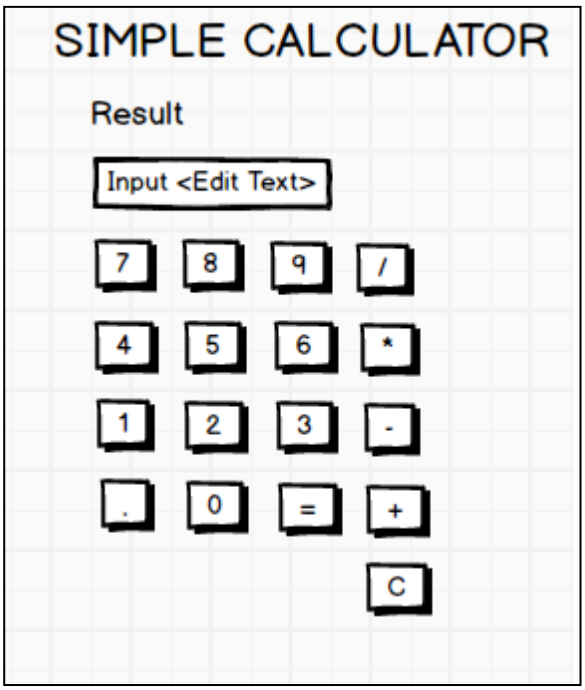
PART A

Program 1

Create an application to design a Visiting Card. The Visiting card should have a company logo at the top right corner. The company name should be displayed in Capital letters, aligned to the center. Information like the name of the employee, job title, phone number, address, email, fax and the website address is to be displayed. Insert a horizontal line between the job title and the phone number.

Program 2

Develop an Android application using controls like Button, TextView, EditText for designing aCalculator having basic functionality like Addition, Subtraction, Multiplication, and Division.

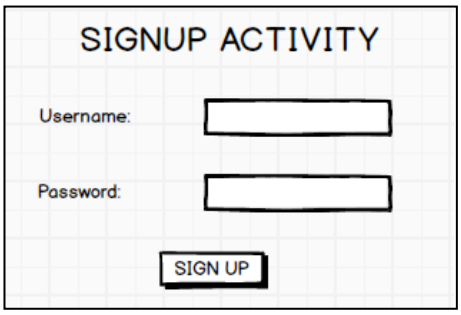


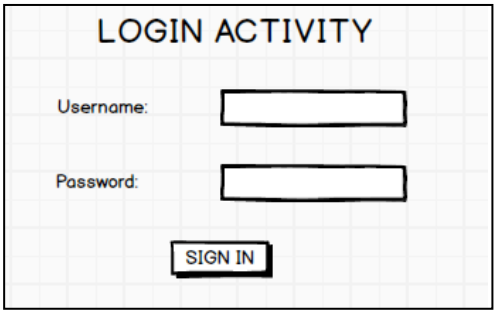
Program 3

Create a SIGN Up activity with Username and Password. Validation of password should happen based on the following rules:

- Password should contain uppercase and lowercase letters.
- Password should contain letters and numbers.
- Password should contain special characters.
- Minimum length of the password (the default value is 8).

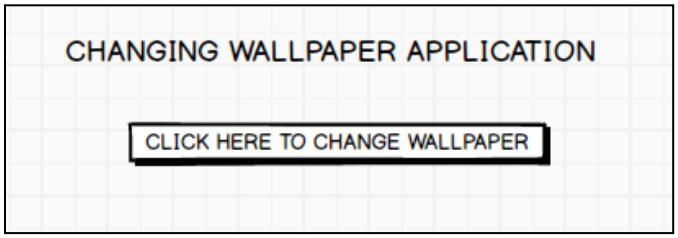
On successful **SIGN UP** proceed to the next Login activity. Here the user should **SIGN IN** using the Username and Password created during signup activity. If the Username and Password are matched then navigate to the next activity which displays a message saying "Successful Login" or else display a toast message saying "Login Failed". The user is given only two attempts and after that display a toast message saying "Failed Login Attempts" and disable the SIGN IN button.Use Bundle to transfer information from one activity to another.





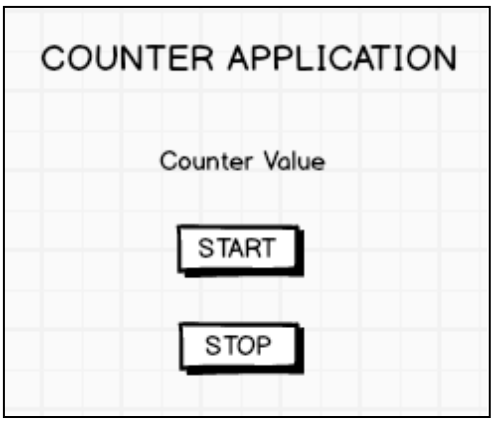
Program 4

Develop an application to set an image as wallpaper. On click of a button, the wallpaper image should start to change randomly every 30 seconds.



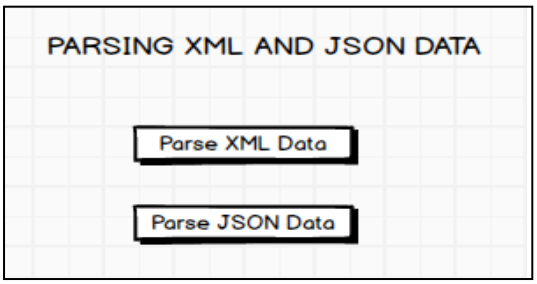
Program 5

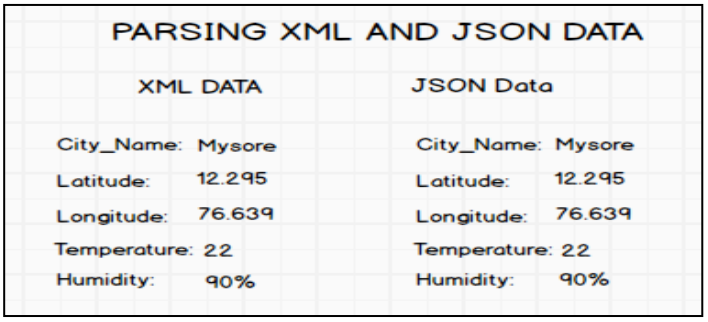
Write a program to create an activity with two buttons START and STOP. On Pressing of the START button, the activity must start the counter by displaying the numbers from One and the counter must keep on counting until the STOP button is pressed. Display the counter value in a TextView control.



Program 6

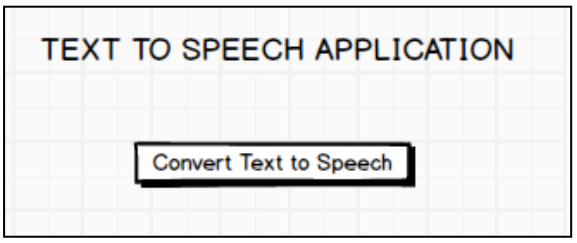
Create two files of XML and JSON type with values for City_Name, Latitude, Longitude, Temperature, and Humidity. Develop an application to create an activity with two buttons to parsethe XML and JSON files which when clicked should display the data in their respective layouts side by side.





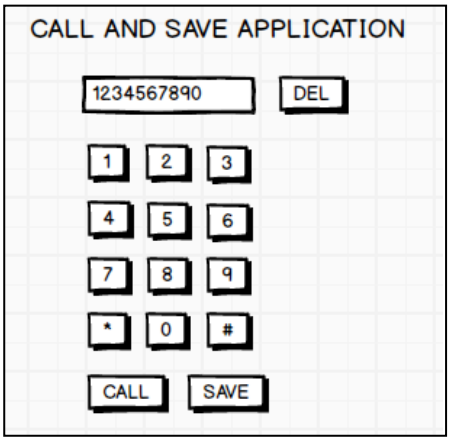
Program 7

Develop a simple application with one Edit Text so that the user can write some text in it. Createa button called “Convert Text to Speech” that converts the user input text into voice.



Program 8

Create an activity like a phone dialer with CALL and SAVE buttons. On pressing the CALL button, it must call the phone number and on pressing the SAVE button it must save the number to the phone contacts.


CALL AND SAVE APPLICATION
1234567890
DEL
1
2
3
4
5
6
7
8
9
*
0
#
CALL
SAVE

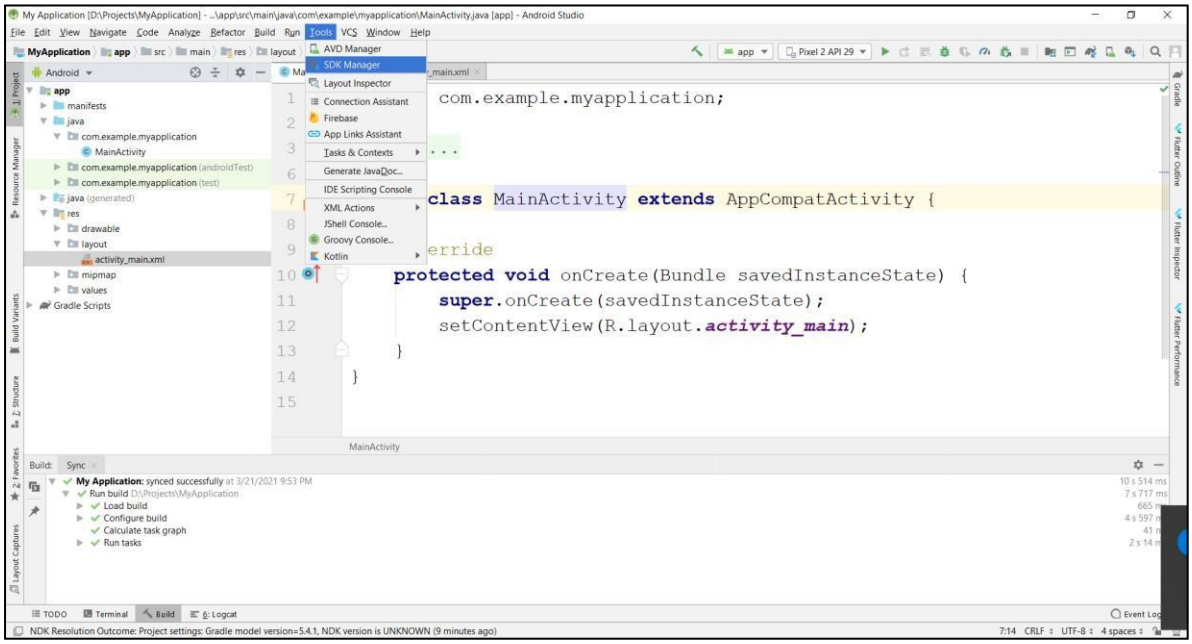
1. Android Studio Tutorials

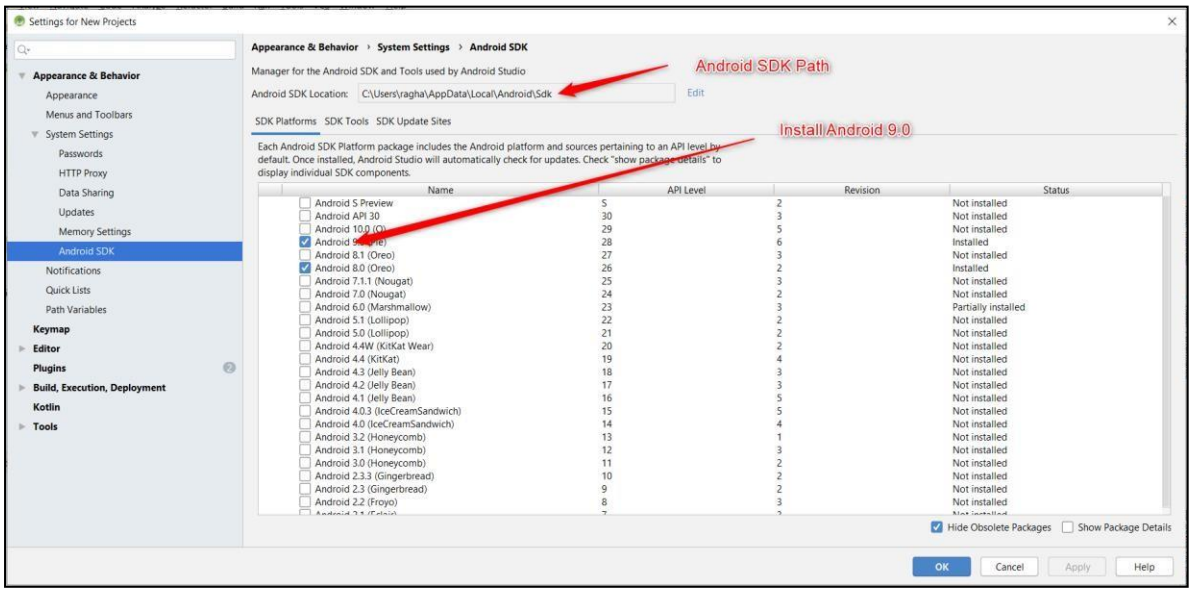
1.1 Install Android Studio and Packages:

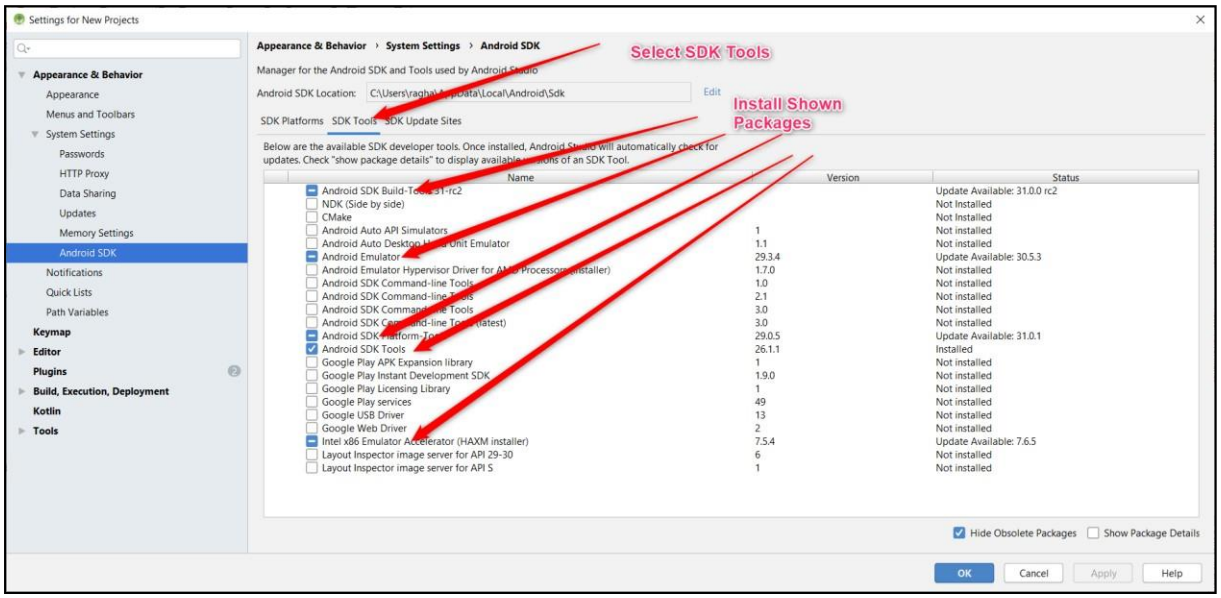
Download Android Version 4.0.2 from the below link
https://redirector.gvt1.com/edgedl/android/studio/install/4.0.2.0/android-studio-ide- 193.6821437-windows.exe

