1. **Develop an application that uses GUI components, Font and Colours**

Objective: To develop a simple and interactive Android text editor application that allows users to dynamically change the text's font size, style, and color.

XML Code

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

xmlns:android="http://schemas.android.com/apk/res/and
roid"
    android:id="@+id/main"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp"
    tools:context=".MainActivity"
    xmlns:tools="http://schemas.android.com/tools">

    <TextView
        android:id="@+id/textView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Welcome to android class"
        android:textSize="25sp"
        android:textStyle="bold"
        android:gravity="center"
        android:layout_marginBottom="20dp"/>

    <Button
        android:id="@+id/button1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Change Font Size"
        android:textSize="20sp"
        android:layout_marginBottom="10dp"/>

    <Button
        android:id="@+id/button2"
        android:layout_width="match_parent"
```

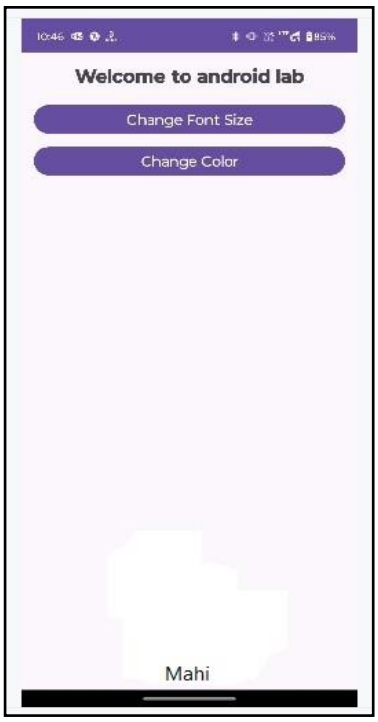
```
        android:layout_height="wrap_content"
        android:text="Change Color"
        android:textSize="20sp"/>
    <TextView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:textSize="24sp"
        android:textStyle="bold"
        android:gravity="bottom|center"
        android:text="Mahi" />

</LinearLayout>
```

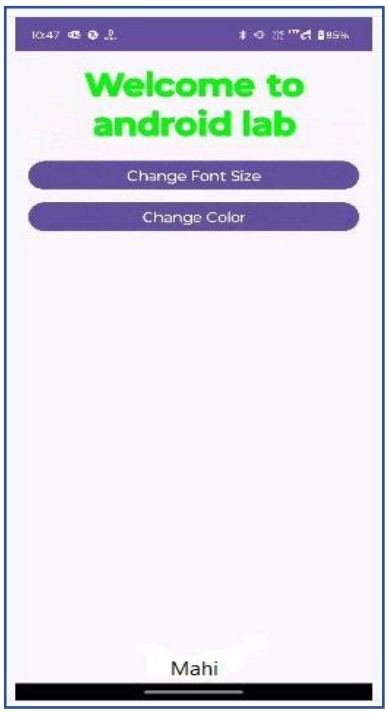
Java Code:

```
import android.graphics.Color;
import android.graphics.Typeface;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;

import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.graphics.Insets;
import androidx.core.view.ViewCompat;
import androidx.core.view.WindowInsetsCompat;

public class MainActivity extends AppCompatActivity {

    private int fontSize = 25;
    private boolean isColorChanged = false;

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

        TextView textView =
findViewById(R.id.textView);
        Button button1 = findViewById(R.id.button1);
```

