Create a basic Hello World program.

**package com.example.a1helloworld;  
  
import android.os.Bundle;  
import androidx.appcompat.app.AppCompatActivity;  
  
public class MainActivity extends AppCompatActivity {  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 // Set the content view to the XML layout (activity\_main.xml)  
 setContentView(R.layout.*activity\_main*);  
 }  
}**

Create a simple application to change colors of background of any textbox with the click of a button.

**package com.example.a2backgrondchanger;  
  
import android.graphics.Color;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.EditText;  
  
import androidx.activity.EdgeToEdge;  
import androidx.appcompat.app.AppCompatActivity;  
import androidx.core.graphics.Insets;  
import androidx.core.view.ViewCompat;  
import androidx.core.view.WindowInsetsCompat;  
  
import java.util.Random;  
  
public class MainActivity extends AppCompatActivity {  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 EdgeToEdge.*enable*(this);  
 setContentView(R.layout.*activity\_main*);  
  
 // Set window insets for edge-to-edge handling  
 ViewCompat.*setOnApplyWindowInsetsListener*(findViewById(R.id.*main*), (v, insets) -> {  
 Insets systemBars = insets.getInsets(WindowInsetsCompat.Type.*systemBars*());  
 v.setPadding(systemBars.left, systemBars.top, systemBars.right, systemBars.bottom);  
 return insets;  
 });  
  
 // Get references to the UI elements  
 EditText editTextBox = findViewById(R.id.*editTextBox*);  
 Button changeColorButton = findViewById(R.id.*changeColorButton*);  
  
 // Set a click listener for the button  
 changeColorButton.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 // Generate a random color  
 Random random = new Random();  
 int color = Color.*rgb*(random.nextInt(256), random.nextInt(256), random.nextInt(256));  
  
 // Set the random color as the background color of the EditText  
 editTextBox.setBackgroundColor(color);  
 }  
 });  
 }  
}**

Create a simple app to change background colour on button click.

**package com.example.a3colorchangerr;  
  
import android.graphics.Color;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import androidx.appcompat.app.AppCompatActivity;  
import androidx.constraintlayout.widget.ConstraintLayout;  
import androidx.core.view.ViewCompat;  
import androidx.core.view.WindowCompat;  
import androidx.core.view.WindowInsetsCompat;  
import androidx.core.view.WindowInsetsControllerCompat;  
  
import java.util.Random;  
  
public class MainActivity extends AppCompatActivity {  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
  
 // Set content view to the layout  
 setContentView(R.layout.*activity\_main*);  
  
 // Enable edge-to-edge mode  
 WindowCompat.*setDecorFitsSystemWindows*(getWindow(), false);  
 View mainLayout = findViewById(R.id.*main*);  
 WindowInsetsControllerCompat windowInsetsController = ViewCompat.*getWindowInsetsController*(mainLayout);  
 if (windowInsetsController != null) {  
 // Make the content appear behind the system bars  
 windowInsetsController.setSystemBarsBehavior(WindowInsetsControllerCompat.*BEHAVIOR\_SHOW\_TRANSIENT\_BARS\_BY\_SWIPE*);  
 windowInsetsController.hide(WindowInsetsCompat.Type.*systemBars*());  
 }  
  
 // Handle background color change on button click  
 ConstraintLayout layout = findViewById(R.id.*main*);  
 Button changeColorButton = findViewById(R.id.*changeColorButton*);  
 changeColorButton.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 // Generate and apply a random background color  
 Random random = new Random();  
 int color = Color.*rgb*(random.nextInt(256), random.nextInt(256), random.nextInt(256));  
 layout.setBackgroundColor(color);  
 }  
 });  
 }  
}**

Create a simple app to add two numbers.

**package com.example.a4add2numbers;  
  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.EditText;  
import android.widget.TextView;  
  
import androidx.appcompat.app.AppCompatActivity;  
import androidx.core.view.ViewCompat;  
import androidx.core.view.WindowCompat;  
import androidx.core.view.WindowInsetsControllerCompat;  
  
public class MainActivity extends AppCompatActivity {  
  
 private EditText num1EditText, num2EditText;  
 private TextView resultTextView;  
 private Button addButton;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
  
 // Enable edge-to-edge mode  
 WindowCompat.*setDecorFitsSystemWindows*(getWindow(), false);  
  
 setContentView(R.layout.*activity\_main*);  
  
 // Initialize views  
 num1EditText = findViewById(R.id.*num1*);  
 num2EditText = findViewById(R.id.*num2*);  
 resultTextView = findViewById(R.id.*resultText*);  
 addButton = findViewById(R.id.*addButton*);  
  
 // Set up button click listener  
 addButton.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 // Get text from EditTexts and convert to numbers  
 String num1String = num1EditText.getText().toString();  
 String num2String = num2EditText.getText().toString();  
  
 // Check if the fields are not empty  
 if (!num1String.isEmpty() && !num2String.isEmpty()) {  
 double num1 = Double.*parseDouble*(num1String);  
 double num2 = Double.*parseDouble*(num2String);  
  
 // Perform addition  
 double result = num1 + num2;  
  
 // Display the result in the TextView  
 resultTextView.setText("Result: " + result);  
 } else {  
 // Show error message if inputs are empty  
 resultTextView.setText("Please enter both numbers");  
 }  
 }  
 });  
 }  
}**

Create a simple app to create a simple calculator in android.