1.2 Configure Android SDK packages:

Go to Tools → SDK Manager

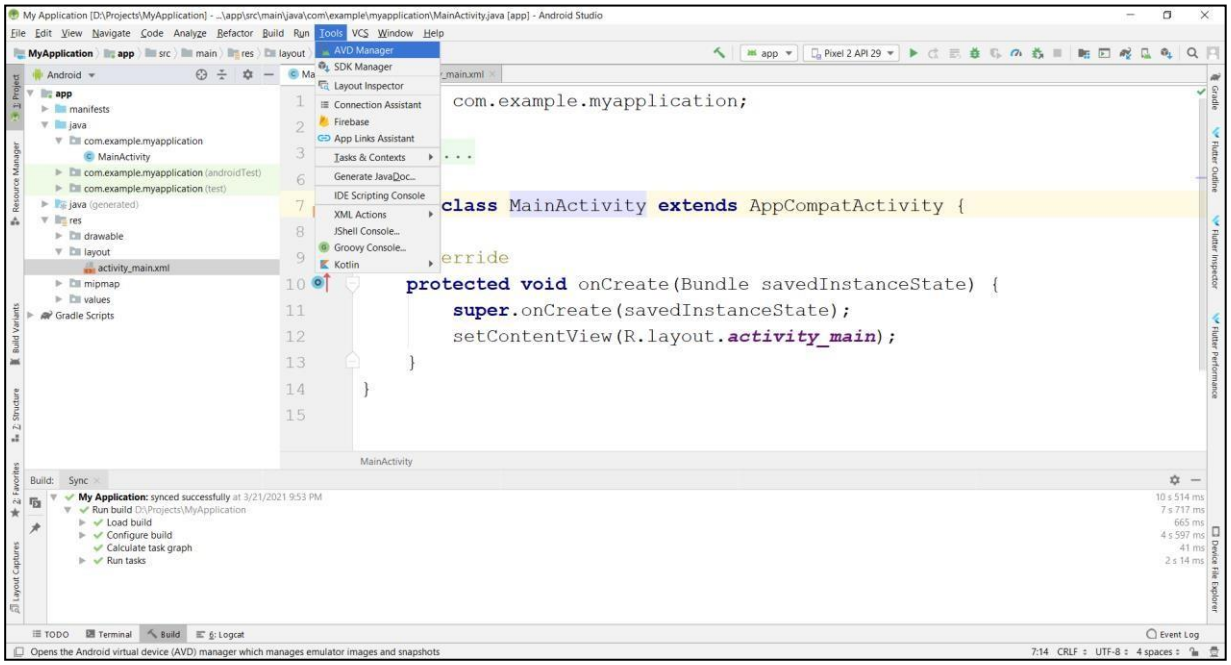


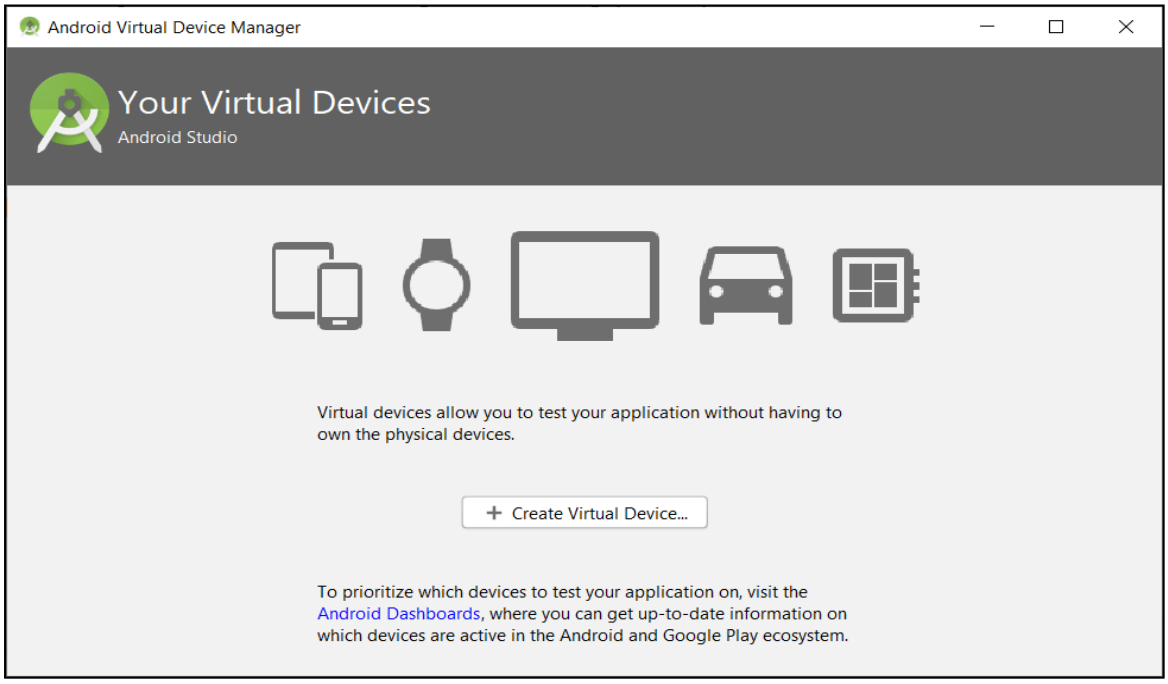




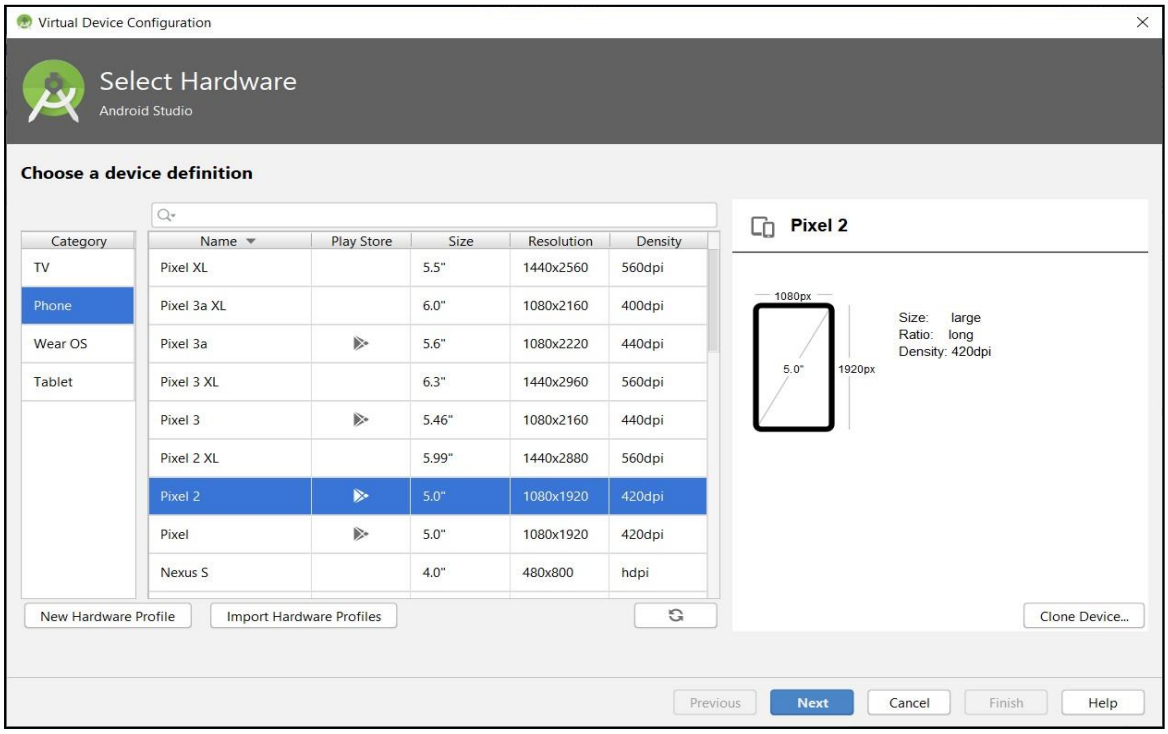
1.3 Creating Emulator

Go to Tools → Select AVD Manager

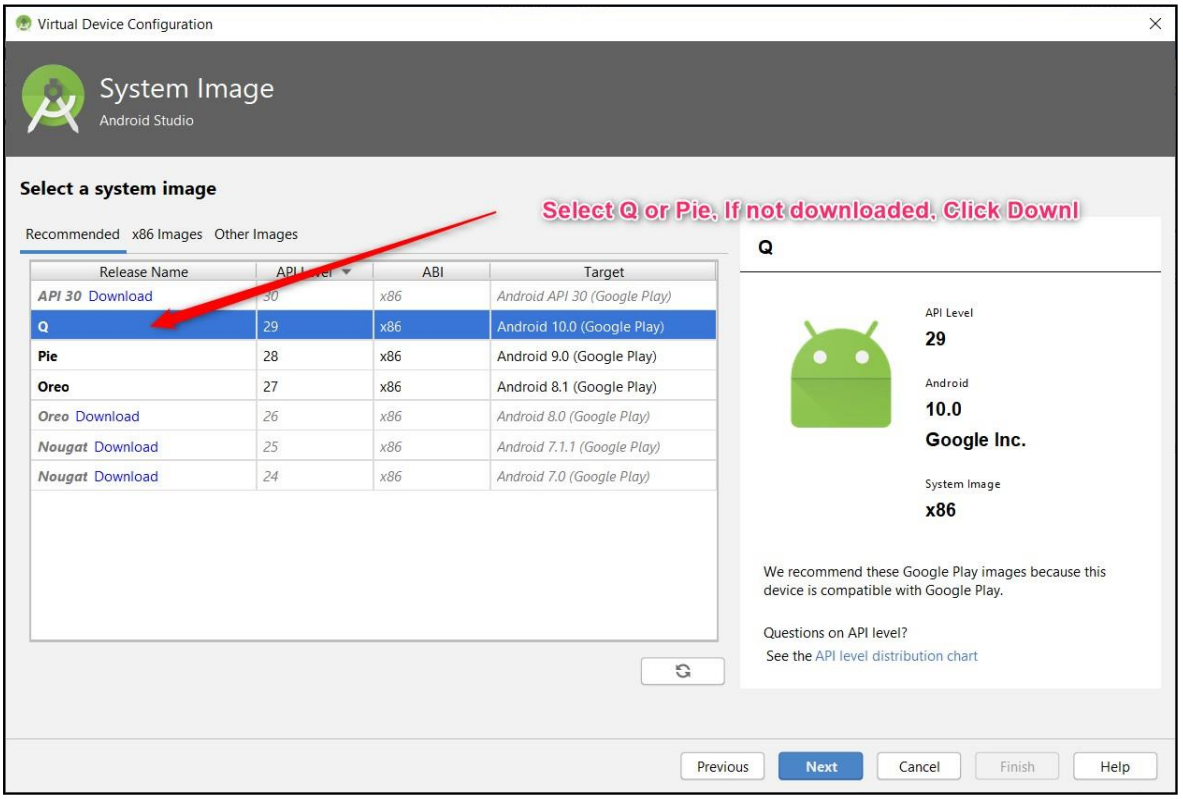




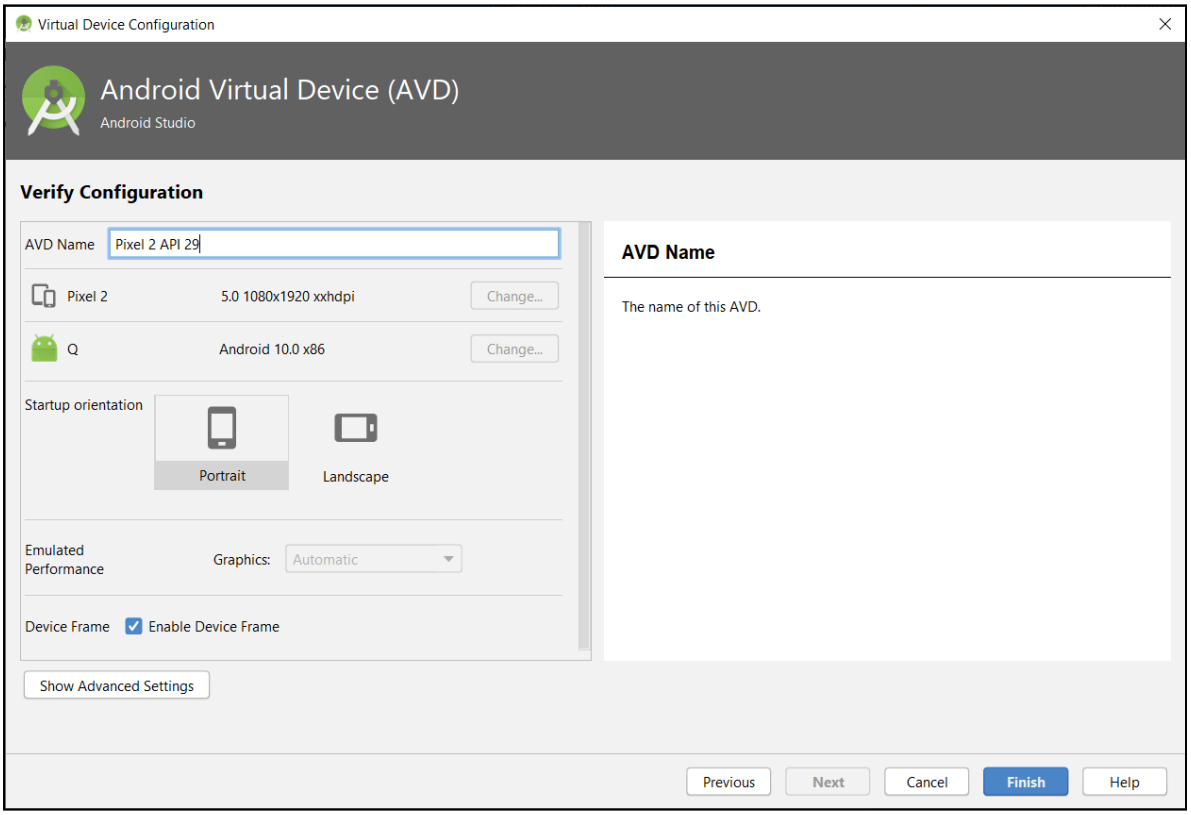
Select Create Virtual Device →Select Phone →Pixel 2 → Press Next



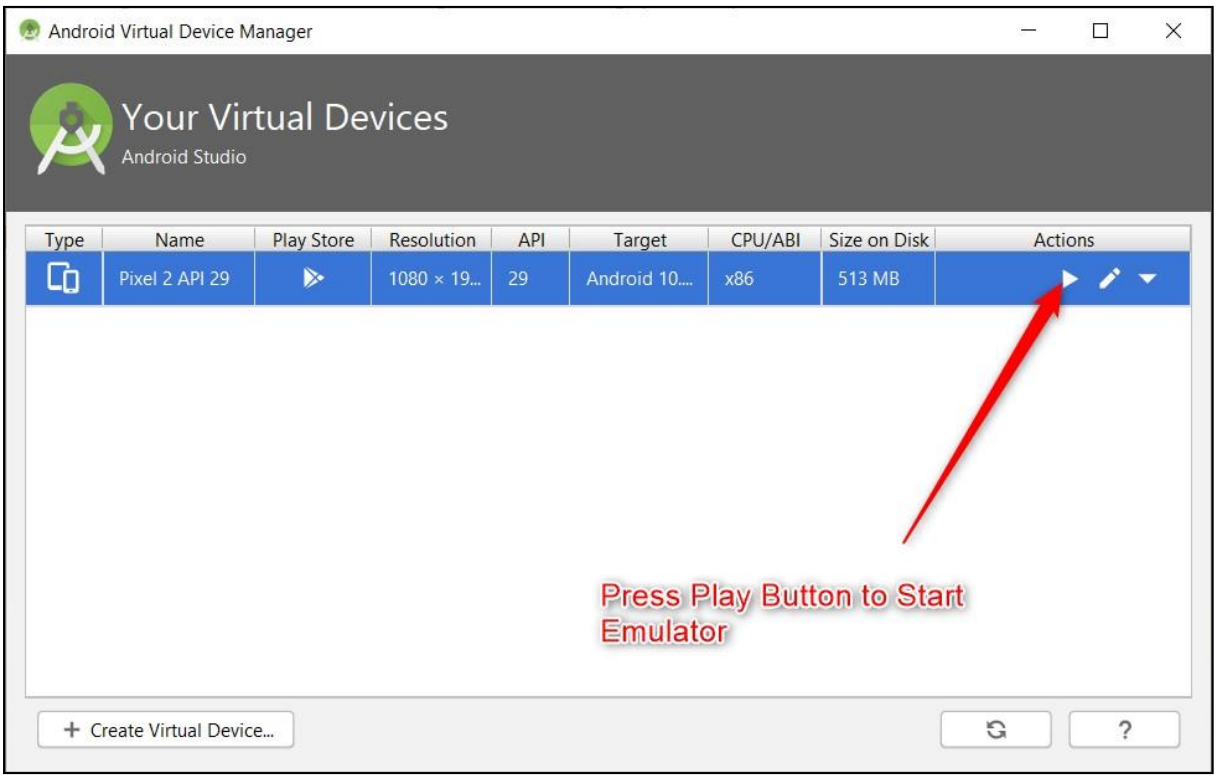
Select Android Q, if not already downloaded press download, After download completes SelectQ and Press Next Button.

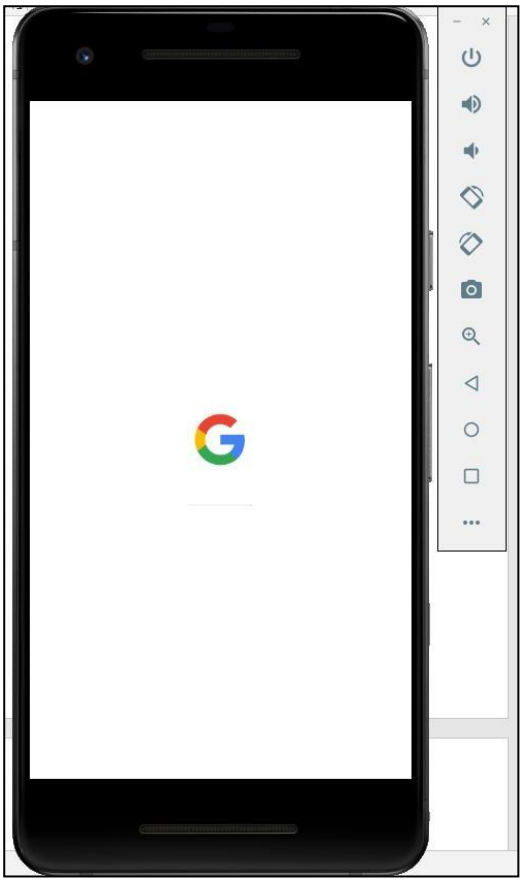


Enter AVD Name and Press Finish.



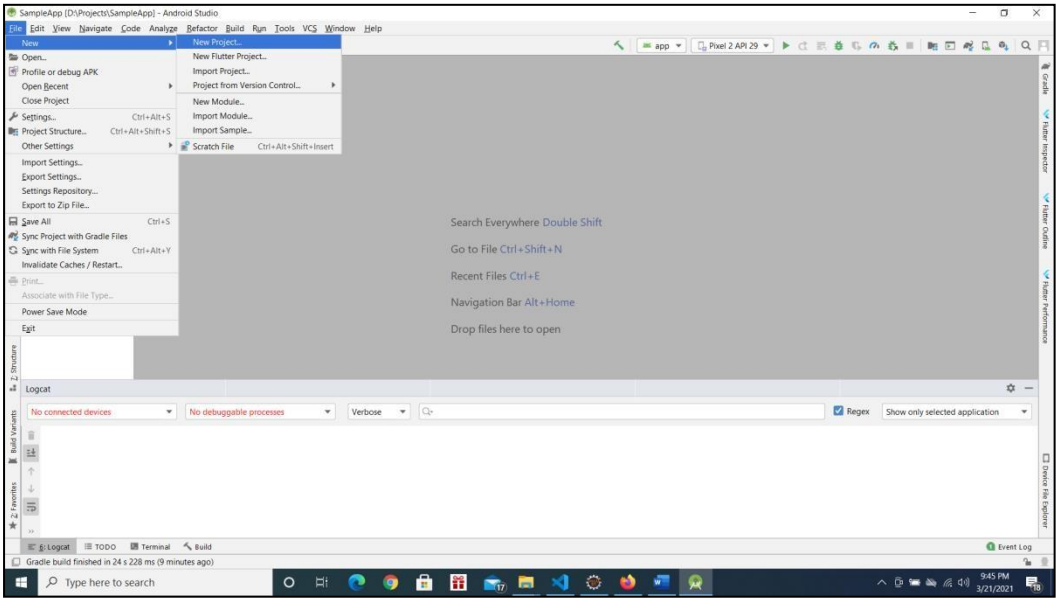
Press Play Button to Start Emulator


Android Virtual Device Manager
Your Virtual Devices
Android Studio
Type
Name
Play Store
Resolution
API
Target
CPU/ABI
Size on Disk
Actions
Pixel 2 API 29
1080 × 19...
29
Android 10....
x86
513 MB
Press Play Button to Start Emulator
Create Virtual Device...

