



**D.Y.PATIL GROUP**

**Dr.D.Y.Patil School of MCA**

Via Lohegoan(Bk),Charoli,pune

External Practical Schedule

Annual Year 2021-22

MCA –2<sup>nd</sup> year(SEM-3)

**A  
Lab Journal  
Of**

**“KNOWLEDGE REPRESENTATION & ARTIFICIAL  
INTELLIGENCE –ML,  
MOBILE APPLICATION DEVELOPMENT”**

**By  
ANKIT DILIP PAWAR**

**SEAT NO. - 22739**

Submitted in partial fulfillment of  
First Year Master in Computer Application  
Savitribai Phule Pune University

**Under The Guidance  
Of**

Prof. Rajnish Mishra, Prof. Asmita Hendre

**Dr. D.Y. Patil School of MCA, Pune  
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## Certificate

This is to certify that Ankit Dilip Pawar

Seat No 22739 Student of the class MCA-II (Sem-III) has successfully completed the Practical on “IT 31L – Practicals (Mobile Application Development Knowledge Representation, Artificial Intelligence, Machine Learning and Deep Learning)  
during the academic year 2021-2022.

**Prof. Rajnish Mishra      Prof. Ashok Deokar      Dr. E. B. Khedkar**  
**Prof. Asmita Hendre      HOD, DYPSONMCA      Director, DYP**

**Place:** Pune

**Date:**

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**Prof. Asmita Hendre**

## 1. Create a simple calculator.

```
<?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">

    <RelativeLayout
        android:id="@+id/relative1"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="1.0"
        app:layout_constraintStart_toStartOf="parent"
        tools:context=".MainActivity"
        tools:layout_editor_absoluteY="95dp">

        <EditText
            android:id="@+id/edt1"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_alignParentTop="true"
            android:layout_marginTop="47dp" />

        <Button
            android:id="@+id/button1"
            style="?android:attr/buttonStyleSmall"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@+id/edt1"
            android:layout_alignEnd="@+id/button4"
            android:layout_alignRight="@+id/button4"
            android:layout_marginTop="94dp"
            android:text="1" />

        <Button
            android:id="@+id/button2"
            style="?android:attr/buttonStyleSmall"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_alignTop="@+id/button1"
            android:layout_toStartOf="@+id/button3"
            android:layout_toLeftOf="@+id/button3"
            android:text="2" />

        <Button
            android:id="@+id/button3"
            style="?android:attr/buttonStyleSmall"
```

```
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignTop="@+id/button2"
        android:layout_centerHorizontal="true"
        android:text="3" />

    <Button
        android:id="@+id/button4"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button1"
        android:layout_toLeftOf="@+id/button2"
        android:text="4" />

    <Button
        android:id="@+id/button5"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignStart="@+id/button2"
        android:layout_alignLeft="@+id/button2"
        android:layout_alignBottom="@+id/button4"
        android:text="5" />

    <Button
        android:id="@+id/button6"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button3"
        android:layout_alignStart="@+id/button3"
        android:layout_alignLeft="@+id/button3"
        android:text="6" />

    <Button
        android:id="@+id/button7"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button4"
        android:layout_toLeftOf="@+id/button2"
        android:text="7" />

    <Button
        android:id="@+id/button8"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button5"
        android:layout_alignStart="@+id/button5"
        android:layout_alignLeft="@+id/button5"
        android:text="8" />

    <Button
        android:id="@+id/button9"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button6"
        android:layout_alignStart="@+id/button6"
```

```
        android:layout_alignLeft="@+id/button6"
        android:text="9" />

<Button
    android:id="@+id/buttonadd"
    style="?android:attr/buttonStyleSmall"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignTop="@+id/button3"
    android:layout_alignEnd="@+id/edit1"
    android:layout_alignRight="@+id/edit1"
    android:layout_marginStart="46dp"
    android:layout_marginLeft="46dp"
    android:layout_toRightOf="@+id/button3"
    android:text="+" />

<Button
    android:id="@+id/buttonsub"
    style="?android:attr/buttonStyleSmall"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/buttonadd"
    android:layout_alignStart="@+id/buttonadd"
    android:layout_alignLeft="@+id/buttonadd"
    android:layout_alignEnd="@+id/buttonadd"
    android:layout_alignRight="@+id/buttonadd"
    android:text="-" />

<Button
    android:id="@+id/buttonmul"
    style="?android:attr/buttonStyleSmall"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/buttonsub"
    android:layout_alignStart="@+id/buttonsub"
    android:layout_alignLeft="@+id/buttonsub"
    android:layout_alignParentEnd="true"
    android:layout_alignParentRight="true"
    android:text="*" />

<Button
    android:id="@+id/button10"
    style="?android:attr/buttonStyleSmall"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/button7"
    android:layout_toLeftOf="@+id/button2"
    android:text="." />

<Button
    android:id="@+id/button0"
    style="?android:attr/buttonStyleSmall"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/button8"
    android:layout_alignStart="@+id/button8"
    android:layout_alignLeft="@+id/button8"
    android:text="0" />

<Button
    android:id="@+id/buttonC"
```

```

        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button9"
        android:layout_alignStart="@+id/button9"
        android:layout_alignLeft="@+id/button9"
        android:text="C" />

<Button
    android:id="@+id/buttondiv"
    style="?android:attr/buttonStyleSmall"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/buttonmul"
    android:layout_alignStart="@+id/buttonmul"
    android:layout_alignLeft="@+id/buttonmul"
    android:layout_alignEnd="@+id/buttonmul"
    android:layout_alignRight="@+id/buttonmul"
    android:text="/" />

<Button
    android:id="@+id/buttononeql"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/button0"
    android:layout_alignStart="@+id/button10"
    android:layout_alignLeft="@+id/button10"
    android:layout_alignEnd="@+id/buttondiv"
    android:layout_alignRight="@+id/buttondiv"
    android:layout_marginStart="-4dp"
    android:layout_marginLeft="-4dp"
    android:layout_marginTop="44dp"
    android:layout_marginEnd="7dp"
    android:layout_marginRight="7dp"
    android:text="=" />

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

```

package com.example.calculatorfinal;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;

public class MainActivity extends AppCompatActivity {
    Button button0, button1, button2, button3, button4, button5,
button6,
            button7, button8, button9, buttonAdd, buttonSub,
buttonDivision,
            buttonMul, button10, buttonC, buttonEqual;
    EditText EditText;

    float ValueOne, ValueTwo;

    boolean Addition, Subtract, Multiplication, Division;
```

```

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

    button0 = (Button) findViewById(R.id.button0);
    button1 = (Button) findViewById(R.id.button1);
    button2 = (Button) findViewById(R.id.button2);
    button3 = (Button) findViewById(R.id.button3);
    button4 = (Button) findViewById(R.id.button4);
    button5 = (Button) findViewById(R.id.button5);
    button6 = (Button) findViewById(R.id.button6);
    button7 = (Button) findViewById(R.id.button7);
    button8 = (Button) findViewById(R.id.button8);
    button9 = (Button) findViewById(R.id.button9);
    button10 = (Button) findViewById(R.id.button10);
    buttonAdd = (Button) findViewById(R.id.buttonadd);
    buttonSub = (Button) findViewById(R.id.buttonsub);
    buttonMul = (Button) findViewById(R.id.buttonmul);
    buttonDivision = (Button) findViewById(R.id.buttondiv);
    buttonC = (Button) findViewById(R.id.buttonC);
    buttonEqual = (Button) findViewById(R.id.buttoneql);
    EditText = (EditText) findViewById(R.id.edt1);

button1.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        EditText.setText(EditText.getText() + "1");
    }
});

button2.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        EditText.setText(EditText.getText() + "2");
    }
});

button3.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        EditText.setText(EditText.getText() + "3");
    }
});

button4.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        EditText.setText(EditText.getText() + "4");
    }
});

button5.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        EditText.setText(EditText.getText() + "5");
    }
});

button6.setOnClickListener(new View.OnClickListener() {

```

```

        @Override
        public void onClick(View v) {
            EditText.setText(EditText.getText() + "6");
        }
    });

button7.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        EditText.setText(EditText.getText() + "7");
    }
});

button8.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        EditText.setText(EditText.getText() + "8");
    }
});

button9.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        EditText.setText(EditText.getText() + "9");
    }
});

button0.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        EditText.setText(EditText.getText() + "0");
    }
});

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

        if (EditText == null) {
            EditText.setText("");
        } else {
            ValueOne = Float.parseFloat(EditText.getText() +
"");
            Addition = true;
            EditText.setText(null);
        }
    }
});

buttonSub.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        ValueOne = Float.parseFloat(EditText.getText() + "");
        Subtract = true;
        EditText.setText(null);
    }
});

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

```

```

        ValueOne = Float.parseFloat.EditText.getText() + "";
        Multiplication = true;
        EditText.setText(null);
    }
}

buttonDivision.setOnClickListener(new View.OnClickListener()
{
    @Override
    public void onClick(View v) {
        ValueOne = Float.parseFloat.EditText.getText() + "";
        Division = true;
        EditText.setText(null);
    }
});

buttonEqual.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        ValueTwo = Float.parseFloat.EditText.getText() + "";

        if (Addition == true) {
            EditText.setText(ValueOne + ValueTwo + "");
            Addition = false;
        }

        if (Subtract == true) {
            EditText.setText(ValueOne - ValueTwo + "");
            Subtract = false;
        }

        if (Multiplication == true) {
            EditText.setText(ValueOne * ValueTwo + "");
            Multiplication = false;
        }

        if (Division == true) {
            EditText.setText(ValueOne / ValueTwo + "");
            Division = false;
        }
    }
});

buttonC.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        EditText.setText("");
    }
});

button10.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        EditText.setText(EditText.getText() + ".");
    }
});
}
}

```



**2. Write a program to find different views (buttons, Textview, Edittext etc.)**

```
<?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">

    <TextView
        android:id="@+id/textView"
        android:layout_width="342dp"
        android:layout_height="40dp"
        android:layout_marginStart="32dp"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="39dp"
        android:layout_marginBottom="12dp"
        android:text="TextView"

        app:layout_constraintBottom_toTopOf="@+id/editTextTextPersonName"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <EditText
        android:id="@+id/editTextTextPersonName"
        android:layout_width="342dp"
        android:layout_height="41dp"
        android:layout_marginStart="32dp"
        android:layout_marginTop="12dp"
        android:layout_marginEnd="32dp"
        android:layout_marginBottom="21dp"
        android:ems="10"
        android:inputType="textPersonName"
        android:text="Name"

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

    <CheckedTextView
        android:id="@+id/checkedTextView"
        android:layout_width="342dp"
        android:layout_height="41dp"
        android:layout_marginStart="32dp"
        android:layout_marginTop="15dp"
        android:layout_marginEnd="32dp"
        android:layout_marginBottom="20dp"
        android:text="CheckedTextView"

        app:layout_constraintBottom_toTopOf="@+id/checkBox"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"

        app:layout_constraintTop_toBottomOf="@+id/editTextTextPersonName" />

    <CheckBox
        android:id="@+id/checkBox"
        android:layout_width="156dp"
        android:layout_height="43dp"
        android:layout_marginStart="25dp"
```

```
        android:layout_marginTop="20dp"
        android:layout_marginEnd="60dp"
        android:layout_marginBottom="20dp"
        android:text="CheckBox"
        app:layout_constraintBottom_toTopOf="@+id/_dynamic"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toEndOf="@+id/radioButton3"
        app:layout_constraintTop_toBottomOf="@+id/checkedTextView"
        app:layout_constraintVertical_bias="1.0" />

<GridView
    android:layout_width="390dp"
    android:layout_height="88dp"
    android:layout_marginTop="21dp"
    android:layout_marginBottom="11dp"
    app:layout_constraintBottom_toTopOf="@+id/progressBar2"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/checkBox" />

<ProgressBar
    android:id="@+id/progressBar2"
    style="?android:attr/progressBarStyle"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="32dp"
    android:layout_marginTop="11dp"
    android:layout_marginEnd="32dp"
    android:layout_marginBottom="32dp"
    app:layout_constraintBottom_toTopOf="@+id/ratingBar"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.468"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/_dynamic" />

<RatingBar
    android:id="@+id/ratingBar"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="308dp"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.444"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/progressBar2" />

<RadioButton
    android:id="@+id/radioButton3"
    android:layout_width="127dp"
    android:layout_height="45dp"
    android:layout_marginStart="35dp"
    android:layout_marginTop="20dp"
    android:layout_marginEnd="25dp"
    android:layout_marginBottom="44dp"
    android:text="RadioButton"
    app:layout_constraintBottom_toTopOf="@+id/_dynamic"
    app:layout_constraintEnd_toStartOf="@+id/checkBox"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/checkedTextView"
    app:layout_constraintVertical_bias="0.0" />

<RatingBar
```

```

        android:id="@+id/ratingBar2"
        android:layout_width="249dp"
        android:layout_height="64dp"
        android:layout_marginTop="9dp"
        android:layout_marginBottom="129dp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.497"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/progressBar2"
        app:layout_constraintVertical_bias="0.137" />

    <Button
        android:id="@+id/button2"
        android:layout_width="123dp"
        android:layout_height="49dp"
        android:layout_marginTop="19dp"
        android:layout_marginBottom="62dp"
        android:text="Button"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/ratingBar2"
        app:layout_constraintVertical_bias="0.0" />

</androidx.constraintlayout.widget.ConstraintLayout>

```



TextView

Name

CheckedTextView

RadioButton

CheckBox

C



BUTTON



3. Write a program to show the intent (move from one activity to another activity).

```
<?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">

    <TextView
        android:id="@+id/textView"
        android:layout_width="121dp"
        android:layout_height="39dp"
        android:layout_marginStart="24dp"
        android:layout_marginTop="26dp"
        android:layout_marginEnd="24dp"
        android:layout_marginBottom="40dp"
        android:text=""
        app:layout_constraintBottom_toTopOf="@+id/button"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/editText2" />

    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="24dp"
        android:layout_marginTop="30dp"
        android:layout_marginEnd="24dp"
        android:layout_marginBottom="220dp"
        android:text="submit"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView" />

    <EditText
        android:id="@+id/editText1"
        android:layout_width="399dp"
        android:layout_height="72dp"
        android:layout_marginTop="56dp"
        android:ems="10"
        android:inputType="textPersonName"
        android:text=""
        app:layout_constraintBottom_toTopOf="@+id/editText2"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.492"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.273" />

    <EditText
        android:id="@+id/editText2"
        android:layout_width="387dp"
        android:layout_height="76dp"
        android:layout_marginTop="20dp"
        android:layout_marginBottom="24dp"
```

```
        android:ems="10"
        android:inputType="textPersonName"
        android:text=""
        app:layout_constraintBottom_toTopOf="@+id/textView"
        app:layout_constraintEnd_toEndOf="parent"

        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/editText1" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

```
package com.example.intent;

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.TextView;

public class MainActivity extends AppCompatActivity {

    private Button b1;
    private TextView tv1;
    private EditText ed1;
    private EditText ed2;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        tv1 = findViewById(R.id.textView);
        ed1 = findViewById(R.id.editText1);
        ed2 = findViewById(R.id.editText2);
        b1 = findViewById(R.id.button);
        b1.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String user = ed1.getText().toString();
                String pass = ed2.getText().toString();
                if((user.equals("chaitanya")) && (pass.equals("123")))
                {
                    //          intent i;
                    //          i=new
                    Intent(getApplicationContext(),MainActivity2.class);
                    //          startActivity(i);
                    startActivity(new
                    Intent(MainActivity.this,MainActivity2.class));
                }
                else
                {
                    tv1.setText("Something went wrong");
                }
            }
        });
    }
}

<?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=".MainActivity2"

<TextView
    android:id="@+id/textView2"
    android:layout_width="267dp"
    android:layout_height="68dp"
    android:text="Hi Chaitanya you are now in another activity"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.666"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.499" />

</androidx.constraintlayout.widget.ConstraintLayout>

```



chaitanya

---

123

---

Hi Chaitanya you are now in another  
activity

SUBMIT



#### 4.1 Write a program to show simple Listview.

```
<?xml version="1.0" encoding="utf-8"?>

    <LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".ListActivity" >
    <ListView
        android:id="@+id/mobile_list"
        android:layout_width="match_parent"
        android:layout_height="wrap_content" >
    </ListView>
</LinearLayout>
```

```
<?xml version="1.0" encoding="utf-8"?>

<TextView xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/label"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:padding="10dip"
    android:textSize="21dip"
    android:textStyle="italic" >
</TextView>

package com.example.listview;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.Menu;
import android.view.View;
import android.widget.ArrayAdapter;
import android.widget.ListView;

public class MainActivity extends AppCompatActivity {
    String[] mobileArray =
    {"Android", "IPhone", "WindowsMobile", "Blackberry",
        "WebOS", "Ubuntu", "Windows7", "Max OS X"};

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        ArrayAdapter adapter = new ArrayAdapter<String>(this,
            R.layout.activity_listview, mobileArray);
        ListView listView = (ListView)
        findViewById(R.id.mobile_list);
        listView.setAdapter(adapter);
    }
}

<resources>
    <string name="app_name">listview</string>
```

```
<string name="action_settings">Settings</string>>  
</resources>
```



*Android*

*iPhone*

*WindowsMobile*

*Blackberry*

*WebOS*

*Ubuntu*

*Windows7*

*Max OS X*



#### 4.2 Write a program to show Webview.

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android =
"http://schemas.android.com/apk/res/android"      android:id =
"@+id/parent"
    xmlns:tools = "http://schemas.android.com/tools"
    android:layout_width = "match_parent"
    android:layout_height = "match_parent"
    tools:context = ".MainActivity">
    <WebView
        android:id="@+id/webView"
        android:layout_width="match_parent"
        android:layout_height="match_parent">
    </WebView>
</RelativeLayout>
```

```
package com.example.webview;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.webkit.WebSettings;
import android.webkit.WebView;
import android.webkit.WebViewClient;

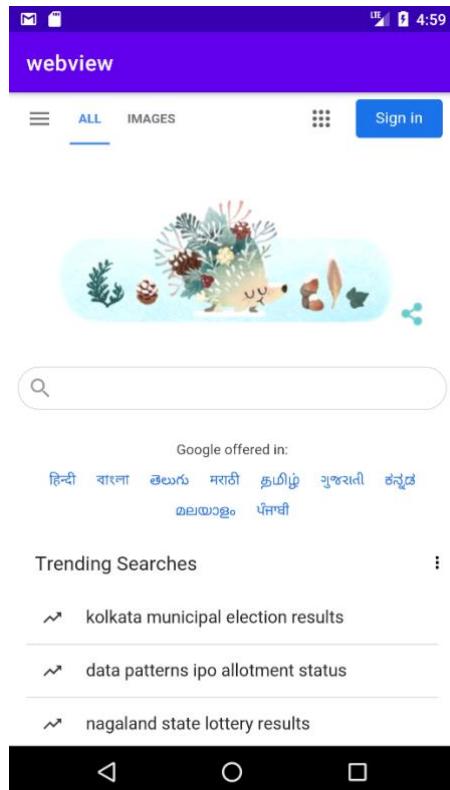
public class MainActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        WebView webView = (WebView) findViewById(R.id.webView);
        webView.setWebViewClient(new WebViewClient());
        webView.loadUrl("https://www.google.com");
        WebSettings webSettings = webView.getSettings();
        webSettings.setJavaScriptEnabled(true);
    }
    /*public void onBackPressed() {
        if (webView.canGoBack()) {
            webView.goBack();
        } else {
            super.onBackPressed();
        }
    }*/
}
```

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.webview">
    <uses-permission
        android:name="android.permission.INTERNET"></uses-permission>
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.Webview">
        <activity
            android:name=".MainActivity"
            android:exported="true">
```

```
<intent-filter>
    <action android:name="android.intent.action.MAIN" />

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



### 5.1 Write a program to show Gridview.

```
<?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">

    <GridView
        android:id="@+id/gridview"
        android:layout_width="408dp"
        android:layout_height="719dp"
        android:columnWidth="90dp"
        android:gravity="center"
        android:horizontalSpacing="10dp"
        android:numColumns="auto_fit"
        android:stretchMode="columnWidth"
        android:verticalSpacing="10dp"
        tools:layout_editor_absoluteY="12dp" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

```
package com.example.gridalpha;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.Menu;
import android.view.View;
import android.widget.Adapter;
import android.widget.AdapterView;
import android.widget.AdapterView.OnItemClickListener;
import android.widget.ArrayAdapter;
import android.widget.GridView;
import android.widget.TextView;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    static final String[] letters = new String[]{
        "A", "B", "C", "D", "E",
        "F", "G", "H", "I", "J",
        "K", "L", "M", "N", "O",
        "P", "Q", "R", "S", "T",
        "U", "V", "W", "X", "Y", "Z"};
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        GridView grid = (GridView) findViewById(R.id.gridview);
        ArrayAdapter adapter = new ArrayAdapter(this,
            android.R.layout.simple_list_item_1, letters);
        grid.setAdapter(adapter);
        grid.setOnItemClickListener(new OnItemClickListener() {
            public void onItemClick(AdapterView parent, View v,
                int position, long id) {
                Toast.makeText(getApplicationContext(),
                    ((TextView) v).getText(),
                    Toast.LENGTH_SHORT).show();
            }
        });
    }
}
```

```
        } ) ;  
    }  
}
```



C



## 5.2 Write a program to show Spinner (Dropdownlist).

```
<?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">

    <RelativeLayout
        xmlns:android="http://schemas.android.com/apk/res/android"
        android:layout_width="match_parent"
        android:layout_height="match_parent">
        <TextView
            android:id="@+id/txtVw"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="50dp"
            android:layout_marginTop="150dp"
            android:text="User Selected:"
            android:textSize="15dp"
            android:textStyle="bold" />
        <Spinner
            android:id="@+id/spinner1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_alignBottom="@+id/txtVw"
            android:layout_toRightOf="@+id/txtVw" />
    </RelativeLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

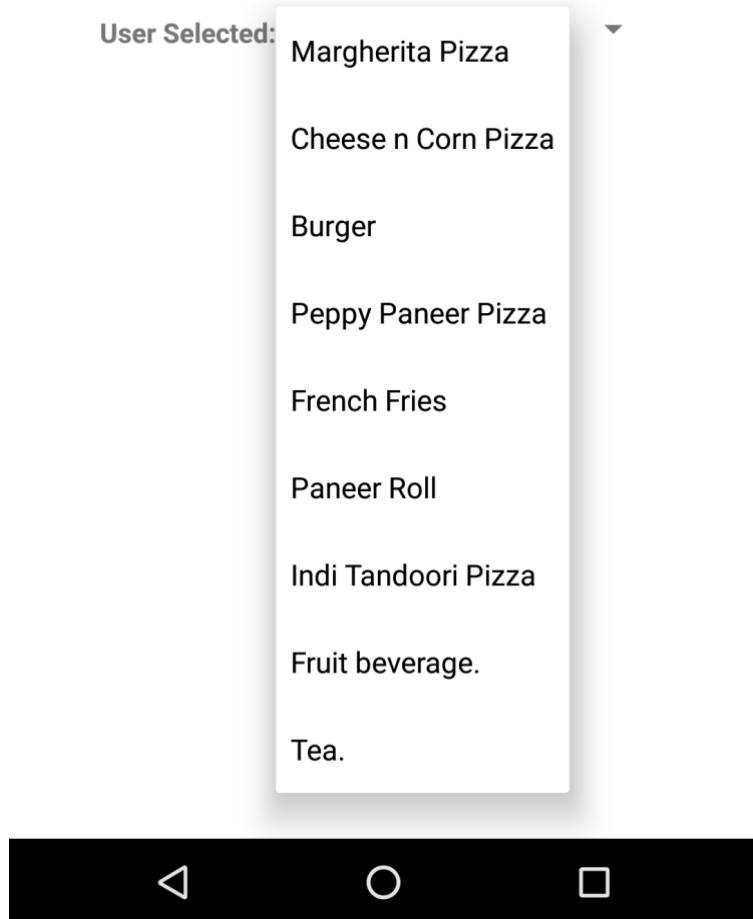
```
package com.example.spinner1;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.ArrayAdapter;
import android.widget.Spinner;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity implements
    AdapterView.OnItemSelectedListener {
    String[] users = { "Margherita Pizza", "Cheese n Corn Pizza",
        "Burger", "Peppy Paneer Pizza", "French Fries", "Paneer Roll", "Indi
        Tandoori Pizza", "Fruit beverage.", "Tea." };
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Spinner spin = (Spinner) findViewById(R.id.spinner1);
        ArrayAdapter<String> adapter = new ArrayAdapter<String>(this,
            android.R.layout.simple_spinner_item, users);

        adapter.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item);
        spin.setAdapter(adapter);
        spin.setOnItemSelectedListener(this);
    }
}
```

```
    @Override
    public void onItemSelected(AdapterView<?> arg0, View arg1, int
position, long id) {
        Toast.makeText(getApplicationContext(), "User Selected:
"+users[position] , Toast.LENGTH_SHORT).show();
    }
    @Override
    public void onNothingSelected(AdapterView<?> arg0) {
    }
}
```



## 6.1 Write a program to show checkbox.

```
<?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">

    <CheckBox
        android:id="@+id/checkBox"
        android:layout_width="96dp"
        android:layout_height="46dp"
        android:layout_marginStart="16dp"
        android:layout_marginTop="68dp"
        android:layout_marginEnd="16dp"
        android:text="Pizza"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <CheckBox
        android:id="@+id/checkBox2"
        android:layout_width="102dp"
        android:layout_height="47dp"
        android:layout_marginStart="16dp"
        android:layout_marginTop="30dp"
        android:layout_marginEnd="16dp"
        android:text="Coffee"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/checkBox" />

    <CheckBox
        android:id="@+id/checkBox3"
        android:layout_width="104dp"
        android:layout_height="46dp"
        android:layout_marginStart="16dp"
        android:layout_marginTop="30dp"
        android:layout_marginEnd="16dp"
        android:text="Burger"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/checkBox2" />

    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:layout_marginTop="184dp"
        android:layout_marginEnd="16dp"
        android:text="Order"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/checkBox3" />

    <CheckBox
        android:id="@+id/checkBox4"
        android:layout_width="108dp"
```

```

        android:layout_height="41dp"
        android:layout_marginStart="16dp"
        android:layout_marginTop="29dp"
        android:layout_marginEnd="16dp"
        android:layout_marginBottom="107dp"
        android:text="FrenchFries"
        app:layout_constraintBottom_toTopOf="@+id/button"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/checkBox3" />

</androidx.constraintlayout.widget.ConstraintLayout>

```

```

package com.example.checkbox1;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.CheckBox;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    CheckBox pizza,coffee,burger,FrenchFries;
    Button buttonOrder;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        addListenerOnButtonClick();
    }

    private void addListenerOnButtonClick() {
        pizza=(CheckBox)findViewById(R.id.checkBox);
        coffee=(CheckBox)findViewById(R.id.checkBox2);
        burger=(CheckBox)findViewById(R.id.checkBox3);
        FrenchFries=(CheckBox)findViewById(R.id.checkBox4);
        buttonOrder=(Button)findViewById(R.id.button);
        //Applying the Listener on the Button click
        buttonOrder.setOnClickListener(new View.OnClickListener() {

            @Override
            public void onClick(View view) {
                int totalamount=0;
                StringBuilder result=new StringBuilder();
                result.append("Selected Items:");
                if(pizza.isChecked()){
                    result.append("\nPizza 100Rs");
                    totalamount+=100;
                }
                if(coffee.isChecked()){
                    result.append("\nCoffee 50Rs");
                    totalamount+=50;
                }
                if(burger.isChecked()){
                    result.append("\nBurger 120Rs");
                    totalamount+=120;
                }
                if(FrenchFries.isChecked()){
                    result.append("\nBurger 150Rs");
                }
            }
        });
    }
}

```



## 6.2 Write a program to show Radiobutton.