**package com.example.calc;  
  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.EditText;  
import android.widget.TextView;  
import android.widget.Toast;  
import androidx.appcompat.app.AppCompatActivity;  
  
public class MainActivity extends AppCompatActivity {  
  
 EditText firstNumber, secondNumber;  
 TextView resultTextView;  
 Button addButton, subtractButton, multiplyButton, divideButton;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.*activity\_main*);  
  
 // Initialize views  
 firstNumber = findViewById(R.id.*firstNumber*);  
 secondNumber = findViewById(R.id.*secondNumber*);  
 resultTextView = findViewById(R.id.*resultTextView*);  
 addButton = findViewById(R.id.*addButton*);  
 subtractButton = findViewById(R.id.*subtractButton*);  
 multiplyButton = findViewById(R.id.*multiplyButton*);  
 divideButton = findViewById(R.id.*divideButton*);  
  
 // Set up button click listeners  
 addButton.setOnClickListener(v -> calculate("+"));  
 subtractButton.setOnClickListener(v -> calculate("-"));  
 multiplyButton.setOnClickListener(v -> calculate("\*"));  
 divideButton.setOnClickListener(v -> calculate("/"));  
 }  
  
 private void calculate(String operator) {  
 String num1String = firstNumber.getText().toString();  
 String num2String = secondNumber.getText().toString();  
  
 if (num1String.isEmpty() || num2String.isEmpty()) {  
 Toast.*makeText*(this, "Please enter both numbers", Toast.*LENGTH\_SHORT*).show();  
 return;  
 }  
  
 double num1 = Double.*parseDouble*(num1String);  
 double num2 = Double.*parseDouble*(num2String);  
 double result = 0;  
  
 switch (operator) {  
 case "+":  
 result = num1 + num2;  
 break;  
 case "-":  
 result = num1 - num2;  
 break;  
 case "\*":  
 result = num1 \* num2;  
 break;  
 case "/":  
 if (num2 == 0) {  
 Toast.*makeText*(this, "Cannot divide by zero", Toast.*LENGTH\_SHORT*).show();  
 return;  
 }  
 result = num1 / num2;  
 break;  
 }  
  
 resultTextView.setText(String.*valueOf*(result));  
 }  
}**

Create an app to set image on imageview.

**package com.example.imagesetup;  
  
import android.content.Intent;  
import android.graphics.Bitmap;  
import android.net.Uri;  
import android.os.Bundle;  
import android.provider.MediaStore;  
import android.widget.Button;  
import android.widget.ImageView;  
import android.widget.Toast;  
  
import androidx.annotation.Nullable;  
import androidx.appcompat.app.AppCompatActivity;  
import androidx.core.graphics.Insets;  
import androidx.core.view.ViewCompat;  
import androidx.core.view.WindowCompat;  
import androidx.core.view.WindowInsetsCompat;  
  
import java.io.IOException;  
  
public class MainActivity extends AppCompatActivity {  
  
 private static final int *PICK\_IMAGE* = 1;  
 ImageView imageView;  
 Button selectImageButton;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
  
 // Enable edge-to-edge layout  
 WindowCompat.*setDecorFitsSystemWindows*(getWindow(), false);  
  
 setContentView(R.layout.*activity\_main*);  
  
 // Initialize views  
 imageView = findViewById(R.id.*imageView*);  
 selectImageButton = findViewById(R.id.*selectImageButton*);  
  
 // Adjust padding for system bars  
 ViewCompat.*setOnApplyWindowInsetsListener*(findViewById(R.id.*main*), (v, insets) -> {  
 Insets systemBars = insets.getInsets(WindowInsetsCompat.Type.*systemBars*());  
 v.setPadding(systemBars.left, systemBars.top, systemBars.right, systemBars.bottom);  
 return insets;  
 });  
  
 // Set up button click listener  
 selectImageButton.setOnClickListener(v -> {  
 // Open gallery to pick an image  
 Intent intent = new Intent(Intent.*ACTION\_PICK*, MediaStore.Images.Media.*EXTERNAL\_CONTENT\_URI*);  
 intent.setType("image/\*");  
 startActivityForResult(intent, *PICK\_IMAGE*);  
 });  
 }  
  