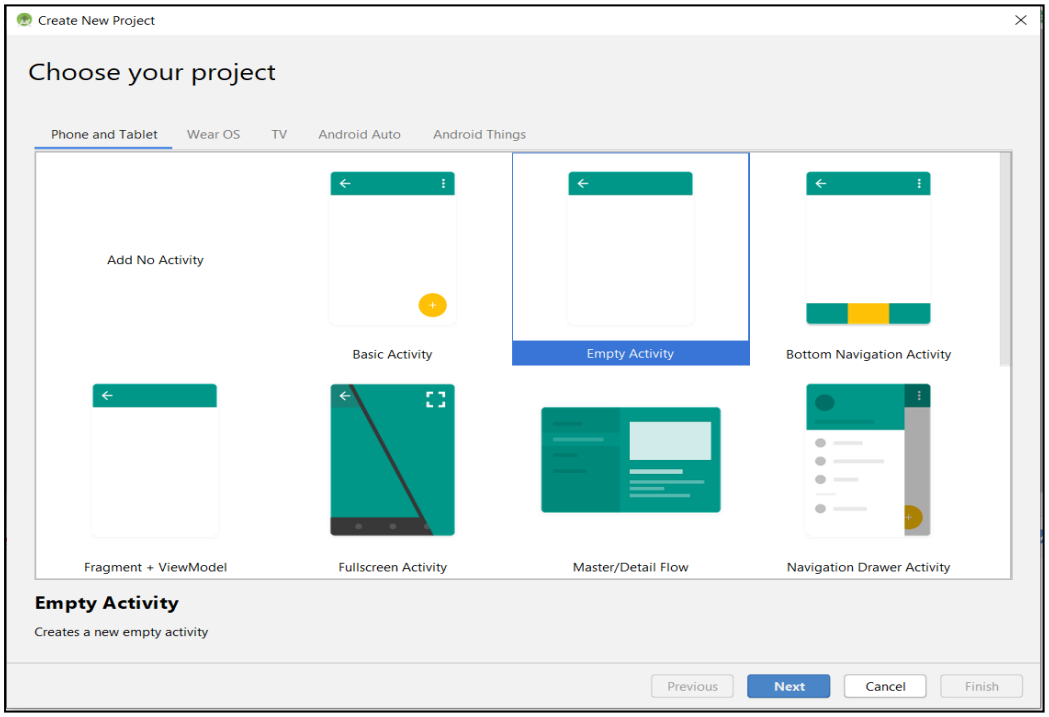


1.4 Creating a New Project in Android

While creating a New Project for First Time, make sure Android Studio is connected to internet,It downloads the required packages from internet.
Go to File →New →New Project



Choose Phone and Tablet → Empty Activity → Press Next



In Configure your Project Screen, Enter below details and Press Finish Button.
Enter Name of the Application → This will be application name this will be visible with HomeScreen Icon.

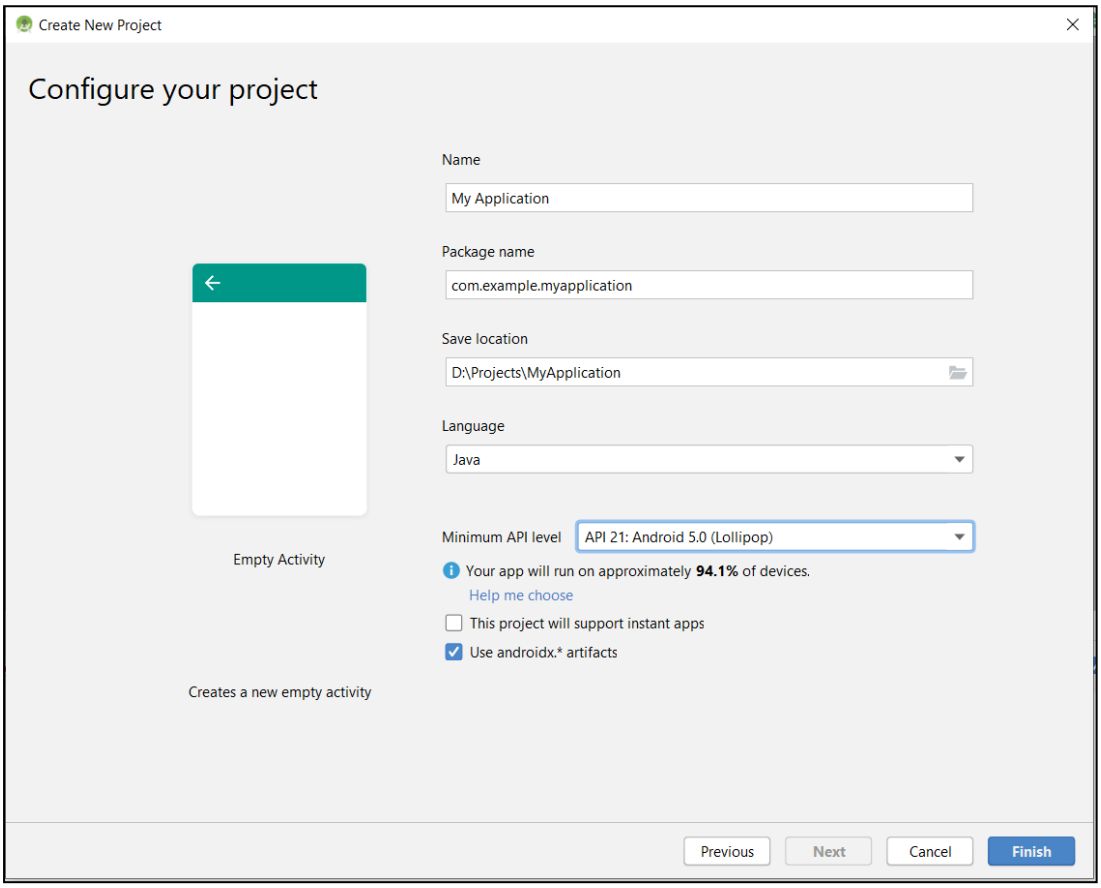
Package Name → Enter package name atleast two identifier (Eg: com.example). Best Practice is3 or more identifier (Eg: com.example.firstapp).

Save Location →Location where to save the

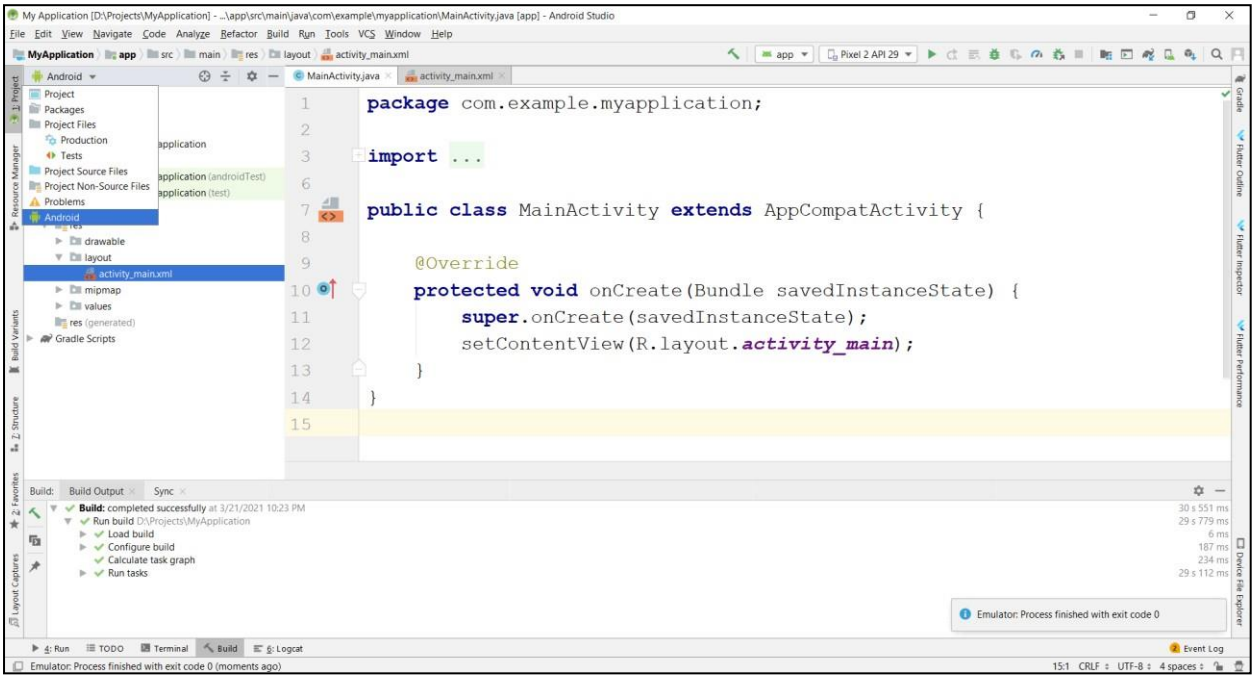
ProjectLanguage → Choose Java

Minimum API Level → Android 5.0

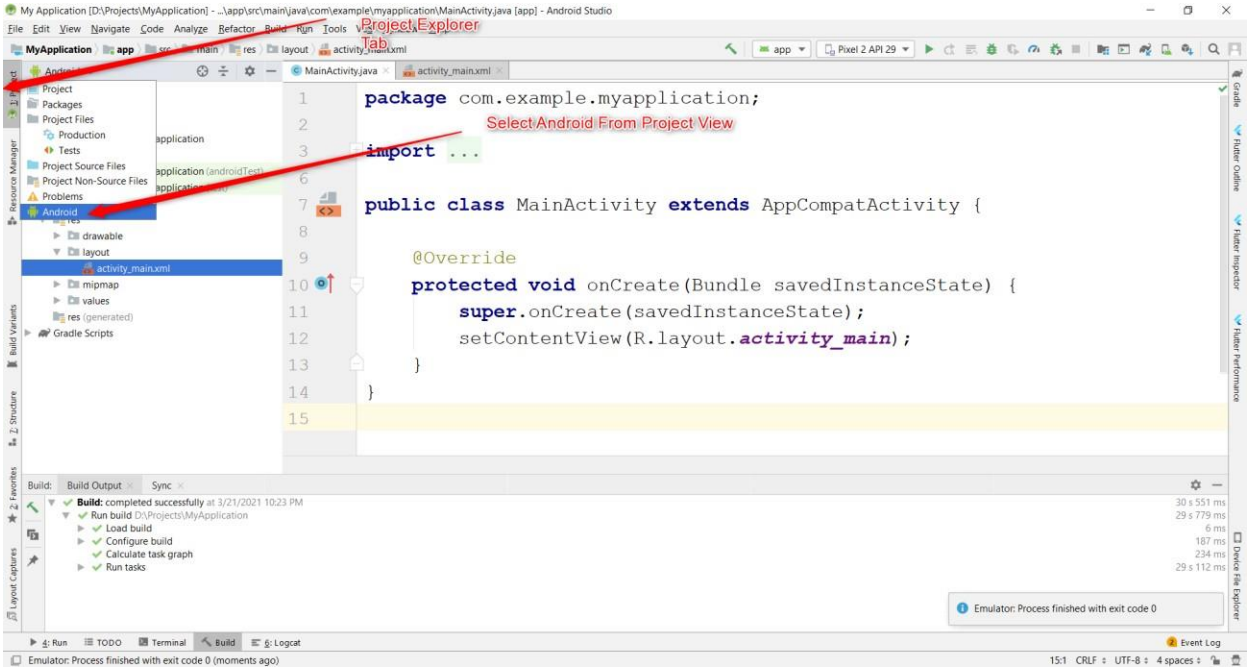
Select Checkbox Use androidx.artifacts folder as below screenshot.



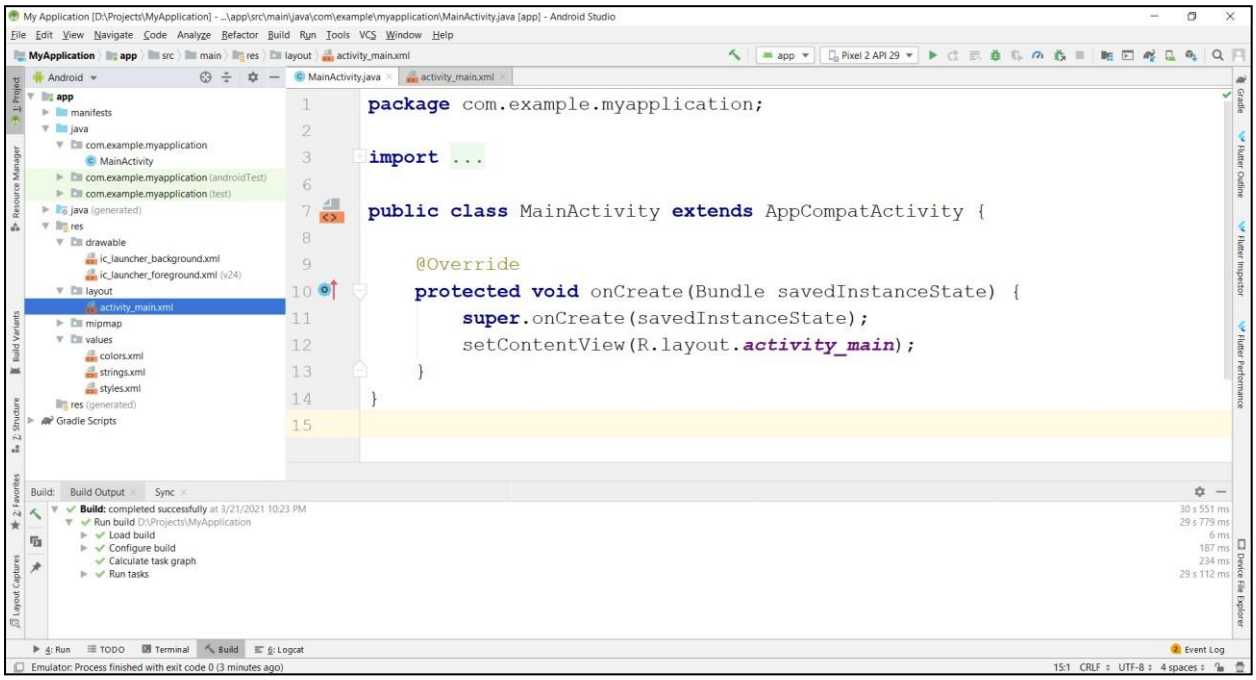
1.5 Android Project Structure:



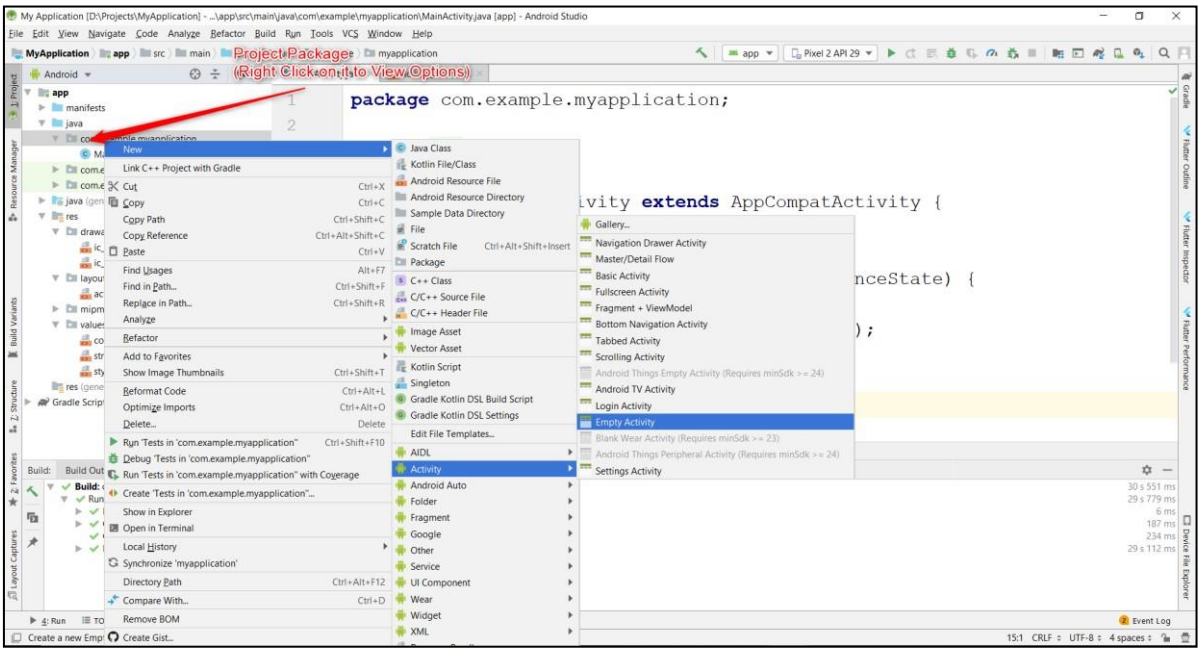
Select Project Explorer and Select Android from Project View



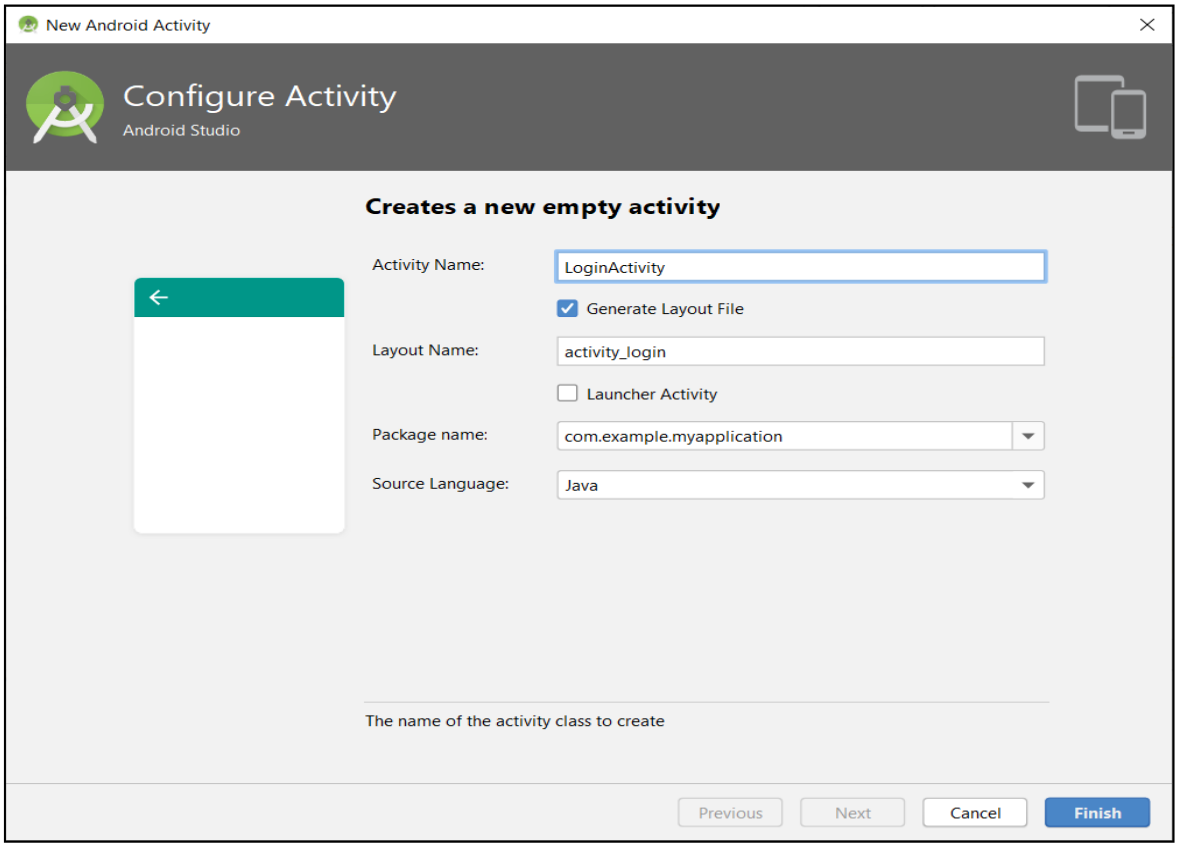
Basic View:

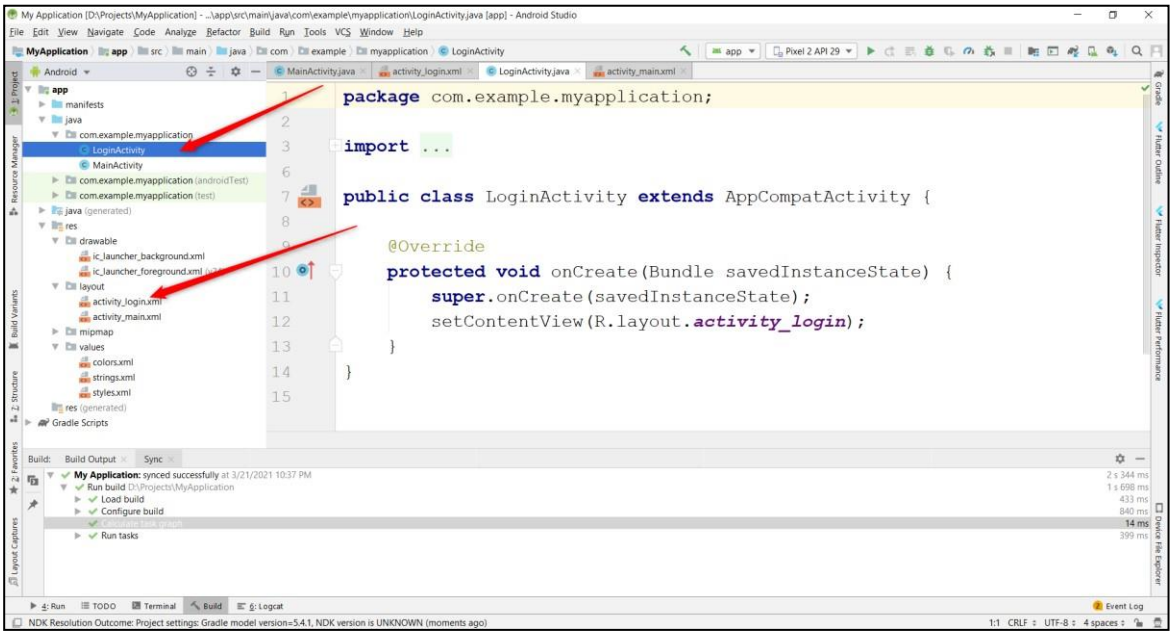


2. Importing an Existing Project in Android Studio
3. Creating an Activity in Android
   Right Click on Package → New → Activity→ Empty Activity



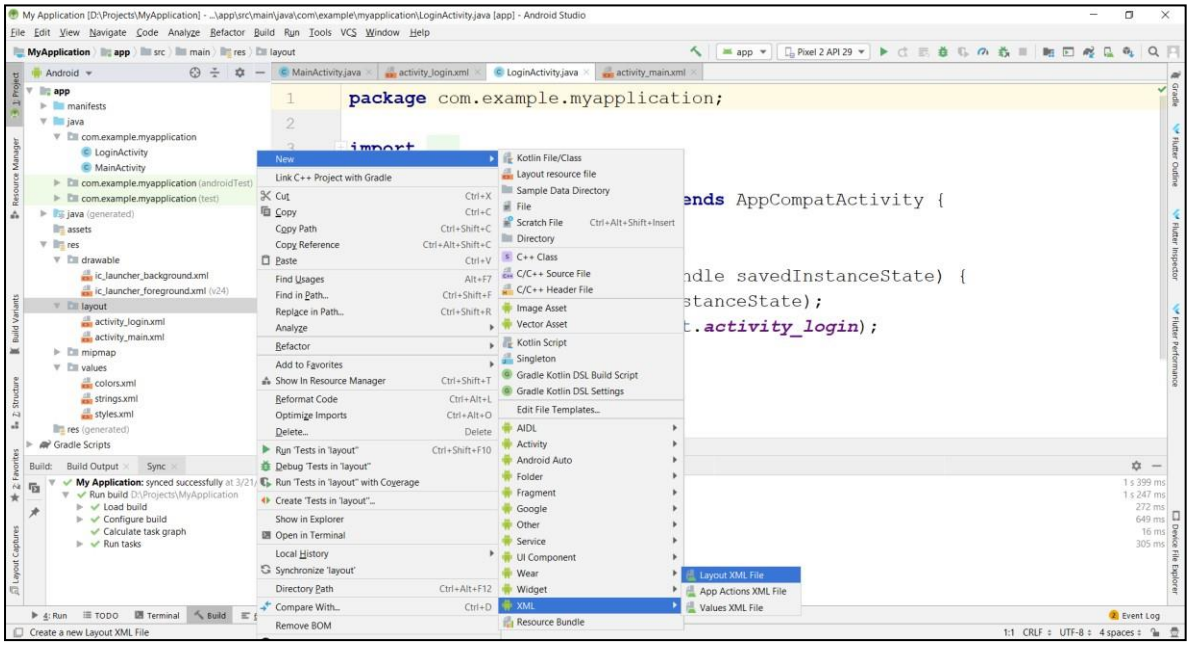
Enter Activity Name and Press Finish


New Android Activity
Configure Activity
Android Studio
Creates a new empty activity
Activity Name:
LoginActivity
Generate Layout File
Layout Name:
activity_login
Launcher Activity
Package name:
com.example.myapplication
Source Language:
Java
The name of the activity class to create
Previous
Next
Cancel
Finish

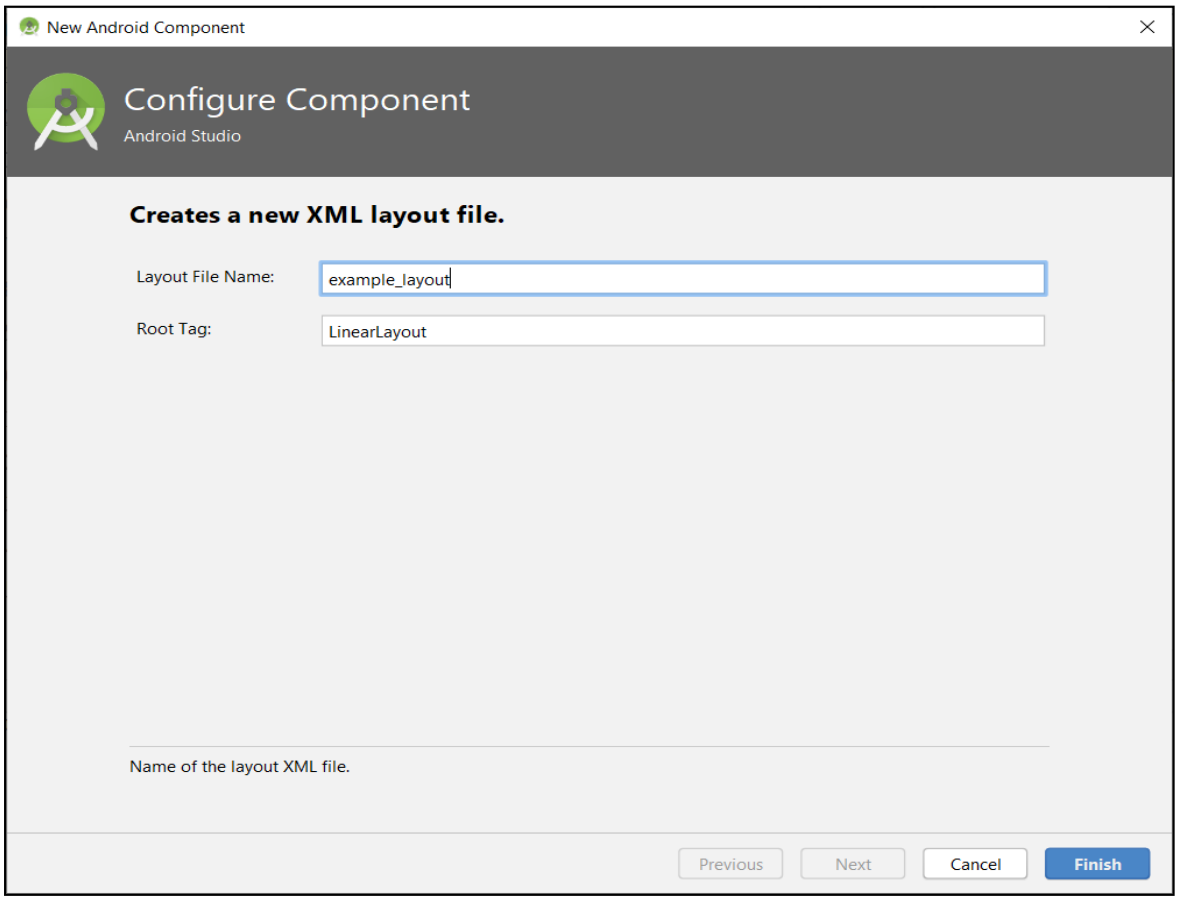

package com.example.myapplication;
import ...
public class LoginActivity extends AppCompatActivity {
@Override
protected void onCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_login);
}
}

1.6 Creating a Layout in Android

Right Click on Layout Folder → New → XML→Layout XML File

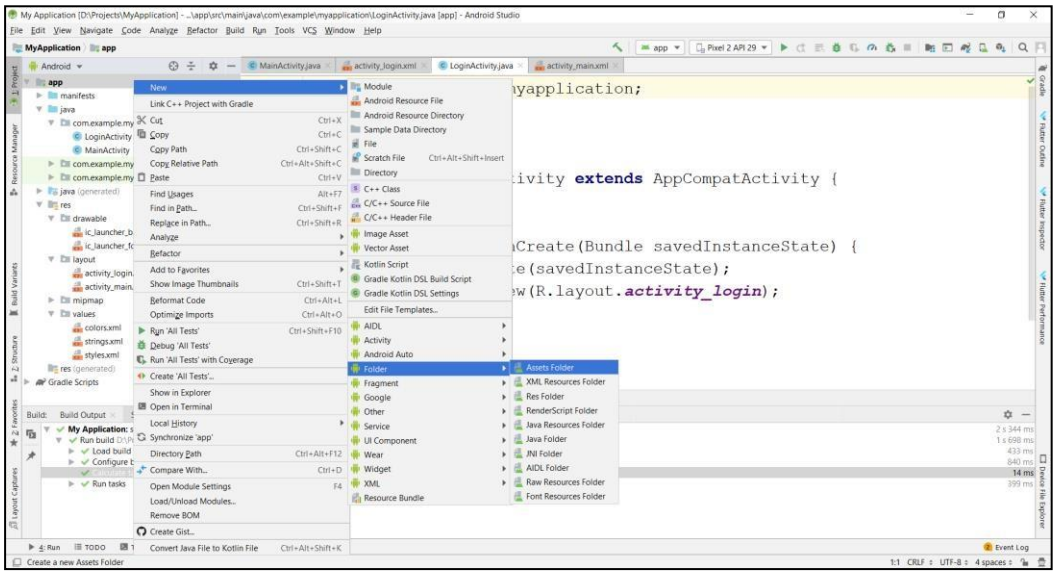


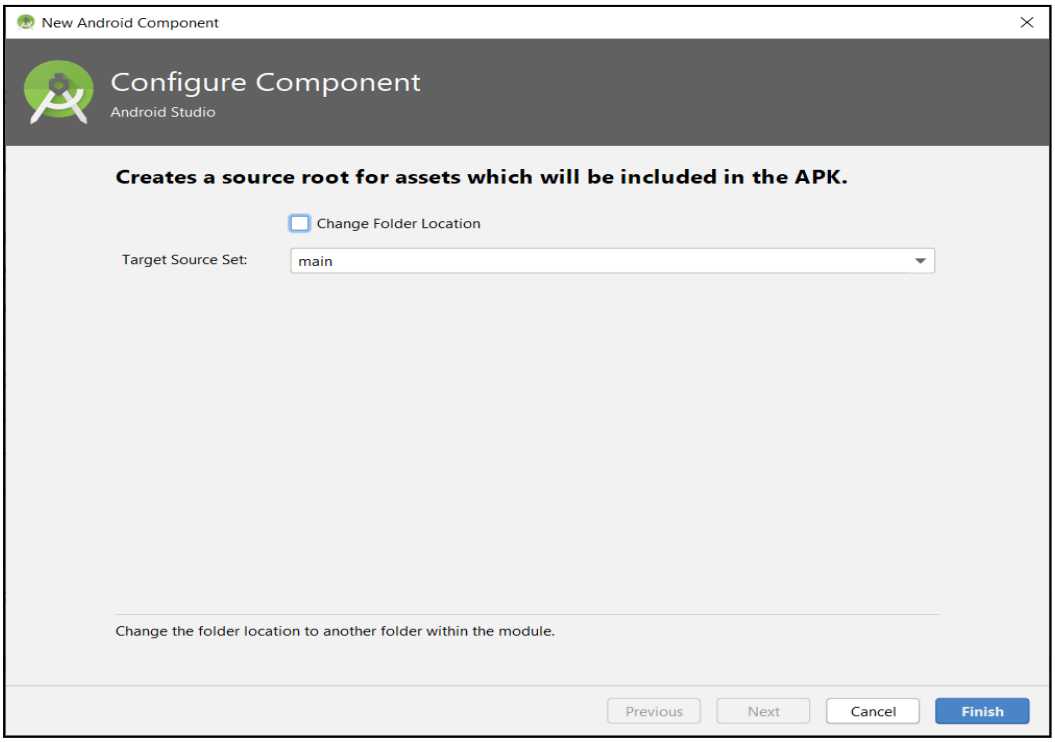
Enter xml file name and press Finish

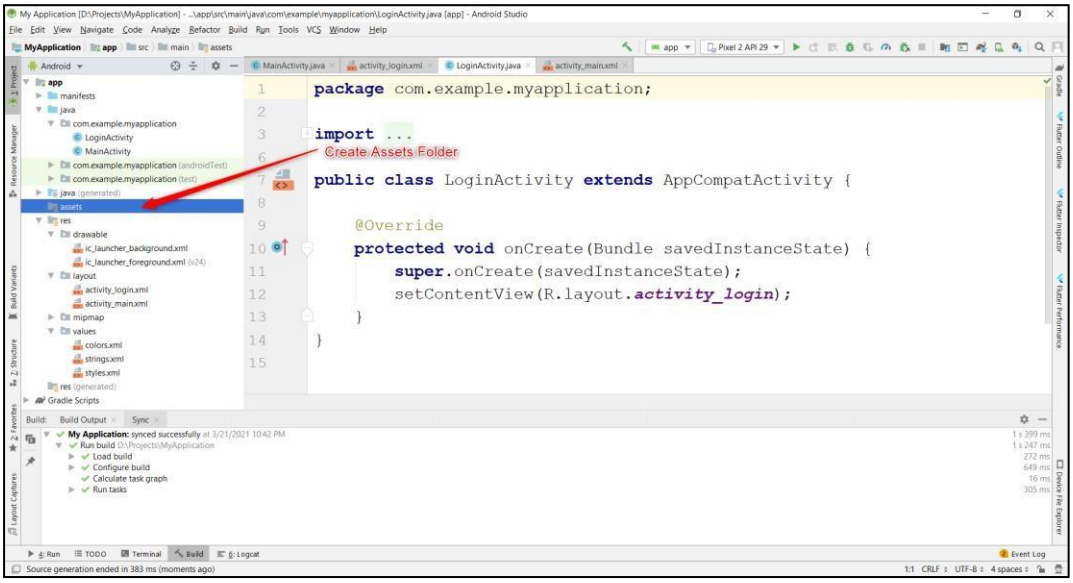


1.7 Creating Assets Folder in Android

Right Click on app folder → New → Folder → Assets Folder → Press Finish Button

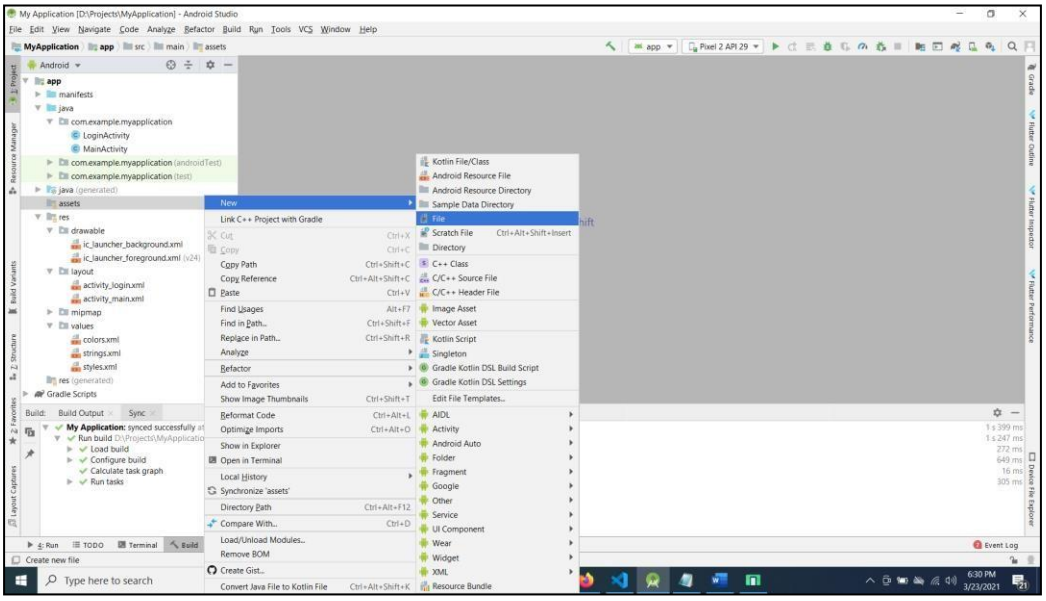




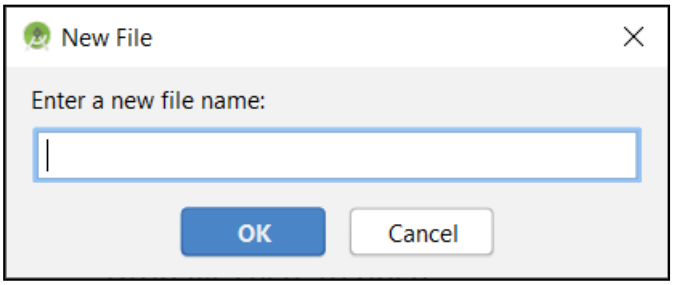


1.8 Creating File in assets Folder:

Right Click on assets folder → New → File

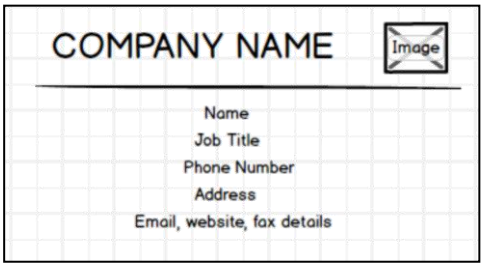


Enter filename with extension (Eg: abc.xml)



Program 1

Create an application to design a Visiting Card. The Visiting card should have a company logo atthe top right corner. The company name should be displayed in Capital letters, aligned to the center. Information like the name of the employee, job title, phone number, address, email, fax and the website address is to be displayed. Insert a horizontal line between the job title and the phone number.