```
<?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">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical"

    tools:context="example.javatpoint.com.radiobutton.MainActivity">
        <TextView
            android:id="@+id/textView1"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="30dp"
            android:gravity="center_horizontal"
            android:textSize="22dp"
            android:text="Single Radio Buttons" />
        <!-- Default RadioButtons -->
        <RadioButton
            android:id="@+id/radioButton1"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_gravity="center_horizontal"
            android:text="Radio Button 1"
            android:layout_marginTop="20dp"
            android:textSize="20dp" />
        <RadioButton
            android:id="@+id/radioButton2"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:text="Radio Button 2"
            android:layout_marginTop="10dp"
            android:textSize="20dp" />
        <View
            android:layout_width="fill_parent"
            android:layout_height="1dp"
            android:layout_marginTop="20dp"
            android:background="#B8B894" />
        <TextView
            android:id="@+id/textView2"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="30dp"
            android:gravity="center_horizontal"
            android:textSize="22dp"
            android:text="Radio button inside RadioGroup" />
        <!-- Customized RadioButtons -->
        <RadioGroup
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:id="@+id/radioGroup">
            <RadioButton
                android:id="@+id/radioMale"
                android:layout_width="fill_parent"
```

```

        android:layout_height="wrap_content"
        android:text=" Male"
        android:layout_marginTop="10dp"
        android:checked="false"
        android:textSize="20dp" />
    <RadioButton
        android:id="@+id/radioFemale"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text=" Female"
        android:layout_marginTop="20dp"
        android:checked="false"
        android:textSize="20dp" />
    <RadioButton
        android:id="@+id/radioOther"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text=" other"
        android:layout_marginTop="20dp"
        android:checked="false"
        android:textSize="20dp" />
</RadioGroup>

<Button
    android:id="@+id/button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_gravity="center_horizontal"
    android:onClick="onclickbuttonMethod"
    android:text="Show Selected" />
</LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

```

package com.example.radiobutton;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.RadioButton;
import android.widget.RadioGroup;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    Button button;
    RadioButton genderRadioButton;
    RadioGroup radioGroup;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        radioGroup=(RadioGroup) findViewById(R.id.radioGroup);
    }
    public void onclickbuttonMethod(View v){
        int selectedId = radioGroup.getCheckedRadioButtonId();
        genderRadioButton = (RadioButton) findViewById(selectedId);
        if(selectedId== -1){
            Toast.makeText(MainActivity.this,"Nothing selected",
Toast.LENGTH_SHORT).show();
        }
    }
}
```

```
        else{
            Toast.makeText(MainActivity.this, genderradioButton.getText(),
            Toast.LENGTH_SHORT).show();
        }
    }
```

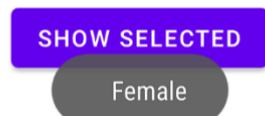


### Single Radio Buttons

- Radio Button 1
  - Radio Button 2
- 

### Radio button inside RadioGroup

- Male
- Female
- other



## 7.1 Write a program to show Alertdialogbox.

```
<?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">

    <RelativeLayout
        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:layout_centerInParent="true"
            android:text=" " />
    </RelativeLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

```
package com.example.alertdialog;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.app.AlertDialog;
import android.content.DialogInterface;
import android.view.Menu;

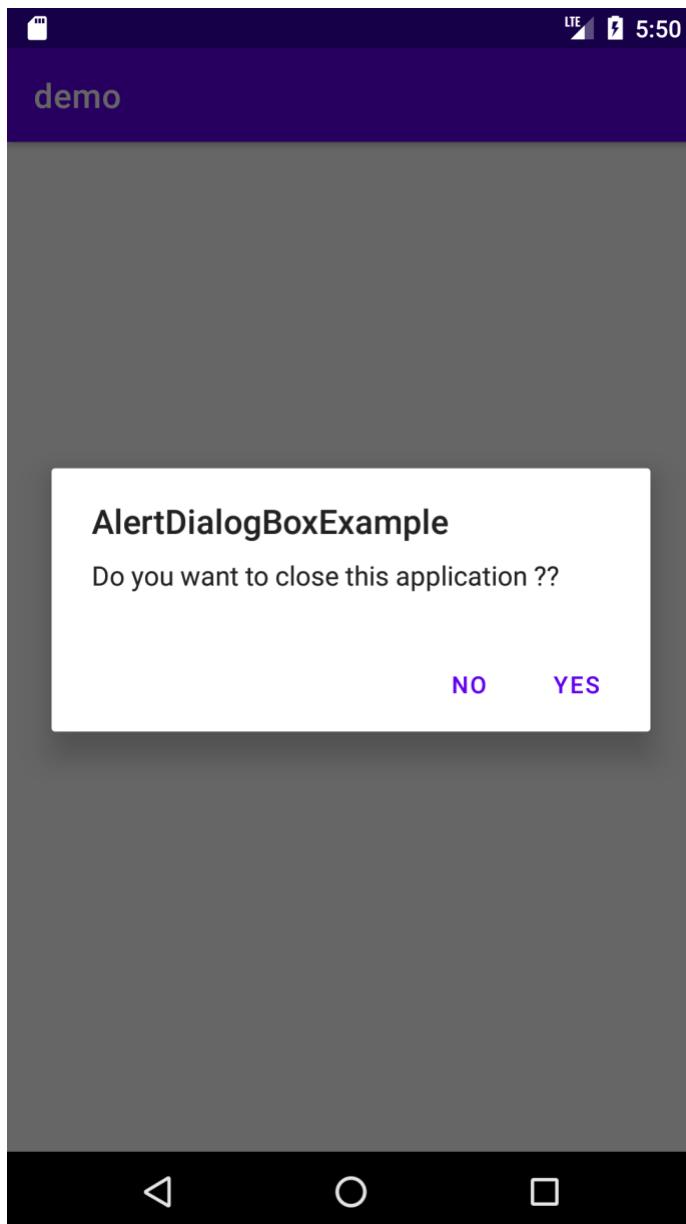
public class MainActivity extends AppCompatActivity {

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

        AlertDialog.Builder builder = new AlertDialog.Builder(this);
        //Uncomment the below code to Set the message and title from
        the strings.xml file
        //builder.setMessage(R.string.dialog_message)
        .setTitle(R.string.dialog_title);
        //Setting message manually and performing action on button
        click
        builder.setMessage("Do you want to close this application
        ??")
            .setCancelable(false)
            .setPositiveButton("Yes", new
        DialogInterface.OnClickListener() {
            public void onClick(DialogInterface dialog, int
        id) {
                finish();
            }
        })
            .setNegativeButton("No", new
        DialogInterface.OnClickListener() {
            public void onClick(DialogInterface dialog, int
        id) {
                // Action for 'NO' Button
            }
        })
    }
}
```

```
        dialog.cancel();
    }
}
//Creating dialog box
AlertDialog alert = builder.create();
//Setting the title manually
alert.setTitle("AlertDialogBoxExample");
alert.show();
}
```

```
<resources>
    <string name="app_name">demo</string>
    <string name="action_settings">Settings</string>
    <string name="hello_world">Hello world!</string>
    <string name="dialog_message">Welcome to Alert
Dialog</string>
    <string name="dialog_title">Javatpoint Alert Dialog</string>
</resources>
```



## 7.2 Write a program to show Progressbar.

### 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">

    <RelativeLayout
        xmlns:android="http://schemas.android.com/apk/res/android"
        android:layout_width="match_parent"
        android:layout_height="match_parent">
        <ProgressBar
            android:id="@+id/pBar"
            style="?android:attr/progressBarStyleHorizontal"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="100dp"
            android:layout_marginTop="200dp"
            android:minHeight="50dp"
            android:minWidth="200dp"
            android:max="100"
            android:indeterminate="false"
            android:progress="0" />
        <TextView
            android:id="@+id/tView"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_alignLeft="@+id/pBar"
            android:layout_below="@+id/pBar" />
        <Button
            android:id="@+id	btnShow"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="130dp"
            android:layout_marginTop="20dp"
            android:text="Start the Progress"
            android:layout_below="@+id/tView"/>
    </RelativeLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

### MainActivity.java

```
package com.example.progressbar;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.os.Handler;
import android.view.View;
import android.widget.Button;
import android.widget.ProgressBar;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity {
    private ProgressBar pgsBar;
```

```

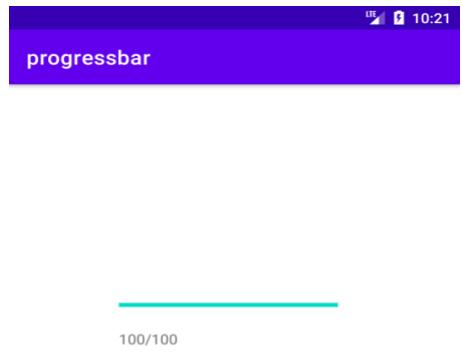
private int i = 0;
private TextView txtView;
private Handler hdrl = new Handler();

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

    pgsBar = (ProgressBar) findViewById(R.id.pBar);
    txtView = (TextView) findViewById(R.id.tView);
    Button btn = (Button) findViewById(R.id.btnShow);
    btn.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            i = pgsBar.getProgress();
            new Thread(new Runnable() {
                public void run() {
                    while (i < 100) {
                        i += 1;
                        // Update the progress bar and display
                        the current value in text view
                        hdrl.post(new Runnable() {
                            public void run() {
                                pgsBar.setProgress(i);

                                txtView.setText(i+"/"+pgsBar.getMax());
                            }
                        });
                    }
                    try {
                        // Sleep for 100 milliseconds to show
                        the progress slowly.
                        Thread.sleep(100);
                    } catch (InterruptedException e) {
                        e.printStackTrace();
                    }
                }
            }).start();
        }
    });
}

```



## 8.1 Write a program to show Ratingbar.

### 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">

    <RelativeLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        tools:context=".MainActivity" >
        <RatingBar
            android:id="@+id/ratingBar1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_alignParentTop="true"
            android:layout_centerHorizontal="true"
            android:layout_marginTop="44dp" />

        <Button
            android:id="@+id/button1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@+id/ratingBar1"
            android:layout_alignLeft="@+id/ratingBar1"
            android:layout_marginLeft="73dp"
            android:layout_marginTop="66dp"
            android:text="Submit" />
    </RelativeLayout>

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

### MainActivity.java

```
package com.example.ratingbar;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.Menu;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.widget.RatingBar;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    RatingBar ratingbar1;
    Button button;

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

        addListenerOnButtonClick();
    }
}
```

```
}

public void addListenerOnButtonClick(){
    ratingbar1=(RatingBar)findViewById(R.id.ratingBar1);
    button=(Button)findViewById(R.id.button1);
    button.setOnClickListener(new OnClickListener(){

        @Override
        public void onClick(View arg0) {

            String rating=String.valueOf(ratingbar1.getRating());
            Toast.makeText(getApplicationContext(), rating,
Toast.LENGTH_LONG).show();
            Toast.makeText(getApplicationContext(), "THANK YOU
FOR RATING", Toast.LENGTH_LONG).show();
        }

    });
}
```



THANK YOU FOR RATING



8.2 Write a program to show Googlemap on your screen.

9. Write a program to show bluetooth (on and off).

#### 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">

    <RelativeLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:paddingLeft="@dimen/activity_horizontal_margin"
        android:paddingRight="@dimen/activity_horizontal_margin"
        android:paddingTop="@dimen/activity_vertical_margin"
        android:paddingBottom="@dimen/activity_vertical_margin"
        tools:context=".MainActivity"
        android:transitionGroup="true">

        <ImageView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:id="@+id/imageView"
            android:src="@drawable/abc"
            android:layout_centerHorizontal="true"
            android:theme="@style/Base.TextAppearance.AppCompat" />

        <Button
            android:id="@+id/button"
            android:layout_width="157dp"
            android:layout_height="wrap_content"
            android:layout_below="@+id/imageView"
            android:layout_marginTop="1dp"
            android:layout_marginEnd="41dp"
            android:layout_marginRight="41dp"
            android:layout_toStartOf="@+id/imageView"
            android:layout_toLeftOf="@+id/imageView"
            android:clickable="true"
            android:onClick="on"
            android:text="Turn On" />

        <Button
            android:id="@+id/button2"
            android:layout_width="160dp"
            android:layout_height="wrap_content"
            android:layout_alignBottom="@+id/button"
            android:layout_alignParentStart="true"
            android:layout_marginStart="11dp"
            android:layout_marginEnd="31dp"
            android:layout_marginBottom="-48dp"
            android:layout_toStartOf="@+id/button3"
            android:onClick="visible"
            android:text="Get visible" />

        <Button
            android:id="@+id/button3"
            android:layout_width="188dp"
```

```
        android:layout_height="wrap_content"
        android:layout_below="@+id/imageView"
        android:layout_alignParentEnd="true"
        android:layout_marginStart="-2dp"
        android:layout_marginLeft="-2dp"
        android:layout_marginTop="47dp"
        android:layout_marginEnd="19dp"
        android:layout_toEndOf="@+id/imageView"
        android:layout_toRightOf="@+id/imageView"
        android:onClick="list"
        android:text="List devices" />

    <Button
        android:id="@+id/button4"
        android:layout_width="174dp"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button"
        android:layout_alignParentStart="true"
        android:layout_alignParentLeft="true"
        android:layout_alignParentEnd="true"
        android:layout_marginStart="202dp"
        android:layout_marginLeft="202dp"
        android:layout_marginTop="-53dp"
        android:layout_marginEnd="35dp"
        android:onClick="off"
        android:text="turn off" />

    <ListView
        android:id="@+id/listView"
        android:layout_width="411dp"
        android:layout_height="459dp"
        android:layout_below="@+id/textView2"
        android:layout_alignStart="@+id/button"
        android:layout_alignLeft="@+id/button"
        android:layout_alignParentBottom="true"
        android:layout_marginStart="-4dp"
        android:layout_marginLeft="-4dp"
        android:layout_marginTop="3dp"
        android:layout_marginBottom="21dp" />

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button4"
        android:layout_alignStart="@+id/listView"
        android:layout_alignLeft="@+id/listView"
        android:layout_marginStart="128dp"
        android:layout_marginLeft="128dp"
        android:layout_marginTop="58dp"
        android:text="Paired devices:"
        android:textColor="#ff34ff06"
        android:textSize="25dp" />

</RelativeLayout>

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

### MianActivity.java

```
package com.example.bluetoothexample;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.bluetooth.BluetoothAdapter;
import android.bluetooth.BluetoothDevice;
import android.content.Intent;
import android.view.View;

import android.widget.ArrayAdapter;
import android.widget.Button;
import android.widget.ListView;

import android.widget.Toast;
import java.util.ArrayList;
import java.util.Set;

public class MainActivity extends AppCompatActivity {
    Button b1,b2,b3,b4;
    private BluetoothAdapter BA;
    private Set<BluetoothDevice>pairedDevices;
    ListView lv;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        b1 = (Button) findViewById(R.id.button);
        b2=(Button) findViewById(R.id.button2);
        b3=(Button) findViewById(R.id.button3);
        b4=(Button) findViewById(R.id.button4);

        BA = BluetoothAdapter.getDefaultAdapter();
        lv = (ListView) findViewById(R.id.listView);
    }

    public void on(View v){
        if (!BA.isEnabled()) {
            Intent turnOn = new
Intent(BluetoothAdapter.ACTION_REQUEST_ENABLE);
            startActivityForResult(turnOn, 0);
            Toast.makeText(getApplicationContext(), "Turned
on",Toast.LENGTH_LONG).show();
        } else {
            Toast.makeText(getApplicationContext(), "Already on",
Toast.LENGTH_LONG).show();
        }
    }

    public void off(View v){
        BA.disable();
        Toast.makeText(getApplicationContext(), "Turned off"
,Toast.LENGTH_LONG).show();
    }

    public void visible(View v){
        Intent getVisible = new
Intent(BluetoothAdapter.ACTION_REQUEST_DISCOVERABLE);
    }
}
```

```

        startActivityForResult(visible, 0);
    }

    public void list(View v) {
        pairedDevices = BA.getBondedDevices();
        ArrayList list = new ArrayList();
        for(BluetoothDevice bt : pairedDevices)
list.add(bt.getName());
        Toast.makeText(getApplicationContext(), "Showing Paired Devices", Toast.LENGTH_SHORT).show();
        final ArrayAdapter adapter = new ArrayAdapter(this, android.R.layout.simple_list_item_1, list);
        lv.setAdapter(adapter);
    }
}

```

### strings.xml

```

<resources>
    <string name="app_name">My Application</string>
</resources>

```

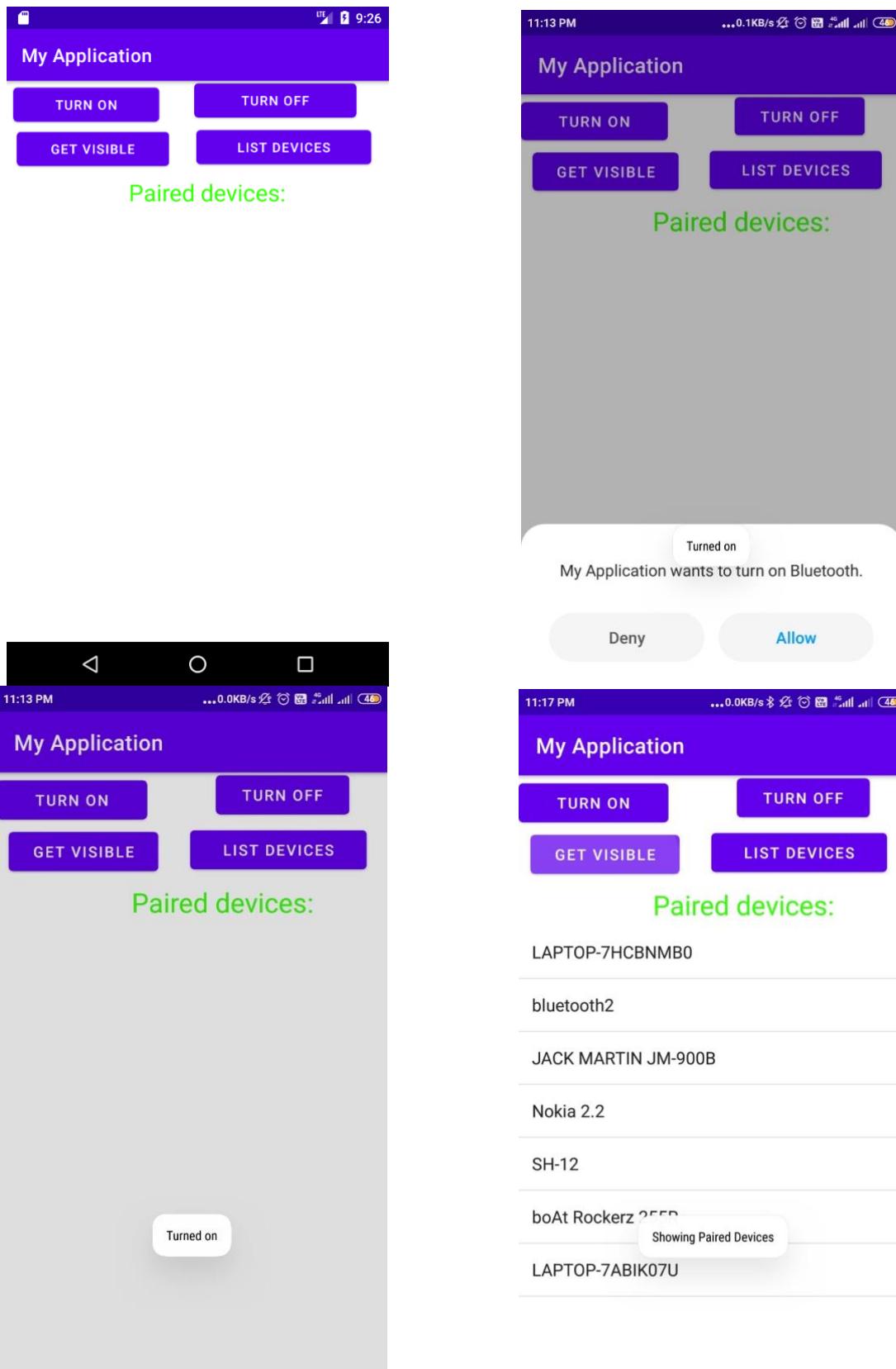
### AndroidManifest.xml

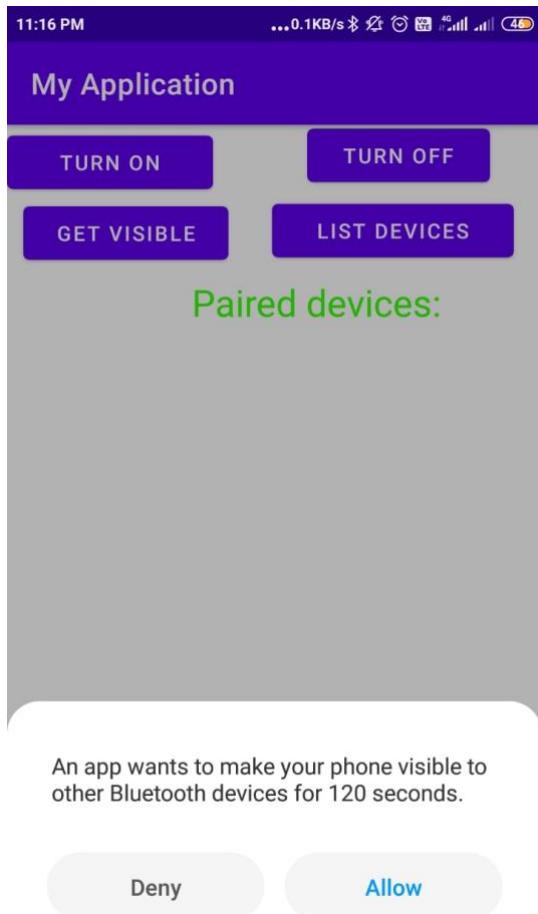
```

<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.bluetoothexample">
    <uses-permission android:name="android.permission.BLUETOOTH"/>
    <uses-permission
        android:name="android.permission.BLUETOOTH_ADMIN"/>
    <uses-permission
        android:name="android.permission.BLUETOOTH_ADVERTISE" />
    <uses-permission
        android:name="android.permission.BLUETOOTH_CONNECT" />

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.BluetoothExample">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category
                    android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>

```





## 10.1 Write a program to start and stop Audio on your screen.

### 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">
    <RelativeLayout
        xmlns:android="http://schemas.android.com/apk/res/android"
            xmlns:tools="http://schemas.android.com/tools"
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:paddingTop="@dimen/activity_vertical_margin"
            android:paddingRight="@dimen/activity_horizontal_margin"
            android:paddingBottom="@dimen/activity_vertical_margin"
            tools:context=".MainActivity">
        <Button
            android:id="@+id/button1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_alignParentLeft="true"
            android:layout_alignParentTop="true"
            android:layout_marginLeft="78dp"
            android:layout_marginTop="81dp"
            android:text="Start" />
        <Button
            android:id="@+id/button2"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_alignLeft="@+id/button1"
            android:layout_centerVertical="true"
            android:text="Stop" />
    </RelativeLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

### MainActivity.java

```
package com.example.audio;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.media.MediaPlayer;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;

public class MainActivity extends AppCompatActivity {
    MediaPlayer media;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        Button b= (Button) findViewById(R.id.button1);
        Button b1= (Button) findViewById(R.id.button2);
        media = new MediaPlayer().create(getApplicationContext(),
```

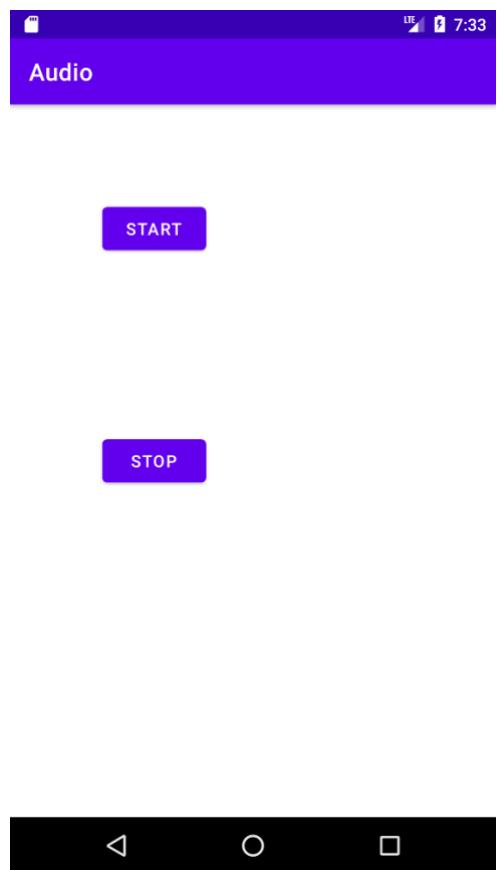
```
R.raw.music);
        b.setOnClickListener(new OnClickListener() {

            @Override
            public void onClick(View arg0) {
                // TODO Auto-generated method stub
                media.reset();
                media = new MediaPlayer().create(getApplicationContext(),
R.raw.music);
                media.start();
            }

        });
        b1.setOnClickListener(new OnClickListener() {

            @Override
            public void onClick(View v) {
                // TODO Auto-generated method stub
                media.stop();
            }

        });
    }
}
```



## 10.2 Write a program to show Video on your screen.

### 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">

    <LinearLayout
        xmlns:android="http://schemas.android.com/apk/res/android"
        android:layout_width="fill_parent"
            android:layout_height="fill_parent"
            android:orientation="vertical" >
        <VideoView
            android:id="@+id/videoView1"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" />
    </LinearLayout>

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

### MainActivity.java

```
package com.example.videodemo;

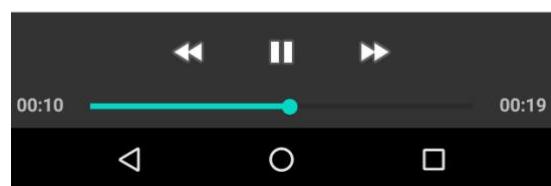
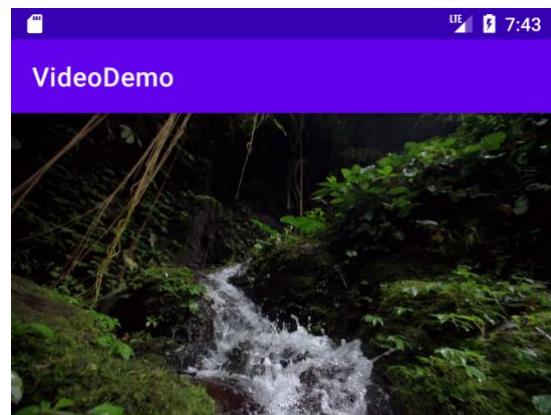
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.net.Uri;
import android.view.Menu;
import android.widget.MediaController;
import android.widget.VideoView;

public class MainActivity extends AppCompatActivity {

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

        final VideoView myv = (VideoView)
findViewById(R.id.videoView1);
        myv.setVideoURI(Uri.parse("android.resource://" +
getPackageName() + "/" + R.raw.waterfall));
        myv.setMediaController(new MediaController(this));
        myv.requestFocus();

    }
}
```



11. Write a program to show Current date (Datepicker) and current time (Timepicker) on your screen.

#### 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">

    <RelativeLayout
        xmlns:android="http://schemas.android.com/apk/res/android"
        android:layout_width="match_parent"
        android:layout_height="match_parent">
        <DatePicker
            android:id="@+id/datePicker1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_centerHorizontal="true"
            android:layout_marginTop="20dp" />
        <Button
            android:id="@+id/button1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@+id/datePicker1"
            android:layout_marginLeft="100dp"
            android:text="Get Date" />
        <TextView
            android:id="@+id/textView1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@+id/button1"
            android:layout_marginLeft="100dp"
            android:layout_marginTop="10dp"
            android:textStyle="bold"
            android:textSize="18dp"/>
    </RelativeLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

#### MainActivity.java

```
package com.example.datepicker;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.DatePicker;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity {
    DatePicker picker;
    Button btnGet;
    TextView tw;

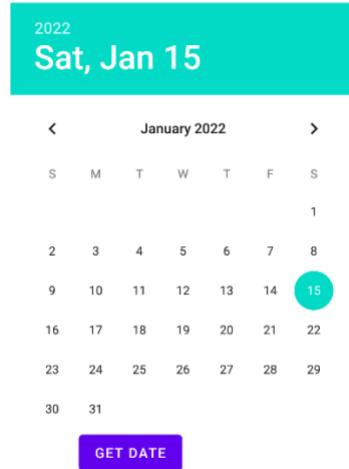
    @Override
    protected void onCreate(Bundle savedInstanceState) {
```

```

super.onCreate(savedInstanceState);
setContentView(R.layout.activity_main);

tvw=(TextView)findViewById(R.id.textView1);
picker=(DatePicker)findViewById(R.id.datePicker1);
btnGet=(Button)findViewById(R.id.button1);
btnGet.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvw.setText("Selected Date: "+ picker.getDayOfMonth() +"/" + (picker.getMonth() + 1) +"/" + picker.getYear());
    }
});
}
}

```



12. Write a program to on Camera on your screen and take a photograph.

#### 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">

    <RelativeLayout
        xmlns:android="http://schemas.android.com/apk/res/android"
            xmlns:tools="http://schemas.android.com/tools"
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            tools:context=".MainActivity">
    </RelativeLayout>

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

#### MainActivity.java

```
package com.example.camera;

import android.Manifest;
import android.app.AlertDialog;
import android.content.Context;
import android.content.DialogInterface;
import android.content.Intent;
import android.content.SharedPreferences;
import android.content.pm.PackageManager;

import android.net.Uri;
import android.os.Bundle;
import android.provider.Settings;

import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;

public class MainActivity extends AppCompatActivity {
    public static final int MY_PERMISSIONS_REQUEST_CAMERA = 100;
    public static final String ALLOW_KEY = "ALLOWED";
    public static final String CAMERA_PREF = "camera_pref";
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        if (ContextCompat.checkSelfPermission(this,
Manifest.permission.CAMERA) != PackageManager.PERMISSION_GRANTED) {
            if (getFromPref(this, ALLOW_KEY)) {
                showSettingsAlert();
            } else if (ContextCompat.checkSelfPermission(this,
Manifest.permission.CAMERA)
!= PackageManager.PERMISSION_GRANTED) {
```

```

        // Should we show an explanation?
        if
(ActivityCompat.shouldShowRequestPermissionRationale(this,
            Manifest.permission.CAMERA)) {
            showAlert();
        } else {
            // No explanation needed, we can request the
            permission.
            ActivityCompat.requestPermissions(this,
                new String[]{Manifest.permission.CAMERA},
                MY_PERMISSIONS_REQUEST_CAMERA);
        }
    } else {
        openCamera();
    }

}

public static void saveToPreferences(Context context, String key,
Boolean allowed) {
    SharedPreferences myPrefs =
context.getSharedPreferences(CAMERA_PREF,
        Context.MODE_PRIVATE);
    SharedPreferences.Editor prefsEditor = myPrefs.edit();
    prefsEditor.putBoolean(key, allowed);
    prefsEditor.commit();
}

public static Boolean getFromPref(Context context, String key) {
    SharedPreferences myPrefs =
context.getSharedPreferences(CAMERA_PREF,
        Context.MODE_PRIVATE);
    return (myPrefs.getBoolean(key, false));
}

private void showAlert() {
    AlertDialog alertDialog = new
AlertDialog.Builder(MainActivity.this).create();
    alertDialog.setTitle("Alert");
    alertDialog.setMessage("App needs to access the Camera.");
    alertDialog.setButton(AlertDialog.BUTTON_NEGATIVE, "DONT
ALLOW",
        new DialogInterface.OnClickListener() {
            public void onClick(DialogInterface dialog, int
which) {
                dialog.dismiss();
                finish();
            }
        });
    alertDialog.setButton(AlertDialog.BUTTON_POSITIVE, "ALLOW",
        new DialogInterface.OnClickListener() {

            public void onClick(DialogInterface dialog, int
which) {
                dialog.dismiss();

ActivityCompat.requestPermissions(MainActivity.this,
            new
String[]{Manifest.permission.CAMERA},
            MY_PERMISSIONS_REQUEST_CAMERA);

```

```

        }
    });
    alertDialog.show();
}

private void showSettingsAlert() {
    AlertDialog alertDialog = new
AlertDialog.Builder(MainActivity.this).create();
    alertDialog.setTitle("Alert");
    alertDialog.setMessage("App needs to access the Camera.");
    alertDialog.setButton(AlertDialog.BUTTON_NEGATIVE, "DONT
ALLOW",
        new DialogInterface.OnClickListener() {

            public void onClick(DialogInterface dialog, int
which) {
                dialog.dismiss();
                //finish();
            }
        });
    alertDialog.setButton(AlertDialog.BUTTON_POSITIVE,
"SETTINGS",
        new DialogInterface.OnClickListener() {

            public void onClick(DialogInterface dialog, int
which) {
                dialog.dismiss();
startInstalledAppDetailsActivity(MainActivity.this);
            }
        });
    alertDialog.show();
}

@Override
public void onRequestPermissionsResult(int requestCode, String
permissions[], int[] grantResults) {
    switch (requestCode) {
        case MY_PERMISSIONS_REQUEST_CAMERA: {
            for (int i = 0, len = permissions.length; i < len;
i++) {
                String permission = permissions[i];
                if (grantResults[i] ==
PackageManager.PERMISSION_DENIED) {
                    boolean
showRationale =
ActivityCompat.shouldShowRequestPermissionRationale(
                        this, permission);
                    if (showRationale) {
                        showAlert();
                    } else if (!showRationale) {
                        // user denied flagging NEVER ASK AGAIN
                        // you can either enable some fall back,
                        // disable features of your app
                        // or open another dialog explaining
                        // again the permission and directing to
                        // the app setting
                        saveToPreferences(MainActivity.this,
ALLOW_KEY, true);
                    }
                }
            }
        }
    }
}

```

```

        }
    }

    // other 'case' lines to check for other
    // permissions this app might request
}

@Override
protected void onResume() {
    super.onResume();
}

public static void startInstalledAppDetailsActivity(final
MainActivity context) {
    if (context == null) {
        return;
    }

    final Intent i = new Intent();
    i.setAction(Settings.ACTION_APPLICATION_DETAILS_SETTINGS);
    i.addCategory(Intent.CATEGORY_DEFAULT);
    i.setData(Uri.parse("package:" + context.getPackageName()));
    i.addFlags(Intent.FLAG_ACTIVITY_NEW_TASK);
    i.addFlags(Intent.FLAG_ACTIVITY_NO_HISTORY);
    i.addFlags(Intent.FLAG_ACTIVITY_EXCLUDE_FROM_RECENTS);
    context.startActivity(i);
}

private void openCamera() {
    Intent intent = new
Intent("android.media.action.IMAGE_CAPTURE");
    startActivity(intent);
}
}

```

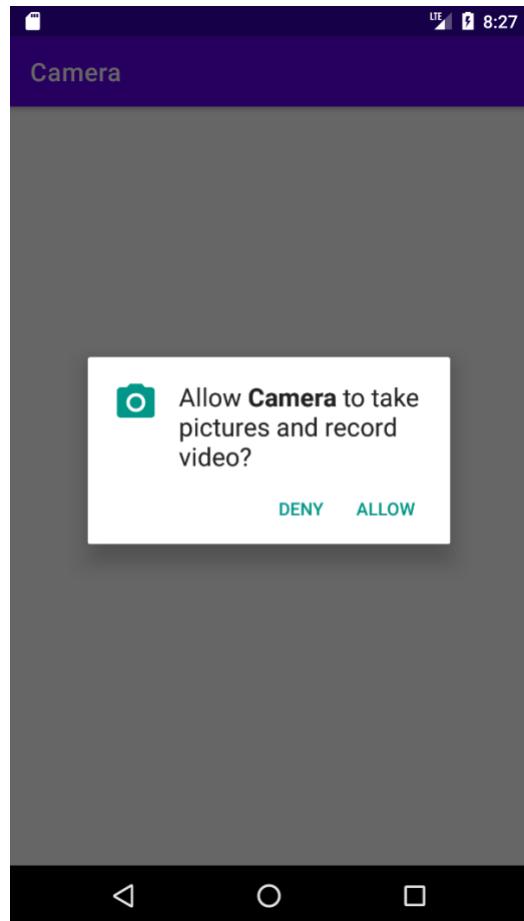
### AndroidManifest.xml

```

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

</manifest>

```



13. Write a program to show GPStracker on your screen (Latitude and Longitude).

14. Write a program to send SMS (Run this application on your actual android phone and show sms received).

15. Write a program to make a phone call. (Run this application on your actual android phone and show phone call on your screen).

#### Activity\_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
        android:layout_width="fill_parent"
        android:layout_height="fill_parent"
        android:orientation="vertical" >

    <Button
        android:id="@+id/buttonCall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="call 9075175722" />

</LinearLayout>
```

#### MainActivity.java

```
package com.example.phonecall;

import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import android.Manifest;
import android.content.Intent;
import android.content.pm.PackageManager;
import android.net.Uri;
import android.view.View;
import android.widget.Button;
import android.os.Bundle;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    private Button button;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        button = (Button) findViewById(R.id.buttonCall);

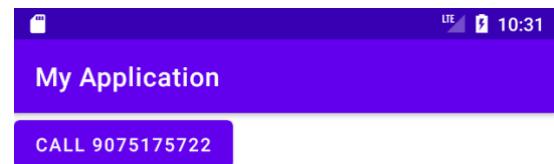
        button.setOnClickListener(new View.OnClickListener() {
            public void onClick(View arg0) {
                Intent callIntent = new Intent(Intent.ACTION_CALL);
                callIntent.setData(Uri.parse("tel:9075175722"));
                Toast.makeText(getApplicationContext(), "DIALED
NUMBER", Toast.LENGTH_LONG).show();
                if
(ActivityCompat.checkSelfPermission(MainActivity.this,
Manifest.permission.CALL_PHONE) !=
PackageManager.PERMISSION_GRANTED) {
                    return;
                }
                startActivity(callIntent);

            }
        });
    }
}
```

```
}
```

### AnroidManifest.xml

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



DIALED NUMBER



16. Write a program to send mail and show the received mail from your mailbox.

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">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:paddingLeft="20dp"
        android:paddingRight="20dp"
        android:orientation="vertical" >
        <EditText
            android:id="@+id/txtTo"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="To"/>
        <EditText
            android:id="@+id/txtSub"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Subject"/>
        <EditText
            android:id="@+id/txtMsg"
            android:layout_width="373dp"
            android:layout_height="376dp"
            android:layout_weight="1"
            android:gravity="top"
            android:hint="Message" />
        <Button
            android:id="@+id	btnSend"
            android:layout_width="368dp"
            android:layout_height="wrap_content"
            android:layout_gravity="right"
            android:text="Send" />
    </LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

```
package com.example.sendemailtest;

import androidx.appcompat.app.AppCompatActivity;

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

public class MainActivity extends AppCompatActivity {
    private EditText eTo;
    private EditText eSubject;
    private EditText eMsg;
    private Button btn;
```

```

@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
    eTo = (EditText) findViewById(R.id.txtTo);
    eSubject = (EditText) findViewById(R.id.txtSub);
    eMsg = (EditText) findViewById(R.id.txtMsg);
    btn = (Button) findViewById(R.id.btnSend);
    btn.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            Intent it = new Intent(Intent.ACTION_SEND);
            it.putExtra(Intent.EXTRA_EMAIL, new
String[]{eTo.getText().toString()});
            it.putExtra(Intent.EXTRA_SUBJECT, eSubject.getText().toString());
            it.putExtra(Intent.EXTRA_TEXT, eMsg.getText());
            it.setType("message/rfc822");
            startActivity(Intent.createChooser(it, "Choose Mail
App"));
        }
    });
}
}

```

#### AndroidManifest.xml

```

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

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.Sendemailtest">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category
android:name="android.intent.category.LAUNCHER" />
                <action android:name="android.intent.action.SEND"/>
                <category
android:name="android.intent.category.DEFAULT"/>
                <data android:mimeType="message/rfc822"/>
            </intent-filter>
        </activity>
    </application>

</manifest>

```

To  test@gmail.com

Test

Hello Test|

10:50 PM ...0.0KB/s ☰ sendemailtest

test@gmail.com

Test

Hello Test|

SEND

17. Write a program to show whether WiFi connection is on or off from your screen.

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">

    <RelativeLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_marginStart="16dp"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="16dp"
        android:layout_marginBottom="16dp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.0"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.0"
        tools:context=".MainActivity">

        <Button
            android:id="@+id/button1"
            android:layout_width="208dp"
            android:layout_height="83dp"
            android:layout_alignParentStart="true"
            android:layout_alignParentTop="true"
            android:layout_alignParentEnd="true"
            android:layout_alignParentBottom="true"
            android:layout_marginStart="96dp"
            android:layout_marginLeft="76dp"
            android:layout_marginTop="160dp"
            android:layout_marginEnd="75dp"
            android:layout_marginBottom="328dp"
            android:text="Enable Wifi" />

        <Button
            android:id="@+id/button2"
            android:layout_width="214dp"
            android:layout_height="77dp"
            android:layout_alignParentStart="true"
            android:layout_alignParentEnd="true"
            android:layout_alignParentBottom="true"
            android:layout_marginStart="96dp"
            android:layout_marginEnd="69dp"
            android:layout_marginBottom="226dp"
            android:text="Disable Wifi" />
    </RelativeLayout>

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

AndroidManifest.xml

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

```

<!--Put the permissions between the manifest and application
opening tags-->
<uses-permission
    android:name="android.permission.ACCESS_WIFI_STATE" />
<uses-permission
    android:name="android.permission.CHANGE_WIFI_STATE" />

<application
    android:allowBackup="true"
    android:icon="@mipmap/ic_launcher"
    android:label="@string/app_name"
    android:roundIcon="@mipmap/ic_launcher_round"
    android:supportsRtl="true"
    android:theme="@style/Theme.Wifi">
    <activity
        android:name=".MainActivity"
        android:exported="true">
        <intent-filter>
            <action android:name="android.intent.action.MAIN" />
            <category
                android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    </activity>
</application>
</manifest>
```

#### ManiActivity.java

```

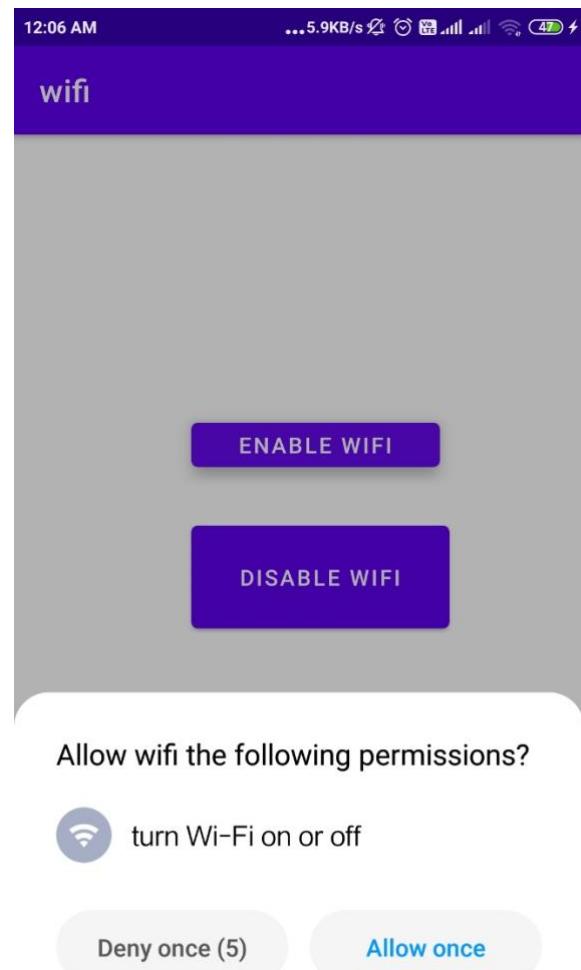
package com.example.wifi;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.content.Context;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.net.wifi.WifiManager;

public class MainActivity extends AppCompatActivity {
    Button enableButton, disableButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        setContentView(R.layout.activity_main);
        enableButton=(Button) findViewById(R.id.button1);
        disableButton=(Button) findViewById(R.id.button2);
        enableButton.setOnClickListener(new OnClickListener() {
            public void onClick(View v) {
                WifiManager wifi = (WifiManager)
getApplicationContext().getSystemService(Context.WIFI_SERVICE);
                wifi.setWifiEnabled(true);
            }
        });
        disableButton.setOnClickListener(new OnClickListener() {
            public void onClick(View v) {
                WifiManager wifi = (WifiManager)
getApplicationContext().getSystemService(Context.WIFI_SERVICE);
                wifi.setWifiEnabled(false);
            }
        });
    }
}
```



## 19.1 Write a program to show Tablelayout.

### 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">

    <TableLayout
        xmlns:android="http://schemas.android.com/apk/res/android"
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:background="#000"
            android:orientation="vertical"
            android:stretchColumns="1">
        <TableRow android:padding="5dip">
            <TextView
                android:layout_height="wrap_content"
                android:layout_marginBottom="20dp"
                android:layout_span="2"
                android:gravity="center_horizontal"
                android:text="@string/loginForm"
                android:textColor="#0ff"
                android:textSize="25sp"
                android:textStyle="bold" />
        </TableRow>

        <TableRow>
            <TextView
                android:layout_height="wrap_content"
                android:layout_column="0"
                android:layout_marginLeft="10dp"
                android:text="@string/userName"
                android:textColor="#fff"
                android:textSize="16sp" />
            <EditText
                android:id="@+id/userName"
                android:layout_height="wrap_content"
                android:layout_column="1"
                android:layout_marginLeft="10dp"
                android:background="#fff"
                android:hint="@string/userName"
                android:padding="5dp"
                android:textColor="#000" />
        </TableRow>

        <TableRow>
            <TextView
                android:layout_height="wrap_content"
                android:layout_column="0"
                android:layout_marginLeft="10dp"
                android:layout_marginTop="20dp"
                android:text="@string/password"
                android:textColor="#fff"
                android:textSize="16sp" />
            <EditText
                android:id="@+id/password"
```

```

        android:layout_height="wrap_content"
        android:layout_column="1"
        android:layout_marginLeft="10dp"
        android:layout_marginTop="20dp"
        android:background="#fff"
        android:hint="@string/password"
        android:padding="5dp"
        android:textColor="#000" />
    </TableRow>

    <TableRow android:layout_marginTop="20dp">
        <Button
            android:id="@+id/loginBtn"
            android:layout_height="wrap_content"
            android:layout_gravity="center"
            android:layout_span="2"
            android:background="#0ff"
            android:text="@string/login"
            android:textColor="#000"
            android:textSize="20sp"
            android:textStyle="bold" />
    </TableRow>
</TableLayout>

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

#### Strings.xml

```

<resources>
    <string name="app_name">TableLayoutExample</string>
    <string name="hello_world">Hello world!</string>
    <string name="action_settings">Settings</string>
    <string name="loginForm">Login Form</string>
    <string name="userName">UserName</string>
    <string name="password">Password</string>
    <string name="login">LogIn</string>
</resources>
```

#### MainActivity.java

```

package com.example.tablelayoutexample;

import androidx.appcompat.app.AppCompatActivity;
import android.view.Menu;
import android.view.MenuItem;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;

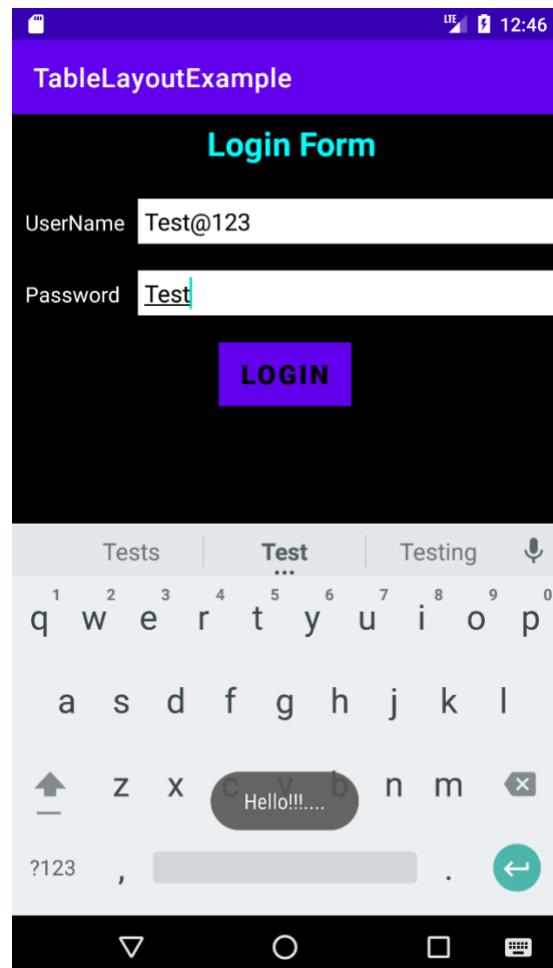
import android.os.Bundle;

public class MainActivity extends AppCompatActivity {

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

        // initiate a button
        Button loginButton = (Button) findViewById(R.id.loginBtn);
        // perform click event on the button
        loginButton.setOnClickListener(new View.OnClickListener() {
```

```
        @Override
        public void onClick(View v) {
            Toast.makeText(getApplicationContext(),
"Hello!!!....", Toast.LENGTH_LONG).show(); // display a toast
message
        }
    }
}
```



## 19.2 Write a program to show Togglebutton.

### 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">
    <RelativeLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        tools:context=".MainActivity" >

        <ToggleButton
            android:id="@+id/toggleButton1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_alignParentLeft="true"
            android:layout_alignParentTop="true"
            android:layout_marginLeft="81dp"
            android:layout_marginTop="89dp"
            android:text="ToggleButton1"
            android:textOff="Off"
            android:textOn="On" />

        <ToggleButton
            android:id="@+id/toggleButton2"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_alignBaseline="@+id/toggleButton1"
            android:layout_alignBottom="@+id/toggleButton1"
            android:layout_marginLeft="86dp"
            android:layout_marginBottom="-84dp"
            android:layout_toRightOf="@+id/toggleButton1"
            android:text="ToggleButton2"
            android:textOff="Off"
            android:textOn="On" />

        <Button
            android:id="@+id/button1"
            android:layout_width="150dp"
            android:layout_height="wrap_content"
            android:layout_below="@+id/toggleButton2"
            android:layout_marginLeft="-16dp"
            android:layout_marginTop="200dp"
            android:layout_toRightOf="@+id/toggleButton1"
            android:text="submit" />
    </RelativeLayout>

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

### MainActivity.java

```
package com.example.tooglebutton;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
```

```

import android.view.Menu;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.widget.Toast;
import android.widget.ToggleButton;
public class MainActivity extends AppCompatActivity {
    private ToggleButton toggleButton1, toggleButton2;
    private Button buttonSubmit;

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

    public void addListenerOnButtonClick() {
        //Getting the ToggleButton and Button instance from the
        //layout xml file
        toggleButton1 = (ToggleButton)
findViewByIId(R.id.toggleButton1);
        toggleButton2 = (ToggleButton)
findViewByIId(R.id.toggleButton2);
        buttonSubmit = (Button) findViewByIId(R.id.button1);
        //Performing action on button click
        buttonSubmit.setOnClickListener(new OnClickListener() {

            @Override
            public void onClick(View view) {
                StringBuilder result = new StringBuilder();
                result.append("ToggleButton1 :");
                result.append(toggleButton1.getText());
                result.append("\nToggleButton2 :");
                result.append(toggleButton2.getText());
                //Displaying the message in toast
                Toast.makeText(getApplicationContext(),
result.toString(), Toast.LENGTH_LONG).show();
            }
        });
    }
}

```



SUBMIT

ToggleButton1 : On  
ToggleButton2 : Off



20. Write a program to show SQLite database to perform CRUD operations (Create, Read, Update and Delete).

#### Activity\_main.xml

```
<?xml version="1.0" encoding="utf-8"?>

<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/activity_main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:paddingBottom="@dimen/activity_vertical_margin"
    android:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin"
    tools:context="com.example.sqliteoperations.MainActivity"
    android:background="@android:color/holo_blue_dark">

    <TextView
        android:id="@+id/textView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_alignParentStart="true"
        android:layout_alignParentLeft="true"
        android:layout_alignParentTop="true"
        android:layout_marginTop="12dp"
        android:gravity="center"
        android:text="@string/Username"
        android:textSize="18sp"
        android:textStyle="bold|italic" />

    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:inputType="textPersonName"
        android:ems="10"
        android:id="@+id/editName"
        android:textStyle="bold|italic"
        android:layout_below="@+id/textView"
        android:layout_alignParentRight="true"
        android:layout_alignParentEnd="true"
        android:hint="Enter Name"
        android:gravity="center_vertical|center" />

    <TextView
        android:text="@string/Password"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="13dp"
        android:id="@+id/textView2"
        android:textStyle="bold|italic"
        android:textSize="18sp"
        android:layout_below="@+id/editName"
        android:layout_alignParentRight="true"
        android:layout_alignParentEnd="true"
        android:gravity="center"
        android:hint="Enter Password" />

    <Button
        android:id="@+id/viewdata"
```

```
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBaseline="@+id/button"
        android:layout_alignEnd="@+id/button4"
        android:layout_alignRight="@+id/button4"
        android:layout_alignBottom="@+id/button"
        android:onClick="viewdata"
        android:text="view data"
        android:textSize="18sp"
        android:textStyle="bold|italic" />

    <Button
        android:text="@string/add_user"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/button"
        android:textStyle="bold|italic"
        android:textSize="18sp"
        android:onClick="addUser"
        android:layout_marginLeft="28dp"
        android:layout_marginStart="28dp"
        android:layout_below="@+id/editPass"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true"
        android:layout_marginTop="23dp" />

    <Button
        android:text="@string/update"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/button3"
        android:onClick="update"
        android:textStyle="normal|bold"
        android:layout_below="@+id/editText3"
        android:layout_alignLeft="@+id/button4"
        android:layout_alignStart="@+id/button4"
        android:layout_marginTop="13dp" />

    <EditText
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:inputType="textPersonName"
        android:ems="10"
        android:id="@+id/editText6"
        android:layout_alignTop="@+id/button4"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true"
        android:freezesText="false"
        android:hint="Enter Name to Delete Data"
        android:layout_toLeftOf="@+id/viewdata"
        android:layout_toStartOf="@+id/viewdata" />

    <Button
        android:text="@string/delete"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginRight="21dp"
        android:layout_marginEnd="21dp"
        android:id="@+id/button4"
        android:onClick="delete"
        android:textStyle="normal|bold"
```

```

        tools:ignore="RelativeOverlap"
        android:layout_marginBottom="41dp"
        android:layout_alignParentBottom="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentEnd="true" />

    <EditText
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:inputType="textPersonName"
        android:ems="10"
        android:layout_marginTop="47dp"
        android:id="@+id/editText3"
        android:textStyle="bold|italic"
        android:textSize="14sp"
        android:layout_below="@+id/button"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true"
        android:layout_marginLeft="7dp"
        android:layout_marginStart="7dp"
        android:hint="Current Name" />

    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:inputType="textPassword"
        android:ems="10"
        android:layout_marginTop="11dp"
        android:id="@+id/editPass"
        android:hint="Enter Password"
        android:gravity="center_vertical|center"
        android:textSize="18sp"
        android:layout_below="@+id/textView2"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true"
        android:textAllCaps="false"
        android:textStyle="normal|bold" />

    <EditText
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:inputType="textPersonName"
        android:ems="10"
        android:id="@+id/editText5"
        android:textStyle="bold|italic"
        android:textSize="14sp"
        android:hint="New Name"
        android:layout_alignTop="@+id/button3"
        android:layout_alignLeft="@+id/editText3"
        android:layout_alignStart="@+id/editText3"
        android:layout_marginTop="32dp" />

```

### Strings.xml

```

<resources>
    <string name="app_name">SQLiteOperations</string>
    <string name="username">username</string>
    <string name="password">password</string>
    <string name="view_data">view_data</string>
    <string name="add_user">add_user</string>
    <string name="update">update</string>

```

```

<string name="delete">delete</string>
<string name="Username" />
<string name="Password" />
</resources>

```

#### Message.java

```

package com.example.sqliteoperations;

import android.content.Context;
import android.widget.Toast;
public class Message {
    public static void message(Context context, String message) {
        Toast.makeText(context, message, Toast.LENGTH_LONG).show();
    }
}

```

#### myDBAdapter.java

```

package com.example.sqliteoperations;

import android.annotation.SuppressLint;
import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;

class myDbAdapter {
    myDbHelper myhelper;
    public myDbAdapter(Context context)
    {
        myhelper = new myDbHelper(context);
    }
    public long insertData(String name, String pass)
    {
        SQLiteDatabase dbb = myhelper.getWritableDatabase();
        ContentValues contentValues = new ContentValues();
        contentValues.put(myDbHelper.NAME, name);
        contentValues.put(myDbHelper.MyPASSWORD, pass);
        long id;
        id = dbb.insert(myDbHelper.TABLE_NAME, null , contentValues);
        return id;
    }
    public String getData()
    {
        SQLiteDatabase db = myhelper.getWritableDatabase();
        String[] columns =
{myDbHelper.UID,myDbHelper.NAME,myDbHelper.MyPASSWORD};
        @SuppressLint("Recycle") Cursor cursor
=db.query(myDbHelper.TABLE_NAME,columns,null,null,null,null,null);
        StringBuffer buffer;
        buffer = new StringBuffer();
        while (cursor.moveToNext())
        {
            @SuppressLint("Range") int cid
=cursor.getInt(cursor.getColumnIndex(myDbHelper.UID));
            @SuppressLint("Range") String name
=cursor.getString(cursor.getColumnIndex(myDbHelper.NAME));
            @SuppressLint("Range") String password
=cursor.getString(cursor.getColumnIndex(myDbHelper.MyPASSWORD));
            buffer.append(cid).append("   ").append(name).append(" "
).append(password).append(" \n");
        }
    }
}

```

```

        }
        return buffer.toString();
    }
    public int delete(String uname)
    {
        SQLiteDatabase db = myhelper.getWritableDatabase();
        String[] whereArgs ={uname};
        int count;
        count = db.delete(myDbHelper.TABLE_NAME ,myDbHelper.NAME+" = ?",
        whereArgs);
        return count;
    }
    public int updateName(String oldName , String newName)
    {
        SQLiteDatabase db = myhelper.getWritableDatabase();
        ContentValues contentValues = new ContentValues();
        contentValues.put(myDbHelper.NAME,newName);
        String[] whereArgs= {oldName};
        int count;
        count = db.update(myDbHelper.TABLE_NAME,contentValues,
        myDbHelper.NAME+" = ?",whereArgs );
        return count;
    }
    static class myDbHelper extends SQLiteOpenHelper
    {
        private static final String DATABASE_NAME = "myDatabase";
        // Database Name
        private static final String TABLE_NAME = "myTable";      // Table Name
        private static final int DATABASE_Version = 1;          // Database Version
        private static final String UID="_id";                  // Column I (Primary Key)
        private static final String NAME = "Name";           //Column II
        private static final String MyPASSWORD= "Password";   // Column III
        private static final String CREATE_TABLE = "CREATE TABLE "+TABLE_NAME+
                                                " ("+UID+" INTEGER PRIMARY KEY AUTOINCREMENT,
                                                "+NAME+" VARCHAR(255) ,"+ MyPASSWORD+" VARCHAR(225));";
        private static final String DROP_TABLE ="DROP TABLE IF EXISTS "+TABLE_NAME;
        private final Context context;
        public myDbHelper(Context context) {
            super(context, DATABASE_NAME, null, DATABASE_Version);
            this.context=context;
        }
        public void onCreate(SQLiteDatabase db) {
            try {
                db.execSQL(CREATE_TABLE);
            } catch (Exception e) {
                Message.message(context,""+e);
            }
        }
        @Override
        public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
            try {
                Message.message(context,"OnUpgrade");
                db.execSQL(DROP_TABLE);
                onCreate(db);
            }
        }
    }
}

```

```
        } catch (Exception e) {
            Message.message(context, ""+e);
        }
    }
}
```

## MainActivity.java

```
package com.example.sqliteoperations;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.View;

import android.widget.EditText;
public class MainActivity extends AppCompatActivity {
    EditText Name, Pass, updateold, updatenew, delete;
    myDbAdapter helper;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Name= (EditText) findViewById(R.id.editName);
        Pass= (EditText) findViewById(R.id.editPass);
        updateold= (EditText) findViewById(R.id.editText3);
        updatenew= (EditText) findViewById(R.id.editText5);
        delete = (EditText) findViewById(R.id.editText6);
        helper = new myDbAdapter(this);
    }

    public void addUser(View view)
    {
        String t1 = Name.getText().toString();
        String t2 = Pass.getText().toString();
        if(t1.isEmpty() || t2.isEmpty())
        {
            Message.message(getApplicationContext(),"Enter Both Name and Password");
        }
        else
        {
            long id = helper.insertData(t1,t2);
            if(id<=0)
            {
                Message.message(getApplicationContext(),"Insertion Unsuccessful");
                Name.setText("");
                Pass.setText("");
            } else
            {
                Message.message(getApplicationContext(),"Insertion Successful");
                Name.setText("");
                Pass.setText("");
            }
        }
    }

    public void viewdata(View view)
    {
```

```

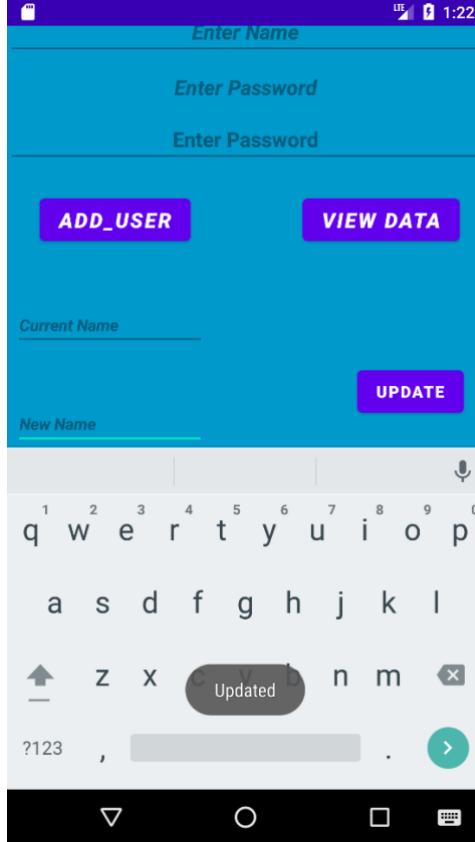
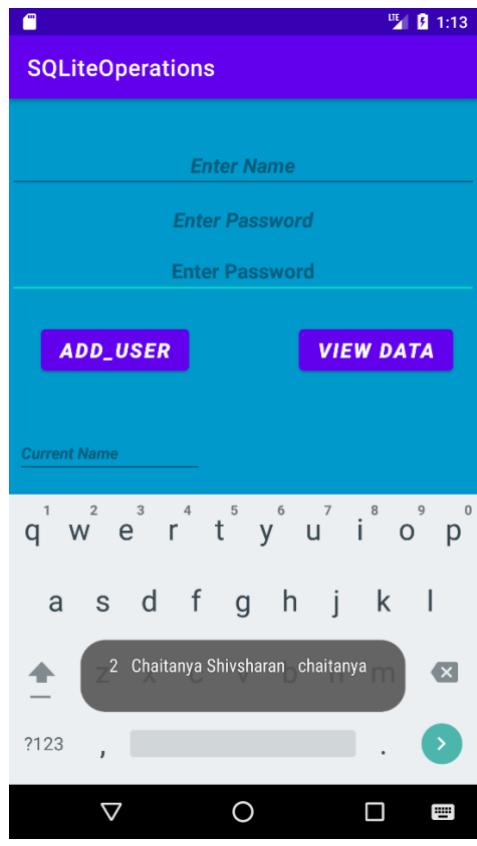
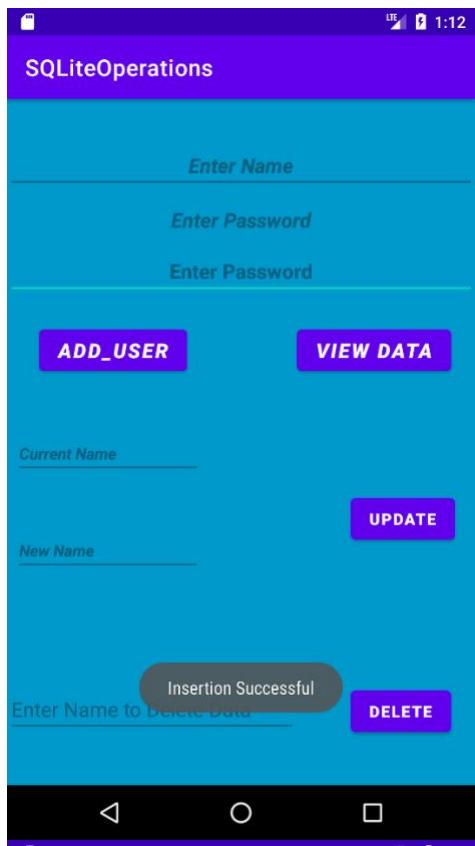
        String data = helper.getData();
        Message.message(this,data);
    }

    public void update( View view)
    {
        String u1 = updateold.getText().toString();
        String u2 = updatenew.getText().toString();
        if(u1.isEmpty() || u2.isEmpty())
        {
            Message.message(getApplicationContext(),"Enter Data");
        }
        else
        {
            int a= helper.updateName( u1, u2);
            if(a<=0)
            {

Message.message(getApplicationContext(),"Unsuccessful");
                updateold.setText("");
                updatenew.setText("");
            } else {
                Message.message(getApplicationContext(),"Updated");
                updateold.setText("");
                updatenew.setText("");
            }
        }
    }
    public void delete( View view)
    {
        String uname = delete.getText().toString();
        if(uname.isEmpty())
        {
            Message.message(getApplicationContext(),"Enter Data");
        }
        else{
            int a= helper.delete(uname);
            if(a<=0)
            {

Message.message(getApplicationContext(),"Unsuccessful");
                delete.setText("");
            }
            else
            {
                Message.message(this, "DELETED");
                delete.setText("");
            }
        }
    }
}

```



21. Write a program to show image gesture (touch screen events such as pinch, double tap, scrolls, long presses and flinch).

### 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">

    <RelativeLayout
        xmlns:android="http://schemas.android.com/apk/res/android"
        xmlns:tools="http://schemas.android.com/tools"
        android:layout_width="match_parent"
            android:layout_height="match_parent"
            tools:context=".MainActivity">
        <TextView android:text=" Imageswitcher Example"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:id="@+id/textview"
            android:textSize="35dp"
            android:layout_alignParentTop="true"
            android:layout_centerHorizontal="true" />
        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text=" "
            android:id="@+id/textView"
            android:layout_below="@+id/textview"
            android:layout_centerHorizontal="true"
            android:textColor="#ff7aff24"
            android:textSize="35dp" />
        <ImageSwitcher
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:id="@+id/imageSwitcher"
            android:layout_below="@+id/textView"
            android:layout_centerHorizontal="true"
            android:layout_marginTop="168dp" />
        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="@string/left"
            android:id="@+id/button"
            android:layout_below="@+id/textView"
            android:layout_centerHorizontal="true" />
        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="@string/right"
            android:id="@+id/button2"
            android:layout_alignParentBottom="true"
            android:layout_alignLeft="@+id/button"
            android:layout_alignStart="@+id/button" />
    </RelativeLayout>
```

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

## MainActivity.java

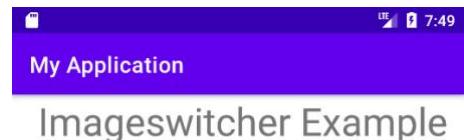
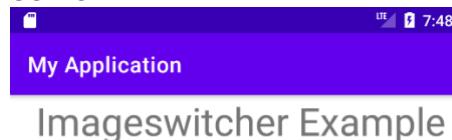
```
package com.example.imagegeasture;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.app.ActionBar.LayoutParams;
import android.view.View;
import android.widget.Button;
import android.widget.ImageSwitcher;
import android.widget.ImageView;
import android.widget.Toast;
import android.widget.ViewSwitcher.ViewFactory;
import android.os.Bundle;

public class MainActivity extends AppCompatActivity {
    private ImageSwitcher sw;
    private Button b1,b2;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        b1 = (Button) findViewById(R.id.button);
        b2 = (Button) findViewById(R.id.button2);
        sw = (ImageSwitcher) findViewById(R.id.imageSwitcher);
        sw.setFactory(new ViewFactory() {
            @Override
            public View makeView() {
                ImageView myView = new
Imageview(getApplicationContext());
                myView.setScaleType(ImageView.ScaleType.FIT_CENTER);
                myView.setLayoutParams(new
ImageSwitcher.LayoutParams(LayoutParams.WRAP_CONTENT,
                    LayoutParams.WRAP_CONTENT));
                return myView;
            }
        });
        b1.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Toast.makeText(getApplicationContext(), "previous
Image",
                    Toast.LENGTH_LONG).show();
                sw.setImageResource(R.drawable.pic1);
            }
        });
        b2.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Toast.makeText(getApplicationContext(), "Next Image",
                    Toast.LENGTH_LONG).show();
                sw.setImageResource(R.drawable.pic2);
            }
        });
    }
}
```

**OUTPUT:**



22. Write a program to show internal storage demo by storing and reading file. E.g.  
code.txt

**activity\_main.xml**

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/activity_main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="com.example.internalstoragedemo.MainActivity">
    <TextView
        android:id="@+id/txtname"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentStart="true"
        android:layout_alignParentLeft="true"
        android:layout_alignParentTop="true"
        android:layout_marginStart="51dp"
        android:layout_marginLeft="51dp"
        android:layout_marginTop="59dp"
        android:text="@string/name"
        android:textSize="18sp"
        android:textStyle="bold|italic" />
    <TextView
        android:id="@+id/txtpass"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/txtname"
        android:layout_alignStart="@+id/txtname"
        android:layout_alignLeft="@+id/txtname"
        android:layout_marginTop="56dp"
        android:text="@string/password"
        android:textSize="18sp"
        android:textStyle="bold|italic" />
    <EditText
        android:id="@+id/editName"
        android:layout_width="223dp"
        android:layout_height="wrap_content"
        android:layout_alignParentTop="true"
        android:layout_marginStart="32dp"
        android:layout_marginLeft="32dp"
        android:layout_marginTop="88dp"
        android:layout_toEndOf="@+id/txtpass"
        android:layout_toRightOf="@+id/txtpass"
        android:ems="8"
        android:inputType="textPersonName" />
    <EditText
        android:id="@+id/editPass"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/editName"
        android:layout_alignStart="@+id/editName"
        android:layout_alignLeft="@+id/editName"
        android:layout_marginStart="11dp"
        android:layout_marginLeft="11dp"
        android:layout_marginTop="67dp"
```

```

        android:ems="10"
        android:inputType="textPassword" />

    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/editPass"
        android:layout_alignStart="@+id/txtpass"
        android:layout_alignLeft="@+id/txtpass"
        android:layout_marginTop="86dp"
        android:onClick="save"
        android:text="@string/save" /> // OnClick "save"

    <Button
        android:id="@+id/button2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignTop="@+id/button"
        android:layout_alignEnd="@+id/editName"
        android:layout_alignRight="@+id/editName"
        android:layout_marginTop="-2dp"
        android:layout_marginEnd="-43dp"
        android:layout_marginRight="-43dp"
        android:onClick="next"
        android:text="@string/next" />
    // OnClick "next"
</RelativeLayout>
```

### activity\_main2.xml

```

<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/activity_main2"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="com.example.internalstoragedemo.Main2Activity">
    <TextView
        android:text="@string/getname"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentTop="true"
        android:layout_alignRight="@+id/button3"
        android:layout_alignEnd="@+id/button3"
        android:layout_marginRight="11dp"
        android:layout_marginEnd="11dp"
        android:layout_marginTop="76dp"
        android:id="@+id/textView3"
        android:textSize="18sp"
        android:textStyle="bold|italic" />
    <TextView
        android:text="@string/getpassword"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/textView3"
        android:layout_alignRight="@+id/textView3"
        android:layout_alignEnd="@+id/textView3"
        android:layout_marginTop="33dp"
        android:id="@+id/textView4"
        android:textStyle="bold|italic"
```

```

        android:textSize="18sp" />

<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/textView4"
    android:layout_alignLeft="@+id/button4"
    android:layout_alignStart="@+id/button4"
    android:id="@+id/getname"
    android:textStyle="bold|italic"
    android:textSize="18sp" />
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBottom="@+id/textView4"
    android:layout_alignLeft="@+id/getname"
    android:layout_alignStart="@+id/getname"
    android:id="@+id/getpass"
    android:textStyle="bold|italic"
    android:textSize="18sp" />
<Button
    android:text="@string/load"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:id="@+id/button3"
    android:layout_marginLeft="35dp"
    android:layout_marginStart="35dp"
    android:onClick="load"
    android:layout_below="@+id/textView4"
    android:layout_alignParentLeft="true"
    android:layout_alignParentStart="true"
    android:layout_marginTop="80dp" />
<Button
    android:text="@string/back"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginRight="54dp"
    android:layout_marginEnd="54dp"
    android:id="@+id/button4"
    android:onClick="back"
    android:layout_alignBaseline="@+id/button3"
    android:layout_alignBottom="@+id/button3"
    android:layout_alignParentRight="true"
    android:layout_alignParentEnd="true" />
</RelativeLayout>
```

### activity\_main3.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=".MainActivity2">
</androidx.constraintlayout.widget.ConstraintLayout>
```

### MainActivity.java

```

package com.example.internalstoragedemo;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.content.Context;
import android.content.Intent;
import android.widget.EditText;
import android.widget.Toast;
import java.io.File;
import java.io.FileOutputStream;
import java.io.IOException;
public class MainActivity extends AppCompatActivity {
    EditText editname,editpass;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        editname = (EditText) findViewById(R.id.editName);
        editpass= (EditText) findViewById(R.id.editPass);
    }

    public void save(View view) // SAVE
    {
        File file= null;
        String name = editname.getText().toString();
        String password = editpass.getText().toString();
        FileOutputStream fileOutputStream = null;
        try {
            name = name + " ";
            file = getFilesDir();
            fileOutputStream = openFileOutput("Code.txt",
Context.MODE_PRIVATE); //MODE PRIVATE
            fileOutputStream.write(name.getBytes());
            fileOutputStream.write(password.getBytes());
            Toast.makeText(this, "Saved \n" + "Path --" + file +
"\tCode.txt", Toast.LENGTH_LONG).show();
            editname.setText("");
            editpass.setText("");
            return;
        } catch (Exception ex) {
            ex.printStackTrace();
        } finally {
            try {
                fileOutputStream.close();
            } catch (IOException e) {
                e.printStackTrace();
            }
        }
    }

    public void next( View view) //NEXT
    {
        Toast.makeText(this,"NEXT", Toast.LENGTH_SHORT).show();
        Intent intent= new Intent(this, Main2Activity.class);
        startActivity(intent);
    }
}

```

## MainActivity2.java

```

package com.example.internalstoragedemo;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.content.Intent;
import android.util.Log;
import android.view.View;
import android.widget.TextView;
import android.widget.Toast;
import java.io.FileInputStream;
public class MainActivity2 extends AppCompatActivity {
    TextView getname, getpass;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main3);
        getname = (TextView) findViewById(R.id.getname);
        getpass = (TextView) findViewById(R.id.getpass);
    }
    public void load(View view)
    {
        try {
            FileInputStream fileInputStream =
openFileInput("Code.txt");
            int read = -1;
            StringBuffer buffer = new StringBuffer();
            while((read =fileInputStream.read())!= -1){
                buffer.append((char)read);
            }
            Log.d("Code", buffer.toString());
            String name = buffer.substring(0,buffer.indexOf(" "));
            String pass = buffer.substring(buffer.indexOf(" ")+1);
            getname.setText(name);
            getpass.setText(pass);
        } catch (Exception e) {
            e.printStackTrace();
        }
        Toast.makeText(this,"Loaded", Toast.LENGTH_LONG).show();
    }

    public void back( View view)
    {
        Toast.makeText(this,"Back", Toast.LENGTH_LONG).show();
        Intent intent= new Intent(this, MainActivity.class);
        startActivity(intent);
    }
}

```

### Main2Activity.java

```

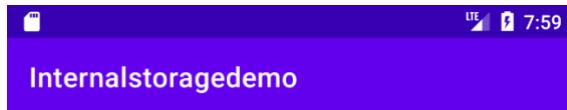
package com.example.internalstoragedemo;

import android.app.Activity;
import android.view.View;

public class Main2Activity extends Activity {
    public void back(View view) {
    }

    public void load(View view) {
    }
}

```



*name*

*password*

**SAVE**

**NEXT**

Saved  
Path --/data/user/0/  
com.example.internalstoragedemo/files  
Code.txt



#### Device File Explorer(internal storage)

Name	Permissions	Date	Size
com.example.internalstoragedemo	drwxrwx--x	2022-02-04 12:21	4 KB
cache	drwxrwx--x	2022-04-27 19:58	4 KB
files	drwxrwx--x	2022-04-27 19:59	4 KB
Code.txt	-rw-rw----	2022-04-27 19:59	13 B

23. Write a program to show MultiautocompleteTextview.

activity\_main.xml

```
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:paddingBottom="@dimen/activity_vertical_margin"
    android:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin"
    tools:context=".MainActivity">

    <!-- MultiAutoCompleteTextView In Android -->
    <MultiAutoCompleteTextView
        android:id="@+id/simpleMultiAutoCompleteTextView"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:background="#0f0"
        android:gravity="center"
        android:hint="Enter Your Text Here"
        android:padding="10dp"
        android:textColor="#f00"
        android:textSize="20sp"
        android:textStyle="bold" />

</RelativeLayout>
```

MainActivity.java

```
package com.example.autocompletetextview;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.widget.ArrayAdapter;
import android.widget.MultiAutoCompleteTextView;

public class MainActivity extends AppCompatActivity {

    String[] androidVersionNames = {"Aestro",
"Android", "Pilot", "Blender", "CupCake", "Donut", "Eclair", "Froyo",
"Gingerbread", "HoneyComb", "IceCream Sandwich", "Jellibean",
"Kitkat", "Lollipop", "MarshMallow"} ;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        // initiate a MultiAutoCompleteTextView
        MultiAutoCompleteTextView simpleMultiAutoCompleteTextView =
(MultiAutoCompleteTextView)
findViewById(R.id.simpleMultiAutoCompleteTextView);
        // set adapter to fill the data in suggestion list
        ArrayAdapter<String> versionNames = new
ArrayAdapter<String>(this, android.R.layout.simple_list_item_1,
        androidVersionNames);
        simpleMultiAutoCompleteTextView.setAdapter(versionNames);
```

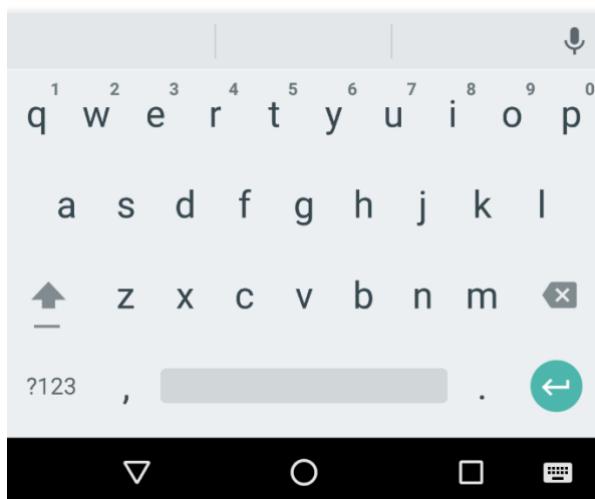
```
// set threshold value 1 that help us to start the searching from  
first character  
    simpleMultiAutoCompleteTextView.setThreshold(1);  
// set tokenizer that distinguish the various substrings by comma  
    simpleMultiAutoCompleteTextView.setTokenizer(new  
MultiAutoCompleteTextView.CommaTokenizer());  
}  
}
```

**OUTPUT:**



Aestro

Android



24. Write a program to show Multitouch. (More than one touches the screen at the same time.)

activity\_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity"
    android:transitionGroup="true">
    <TextView android:text="Multitouch example"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/textview"
        android:textSize="35dp"
        android:layout_alignParentTop="true"
        android:layout_centerHorizontal="true" />
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text=" "
        android:id="@+id/textView"
        android:layout_below="@+id/textview"
        android:layout_centerHorizontal="true"
        android:textColor="#ff7aff24"
        android:textSize="35dp" />
    <EditText
        android:id="@+id/editText"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignStart="@+id/textview"
        android:layout_alignLeft="@+id/textview"
        android:layout_alignEnd="@+id/textview"
        android:layout_alignRight="@+id/textview"
        android:layout_alignParentTop="true"
        android:layout_centerHorizontal="true"
        android:layout_marginStart="3dp"
        android:layout_marginLeft="3dp"
        android:layout_marginTop="121dp"
        android:layout_marginEnd="-3dp"
        android:layout_marginRight="-3dp"
        android:hint="X-Axis"
        android:textColorHint="#ff69ff0e" />
    <EditText
        android:id="@+id/editText2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/editText"
        android:layout_alignStart="@+id/editText"
        android:layout_alignLeft="@+id/editText"
        android:layout_alignEnd="@+id/editText"
        android:layout_alignRight="@+id/editText"
        android:hint="Y-Axis"
        android:textColorHint="#ff21ff11" />
    <EditText
        android:id="@+id/editText3"
        android:layout_width="wrap_content"
```

```

        android:layout_height="wrap_content"
        android:layout_below="@+id/editText2"
        android:layout_alignStart="@+id/editText2"
        android:layout_alignLeft="@+id/editText2"
        android:layout_alignEnd="@+id/editText2"
        android:layout_alignRight="@+id/editText2"
        android:hint="Move X"
        android:textColorHint="#ff33ff20" />
<EditText
        android:id="@+id/editText4"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/editText3"
        android:layout_alignStart="@+id/editText3"
        android:layout_alignLeft="@+id/editText3"
        android:layout_alignEnd="@+id/editText3"
        android:layout_alignRight="@+id/editText3"
        android:hint="Move Y"
        android:textColorHint="#ff31ff07" />
<TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Touch here"
        android:id="@+id/textView2"
        android:layout_alignParentBottom="true"
        android:focusable="true"
        android:typeface="sans"
        android:clickable="true"
        android:textColor="#ff5480ff"
        android:textSize="35dp" />
</RelativeLayout>
```

### MainActivity.xml

```

package com.example.multitouch;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.MotionEvent;
import android.view.View;
import android.widget.EditText;
import android.widget.TextView;
public class MainActivity extends AppCompatActivity {
    float xAxis = 0f;
    float yAxis = 0f;
    float lastXAxis = 0f;
    float lastYAxis = 0f;
    EditText ed1, ed2, ed3, ed4;
    TextView tv1;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        ed1 = (EditText) findViewById(R.id.editText);
        ed2 = (EditText) findViewById(R.id.editText2);
        ed3 = (EditText) findViewById(R.id.editText3);
        ed4 = (EditText) findViewById(R.id.editText4);
        tv1=(TextView)findViewById(R.id.textView2);
        tv1.setOnTouchListener(new View.OnTouchListener() {
            @Override
            public boolean onTouch(View v, MotionEvent event) {
```

```
        final int actionPerformed = event.getAction();
        switch(actionPerformed){
            case MotionEvent.ACTION_DOWN:
                final float x = event.getX();
                final float y = event.getY();
                lastXAxis = x;
                lastYAxis = y;
                ed1.setText(Float.toString(lastXAxis));
                ed2.setText(Float.toString(lastYAxis));
                break;
        }

        case MotionEvent.ACTION_MOVE:
            final float x = event.getX();
            final float y = event.getY();
            final float dx = x - lastXAxis;
            final float dy = y - lastYAxis;
            xAxis += dx;
            yAxis += dy;
            ed3.setText(Float.toString(xAxis));
            ed4.setText(Float.toString(yAxis));
            break;
        }
    }
    return true;
}
)
}
```

## **OUTPUT:**

## multitouch

## Multitouch example

204.97192  
71.92969  
25.01587  
7.9101562

Touch here

25. Write a program to show Push notification. (It creates a basic application that allows you to create a notification.

26. Write a program to show how to use Location Services in your app to get the current location and its equivalent addresses etc.

activity\_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android =
"http://schemas.android.com/apk/res/android"
    android:layout_width = "fill_parent"
    android:layout_height = "fill_parent"
    android:orientation = "vertical" >

    <Button
        android:id = "@+id/button"
        android:layout_width = "fill_parent"
        android:layout_height = "wrap_content"
        android:text = "getlocation"/>

</LinearLayout>
```

AndroidManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.location_based_services">
    <uses-permission android:name =
"android.permission.ACCESS_FINE_LOCATION" />
    <uses-permission android:name = "android.permission.INTERNET" />
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.Location_based_services">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

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

</manifest>
```

MainActivity.java

```
package com.example.location_based_services;

import android.Manifest;
import android.app.Activity;
import android.content.pm.PackageManager;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;

import androidx.core.app.ActivityCompat;
```

```

public class MainActivity extends Activity {

    Button btnShowLocation;
    private static final int REQUEST_CODE_PERMISSION = 2;
    String mPermission = Manifest.permission.ACCESS_FINE_LOCATION;

    // GPSTracker class
    GPSTracker gps;
    private PackageManager MockPackageManager;

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

        try {
            if (ActivityCompat.checkSelfPermission(this, mPermission)
                != MockPackageManager.PERMISSION_GRANTED) {

                ActivityCompat.requestPermissions(this, new
String[] {mPermission},
                    REQUEST_CODE_PERMISSION);

                // If any permission above not allowed by user, this
condition will
                // execute every time, else your else part will work
            }
        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    btnShowLocation = (Button) findViewById(R.id.button);

    // show location button click event
    btnShowLocation.setOnClickListener(new View.OnClickListener()
{
    @Override
    public void onClick(View arg0) {
        // create class object
        gps = new GPSTracker(MainActivity.this);

        // check if GPS enabled
        if(gps.canGetLocation()){

            double latitude = gps.getLatitude();
            double longitude = gps.getLongitude();

            // \n is for new line
            Toast.makeText(getApplicationContext(), "Your
Location is - \nLat: " + latitude + "\nLong: " + longitude,
Toast.LENGTH_LONG).show();
        }else{
            // can't get location
            // GPS or Network is not enabled
            // Ask user to enable GPS/network in settings
            gps.showSettingsAlert();
        }
    }
});
}

```

```
        }
    }
}
```

### GPSTracker.java

```
package com.example.location_based_services;

import android.Manifest;
import android.app.AlertDialog;
import android.app.Service;
import android.content.Context;
import android.content.DialogInterface;
import android.content.Intent;
import android.content.pm.PackageManager;
import android.location.Location;
import android.location.LocationListener;
import android.location.LocationManager;
import android.os.Bundle;
import android.os.IBinder;
import android.provider.Settings;
import android.util.Log;

import androidx.core.app.ActivityCompat;

public class GPSTracker extends Service implements LocationListener {

    private final Context mContext;

    // flag for GPS status
    boolean isGPSEnabled = false;

    // flag for network status
    boolean isNetworkEnabled = false;

    // flag for GPS status
    boolean canGetLocation = false;

    Location location; // location
    double latitude; // latitude
    double longitude; // longitude

    // The minimum distance to change Updates in meters
    private static final long MIN_DISTANCE_CHANGE_FOR_UPDATES = 10;
    // 10 meters

    // The minimum time between updates in milliseconds
    private static final long MIN_TIME_BW_UPDATES = 1000 * 60 * 1; // 1 minute

    // Declaring a Location Manager
    protected LocationManager locationManager;

    public GPSTracker(Context context) {
        this.mContext = context;
        getLocation();
    }

    public Location getLocation() {
        try {
            locationManager = (LocationManager)
```

```

mContext.getSystemService(LOCATION_SERVICE);

        // getting GPS status
        isGPSEnabled =
locationManager.isProviderEnabled(LocationManager.GPS_PROVIDER);

        // getting network status
        isNetworkEnabled = locationManager

.isProviderEnabled(LocationManager.NETWORK_PROVIDER);

        if (!isGPSEnabled && !isNetworkEnabled) {
            // no network provider is enabled
        } else {
            this.canGetLocation = true;
            // First get location from Network Provider
            if (isNetworkEnabled) {
                if (ActivityCompat.checkSelfPermission(this,
Manifest.permission.ACCESS_FINE_LOCATION) !=
PackageManager.PERMISSION_GRANTED &&
ActivityCompat.checkSelfPermission(this,
Manifest.permission.ACCESS_COARSE_LOCATION) != PackageManager.PERMISSION_GRANTED) {
                    // TODO: Consider calling
                    //      ActivityCompat#requestPermissions
                    // here to request the missing permissions,
and then overriding
                    //    public void
onRequestPermissionsResult(int requestCode, String[] permissions,
                           //
int[] grantResults)
                    // to handle the case where the user grants
the permission. See the documentation
                    // for ActivityCompat#requestPermissions
for more details.
                    return location;
                }
                locationManager.requestLocationUpdates(
                    LocationManager.NETWORK_PROVIDER,
                    MIN_TIME_BW_UPDATES,
                    MIN_DISTANCE_CHANGE_FOR_UPDATES, this);
                Log.d("Network", "Network");
                if (locationManager != null) {
                    location = locationManager
                }
            }
            .getLastKnownLocation(LocationManager.NETWORK_PROVIDER);

            if (location != null) {
                latitude = location.getLatitude();
                longitude = location.getLongitude();
            }
        }
    }

    // if GPS Enabled get lat/long using GPS Services
    if (isGPSEnabled) {
        if (location == null) {
            locationManager.requestLocationUpdates(
                LocationManager.GPS_PROVIDER,
                MIN_TIME_BW_UPDATES,

```

```

        MIN_DISTANCE_CHANGE_FOR_UPDATES,
this);

Log.d("GPS Enabled", "GPS Enabled");
if (locationManager != null) {
    location = locationManager

.getLastKnownLocation(LocationManager.GPS_PROVIDER);

    if (location != null) {
        latitude = location.getLatitude();
        longitude = location.getLongitude();
    }
}
}

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

return location;
}

/**
 * Stop using GPS listener
 * Calling this function will stop using GPS in your app
 */
public void stopUsingGPS(){
    if(locationManager != null){
        locationManager.removeUpdates(GPSTracker.this);
    }
}

/**
 * Function to get latitude
 */
public double getLatitude(){
    if(location != null){
        latitude = location.getLatitude();
    }

    // return latitude
    return latitude;
}

/**
 * Function to get longitude
 */
public double getLongitude(){
    if(location != null){
        longitude = location.getLongitude();
    }

    // return longitude
    return longitude;
}

```

```

    /**
     * Function to check GPS/wifi enabled
     * @return boolean
     */
    public boolean canGetLocation() {
        return this.canGetLocation;
    }

    /**
     * Function to show settings alert dialog
     * On pressing Settings button will lauch Settings Options
     */
    public void showSettingsAlert(){
        AlertDialog.Builder alertDialog = new
        AlertDialog.Builder(mContext);

        // Setting Dialog Title
        alertDialog.setTitle("GPS is settings");

        // Setting Dialog Message
        alertDialog.setMessage("GPS is not enabled. Do you want to go
        to settings menu?");

        // On pressing Settings button
        alertDialog.setPositiveButton("Settings", new
        DialogInterface.OnClickListener() {
            public void onClick(DialogInterface dialog,int which) {
                Intent intent = new
                Intent(Settings.ACTION_LOCATION_SOURCE_SETTINGS);
                mContext.startActivity(intent);
            }
        });

        // on pressing cancel button
        alertDialog.setNegativeButton("Cancel", new
        DialogInterface.OnClickListener() {
            public void onClick(DialogInterface dialog, int which) {
                dialog.cancel();
            }
        });
    }

    // Showing Alert Message
    alertDialog.show();
}

@Override
public void onLocationChanged(Location location) {
}

@Override
public void onProviderDisabled(String provider) {
}

@Override
public void onProviderEnabled(String provider) {
}

@Override

```

```
    public void onStatusChanged(String provider, int status, Bundle
extras) {
}

@Override
public IBinder onBind(Intent arg0) {
    return null;
}
}
```

## OUTPUT:



Your Location is -  
Lat: 37.42199833333335  
Long: -122.08400000000002

27. Write a program to show Texture View. (It creates a basic application that allows you to view camera inside a texture view and change its angle, orientation etc.)

28. Write a program to show network connection. (It creates a basic application that allows you to download HTML from a given web page.)

29. Write a program to show Audio Capture (It provides demonstration of Media Recorder class to capture audio and then Media Player class to play that recorded audio.)

activity\_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent">
    <ImageView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/imageView"
        android:layout_alignParentTop="true"
        android:layout_centerHorizontal="true"/>
    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Record"
        android:id="@+id/button"
        android:layout_below="@+id/imageView"
        android:layout_alignParentLeft="true"
        android:layout_marginTop="37dp"
        />
    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="STOP"
        android:id="@+id/button2"
        android:layout_alignTop="@+id/button"
        android:layout_centerHorizontal="true"
        />
    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Play"
        android:id="@+id/button3"
        android:layout_alignTop="@+id/button2"
        android:layout_alignParentRight="true"
        android:layout_alignParentEnd="true"
        />
    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="STOP PLAYING RECORDING "
        android:id="@+id/button4"
        android:layout_below="@+id/button2"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="10dp"
        />
</RelativeLayout>
```

MainActivity.java

```
package com.example.recordingaudio;
import android.annotation.SuppressLint;
import android.content.pm.PackageManager;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;
import android.media.MediaPlayer;
```

```

import android.media.MediaRecorder;
import android.os.Environment;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;
import java.io.IOException;
import java.util.Random;
import static android.Manifest.permission.RECORD_AUDIO;
import static android.Manifest.permission.WRITE_EXTERNAL_STORAGE;

import android.os.Bundle;

public class MainActivity extends AppCompatActivity {
    Button buttonStart, buttonStop, buttonPlayLastRecordAudio,
           buttonStopPlayingRecording ;
    String AudioSavePathInDevice = null;
    MediaRecorder mediaRecorder ;
    Random random ;
    String RandomAudioFileName = "ABCDEFGHIJKLMNP";
    public static final int RequestPermissionCode = 1;
    MediaPlayer mediaPlayer ;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        buttonStart = (Button) findViewById(R.id.button);
        buttonStop = (Button) findViewById(R.id.button2);
        buttonPlayLastRecordAudio = (Button)
        findViewById(R.id.button3);
        buttonStopPlayingRecording = (Button)
        findViewById(R.id.button4);
        buttonStop.setEnabled(false);
        buttonPlayLastRecordAudio.setEnabled(false);
        buttonStopPlayingRecording.setEnabled(false);
        random = new Random();
        buttonStart.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                if (checkPermission()) {
                    AudioSavePathInDevice =
Environment.getExternalStorageDirectory().getAbsolutePath() + "/" +
CreateRandomAudioFileName(5) +
"AudioRecording.3gp";
                    MediaRecorderReady();
                    try {
                        mediaRecorder.prepare();
                        mediaRecorder.start();
                    } catch (IllegalStateException e) {
                        // TODO Auto-generated catch block
                        e.printStackTrace();
                    } catch (IOException e) {
                        // TODO Auto-generated catch block
                        e.printStackTrace();
                    }
                    buttonStart.setEnabled(false);
                    buttonStop.setEnabled(true);
                    Toast.makeText(MainActivity.this, "Recording

```

```

        started",
                Toast.LENGTH_LONG).show();
            } else {
                requestPermission();
            }
        }
    });
buttonStop.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        mediaRecorder.stop();
        buttonStop.setEnabled(true);
        buttonPlayLastRecordAudio.setEnabled(true);
        buttonStart.setEnabled(true);
        buttonStopPlayingRecording.setEnabled(true);
        Toast.makeText(MainActivity.this, "Recording
Completed",
                Toast.LENGTH_LONG).show();
    }
});
buttonPlayLastRecordAudio.setOnClickListener(new
View.OnClickListener() {
    @Override
    public void onClick(View view) throws
IllegalArgumentException,
            SecurityException, IllegalStateException {

        buttonStop.setEnabled(false);
        buttonStart.setEnabled(false);
        buttonStopPlayingRecording.setEnabled(true);
        mediaPlayer = new MediaPlayer();
        try {
            mediaPlayer.setDataSource(AudioSavePathInDevice);
            mediaPlayer.prepare();
        } catch (IOException e) {
            e.printStackTrace();
        }

        mediaPlayer.start();
        Toast.makeText(MainActivity.this, "Recording
Playing",
                Toast.LENGTH_LONG).show();
    }
});
buttonStopPlayingRecording.setOnClickListener(new
View.OnClickListener() {
    @Override
    public void onClick(View view) {
        buttonStop.setEnabled(false);
        buttonStart.setEnabled(true);
        buttonStopPlayingRecording.setEnabled(false);
        buttonPlayLastRecordAudio.setEnabled(true);
        if(mediaPlayer != null){
            mediaPlayer.stop();
            mediaPlayer.release();
            MediaRecorderReady();
        }
    }
});
}

```

```

    }

    @SuppressLint("WrongConstant")
    public void MediaRecorderReady() {
        mediaRecorder=new MediaRecorder();
        mediaRecorder.setAudioSource(MediaRecorder.AudioSource.MIC);

        mediaRecorder.setOutputFormat(MediaRecorder.OutputFormat.THREE_GPP);

        mediaRecorder.setAudioEncoder(MediaRecorder.OutputFormat.AMR_NB);
        mediaRecorder.setOutputFile(AudioSavePathInDevice);
    }

    public String CreateRandomAudioFileName(int string) {
        StringBuilder stringBuilder = new StringBuilder( string );
        int i = 0 ;
        while(i < string ) {
            stringBuilder.append(RandomAudioFileName.

charAt(random.nextInt(RandomAudioFileName.length())));
            i++ ;
        }
        return stringBuilder.toString();
    }

    private void requestPermission() {
        ActivityCompat.requestPermissions(MainActivity.this, new
            String[]{WRITE_EXTERNAL_STORAGE, RECORD_AUDIO},
        RequestPermissionCode);
    }

    @Override
    public void onRequestPermissionsResult(int requestCode,
                                         String permissions[],
                                         int[] grantResults) {
        super.onRequestPermissionsResult(requestCode, permissions,
                                         grantResults);
        switch (requestCode) {
            case RequestPermissionCode:
                if (grantResults.length > 0) {
                    boolean StoragePermission = grantResults[0] ==
                        PackageManager.PERMISSION_GRANTED;
                    boolean RecordPermission = grantResults[1] ==
                        PackageManager.PERMISSION_GRANTED;
                    if (StoragePermission && RecordPermission) {
                        Toast.makeText(MainActivity.this, "Permission
Granted",
                            Toast.LENGTH_LONG).show();
                    } else {
                        Toast.makeText(MainActivity.this, "Permission
Denied", Toast.LENGTH_LONG).show();
                    }
                }
                break;
        }
    }

    public boolean checkPermission() {
        int result =
ContextCompat.checkSelfPermission(getApplicationContext(),
        WRITE_EXTERNAL_STORAGE);

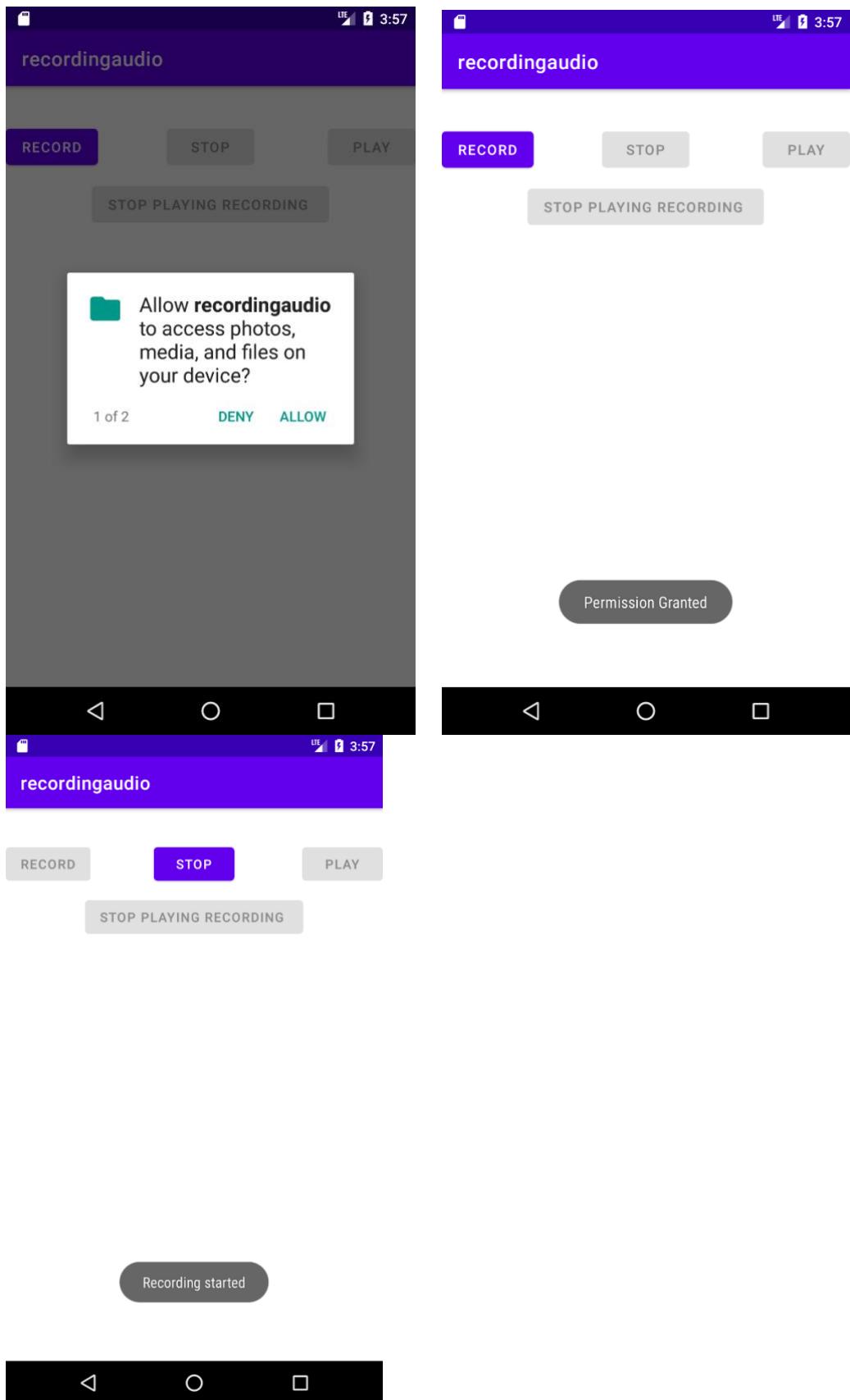
```

```
        int result1 =
ContextCompat.checkSelfPermission(getApplicationContext() ,
        RECORD_AUDIO) ;
    return result == PackageManager.PERMISSION_GRANTED &&
        result1 == PackageManager.PERMISSION_GRANTED;
}
}
```

### AndroidManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
package="com.example.recordingaudio">
    <uses-permission
android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
    <uses-permission android:name="android.permission.RECORD_AUDIO"
/>
    <uses-permission android:name="android.permission.STORAGE" />
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.Recordingaudio">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category
android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```

### OUTPUT:





STOP PLAYING RECORDING

STOP PLAYING RECORDING

Recording Completed

Recording Playing



30. Write a program to show Image effects. (It demonstrates some of the image effects on the bitmap. It creates a basic application that allows you to convert the picture into grayscale and much more.

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">

    <RelativeLayout
        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:id="@+id/textView"
            android:layout_alignParentTop="true"
            android:layout_centerHorizontal="true"
            android:textSize="30dp"
            android:text="Image Effects" />
        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text=" "
            android:id="@+id/textView2"
            android:layout_below="@+id/textView"
            android:layout_centerHorizontal="true"
            android:textSize="35dp"
            android:textColor="#ff16ff01" />
        <ImageView
            android:id="@+id/imageView"
            android:layout_width="400dp"
            android:layout_height="528dp"
            android:layout_below="@+id/textView2"
            android:layout_marginTop="-37dp"
            android:src="@drawable/simple" />
        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Gray"
            android:onClick="gray"
            android:id="@+id/button"
            android:layout_alignParentBottom="true"
            android:layout_alignParentLeft="true"
            android:layout_alignParentStart="true"
            android:layout_marginBottom="97dp" />
        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="dark"
            android:onClick="dark"
            android:id="@+id/button2" />
    

```

```

        android:layout_alignBottom="@+id/button"
        android:layout_alignParentRight="true"
        android:layout_alignParentEnd="true" />

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Bright"
        android:onClick="bright"
        android:id="@+id/button3"
        android:layout_alignTop="@+id/button2"
        android:layout_centerHorizontal="true" />

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Red"
        android:onClick="gama"
        android:id="@+id/button4"
        android:layout_below="@+id/button3"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true" />

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Green"
        android:onClick="green"
        android:id="@+id/button5"
        android:layout_alignTop="@+id/button4"
        android:layout_alignLeft="@+id/button3"
        android:layout_alignStart="@+id/button3" />

    <Button
        android:id="@+id/button6"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button2"
        android:layout_marginStart="23dp"
        android:layout_marginLeft="23dp"
        android:layout_marginTop="0dp"
        android:layout_toEndOf="@+id/textView"
        android:layout_toRightOf="@+id/textView"
        android:onClick="blue"
        android:text="blue" />

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

## MainActivity.java

```

package com.example.imagecolorchange;

import android.os.Bundle;
import android.graphics.Bitmap;
import android.graphics.Color;
import android.graphics.drawable.BitmapDrawable;
import android.view.View;
import android.widget.Button;
import android.widget.ImageView;
```

```

import android.widget.Toast;

import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {
    Button b1, b2, b3;
    ImageView im;
    private Bitmap bmp;
    private Bitmap operation;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        b1 = (Button) findViewById(R.id.button);
        b2 = (Button) findViewById(R.id.button2);
        b3 = (Button) findViewById(R.id.button3);
        im = (ImageView) findViewById(R.id.imageView);
        BitmapDrawable abmp = (BitmapDrawable) im.getDrawable();
        bmp = abmp.getBitmap();
    }

    public void gray(View view) {
        operation =
        Bitmap.createBitmap(bmp.getWidth(), bmp.getHeight(), bmp.getConfig());
        double red = 0.33;
        double green = 0.59;
        double blue = 0.11;
        for (int i = 0; i < bmp.getWidth(); i++) {
            for (int j = 0; j < bmp.getHeight(); j++) {
                int p = bmp.getPixel(i, j);
                int r = Color.red(p);
                int g = Color.green(p);
                int b = Color.blue(p);
                r = (int) red * r;
                g = (int) green * g;
                b = (int) blue * b;
                operation.setPixel(i, j, Color.argb(Color.alpha(p),
r, g, b));
                Toast.makeText(this, "IMAGE COLOR CHANGED TO GRAY",
Toast.LENGTH_SHORT).show();
            }
        }
        im.setImageBitmap(operation);
    }

    public void bright(View view) {
        operation= Bitmap.createBitmap(bmp.getWidth(),
        bmp.getHeight(), bmp.getConfig());
        for(int i=0; i<bmp.getWidth(); i++){
            for(int j=0; j<bmp.getHeight(); j++){
                int p = bmp.getPixel(i, j);
                int r = Color.red(p);
                int g = Color.green(p);
                int b = Color.blue(p);
                int alpha = Color.alpha(p);
                r = 100 + r;
                g = 100 + g;
                b = 100 + b;
                alpha = 100 + alpha;
                operation.setPixel(i, j, Color.argb(alpha, r, g, b));
            }
        }
    }
}

```

```

        }
    }
    im.setImageBitmap(operation);
    Toast.makeText(this, "NOW YOUR PICTURE IS BRIGHTER",
    Toast.LENGTH_SHORT).show();
}

public void dark(View view) {
    operation=
    Bitmap.createBitmap(bmp.getWidth(), bmp.getHeight(), bmp.getConfig());
    for(int i=0; i<bmp.getWidth(); i++){
        for(int j=0; j<bmp.getHeight(); j++){
            int p = bmp.getPixel(i, j);
            int r = Color.red(p);
            int g = Color.green(p);
            int b = Color.blue(p);
            int alpha = Color.alpha(p);
            r = r - 50;
            g = g - 50;
            b = b - 50;
            alpha = alpha -50;
            operation.setPixel(i, j, Color.argb(Color.alpha(p),
r, g, b));
            Toast.makeText(this, "NOW YOUR PICTURE IS DARKER",
            Toast.LENGTH_SHORT).show();
        }
    }
    im.setImageBitmap(operation);
}

public void gama(View view) {
    operation =
    Bitmap.createBitmap(bmp.getWidth(), bmp.getHeight(), bmp.getConfig());
    for(int i=0; i<bmp.getWidth(); i++){
        for(int j=0; j<bmp.getHeight(); j++){
            int p = bmp.getPixel(i, j);
            int r = Color.red(p);
            int g = Color.green(p);
            int b = Color.blue(p);
            int alpha = Color.alpha(p);
            r = r + 150;
            g = 0;
            b = 0;
            alpha = 0;
            operation.setPixel(i, j, Color.argb(Color.alpha(p),
r, g, b));
            Toast.makeText(this, "GAMA THEME APPLIED TO YOUR
PICTURE", Toast.LENGTH_SHORT).show();
        }
    }
    im.setImageBitmap(operation);
}

public void green(View view) {
    operation =
    Bitmap.createBitmap(bmp.getWidth(), bmp.getHeight(), bmp.getConfig());
    int i;
    for(i=0; i<bmp.getWidth(); i++){

        for(int j=0; j<bmp.getHeight(); j++) {

```

```

        int p = bmp.getPixel(i, j);
        int r = Color.red(p);
        int g = Color.green(p);
        int b = Color.blue(p);
        int alpha = Color.alpha(p);
        r = 0;
        g = g+150;
        b = 0;
        alpha = 0;
        operation.setPixel(i, j, Color.argb(Color.alpha(p),
r, g, b));

        Toast.makeText(this, "IMAGE COLOR CHANGED TO GREEN",
Toast.LENGTH_SHORT).show();
    }
    im.setImageBitmap(operation);
}

public void blue(View view) {
    operation =
Bitmap.createBitmap(bmp.getWidth(), bmp.getHeight(), bmp.getConfig());
    for(int i=0; i<bmp.getWidth(); i++){
        for(int j=0; j<bmp.getHeight(); j++){
            int p = bmp.getPixel(i, j);
            int r = Color.red(p);
            int g = Color.green(p);
            int b = Color.blue(p);
            int alpha = Color.alpha(p);
            r = 0;
            g = 0;
            b = b+150;
            alpha = 0;
            operation.setPixel(i, j, Color.argb(Color.alpha(p),
r, g, b));

            Toast.makeText(this, "IMAGE COLOR CHANGED TO BLUE",
Toast.LENGTH_SHORT).show();
        }
        im.setImageBitmap(operation);
    }
}

```

## OUTPUT:

31. Write a program to show custom Fonts (It creates a basic application that displays a custom font that you specified in the fonts file.)

32. Write a program to show Progress Circle (It display a spinning progress dialog on pressing the button.)

**activity\_main.xml**

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <TextView
        android:text="Music Player"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/textview"
        android:textSize="35dp"
        android:layout_alignParentTop="true"
        android:layout_centerHorizontal="true" />
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text=" "
        android:id="@+id/textView"
        android:layout_below="@+id/textview"
        android:layout_centerHorizontal="true"
        android:textColor="#ff7aff24"
        android:textSize="35dp" />
    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="download"
        android:id="@+id/button"
        android:layout_alignParentBottom="true"
        android:layout_centerHorizontal="true"
        android:layout_marginBottom="112dp" />
</RelativeLayout>
```

**MainActivity.java**

```
package com.example.progresscircle;

import androidx.appcompat.app.AppCompatActivity;

import android.app.AlertDialog;
import android.os.Bundle;
import android.os.Handler;
import android.view.View;
import android.widget.Button;

public class MainActivity extends AppCompatActivity {
    Button b1;
    private AlertDialog 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);
        b1=(Button) findViewById(R.id.button);
        b1.setOnClickListener(new View.OnClickListener() {
```

```

@Override
public void onClick(View v) {
    progressBar = new ProgressDialog(v.getContext());
    progressBar.setCancelable(true);
    progressBar.setMessage("File downloading ...");

    progressBar.setProgressStyle(ProgressDialog.STYLE_SPINNER);
    progressBar.setProgress(0);
    progressBar.setMax(100);
    progressBar.show();
    progressBarStatus = 0;
    fileSize = 0;
    new Thread(new Runnable() {
        public void run() {
            while (progressBarStatus < 100) {
                progressBarStatus = downloadFile();
                try {
                    Thread.sleep(1000);
                } catch (InterruptedException e) {
                    e.printStackTrace();
                }

                progressBarHandler.post(new Runnable() {
                    public void run() {
                        progressBar.setProgress(progressBarStatus);
                    }
                });
            }

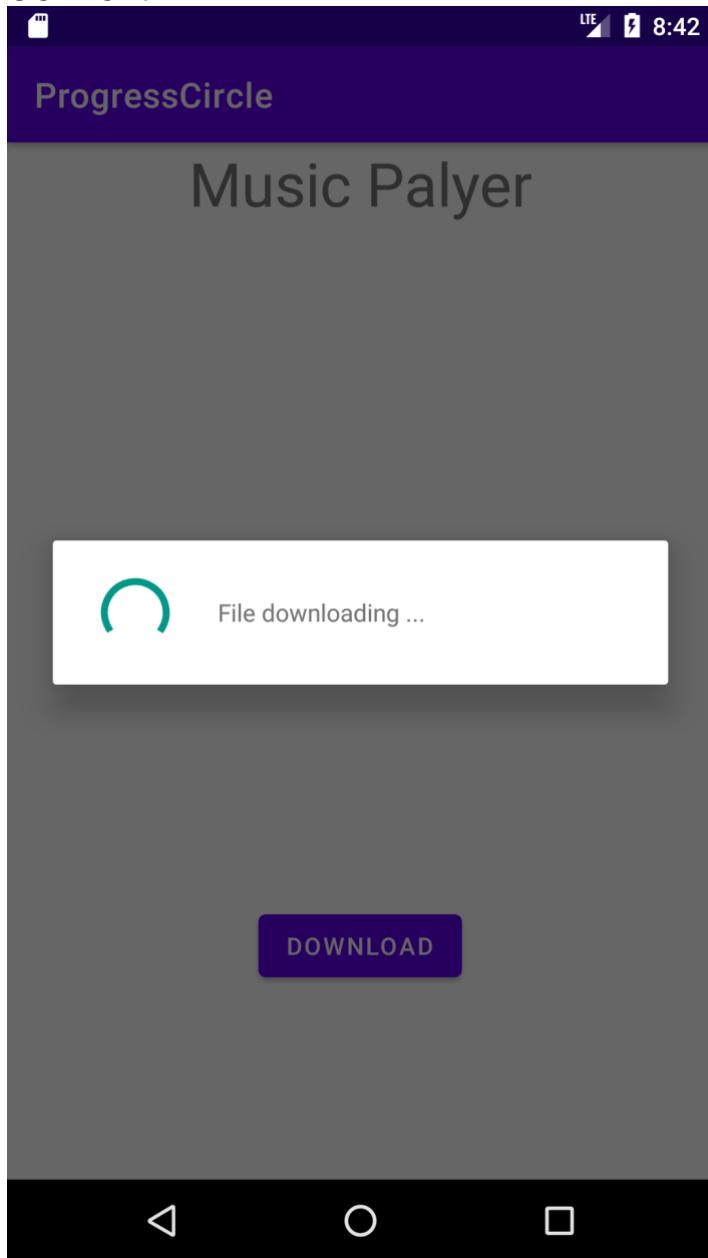
            if (progressBarStatus >= 100) {
                try {
                    Thread.sleep(2000);
                } catch (InterruptedException e) {
                    e.printStackTrace();
                }
                progressBar.dismiss();
            }
        }
    }).start();
}

public int downloadFile() {
    while (fileSize <= 1000000) {
        fileSize++;
        if (fileSize == 100000) {
            return 10;
        } else if (fileSize == 200000) {
            return 20;
        } else if (fileSize == 300000) {
            return 30;
        } else if (fileSize == 400000) {
            return 40;
        } else if (fileSize == 500000) {
            return 50;
        } else if (fileSize == 700000) {
            return 70;
        } else if (fileSize == 800000) {
            return 80;
        }
    }
}

```

```
        }
    }
    return 100;
}
}
```

**OUTPUT:**



33. Write a program to show Navigation (It creates a basic application that allows you to navigate within your application.)

**activity\_main.xml**

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity"
    android:transitionGroup="true">
    <TextView
        android:id="@+id/textview"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentTop="true"
        android:layout_centerHorizontal="true"
        android:text="Navigation example"
        android:textSize="35dp" />
    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/textview"
        android:layout_centerHorizontal="true"
        android:text=" "
        android:textColor="#ff7aff24"
        android:textSize="35dp" />
    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="first page"
        android:id="@+id/button"
        android:layout_alignRight="@+id/textView"
        android:layout_alignEnd="@+id/textView"
        android:layout_marginTop="61dp"/>
</RelativeLayout>
```

**activity\_main2.xml**

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical" android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:weightSum="1">
    <WebView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/webView"
        android:layout_gravity="center_horizontal"
        android:layout_weight="1.03" />
</LinearLayout>
```

**MainActivity.java**

```
package com.example.navigation;
import android.os.Bundle;
import android.content.Intent;
import android.view.View;
import android.widget.Button;
```

```

import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {
    Button b1;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        b1 = (Button) findViewById(R.id.button);
        b1.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent in = new Intent(MainActivity.this,
second_main.class);
                startActivity(in);
            }
        });
    }
}

```

### second\_main.java

```

package com.example.navigation;
import android.app.Activity;
import android.os.Bundle;
import android.webkit.WebView;
import android.webkit.WebViewClient;
public class second_main extends Activity {
    WebView wv;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main2);
        wv = (WebView) findViewById(R.id.webView);
        wv.setWebViewClient(new MyBrowser());
        wv.getSettings().setLoadsImagesAutomatically(true);
        wv.getSettings().setJavaScriptEnabled(true);
        wv.loadUrl("http://www.google.com");
    }

    private class MyBrowser extends WebViewClient {
        @Override
        public boolean shouldOverrideUrlLoading(WebView view, String url) {
            view.loadUrl(url);
            return true;
        }
    }
}

```

### AndroidManifest.xml

```

<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.navigation">
    <uses-permission android:name="android.permission.INTERNET">
    </uses-permission>
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"

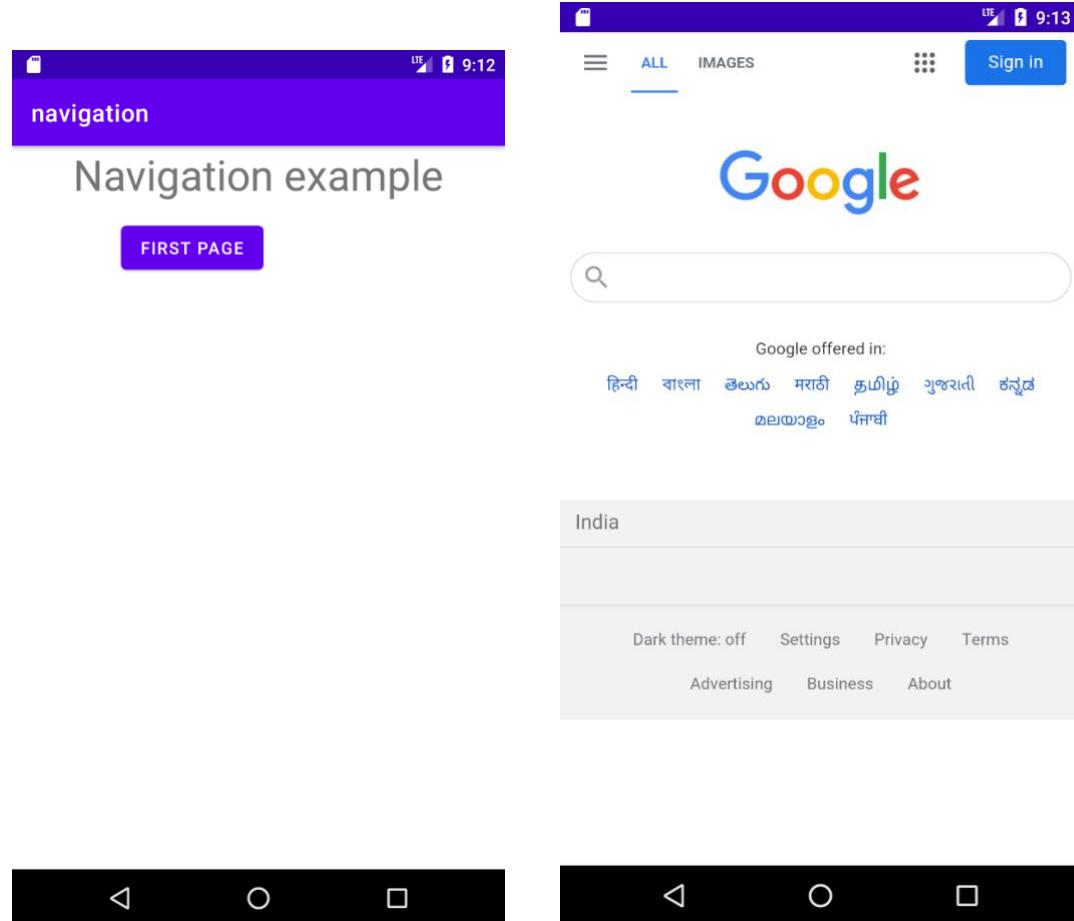
```

```

    android:roundIcon="@mipmap/ic_launcher_round"
    android:supportsRtl="true"
    android:theme="@style/Theme.Navigation">
<activity
        android:name=".second_main"
        android:exported="true"/>
        android:label="@string/title_activity_second_main"
        android:theme="@style/Theme.Navigation.NoActionBar" />
<activity
        android:name=".MainActivity"
        android:exported="true">
        <intent-filter>
            <action android:name="android.intent.action.MAIN" />
            <category
                android:name="android.intent.category.LAUNCHER"/>
        </intent-filter>
    </activity>
</application>
</manifest>