 @Override  
 protected void onActivityResult(int requestCode, int resultCode, @Nullable Intent data) {  
 super.onActivityResult(requestCode, resultCode, data);  
  
 if (requestCode == *PICK\_IMAGE* && resultCode == *RESULT\_OK* && data != null) {  
 Uri imageUri = data.getData();  
 try {  
 // Convert URI to Bitmap and set it in the ImageView  
 Bitmap bitmap = MediaStore.Images.Media.*getBitmap*(this.getContentResolver(), imageUri);  
 imageView.setImageBitmap(bitmap);  
 } catch (IOException e) {  
 e.printStackTrace();  
 Toast.*makeText*(this, "Failed to load image", Toast.*LENGTH\_SHORT*).show();  
 }  
 }  
 }  
}**

Create a program to change image on button click.

Create a program to depict activity lifecycle.

**package com.example.a9lifecycle;  
  
import android.os.Bundle;  
import android.util.Log;  
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 static final String *TAG* = "ActivityLifecycle";  
 private TextView lifecycleTextView;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 EdgeToEdge.*enable*(this);  
 setContentView(R.layout.*activity\_main*);  
  
 lifecycleTextView = findViewById(R.id.*lifecycleTextView*);  
 updateLifecycleText("onCreate");  
 Log.*d*(*TAG*, "onCreate called");  
  
 // Handle window insets  
 ViewCompat.*setOnApplyWindowInsetsListener*(findViewById(R.id.*main*), (v, insets) -> {  
 Insets systemBars = insets.getInsets(WindowInsetsCompat.Type.*systemBars*());  
 v.setPadding(systemBars.left, systemBars.top, systemBars.right, systemBars.bottom);  
 return insets;  
 });  
 }  
  
 @Override  
 protected void onStart() {  
 super.onStart();  
 updateLifecycleText("onStart");  
 Log.*d*(*TAG*, "onStart called");  
 }  
  
 @Override  
 protected void onResume() {  
 super.onResume();  
 updateLifecycleText("onResume");  
 Log.*d*(*TAG*, "onResume called");  
 }  
  
 @Override  
 protected void onPause() {  
 super.onPause();  
 updateLifecycleText("onPause");  
 Log.*d*(*TAG*, "onPause called");  
 }  
  
 @Override  
 protected void onStop() {  
 super.onStop();  
 updateLifecycleText("onStop");  
 Log.*d*(*TAG*, "onStop called");  
 }  
  
 @Override  
 protected void onDestroy() {  
 super.onDestroy();  
 updateLifecycleText("onDestroy");  
 Log.*d*(*TAG*, "onDestroy called");  
 }  
  
 @Override  
 protected void onRestart() {  
 super.onRestart();  
 updateLifecycleText("onRestart");  
 Log.*d*(*TAG*, "onRestart called");  
 }  
  
 private void updateLifecycleText(String state) {  
 String currentText = lifecycleTextView.getText().toString();  
 lifecycleTextView.setText(state + "\n" + currentText);  
 }  
}**

Create an App to depict Started Servies.

**package com.example.a10startedservis;  
  
import android.content.Intent;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
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 TextView statusTextView;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 EdgeToEdge.*enable*(this);  
 setContentView(R.layout.*activity\_main*);  
  
 ViewCompat.*setOnApplyWindowInsetsListener*(findViewById(R.id.*main*), (v, insets) -> {  
 Insets systemBars = insets.getInsets(WindowInsetsCompat.Type.*systemBars*());  
 v.setPadding(systemBars.left, systemBars.top, systemBars.right, systemBars.bottom);  
 return insets;  
 });  
  
 statusTextView = findViewById(R.id.*statusTextView*);  
 Button startServiceButton = findViewById(R.id.*startServiceButton*);  
 Button stopServiceButton = findViewById(R.id.*stopServiceButton*);  
  
 startServiceButton.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 startMyService();  
 }  
 });  
  
 stopServiceButton.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 stopMyService();  
 }  
 });  
 }  
  
 private void startMyService() {  
 Intent serviceIntent = new Intent(this, MyService.class);  
 startService(serviceIntent);  
 statusTextView.setText("Service is running");  
 }  
  
 private void stopMyService() {  
 Intent serviceIntent = new Intent(this, MyService.class);  
 stopService(serviceIntent);  
 statusTextView.setText("Service is not running");  
 }  
}**

SERVICE CLASS

**package com.example.a10startedservis;  
  
import android.app.Service;  
import android.content.Intent;  
import android.os.Handler;  
import android.os.IBinder;  
import android.util.Log;  
  
public class MyService extends Service {  
  
 private static final String *TAG* = "MyService";  
 private Handler handler;  
 private Runnable runnable;  
 private int counter = 0;  
  