1. Create a New Android Project with Empty Activity.
2. Open activity_main.xml file from res layout folder, check/add Linear Layout as the rootview.
3. Create layout using nested Relative Layout and TextView.
4. Use View background property to draw the line
5. Add Image to drawable folder and reference the image in the layout using@drawable/<image_name>
6. Use android:layout_gravity/android:gravity properties to center the components.

Design

activity_main.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:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity">
    <RelativeLayout
        android:layout_width="match_parent"
        android:layout_height="59dp">

        <TextView
            android:id="@+id/textView"
            android:layout_width="79dp"
            android:layout_height="42dp"
            android:layout_alignParentStart="true"
            android:layout_alignParentBottom="true"
            android:layout_marginStart="113dp"
            android:layout_marginLeft="20dp"
            android:layout_marginBottom="12dp"
            android:gravity="center"
            android:text="RNS IT"
            android:textColor="#E61717"
            android:textSize="20sp" />

        <ImageView
            android:id="@+id/imageView4"
            android:layout_width="48dp"
            android:layout_height="match_parent"
            android:layout_alignParentBottom="true"
            android:layout_marginLeft="88dp"
            android:layout_marginBottom="1dp"
            android:layout_toRightOf="@id/textView"
            app:srcCompat="@drawable/rnsit" />
    </RelativeLayout>
```

```
<View android:layout_width="match_parent"
    android:layout_height="2dp" android:background="#000000" />
<TextView android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Shwetha G N"
    android:textSize="16dp"
    android:layout_marginBottom="10dp"
    android:layout_marginTop="10dp"
    android:textColor="#000000"
    android:gravity="center" />
<TextView android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Asst prof"
    android:textSize="16dp"
    android:layout_marginBottom="10dp"
    android:layout_marginTop="10dp"
    android:textColor="#000000"
    android:gravity="center" />
<View
    android:layout_width="match_parent"
    android:layout_height="2dp"
    android:background="#000000" />
<TextView android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="+91-9108245345"
    android:textSize="16dp"
    android:layout_marginBottom="10dp"
    android:layout_marginTop="10dp"
    android:textColor="#000000"
    android:gravity="center" />
<TextView android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Bangalore"
    android:textSize="16dp"
    android:layout_marginBottom="10dp"
    android:layout_marginTop="10dp"
```

```
            android:textColor="#000000" android:gravity="center" />
        <TextView android:layout_width="match_parent"
            android:layout_height="wrap_content" android:text="Email:rnsit.ac.in"
            android:textSize="16dp"
            android:layout_marginBottom="10dp"
            android:layout_marginTop="10dp"
            android:textColor="#000000"
            android:gravity="center" />

    </LinearLayout>
```

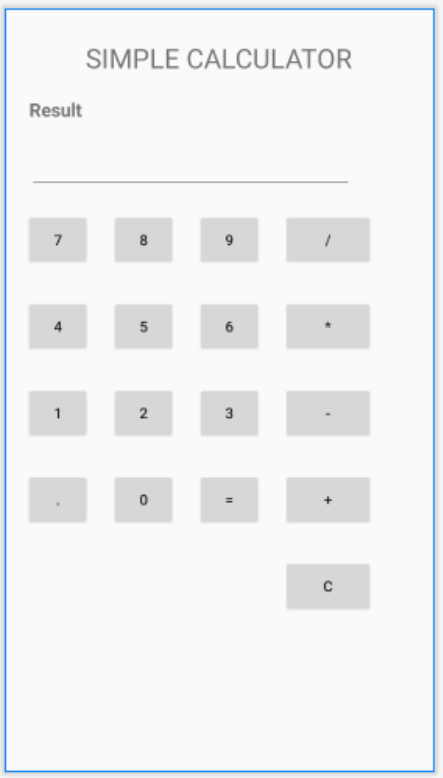
Sample Output:

Program 2

Develop an Android application using controls like Button, TextView, EditText for designing a Calculator having basic functionality like Addition, Subtraction, Multiplication, and Division.

1. Create a New Android Project with Empty Activity.
2. Open activity_main.xml file from res→ layout folder, check/add Constraint Layout as theroot view.
3. Create Layout using Drag and Drop framework.
4. Open MainActivty.java file, Override onCreate() method and bring activity_main.xml file on screen using setContentView() and bring the view references using findViewById() method.
5. Add Listeners to Button Click Event:
6. Create a class which implements OnClickListener interface.
7. Override onClick() method of OnClickListener Interface.
8. Register the button for click event by calling setOnClickListener() method of View class and pass the object of the class that implemented OnClickListener Interface.
9. Create a logic to Add/Subtract/Multiply/Divide to perform arithmetic operation on 2 operands (Eg: 10+20), If more than 2 operands or wrong input, display invalid input messages.

Design



activity_main.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:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <Button
        android:id="@+id/button_nine"
        android:layout_width="62dp"
        android:layout_height="48dp"
        android:text="9"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.123"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.467" />

    <Button
        android:id="@+id/button_zero"
        android:layout_width="63dp"
        android:layout_height="46dp"
        android:text="0"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.39"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.465"
        tools:ignore="TouchTargetSizeCheck" />

    <Button
        android:id="@+id/button_sub"
        android:layout_width="69dp"
        android:layout_height="49dp"
        android:text="-"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.953"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.463" />
```

```
<Button
    android:id="@+id/button_add"
    android:layout_width="65dp"
    android:layout_height="44dp"
    android:text="+"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.656"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.467"
    tools:ignore="TouchTargetSizeCheck" />

<Button
    android:id="@+id/button_equal"
    android:layout_width="62dp"
    android:layout_height="48dp"
    android:text="="
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.163"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.689" />

<Button
    android:id="@+id/button_mul"
    android:layout_width="62dp"
    android:layout_height="48dp"
    android:text="*"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.123"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.568" />

<Button
    android:id="@+id/button_div"
    android:layout_width="63dp"
    android:layout_height="46dp"
    android:text="/"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.39"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.566"
```

```
    tools:ignore="TouchTargetSizeCheck" />

<Button
    android:id="@+id/button_clear"
    android:layout_width="69dp"
    android:layout_height="49dp"
    android:text="C"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.953"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.564" />

<Button
    android:id="@+id/button_dot"
    android:layout_width="65dp"
    android:layout_height="44dp"
    android:text="."
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.656"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.567"
    tools:ignore="TouchTargetSizeCheck" />

<Button
    android:id="@+id/button_five"
    android:layout_width="62dp"
    android:layout_height="48dp"
    android:text="5"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.123"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.377" />

<Button
    android:id="@+id/button_six"
    android:layout_width="63dp"
    android:layout_height="46dp"
    android:text="6"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.39"
    app:layout_constraintStart_toStartOf="parent"
```

```
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.376"
    tools:ignore="TouchTargetSizeCheck" />

<Button
    android:id="@+id/button_eight"
    android:layout_width="69dp"
    android:layout_height="49dp"
    android:text="8"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.953"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.373" />

<Button
    android:id="@+id/button_seven"
    android:layout_width="65dp"
    android:layout_height="44dp"
    android:text="7"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.656"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.378"
    tools:ignore="TouchTargetSizeCheck" />

<Button
    android:id="@+id/button_one"
    android:layout_width="62dp"
    android:layout_height="48dp"
    android:text="1"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.123"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.281" />

<Button
    android:id="@+id/button_two"
    android:layout_width="63dp"
    android:layout_height="46dp"
    android:text="2"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
```

```
    app:layout_constraintHorizontal_bias="0.39"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.28"
    tools:ignore="TouchTargetSizeCheck" />

<Button
    android:id="@+id/button_three"
    android:layout_width="65dp"
    android:layout_height="44dp"
    android:text="3"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.656"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.282"
    tools:ignore="TouchTargetSizeCheck" />

<TextView
    android:id="@+id/textView"
    android:layout_width="310dp"
    android:layout_height="46dp"
    android:text="Simple Calculator"
    android:textColor="#C2185B"
    android:textSize="25dp"
    android:textStyle="bold"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintHorizontal_bias="0.422"
    app:layout_constraintLeft_toLeftOf="parent"
    app:layout_constraintRight_toRightOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.058" />

<TextView
    android:id="@+id/textView2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Result"
    android:textColor="#00796B"
    android:textSize="20dp"
    android:textStyle="bold"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.07"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.176" />
```

```
    <EditText
        android:id="@+id/txt_result"
        android:layout_width="249dp"
        android:layout_height="40dp"
        android:layout_marginTop="20dp"
        android:ems="10"
        android:inputType="textPersonName"
        android:text=""
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.839"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.135"
        tools:ignore="SpeakableTextPresentCheck,TouchTargetSizeCheck" />

    <Button
        android:id="@+id/button_four"
        android:layout_width="69dp"
        android:layout_height="49dp"
        android:text="4"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.952"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.277" />

</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

```
package com.example.program2;
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import java.util.regex.Pattern;

public class MainActivity extends AppCompatActivity implements
View.OnClickListener {


    Button btnOne, btnTwo, btnThree, btnFour, btnFive, btnSix;
```

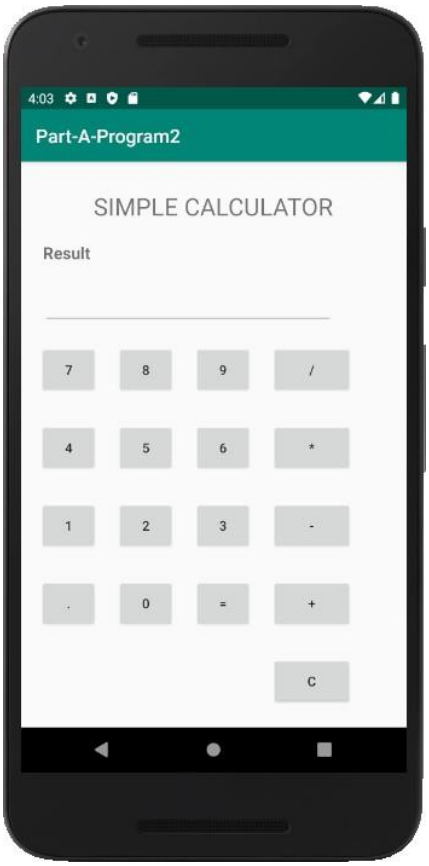
```
Button btnSeven, btnEight, btnNine, btnZero;
Button btnAdd, btnSub, btnMul, btnDiv;
Button btnClear, btnEqual, btnDot;
EditText txtResult;

@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
    btnOne = (Button) findViewById(R.id.button_one);
    btnOne.setOnClickListener(this);

    btnTwo = (Button) findViewById(R.id.button_two);
    btnTwo.setOnClickListener(this);

    btnThree = (Button) findViewById(R.id.button_three);
    btnThree.setOnClickListener(this);

    btnFour = (Button) findViewById(R.id.button_four);
    btnFour.setOnClickListener(this);

    btnFive = (Button) findViewById(R.id.button_five);
    btnFive.setOnClickListener(this);

    btnSix = (Button) findViewById(R.id.button_six);
    btnSix.setOnClickListener(this);

    btnSeven = (Button) findViewById(R.id.button_seven);
    btnSeven.setOnClickListener(this);

    btnEight = (Button) findViewById(R.id.button_eight);
    btnEight.setOnClickListener(this);

    btnNine = (Button) findViewById(R.id.button_nine);
    btnNine.setOnClickListener(this);

    btnZero = (Button) findViewById(R.id.button_zero);
    btnZero.setOnClickListener(this);

    btnAdd = (Button) findViewById(R.id.button_add);
    btnAdd.setOnClickListener(this);

    btnSub = (Button) findViewById(R.id.button_sub);
    btnSub.setOnClickListener(this);

    btnMul = (Button) findViewById(R.id.button_mul);
    btnMul.setOnClickListener(this);
```

```
        btnDiv = (Button) findViewById(R.id.button_div);
        btnDiv.setOnClickListener(this);

        btnClear = (Button) findViewById(R.id.button_clear);
        btnClear.setOnClickListener(this);

        btnEqual = (Button) findViewById(R.id.button_equal);
        btnEqual.setOnClickListener(this);

        btnDot = (Button) findViewById(R.id.button_dot);
        btnDot.setOnClickListener(this);

        txtResult = (EditText) findViewById(R.id.txt_result);
        txtResult.setText("");
    }


    @Override
    public void onClick(View v)
    {

        if (v.equals(btnOne))
            txtResult.append("1");
        if (v.equals(btnTwo))
            txtResult.append("2");
        if (v.equals(btnThree))
            txtResult.append("3");
        if (v.equals(btnFour))
            txtResult.append("4");
        if (v.equals(btnFive))
            txtResult.append("5");
        if (v.equals(btnSix))
            txtResult.append("6");
        if (v.equals(btnSeven))
            txtResult.append("7");
        if (v.equals(btnEight))
            txtResult.append("8");
        if (v.equals(btnNine))
            txtResult.append("9");
        if (v.equals(btnZero))
            txtResult.append("0");
        if (v.equals(btnDot))
            txtResult.append(".");
        if (v.equals(btnClear))
            txtResult.setText("");
        if (v.equals(btnAdd))
            txtResult.append("+");
        if (v.equals(btnSub))
```

```
            txtResult.append("-");
        if (v.equals(btnMul))
            txtResult.append("*");
        if (v.equals(btnDiv))
            txtResult.append("/");
        if (v.equals(btnEqual))
        {
            try {
                String data = txtResult.getText().toString();
                if (data.contains("/")) {
                    String[] operands = data.split("/");
                    if (operands.length == 2) {
                        double operand1 = Double.parseDouble(operands[0]);
                        double operand2 = Double.parseDouble(operands[1]);
                        double result = operand1 / operand2;
                        txtResult.setText(String.valueOf(result));
                    } else {
                        Toast.makeText(getBaseContext(), "Invalid Input",
Toast.LENGTH_LONG).show();
                    }
                } else if (data.contains("*")) {
                    String[] operands = data.split(Pattern.quote("*"));
                    if (operands.length == 2) {
                        double operand1 = Double.parseDouble(operands[0]);
                        double operand2 = Double.parseDouble(operands[1]);
                        double result = operand1 * operand2;
                        txtResult.setText(String.valueOf(result));
                    } else {
                        Toast.makeText(getBaseContext(), "Invalid Input",
Toast.LENGTH_LONG).show();
                    }
                } else if (data.contains("+"))
                {
                    String[] operands = data.split(Pattern.quote("+"));
                    if (operands.length == 2) {
                        double operand1 = Double.parseDouble(operands[0]);
                        double operand2 = Double.parseDouble(operands[1]);
                        double result = operand1 + operand2;
                        txtResult.setText(String.valueOf(result));
                    }
                    else {
                        Toast.makeText(getBaseContext(), "Invalid Input",
Toast.LENGTH_LONG).show();
                    }
                }
                else if (data.contains("-"))
                {
                    String[] operands = data.split("-");
```

```
                    if (operands.length == 2) {
                        double operand1 = Double.parseDouble(operands[0]);
                        double operand2 = Double.parseDouble(operands[1]);
                        double result = operand1 - operand2;
                        txtResult.setText(String.valueOf(result));
                    }
                    else
                    {
                        Toast.makeText(getBaseContext(), "Invalid Input",
        Toast.LENGTH_LONG).show();
                    }
                }
            }
            catch (Exception e)
            {
                Toast.makeText(getBaseContext(), "Invalid Input",
        Toast.LENGTH_LONG).show();
            }
        }

    }
}
```

Sample Output

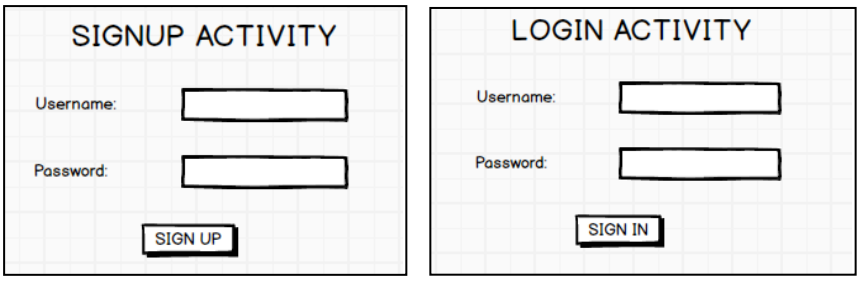


Program 3

Create a SIGN Up activity with Username and Password. Validation of password should happen based on the following rules:

1. **Password should contain uppercase and lowercase letters.**
2. **Password should contain letters and numbers.**
3. **Password should contain special characters.**
4. **Minimum length of the password (the default value is 8).**

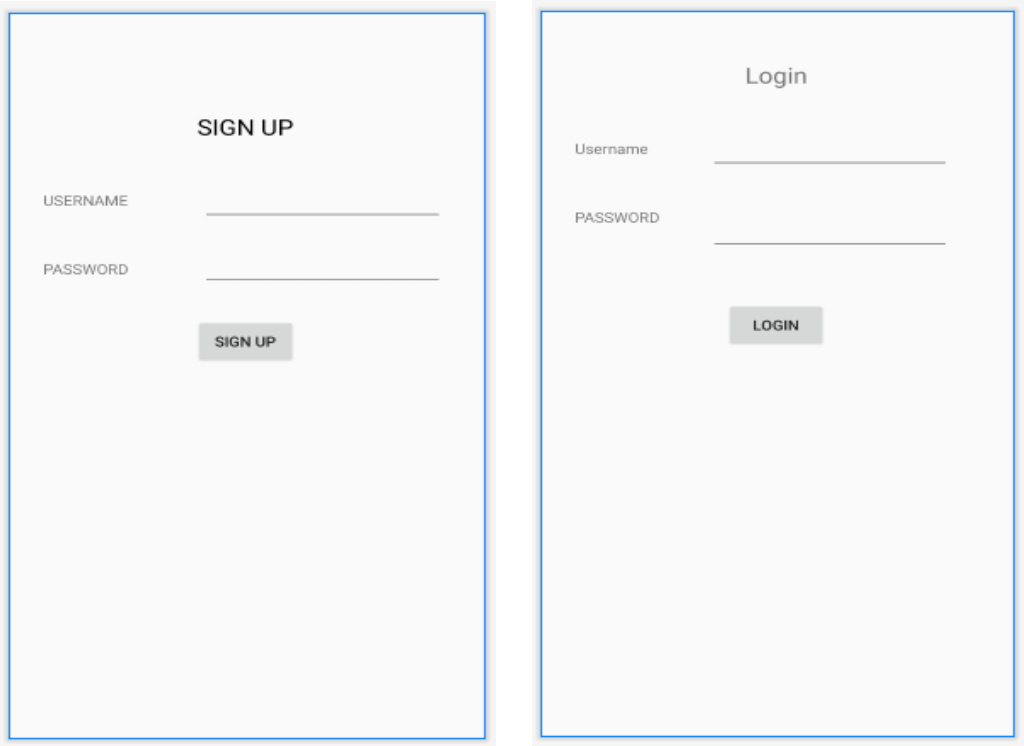
On successful SIGN UP proceed to the next Login activity. Here the user should SIGN IN using the Username and Password created during signup activity. If the Username and Password are matched then navigate to the next activity which displays a message saying "Successful Login" or else display a toast message saying "Login Failed". The user is given only two attempts and after that display a toast message saying "Failed Login Attempts" and disable the SIGN IN button. Use Bundle to transfer information from one activity to another.



1. Create a New Android Project with Empty Activity.
2. Open activity_main.xml file from res→ layout folder, check/add Constraint Layout as theroot view.
3. Create Signup Layout using Drag and Drop framework design the layout.
4. Create One more Empty Activity LoginActivity using Android Studio Create ActivityFlow (Refer Android Studio Tutorial)
5. Open activity_login.xml file from res→layout folder, check/add Constraint Layout as theroot view.
6. Create Login Layout using Drag and Drop framework.
7. Add Listeners to Button Click Event:
   - Create a class which implements OnClickListener interface.
   - Override onClick() method of OnClickListener Interface.
   - Register the button for click event by calling setOnClickListener() method of Viewclass and pass the object of the class that implemented OnClickListener Interface.
8. Use Regular Expression

"^(?=.*[A-Z])(?=.*[a-z])(?=.*\\d)(?=.*[@$!])[A-Za-z\\d@$!]{8,}$" to validate the password.

Design



Activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayoutxmlns: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:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".MainActivity">

<TextView android:id="@+id/textView2"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="100dp"
android:text="SIGN UP"
android:textColor="@android:color/background_dark"
android:textSize="22dp"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent" />

<TextView android:id="@+id/textView3"
android:layout_width="wrap_content"
android:layout_height="wrap_content"

android:layout_marginStart="30dp"
android:layout_marginTop="50dp"
```

```
android:text="USERNAME"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/textView2" />

<TextView android:id="@+id/textView4"
android:layout_width="82dp" android:layout_height="34dp"
android:layout_marginTop="50dp"
android:text="PASSWORD"
app:layout_constraintStart_toStartOf="@+id/textView3"
app:layout_constraintTop_toBottomOf="@+id/textView3" />

<EditText android:id="@+id/txt_username"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="40dp"
android:layout_marginEnd="10dp"
android:ems="10"
android:inputType="textPersonName"
app:layout_constraintBottom_toBottomOf="@+id/textView3"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toEndOf="@+id/textView3"
app:layout_constraintTop_toTopOf="@+id/textView3" />

<EditText
android:id="@+id/txt_password"
android:layout_width="0dp"
android:layout_height="40dp"
android:layout_marginTop="26dp"
android:ems="10"
android:inputType="textPassword"
app:layout_constraintEnd_toEndOf="@+id/txt_username"
app:layout_constraintStart_toStartOf="@+id/txt_username"
app:layout_constraintTop_toBottomOf="@+id/txt_username" />

<Button android:id="@+id/btn_signup"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="30dp"
android:text="Sign Up"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/txt_password" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Activity_login.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayoutxmlns:android="http://schema
s.android.com/apk/res/android"
```

```
xmlns:app="http://schemas.android.com/apk/res-auto"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".LoginActivity">

<TextView android:id="@+id/textView7"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="50dp"
android:text="Login" android:textSize="22dp"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent" />

<TextView
android:id="@+id/textView9"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="30dp"
android:layout_marginTop="50dp"
android:text="Username"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/textView7" />

<EditText
android:id="@+id/txt_login_username"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="20dp"
android:layout_marginEnd="20dp"
android:ems="10"
android:inputType="textPersonName"
app:layout_constraintBottom_toBottomOf="@+id/textView9"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toEndOf="@+id/textView9"
app:layout_constraintTop_toTopOf="@+id/textView9" />

<TextView android:id="@+id/textView10"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="30dp"
android:layout_marginTop="50dp"
 android:text="PASSWORD"
 app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/textView9" />

<EditText android:id="@+id/txt_login_password"
android:layout_width="wrap_content"
```

```
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPassword"
        app:layout_constraintEnd_toEndOf="@+id/txt_login_username"
        app:layout_constraintStart_toStartOf="@+id/txt_login_username"
        app:layout_constraintTop_toTopOf="@+id/textView10" />

        <Button android:id="@+id/btn_login_signin"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="50dp"
        android:text="Login"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/txt_login_password" />
        </androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

```
        package com.example.parta.program3;
        import androidx.appcompat.app.AppCompatActivity;
        import android.content.Intent;
        import android.os.Bundle;
        import android.view.View;
        import android.widget.Button;
         import android.widget.EditText;
        import android.widget.Toast;
        import java.util.regex.Matcher;
        import java.util.regex.Pattern;
public class MainActivityextends AppCompatActivity  implements View.OnClickListener
        {

        EditTexttxt   Username;
        EditTexttxt   Password;
        Button btnSignup;
        String regularExpression="^(?=.*[A-Z])(?=.*[a-z])(?=.*\\d)(?=.*[@$!])[A-
        Za-z\\d@$!]{8,}$";

        @Override
        protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        txtUsername=(EditText)findViewById(R.id.txt_username);
        txtPassword=(EditText)findViewById(R.id.txt_password);
        btnSignup=(Button)findViewById(R.id.btn_signup);
        btnSignup.setOnClickListener(this);

        }

        public void onClick(View v)
        {
```

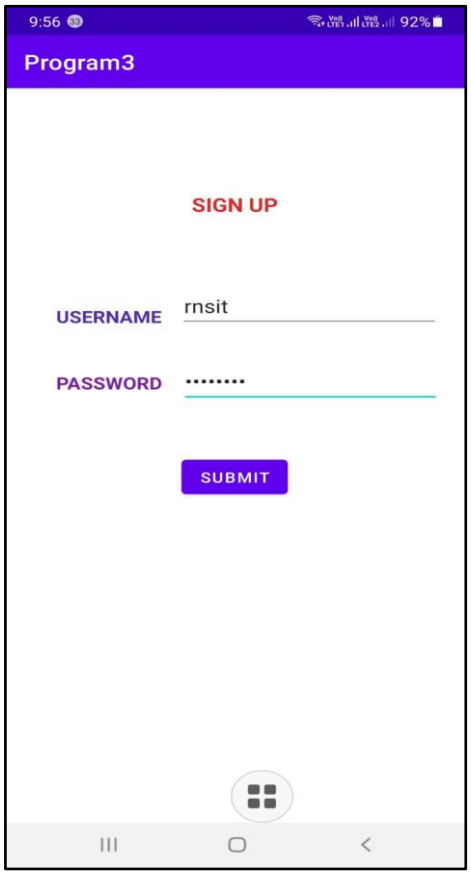
```
        String username=txtUsername.getText().toString();
        String password=txtPassword.getText().toString();
         if(validatePassword(password)) {
         Bundle bundle = new Bundle();
         bundle.putString("user", username);
         bundle.putString("Lab@2020", password);
         Intent it = new Intent(this, LoginActivity.class);
         it.putExtra("data", bundle);
          startActivity(it); }

Toast.makeText(getBaseContext(), "Invalid Password",
Toast.LENGTH_LONG).show();
            }}
{
public booleanvalidatePassword(String password)
    {
        Pattern pattern=Pattern.compile(regularExpression);
        Matcher matcher=pattern.matcher(password);
        return matcher.matches();

    }
}
```

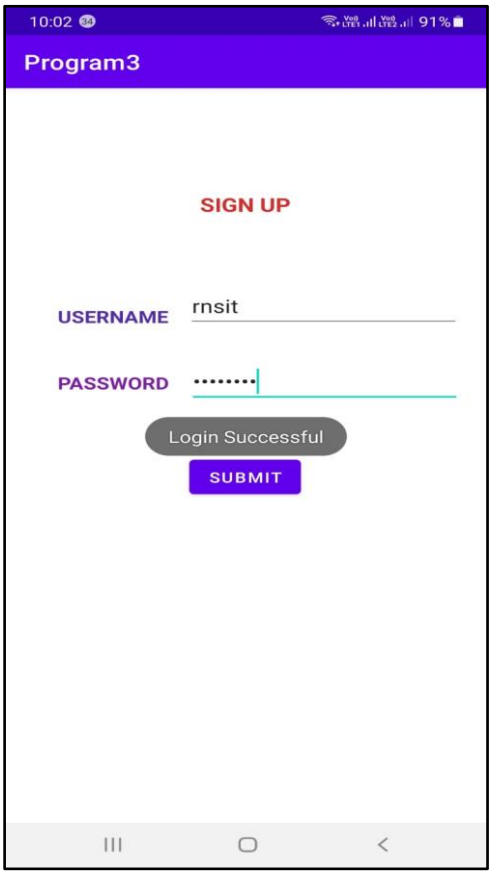
LoginActivity.java

```
package com.example.parta.program3;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
public class LoginActivityextends AppCompatActivity implements
View.OnClickListener
{
EditTexttxt   LoginUsername;
EditTexttxt   LoginPassword;
              Button btnLogin;
              String user,pass;
int count=0
```

```
@Override
protected void onCreate(Bundle savedInstanceState)
 {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_login);
txtLoginUsername=(EditText) findViewById(R.id.txt_login_username);
txtLoginPassword=(EditText) findViewById(R.id.txt_login_password);
btnLogin=(Button)findViewById(R.id.btn_login_signin);
btnLogin.setOnClickListener(this);
Bundle bundle=getIntent().getBundleExtra("data");
user=bundle.getString("rnsit");
pass=bundle.getString("Lab@2020");
}

public void onClick(View v)
     {
          String user1=txtLoginUsername.getText().toString();
          String pass1=txtLoginPassword.getText().toString();

if(user.equals(user1)&&pass.equals(pass1))
          {
Toast.makeText(this,"Login Successful" ,Toast.LENGTH_LONG).show();
          }
else
{
count++;
if(count==3)
{
btnLogin.setEnabled(false);Toast.makeText(this, "Failed  Login Attempts"
,Toast.LENGTH_LONG).show();
}
else
{
Toast.makeText(this,"Login Failed "+count ,Toast.LENGTH_LONG).show();
  }
          }

     }
}
```

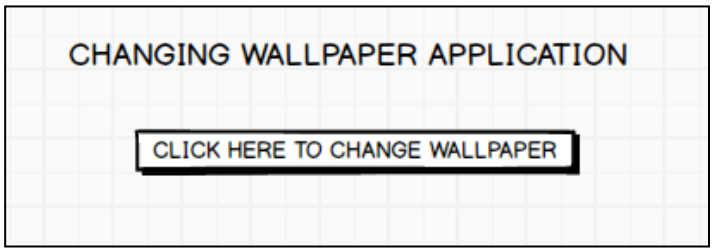
Sample Output





Program 4

Develop an application to set an image as wallpaper. On click of a button, the wallpaper image should start to change randomly every 30 seconds.



1. Create a New Android Project with Empty Activity.
2. Open activity_main.xml file from res→layout folder, check/add LinearLayout as the rootview.
3. Create the layout
4. Add 3 or More images to drawable folder (res→drawable)
5. Declare uses permission android.permission.SET_WALLPAPPER in The AndroidManifest.xml file
6. Schedule Timer task to change the wallpaper on every 30 seconds interval.
7. Initialize and use WallpaperManager.setBitmap() method to change the wallpaper.

Activity_main.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:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:gravity="center" tools:context=".MainActivity">

    <Button
        android:id="@+id/btn_start_change_wallpaper"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Click here to Change Wallpaper" />

</LinearLayout>
```

MainActivity.java

```
package com.example.program5;
import  androidx.appcompat.app.AppCompatActivity;
import android.app.WallpaperManager;
import android.graphics.BitmapFactory;
import android.os.Bundle;
import android.view.View;
```

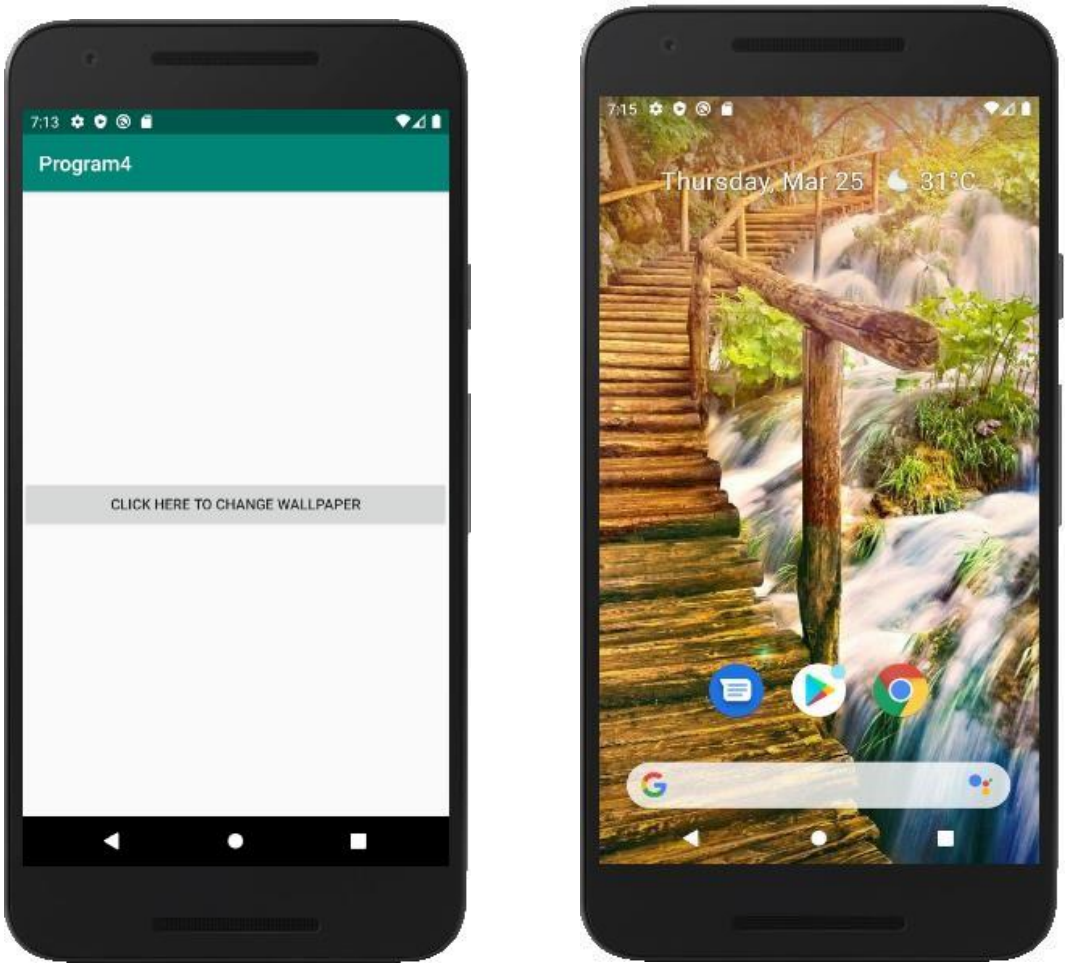
```
import android.widget.Button;
import java.util.Timer;
import java.util.TimerTask;

public class MainActivity extends AppCompatActivity implements
View.OnClickListener {
   Button btnChangeWallpaper;
   boolean running;
   int[] imagesArray=new int[]
         {
               R.drawable.img1,
               R.drawable.img2,
               R.drawable.img3,
               R.drawable.img4,
               R.drawable.img5
         };
   int i=0;
   @Override
   protected void onCreate(Bundle savedInstanceState)
   {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.activity_main)
 btnChangeWallpaper=(Button) findViewById(R.id.btn_start_change_wallpaper);
     btnChangeWallpaper.setOnClickListener(this);
   }

   @Override
   public void onClick(View view)
   {
      if(!running)
      {
         new Timer().schedule (new MyTimer(),0,3000);
                  running=true;
      }
   }
   class MyTimer extends TimerTask {

      public void run() {
         try {
            WallpaperManager wallpaperManager =
WallpaperManager.getInstance(getBaseContext());

if(i==12) i=1;
if(i==11) i=2;
if(i==10) i=3;
if(i==9) i=4;
if(i==8) i=5;
if(i==7) i=6;
if(i==6) i=7;
```

```
            if(i==5) i=8;
            if(i==4) i=9;
            if(i==3) i=10;

            wallpaperManager.setBitmap(BitmapFactory.decodeResource(getResources(),
            imagesArray[i]));
                        i++;
                    } catch (Exception e)

                    {       }
                }

            } }
```

AndriodManifest.xml

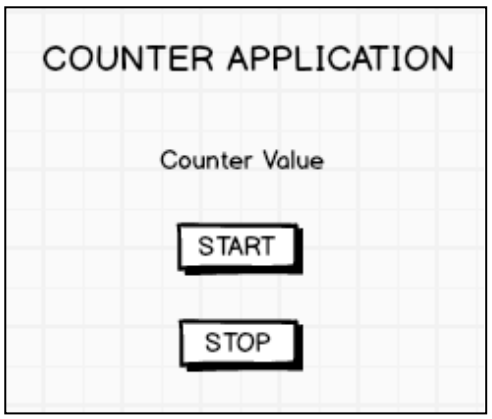
```
            <?xml version="1.0" encoding="utf-8"?>
            <manifest xmlns:android="http://schemas.android.com/apk/res/android"
            package="com.example.program4">
            <uses-permission android:name="android.permission.SET_WALLPAPER"/>
            <application android:allowBackup="true"
            android:icon="@mipmap/ic_launcher"
            android:label="@string/app_name"
            android:roundIcon="@mipmap/ic_launcher_ro
            und"android:supportsRtl="true"
            android:theme="@style/AppTheme">
            <activity android:name=".MainActivity">
            <intent-filter>
            <action android:name="android.intent.action.MAIN" />
            <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
            </activity>
            </application>
            </manifest>
```

Sample Output



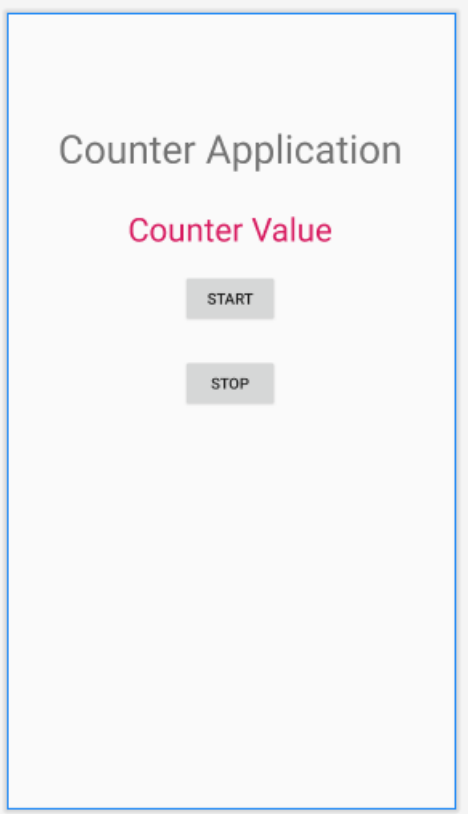
Program 5

Write a program to create an activity with two buttons START and STOP. On Pressing of the START button, the activity must start the counter by displaying the numbers from One and the counter must keep on counting until the STOP button is pressed. Display the counter value in a TextViewcontrol.