```
        Button button2 = findViewById(R.id.button2);

        button1.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View view) {
                fontSize += 5;
                if (fontSize > 50) {
                    fontSize = 25;
                }
                textView.setTextSize(fontSize);
            }
        });
        button2.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View view) {
                if (isColorChanged){

textView.setTextColor(Color.BLACK);
                }
                else {
                    textView.setTextColor(Color.RED);
                }
                isColorChanged = !isColorChanged;
            }
        });
    }
}
```

Output:


Welcome to android lab
Change Font Size
Change Color
Mahi


Welcome to android lab
Change Font Size
Change Color
Mahi

2. **Develop an application that uses Layout Managers and event listeners.**

Objective: To develop an Android application that effectively utilizes various layout managers to organize UI components and implements event listeners to handle user interactions.

XML Code:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/and
roid"
    xmlns:app="http://schemas.android.com/apk/res-
auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    xmlns:tools="http://schemas.android.com/tools"
    android:orientation="vertical"
    tools:context=".MainActivity">

    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Button 1" />

    <Button
        android:id="@+id/button2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Button 2" />

    <RelativeLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content">

        <EditText
            android:id="@+id/editText"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_centerHorizontal="true"
            android:ems="10"
```

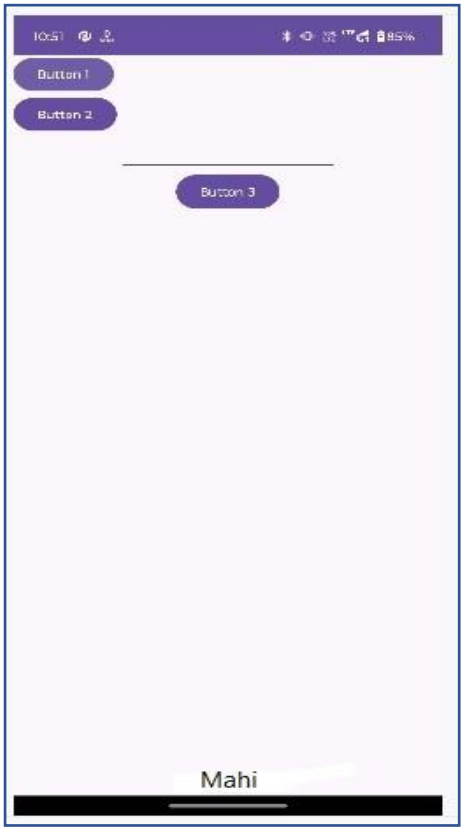
```
            android:inputType="text" />

        <Button
            android:id="@+id/button3"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@id/editText"
            android:layout_centerHorizontal="true"
            android:text="Button 3" />

    </RelativeLayout>
<TextView
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:gravity="bottom|center"
    android:textSize="25sp"
    android:text=" Mahi "/>
</LinearLayout>
```

Java Code:

```
package com.example.layoutmng;

import androidx.appcompat.app.AppCompatActivity;

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

public class MainActivity extends AppCompatActivity {

    private Button button1, button2, button3;
    private EditText editText;

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

        button1 = findViewById(R.id.button1);
        button2 = findViewById(R.id.button2);
```

```
        button3 = findViewById(R.id.button3);
        editText = findViewById(R.id.editText);

        // Set event listeners for buttons
        button1.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Toast.makeText(MainActivity.this,
"Button 1 clicked", Toast.LENGTH_SHORT).show();
            }
        });

        button2.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Toast.makeText(MainActivity.this,
"Button 2 clicked", Toast.LENGTH_SHORT).show();
            }
        });

        button3.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String text =
editText.getText().toString();
                Toast.makeText(MainActivity.this,
"Button 3 clicked: " + text,
Toast.LENGTH_SHORT).show();
            }
        });
    }
}
```

Output:


Button 1
Button 2
Button 3
Mahi


Button 1
Button 2
hii Android
Button 3
Mahi

3. Develop a native calculator application.

Objective: To develop a fully functional native calculator application for Android that supports basic arithmetic operations

XML Code:

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

xmlns:android="http://schemas.android.com/apk/res/and
roid"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:layout_margin="10dp"
    tools:context=".MainActivity">
<EditText
    android:id="@+id/number1"
    android:layout_width="match_parent"
    android:layout_height="50dp"
    android:inputType="numberDecimal"
    android:hint="@string/num1"
    tools:ignore="Autofill" />

    <EditText
        android:id="@+id/number2"
        android:layout_width="match_parent"
        android:layout_height="50dp"
        android:inputType="numberDecimal"
        android:hint="@string/num2"
        tools:ignore="Autofill" />