 @Override  
 public void onCreate() {  
 super.onCreate();  
 Log.*d*(*TAG*, "Service Created");  
 handler = new Handler(); // Initialize the handler  
 runnable = new Runnable() {  
 @Override  
 public void run() {  
 counter++;  
 Log.*d*(*TAG*, "Service Running: " + counter);  
 handler.postDelayed(this, 1000); // Runs every second  
 }  
 };  
 }  
  
 @Override  
 public int onStartCommand(Intent intent, int flags, int startId) {  
 Log.*d*(*TAG*, "Service Started");  
 handler.post(runnable); // Start the runnable  
 return *START\_STICKY*; // Keep the service running until explicitly stopped  
 }  
  
 @Override  
 public void onDestroy() {  
 super.onDestroy();  
 Log.*d*(*TAG*, "Service Destroyed");  
 handler.removeCallbacks(runnable); // Prevent memory leaks by removing callbacks  
 }  
  
 @Override  
 public IBinder onBind(Intent intent) {  
 return null; // No binding, return null  
 }  
}**

Show Bounded Services in android app.

Create an app to show array adapter.

**package com.example.a11arrayadapter;  
  
import android.os.Bundle;  
import android.widget.ArrayAdapter;  
import android.widget.ListView;  
  
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 ListView listView; // Declare the ListView  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 EdgeToEdge.*enable*(this);  
 setContentView(R.layout.*activity\_main*);  
  
 // Set padding for the main layout to avoid overlaps with system UI  
 ViewCompat.*setOnApplyWindowInsetsListener*(findViewById(R.id.main), (v, insets) -> {  
 Insets systemBars = insets.getInsets(WindowInsetsCompat.Type.*systemBars*());  
 v.setPadding(systemBars.left, systemBars.top, systemBars.right, systemBars.bottom);  
 return insets;  
 });  
  
 // Initialize the ListView  
 listView = findViewById(R.id.listView);  
  
 // Sample data to display  
 String[] items = {"Apple", "Banana", "Orange", "Mango", "Pineapple", "Grapes", "Strawberry"};  
  
 // Create an ArrayAdapter  
 ArrayAdapter<String> adapter = new ArrayAdapter<>(this, android.R.layout.*simple\_list\_item\_1*, items);  
  
 // Set the adapter to the ListView  
 listView.setAdapter(adapter);  
 }  
}**

Create an app to show broadcast receiver.

**package com.example.a12broadcastreceiver;  
  
import android.content.BroadcastReceiver;  
import android.content.Context;  
import android.content.Intent;  
import android.widget.Toast;  
  
public class MyBroadcastReceiver extends BroadcastReceiver {  
  
 @Override  
 public void onReceive(Context context, Intent intent) {  
 // Get the message from the Intent  
 String message = intent.getStringExtra("message");  
  
 // Show the message using a Toast  
 Toast.*makeText*(context, "Received: " + message, Toast.*LENGTH\_SHORT*).show();  
 }  
}**

main activity

**package com.example.a12broadcastreceiver;  
  
import android.content.Intent;  
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 EditText editTextMessage;  
 private Button buttonSend;  
 private TextView textViewMessage;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 EdgeToEdge.*enable*(this);  
 setContentView(R.layout.*activity\_main*);  
  
 // Setup UI elements  
 editTextMessage = findViewById(R.id.*editTextMessage*);  
 buttonSend = findViewById(R.id.*buttonSend*);  
 textViewMessage = findViewById(R.id.*textViewMessage*);  
  
 ViewCompat.*setOnApplyWindowInsetsListener*(findViewById(R.id.*main*), (v, insets) -> {  
 Insets systemBars = insets.getInsets(WindowInsetsCompat.Type.*systemBars*());  
 v.setPadding(systemBars.left, systemBars.top, systemBars.right, systemBars.bottom);  
 return insets;  
 });  
  
 // Set button click listener  
 buttonSend.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 // Get the message from EditText  
 String message = editTextMessage.getText().toString();  
  
 // Create an Intent to send the broadcast  
 Intent intent = new Intent("com.example.a12broadcastreceiver.SEND\_MESSAGE");  
 intent.putExtra("message", message);  
  
 // Send the broadcast  
 sendBroadcast(intent);  
 }  
 });  
 }  
}**

manifestfile

**<?xml version="1.0" encoding="utf-8"?>  
<manifest xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:tools="http://schemas.android.com/tools">  
  
 <application  
 android:allowBackup="true"  
 android:dataExtractionRules="@xml/data\_extraction\_rules"  
 android:fullBackupContent="@xml/backup\_rules"  
 android:icon="@mipmap/ic\_launcher"  
 android:label="@string/app\_name"  
 android:roundIcon="@mipmap/ic\_launcher\_round"  
 android:supportsRtl="true"  
 android:theme="@style/Theme.\_12broadcastreceiver"  
 tools:targetApi="31">  
 <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>**