1. Create a New Android Project with Empty Activity.
2. Open activity_main.xml file from res→ layout folder, check/add ConstraintLayout as theroot view.
3. Create the layout design using Drag and Drop framework.
4. Add Listeners to Button Click Event:
   - Create a class which implements OnClickListener interface.
   - Override onClick() method of OnClickListener Interface.
   - Register the button for click event by calling setOnClickListener() method of Viewclass and pass the object of the class that implemented OnClickListener Interface.
5. Create a Thread to start the counter logic.
6. Steps to Create a Thread
   - Create a class that extends Thread Class.
   - Override run method of Thread Class.
   - Use start() method of thread class to start the thread.
7. Create Handler class to receive message from child thread, Handler executes in MainThread.
8. Steps to Create Handler
   - Create Object of type Handler.
   - OverridhandleMessage() of handler class.
9. Pass the counter value to be displayed to the handler.
10. Update the UI to display the counter value received from thread.

Design



activity_main.xml

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

        <TextView android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="100dp"
        android:text="Counter Application"
        android:textSize="36sp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

        <TextView android:id="@+id/lbl_text"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="30dp"
        android:text="Counter Value"
        android:textColor="@color/colorAccent"
        android:textSize="30sp"
```

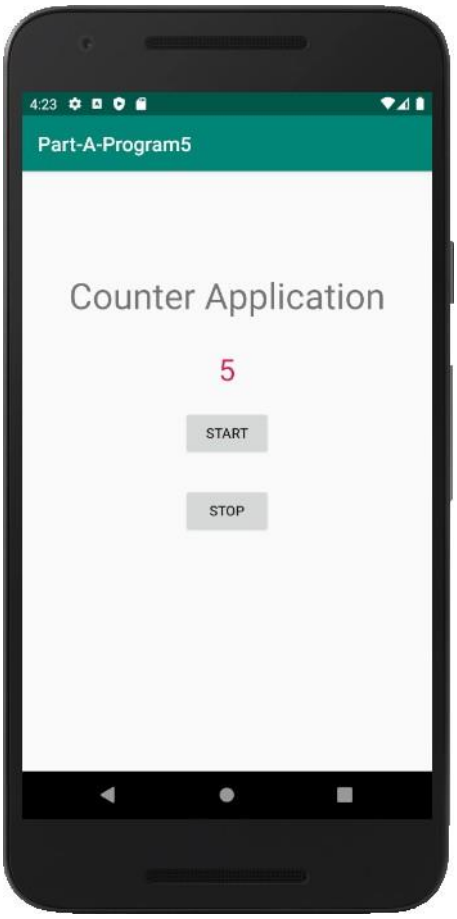
```
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/textView" />

<Button android:id="@+id/btn_start"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="20dp"
android:text="Start"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/lbl_text" />

<Button
android:id="@+id/btn_stop"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="30dp"
android:text="Stop"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/btn_start" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

```
package com.example.program5;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.os.Handler;
import android.os.Message;
import android.view.View; import
android.widget.Button; import
android.widget.TextView;

import org.w3c.dom.Text;
public class MainActivity  extends
AppCompatActivity implements View.OnClickListener
 {
TextViewlblCounter;
Button btnStart,btnStop;

int counter=0;
Boolean running=false;

@Override
protected void onCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_main);
lblCounter=(TextView)findViewById(R.id.lbl_text);
btnStart=(Button)findViewById(R.id.btn_start);
btnStop=(Button)findViewById(R.id.btn_stop);
btnStop.setOnClickListener(this);
```

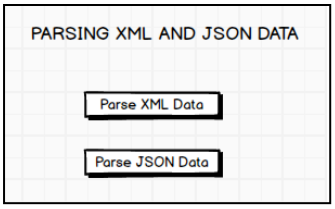
```
btnStart.setOnClickListener(this);
}

public void onClick(View v)
{
if(v.equals(btnStart))
{
    counter=0;
    running=true;
    new MyCounter().start();
  }
  else if(v.equals(btnStop))
  {
     running=false;
  }
}

Handler handler=new Handler()
{
public void handleMessage(Message m)
{
    lblCounter.setText(String.valueOf(m.what));
}

};



class MyCounter  extends Thread
{
  public void run()
  {
     while(running)
     {
       counter++;
       handler.sendEmptyMessage(counter);

       try { Thread.sleep(1000);
     }
     catch(Exception e) {  }
       }
   }
 }
}
```

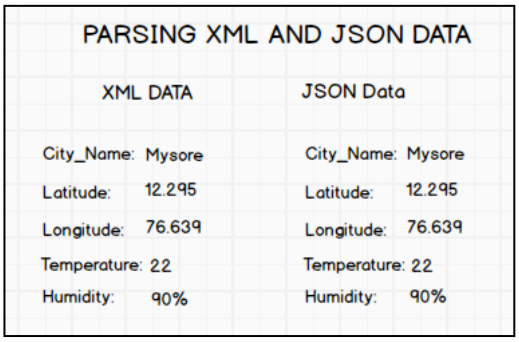
Sample Output



Program 6

Create two files of XML and JSON type with values for City_Name, Latitude, Longitude, Temperature, and Humidity. Develop an application to create an activity with two buttons to parse the XML and JSON files which when clicked should display the data in their respective layouts side by side.





1. Create a New Android Project with Empty Activity.
2. Open activity_main.xml file from res layout folder, check/add ConstraintLayout as theroot view.
3. Create the layout design using Drag and Drop framework.
4. Add Listeners to Button Click Event:
   - Create a class which implements OnClickListener interface.
   - Override onClick() method of OnClickListener Interface.
   - Register the button for click event by calling setOnClickListener() method of Viewclass and pass the object of the class that implemented OnClickListener Interface.
5. Create assets folder (Refer Section Android Studio Tutorial)
6. Create input.xml file inside assets folder and paste the below Xml Data

```
<?xml version="1.0"?>
<records>
<employee>
<city_name>Mysore</city_name>
<Latitude>12.295</Latitude>
<Longitude>76.639</Longitude>
<Temperature>22</Temperature>
<Humidity>90%</Humidity>
</employee>
</records>
```

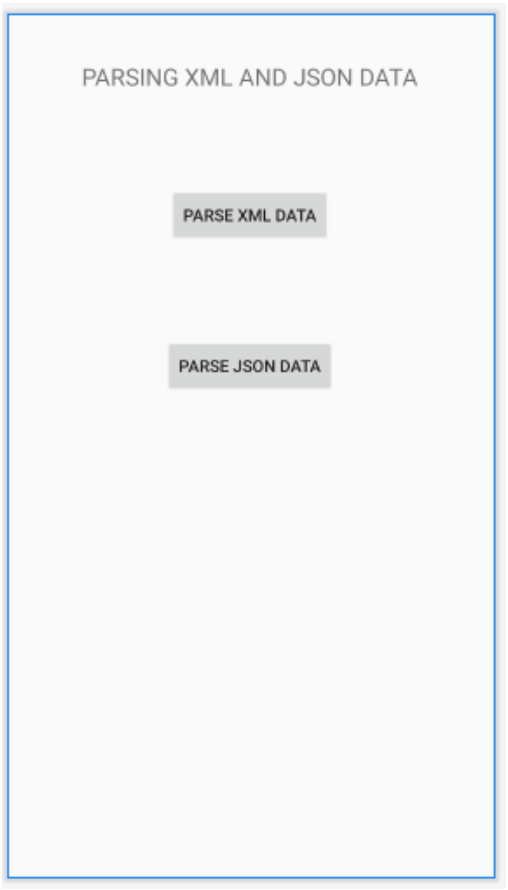
7. Create input.json file inside assets folder and paste the below Json Data

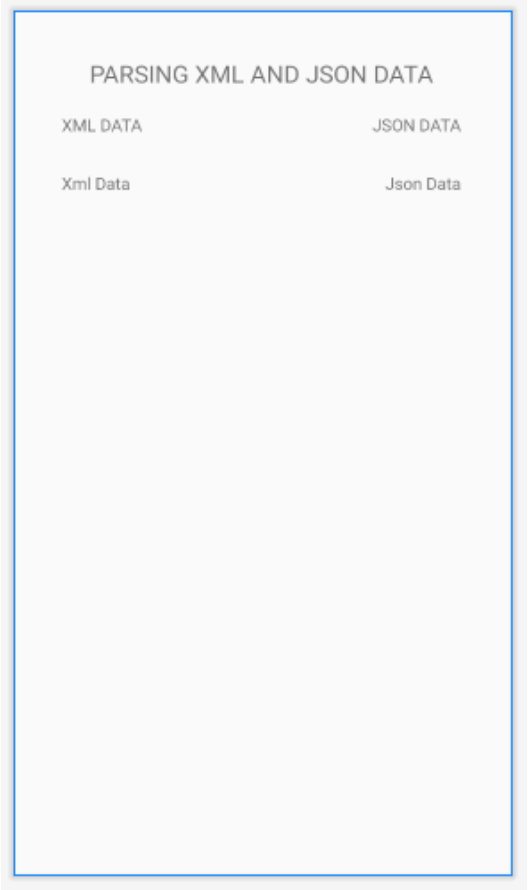
```
{
"employee": {
"city_name":
"Mysore","Latitude":
"12.295",
"Longitude": "76.639",
"Temperature": 22,
"Humidity": "90%"
```

} }

8. Read the XML and Json Data in the files and display on screen

Design





activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayoutxmlns:android="http://schema
s.android.com/apk/res/android"
xmlns:app="http://schemas.android.com/apk/res-auto"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".MainActivity">

<Button android:id="@+id/btn_parsexml"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="80dp"
android:text="Parse XML Data"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/textView4" />
```

```
<Button
android:id="@+id/btn_parsejson"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="80dp"
android:text="Parse Json Data"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/btn_parsexml" />

<TextView android:id="@+id/textView4"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="40dp"
android:text="PARSING XML AND JSON DATA"
android:textSize="20dp"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

activity_view.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayoutxmlns:android="http://schema
s.android.com/apk/res/android"
xmlns:app="http://schemas.android.com/apk/res-auto"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".ViewActivity">

<TextView android:id="@+id/lbl_xml_data"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="30dp"
android:text="Xml Data"
app:layout_constraintStart_toStartOf="@+id/textView2"
app:layout_constraintTop_toBottomOf="@+id/textView2" />

<TextView
android:id="@+id/textView"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="40dp"
android:text="PARSING XML AND JSON  DATA"
android:textSize="20dp"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent" />
```

```
<TextView android:id="@+id/textView2"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="40dp"
android:layout_marginTop="20dp"
android:text="XML DATA"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/textView" />

<TextView android:id="@+id/textView3"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="20dp"
android:layout_marginEnd="40dp"
android:text="JSON DATA"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintTop_toBottomOf="@+id/textView" />

<TextView android:id="@+id/lbl_json_data"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="30dp"
android:text="Json Data"
app:layout_constraintEnd_toEndOf="@+id/textView3"
app:layout_constraintTop_toBottomOf="@+id/textView3" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

```
package com.example.parta_program6;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;

public class MainActivity extends AppCompatActivity implements
View.OnClickListener
{
Button btnParseXml,btnParseJson;
@Override
protected void onCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_main);
btnParseXml=(Button)findViewById(R.id.btn_parsexml);
btnParseJson=(Button)findViewById(R.id.btn_parsejson);
btnParseJson.setOnClickListener(this);
btnParseXml.setOnClickListener(this);
}
```

```
@Override
public void onClick(View v) {

if(v.equals(btnParseJson))
{
      Intent it=new
      Intent(this,ViewActivity.class);
      it.putExtra("mode",1);
      startActivity(it);

}
else if(v.equals(btnParseXml))
{
       Intent it=new
       Intent(this,ViewActivity.class);
       it.putExtra("mode",2);
      startActivity(it);
}
}
}
```

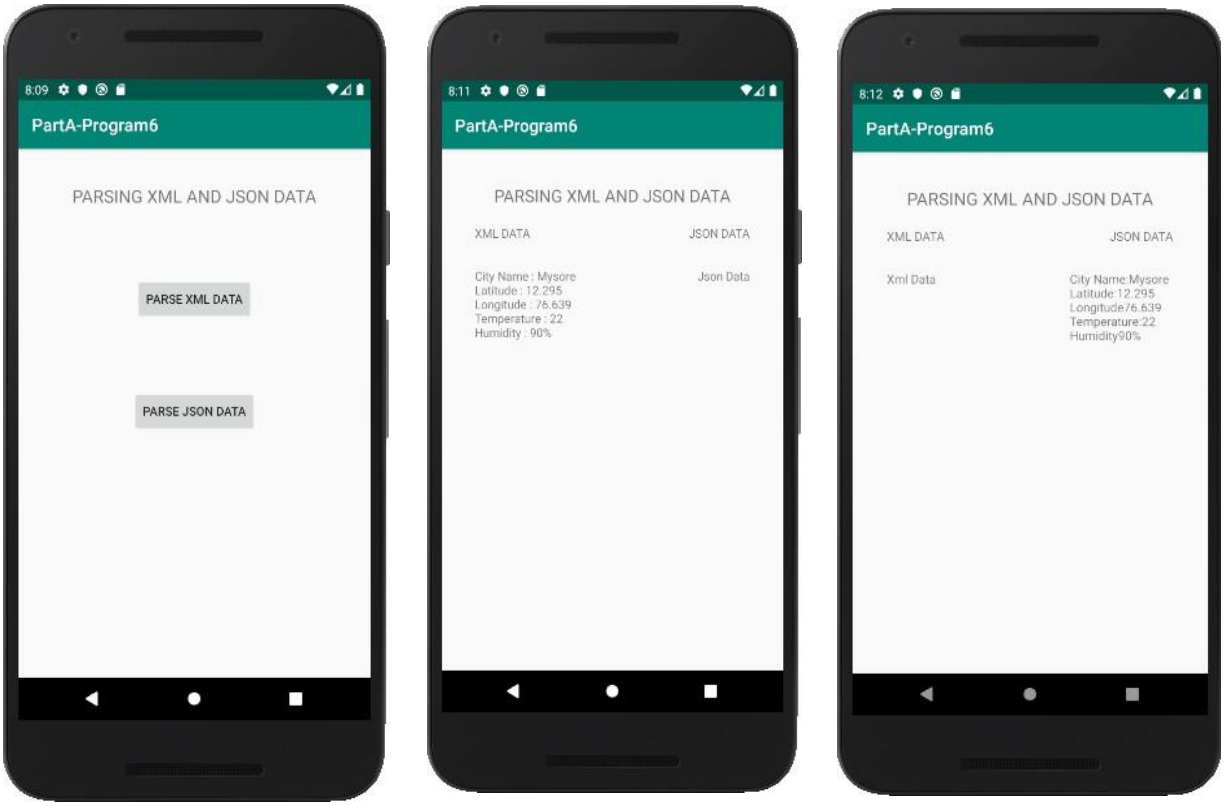
ViewActivity.java

```
package com.example.parta_program6;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.widget.TextView;

import org.json.JSONObject;
import org.w3c.dom.Document;
import org.w3c.dom.Element;
import org.w3c.dom.Node;
import org.w3c.dom.NodeList;
import java.io.InputStream;

import   javax.xml.parsers.DocumentBuilder;
import  javax.xml.parsers.DocumentBuilderFactory;

public class ViewActivity extends  AppCompatActivity {

TextView lblXmlData,lblJsonData;

int mode=0;
@Override
protected void onCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_view);
lblXmlData=(TextView)findViewById(R.id.lbl_xml_data);
lblJsonData=(TextView)findViewById(R.id.lbl_json_data);
mode=getIntent().getIntExtra("mode",0);
```

```
if(mode==1) parseJson();
else parseXmlDocument();
}

public String parseXmlDocument()
{
try {
InputStream is = getAssets().open("input.xml");
DocumentBuilderFactorydbFactory =
DocumentBuilderFactory.newInstance();DocumentBuilderdBuilder
= dbFactory.newDocumentBuilder();
Document doc = dBuilder.parse(is);

Element element=doc.getDocumentElement();
element.normalize();

NodeListnList = doc.getElementsByTagName("employee");

for (int i=0; i<n;i++)

List.getLength();

{

Node node = nList.item(i);
if (node.getNodeType() ==
Node.ELEMENT_NODE) {Element element2
= (Element) node;
lblXmlData.setText("City Name : " + getValue("city_name",
element2)+"\n"); lblXmlData.append("Latitude : " + getValue("Latitude",
element2)+"\n"); lblXmlData.append("Longitude : " +
getValue("Longitude", element2)+"\n"); lblXmlData.append("Temperature :
" + getValue("Temperature", element2)+"\n");
lblXmlData.append("Humidity : " + getValue("Humidity", element2)+"\n");

    }
 }
}
catch (Exception e) {e.printStackTrace();}
return  null;
}

private static String getValue(String tag, Element element) {
NodeListnodeList =
element.getElementsByTagName(tag).item(0).getChildNodes();Node node =
nodeList.item(0);
return node.getNodeValue();
}

public void parseJson()
{
try {
InputStreaminputStream=getAssets().open("input.jso
n");byte[] data=new byte[inputStream.available()];
```

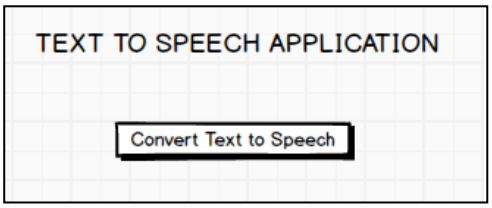
```
            inputStream.read(data);

          String readData=new String(data); JSONObjectjsonObject=new
JSONObject(readData);
            JSONObject jsonObject1=jsonObject.getJSONObject("employee");
            lblJsonData.setText("City
            Name:"+jsonObject1.getString("city_name")+"\n");
            lblJsonData.append("Latitude:"+jsonObject1.getString("Latitude")+"\n")
            ;
            lblJsonData.append("Longitude"+jsonObject1.getString("Longitude")+"\
            n");
            lblJsonData.append("Temperature:"+jsonObject1.getInt("Temperature")
            +"\n");
            lblJsonData.append("Humidity"+jsonObject1.getString("Humidity")+"\n
            ");

            }
            catch (Exception e) {e.printStackTrace();}
              }
            }
```

Sample Output



Program 7

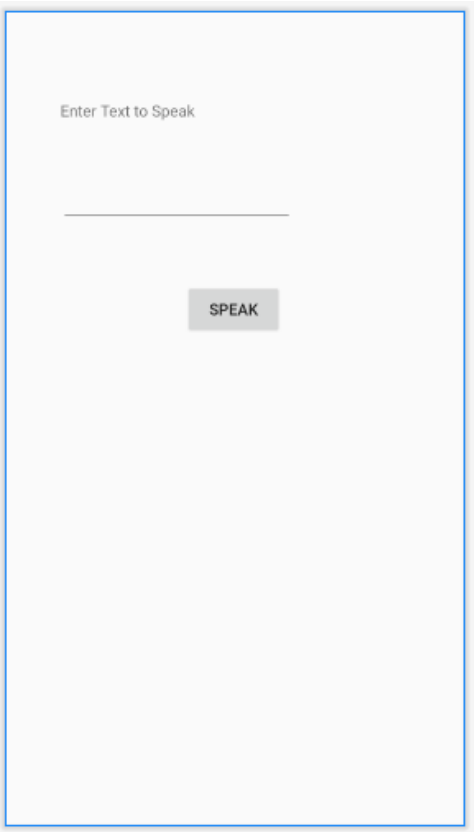
Develop a simple application with one EditText so that the user can write some text in it. Create a buttoncalled “Convert Text to Speech” that converts the user input



text into voice.

1. Create a New Android Project with Empty Activity.
2. Open activity_main.xml file from res layout folder, check/add ConstraintLayout as theroot view.
3. Create the layout design using Drag and Drop framework.
4. Add Listeners to Button Click Event:
   - Create a class which implments OnClickListener interface.
   - Override onClick() method of OnClickListener Interface.
   - Register the button for click event by calling setOnClickListener() method of Viewclass and pass the object of the class that implemented OnClickListener Interface.
5. Initialize TextToSpeech Engine and the Language to Speak using setLanguage() method
6. Use Speak() method to speak the text passed to it.

Design



activity_main.xml

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

<TextView
android:id="@+id/textView"
android:layout_width="wrap_c
ontent"
android:layout_height="wrap_content"
android:layout_marginStart="50dp"
android:layout_marginTop="80dp" android:text="Enter
Text to Speak"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent" />

<EditText
android:id="@+id/editText"
android:layout_width="wrap_c
ontent"
android:layout_height="wrap_content"
android:layout_marginTop="48dp"
android:ems="10"
android:inputType="textPersonName"
app:layout_constraintEnd_toEndOf="pare
nt"
app:layout_constraintHorizontal_bias="0.
0"
app:layout_constraintStart_toStartOf="@+id/textView"
app:layout_constraintTop_toBottomOf="@+id/textView" />

<Button
android:id="@+id/btn_spe
ak"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="52dp"
android:text="Speak"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/editText" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

```
package

com.example.parta.parta_program7;

import

androidx.appcompat.app.AppCompatActi

vity;

import android.os.Bundle;
import
android.speech.tts.TextToSpeec
h;import android.view.View;
import
android.widget.Button;
import
android.widget.EditText;
import
android.widget.Toast;

import java.util.Locale;

public class

MainActivityextendsAppCompatActivityimplementsView.OnClickListene

r {EditTexttxtSpeak;
Button btnSpeak;
TextToSpeechtextToSpeech;

@Override
protected void onCreate(Bundle
savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_main);
txtSpeak=(EditText)findViewById(R.id.editTe
xt);
btnSpeak=(Button)findViewById(R.id.btn_spe
ak); btnSpeak.setOnClickListener(this);
textToSpeech=new
TextToSpeech(getBaseContext(),new
TextToSpeech.OnInitListener() {
@Override
public void onInit(int
status) {
if(status!=TextToSpeech.E
RROR)
{
Toast.makeText(getBaseContext(),"Success", Toast.LENGTH_LONG).show();
 }
    }
 });
textToSpeech.setLanguage(Locale.UK);
}
```

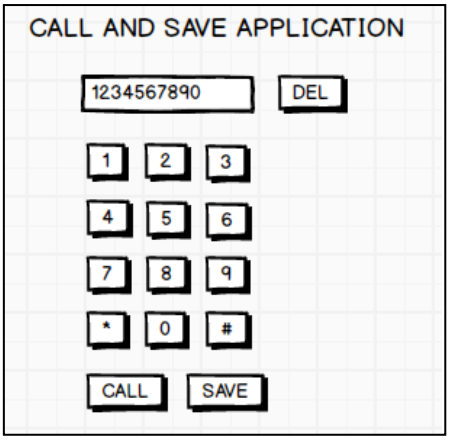
```
public void onClick(View v)
{
        String text=txtSpeak.getText().toString();
        textToSpeech.speak(text,TextToSpeech.QUEUE_
        FLUSH,null);

 }
}
```

Sample Output

Program 8

Create an activity like a phone dialer with CALL and SAVE buttons. On pressing the

CALL button, it mustcall the phone number and on pressing the SAVE button it must save the number to the phone contacts.



1. Create a New Android Project with Empty Activity.
2. Open activity_main.xml file from res layout folder, check/add ConstraintLayout as theroot view.
3. Create the layout design using Drag and Drop framework.
4. Add Listeners to Button Click Event:
   - Create a class which implments OnClickListener interface.
   - Override onClick() method of OnClickListener Interface.
   - Register the button for click event by calling setOnClickListener() method of Viewclass and pass the object of the class that implemented OnClickListener Interface.
5. Declare uses permission android.permission.CALL_PHONE in the manifest file.
6. Use ACTION_CALL intent name and pass the “tel:<phone-number> as URI in intentdata and start the call activity.
7. Use intent name and pass the “Telephone Number” and “unknown” as name as intentdata call Contacts Save Activity.

Design

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayoutxmlns:android="http://schemas.an
droid.com/apk/res/android"
xmlns:app="http://schemas.android.com/apk/res-auto"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".MainActivity">

<TextView
android:id="@+id/textView"
android:layout_width="wrap_con
tent"
android:layout_height="wrap_content"
android:layout_marginTop="50dp"
android:text="PHONE DAILER"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent
"app:layout_constraintTop_toTopOf="parent"
/>

<EditText android:id="@+id/txt_phonenumber"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="20dp"
android:layout_marginTop="30dp" android:ems="10"
```

```
android:inputType="textPersonName"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/textView" />

<Button
android:id="@+id/btn_delete"
android:layout_width="wrap_con
tent"
android:layout_height="wrap_con
tent"
android:layout_marginStart="20d
p"
android:layout_marginTop="30dp"
android:text="Delete"
app:layout_constraintStart_toEndOf="@+id/txt_phonenumber"
app:layout_constraintTop_toBottomOf="@+id/textView" />

<Button
android:id="@+id/btn_one"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="20dp"
android:layout_marginTop="30dp" android:text="1"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/txt_phonenumber" />

<Button android:id="@+id/btn_two"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="30dp"
android:text="2"
```

```
app:layout_constraintEnd_toStartOf="@+id/btn_three"
app:layout_constraintStart_toEndOf="@+id/btn_one"
app:layout_constraintTop_toBottomOf="@+id/txt_phonenumber" />

<Button
android:id="@+id/btn_thre
e"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="30dp"
android:layout_marginEnd="20dp"
android:text="3"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintTop_toBottomOf="@+id/txt_phonenumber" />

<Button
android:id="@+id/btn_
four"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="20dp"
android:layout_marginTop="30dp"
android:text="4"
app:layout_constraintStart_toStartOf="par
ent"
app:layout_constraintTop_toBottomOf="@+id/btn_one" />

<Button
android:id="@+id/btn_
five"
android:layout_width="wrap_cont
ent"
android:layout_height="wrap_con
tent"
android:layout_marginTop="30dp"
android:text="5"
app:layout_constraintEnd_toStartOf="@+id/btn_six"
app:layout_constraintStart_toEndOf="@+id/btn_four"
app:layout_constraintTop_toBottomOf="@+id/btn_two" />

<Button
android:id="@+id/btn_six"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="30dp"
android:layout_marginEnd="20dp"
android:text="6"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintTop_toBottomOf="@+id/btn_three" />

<Button
android:id="@+id/btn_seve
n"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="20dp"
android:layout_marginTop="30dp"
android:text="7"
app:layout_constraintStart_toStartOf="par
ent"
```

```
app:layout_constraintTop_toBottomOf="@+id/btn_four" />

<Button
android:id="@+id/btn_eigh
t"
android:layout_width="wrap_cont
ent"
android:layout_height="wrap_con
tent"
android:layout_marginTop="30dp"
```

```
android:text="8"
app:layout_constraintEnd_toStartOf="@+id/btn_nine"
app:layout_constraintStart_toEndOf="@+id/btn_seven"
app:layout_constraintTop_toBottomOf="@+id/btn_five"
/>

<Button
android:id="@+id/btn_
nine"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="30dp"
android:layout_marginEnd="20dp"
android:text="9"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintTop_toBottomOf="@+id/btn_six" />

<Button
android:id="@+id/btn_
zero"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="30dp"
android:text="0"
app:layout_constraintEnd_toEndOf="parent
"
app:layout_constraintStart_toStartOf="par
ent"
app:layout_constraintTop_toBottomOf="@+id/btn_eight" />

<Button
android:id="@+id/btn_
call"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="20dp"
android:layout_marginTop="30dp"
android:text="Call"
app:layout_constraintStart_toStartOf="parent
"
app:layout_constraintTop_toBottomOf="@+id/btn_zero" />

<Button
android:id="@+id/btn_
save"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="30dp"
android:layout_marginEnd="20dp"
android:text="Save"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintTop_toBottomOf="@+id/btn_zero" />

<Button
android:id="@+id/btn_star
t"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="20dp"
android:layout_marginTop="30dp"
```

```
android:text="*"
app:layout_constraintStart_toStartOf="par
ent"
app:layout_constraintTop_toBottomOf="@+id/btn_seven" />

<Button
android:id="@+id/btn_
hash"
android:layout_width="wrap_cont
ent"
android:layout_height="wrap_con
tent"
```

```
android:layout_marginTop="30dp"
android:layout_marginEnd="20dp"
android:text="#"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintTop_toBottomOf="@+id/btn_nine" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

```
package com.example.part_a_program_8;

import
androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import
android.net.Uri;
import
android.os.Bundle;
import
android.provider.ContactsContract;
import android.view.View;
import
android.widget.Button;
import
android.widget.EditText;

public class MainActivityextends AppCompatActivityimplements

View.OnClickListener{Button btnOne,btnTwo,btnThree,btnFour,btnFive;
Button
btnSix,btnSeven,btnEight,btnNine,btnZero;
Button
btnDel,btnStar,btnHash,btnCall,btnSave;

EditTexttxtPhonenu

mber;@Override
protected void onCreate(Bundle
savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_main);

btnOne=(Button)findViewById(R.id.btn_one);
btnOne.setOnClickListener(this);

btnTwo=(Button)findViewById(R.id.btn_two);
btnTwo.setOnClickListener(this);

btnThree=(Button)findViewById(R.id.btn_three);
btnThree.setOnClickListener(this);


btnFour=(Button)findViewById(R.id.btn_four);
btnFour.setOnClickListener(this);

btnFive=(Button)findViewById(R.id.btn_five);
btnFive.setOnClickListener(this);
```

```
        btnSix=(Button)findViewById(R.id.btn_six);
        btnSix.setOnClickListener(this);

        btnSeven=(Button)findViewById(R.id.btn_seven);
        btnSeven.setOnClickListener(this);

        btnEight=(Button)findViewById(R.id.btn_eight);
        btnEight.setOnClickListener(this);
```

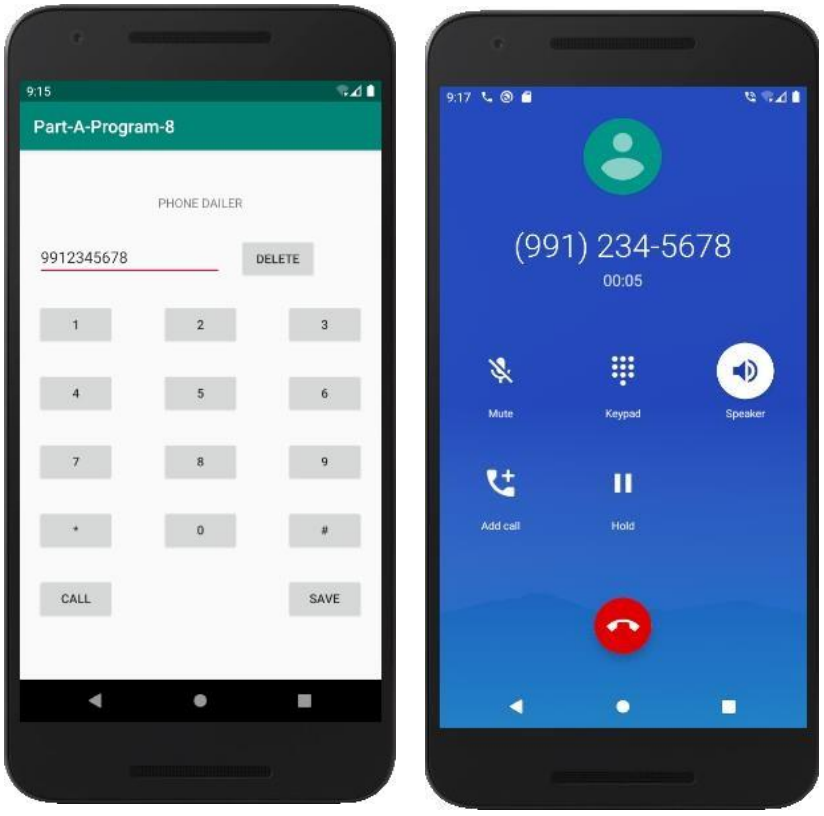
```
btnNine=(Button)findViewById(R.id.btn_nine);
btnNine.setOnClickListener(this);

btnZero=(Button)findViewById(R.id.btn_zero);
btnZero.setOnClickListener(this);

btnStar=(Button)findViewById(R.id.btn_st
art);btnStar.setOnClickListener(this);

btnHash=(Button)findViewById(R.id.btn_hash);
btnHash.setOnClickListener(this);

btnCall=(Button)findViewById(R.id.btn_call);
btnCall.setOnClickListener(this);

btnSave=(Button)findViewById(R.id.btn_save);
btnSave.setOnClickListener(this);

btnDel=(Button)findViewById(R.id.btn_del
ete);btnDel.setOnClickListener(this);

txtPhonenumber=(EditText)findViewById(R.id.txt_phonenumber);

txtPhonenumber.setText("");
}

public void onClick(View v)
{
if(v.equals(btnOne))
txtPhonenumber.append("1");

else if(v.equals(btnTwo))
txtPhonenumber.append("2");

else if(v.equals(btnThree))
txtPhonenumber.append("3");

else if(v.equals(btnFour))
txtPhonenumber.append("4");

else if(v.equals(btnFive))
txtPhonenumber.append("5");

else if(v.equals(btnSix))
txtPhonenumber.append("6");

else if(v.equals(btnSeven))
txtPhonenumber.append("7");

else if(v.equals(btnEight))
txtPhonenumber.append("8");

else if(v.equals(btnNine))
txtPhonenumber.append("9");


else if(v.equals(btnZero))
txtPhonenumber.append("0");
```

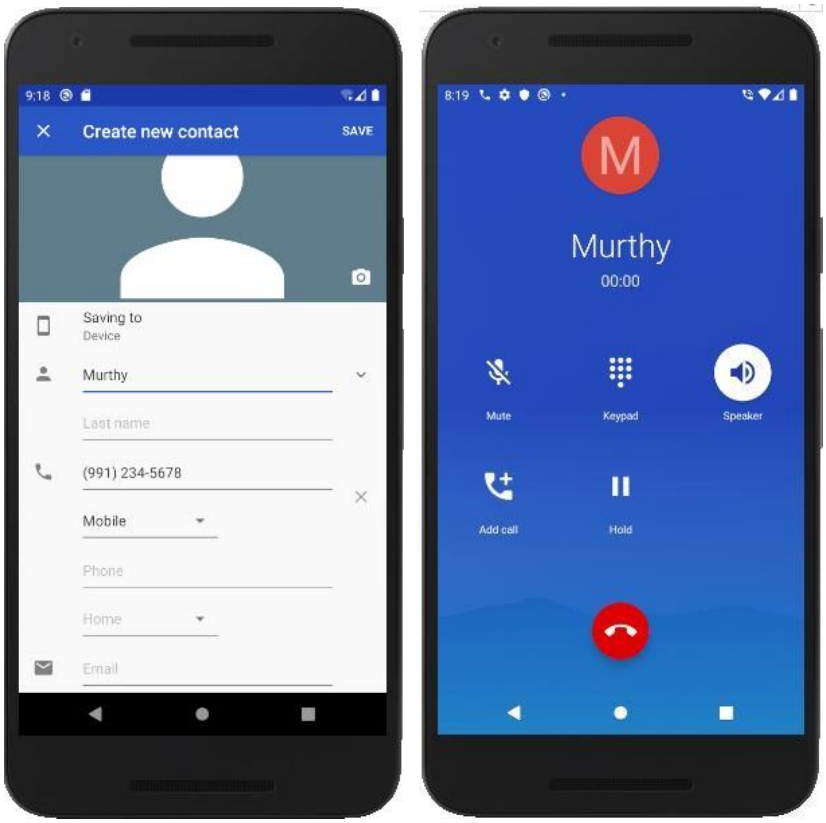
```
else if(v.equals(btnStar))
txtPhonenumber.append("*");

else if(v.equals(btnHash))
txtPhonenumber.append("#");

else  if(v.equals(btnSave))
{
Intent contactIntent= new Intent
                    (ContactsContract.Intents.Insert.ACT
ION);contactIntent.setType
                    (ContactsContract.RawContacts.CONTENT_TYPE);

contactIntent
.putExtra(ContactsContract.Intents.Insert.NAME,"Unknown");
contactIntent.putExtra(ContactsContract.Intents.Insert.PHONE,
txtPhonenumber.getText().toString());

startActivity(contactIntent);

}

else  if(v.equals(btnDel))
{
String
data=txtPhonenumber.getText().toString();
if(data.length()>0)
{
txtPhonenumber.setText
                        (data.substring(0,data.length()-1));

}
else
{
txtPhonenumber.setText("");
}
}

btnCall.setOnClickListener(new View.OnClickListener()
        {
@Override
public void onClick(View v) {

String data =
txtPhonenumber.getText().toString();Intent
intent=new Intent(Intent.ACTION_DIAL);
intent.setData(Uri.parse("tel:"+ data));
startActivity(intent);
                        }
              }
        );

    }

}
```

AndriodManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
package="com.example.part_a_program_8">

<uses-permission  android:name="android.permission.CALL_PHONE"/>

<application
android:allowBackup="true"
android:icon="@mipmap/ic_launch
er"
android:label="@string/app_name
"
android:roundIcon="@mipmap/ic_launcher_round"
android:supportsRtl="true"
android:theme="@style/AppTheme">
<activity android:name=".MainActivity">
<intent-filter>
<action android:name="android.intent.action.MAIN" />

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

</manifest>
```

Sample Output




9:18
Create new contact
SAVE
Saving to
Device
Murthy
Last name
(991) 234-5678
Mobile
Phone
Home
Email
8:19
M
Murthy
00:00
Mute
Keypad
Speaker
Add call
Hold

PART B