```

## OUTPUT:



34. Write a program to show androidcustomgridview.

### 35. Write a program to show Restful Web Service.

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="com.example.jsonparseexample.MainActivity">

    <ListView
        android:id="@+id/list" android:layout_width="fill_parent"
        android:layout_height="wrap_content" />
</RelativeLayout>
```

#### Mainactivity.java

```
package com.example.restful;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.os.AsyncTask;
import android.util.Log;
import android.widget.ArrayAdapter;
import android.widget.ListView;
import android.widget.SimpleAdapter;
import android.widget.Toast;
import org.json.JSONArray;
import org.json.JSONException;
import org.json.JSONObject;
import java.util.ArrayList;
import java.util.HashMap;

import android.os.Bundle;

public class MainActivity extends AppCompatActivity {
    private String TAG = MainActivity.class.getSimpleName();
    private ListView lv;
    ArrayList<HashMap<String, String>> contactList;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        contactList = new ArrayList<>();
        lv = (ListView) findViewById(R.id.list);

        new GetContacts().execute();
    }

    private class GetContacts extends AsyncTask<Void, Void, Void> {
        @Override
        protected void onPreExecute() { super.onPreExecute();
            Toast.makeText(MainActivity.this,"Json Data is
downloading",Toast.LENGTH_LONG).show();
        }
    }
}
```

```

@Override
protected Void doInBackground(Void... arg0) {

    HttpHandler sh = new HttpHandler();
    // Making a request to url and getting response String url =
    "http://api.androidhive.info/contacts/"; String jsonStr =
    sh.makeServiceCall(url);

    String url = "http://api.androidhive.info/contacts/";
    String jsonStr = sh.makeServiceCall(url);

    Log.e(TAG, "Response from url: " + jsonStr); if (jsonStr
!= null) {
        try {
            JSONObject jsonObj = new JSONObject(jsonStr);

            // Getting JSON Array node
            JSONArray contacts =
            jsonObj.getJSONArray("contacts");

            // looping through All Contacts
            for (int i = 0; i < contacts.length(); i++) {
                JSONObject c = contacts.getJSONObject(i); String id =
                c.getString("id");
                String name = c.getString("name"); String
                email = c.getString("email"); String address =
                c.getString("address"); String gender = c.getString("gender");

                // Phone node is JSON Object
                JSONObject phone = c.getJSONObject("phone");
                String mobile = phone.getString("mobile"); String home =
                phone.getString("home"); String office = phone.getString("office");

                // tmp hash map for single contact
                HashMap<String, String> contact = new
                HashMap<>();

                // adding each child node to HashMap key => value
                contact.put("id", id); contact.put("name",
                name); contact.put("email", email); contact.put("mobile",
                mobile);

                // adding contact to contact list
                contactList.add(contact);
            }

            } catch (final JSONException e) {
                Log.e(TAG, "Json parsing error: " +
                e.getMessage()); runOnUiThread(new Runnable() {
                    @Override
                    public void run() {
                        Toast.makeText(getApplicationContext(),
                            "Json parsing error: "
                            +e.getMessage(),
                            Toast.LENGTH_LONG).show();
                    }
                });
            }
        }
    }
}

```

```

        } else {
            Log.e(TAG, "Couldn't get json from server.");
runOnUiThread(new Runnable() {
    @Override
    public void run() {
        Toast.makeText(getApplicationContext(),
                "Couldn't get json from server. Check LogCat for possible errors!", Toast.LENGTH_LONG).show();
    }
});
}

return null;
}

@Override
protected void onPostExecute(Void result)
{
    super.onPostExecute(result);
    ListAdapter adapter = new
SimpleAdapter(MainActivity.this,
        contactList, R.layout.list_item, new String[]{ "email", "mobile"}, new int[]{R.id.email, R.id.mobile});
lv.setAdapter(adapter);

}
}
}

```

### AndroidManifest.xml

```

<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.restful">
    <uses-permission android:name="android.permission.INTERNET"/>

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

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

```

</manifest>

## List\_item.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:orientation="vertical" >
    <TextView
        android:id="@+id/email" android:layout_width="fill_parent"
        android:layout_height="wrap_content" android:paddingBottom="2dip"/>

    <TextView
        android:id="@+id/mobile" android:layout_width="wrap_content"
        android:layout_height="wrap_content" android:textColor="#5d5d5d"
        android:textStyle="bold" />
</LinearLayout>
```

## HttpHandler.java

```
package com.example.restful;

import android.util.Log;
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStream;
import java.io.InputStreamReader;
import java.net.HttpURLConnection;
import java.net.MalformedURLException;
import java.net.ProtocolException;
import java.net.URL;

public class HttpHandler {
    private static final String TAG =
HttpHandler.class.getSimpleName();

    public HttpHandler() {
    }
    public String makeServiceCall(String reqUrl) { String
response = null;
        try {
            URL url = new URL(reqUrl);
            HttpURLConnection conn = (HttpURLConnection)
url.openConnection();
            conn.setRequestMethod("GET");
// read the response
            InputStream in = new
BufferedInputStream(conn.getInputStream());
            response = convertStreamToString(in);
        } catch (MalformedURLException e) {
            Log.e(TAG, "MalformedURLException: " +
e.getMessage());
        } catch (ProtocolException e) {
            Log.e(TAG, "ProtocolException: " + e.getMessage());
        } catch (IOException e) {
            Log.e(TAG, "IOException: " + e.getMessage());
        } catch (Exception e) {
            Log.e(TAG, "Exception: " + e.getMessage());
        }
        return response;
    }

    private String convertStreamToString(InputStream is) {
```

```
BufferedReader reader = new BufferedReader(new
    InputStreamReader(is));
StringBuilder sb = new StringBuilder();

String line; try {
    while ((line = reader.readLine()) != null) {
sb.append(line).append('\n');
    }
} catch (IOException e) { e.printStackTrace();
} finally {
    try { is.close();
    } catch (IOException e) { e.printStackTrace();
    }
}

return sb.toString();
}
```

## OUTPUT



Json parsing error: Value <html> of type  
java.lang.String cannot be converted to  
JSONObject



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## 01.Find the correlation matrix.

### Find the correlation matrix

```
In [2]: import scipy.stats as st
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline

In [5]: data=pd.read_excel("Sample - Superstore.xls")

In [4]: !pip install xlrd
Collecting xlrd
  Downloading xlrd-2.0.1-py2.py3-none-any.whl (96 kB)
Installing collected packages: xlrd
Successfully installed xlrd-2.0.1

In [6]: np.corrcoef(data['Sales'],data['Profit'])

Out[6]: array([[1.          ,  0.47906435],
               [0.47906435, 1.          ]])

In [9]: data.corr()

Out[9]:
```

	Row ID	Postal Code	Sales	Quantity	Discount	Profit
Row ID	1.000000	0.009671	-0.001359	-0.004016	0.013480	0.012497
Postal Code	0.009671	1.000000	-0.023854	0.012761	0.058443	-0.029961
Sales	-0.001359	-0.023854	1.000000	0.200795	-0.028190	0.479064
Quantity	-0.004016	0.012761	0.200795	1.000000	0.008623	0.066253

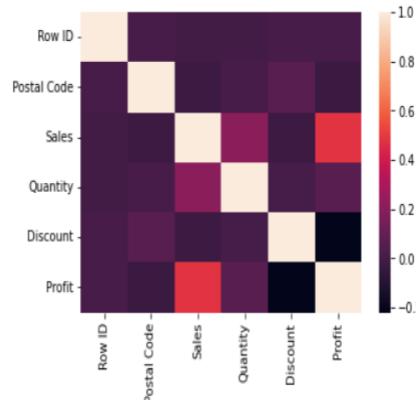
```
In [9]: data.corr()

Out[9]:
```

	Row ID	Postal Code	Sales	Quantity	Discount	Profit
Row ID	1.000000	0.009671	-0.001359	-0.004016	0.013480	0.012497
Postal Code	0.009671	1.000000	-0.023854	0.012761	0.058443	-0.029961
Sales	-0.001359	-0.023854	1.000000	0.200795	-0.028190	0.479064
Quantity	-0.004016	0.012761	0.200795	1.000000	0.008623	0.066253
Discount	0.013480	0.058443	-0.028190	0.008623	1.000000	-0.219487
Profit	0.012497	-0.029961	0.479064	0.066253	-0.219487	1.000000

```
In [10]: sns.heatmap(data.corr())
```

```
Out[10]: <AxesSubplot:>
```



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02.Plot the correlation plot on dataset and visualize giving an overview of relationships among data on iris.

Plot the correlation plot on dataset and visualize giving an overview of relationships among data on iris data

```
In [13]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
from sklearn import metrics
sns.set()
```

```
In [3]: iris_data=pd.read_csv('iris.csv')
iris_data
```

```
Out[3]:
```

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	setosa
1	4.9	3.0	1.4	0.2	setosa
2	4.7	3.2	1.3	0.2	setosa
3	4.6	3.1	1.5	0.2	setosa
4	5.0	3.6	1.4	0.2	setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	virginica
146	6.3	2.5	5.0	1.9	virginica
147	6.5	3.0	5.2	2.0	virginica
148	6.2	3.4	5.4	2.3	virginica
149	5.9	3.0	5.1	1.8	virginica

150 rows × 5 columns

```
In [4]: iris_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 5 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   sepal_length  150 non-null   float64
 1   sepal_width   150 non-null   float64
 2   petal_length  150 non-null   float64
 3   petal_width   150 non-null   float64
 4   species       150 non-null   object  
dtypes: float64(4), object(1)
memory usage: 6.0+ KB
```

```
In [5]: iris_data.describe()
```

```
Out[5]:
```

	sepal_length	sepal_width	petal_length	petal_width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.057333	3.758000	1.199333
std	0.828066	0.435866	1.765298	0.762238
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

```
In [6]: iris_data[iris_data.duplicated()]
```

```
Out[6]:
```

	sepal_length	sepal_width	petal_length	petal_width	species
--	--------------	-------------	--------------	-------------	---------

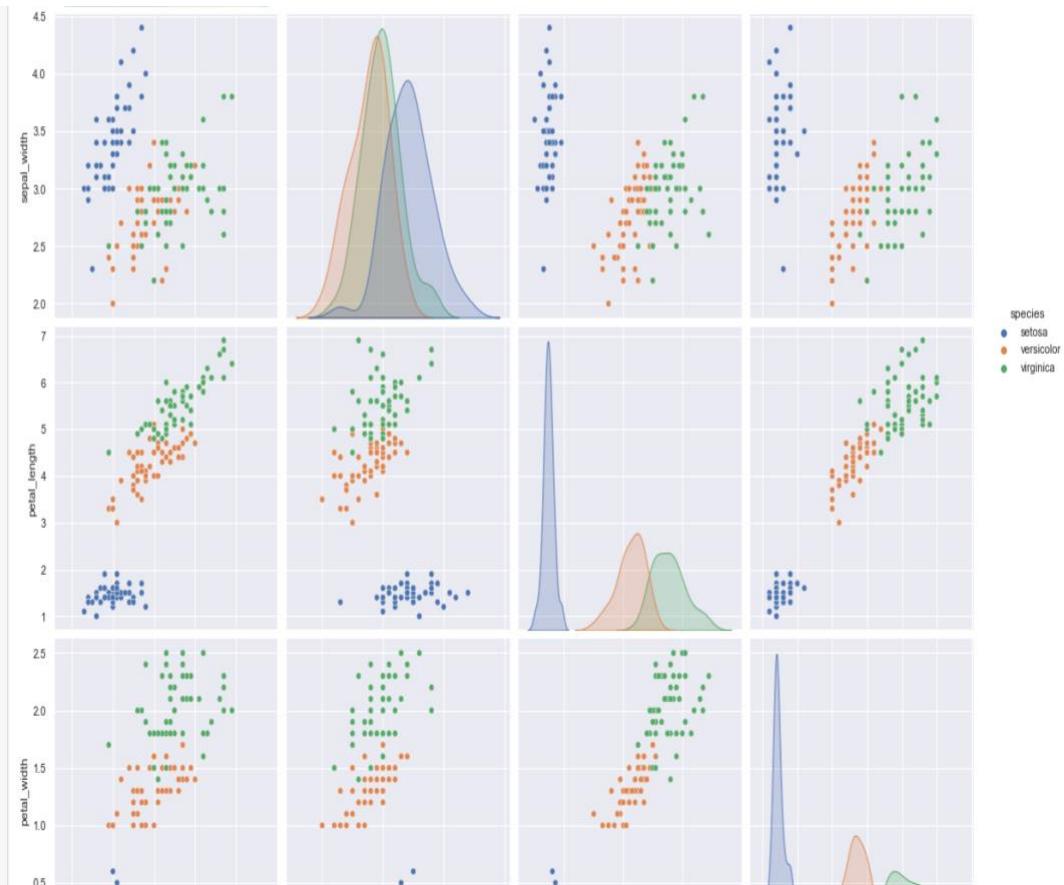
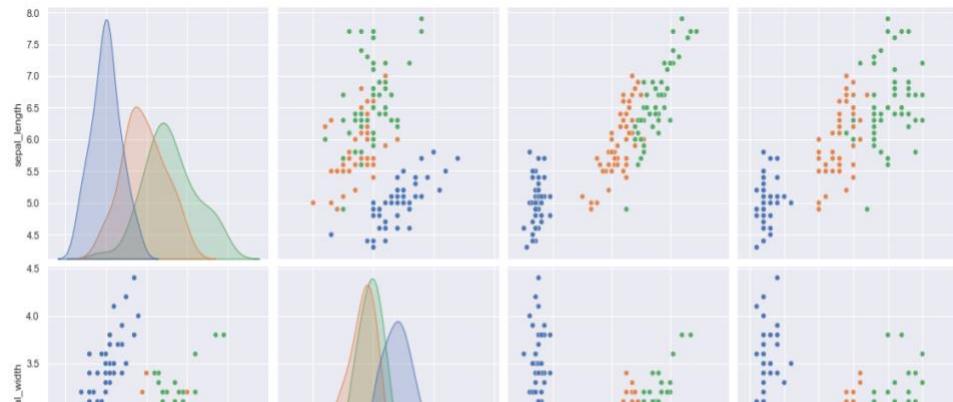
```
In [6]: iris_data[iris_data.duplicated()]
Out[6]:    sepal_length  sepal_width  petal_length  petal_width  species
          142           5.8         2.7          5.1         1.9   virginica
```

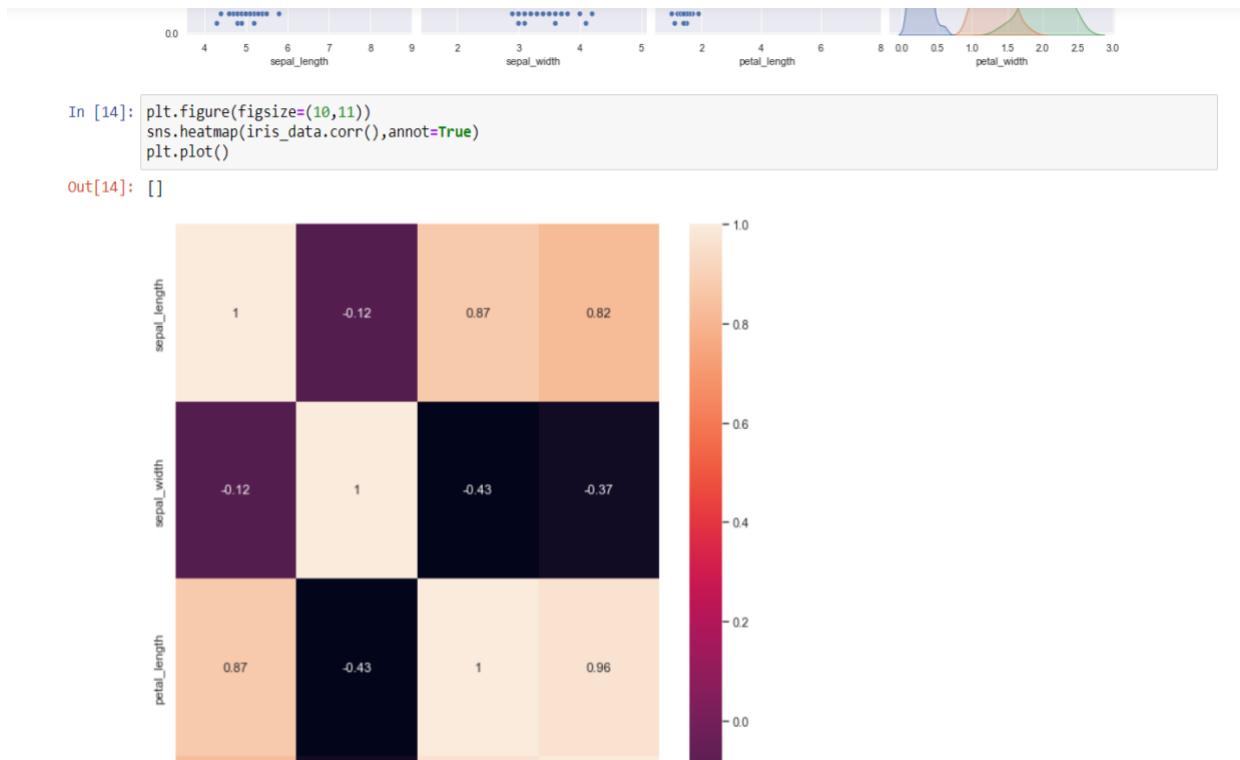
```
In [7]: iris_data['species'].value_counts()
```

```
Out[7]: setosa      50
versicolor  50
virginica   50
Name: species, dtype: int64
```

```
In [15]: sns.pairplot(iris_data,hue='species',height=4)
```

```
Out[15]: <seaborn.axisgrid.PairGrid at 0x20b16a147f0>
```

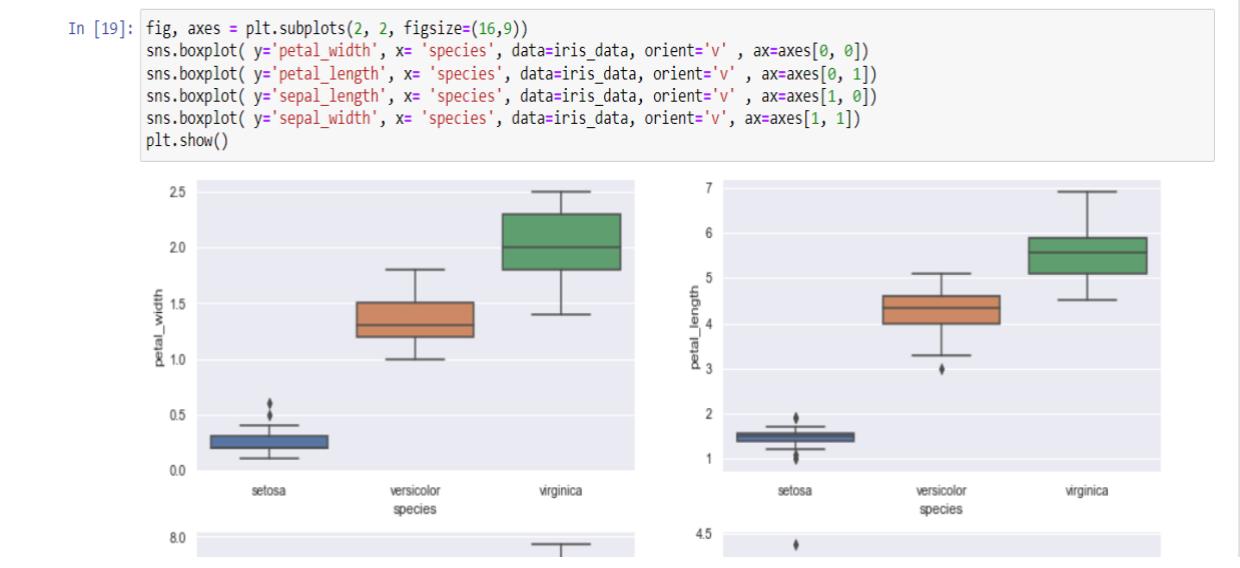




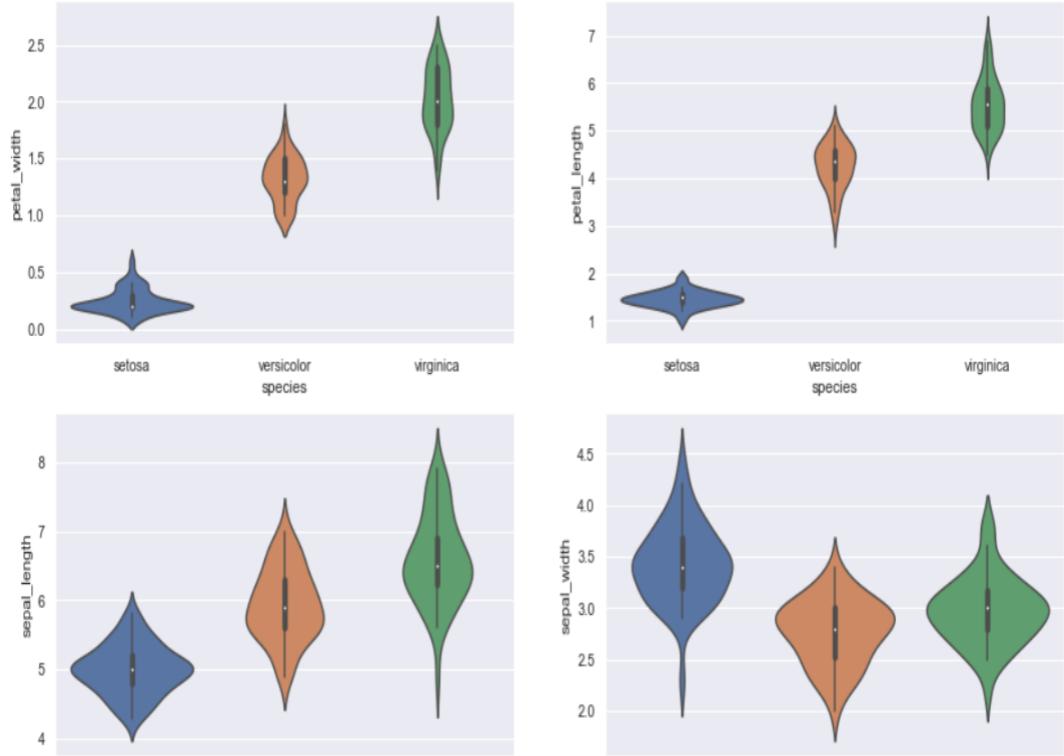
```
In [17]: iris_data.groupby('species').agg(['mean','median'])
```

Out[17]:

species	sepal_length		sepal_width		petal_length		petal_width	
	mean	median	mean	median	mean	median	mean	median
setosa	5.006	5.0	3.428	3.4	1.462	1.50	0.246	0.2
versicolor	5.936	5.9	2.770	2.8	4.260	4.35	1.326	1.3
virginica	6.588	6.5	2.974	3.0	5.552	5.55	2.026	2.0



```
In [20]: fig, axes = plt.subplots(2, 2, figsize=(16,9))
sns.violinplot( y='petal_width', x= 'species', data=iris_data, orient='v' , ax=axes[0, 0])
sns.violinplot( y='petal_length', x= 'species', data=iris_data, orient='v' , ax=axes[0, 1])
sns.violinplot( y='sepal_length', x= 'species', data=iris_data, orient='v' , ax=axes[1, 0])
sns.violinplot( y='sepal_width', x= 'species', data=iris_data, orient='v' , ax=axes[1, 1])
plt.show()
```



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### 03. Analysis of covariance: variance (ANOVA), if data have categorical variables on iris data.

#### Analysis of covariance: variance(ANOVA), if data has categorical variables in iris data

```
In [1]: import numpy as np  
import pandas as pd
```

```
In [2]: df=pd.read_csv('iris.csv')
```

```
In [3]: df.head()
```

```
Out[3]:
```

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	setosa
1	4.9	3.0	1.4	0.2	setosa
2	4.7	3.2	1.3	0.2	setosa
3	4.6	3.1	1.5	0.2	setosa
4	5.0	3.6	1.4	0.2	setosa

```
In [ ]:
```

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#### 04. Apply linear regression Model techniques to predict the data on any dataset.

##### Apply linear regression Model techniques to predict the data on any dataset

```
In [1]: import numpy as np  
import matplotlib.pyplot as plt  
import pandas as pd  
  
In [2]: data=pd.read_csv('salary_Data.csv')  
  
In [3]: X=data.iloc[:, :-1].values  
y=data.iloc[:, 1].values  
  
In [4]: from sklearn.model_selection import train_test_split  
X_train, X_test, y_train, y_test = train_test_split(X,y,test_size=0.25,random_state=0)  
  
In [6]: from sklearn.preprocessing import StandardScaler  
  
In [7]: scaler=StandardScaler()  
  
In [8]: X_train=scaler.fit_transform(X_train)  
X_test=scaler.fit_transform(X_test)  
  
In [10]: from sklearn.linear_model import LinearRegression  
  
In [11]: regressor=LinearRegression()  
regressor.fit(X_train,y_train)  
  
Out[11]: LinearRegression()  
  
In [14]: y_pre=regressor.predict(X_test[[0]])
```

```
In [14]: y_pre=regressor.predict(X_test[[0]])  
  
In [15]: y_pre  
Out[15]: array([36569.76758981])  
  
In [ ]:
```

[back](#)

## 05. Apply logistic regression Model techniques to predict the data on any dataset.

### Apply logistic regression Model techniques to predict the data on any dataset

```
In [1]: import pandas as pd
import matplotlib.pyplot as plt

In [2]: df=pd.read_csv('Social_Network_Ads.csv')

In [3]: X=df[['Age','EstimatedSalary']]
y=df['Purchased']

In [4]: from sklearn.linear_model import LogisticRegression

In [5]: model=LogisticRegression()

In [6]: model.fit(X,y)

Out[6]: LogisticRegression()

In [8]: scaled_Age=(df['Age']-df['Age'].min()) / (df['Age'].max()-df['Age'].min())
scaled_Salary=(df['EstimatedSalary']-df['EstimatedSalary'].min()) / (df['EstimatedSalary'].max()-df['EstimatedSalary'].min())

In [9]: X=pd.concat([scaled_Age,scaled_Salary],axis=1)
y=df['Purchased']

In [10]: model_scaled = LogisticRegression()
model_scaled.fit(X,y)

Out[10]: LogisticRegression()

In [11]: df
```

```
In [11]: def get_scaled(pt):
    age,sal = pt[0],pt[1]
    sc_age=(age-df['Age'].min()) / (df['Age'].max()-df['Age'].min())
    sc_sal=(sal-df['EstimatedSalary'].min()) / (df['EstimatedSalary'].max()-df['EstimatedSalary'].min())
    return sc_age,sc_sal

In [12]: q1=get_scaled([52,130000])
q2=get_scaled([25,40000])

In [13]: model_scaled.predict([q1])
Out[13]: array([1], dtype=int64)

In [14]: model_scaled.predict([q2])
Out[14]: array([0], dtype=int64)

In [15]: from sklearn.preprocessing import MinMaxScaler

In [16]: X = df[['Age','EstimatedSalary']]
scaler = MinMaxScaler()
scaler.fit(X)
X_scaled = scaler.transform(X)

In [17]: X_scaled
Out[17]: array([[0.02380952, 0.02962963],
   [0.4047619 , 0.03703704],
   [0.19047619, 0.20740741],
   [0.21428571, 0.31111111],
   [0.02380952, 0.45185185],
   [0.21428571, 0.31851852],
   [0.21428571, 0.51111111],
   [0.33333333, 1.      ]],
```

```
In [27]: from sklearn.model_selection import train_test_split

In [28]: X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.25)

In [29]: scaler = MinMaxScaler()
        scaler.fit(X_train)
        X_train_scaled = scaler.transform(X_train)

In [30]: model = LogisticRegression()
        model.fit(X_train_scaled, y_train)

Out[30]: LogisticRegression()

In [31]: train_score = model.score(X_train_scaled, y_train)
        train_score

Out[31]: 0.8266666666666667

In [32]: X_test_scaled = scaler.transform(X_test)
        test_score = model.score(X_test_scaled, y_test)
        test_score

Out[32]: 0.8
```

[back](#)

## 06. Clustering algorithms for unsupervised classification.

```
In [1]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import scipy.stats as stats

In [2]: np.random.seed(12)

races = ["asian", "black", "hispanic", "other", "white"]

# Generate random data
voter_race = np.random.choice(a=races,
                               p=[0.05, 0.15, 0.25, 0.05, 0.5],
                               size=1000)

voter_age = stats.poisson.rvs(loc=18,
                              mu=30,
                              size=1000)

# Group age data by race
voter_frame = pd.DataFrame({"race":voter_race, "age":voter_age})
groups = voter_frame.groupby("race").groups

# Extract individual groups
asian = voter_age[groups["asian"]]
black = voter_age[groups["black"]]
hispanic = voter_age[groups["hispanic"]]
other = voter_age[groups["other"]]
white = voter_age[groups["white"]]

# Perform the ANOVA
stats.f_oneway(asian, black, hispanic, other, white)
```

```
In [3]: import statsmodels.api as sm
from statsmodels.formula.api import ols

model = ols('age ~ race', data=voter_frame).fit() # Model formula

anova_result = sm.stats.anova_lm(model, typ=2)
print(anova_result)
```

```
In [4]: np.random.seed(12)

# Generate random data
voter_race = np.random.choice(a=races,
                               p=[0.05, 0.15, 0.25, 0.05, 0.5],
                               size=1000)

# Use a different distribution for white ages
white_ages = stats.poisson.rvs(loc=18,
                               mu=32,
                               size=1000)

voter_age = stats.poisson.rvs(loc=18,
                              mu=30,
                              size=1000)

voter_age = np.where(voter_race=="white", white_ages, voter_age)

# Group age data by race
voter_frame = pd.DataFrame({"race":voter_race, "age":voter_age})
groups = voter_frame.groupby("race").groups

# Extract individual groups
asian = voter_age[groups["asian"]]
black = voter_age[groups["black"]]
hispanic = voter_age[groups["hispanic"]]
other = voter_age[groups["other"]]
...
```

```
# Extract individual groups
asian = voter_age[groups["asian"]]
black = voter_age[groups["black"]]
hispanic = voter_age[groups["hispanic"]]
other = voter_age[groups["other"]]
white = voter_age[groups["white"]]

# Perform the ANOVA
stats.f_oneway(asian, black, hispanic, other, white)
```

```
In [5]: # Alternate method
model = ols('age ~ race',
            data = voter_frame).fit()

anova_result = sm.stats.anova_lm(model, typ=2)
print (anova_result)
```

```
In [6]: # Get all race pairs
race_pairs = []

for race1 in range(4):
    for race2 in range(race1+1,5):
        race_pairs.append((races[race1], races[race2]))

# Conduct t-test on each pair
for race1, race2 in race_pairs:
    print(race1, race2)
    print(stats.ttest_ind(voter_age[groups[race1]],
                          voter_age[groups[race2]])))
```

```
In [7]: from statsmodels.stats.multicomp import pairwise_tukeyhsd

tukey = pairwise_tukeyhsd(endog=voter_age,      # Data
                        groups=voter_race,   # Groups
                        alpha=0.05)          # Significance Level
```

```
In [7]: from statsmodels.stats.multicomp import pairwise_tukeyhsd

tukey = pairwise_tukeyhsd(endog=voter_age,      # Data
                        groups=voter_race,   # Groups
                        alpha=0.05)          # Significance level

tukey.plot_simultaneous()      # Plot group confidence intervals
plt.vlines(x=49.57,ymin=-0.5,ymax=4.5, color="red")

tukey.summary()               # See test summary
```

[bcak](#)

## 07. Association algorithms for supervised classification on any dataset.

```
In [1]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import scipy.stats as stats

In [2]: np.random.seed(12)
races = ["asian", "black", "hispanic", "other", "white"]

# Generate random data
voter_race = np.random.choice(a=races,
                               p=[0.05, 0.15, 0.25, 0.05, 0.5],
                               size=1000)

voter_age = stats.poisson.rvs(loc=18,
                              mu=30,
                              size=1000)

# Group age data by race
voter_frame = pd.DataFrame({"race": voter_race, "age": voter_age})
groups = voter_frame.groupby("race").groups

# Extract individual groups
asian = voter_age[groups["asian"]]
black = voter_age[groups["black"]]
hispanic = voter_age[groups["hispanic"]]
other = voter_age[groups["other"]]
white = voter_age[groups["white"]]

# Perform the ANOVA
stats.f_oneway(asian, black, hispanic, other, white)
```

```
In [3]: import statsmodels.api as sm
from statsmodels.formula.api import ols

model = ols('age ~ race',           # Model formula
            data=voter_frame).fit()

anova_result = sm.stats.anova_lm(model, typ=2)
print(anova_result)
```

```
In [4]: np.random.seed(12)

# Generate random data
voter_race = np.random.choice(a=races,
                               p=[0.05, 0.15, 0.25, 0.05, 0.5],
                               size=1000)

# Use a different distribution for white ages
white_ages = stats.poisson.rvs(loc=18,
                               mu=32,
                               size=1000)

voter_age = stats.poisson.rvs(loc=18,
                              mu=30,
                              size=1000)

voter_age = np.where(voter_race=="white", white_ages, voter_age)

# Group age data by race
voter_frame = pd.DataFrame({"race": voter_race, "age": voter_age})
groups = voter_frame.groupby("race").groups

# Extract individual groups
asian = voter_age[groups["asian"]]
black = voter_age[groups["black"]]
hispanic = voter_age[groups["hispanic"]]
other = voter_age[groups["other"]]
```

```

# Extract individual groups
asian = voter_age[groups["asian"]]
black = voter_age[groups["black"]]
hispanic = voter_age[groups["hispanic"]]
other = voter_age[groups["other"]]
white = voter_age[groups["white"]]

# Perform the ANOVA
stats.f_oneway(asian, black, hispanic, other, white)

```

```

In [5]: # Alternate method
model = ols('age ~ race',           # Model formula
            data = voter_frame).fit()

anova_result = sm.stats.anova_lm(model, typ=2)
print (anova_result)

```

```

In [6]: # Get all race pairs
race_pairs = []

for race1 in range(4):
    for race2 in range(race1+1,5):
        race_pairs.append((races[race1], races[race2]))

# Conduct t-test on each pair
for race1, race2 in race_pairs:
    print(race1, race2)
    print(stats.ttest_ind(voter_age[groups[race1]],
                          voter_age[groups[race2]])))

```

```

In [7]: from statsmodels.stats.multicomp import pairwise_tukeyhsd

tukey = pairwise_tukeyhsd(endog=voter_age,      # Data
                         groups=voter_race,   # Groups
                         alpha=0.05)          # Significance level

```

```

In [7]: from statsmodels.stats.multicomp import pairwise_tukeyhsd

tukey = pairwise_tukeyhsd(endog=voter_age,      # Data
                         groups=voter_race,   # Groups
                         alpha=0.05)          # Significance level

tukey.plot_simultaneous()    # Plot group confidence intervals
plt.vlines(x=49.57,ymin=-0.5,ymax=4.5, color="red")

tukey.summary()              # See test summary

```

[Back](#)

## 08. Developing and implementing Decision Tree model on the dataset.

### Developing and implementing Decision Tree Model on the dataset

```
In [1]: import numpy as np  
import matplotlib.pyplot as plt  
import pandas as pd
```

```
In [2]: data=pd.read_csv('Salary_Data.csv')
```

```
In [7]: data.head()
```

```
Out[7]:
```

	YearsExperience	Salary
0	1.1	39343.0
1	1.3	46205.0
2	1.5	37731.0
3	2.0	43525.0
4	2.2	39891.0

```
In [9]: X=data[['YearsExperience']]  
y=data['Salary']
```

```
In [10]: from sklearn.tree import DecisionTreeRegressor  
regressor = DecisionTreeRegressor(random_state=0)
```

```
In [11]: regressor.fit(X,y)
```

```
In [11]: regressor.fit(X,y)
```

```
Out[11]: DecisionTreeRegressor(random_state=0)
```

```
In [12]: regressor.predict([[6.5]])
```

```
Out[12]: array([91738.])
```

```
In [ ]:
```

[back](#)

## 09. Bayesian classification on any dataset.

### Bayesian Classification on any dataset

```
In [1]: import numpy as np  
import pandas as pd  
import matplotlib.pyplot as plt  
  
In [2]: df=pd.read_csv('iris.csv')  
  
In [4]: df.columns=['sepal_length','sepal_width','petal_length','petal_width','species']  
  
In [5]: col_names=list(df.columns)  
predictors=col_names[0:4]  
target=col_names[4]  
  
In [7]: from sklearn.model_selection import train_test_split  
train,test=train_test_split(df,test_size=0.3,random_state=0)
```

#### Gaussian Naive Bayes

```
In [8]: from sklearn.naive_bayes import GaussianNB  
Gmodel=GaussianNB()  
Gmodel.fit(train[predictors],train[target])  
train_Gpred=Gmodel.predict(train[predictors])  
test_Gpred=Gmodel.predict(test[predictors])  
  
In [9]: train_acc_gau=np.mean(train_Gpred==train[target])  
test_acc_gau=np.mean(test_Gpred==test[target])
```

```
In [11]: train_acc_gau
```

```
Out[11]: 0.9428571428571428
```

```
In [12]: test_acc_gau
```

```
Out[12]: 1.0
```

#### Multinomial Naive Bayes

```
In [13]: from sklearn.naive_bayes import MultinomialNB  
Mmodel=MultinomialNB()  
Mmodel.fit(train[predictors],train[target])  
train_Mpred=Mmodel.predict(train[predictors])  
test_Mpred=Mmodel.predict(test[predictors])  
  
In [14]: train_acc_multi=np.mean(train_Mpred==train[target])  
test_acc_multi=np.mean(test_Mpred==test[target])  
  
In [15]: train_acc_multi  
  
Out[15]: 0.7047619047619048  
  
In [16]: test_acc_multi  
  
Out[16]: 0.6  
  
In [ ]:
```

[back](#)

## 10. SVM classification on any dataset.

### SVM classification on any dataset

```
In [2]: import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline

In [3]: df=pd.read_csv('Social_Network_Ads.csv')

In [4]: df.head()

Out[4]:   UserID Gender Age EstimatedSalary Purchased
0  15624510    Male  19        19000       0
1  15810944    Male  35        20000       0
2  15668575  Female  26        43000       0
3  15603246  Female  27        57000       0
4  15804002    Male  19        76000       0

In [5]: X=df[['Age','EstimatedSalary']]
y=df['Purchased']

In [6]: from sklearn.model_selection import train_test_split

In [7]: X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.23, random_state=91)

In [8]: from sklearn.preprocessing import MinMaxScaler
scaler=MinMaxScaler()
scaler.fit(X_train)
X_train_scaled=scaler.transform(X_train)
X_test_scaled=scaler.transform(X_test)
```

```
In [9]: from sklearn.svm import SVC

In [10]: model_lin = SVC(kernel='linear')
model_lin.fit(X_train_scaled,y_train)
model_lin.score(X_test_scaled,y_test)

Out[10]: 0.8043478260869565

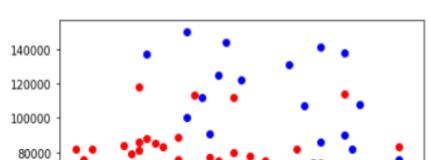
In [11]: model_poly = SVC(kernel='poly')
model_poly.fit(X_train_scaled,y_train)
model_poly.score(X_test_scaled,y_test)

Out[11]: 0.8913043478260869

In [12]: model_rbf = SVC(kernel='rbf')
model_rbf.fit(X_train_scaled,y_train)
model_rbf.score(X_test_scaled,y_test)

Out[12]: 0.8913043478260869

In [13]: #Actual data
class_0_act = X_test[y_test==0]
class_1_act = X_test[y_test==1]
plt.scatter(class_0_act['Age'],class_0_act['EstimatedSalary'],c='red')
plt.scatter(class_1_act['Age'],class_1_act['EstimatedSalary'],c='blue')
```

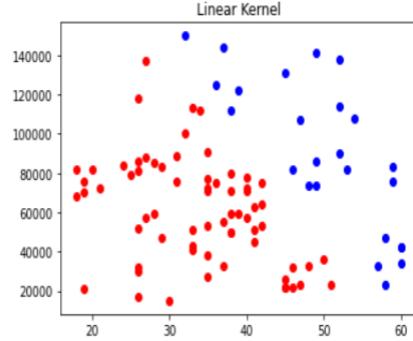


[back](#)

## 11. Text Mining algorithms on unstructured dataset.

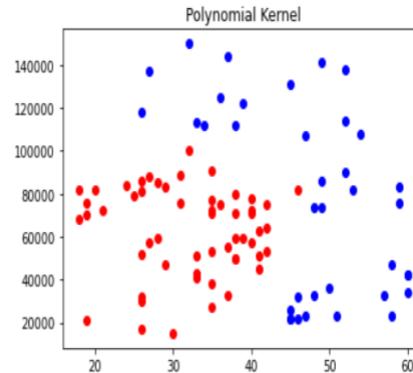
```
In [14]: #Plot points according to predicted values of linear kernel  
y_pre = model_lin.predict(X_test_scaled)  
class_0_pre = X_test[y_pre==0]  
class_1_pre = X_test[y_pre==1]  
plt.scatter(class_0_pre['Age'],class_0_pre['EstimatedSalary'],c='red')  
plt.scatter(class_1_pre['Age'],class_1_pre['EstimatedSalary'],c='blue')  
plt.title('Linear Kernel')
```

Out[14]: Text(0.5, 1.0, 'Linear Kernel')



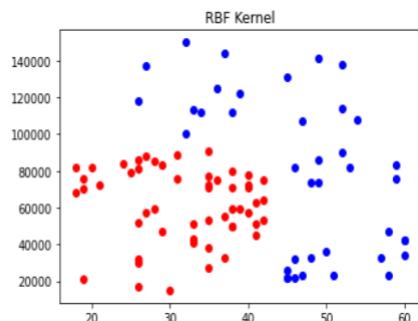
```
In [15]: #Plot points according to predicted values of polynomial kernel  
y_pre = model_poly.predict(X_test_scaled)  
class_0_pre = X_test[y_pre==0]  
class_1_pre = X_test[y_pre==1]  
plt.scatter(class_0_pre['Age'],class_0_pre['EstimatedSalary'],c='red')  
plt.scatter(class_1_pre['Age'],class_1_pre['EstimatedSalary'],c='blue')  
plt.title('Polynomial Kernel')
```

Out[15]: Text(0.5, 1.0, 'Polynomial Kernel')



```
In [16]: #Plot points according to predicted values of rbf kernel
y_pre = model_rbf.predict(X_test_scaled)
class_0_pre = X_test[y_pre==0]
class_1_pre = X_test[y_pre==1]
plt.scatter(class_0_pre['Age'],class_0_pre['EstimatedSalary'],c='red')
plt.scatter(class_1_pre['Age'],class_1_pre['EstimatedSalary'],c='blue')
plt.title('RBF Kernel')
```

Out[16]: Text(0.5, 1.0, 'RBF Kernel')



```
In [17]: import numpy as np
```

```
In [18]: plot_data = []
for x in range(0,100,1):
    for y in range(0,100,1):
        plot_data.append([x,y])
plot_data=np.array(plot_data)/100
```

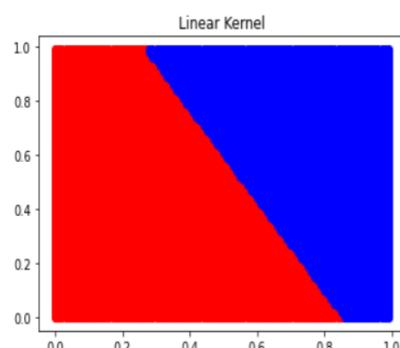
```
In [19]: plot_data
```

```
In [20]: plot_data.shape
```

Out[20]: (10000, 2)

```
In [21]: y_plot = model_lin.predict(plot_data)
class_0 = plot_data[y_plot==0]
class_1 = plot_data[y_plot==1]
plt.scatter(class_0[:,0],class_0[:,1],c='red')
plt.scatter(class_1[:,0],class_1[:,1],c='blue')
plt.title('Linear Kernel')
```

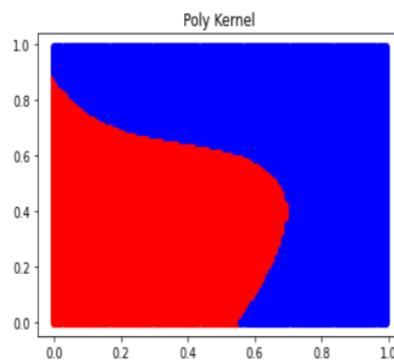
Out[21]: Text(0.5, 1.0, 'Linear Kernel')



```
In [22]: y_plot = model_poly.predict(plot_data)
class_0 = plot_data[y_plot==0]
class_1 = plot_data[y_plot==1]
plt.scatter(class_0[:,0],class_0[:,1],c='red')
plt.scatter(class_1[:,0],class_1[:,1],c='blue')
plt.title('Poly Kernel')
```

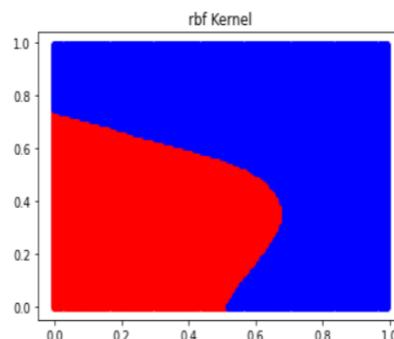
```
In [22]: y_plot = model_poly.predict(plot_data)
class_0 = plot_data[y_plot==0]
class_1 = plot_data[y_plot==1]
plt.scatter(class_0[:,0],class_0[:,1],c='red')
plt.scatter(class_1[:,0],class_1[:,1],c='blue')
plt.title('Poly Kernel')
```

```
Out[22]: Text(0.5, 1.0, 'Poly Kernel')
```



```
In [23]: y_plot = model_rbf.predict(plot_data)
class_0 = plot_data[y_plot==0]
class_1 = plot_data[y_plot==1]
plt.scatter(class_0[:,0],class_0[:,1],c='red')
plt.scatter(class_1[:,0],class_1[:,1],c='blue')
plt.title('rbf Kernel')
```

```
Out[23]: Text(0.5, 1.0, 'rbf Kernel')
```



```
In [24]: pts = np.array([[25,60000],[50,120000]])
pts_scaled = scaler.transform(pts)
```

```
In [25]: pts_scaled
```

```
Out[25]: array([[0.16666667, 0.33333333],
 [0.76190476, 0.77777778]])
```

```
In [26]: y = model_rbf.predict(pts_scaled)
y
```

```
Out[26]: array([0, 1], dtype=int64)
```

```
In [ ]:
```

[back](#)

## 12. Plot the cluster data using python visualizations.

Plot the cluster data using Python visualization

```
In [12]: from sklearn.datasets import load_digits
from sklearn.decomposition import PCA
from sklearn.cluster import KMeans
import numpy as np

In [13]: data = load_digits().data
pca = PCA(2)

In [14]: df = pca.fit_transform(data)

In [15]: df.shape
Out[15]: (1797, 2)

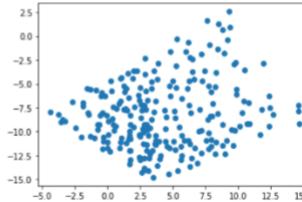
In [16]: from sklearn.cluster import KMeans

In [17]: kmeans = KMeans(n_clusters= 10)

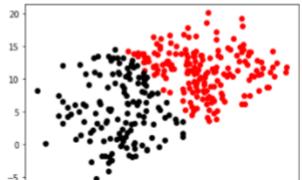
In [18]: label = kmeans.fit_predict(df)
print(label)
[3 5 0 ... 0 2 1]

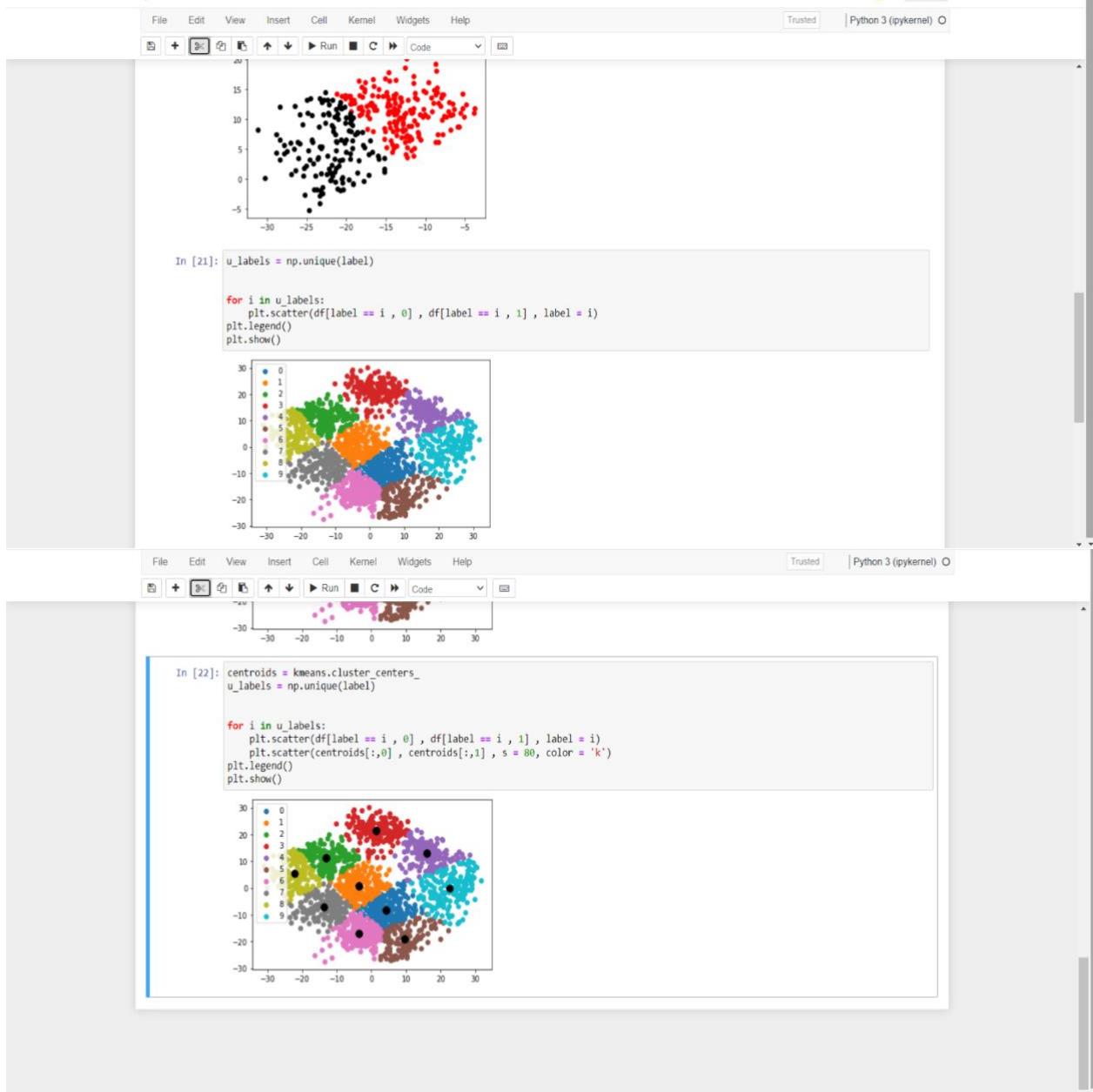
In [19]: import matplotlib.pyplot as plt
filtered_label0 = df[label == 0]
nlt cratton/filterated lshala[:: al filterated lshala[:: 11]

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3 (ipykernel) O
```



```
In [20]: filtered_label2 = df[label == 2]
filtered_label8 = df[label == 8]
plt.scatter(filtered_label2[:,0] , filtered_label2[:,1] , color = 'red')
plt.scatter(filtered_label8[:,0] , filtered_label8[:,1] , color = 'black')
plt.show()
```





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13. Creating & Visualizing Neural Network for the given data. (Use python)

### Creating and Visualizing Neural Network for the given data

```
In [15]: import tensorflow as tf  
  
In [16]: from tensorflow import keras  
  
In [17]: from matplotlib.pyplot import title  
  
In [21]: from tensorflow.keras.models import Sequential,Model  
from tensorflow.keras.layers import Dense, Dropout, Flatten  
from tensorflow.keras.layers import Conv2D, MaxPooling2D  
from tensorflow.keras.layers import LeakyReLU  
  
In [22]: model = Sequential()  
model.add(Conv2D(32, kernel_size=(3, 3),activation='linear',input_shape=(28,28,1),padding='same'))  
model.add(LeakyReLU(alpha=0.1))  
model.add(MaxPooling2D((2, 2),padding='same'))  
model.add(Conv2D(64, (3, 3), activation='linear',padding='same'))  
model.add(LeakyReLU(alpha=0.1))  
model.add(MaxPooling2D(pool_size=(2, 2),padding='same'))  
model.add(Conv2D(128, (3, 3), activation='linear',padding='same'))  
model.add(LeakyReLU(alpha=0.1))  
model.add(MaxPooling2D(pool_size=(2, 2),padding='same'))  
model.add(Flatten())  
model.add(Dense(128, activation='linear'))  
model.add(LeakyReLU(alpha=0.1))  
model.add(Dense(500, activation='softmax'))  
  
In [23]: model.compile(loss=keras.losses.categorical_crossentropy, optimizer=keras.optimizers.Adam(),metrics=['accuracy'])  
  
In [26]: model.summary()
```

```
In [26]: model.summary()  
Model: "sequential_1"  


| Layer (type)                   | Output Shape       | Param # |
|--------------------------------|--------------------|---------|
| conv2d (Conv2D)                | (None, 28, 28, 32) | 320     |
| leaky_re_lu (LeakyReLU)        | (None, 28, 28, 32) | 0       |
| max_pooling2d (MaxPooling2D)   | (None, 14, 14, 32) | 0       |
| conv2d_1 (Conv2D)              | (None, 14, 14, 64) | 18496   |
| leaky_re_lu_1 (LeakyReLU)      | (None, 14, 14, 64) | 0       |
| max_pooling2d_1 (MaxPooling2D) | (None, 7, 7, 64)   | 0       |
| conv2d_2 (Conv2D)              | (None, 7, 7, 128)  | 73856   |
| leaky_re_lu_2 (LeakyReLU)      | (None, 7, 7, 128)  | 0       |
| max_pooling2d_2 (MaxPooling2D) | (None, 4, 4, 128)  | 0       |
| flatten (Flatten)              | (None, 2048)       | 0       |
| dense_2 (Dense)                | (None, 128)        | 262272  |
| leaky_re_lu_3 (LeakyReLU)      | (None, 128)        | 0       |
| dense_3 (Dense)                | (None, 500)        | 64500   |

  
Total params: 419,444  
Trainable params: 419,444  
Non-trainable params: 0
```

[back](#)

## 14. Recognize optical character using ANN.

```
In [ ]: from tensorflow.keras.datasets import mnist
In [ ]: (x_train,y_train),(x_test,y_test)=mnist.load_data()
        Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz
        11493376/11490434 [=====] - 0s 0us/step

In [ ]: x_train.shape
Out[3]: (60000, 28, 28)

In [ ]: X_train=x_train.reshape(60000,784)
X_test=x_test.reshape(10000,784)

In [ ]: from tensorflow.keras.utils import to_categorical

In [ ]: y_train=to_categorical(y_train,num_classes=10)
y_test=to_categorical(y_test,num_classes=10)

In [ ]: X_train=X_train/255
X_test=X_test/255

In [ ]: from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense

In [ ]: model=Sequential()
model.add(Dense(50,activation='relu',input_shape=(784,)))
model.add(Dense(50,activation='relu'))
model.add(Dense(10,activation='softmax'))
```

```
In [ ]: model.summary()
```

Model: "sequential"

Layer (type)	Output Shape	Param #
<hr/>		
dense (Dense)	(None, 50)	39250
dense_1 (Dense)	(None, 50)	2550
dense_2 (Dense)	(None, 10)	510
<hr/>		
Total params: 42,310		
Trainable params: 42,310		
Non-trainable params: 0		

```
In [ ]: model.compile(loss='categorical_crossentropy',metrics=['accuracy'])
```

```
In [ ]: model.fit(x_train,y_train,batch_size=64,epochs=10,validation_data=(x_test,y_test))
```

```
Epoch 1/10
938/938 [=====] - 2s 2ms/step - loss: 0.3367 - accuracy: 0.9059 - val_loss: 0.1963 - val_accuracy: 0.9417
Epoch 2/10
938/938 [=====] - 1s 2ms/step - loss: 0.1610 - accuracy: 0.9531 - val_loss: 0.1341 - val_accuracy: 0.9581
Epoch 3/10
938/938 [=====] - 1s 2ms/step - loss: 0.1209 - accuracy: 0.9644 - val_loss: 0.1096 - val_accuracy: 0.9665
Epoch 4/10
938/938 [=====] - 1s 2ms/step - loss: 0.0976 - accuracy: 0.9708 - val_loss: 0.1101 - val_accuracy: 0.9673
Epoch 5/10
938/938 [=====] - 1s 2ms/step - loss: 0.0830 - accuracy: 0.9745 - val_loss: 0.1051 - val_accuracy: 0.9699
```

```
Epoch 4/10
938/938 [=====] - 1s 2ms/step - loss: 0.0976 - accuracy: 0.9708 - val_loss: 0.1101 - val_accuracy: 0.9673
Epoch 5/10
938/938 [=====] - 1s 2ms/step - loss: 0.0830 - accuracy: 0.9745 - val_loss: 0.1051 - val_accuracy: 0.9699
Epoch 6/10
938/938 [=====] - 1s 2ms/step - loss: 0.0717 - accuracy: 0.9784 - val_loss: 0.0968 - val_accuracy: 0.9720
Epoch 7/10
938/938 [=====] - 2s 2ms/step - loss: 0.0637 - accuracy: 0.9806 - val_loss: 0.0955 - val_accuracy: 0.9739
Epoch 8/10
938/938 [=====] - 1s 2ms/step - loss: 0.0574 - accuracy: 0.9831 - val_loss: 0.0920 - val_accuracy: 0.9740
Epoch 9/10
938/938 [=====] - 1s 2ms/step - loss: 0.0508 - accuracy: 0.9846 - val_loss: 0.1030 - val_accuracy: 0.9723
Epoch 10/10
938/938 [=====] - 1s 2ms/step - loss: 0.0469 - accuracy: 0.9858 - val_loss: 0.0976 - val_accuracy: 0.9737
```

```
Out[13]: <tensorflow.python.keras.callbacks.History at 0x7f9074869a10>
```

```
In [ ]: import numpy as np
```

```
In [ ]: X_train
```

```
Out[20]: array([[0., 0., 0., ..., 0., 0., 0.],
 [0., 0., 0., ..., 0., 0., 0.],
 [0., 0., 0., ..., 0., 0., 0.],
 ...,
 [0., 0., 0., ..., 0., 0., 0.],
 [0., 0., 0., ..., 0., 0., 0.],
 [0., 0., 0., ..., 0., 0., 0.]])
```

```
In [ ]: y_train[:5,:]
```

```
Out[22]: array([[0., 0., 0., 0., 0., 1., 0., 0., 0., 0.],
 [1., 0., 0., 0., 0., 0., 0., 0., 0., 0.],
 [0., 0., 0., 0., 1., 0., 0., 0., 0., 0.],
 [0., 1., 0., 0., 0., 0., 0., 0., 0., 0.],
 [0., 0., 0., 0., 0., 0., 0., 0., 0., 1.]], dtype=float32)
```

```
In [ ]: img0 = np.array(X_train[0]).reshape(1,784)
```

```
In [ ]: model.predict(img0).argmax()
```

```
Out[25]: 5
```

```
In [ ]: y_train[0].argmax()
```

```
Out[26]: 5
```

```
In [ ]: def recognise(img):
    img=np.array(img).reshape(1,784)
    return model.predict(img).argmax()
```

```
In [ ]: y_pre=model.predict(X_test).argmax(axis=1)
```

```
In [ ]: y_pre
```

```
Out[29]: array([7, 2, 1, ..., 4, 5, 6])
```

```
In [ ]: len(y_pre)
```

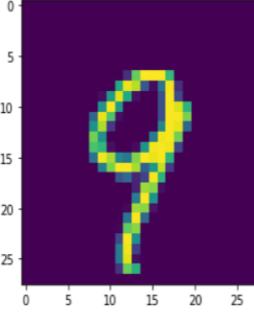
```
Out[31]: 10000
```

```
In [ ]: y_test.argmax(axis=1)
Out[32]: array([7, 2, 1, ..., 4, 5, 6])

In [ ]: sum(y_pre==y_test.argmax(axis=1))
Out[33]: 9737

In [ ]: 9737/10000
Out[34]: 0.9737

In [ ]: import matplotlib.pyplot as plt
In [ ]: plt.imshow(np.array(X_test[560]).reshape(28,28))
Out[40]: <matplotlib.image.AxesImage at 0x7f90708246d0>

A 28x28 pixel grayscale image of a handwritten digit '9' on a black background. The digit is drawn in yellow and green pixels. The plot has x and y axes ranging from 0 to 25.
```

```
In [ ]: recognise(X_test[560])
Out[41]: 9
```

[back](#)

## 15. Write a program to implement CNN.

```
In [25]: # This Python 3 environment comes with many helpful analytics libraries installed
# It is defined by the kaggle/python Docker image: https://github.com/kaggle/docker-python
# For example, here's several helpful packages to load

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

# Input data files are available in the read-only "../input/" directory
# For example, running this (by clicking "Run" or pressing Shift+Enter) will list all files under the input directory

import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

# You can write up to 20GB to the current directory (/kaggle/working/) that gets preserved as output when you create a version of your notebook.
# You can also write temporary files to /kaggle/temp/, but they won't be saved outside of the current session
```

```
In [26]: ##Link for dataset: https://www.kaggle.com/biiascience/dogs-vs-cats
```

```
In [27]: os.listdir('/kaggle/input/dogs-vs-cats/')
```

```
In [28]: filenames=os.listdir('../input/dogs-vs-cats/train/train')
```

```
In [29]: len(filenames)
```

```
In [30]: filenames[:5]
```

```
In [31]: df=pd.DataFrame({'filename':filenames})
df.head()
```

```
In [32]: df['class']=df['filename'].apply(lambda x:x[:3])

In [33]: df.head()

In [34]: from tensorflow.keras.preprocessing.image import ImageDataGenerator

In [35]: data_gen=ImageDataGenerator(zoom_range=0.2,shear_range=0.2,horizontal_flip=True,rescale=1/255)

In [36]: train_data=data_gen.flow_from_dataframe(df,'../input/dogs-vs-cats/train/train',x='filename',y='class',target_size=(224,224))

In [37]: from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D,MaxPool2D,Flatten,Dense

In [38]: model=Sequential()
model.add(Conv2D(16,(3,3),activation='relu',input_shape=(224,224,3)))
model.add(MaxPool2D())
model.add(Conv2D(32,(3,3),activation='relu'))
model.add(MaxPool2D())
model.add(Conv2D(64,(3,3),activation='relu'))
model.add(MaxPool2D())
model.add(Conv2D(64,(5,5),activation='relu'))
model.add(MaxPool2D())
model.add(Conv2D(128,(3,3),activation='relu'))
model.add(MaxPool2D())
model.add(Flatten())
model.add(Dense(2,activation='softmax'))

In [39]: model.summary()

In [40]: model.compile(optimizer='adam',loss='categorical_crossentropy',metrics=['accuracy'])

In [41]: model.fit_generator(train_data,epochs=5)
```

```
In [39]: model.summary()
In [40]: model.compile(optimizer='adam',loss='categorical_crossentropy',metrics=['accuracy'])
In [41]: model.fit_generator(train_data,epochs=5)
In [42]: import cv2
def get_class(img_path):
    img=cv2.imread(img_path)
    img=cv2.resize(img,(224,224))
    img=img/255
    op=model.predict(img.reshape(1,224,224,3)).argmax()
    return 'cat' if op==0 else 'dog'
In [43]: train_data.class_mode
In [44]: get_class('../input/dogs-vs-cats/train/train/cat.10002.jpg')
In [ ]:
In [ ]:
In [ ]:
```

[back](#)

## 16. Write a program to implement RNN.

```
In [ ]: from tensorflow.keras.datasets import imdb
```

```
In [ ]: (X_train,y_train),(X_test,y_test)=imdb.load_data(num_words=20000)
```

```
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/imdb.npz  
17465344/17464789 [=====] - 0s 0us/step
```

```
<string>:6: VisibleDeprecationWarning: Creating an ndarray from ragged nested sequences (which is a list-or-tuple of lists-or-tuples-or ndarrays with different lengths or shapes) is deprecated. If you meant to do this, you must specify 'dtype=object' when creating the ndarray  
/usr/local/lib/python3.7/dist-packages/tensorflow/python/keras/datasets/imdb.py:155: VisibleDeprecationWarning: Creating an ndarray from ragged nested sequences (which is a list-or-tuple of lists-or-tuples-or ndarrays with different lengths or shapes) is deprecated. If you meant to do this, you must specify 'dtype=object' when creating the ndarray  
    x_train, y_train = np.array(xs[:idx]), np.array(labels[:idx])  
/usr/local/lib/python3.7/dist-packages/tensorflow/python/keras/datasets/imdb.py:156: VisibleDeprecationWarning: Creating an ndarray from ragged nested sequences (which is a list-or-tuple of lists-or-tuples-or ndarrays with different lengths or shapes) is deprecated. If you meant to do this, you must specify 'dtype=object' when creating the ndarray  
    x_test, y_test = np.array(xs[idx:]), np.array(labels[idx:])
```

```
In [ ]: X_train.shape,X_test.shape
```

```
Out[3]: ((25000,), (25000,))
```

```
In [ ]: len(X_train[0]),len(X_train[1]),len(X_train[2]),len(X_train[3]),len(X_train[4])
```

```
Out[4]: (218, 189, 141, 550, 147)
```

```
In [ ]: y_train[:5]
```

```
Out[5]: array([1, 0, 0, 1, 0])
```

```
In [ ]: X_train[0]
```

```
In [ ]: X_train[0]
```

```
Out[6]: [1,  
        14,  
        22,  
        16,  
        43,  
        530,  
        973,  
        1622,  
        1385,  
        65,  
        458,  
        4468,  
        66,  
        3941,  
        4,  
        173,  
        36,  
        256,  
        5,  
        ...]
```

```
In [ ]: import numpy as np
```

```
In [ ]: np.array(X_train[0])
```

```
Out[8]: array([ 1,  14,   22,   16,   43,   530,   973,  1622,  1385,  
      65,  458,  4468,   66,  3941,     4,  173,    36,   256,  
      5,   25,   100,   43,   838,   112,    50,   670,     2,  
      9,   35,   480,   284,     5,   150,     4,   172,   112,  
     167,    2,   336,   385,    39,     4,   172,   4536,  1111,  
     17,   546,    38,    13,   447,     4,   192,    50,    16,  
      6,   147,  2025,    19,    14,    22,     4,   1920,  4613,  
     469,    4,   22,    71,    87,    12,    16,    43,   530,  
     38,   76,   15,    13,   1247,     4,    22,    17,   515,  
     17,   12,   16,   626,    18,  19193,     5,    62,   386,  
     12,     8,   216,     8,   106,     5,     4,   2222,  5211])
```

```
Out[8]: array([[ 1, 14, 22, 16, 43, 530, 973, 1622, 1385,
   65, 458, 4468, 66, 3941, 4, 173, 36, 256,
   5, 25, 100, 43, 838, 112, 50, 670, 2,
   9, 35, 480, 284, 5, 150, 4, 172, 112,
  167, 2, 336, 385, 39, 4, 172, 4536, 1111,
  17, 546, 38, 13, 447, 4, 192, 50, 16,
   6, 147, 2025, 19, 14, 22, 4, 1920, 4613,
  469, 4, 22, 71, 87, 12, 16, 43, 530,
  38, 76, 15, 13, 1247, 4, 22, 17, 515,
  17, 12, 16, 626, 18, 19193, 5, 62, 386,
  12, 8, 316, 8, 106, 5, 4, 2223, 5244,
  16, 488, 66, 3785, 33, 4, 130, 12, 16,
  38, 619, 5, 25, 124, 51, 36, 135, 48,
  25, 1415, 33, 6, 22, 12, 215, 28, 77,
  52, 5, 14, 407, 16, 82, 10311, 8, 4,
  107, 117, 5952, 15, 256, 4, 2, 7, 3766,
   5, 723, 36, 71, 43, 530, 476, 26, 400,
  317, 46, 7, 4, 12118, 1029, 13, 104, 88,
   4, 381, 15, 297, 98, 32, 2071, 56, 26,
  141, 6, 194, 7486, 18, 4, 226, 22, 21,
  134, 476, 26, 480, 5, 144, 30, 5535, 18,
  51, 36, 28, 224, 92, 25, 104, 4, 226,
  65, 16, 38, 1334, 88, 12, 16, 283, 5,
  16, 4472, 113, 103, 32, 15, 16, 5345, 19,
  178, 32]])
```

```
In [ ]: from tensorflow.keras.preprocessing.sequence import pad_sequences
```

```
In [ ]: X=pad_sequences(X_train,maxlen=200)
X_val=pad_sequences(X_test,maxlen=200)
```

```
In [ ]: len(X[0])
```

```
Out[11]: 200
```

```
out[11]: 200
```

```
In [ ]: from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import LSTM,Dense,Embedding
```

```
In [ ]: model=Sequential()
model.add(Embedding(2000,128,input_shape=(200,)))
model.add(LSTM(100,return_sequences=True))
model.add(LSTM(100))
model.add(Dense(1,activation='sigmoid'))
```

```
In [ ]: model.compile(loss='binary_crossentropy',optimizer='adam',metrics=['accuracy'])
```

```
In [ ]: model.fit(X,y_train,validation_data=(X_val,y_test),epochs=5,batch_size=64)
```

```
Epoch 1/5
391/391 [=====] - 284s 719ms/step - loss: 0.3937 - accuracy: 0.8202 - val_loss: 0.3396 - val_accuracy: 0.8546
Epoch 2/5
391/391 [=====] - 291s 744ms/step - loss: 0.2017 - accuracy: 0.9252 - val_loss: 0.3343 - val_accuracy: 0.8648
Epoch 3/5
391/391 [=====] - 285s 730ms/step - loss: 0.1272 - accuracy: 0.9552 - val_loss: 0.3831 - val_accuracy: 0.8570
Epoch 4/5
391/391 [=====] - 284s 726ms/step - loss: 0.1051 - accuracy: 0.9620 - val_loss: 0.4718 - val_accuracy: 0.8502
Epoch 5/5
391/391 [=====] - 286s 732ms/step - loss: 0.0872 - accuracy: 0.9707 - val_loss: 0.4961 - val_accuracy: 0.8302
```

```
Out[ ]: <tensorflow.python.keras.callbacks.History at 0x7fea6b32d790>
```

```
In [ ]:
```

[back](#)

## 17. Write a program to implement GAN.

```
In [ ]: import os  
print(os.listdir("../input"))
```

Importing the libraries

```
In [ ]: from __future__ import print_function  
import time  
import torch  
import torch.nn as nn  
import torch.nn.parallel  
import torch.optim as optim  
import torch.utils.data  
import torchvision.datasets as dset  
import torchvision.transforms as transforms  
import torchvision.utils as vutils  
from torch.autograd import Variable  
import matplotlib.pyplot as plt  
import numpy as np  
from torch import nn, optim  
import torch.nn.functional as F  
from torchvision import datasets, transforms  
from torchvision.utils import save_image  
import matplotlib.pyplot as plt  
import matplotlib.image as mpimg  
from tqdm import tqdm_notebook as tqdm
```

### Some dogs

The Stanford Dogs dataset contains images of 120 breeds of dogs from around the world.

### Some dogs

The Stanford Dogs dataset contains images of 120 breeds of dogs from around the world.

```
In [ ]: PATH = '../input/all-dogs/all-dogs/'  
images = os.listdir(PATH)  
print(f'There are {len(os.listdir(PATH))} pictures of dogs.')  
  
fig, axes = plt.subplots(nrows=3, ncols=3, figsize=(12,10))  
  
for idx, axis in enumerate(axes.flatten()):  
    rnd_idx = np.random.randint(0, len(os.listdir(PATH)))  
    # https://matplotlib.org/users/image\_tutorial.html  
    img = plt.imread(PATH + images[rnd_idx])  
    imgplot = axis.imshow(img)  
    axis.set_title(images[rnd_idx])  
    axis.set_axis_off()  
plt.tight_layout(rect=[0, 0.03, 1, 0.95])
```

```
In [ ]: batch_size = 32  
image_size = 64  
  
random_transforms = [transforms.ColorJitter(), transforms.RandomRotation(degrees=20)]  
transform = transforms.Compose([transforms.Resize(64),  
                             transforms.CenterCrop(64),  
                             transforms.RandomHorizontalFlip(p=0.5),  
                             transforms.RandomApply(random_transforms, p=0.2),  
                             transforms.ToTensor(),  
                             transforms.Normalize((0.5, 0.5, 0.5), (0.5, 0.5, 0.5))])  
  
train_data = datasets.ImageFolder('../input/all-dogs/', transform=transform)  
train_loader = torch.utils.data.DataLoader(train_data, shuffle=True,  
                                         batch_size=batch_size)
```

```

        transforms.Normalize((0.5, 0.5, 0.5), (0.5, 0.5, 0.5)))

train_data = datasets.ImageFolder('../input/all-dogs/', transform=transform)
train_loader = torch.utils.data.DataLoader(train_data, shuffle=True,
                                           batch_size=batch_size)

imgs, label = next(iter(train_loader))
imgs = imgs.numpy().transpose(0, 2, 3, 1)

In [ ]: for i in range(5):
    plt.imshow(imgs[i])
    plt.show()

In [ ]: def weights_init(m):
    """
    Takes as input a neural network m that will initialize all its weights.
    """
    classname = m.__class__.__name__
    if classname.find('Conv') != -1:
        m.weight.data.normal_(0.0, 0.02)
    elif classname.find('BatchNorm') != -1:
        m.weight.data.normal_(1.0, 0.02)
        m.bias.data.fill_(0)

In [ ]: class G(nn.Module):
    def __init__(self):
        # Used to inherit the torch.nn Module
        super(G, self).__init__()
        # Meta Module consists of different layers of Modules
        self.main = nn.Sequential(
            nn.ConvTranspose2d(100, 512, 4, stride=1, padding=0, bias=False),
            nn.BatchNorm2d(512),
            nn.ReLU(True),
            nn.ConvTranspose2d(512, 256, 4, stride=2, padding=1, bias=False),
            nn.BatchNorm2d(256),
            nn.ReLU(True),
            nn.ConvTranspose2d(256, 128, 4, stride=2, padding=1, bias=False),
            nn.BatchNorm2d(128),
            nn.ReLU(True),
            nn.ConvTranspose2d(128, 64, 4, stride=2, padding=1, bias=False),
            nn.BatchNorm2d(64),
            nn.ReLU(True),
            nn.ConvTranspose2d(64, 3, 4, stride=2, padding=1, bias=False),
            nn.Tanh()
        )

        def forward(self, input):
            output = self.main(input)
            return output

    # Creating the generator
    netG = G()
    netG.apply(weights_init)

In [ ]: # Defining the discriminator
class D(nn.Module):
    def __init__(self):
        super(D, self).__init__()
        self.main = nn.Sequential(
            nn.Conv2d(3, 64, 4, stride=2, padding=1, bias=False),
            nn.LeakyReLU(negative_slope=0.2, inplace=True),
            nn.Conv2d(64, 128, 4, stride=2, padding=1, bias=False),
            nn.BatchNorm2d(128),
            nn.LeakyReLU(negative_slope=0.2, inplace=True),
            nn.Conv2d(128, 256, 4, stride=2, padding=1, bias=False),

```

```

super(D, self).__init__()
self.main = nn.Sequential(
    nn.Conv2d(3, 64, 4, stride=2, padding=1, bias=False),
    nn.LeakyReLU(negative_slope=0.2, inplace=True),
    nn.Conv2d(64, 128, 4, stride=2, padding=1, bias=False),
    nn.BatchNorm2d(128),
    nn.LeakyReLU(negative_slope=0.2, inplace=True),
    nn.Conv2d(128, 256, 4, stride=2, padding=1, bias=False),
    nn.BatchNorm2d(256),
    nn.LeakyReLU(negative_slope=0.2, inplace=True),
    nn.Conv2d(256, 512, 4, stride=2, padding=1, bias=False),
    nn.BatchNorm2d(512),
    nn.LeakyReLU(negative_slope=0.2, inplace=True),
    nn.Conv2d(512, 1, 4, stride=1, padding=0, bias=False),
    nn.Sigmoid()
)

def forward(self, input):
    output = self.main(input)
    # .view(-1) = Flattens the output into 1D instead of 2D
    return output.view(-1)

# Creating the discriminator
netD = D()
netD.apply(weights_init)

```

```

In [ ]: class Generator(nn.Module):
    def __init__(self, nz=128, channels=3):
        super(Generator, self).__init__()

        self.nz = nz
        self.channels = channels

        def convlayer(n_input, n_output, k_size=4, stride=2, padding=0):
            block = [

```

```

                self.nz = nz
                self.channels = channels

                def convlayer(n_input, n_output, k_size=4, stride=2, padding=0):
                    block = [
                        nn.ConvTranspose2d(n_input, n_output, kernel_size=k_size, stride=stride, padding=padding, bias=False),
                        nn.BatchNorm2d(n_output),
                        nn.ReLU(inplace=True),
                    ]
                    return block

                self.model = nn.Sequential(
                    *convlayer(self.nz, 1024, 4, 1, 0), # Fully connected layer via convolution.
                    *convlayer(1024, 512, 4, 2, 1),
                    *convlayer(512, 256, 4, 2, 1),
                    *convlayer(256, 128, 4, 2, 1),
                    *convlayer(128, 64, 4, 2, 1),
                    nn.ConvTranspose2d(64, self.channels, 3, 1, 1),
                    nn.Tanh()
                )

                def forward(self, z):
                    z = z.view(-1, self.nz, 1, 1)
                    img = self.model(z)
                    return img

            class Discriminator(nn.Module):
                def __init__(self, channels=3):
                    super(Discriminator, self).__init__()

                    self.channels = channels

                    def convlayer(n_input, n_output, k_size=4, stride=2, padding=0, bn=False):
                        block = [nn.Conv2d(n_input, n_output, kernel_size=k_size, stride=stride, padding=padding, bias=False)]
                        if bn:
                            block.append(nn.BatchNorm2d(n_output))

```

```

    self.channels = channels

    def convlayer(n_input, n_output, k_size=4, stride=2, padding=0, bn=False):
        block = [nn.Conv2d(n_input, n_output, kernel_size=k_size, stride=stride, padding=padding, bias=False)]
        if bn:
            block.append(nn.BatchNorm2d(n_output))
        block.append(nn.LeakyReLU(0.2, inplace=True))
        return block

    self.model = nn.Sequential(
        *convlayer(self.channels, 32, 4, 2, 1),
        *convlayer(32, 64, 4, 2, 1),
        *convlayer(64, 128, 4, 2, 1, bn=True),
        *convlayer(128, 256, 4, 2, 1, bn=True),
        nn.Conv2d(256, 1, 4, 1, 0, bias=False), # FC with Conv.
    )

    def forward(self, imgs):
        logits = self.model(imgs)
        out = torch.sigmoid(logits)

        return out.view(-1, 1)

In [ ]: !mkdir results
!ls

In [ ]: EPOCH = 0 # play with me
LR = 0.001
criterion = nn.BCELoss()
optimizerD = optim.Adam(netD.parameters(), lr=LR, betas=(0.5, 0.999))
optimizerG = optim.Adam(netG.parameters(), lr=LR, betas=(0.5, 0.999))

```

```

In [ ]: for epoch in range(EPOCH):
    for i, data in enumerate(dataloader, 0):
        # 1st Step: Updating the weights of the neural network of the discriminator
        netD.zero_grad()

        # Training the discriminator with a real image of the dataset
        real, _ = data
        input = Variable(real)
        target = Variable(torch.ones(input.size()[0]))
        output = netD(input)
        errD_real = criterion(output, target)

        # Training the discriminator with a fake image generated by the generator
        noise = Variable(torch.randn(input.size()[0], 100, 1, 1))
        fake = netG(noise)
        target = Variable(torch.zeros(input.size()[0]))
        output = netD(fake.detach())
        errD_fake = criterion(output, target)

        # Backpropagating the total error
        errD = errD_real + errD_fake
        errD.backward()
        optimizerD.step()

        # 2nd Step: Updating the weights of the neural network of the generator
        netG.zero_grad()
        target = Variable(torch.ones(input.size()[0]))
        output = netD(fake)
        errG = criterion(output, target)
        errG.backward()
        optimizerG.step()

        # 3rd Step: Printing the losses and saving the real images and the generated images of the minibatch every 100 steps
        print('[%d/%d][%d/%d] Loss_D: %.4f; Loss_G: %.4f' % (epoch, EPOCH, i, len(dataloader), errD.item(), errG.item()))
        if i % 100 == 0:
            vutils.save_image(real, '%s/real_samples.png' % './results', normalize=True)
            fake = netG(noise)

```

```

# 3rd Step: Printing the losses and saving the real images and the generated images of the minibatch every 100 steps
print('[%d/%d][%d/%d] Loss_D: %.4f; Loss_G: %.4f' % (epoch, EPOCH, i, len(dataloader), errD.item(), errG.item()))
if i % 100 == 0:
    vutils.save_image(real, '%s/real_samples.png' % "./results", normalize=True)
    fake = netG(noise)
    vutils.save_image(fake.data, '%s/fake_samples_epoch_%03d.png' % ("./results", epoch), normalize=True)

In [ ]: batch_size = 32
LR_G = 0.001
LR_D = 0.0005

beta1 = 0.5
epochs = 100

real_label = 0.9
fake_label = 0
nz = 128

device = torch.device("cuda" if torch.cuda.is_available() else "cpu")

In [ ]: netG = Generator(nz).to(device)
netD = Discriminator().to(device)

criterion = nn.BCELoss()

optimizerD = optim.Adam(netD.parameters(), lr=LR_D, betas=(beta1, 0.999))
optimizerG = optim.Adam(netG.parameters(), lr=LR_G, betas=(beta1, 0.999))

fixed_noise = torch.randn(25, nz, 1, 1, device=device)

G_losses = []
D_losses = []
epoch_time = []

In [ ]: def plot_loss (G_losses, D_losses, epoch):
    plt.figure(figsize=(10,5))
    plt.title("Generator and Discriminator Loss - EPOCH "+ str(epoch))
    plt.plot(G_losses,label="G")
    plt.plot(D_losses,label="D")
    plt.xlabel("iterations")
    plt.ylabel("Loss")
    plt.legend()
    plt.show()

In [ ]: def show_generated_img(n_images=5):
    sample = []
    for _ in range(n_images):
        noise = torch.randn(1, nz, 1, 1, device=device)
        gen_image = netG(noise).to("cpu").clone().detach().squeeze(0)
        gen_image = gen_image.numpy().transpose(1, 2, 0)
        sample.append(gen_image)

    figure, axes = plt.subplots(1, len(sample), figsize = (64,64))
    for index, axis in enumerate(axes):
        axis.axis('off')
        image_array = sample[index]
        axis.imshow(image_array)

    plt.show()
    plt.close()

In [ ]: for epoch in range(epochs):

    start = time.time()
    for ii, (real_images, train_labels) in tqdm(enumerate(train_loader), total=len(train_loader)):
        netD.zero_grad()
        real_images = real_images.to(device)
        batch_size = real_images.size(0)
        labels = torch.full((batch_size, 1), real_label, device=device)

```

```

netD.zero_grad()
real_images = real_images.to(device)
batch_size = real_images.size(0)
labels = torch.full((batch_size, 1), real_label, device=device)

output = netD(real_images)
errD_real = criterion(output, labels)
errD_real.backward()
D_x = output.mean().item()

# train with fake
noise = torch.randn(batch_size, nz, 1, 1, device=device)
fake = netG(noise)
labels.fill_(fake_label)
output = netD(fake.detach())
errD_fake = criterion(output, labels)
errD_fake.backward()
D_G_z1 = output.mean().item()
errD = errD_real + errD_fake
optimizerD.step()

netG.zero_grad()
labels.fill_(real_label) # fake labels are real for generator cost
output = netD(fake)
errG = criterion(output, labels)
errG.backward()
D_G_z2 = output.mean().item()
optimizerG.step()

# Save Losses for plotting later
G_losses.append(errG.item())
D_losses.append(errD.item())

if (ii+1) % (len(train_loader)//2) == 0:
    print(['%d/%d'][%d/%d] Loss_D: %.4f Loss_G: %.4f D(x): %.4f D(G(z)): %.4f / %.4f'
          % (epoch + 1, epochs, ii+1, len(train_loader),
             errD.item(), errG.item(), D_x, D_G_z1, D_G_z2))

```

```

        errD.item(), errG.item(), D_x, D_G_z1, D_G_z2))

plot_loss(G_losses, D_losses, epoch)
G_losses = []
D_losses = []
if epoch % 10 == 0:
    show_generated_img()
epoch_time.append(time.time() - start)

#         valid_image = netG(fixed_noise)

In [ ]: print (">> average EPOCH duration = ", np.mean(epoch_time))

In [ ]: show_generated_img(7)

In [ ]: if not os.path.exists('../output_images'):
    os.mkdir('../output_images')

im_batch_size = 50
n_images=10000

for i_batch in tqdm(range(0, n_images, im_batch_size)):
    gen_z = torch.randn(im_batch_size, nz, 1, 1, device=device)
    gen_images = netG(gen_z)
    images = gen_images.to("cpu").clone().detach()
    images = images.numpy().transpose(0, 2, 3, 1)
    for i_image in range(gen_images.size(0)):
        save_image(gen_images[i_image], :, :, :], os.path.join('../output_images', f'image_{i_batch+i_image:05d}.png'))

In [ ]: fig = plt.figure(figsize=(25, 16))
# display 10 images from each class
for i, j in enumerate(images[:32]):
    ax = fig.add_subplot(4, 8, i + 1, xticks=[], yticks[])
    plt.imshow(j)

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In [ ]: import shutil
shutil.make_archive('images', 'zip', '../output_images')

In [ ]: torch.save(netG.state_dict(), 'generator.pth')
torch.save(netD.state_dict(), 'discriminator.pth')

```

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## 18. Web scraping experiments. (by using tools)

```
In [1]: import requests
from bs4 import BeautifulSoup
import csv

URL = "http://www.values.com/inspirational-quotes"
r = requests.get(URL)

soup = BeautifulSoup(r.content, 'html5lib')

quotes=[]

In [2]: soup.find('div', attrs = {'id':'all_quotes'})

Out[2]: <div class="row" id="all_quotes">
    <div class="col-6 col-lg-3 text-center margin-30px-bottom sm-margin-30px-top">
        <a href="/inspirational-quotes/7919-to-persist-with-a-goal-you-must-treasure-the"></a>
        <h5 class="value_on_red"><a href="/inspirational-quotes/7919-to-persist-with-a-goal-you-must-treasure-the">PERSISTENCE</a></h5>
    </div><div class="col-6 col-lg-3 text-center margin-30px-bottom sm-margin-30px-top">
        <a href="/inspirational-quotes/8300-failure-cannot-cope-with-persistence"></a>
        <h5 class="value_on_red"><a href="/inspirational-quotes/8300-failure-cannot-cope-with-persistence">PERSISTENCE</a></h5>
    </div><div class="col-6 col-lg-3 text-center margin-30px-bottom sm-margin-30px-top">
```

```
In [3]: for row in table.find_all_next('div', attrs = {'class': 'col-6 col-lg-3 text-center margin-30px-bottom sm-margin-30px-top'}):
    quote = {}
    quote['theme'] = row.h5.text
    quote['url'] = row.a['href']
    quote['img'] = row.img['src']
    quote['lines'] = row.img['alt'].split(" #")[0]
    quote['author'] = row.img['alt'].split(" #")[1]
    quotes.append(quote)

In [4]: quote['theme'] = row.h5.text

In [5]: quote['url'] = row.a['href']

In [6]: filename = 'inspirational_quotes.csv'
with open(filename, 'w', newline='') as f:
    w = csv.DictWriter(f,['theme','url','img','lines','author'])
    w.writeheader()
    for quote in quotes:
        w.writerow(quote)

In [ ]:
```

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