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/android"  
 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"  
 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="Saksham Gupta" />  
  
</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:**

1. **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/android"  
 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="Saksham Gupta"/>  
</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:**

1. **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/android"  
 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="Saksham Gupta" />  
</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:**

1. **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/android"  
 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="Saksham Gupta"/>  
</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:**