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal"
        android:layout_marginTop="100dp">
```

```
        <Button
            android:id="@+id/addButton"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="+" />

        <Button android:id="@+id/subtractButton"
            android:layout_width= "9dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:textStyle="bold"
            android:text="-"/>

        <Button android:id="@+id/multiplyButton"
            android:layout_width= "0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="*"/>

        <Button android:id="@+id/divideButton"
            android:layout_width= "0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="/" />

    </LinearLayout>

    <TextView
        android:id="@+id/result"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textSize="24sp"
        android:layout_marginTop="50dp"
        android:text="Result will be displayed
here"/>

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="490sp"
        android:textSize="24sp"
        android:textStyle="bold"
        android:layout_gravity="bottom|center"
```

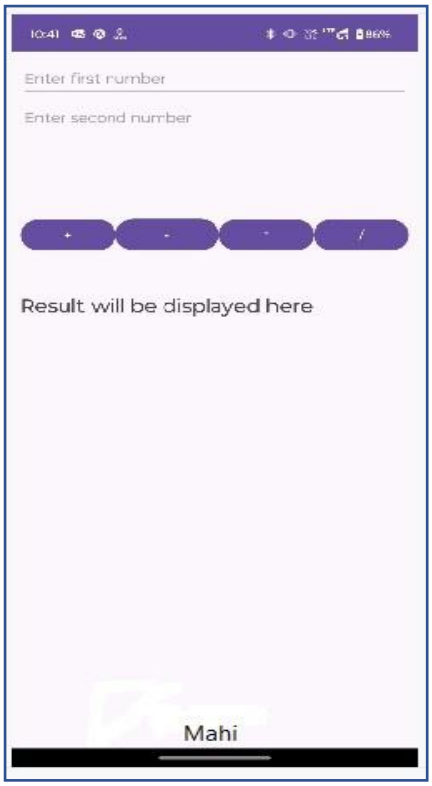
```
        android:text=" Mahi " />
</LinearLayout>
```

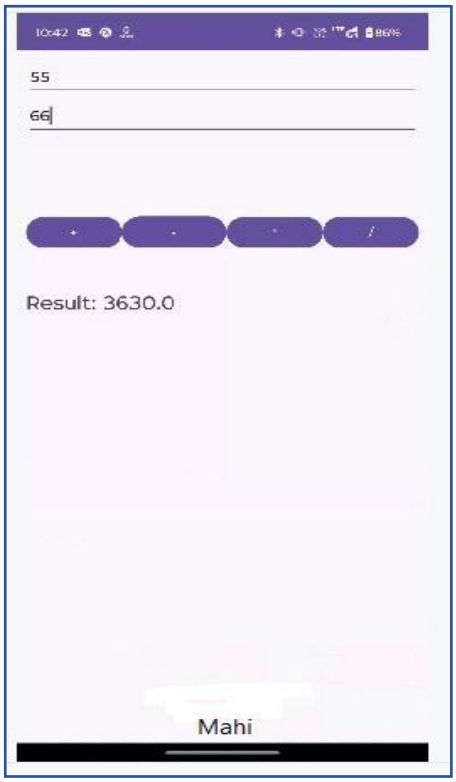
Java Code:

```
package com.example.myapplication;

import android.annotation.SuppressLint;
import android.os.Bundle;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;

import androidx.appcompat.app.AppCompatActivity;


public class MainActivity extends AppCompatActivity {

    EditText number1, number2;
    Button
addButton,subtractButton,multiplyButton,divideButton;
    TextView result;
    @SuppressLint("SetTextI18n")
    @Override
    protected void onCreate(Bundle
savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        number1 = findViewById(R.id.number1);
        number2 = findViewById(R.id.number2);
        addButton = findViewById(R.id.addButton);
        subtractButton =
findViewById(R.id.subtractButton);
        multiplyButton =
findViewById(R.id.multiplyButton);
        divideButton =
findViewById(R.id.divideButton);
        result = findViewById(R.id.result);

        addButton.setOnClickListener(v -> {
            double num1 =
Double.parseDouble(number1.getText().toString());
            double num2 =
```

```
Double.parseDouble(number2.getText().toString());
            double res = num1 + num2;
result.setText("Result: " +res);
        });
        subtractButton.setOnClickListener(v -> {
            double num1 =
Double.parseDouble(number1.getText().toString());
            double num2 =
Double.parseDouble(number2.getText().toString());
            double res = num1 - num2;
            result.setText("Result: " +res);
        });
        multiplyButton.setOnClickListener(v -> {
            double num1 =
Double.parseDouble(number1.getText().toString());
            double num2 =
Double.parseDouble(number2.getText().toString());
            double res = num1 * num2;
            result.setText("Result: " +res);
        });
        divideButton.setOnClickListener(v -> {
            double num1 =
Double.parseDouble(number1.getText().toString());
            double num2 =
Double.parseDouble(number2.getText().toString());
            double res = num1 / num2;
            result.setText("Result: " +res);
        });
    }
}
```

Output:


10:41
Enter first number
Enter second number
+
-
*
/
Result will be displayed here
Mahi


10:42
55
66
+
-
*
/
Result: 3630.0
Mahi

4. **Write an application that draws basic graphical primitives on the screen.**

Objective: To develop an application that can draw basic graphical primitives (such as lines, rectangles, circles, and polygons) on the screen

XML Code:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/and
roid"
    xmlns:app="http://schemas.android.com/apk/res-
auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    xmlns:tools="http://schemas.android.com/tools"
    android:orientation="vertical"
    tools:context=".MainActivity">

    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Button 1" />

    <Button
        android:id="@+id/button2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Button 2" />

    <RelativeLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content">

        <EditText
            android:id="@+id/editText"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_centerHorizontal="true"
            android:ems="10"
```

```
            android:inputType="text" />

        <Button
            android:id="@+id/button3"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@id/editText"
            android:layout_centerHorizontal="true"
            android:text="Button 3" />

    </RelativeLayout>
<TextView
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:gravity="bottom|center"
    android:textSize="25sp"
    android:text=" Mahi "/>
</LinearLayout>
```

Java Code:

```
package com.example.graphicalprimitiveapp;

import android.graphics.Bitmap;
import android.graphics.Canvas;
import android.graphics.Color;
import android.graphics.Paint;
import android.graphics.drawable.BitmapDrawable;
import android.os.Bundle;
import android.widget.ImageView;

import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle
savedInstanceState) {
        super.onCreate(savedInstanceState);
        EdgeToEdge.enable(this);
```

```
        setContentView(R.layout.activity_main);
        // Create a Bitmap
        Bitmap bg = Bitmap.createBitmap(720, 1280,
Bitmap.Config.ARGB_8888);

        // Set the Bitmap as the background for the
ImageView
        ImageView imageView =
findViewById(R.id.imageView);
        imageView.setBackgroundDrawable(new
BitmapDrawable(bg));

        // Create a Canvas object
        Canvas canvas = new Canvas(bg);

        // Create a Paint object and set its color &
textSize
        Paint paint = new Paint();
        paint.setColor(Color.BLUE);
        paint.setTextSize(50);

        // Draw a Rectangle
        canvas.drawText("Rectangle", 420, 150,
paint);
        canvas.drawRect(400, 200, 650, 700, paint);

        // Draw a Circle
        canvas.drawText("Circle", 120, 150, paint);
        canvas.drawCircle(200, 350, 150, paint);

        // Draw a Square
        canvas.drawText("Square", 120, 800, paint);
        canvas.drawRect(50, 850, 350, 1150, paint);

        // Draw a Line
        canvas.drawText("Line", 480, 800, paint);
        canvas.drawLine(520, 850, 520, 1150, paint);
    }
}
```

Output: