

Output

12:10

Add Two Numbers

Enter First Number

Enter Second Number

ADD

Result :

12:06

Add Two Numbers

25

69

ADD

Result: 94

Course Outcome -1

Experiment 1

Write a program to Add two numbers

MainActivity.java

```
package com.example.addtwonumbers;
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;
public class MainActivity extends AppCompatActivity {
    private EditText editTextNum1;
    private EditText editTextNum2;
    private Button buttonAdd;
    private TextView textViewResult;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        editTextNum1 = findViewById(R.id.editTextNum1);
        editTextNum2 = findViewById(R.id.editTextNum2);
        buttonAdd = findViewById(R.id.buttonAdd);
        textViewResult = findViewById(R.id.textViewResult);
        buttonAdd.setOnClickListener(new View.OnClickListener() {
            public void onClick(View v) {
                String num1Str = editTextNum1.getText().toString();
                String num2Str = editTextNum2.getText().toString();
                if (!num1Str.isEmpty() && !num2Str.isEmpty()) {
                    int num1 = Integer.parseInt(num1Str);
                    int num2 = Integer.parseInt(num2Str);
                    int result = num1 + num2;
                    textViewResult.setText("Result: " + result);
                } else {
                    textViewResult.setText("Please enter both numbers");
                }
            }
        });
    }
}
```

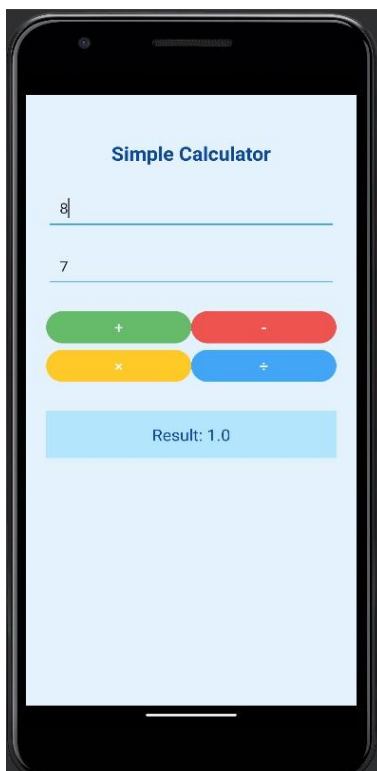
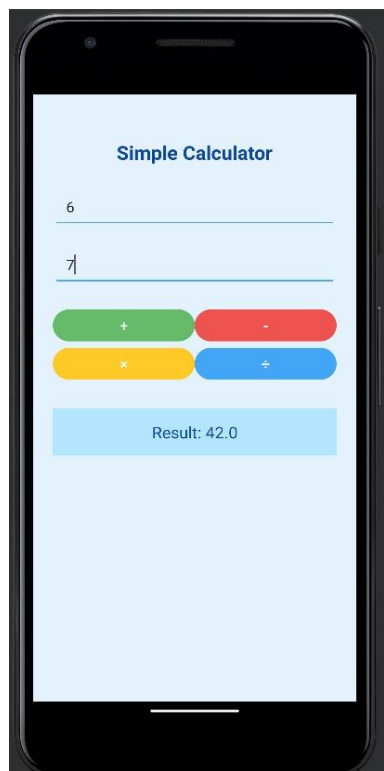
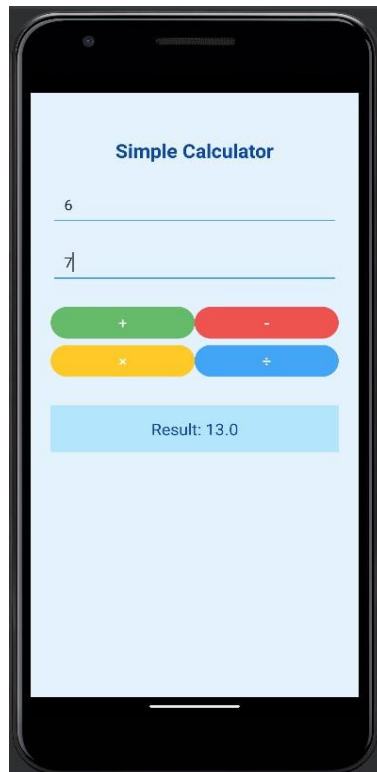
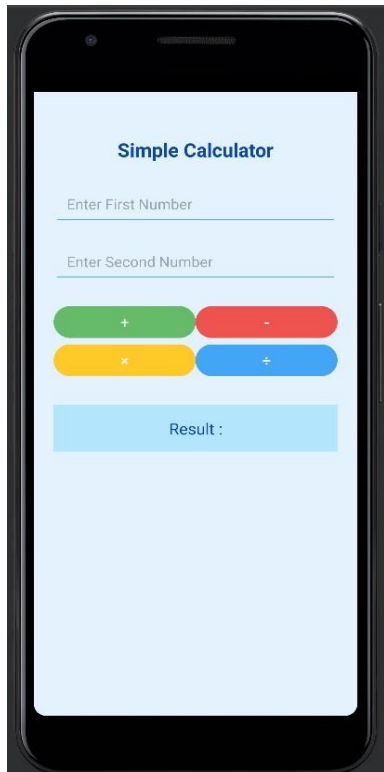
activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="24dp">
```

```
android:background="#F0F0F0">
<TextView
    android:id="@+id/textViewTitle"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Add Two Numbers"
    android:textSize="24sp"
    android:textStyle="bold"
    android:textColor="#37474F"
    android:layout_centerHorizontal="true"
    android:layout_marginTop="32dp"/>
<EditText
    android:id="@+id/editTextNum1"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Enter First Number"
    android:textColor="#212121"
    android:backgroundTint="#FF9800"
    android:padding="16dp"
    android:inputType="number"
    android:layout_below="@id/textViewTitle"
    android:layout_marginTop="24dp"
    android:textSize="18sp"/>
<EditText
    android:id="@+id/editTextNum2"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Enter Second Number"
    android:textColor="#212121"
    android:backgroundTint="#FF9800"
    android:padding="16dp"
    android:inputType="number"
    android:layout_below="@id/editTextNum1"
    android:layout_marginTop="16dp"
    android:textSize="18sp"/>
<Button
    android:id="@+id/buttonAdd"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="ADD"
    android:backgroundTint="#4CAF50"
    android:textColor="FFFFFF"
    android:layout_below="@id/editTextNum2"
    android:layout_centerHorizontal="true"
    android:layout_marginTop="32dp"
    android:paddingHorizontal="32dp"
    android:paddingVertical="12dp"
    android:textSize="18sp"/>
```

```
<TextView
    android:id="@+id/textViewResult"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Result :"
    android:textSize="20sp"
    android:textColor="#37474F"
    android:layout_below="@id/buttonAdd"
    android:layout_marginTop="32dp"
    android:padding="16dp"
    android:background="#E0E0E0"
    android:gravity="center"/>
</RelativeLayout>
```

Output



Experiment 2

Implementing basic arithmetic operations of a simple calculator

MainActivity.java

```
package com.example.calculator;
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;
public class MainActivity extends AppCompatActivity {
    private EditText editTextNum1;
    private EditText editTextNum2;
    private Button buttonAdd, buttonSubtract, buttonMultiply, buttonDivide;
    private TextView textViewResult;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        editTextNum1 = findViewById(R.id.editTextNum1);
        editTextNum2 = findViewById(R.id.editTextNum2);
        buttonAdd = findViewById(R.id.buttonAdd);
        buttonSubtract = findViewById(R.id.buttonSubtract);
        buttonMultiply = findViewById(R.id.buttonMultiply);
        buttonDivide = findViewById(R.id.buttonDivide);
        textViewResult = findViewById(R.id.textViewResult);
        buttonAdd.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                performOperation("+");
            }
        });
        buttonSubtract.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                performOperation("-");
            }
        });
        buttonMultiply.setOnClickListener(new View.OnClickListener() {
            @Override
```

```
        public void onClick(View v) {
            performOperation("*");
        }
    });
    buttonDivide.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            performOperation("/");
        }
    });
}

private void performOperation(String operation) {
    String num1Str = editTextNum1.getText().toString();
    String num2Str = editTextNum2.getText().toString();
    if (!num1Str.isEmpty() && !num2Str.isEmpty()) {
        double num1 = Double.parseDouble(num1Str);
        double num2 = Double.parseDouble(num2Str);
        double result = 0;
        switch (operation) {
            case "+":
                result = num1 + num2;
                break;
            case "-":
                result = num1 - num2;
                break;
            case "*":
                result = num1 * num2;
                break;
            case "/":
                if (num2 != 0) {
                    result = num1 / num2;
                } else {
                    textViewResult.setText("Error: Division by Zero");
                    return;
                }
                break;
        }
        textViewResult.setText("Result: " + result);
    } else {
        textViewResult.setText("Please enter both numbers");
    }
}
```

activity_main.xml

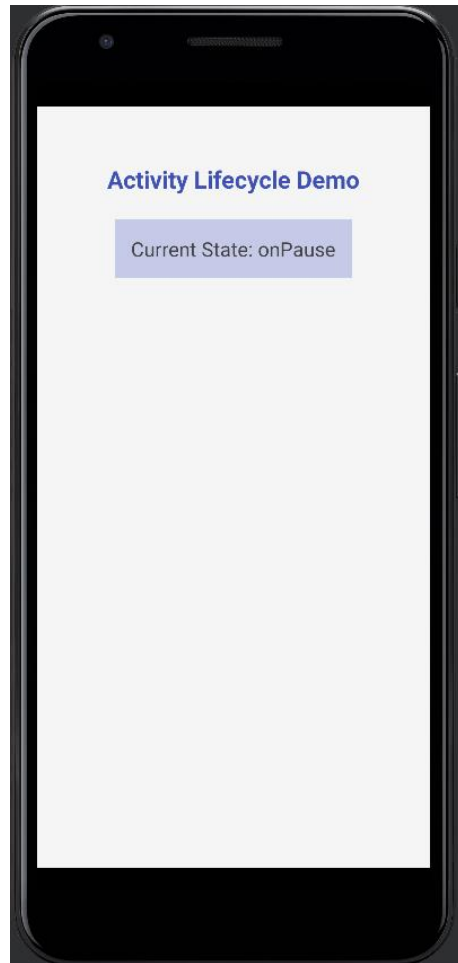
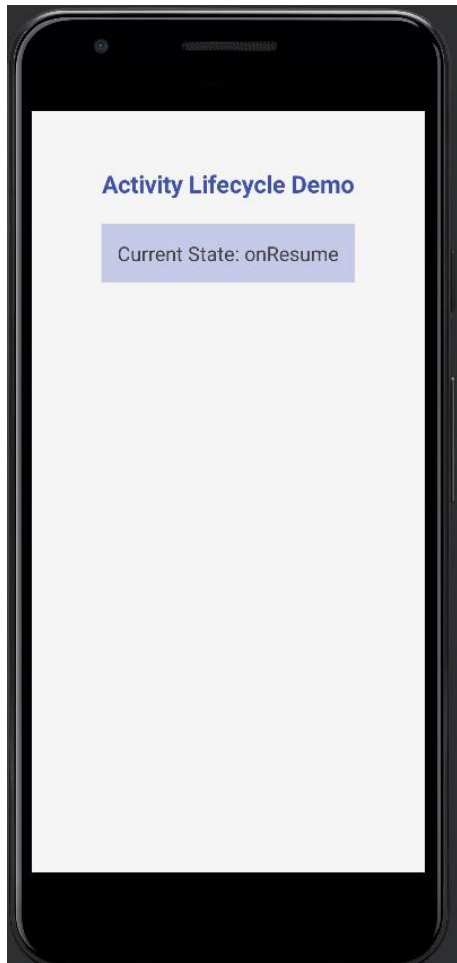
```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="24dp"
    android:background="#E3F2FD">
    <TextView
        android:id="@+id/textViewTitle"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Simple Calculator"
        android:textSize="24sp"
        android:textStyle="bold"
        android:textColor="#0D47A1"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="32dp"/>
    <EditText
        android:id="@+id/editTextNum1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter First Number"
        android:textColor="#212121"
        android:backgroundTint="#42A5F5"
        android:padding="16dp"
        android:inputType="numberDecimal"
        android:layout_below="@id/textViewTitle"
        android:layout_marginTop="24dp"
        android:textSize="18sp"/>
    <EditText
        android:id="@+id/editTextNum2"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter Second Number"
        android:textColor="#212121"
        android:backgroundTint="#42A5F5"
        android:padding="16dp"
        android:inputType="numberDecimal"
        android:layout_below="@id/editTextNum1"
        android:layout_marginTop="16dp"
        android:textSize="18sp"/>
    <GridLayout
        android:id="@+id/gridLayoutButtons"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/editTextNum2"
        android:layout_marginTop="24dp"
        android:columnCount="2"
        android:rowCount="2">
```



```
android:orientation="horizontal"
android:layout_gravity="center">
<Button
    android:id="@+id/buttonAdd"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:layout_rowWeight="1"
    android:text="+"
    android:backgroundTint="#66BB6A"
    android:textColor="#FFFFFF"
    android:paddingHorizontal="32dp"
    android:textSize="18sp"/>
<Button
    android:id="@+id/buttonSubtract"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:layout_rowWeight="1"
    android:text="-"
    android:backgroundTint="#EF5350"
    android:textColor="#FFFFFF"
    android:paddingHorizontal="32dp"
    android:textSize="18sp"/>
<Button
    android:id="@+id/buttonMultiply"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:layout_rowWeight="1"
    android:text="×"
    android:backgroundTint="#FFCA28"
    android:textColor="#FFFFFF"
    android:paddingHorizontal="32dp"
    android:textSize="18sp"/>
<Button
    android:id="@+id/buttonDivide"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:layout_rowWeight="1"
    android:text="÷"
    android:backgroundTint="#42A5F5"
    android:textColor="#FFFFFF"
    android:paddingHorizontal="32dp"
    android:textSize="18sp"/>
</GridLayout>
<TextView
    android:id="@+id/textViewResult"
```

```
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Result :"
        android:textSize="20sp"
        android:textColor="#0D47A1"
        android:layout_below="@id/gridLayoutButtons"
        android:layout_marginTop="32dp"
        android:padding="16dp"
        android:background="#B3E5FC"
        android:gravity="center"/>
</RelativeLayout>
```

Output



Experiment 3

Write a program that demonstrates Activity Lifecycle

MainActivity.java

```
package com.example.activity_lifecycle;
import android.os.Bundle;
import android.util.Log;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    private static final String TAG = "LifecycleDemo";
    private TextView lifecycleTextView;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        lifecycleTextView = findViewById(R.id.textViewLifecycle);
        updateLifecycleState("onCreate");
    }
    @Override
    protected void onStart() {
        super.onStart();
        updateLifecycleState("onStart");
    }
    @Override
    protected void onResume() {
        super.onResume();
        updateLifecycleState("onResume");
    }
    @Override
    protected void onPause() {
        super.onPause();
        updateLifecycleState("onPause");
    }
    @Override
    protected void onStop() {
        super.onStop();
        updateLifecycleState("onStop");
    }
    @Override
    protected void onDestroy() {
```

```

        super.onDestroy();
        updateLifecycleState("onDestroy");
    }
    @Override
    protected void onRestart() {
        super.onRestart();
        updateLifecycleState("onRestart");
    }
    private void updateLifecycleState(String state) {
        String lifecycleText = "Current State: " + state;
        lifecycleTextView.setText(lifecycleText);
        Log.d(TAG, lifecycleText);
    }
}

```

activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="24dp"
    android:background="#F5F5F5">
    <TextView
        android:id="@+id/textViewTitle"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Activity Lifecycle Demo"
        android:textSize="24sp"
        android:textStyle="bold"
        android:textColor="#3F51B5"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="32dp"/>
    <TextView
        android:id="@+id/textViewLifecycle"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Current State: "
        android:textSize="20sp"
        android:textColor="#424242"
        android:layout_below="@id/textViewTitle"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="24dp"
        android:padding="16dp"
        android:background="#C5CAE9"
        android:gravity="center"/>
</RelativeLayout>

```

Output



Experiment 4

Demonstrate the difference between Text view and toast message by showing how each displays messages in an app

MainActivity.java

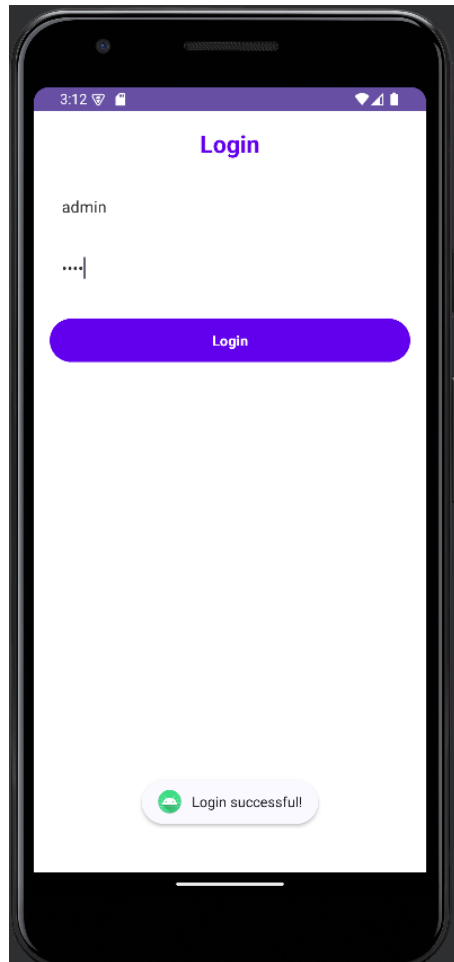
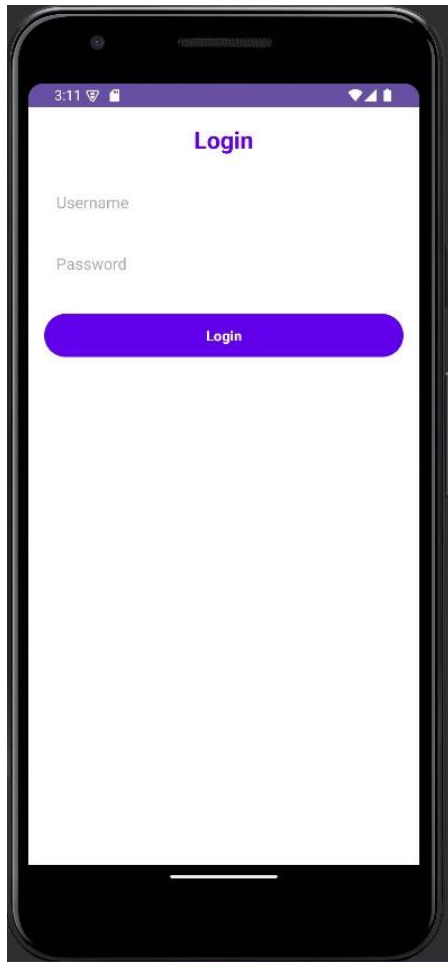
```
package com.example.toast;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        TextView textView = findViewById(R.id.textView);
        Button button = findViewById(R.id.button);
        button.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                textView.setText("Button Clicked!");
                Toast.makeText(MainActivity.this, "Button was clicked!",
                Toast.LENGTH_SHORT).show();
            }
        });
    }
}
```

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp">
    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Button Clicked!" />
    <Button
        android:id="@+id/button"
```

```
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:background="#009688"  
        android:text="Click Me" />  
</LinearLayout>
```


Output



Experiment 5

Design a Login Form with username and password using Linear Layout and toast valid credentials

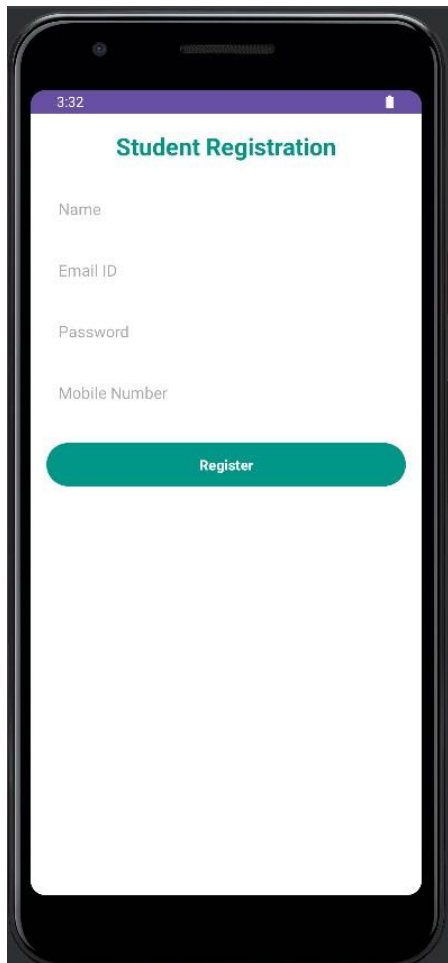
MainActivity.java

```
package com.example.login;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        EditText usernameEditText = findViewById(R.id.username);
        EditText passwordEditText = findViewById(R.id.password);
        Button loginButton = findViewById(R.id.login_button);
        loginButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String username = usernameEditText.getText().toString();
                String password = passwordEditText.getText().toString();
                if(username.isEmpty() || password.isEmpty()) {
                    Toast.makeText(MainActivity.this, "Please enter both username and password",
Toast.LENGTH_SHORT).show();
                } else if(username.equals("admin") && password.equals("1234")) {
                    // Valid credentials
                    Toast.makeText(MainActivity.this, "Login successful!",
Toast.LENGTH_SHORT).show();
                } else {
                    // Invalid credentials
                    Toast.makeText(MainActivity.this, "Invalid username or password",
Toast.LENGTH_SHORT).show();
                }
            }
        });
    }
}
```

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp"
    android:background="@android:color/background_light">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Login"
        android:textSize="24sp"
        android:textStyle="bold"
        android:layout_gravity="center_horizontal"
        android:textColor="#6200EE"
        android:paddingBottom="24dp"/>
    <EditText
        android:id="@+id/username"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Username"
        android:padding="12dp"
        android:background="@android:color/white"
        android:layout_marginBottom="16dp"
        android:textColor="#333333"
        android:textSize="16sp"
        android:inputType="text"/>
    <EditText
        android:id="@+id/password"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Password"
        android:padding="12dp"
        android:background="@android:color/white"
        android:layout_marginBottom="24dp"
        android:textColor="#333333"
        android:textSize="16sp"
        android:inputType="textPassword"/>
    <Button
        android:id="@+id/login_button"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Login"
        android:backgroundTint="#6200EE"
        android:textColor="@android:color/white"
        android:padding="12dp"
        android:textStyle="bold"/>
</LinearLayout>
```

Output



A mobile application interface for student registration. The screen has a purple header bar with the time 3:32 and a battery icon. Below the header, the title "Student Registration" is displayed in green. There are four input fields: "Name", "Email ID", "Password", and "Mobile Number". A green "Register" button is positioned below the input fields.

3:32

Student Registration

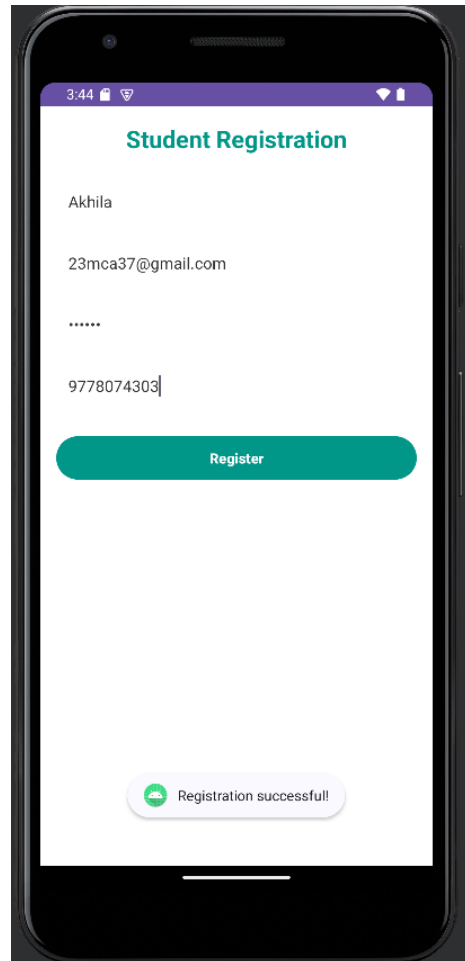
Name

Email ID

Password

Mobile Number

Register



The same mobile application interface as the first image, but with the input fields filled with data. The "Name" field contains "Akhila", "Email ID" contains "23mca37@gmail.com", "Password" contains "*****", and "Mobile Number" contains "9778074303". The green "Register" button is still present. At the bottom of the screen, a white toast message with a green checkmark icon says "Registration successful!". The purple header bar now shows the time 3:44 and signal, Wi-Fi, and battery icons.

3:44

Student Registration

Akhila

23mca37@gmail.com

9778074303

Register

Registration successful!

Experiment 6

Design a student registration form using toast and validation [Hint: - Name, Emailid, password, mobile number

MainActivity.java

```
package com.example.stud_registration;
import android.os.Bundle;
import android.text.TextUtils;
import android.util.Patterns;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        EditText nameEditText = findViewById(R.id.name);
        EditText emailEditText = findViewById(R.id.email);
        EditText passwordEditText = findViewById(R.id.password);
        EditText mobileEditText = findViewById(R.id.mobile);
        Button registerButton = findViewById(R.id.register_button);
        registerButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String name = nameEditText.getText().toString();
                String email = emailEditText.getText().toString();
                String password = passwordEditText.getText().toString();
                String mobile = mobileEditText.getText().toString();
                if (TextUtils.isEmpty(name)) {
                    Toast.makeText(MainActivity.this, "Please enter your name",
Toast.LENGTH_SHORT).show();
                } else if (!Patterns.EMAIL_ADDRESS.matcher(email).matches()) {
                    Toast.makeText(MainActivity.this, "Please enter a valid email ID",
Toast.LENGTH_SHORT).show();
                } else if (password.length() < 6) {
                    Toast.makeText(MainActivity.this, "Password must be at least 6 characters long",
Toast.LENGTH_SHORT).show();
                } else if (mobile.length() != 10 || !TextUtils.isDigitsOnly(mobile)) {
                    Toast.makeText(MainActivity.this, "Please enter a valid 10-digit mobile number",
```

```

Toast.LENGTH_SHORT).show();
        } else {
            // Registration successful
            Toast.makeText(MainActivity.this, "Registration successful!",
Toast.LENGTH_SHORT).show();
        }
    }
});
}
}
}

```

activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp"
    android:orientation="vertical"
    android:background="@android:color/background_light">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Student Registration"
        android:textSize="24sp"
        android:textStyle="bold"
        android:layout_gravity="center_horizontal"
        android:textColor="#009688"
        android:paddingBottom="24dp"/>
    <EditText
        android:id="@+id/name"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Name"
        android:padding="12dp"
        android:background="@android:color/white"
        android:layout_marginBottom="16dp"
        android:textColor="#333333"
        android:textSize="16sp"
        android:inputType="textPersonName"/>
    <EditText
        android:id="@+id/email"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Email ID"
        android:padding="12dp"
        android:background="@android:color/white"

```

```
        android:layout_marginBottom="16dp"
        android:textColor="#333333"
        android:textSize="16sp"
        android:inputType="textEmailAddress"/>
    <EditText
        android:id="@+id/password"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Password"
        android:padding="12dp"
        android:background="@android:color/white"
        android:layout_marginBottom="16dp"
        android:textColor="#333333"
        android:textSize="16sp"
        android:inputType="textPassword"/>
    <EditText
        android:id="@+id/mobile"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Mobile Number"
        android:padding="12dp"
        android:background="@android:color/white"
        android:layout_marginBottom="24dp"
        android:textColor="#333333"
        android:textSize="16sp"
        android:inputType="phone"/>
    <Button
        android:id="@+id/register_button"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Register"
        android:backgroundTint="#009688"
        android:textColor="@android:color/white"
        android:padding="12dp"
        android:textStyle="bold"/>
</LinearLayout>
```

Output



Course Outcome -2

Experiment 1

Create an app with an image view and a toggle button . when the toggle is pressed , the image view should switch between two images.

MainActivity.java

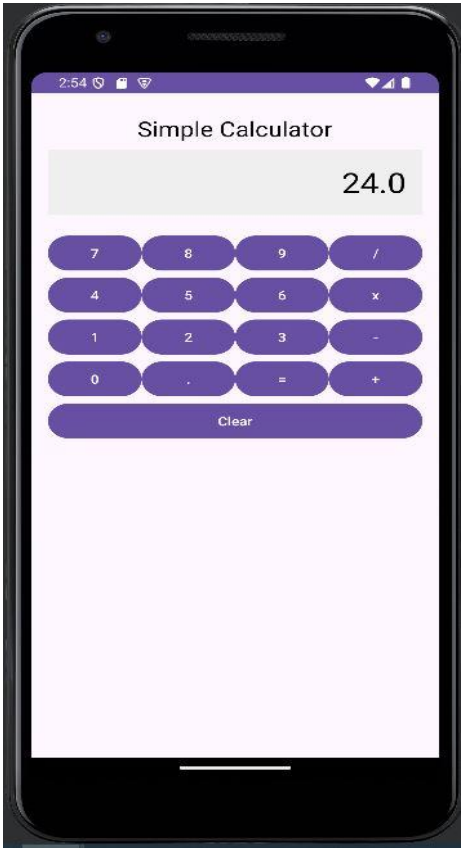
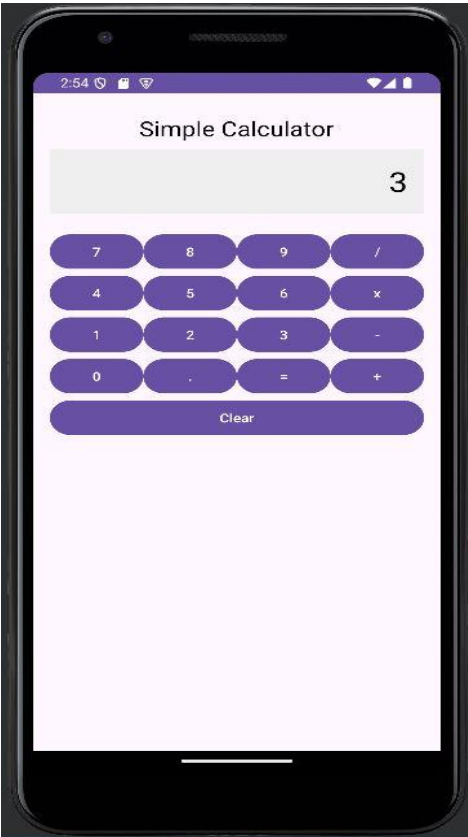
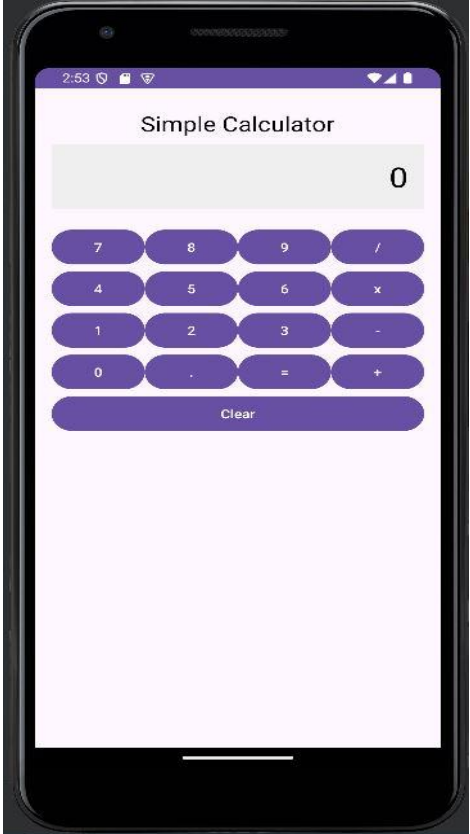
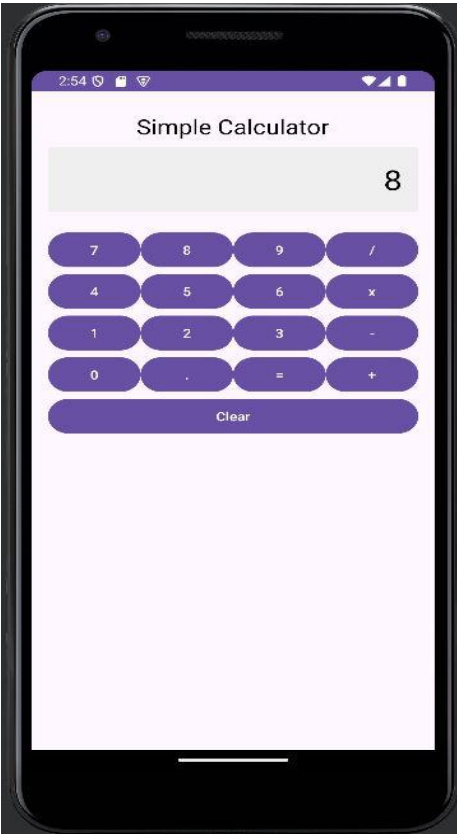
```
package com.example.imagetoggle;
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.ImageView;
import android.widget.ToggleButton;
public class MainActivity extends AppCompatActivity {
    private int currentIndex = 0;
    private ImageView imageView;
    private final int[] imageResources = {
        R.drawable.img1,
        R.drawable.img2,
        R.drawable.img3
    };
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        imageView = findViewById(R.id.imageView);
        ToggleButton toggleButton = findViewById(R.id.toggleButton);
        toggleButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                currentIndex = (currentIndex + 1) % imageResources.length;
                imageView.setImageResource(imageResources[currentIndex]);
            }
        });
    }
}
```

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">
<ImageView
    android:id="@+id/imageView"
    android:layout_width="0dp"
    android:layout_height="0dp"
    android:layout_marginStart="48dp"
    android:layout_marginTop="48dp"
    android:layout_marginEnd="48dp"
    android:layout_marginBottom="48dp"
    android:contentDescription="@string/image_desc"
    app:layout_constraintBottom_toTopOf="@+id/toggleButton"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:srcCompat="@drawable/img1" />
<ToggleButton
    android:id="@+id/toggleButton"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:textOff="Show Next Image"
    android:textOn="Show Next Image"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/imageView" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Output



Experiment 2

Create a simple calculator app using grid and linear layout that arranges number buttons (0-9) and basic operations (+,-,/,x) in a grid format.

MainActivity.java

```
package com.example.calc;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    private TextView display;
    private String currentDisplay = "";
    private double firstNumber = 0;
    private double secondNumber = 0;
    private String currentOperator = "";
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        display = findViewById(R.id.display);
        View.OnClickListener listener = new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Button button = (Button) v;
                String buttonText = button.getText().toString();
                if (buttonText.matches("[0-9.]")) {
                    if (buttonText.equals(".") && currentDisplay.contains(".")) {
                        return;
                    }
                    currentDisplay += buttonText;
                    display.setText(currentDisplay);
                } else if (buttonText.matches("[+\\-x/]")) {
                    if (!currentDisplay.isEmpty()) {
                        firstNumber = Double.parseDouble(currentDisplay);
                        currentOperator = buttonText;
                        currentDisplay = "";
                    }
                } else if (buttonText.equals("=")) {
                    if (!currentDisplay.isEmpty() && !currentOperator.isEmpty()) {
                        secondNumber = Double.parseDouble(currentDisplay);
```

```
        double result = performCalculation();
        display.setText(String.valueOf(result));
        currentDisplay = String.valueOf(result);
        currentOperator = "";
    }
} else if (buttonText.equals("Clear")) {
    currentDisplay = "";
    firstNumber = 0;
    secondNumber = 0;
    currentOperator = "";
    display.setText("0");
}
}
};
int[] buttonIds = {
    R.id.button0, R.id.button1, R.id.button2, R.id.button3,
    R.id.button4, R.id.button5, R.id.button6, R.id.button7,
    R.id.button8, R.id.button9, R.id.buttonAdd, R.id.buttonSubtract,
    R.id.buttonMultiply, R.id.buttonDivide, R.id.buttonDot, R.id.buttonEquals,
    R.id.buttonClear
};
for (int id : buttonIds) {
    findViewById(id).setOnClickListener(listener);
}
}
private double performCalculation() {
    switch (currentOperator) {
        case "+":
            return firstNumber + secondNumber;
        case "-":
            return firstNumber - secondNumber;
        case "x":
            return firstNumber * secondNumber;
        case "/":
            if (secondNumber == 0) {
                return 0;
            }
            return firstNumber / secondNumber;
        default:
            return 0;
    }
}
}
```

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp">
    <TextView
        android:id="@+id/textViewHeading"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Simple Calculator"
        android:textSize="24sp"
        android:textColor="#000000"
        android:layout_gravity="center"
        android:padding="8dp" />
    <TextView
        android:id="@+id/display"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:background="#EFEFEF"
        android:gravity="right"
        android:padding="16dp"
        android:text="0"
        android:textColor="#000000"
        android:textSize="32sp" />
    <GridLayout
        android:id="@+id/gridLayout"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp"
        android:columnCount="4"
        android:rowCount="4">
        <Button
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_columnWeight="1"
            android:text="7"
            android:id="@+id/button7"/>
        <Button
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_columnWeight="1"
            android:text="8"
            android:id="@+id/button8"/>
        <Button
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_columnWeight="1"
```

```
        android:text="9"
        android:id="@+id/button9"/>
<Button
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:text="/"
    android:id="@+id/buttonDivide"/>
<Button
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:text="4"
    android:id="@+id/button4"/>
<Button
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:text="5"
    android:id="@+id/button5"/>
<Button
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:text="6"
    android:id="@+id/button6"/>
<Button
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:text="x"
    android:id="@+id/buttonMultiply"/>
<Button
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:text="1"
    android:id="@+id/button1"/>
<Button
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:text="2"
    android:id="@+id/button2"/>
<Button
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_columnWeight="1"
    android:text="3"
```

```
        android:id="@+id/button3"/>
    <Button
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_columnWeight="1"
        android:text="-"
        android:id="@+id/buttonSubtract"/>
    <Button
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_columnWeight="1"
        android:text="0"
        android:id="@+id/button0"/>
    <Button
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_columnWeight="1"
        android:text="."
        android:id="@+id/buttonDot"/>
    <Button
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_columnWeight="1"
        android:text="="
        android:id="@+id/buttonEquals"/>
    <Button
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_columnWeight="1"
        android:text="+"
        android:id="@+id/buttonAdd"/>
</GridLayout>
<Button
    android:id="@+id/buttonClear"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Clear"/>
</LinearLayout>
```


Output

A mobile application interface titled "Personal Details". It features three input fields: "Name", "Age", and "Gender". The "Gender" field has two radio buttons labeled "Male" and "Female", both of which are currently unselected. Below the input fields is a purple "Submit" button. The status bar at the top shows the time as 7:02 and various system icons.

The same mobile application interface as the first screenshot, but now with data entered into the fields. The "Name" field contains "Akhila", the "Age" field contains "22", and the "Female" radio button under the "Gender" field is now selected. The purple "Submit" button remains at the bottom. The status bar at the top shows the time as 7:03.

A mobile application interface displaying the confirmed details. The text "Name: Akhila", "Age: 22", and "Gender: Female" is shown at the top of the screen. The rest of the screen is empty. The status bar at the top shows the time as 7:03.

Experiment 3

Create an app where users input their personal details on first screen (use checkbox) when they click submit button use an explicit intent to pass this data to a second activity where it is displayed on the screen.

MainActivity.java

```
package com.example.personaldetailsapp;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.CheckBox;
import android.widget.EditText;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    private EditText nameEditText;
    private EditText ageEditText;
    private CheckBox maleCheckBox;
    private CheckBox femaleCheckBox;
    private Button submitButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        nameEditText = findViewById(R.id.name);
        ageEditText = findViewById(R.id.age);
        maleCheckBox = findViewById(R.id.maleCheckBox);
        femaleCheckBox = findViewById(R.id.femaleCheckBox);
        submitButton = findViewById(R.id.submitButton);
        submitButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String name = nameEditText.getText().toString();
                String age = ageEditText.getText().toString();
                String gender = "";
                if (maleCheckBox.isChecked()) {
                    gender = "Male";
                } else if (femaleCheckBox.isChecked()) {
                    gender = "Female";
                }
                if (name.isEmpty() || age.isEmpty() || gender.isEmpty()) {
                    Toast.makeText(MainActivity.this, "Please fill all fields",
                        Toast.LENGTH_SHORT).show();
                } else {
                    Intent intent = new Intent(MainActivity.this, SecondActivity.class);
                    intent.putExtra("name", name);
```

```

        intent.putExtra("age", age);
        intent.putExtra("gender", gender);
        startActivity(intent);
    }
}
});
}
}

```

activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp">
    <TextView
        android:id="@+id/heading"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Personal Details"
        android:textSize="24sp"
        android:textStyle="bold"
        android:layout_centerHorizontal="true"
        android:layout_alignParentTop="true"
        android:layout_marginBottom="20dp"/>
    <EditText
        android:id="@+id/name"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/heading"
        android:hint="Name"/>
    <EditText
        android:id="@+id/age"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/name"
        android:hint="Age"
        android:inputType="number"/>
    <CheckBox
        android:id="@+id/maleCheckBox"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/age"
        android:text="Male"/>
    <CheckBox
        android:id="@+id/femaleCheckBox"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"

```

```

        android:layout_toRightOf="@id/maleCheckBox"
        android:layout_below="@id/age"
        android:text="Female"/>
    <Button
        android:id="@+id/submitButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/maleCheckBox"
        android:text="Submit"/>
</RelativeLayout>

```

SecondActivity.java

```

package com.example.personaldetailsapp;
import android.content.Intent;
import android.os.Bundle;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;
public class SecondActivity extends AppCompatActivity {
    private TextView detailsTextView;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_second);
        detailsTextView = findViewById(R.id.detailsTextView);
        Intent intent = getIntent();
        String name = intent.getStringExtra("name");
        String age = intent.getStringExtra("age");
        String gender = intent.getStringExtra("gender");
        detailsTextView.setText("Name: " + name + "\nAge: " + age + "\nGender: " + gender);
    }
}

```

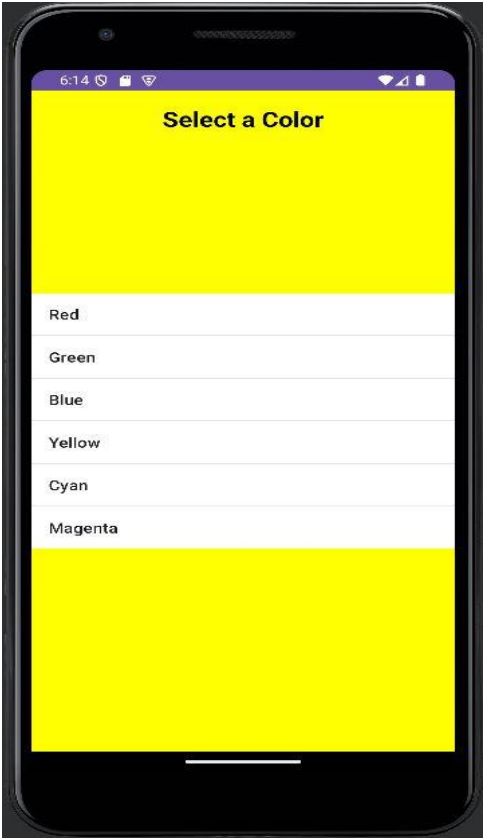
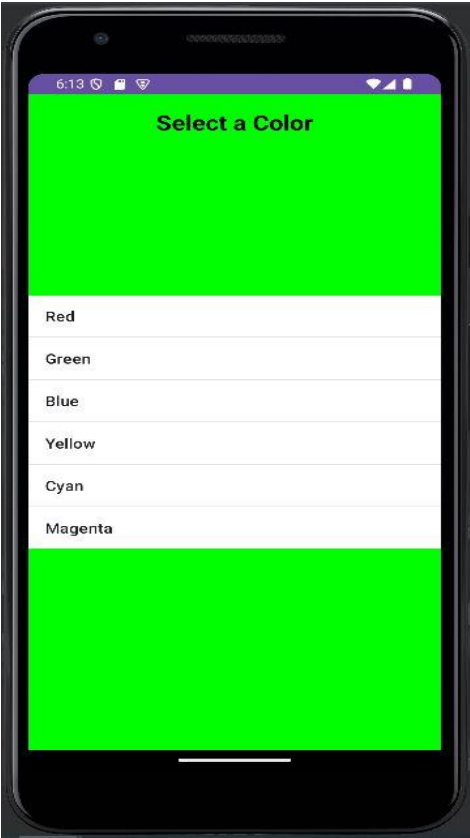
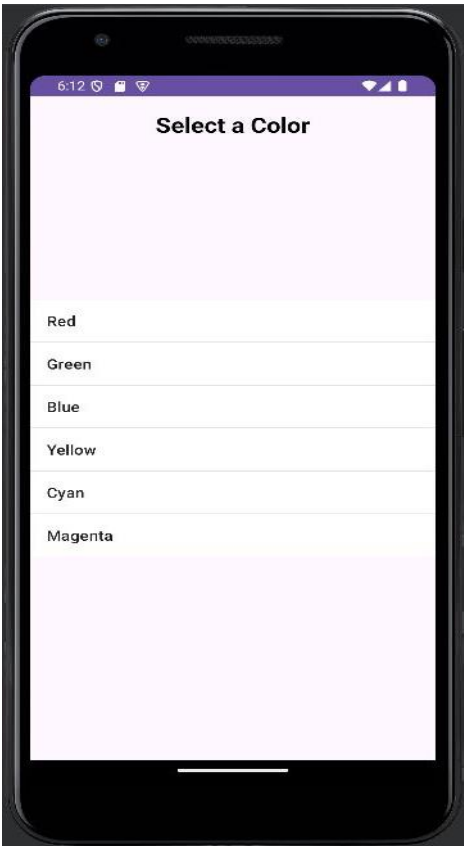
activity_second.xml

```

<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp">
    <TextView
        android:id="@+id/detailsTextView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textSize="18sp"/>
</RelativeLayout>

```

Output



Experiment 4

Build a color selection app using a frame layout that displays a listbox of color names. When a color is selected, change the background color of the frame layout to match the selected color.

MainActivity.java

```
package com.example.colorchange;
import android.graphics.Color;
import android.os.Bundle;
import android.widget.AdapterView;
import android.widget.AdapterView.Adapter;
import android.widget.AdapterView.OnItemClickListener;
import android.widget.FrameLayout;
import android.widget.ListView;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    FrameLayout frameLayout;
    ListView listView;
    String[] colors = {"Red", "Green", "Blue", "Yellow", "Cyan", "Magenta"};
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        frameLayout = findViewById(R.id.frameLayout);
        listView = findViewById(R.id.listView);
        ArrayAdapter<String> adapter = new ArrayAdapter<>(this,
android.R.layout.simple_list_item_1, colors);
        listView.setAdapter(adapter);
        listView.setOnItemClickListener(new AdapterView.OnItemClickListener() {
            @Override
            public void onItemClick(AdapterView<?> parent, android.view.View view, int position,
long id) {
                String selectedColor = colors[position];
                switch (selectedColor) {
                    case "Red":
                        frameLayout.setBackgroundColor(Color.RED);
                        break;
                    case "Green":
                        frameLayout.setBackgroundColor(Color.GREEN);
                        break;
                    case "Blue":
                        frameLayout.setBackgroundColor(Color.BLUE);
                        break;
                    case "Yellow":
                        frameLayout.setBackgroundColor(Color.YELLOW);
                        break;
                    case "Cyan":
                        frameLayout.setBackgroundColor(Color.CYAN);
                        break;
                }
            }
        });
    }
}
```

```

        case "Magenta":
            frameLayout.setBackgroundColor(Color.MAGENTA);
            break;
    }
}
});
}
}

```

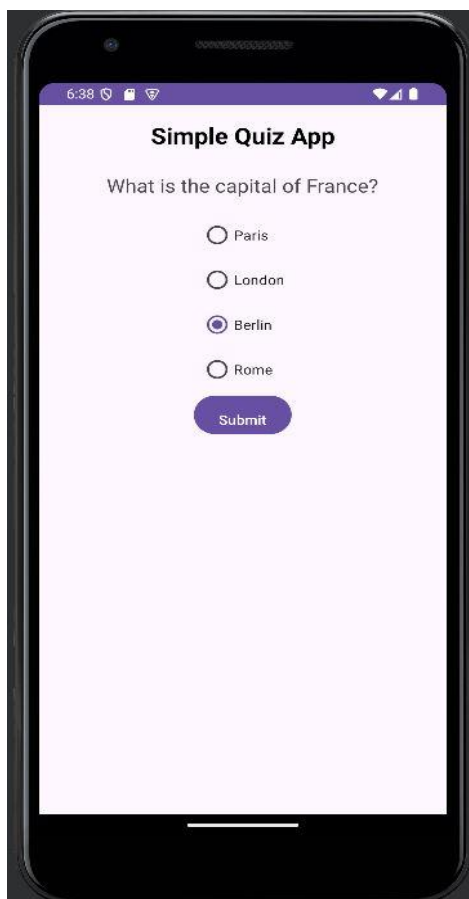
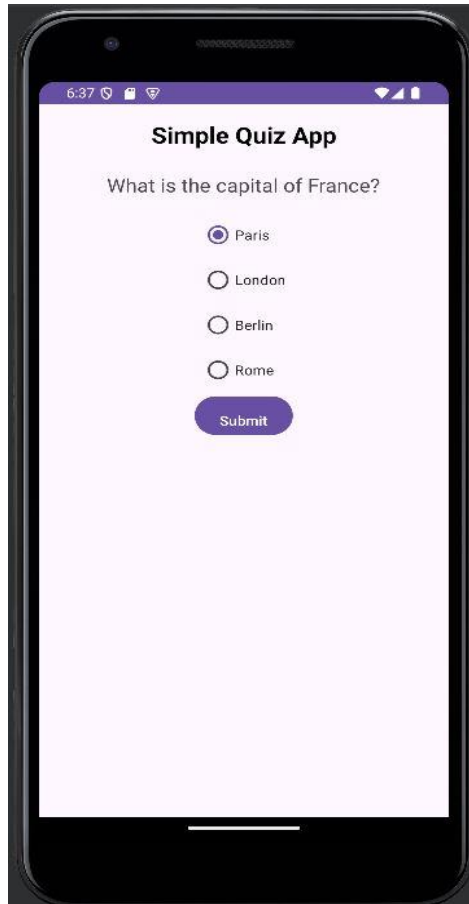
activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>
<FrameLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/frameLayout"
    android:layout_width="match_parent"
    android:layout_height="match_parent">
    <TextView
        android:id="@+id/textViewHeading"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="top|center_horizontal"
        android:text="Select a Color"
        android:textSize="24sp"
        android:textStyle="bold"
        android:padding="16dp"
        android:textColor="#000000" />
    <ListView
        android:id="@+id/listView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:dividerHeight="1dp"
        android:background="#FFFFFF" />
</FrameLayout>

```

Output



Experiment 5

Design a quiz app with two activities. First activity contains a question with multiple choices using radio buttons and a submit button. Use an explicit intent to navigate to a results activity that shows whether the user's answer was correct based on the selected radio button.

MainActivity.java

```
package com.example.quizapp;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.RadioButton;
import android.widget.RadioGroup;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    RadioGroup radioGroup;
    Button submitButton;
    RadioButton selectedRadioButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        radioGroup = findViewById(R.id.radioGroup);
        submitButton = findViewById(R.id.submitButton);
        submitButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                int selectedId = radioGroup.getCheckedRadioButtonId();
                selectedRadioButton = findViewById(selectedId);
                String selectedAnswer = selectedRadioButton.getText().toString();
                Intent intent = new Intent(MainActivity.this, ResultActivity.class);
                intent.putExtra("selectedAnswer", selectedAnswer);
                startActivity(intent);
            }
        });
    }
}
```

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp">
    <TextView
        android:id="@+id/headingTextView"
        android:layout_width="wrap_content"
```

```
        android:layout_height="wrap_content"
        android:text="Simple Quiz App"
        android:textSize="24sp"
        android:textStyle="bold"
        android:layout_gravity="center_horizontal"
        android:paddingBottom="24dp"
        android:textColor="#000000" />
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="What is the capital of France?"
    android:textSize="20sp"
    android:layout_gravity="center_horizontal"
    android:paddingBottom="16dp" />
<RadioGroup
    android:id="@+id/radioGroup"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:orientation="vertical"
    android:layout_gravity="center_horizontal">
    <RadioButton
        android:id="@+id/radioButton1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Paris" />
    <RadioButton
        android:id="@+id/radioButton2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="London" />
    <RadioButton
        android:id="@+id/radioButton3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Berlin" />
    <RadioButton
        android:id="@+id/radioButton4"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Rome" />
</RadioGroup>
<Button
    android:id="@+id/submitButton"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Submit"
    android:layout_gravity="center_horizontal"
    android:paddingTop="16dp" />
</LinearLayout>
```

ResultActivity.java

```

package com.example.quizapp;
import android.os.Bundle;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;
public class ResultActivity extends AppCompatActivity {
    TextView resultTextView;
    String correctAnswer = "Paris";
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_result);
        resultTextView = findViewById(R.id.resultTextView);
        String selectedAnswer = getIntent().getStringExtra("selectedAnswer");
        if (selectedAnswer.equals(correctAnswer)) {
            resultTextView.setText("Correct! The capital of France is Paris.");
        } else {
            resultTextView.setText("Incorrect. The correct answer is Paris.");
        }
    }
}

```

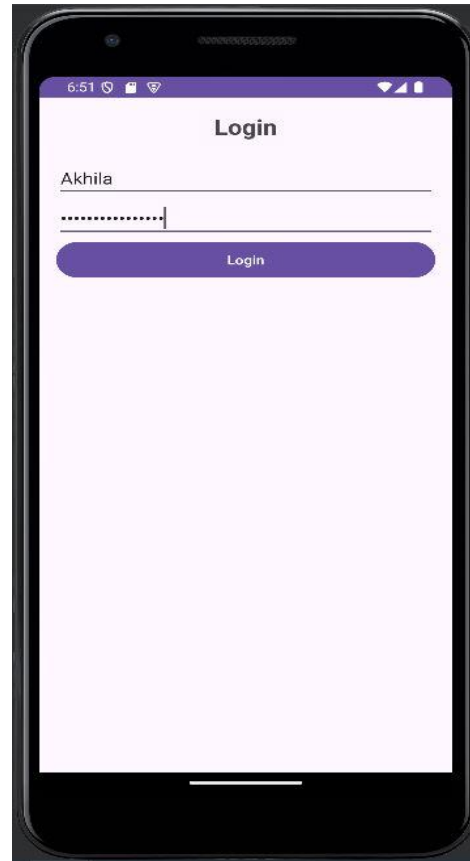
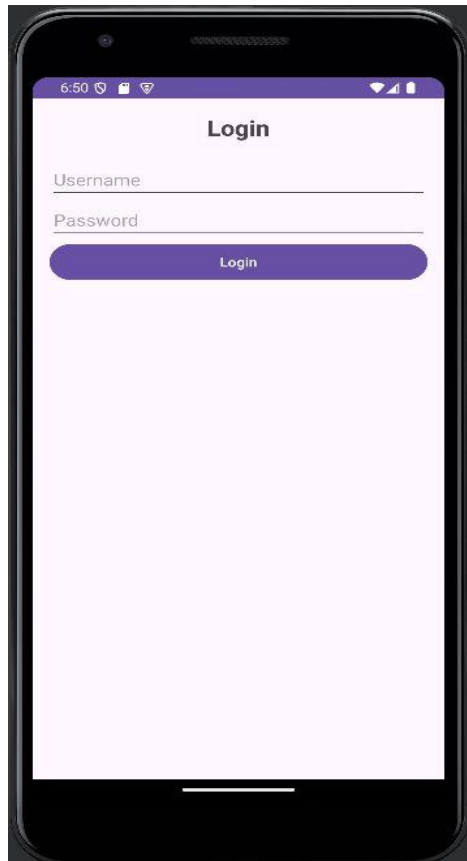
activity_result.xml

```

<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp"
    android:gravity="center">
    <TextView
        android:id="@+id/headingResultTextView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Quiz Result"
        android:textSize="24sp"
        android:textStyle="bold"
        android:layout_gravity="center_horizontal"
        android:paddingBottom="24dp"
        android:textColor="#000000" />
    <TextView
        android:id="@+id/resultTextView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textSize="20sp"
        android:layout_gravity="center_horizontal"
        android:paddingBottom="16dp" />
</LinearLayout>

```

Output



Experiment 6

Create an Android application with two activities: In MainActivity, implement a login page where users enter their username and password, save the username using Shared Preferences, and share the username using an implicit intent. In SecondActivity, receive the shared username and display a welcome message, simulating a login experience similar to Facebook.

MainActivity.java

```
package com.example.simpleloginapp;
import android.content.Context;
import android.content.Intent;
import android.content.SharedPreferences;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    private EditText usernameEditText;
    private EditText passwordEditText;
    private Button loginButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        usernameEditText = findViewById(R.id.username);
        passwordEditText = findViewById(R.id.password);
        loginButton = findViewById(R.id.loginButton);
        loginButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String username = usernameEditText.getText().toString();
                String password = passwordEditText.getText().toString();
                if (username.isEmpty() || password.isEmpty()) {
                    Toast.makeText(MainActivity.this, "Please enter both username and password",
Toast.LENGTH_SHORT).show();
                } else {
                    SharedPreferences sharedPreferences = getSharedPreferences("MyPrefs",
Context.MODE_PRIVATE);
                    SharedPreferences.Editor editor = sharedPreferences.edit();
                    editor.putString("username", username);
                    editor.apply();
                    Intent intent = new Intent(MainActivity.this, SecondActivity.class);
                    intent.putExtra("username", username);
                    startActivity(intent);
                }
            }
        })
    }
}
```

```

    });
}
}

```

activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp">
    <TextView
        android:id="@+id/heading"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Login"
        android:textSize="24sp"
        android:textStyle="bold"
        android:layout_centerHorizontal="true"
        android:layout_alignParentTop="true"
        android:layout_marginBottom="20dp"/>
    <EditText
        android:id="@+id/username"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/heading"
        android:hint="Username"
        android:inputType="text"/>
    <EditText
        android:id="@+id/password"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/username"
        android:hint="Password"
        android:inputType="textPassword"/>
    <Button
        android:id="@+id/loginButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/password"
        android:text="Login"/>
</RelativeLayout>

```

SecondActivity.java

```

package com.example.simpleloginapp;
import android.content.Intent;
import android.os.Bundle;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;

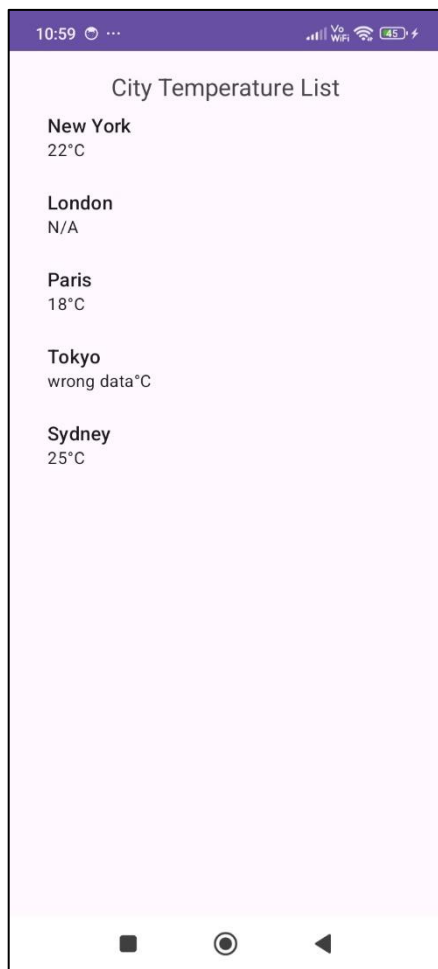
```

```
public class SecondActivity extends AppCompatActivity {  
    private TextView welcomeTextView;  
    @Override  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        setContentView(R.layout.activity_second);  
        welcomeTextView = findViewById(R.id.welcomeTextView);  
        Intent intent = getIntent();  
        String username = intent.getStringExtra("username");  
        if (username != null) {  
            welcomeTextView.setText("Welcome, " + username + "!");  
        }  
    }  
}
```

activity_second.xml

```
<?xml version="1.0" encoding="utf-8"?>  
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"  
    android:layout_width="match_parent"  
    android:layout_height="match_parent"  
    android:padding="16dp">  
    <TextView  
        android:id="@+id/welcomeTextView"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:textSize="24sp"/>  
</RelativeLayout>
```

Output



Course Outcome - 3

Experiment 1

Create an app that uses an adapter to display a list of cities and their corresponding temperatures. Implement exception handling to manage scenarios where temperature data is missing or improperly formatted.

MainActivity.java

```
package com.example.citytemp;
import android.os.Bundle;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.TextView;
import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.recyclerview.widget.LinearLayoutManager;
import androidx.recyclerview.widget.RecyclerView;
import java.util.ArrayList;
import java.util.List;
public class MainActivity extends AppCompatActivity {
    private RecyclerView recyclerView;
    private CityTemperatureAdapter adapter;
    private List<CityTemperature> cityTemperatureList;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        recyclerView = findViewById(R.id.recyclerView);
        recyclerView.setLayoutManager(new LinearLayoutManager(this));
        cityTemperatureList = new ArrayList<>();
        cityTemperatureList.add(new CityTemperature("New York", "22"));
        cityTemperatureList.add(new CityTemperature("London", null));
        cityTemperatureList.add(new CityTemperature("Paris", "18"));
        cityTemperatureList.add(new CityTemperature("Tokyo", "wrong data"));
        cityTemperatureList.add(new CityTemperature("Sydney", "25"));
        adapter = new CityTemperatureAdapter(cityTemperatureList);
        recyclerView.setAdapter(adapter);
    }
    public static class CityTemperature {
        private String cityName;
        private String temperature;
        public CityTemperature(String cityName, String temperature) {
            this.cityName = cityName;
            this.temperature = temperature;
        }
    }
}
```

```

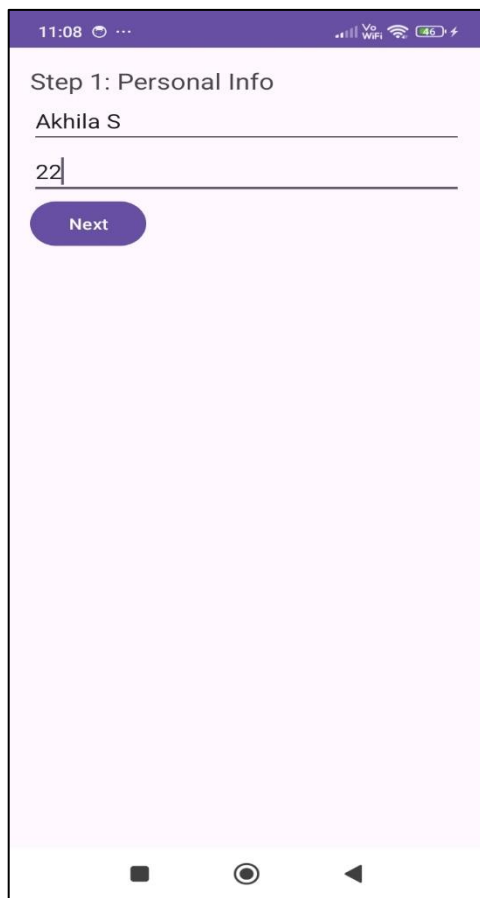
        public String getCityName() {
            return cityName;
        }
        public String getTemperature() {
            return temperature;
        }
    }
    public static class CityTemperatureAdapter extends
RecyclerView.Adapter<CityTemperatureAdapter.ViewHolder> {
        private List<CityTemperature> cityTemperatureList;
        public CityTemperatureAdapter(List<CityTemperature> cityTemperatureList) {
            this.cityTemperatureList = cityTemperatureList;
        }
        @NonNull
        @Override
        public ViewHolder onCreateViewHolder(@NonNull ViewGroup parent, int viewType) {
            View view =
LayoutInflater.from(parent.getContext()).inflate(android.R.layout.simple_list_item_2, parent, false);
            return new ViewHolder(view);
        }
        @Override
        public void onBindViewHolder(@NonNull ViewHolder holder, int position) {
            CityTemperature cityTemperature = cityTemperatureList.get(position);
            holder.tvCity.setText(cityTemperature.getCityName());
            try {
                if (cityTemperature.getTemperature() == null || cityTemperature.getTemperature().isEmpty()) {
                    throw new Exception("Temperature data missing");
                }
                holder.tvTemperature.setText(cityTemperature.getTemperature() + "°C");
            } catch (Exception e) {
                holder.tvTemperature.setText("N/A");
            }
        }
        @Override
        public int getItemCount() {
            return cityTemperatureList.size();
        }
    }
    public static class ViewHolder extends RecyclerView.ViewHolder {
        TextView tvCity, tvTemperature;
        public ViewHolder(@NonNull View itemView) {
            super(itemView);
            tvCity = itemView.findViewById(android.R.id.text1);
            tvTemperature = itemView.findViewById(android.R.id.text2);
        }
    }
}

```

activity_main.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:padding="16dp">
    <TextView
        android:id="@+id/heading"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="City Temperature List"
        android:textSize="20sp"
        android:layout_gravity="center"/>
    <androidx.recyclerview.widget.RecyclerView
        android:id="@+id/recyclerView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"/>
</LinearLayout>
```

Output



11:08

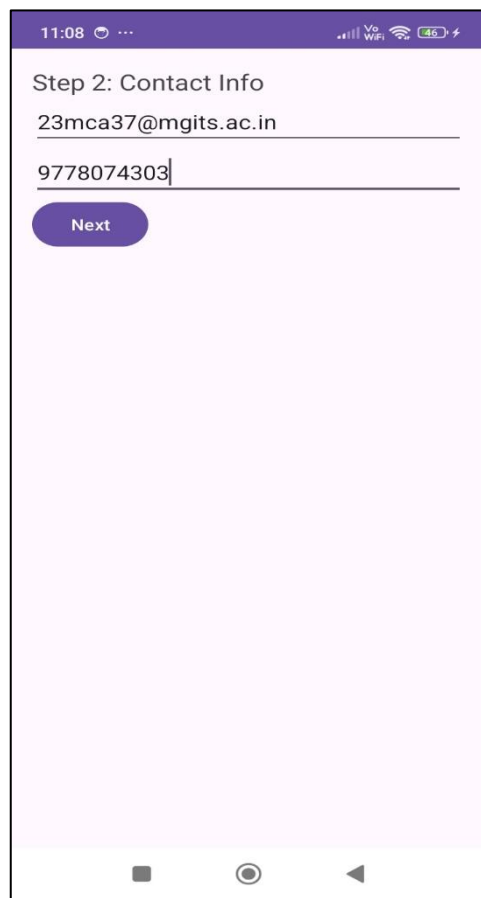
Step 1: Personal Info

Akhila S

22

Next

This screenshot shows the first step of a registration form. The title is 'Step 1: Personal Info'. There are two text input fields: the first contains 'Akhila S' and the second contains '22'. A purple 'Next' button is located below the second field. The status bar at the top shows the time as 11:08 and 46% battery.



11:08

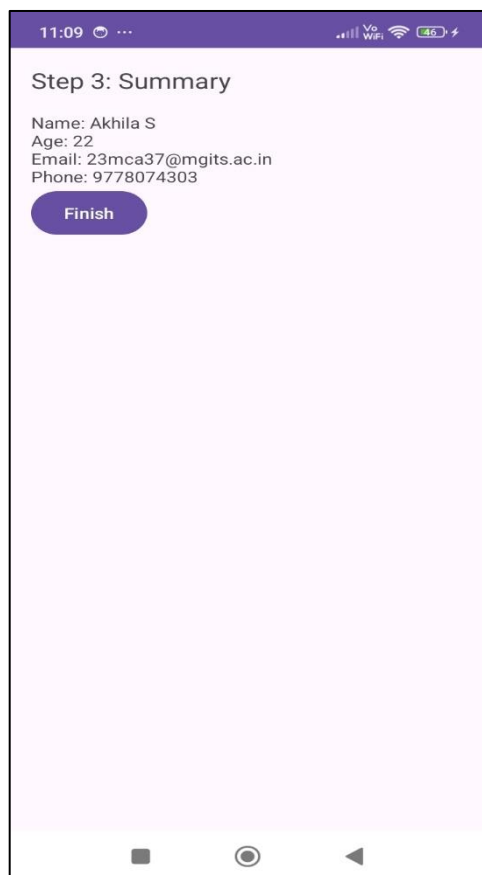
Step 2: Contact Info

23mca37@mgits.ac.in

9778074303

Next

This screenshot shows the second step of the registration form. The title is 'Step 2: Contact Info'. There are two text input fields: the first contains '23mca37@mgits.ac.in' and the second contains '9778074303'. A purple 'Next' button is located below the second field. The status bar at the top shows the time as 11:08 and 46% battery.



11:09

Step 3: Summary

Name: Akhila S
Age: 22
Email: 23mca37@mgits.ac.in
Phone: 9778074303

Finish

This screenshot shows the third and final step of the registration form. The title is 'Step 3: Summary'. It displays a list of the entered information: Name: Akhila S, Age: 22, Email: 23mca37@mgits.ac.in, and Phone: 9778074303. A purple 'Finish' button is located below the summary text. The status bar at the top shows the time as 11:09 and 46% battery.

Experiment 2

Develop a user profile setup wizard where each activity represents a different setup step (e.g., personal info, contact info). Use intents to navigate between activities and carry the user's data across each step.

MainActivity.java

```
package com.example.profilewizard;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.LinearLayout;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    private LinearLayout layoutPersonalInfo, layoutContactInfo, layoutSummary;
    private EditText etName, etAge, etEmail, etPhone;
    private TextView tvSummary;
    private Button btnNext;
    private int currentStep = 1;
    private String name, age, email, phone;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        layoutPersonalInfo = findViewById(R.id.layoutPersonalInfo);
        layoutContactInfo = findViewById(R.id.layoutContactInfo);
        layoutSummary = findViewById(R.id.layoutSummary);
        etName = findViewById(R.id.etName);
        etAge = findViewById(R.id.etAge);
        etEmail = findViewById(R.id.etEmail);
        etPhone = findViewById(R.id.etPhone);
        tvSummary = findViewById(R.id.tvSummary);
        btnNext = findViewById(R.id.btnNext);
        btnNext.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (currentStep == 1) {
                    name = etName.getText().toString();
                    age = etAge.getText().toString();
                    if (!name.isEmpty() && !age.isEmpty()) {
                        currentStep = 2;
                        showStep();
                    } else {
                        etName.setError("Name is required");
                        etAge.setError("Age is required");
                    }
                }
            }
        });
    }
}
```

```

        } else if (currentStep == 2) {
            email = etEmail.getText().toString();
            phone = etPhone.getText().toString();
            if (!email.isEmpty() && !phone.isEmpty()) {
                currentStep = 3;
                showStep();
            } else {
                etEmail.setError("Email is required");
                etPhone.setError("Phone is required");
            }
        } else if (currentStep == 3) {
            finish();
        }
    }
});
}

private void showStep() {
    if (currentStep == 1) {
        layoutPersonalInfo.setVisibility(View.VISIBLE);
        layoutContactInfo.setVisibility(View.GONE);
        layoutSummary.setVisibility(View.GONE);
        btnNext.setText("Next");
    } else if (currentStep == 2) {
        layoutPersonalInfo.setVisibility(View.GONE);
        layoutContactInfo.setVisibility(View.VISIBLE);
        layoutSummary.setVisibility(View.GONE);
        btnNext.setText("Next");
    } else if (currentStep == 3) {
        layoutPersonalInfo.setVisibility(View.GONE);
        layoutContactInfo.setVisibility(View.GONE);
        layoutSummary.setVisibility(View.VISIBLE);
        String summary = "Name: " + name + "\n" +
            "Age: " + age + "\n" +
            "Email: " + email + "\n" +
            "Phone: " + phone;
        tvSummary.setText(summary);
        btnNext.setText("Finish");
    }
}
}
}

```

activity_main.xml

```

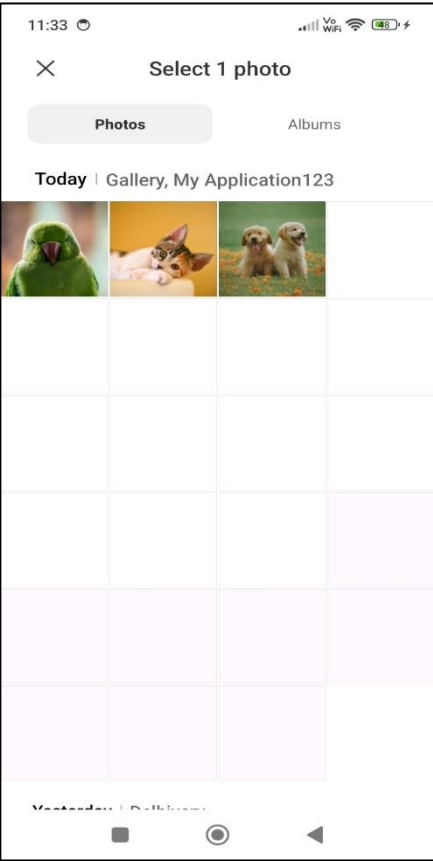
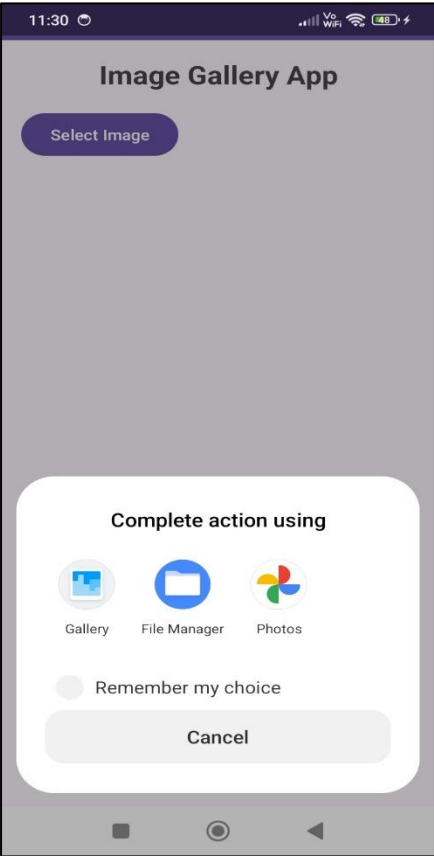
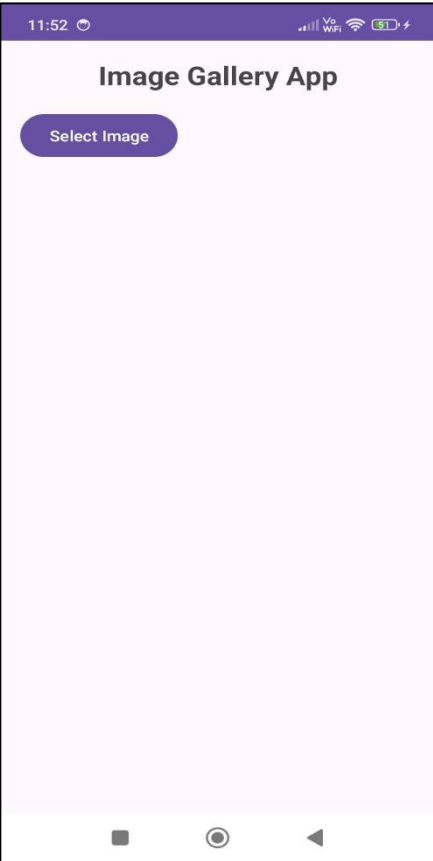
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp">

```

```
<LinearLayout
    android:id="@+id/layoutPersonalInfo"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="wrap_content">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Step 1: Personal Info"
        android:textSize="20sp"/>
    <EditText
        android:id="@+id/etName"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter your name"/>
    <EditText
        android:id="@+id/etAge"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter your age"
        android:inputType="number"/>
</LinearLayout>
<LinearLayout
    android:id="@+id/layoutContactInfo"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:visibility="gone">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Step 2: Contact Info"
        android:textSize="20sp"/>
    <EditText
        android:id="@+id/etEmail"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter your email"
        android:inputType="textEmailAddress"/>
    <EditText
        android:id="@+id/etPhone"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter your phone number"
        android:inputType="phone"/>
</LinearLayout>
<LinearLayout
    android:id="@+id/layoutSummary"
    android:orientation="vertical"
```

```
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:visibility="gone">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Step 3: Summary"
        android:textSize="20sp"/>
    <TextView
        android:id="@+id/tvSummary"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:paddingTop="16dp"/>
</LinearLayout>
<Button
    android:id="@+id/btnNext"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Next"/>
</LinearLayout>
```


Output



Experiment - 3

Develop an app that allows users to select an image from their gallery and display the information about the selected image.

MainActivity.java

```
package com.example.selectimg;
import android.Manifest;
import android.content.Intent;
import android.content.pm.PackageManager;
import android.database.Cursor;
import android.graphics.Bitmap;
import android.graphics.BitmapFactory;
import android.net.Uri;
import android.os.Build;
import android.os.Bundle;
import android.provider.MediaStore;
import android.widget.Button;
import android.widget.ImageView;
import android.widget.TextView;
import android.widget.Toast;
import androidx.annotation.NonNull;
import androidx.annotation.Nullable;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;
import java.io.File;
public class MainActivity extends AppCompatActivity {
    private static final int PICK_IMAGE_REQUEST = 1;
    private static final int STORAGE_PERMISSION_CODE = 100;
    private ImageView imageView;
    private TextView textViewImageInfo;
    private Button btnSelectImage;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        imageView = findViewById(R.id.imageView);
        textViewImageInfo = findViewById(R.id.textViewImageInfo);
        btnSelectImage = findViewById(R.id.btnSelectImage);
        btnSelectImage.setOnClickListener(v -> {
            if (checkStoragePermission()) {
                openGallery();
            } else {
                requestStoragePermission();
            }
        });
    }
}
```

```

private void openGallery() {
    Intent intent = new Intent(Intent.ACTION_PICK,
MediaStore.Images.Media.EXTERNAL_CONTENT_URI);
    startActivityForResult(intent, PICK_IMAGE_REQUEST);
}
@Override
protected void onActivityResult(int requestCode, int resultCode, @Nullable Intent data) {
    super.onActivityResult(requestCode, resultCode, data);
    if (requestCode == PICK_IMAGE_REQUEST && resultCode == RESULT_OK && data !=
null) {
        Uri imageUri = data.getData();
        if (imageUri != null) {
            displayImageInfo(imageUri);
        }
    }
}
private void displayImageInfo(Uri imageUri) {
    String filePath = getRealPathFromURI(imageUri);
    if (filePath != null) {
        File imageFile = new File(filePath);
        String imageSize = imageFile.length() / 1024 + " KB"; // File size in KB
        Bitmap bitmap = BitmapFactory.decodeFile(filePath);
        imageView.setImageBitmap(bitmap);
        imageView.setVisibility(android.view.View.VISIBLE); // Use full path for View
        textViewImageInfo.setText("File Path: " + filePath + "\nSize: " + imageSize +
"\nResolution: " + bitmap.getWidth() + "x" + bitmap.getHeight());
        textViewImageInfo.setVisibility(android.view.View.VISIBLE); // Use full path for View
    } else {
        Toast.makeText(this, "Unable to retrieve image info", Toast.LENGTH_SHORT).show();
    }
}
private String getRealPathFromURI(Uri contentUri) {
    String[] proj = {MediaStore.Images.Media.DATA};
    Cursor cursor = getContentResolver().query(contentUri, proj, null, null, null);
    if (cursor != null) {
        int column_index = cursor.getColumnIndexOrThrow(MediaStore.Images.Media.DATA);
        cursor.moveToFirst();
        String result = cursor.getString(column_index);
        cursor.close();
        return result;
    }
    return null;
}
private boolean checkStoragePermission() {
    int result = ContextCompat.checkSelfPermission(this,
Manifest.permission.READ_EXTERNAL_STORAGE);
    return result == PackageManager.PERMISSION_GRANTED;
}

```

```

private void requestStoragePermission() {
    if (ActivityCompat.shouldShowRequestPermissionRationale(this,
Manifest.permission.READ_EXTERNAL_STORAGE)) {
        Toast.makeText(this, "Storage permission is needed to select images",
Toast.LENGTH_LONG).show();
    }
    ActivityCompat.requestPermissions(this, new
String[]{ Manifest.permission.READ_EXTERNAL_STORAGE},
STORAGE_PERMISSION_CODE);
}
@Override
public void onRequestPermissionsResult(int requestCode, @NonNull String[] permissions,
@NonNull int[] grantResults) {
    if (requestCode == STORAGE_PERMISSION_CODE) {
        if (grantResults.length > 0 && grantResults[0] ==
PackageManager.PERMISSION_GRANTED) {
            openGallery();
        } else {
            Toast.makeText(this, "Permission denied", Toast.LENGTH_SHORT).show();
        }
    }
}
}
}

```

activity_main.xml

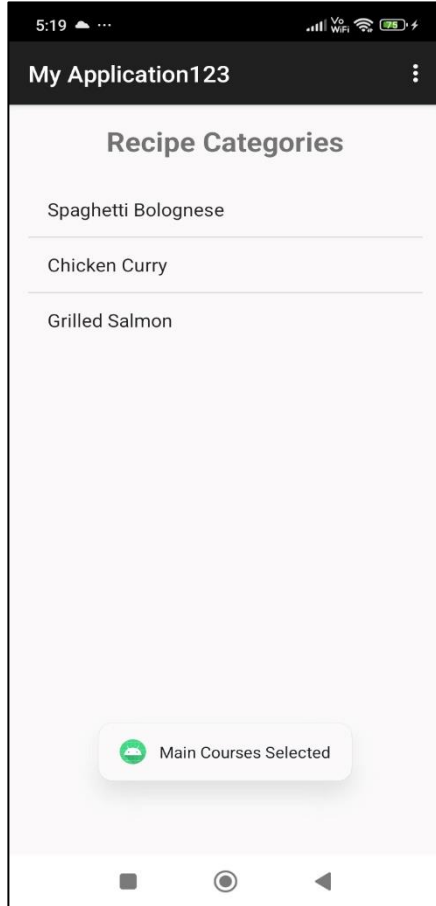
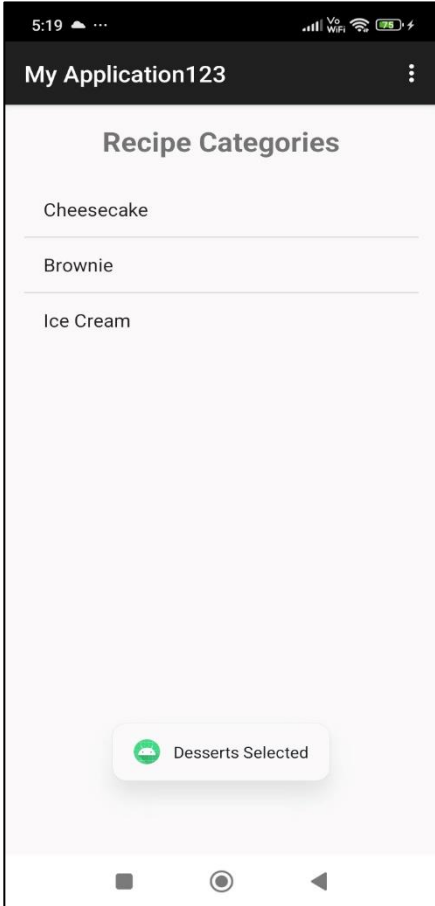
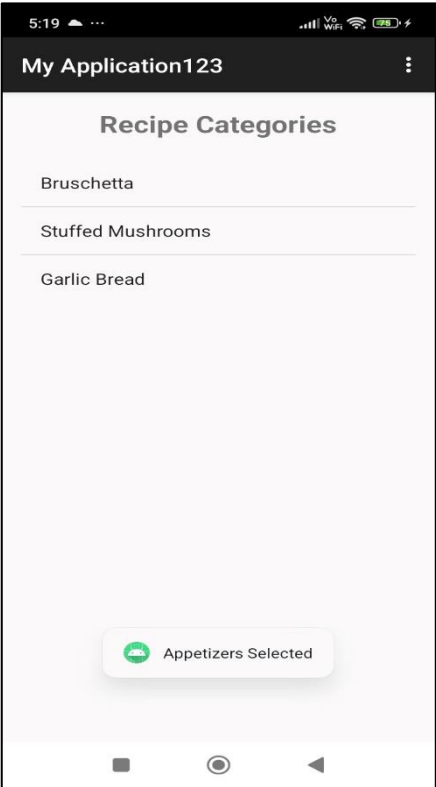
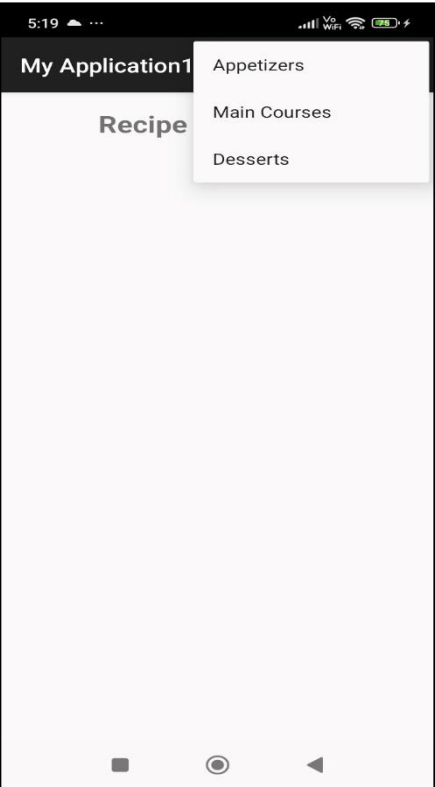
```

<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp">
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Select an Image"
        android:textSize="24sp"
        android:textStyle="bold"
        android:gravity="center"
        android:layout_marginBottom="16dp"/>
    <Button
        android:id="@+id/btnSelectImage"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Select Image"
        android:layout_marginBottom="16dp"/>
    <ImageView
        android:id="@+id/imageView"
        android:layout_width="match_parent"
        android:layout_height="300dp"

```

```
        android:scaleType="fitCenter"
        android:layout_marginBottom="16dp"
        android:visibility="gone"/>
    <TextView
        android:id="@+id/textViewImageInfo"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text=""
        android:textSize="16sp"
        android:visibility="gone"/>
</LinearLayout>
```

Output



Experiment - 4

Design an app with an options menu that allows users to navigate to different activities for browsing recipes by type (e.g., Appetizers, Main Courses, Desserts). Each menu item should open a list of recipes for the selected category.

MainActivity.java

```
package com.example.menuapp;
import android.os.Bundle;
import android.view.Menu;
import android.view.MenuItem;
import android.widget.ArrayAdapter;
import android.widget.ListView;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
import java.util.ArrayList;
public class MainActivity extends AppCompatActivity {
    private ListView listViewRecipes;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        listViewRecipes = findViewById(R.id.listViewRecipes);
    }
    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        menu.add(Menu.NONE, 1, Menu.NONE, "Appetizers");
        menu.add(Menu.NONE, 2, Menu.NONE, "Main Courses");
        menu.add(Menu.NONE, 3, Menu.NONE, "Desserts");
        return true;
    }
    @Override
    public boolean onOptionsItemSelected(MenuItem item) {
        ArrayList<String> recipes = new ArrayList<>();
        switch (item.getItemId()) {
            case 1:
                recipes.add("Bruschetta");
                recipes.add("Stuffed Mushrooms");
                recipes.add("Garlic Bread");
                Toast.makeText(this, "Appetizers Selected", Toast.LENGTH_SHORT).show();
                break;
            case 2:
                recipes.add("Spaghetti Bolognese");
                recipes.add("Chicken Curry");
                recipes.add("Grilled Salmon");
                Toast.makeText(this, "Main Courses Selected", Toast.LENGTH_SHORT).show();
                break;
```

```

        case 3:
            recipes.add("Cheesecake");
            recipes.add("Brownie");
            recipes.add("Ice Cream");
            Toast.makeText(this, "Desserts Selected", Toast.LENGTH_SHORT).show();
            break;
        default:
            return super.onOptionsItemSelected(item);
    }
    ArrayAdapter<String> adapter = new ArrayAdapter<>(this, android.R.layout.simple_list_item_1,
    recipes);
    listViewRecipes.setAdapter(adapter);
    return true;
}
}

```

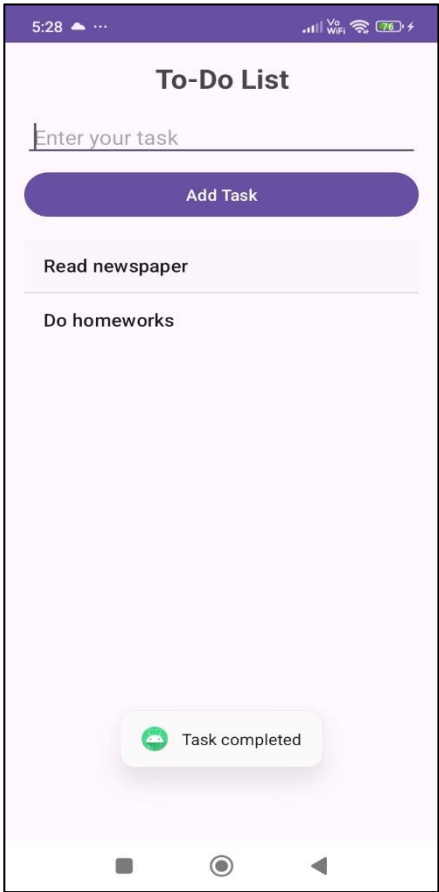
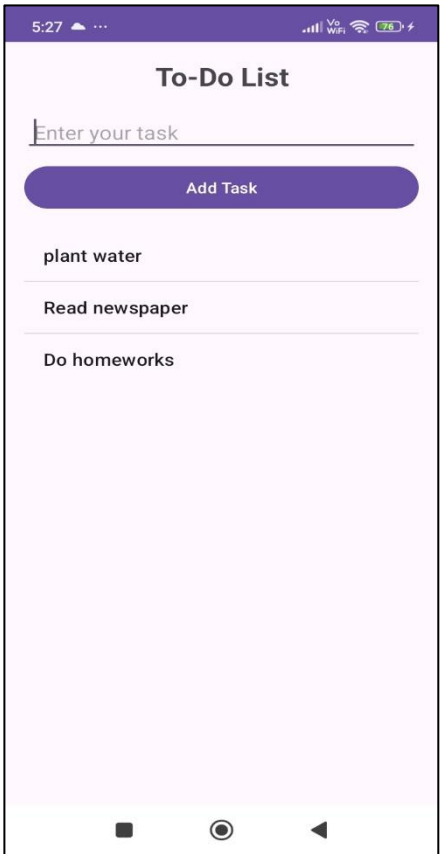
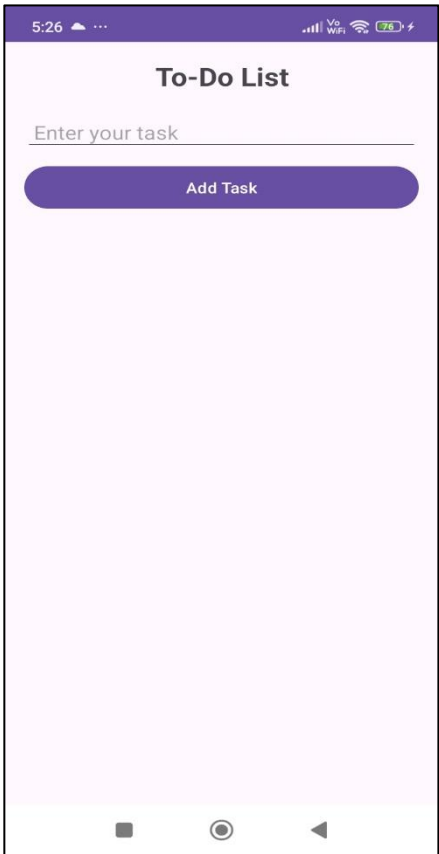
activity_main.xml

```

<?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:padding="16dp">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Recipe Categories"
        android:textSize="24sp"
        android:textStyle="bold"
        android:gravity="center"
        android:layout_gravity="center"/>
    <ListView
        android:id="@+id/listViewRecipes"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp" />
</LinearLayout>

```


Output



Experiment - 5

Develop a to-do list app where users can add tasks to a ListView. Use an ArrayAdapter to manage the tasks, allowing users to mark them as complete or delete them.

MainActivity.java

```
package com.example.todolist;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.ArrayAdapter;
import android.widget.Button;
import android.widget.EditText;
import android.widget.ListView;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
import java.util.ArrayList;
public class MainActivity extends AppCompatActivity {
    private EditText editTextTask;
    private Button buttonAdd;
    private ListView listViewTasks;
    private ArrayList<String> tasks;
    private ArrayAdapter<String> tasksAdapter;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        editTextTask = findViewById(R.id.editTextTask);
        buttonAdd = findViewById(R.id.buttonAdd);
        listViewTasks = findViewById(R.id.listViewTasks);
        tasks = new ArrayList<>();
        tasksAdapter = new ArrayAdapter<>(this, android.R.layout.simple_list_item_1, tasks);
        listViewTasks.setAdapter(tasksAdapter);
        buttonAdd.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String task = editTextTask.getText().toString().trim();
                if (!task.isEmpty()) {
                    tasks.add(task);
                    tasksAdapter.notifyDataSetChanged();
                    editTextTask.setText("");
                } else {
                    Toast.makeText(MainActivity.this, "Please enter a task",
Toast.LENGTH_SHORT).show();
                }
            }
        });
    }
}
```

```

listViewTasks.setOnItemClickListener(new AdapterView.OnItemClickListener() {
    @Override
    public void onItemClick(AdapterView<?> parent, View view, final int position, long id) {
        tasks.remove(position);
        tasksAdapter.notifyDataSetChanged();
        Toast.makeText(MainActivity.this, "Task completed", Toast.LENGTH_SHORT).show();
    }
});
listViewTasks.setOnItemLongClickListener(new AdapterView.OnItemLongClickListener() {
    @Override
    public boolean onItemLongClick(AdapterView<?> parent, View view, int position, long id)
{
    tasks.remove(position);
    tasksAdapter.notifyDataSetChanged(); // Refresh ListView
    Toast.makeText(MainActivity.this, "Task deleted", Toast.LENGTH_SHORT).show();
    return true;
}
});
}
}

```

activity_main.xml

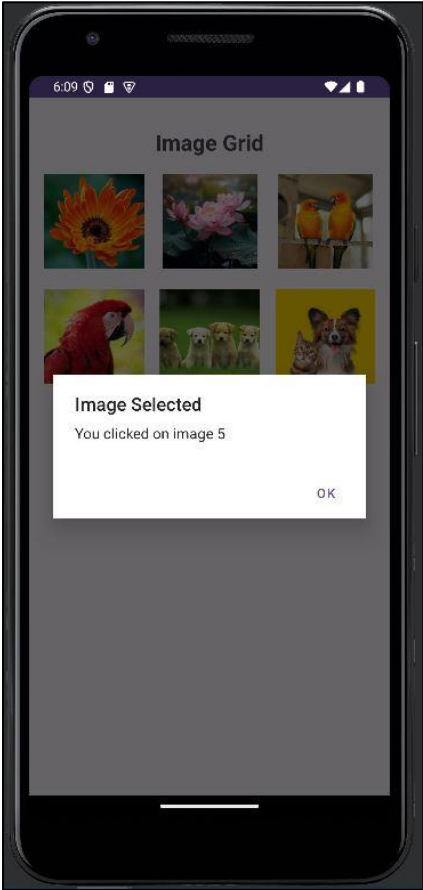
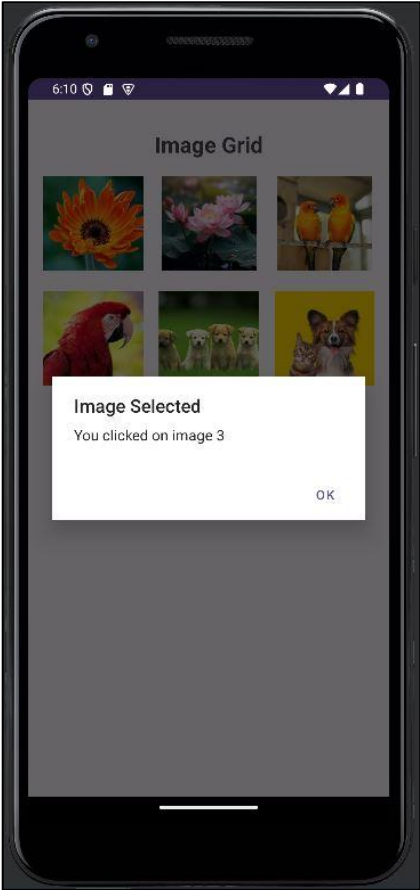
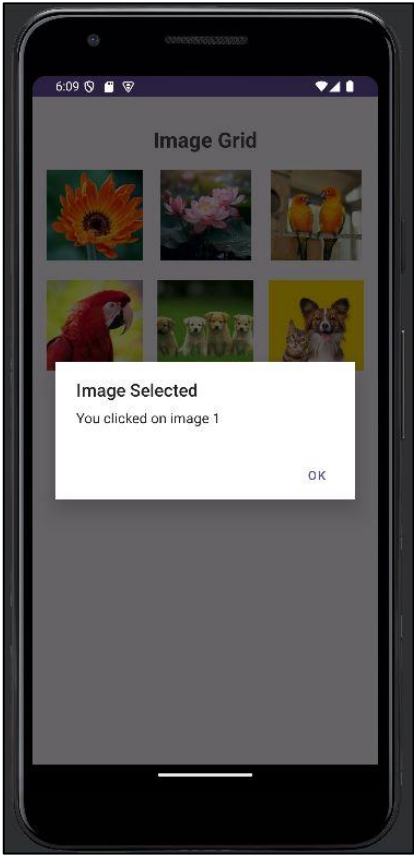
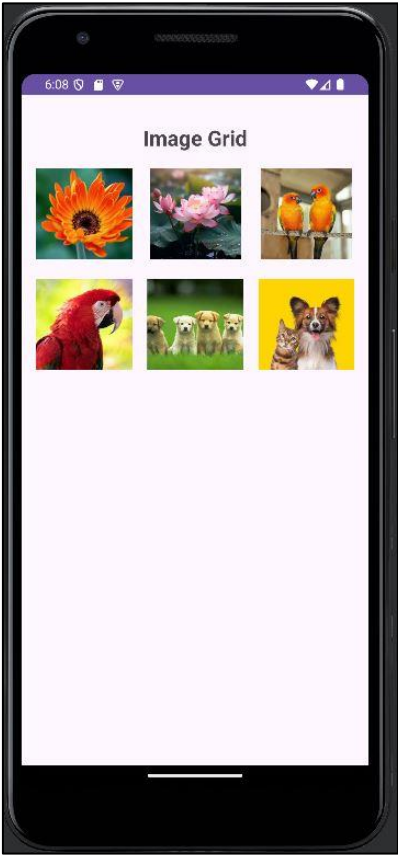
```

<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp">
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="To-Do List"
        android:textSize="24sp"
        android:textStyle="bold"
        android:gravity="center"
        android:layout_marginBottom="16dp"/>
    <EditText
        android:id="@+id/editTextTask"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter your task"
        android:padding="8dp"
        android:layout_marginBottom="8dp"/>
    <Button
        android:id="@+id/buttonAdd"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Add Task"/>

```

```
<ListView
    android:id="@+id/listViewTasks"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="16dp"/>
</LinearLayout>
```

Output



Course Outcome - 4

Experiment 1

Build an Android application that employs a GridView to display a grid of images. Implement functionality to trigger an Alert Dialog when a user selects or clicks on one of the images in the GridView.

MainActivity.java

```
package com.example.imagetri;
import android.app.AlertDialog;
import android.content.DialogInterface;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.AdapterView.OnItemClickListener;
import android.widget.GridView;
import android.widget.ImageView;
import android.widget.BaseAdapter;
import android.view.ViewGroup;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    private Integer[] imageIds = {
        R.drawable.image1, R.drawable.image2, R.drawable.image3,
        R.drawable.image4, R.drawable.image5, R.drawable.image6
    };
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        GridView gridView = findViewById(R.id.gridView);
        gridView.setAdapter(new ImageAdapter());
        gridView.setOnItemClickListener(new AdapterView.OnItemClickListener() {
            @Override
            public void onItemClick(AdapterView<?> parent, View view, int position, long id) {
                showAlertDialog(position);
            }
        });
    }
    private void showAlertDialog(int position) {
        AlertDialog.Builder builder = new AlertDialog.Builder(this);
        builder.setTitle("Image Selected");
        builder.setMessage("You clicked on image " + (position + 1));
        builder.setPositiveButton("OK", new DialogInterface.OnClickListener() {
            @Override
            public void onClick(DialogInterface dialog, int which) {
                dialog.dismiss();
            }
        });
    }
}
```

```

        builder.create().show();
    }
    private class ImageAdapter extends BaseAdapter {
        @Override
        public int getCount() {
            return imageIds.length;
        }
        @Override
        public Object getItem(int position) {
            return imageIds[position];
        }
        @Override
        public long getItemId(int position) {
            return position;
        }
        @Override
        public View getView(int position, View convertView, ViewGroup parent) {
            ImageView imageView;
            if (convertView == null) {
                imageView = new ImageView(MainActivity.this);
                imageView.setLayoutParams(new ViewGroup.LayoutParams(300, 300));
                imageView.setScaleType(ImageView.ScaleType.CENTER_CROP);
                imageView.setPadding(8, 8, 8, 8);
            } else {
                imageView = (ImageView) convertView;
            }
            imageView.setImageResource(imageIds[position]);
            return imageView;
        }
    }
}

```

activity_main.xml

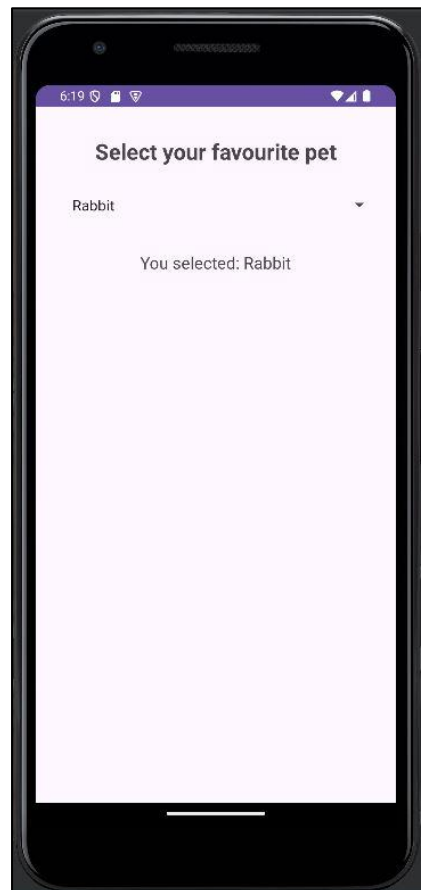
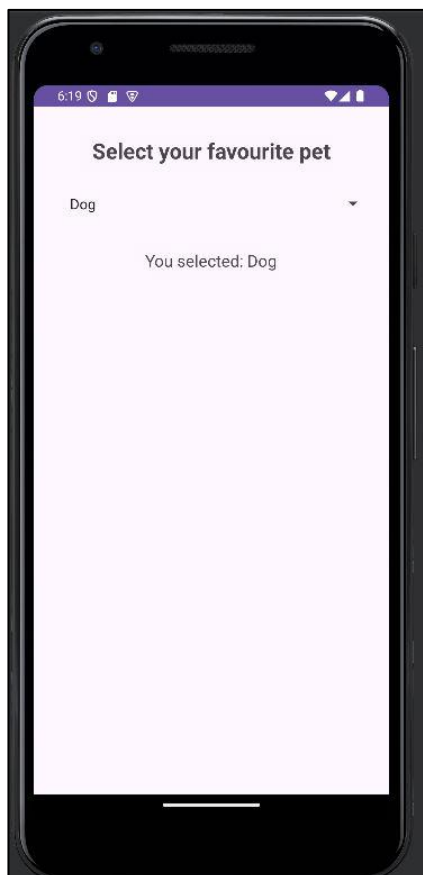
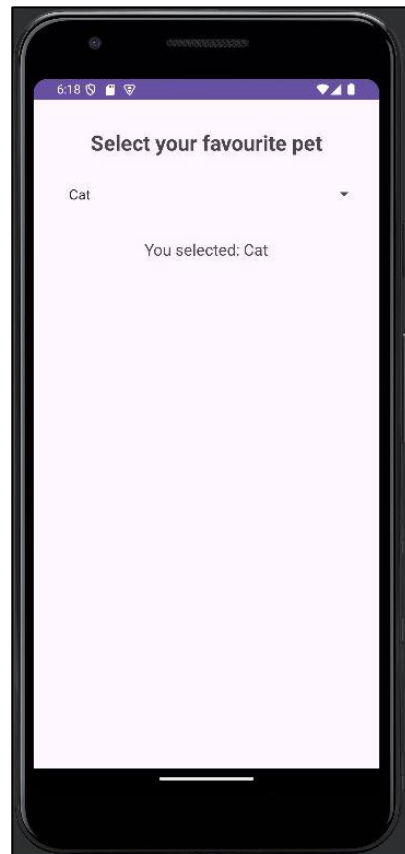
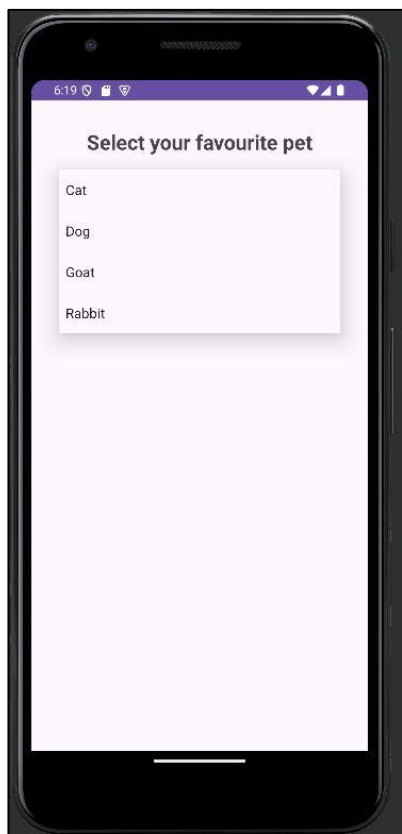
```

<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp">
    <TextView
        android:id="@+id/screenHeading"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Image Grid"
        android:textSize="24sp"
        android:textStyle="bold"
        android:layout_gravity="center_horizontal"
        android:padding="16dp" />

```

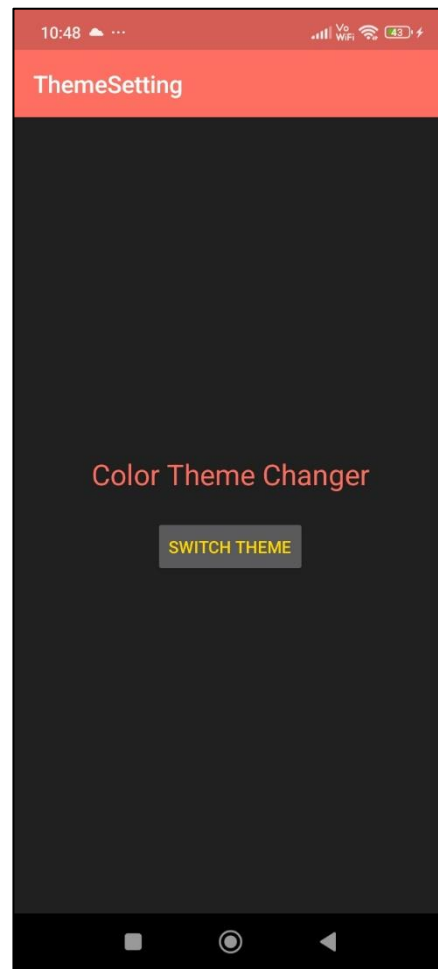
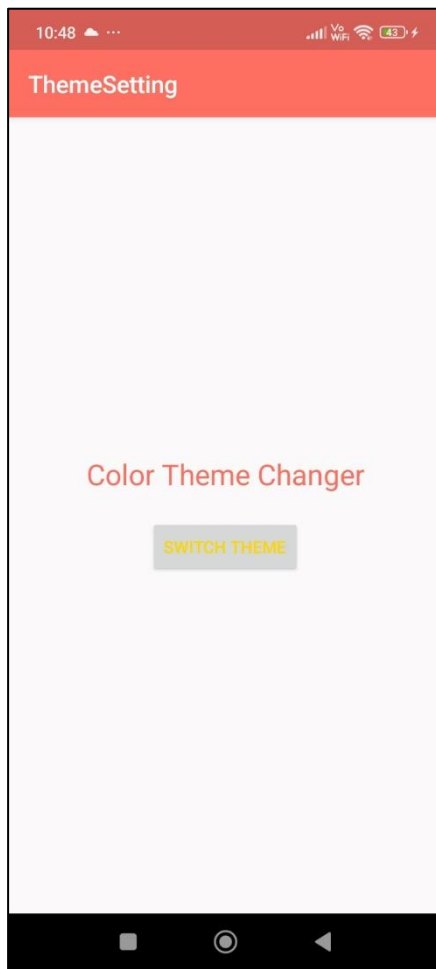
```
<GridView
    android:id="@+id/gridView"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:numColumns="3"
    android:horizontalSpacing="16dp"
    android:verticalSpacing="16dp"
    android:columnWidth="120dp"
    android:stretchMode="columnWidth"
    android:gravity="center" />
</LinearLayout>
```


Output




```
        android:orientation="vertical"
        android:padding="16dp">
        <TextView
            android:id="@+id/screenHeading"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Select your favourite pet"
            android:textSize="24sp"
            android:textStyle="bold"
            android:layout_gravity="center_horizontal"
            android:padding="16dp" />
        <Spinner
            android:id="@+id/spinner"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:padding="16dp" />
        <TextView
            android:id="@+id/selectedItemText"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="You selected: "
            android:textSize="18sp"
            android:paddingTop="24dp"
            android:layout_gravity="center_horizontal"/>
    </LinearLayout>
```

Output



Experiment 3

Design an Android app that incorporates a Spinner component and demonstrates event handling. Users should interact with the Spinner, and your app should respond accordingly to the selected options or items.

MainActivity.java

```
package com.example.themesetting;
import android.content.Intent;
import android.content.SharedPreferences;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    private static final String PREFS_NAME = "theme_prefs";
    private static final String KEY_THEME = "theme";
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        SharedPreferences preferences = getSharedPreferences(PREFS_NAME, MODE_PRIVATE);
        int theme = preferences.getInt(KEY_THEME, R.style.Theme_Light); // Default to light theme
        setTheme(theme);
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Button switchThemeButton = findViewById(R.id.switch_theme_button);
        switchThemeButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (theme == R.style.Theme_Light) {
                    setAppTheme(R.style.Theme_Dark);
                } else {
                    setAppTheme(R.style.Theme_Light);
                }
            }
        });
    }
    private void setAppTheme(int theme) {
        SharedPreferences.Editor editor = getSharedPreferences(PREFS_NAME,
MODE_PRIVATE).edit();
        editor.putInt(KEY_THEME, theme);
        editor.apply();
        Intent intent = new Intent(this, MainActivity.class);
        intent.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);
        startActivity(intent);
    }
}
```

activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:gravity="center"
    android:padding="16dp">
    <TextView
        android:id="@+id/app_heading"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Color Theme Changer"
        android:textSize="24sp"
        android:textColor="?colorPrimary" />
    <Button
        android:id="@+id/switch_theme_button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Switch Theme"
        android:textColor="?colorAccent"
        android:layout_marginTop="20dp" />
</LinearLayout>

```

themes.xml

```

<resources>
    <style name="Theme.DynamicStyles.Light" parent="Theme.AppCompat.Light.NoActionBar">
        <item name="colorPrimary">#6200EE</item>
        <item name="colorPrimaryDark">#3700B3</item>
        <item name="colorAccent">#03DAC5</item>
        <item name="android:textColor">#000000</item>
        <item name="android:background">#FFFFFF</item>
    </style>
    <style name="Theme.DynamicStyles.Dark"
parent="Theme.AppCompat.DayNight.NoActionBar">
        <item name="colorPrimary">#121212</item>
        <item name="colorPrimaryDark">#1F1F1F</item>
        <item name="colorAccent">#BB86FC</item>
        <item name="android:textColor">#FFFFFF</item>
        <item name="android:background">#000000</item>
    </style>
</resources>

```

styles.xml

```

<resources>
    <style name="Theme.ThemeSetting" parent="Theme.AppCompat.Light.DarkActionBar">
        <item name="colorPrimary">@color/primary_color</item>
        <item name="colorPrimaryDark">@color/primary_dark_color</item>
        <item name="colorAccent">@color/accent_color</item>
    </style>

```

```

        <item name="android:windowBackground">@color/background_light</item>
    </style>
    <style name="Theme_Light" parent="Theme.AppCompat.Light.DarkActionBar">
        <item name="colorPrimary">@color/primary_color</item>
        <item name="colorPrimaryDark">@color/primary_dark_color</item>
        <item name="colorAccent">@color/accent_color</item>
        <item name="android:windowBackground">@color/background_light</item>
        <item name="android:textColorPrimary">@color/text_primary_light</item>
    </style>
    <style name="Theme_Dark" parent="Theme.AppCompat">
        <item name="colorPrimary">@color/primary_color</item>
        <item name="colorPrimaryDark">@color/primary_dark_color</item>
        <item name="colorAccent">@color/accent_color</item>
        <item name="android:windowBackground">@color/background_dark</item>
        <item name="android:textColorPrimary">@color/text_primary_dark</item>
    </style>
</resources>

```

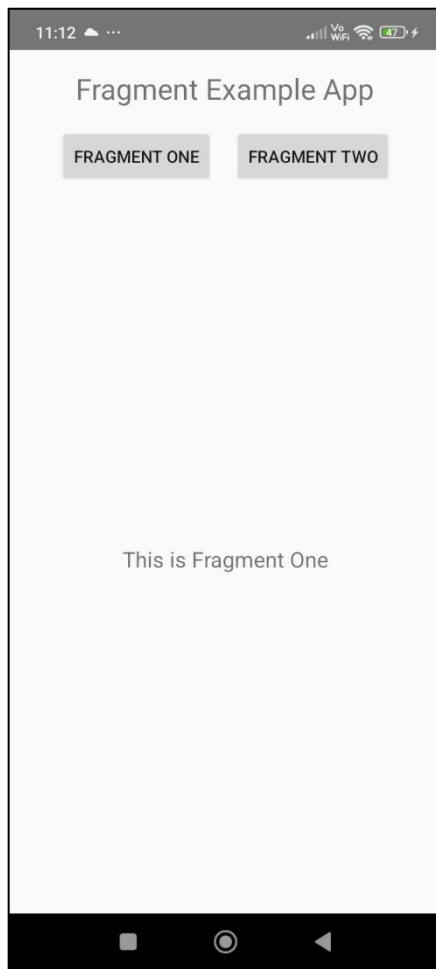
colors.xml

```

<resources>
    <color name="primary_color">#FF6F61</color>
    <color name="primary_dark_color">#D45D55</color>
    <color name="accent_color">#FFD700</color>
    <color name="background_light">#FAFAFA</color>
    <color name="background_dark">#212121</color>
    <color name="text_primary_light">#333333</color>
    <color name="text_primary_dark">#FFFFFF</color>
    <color name="highlight">#4CAF50</color>
    <color name="warning">#FF9800</color>
    <color name="error">#F44336</color>
</resources>

```

Output



Experiment 4

Build an Android application that utilizes Fragments to enhance the user experience. Implement multiple fragments that work together to create a cohesive user interface and user interaction flow.

MainActivity.java

```
package com.example.fragmentapp;
import android.os.Bundle;
import androidx.appcompat.app.AppCompatActivity;
import androidx.fragment.app.Fragment;
import androidx.fragment.app.FragmentManager;
import androidx.fragment.app.FragmentTransaction;
import android.view.View;
import android.widget.Button;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        loadFragment(new FragmentOne());
        Button buttonOne = findViewById(R.id.button_one);
        Button buttonTwo = findViewById(R.id.button_two);
        buttonOne.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                loadFragment(new FragmentOne());
            }
        });
        buttonTwo.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                loadFragment(new FragmentTwo());
            }
        });
    }
    private void loadFragment(Fragment fragment) {
        FragmentManager fragmentManager = getSupportFragmentManager();
        FragmentTransaction fragmentTransaction = fragmentManager.beginTransaction();
        fragmentTransaction.replace(R.id.fragment_container, fragment);
        fragmentTransaction.commit();
    }
}
```

activity_main.xml

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
```

```

    android:orientation="vertical">
    <TextView
        android:id="@+id/app_heading"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Fragment Example App"
        android:textSize="24sp"
        android:layout_gravity="center"
        android:padding="16dp" />
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal"
        android:gravity="center">
        <Button
            android:id="@+id/button_one"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Fragment One" />
        <Button
            android:id="@+id/button_two"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Fragment Two"
            android:layout_marginStart="16dp" />
    </LinearLayout>
    <FrameLayout
        android:id="@+id/fragment_container"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_marginTop="16dp" />
</LinearLayout>

```

FragmentOne.java

```

package com.example.fragmentapp;
import android.os.Bundle;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import androidx.fragment.app.Fragment;
public class FragmentOne extends Fragment {
    public FragmentOne() {
    }
    @Override
    public View onCreateView(LayoutInflater inflater, ViewGroup container,
        Bundle savedInstanceState) {
        return inflater.inflate(R.layout.fragment_one, container, false);
    }
}

```

fragment_one.xml

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:gravity="center"
    android:orientation="vertical">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="This is Fragment One"
        android:textSize="18sp" />
</LinearLayout>
```

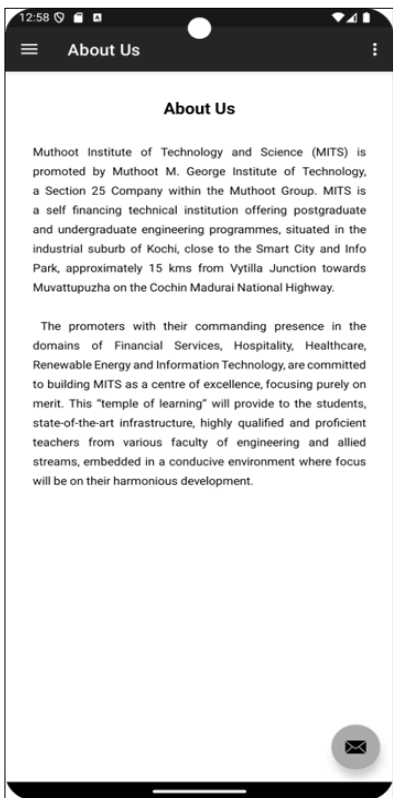
FragmentTwo.java

```
package com.example.fragmentapp;
import android.os.Bundle;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import androidx.fragment.app.Fragment;
public class FragmentTwo extends Fragment {
    public FragmentTwo() {
    }
    @Override
    public View onCreateView(LayoutInflater inflater, ViewGroup container,
        Bundle savedInstanceState) {
        return inflater.inflate(R.layout.fragment_two, container, false);
    }
}
```

fragment_two.xml

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:gravity="center"
    android:orientation="vertical">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="This is Fragment Two"
        android:textSize="18sp" />
</LinearLayout>
```

Output



Experiment 5

Develop an Android application that integrates a Navigation Drawer, providing users with an intuitive way to navigate between different sections or features of the app. Ensure that the Navigation Drawer functions smoothly and efficiently.

MainActivity.java

```
package com.example.navdrawer;
import android.os.Bundle;
import android.view.View;
import android.view.Menu;
import com.google.android.material.snackbar.Snackbar;
import com.google.android.material.navigation.NavigationView;
import androidx.navigation.NavController;
import androidx.navigation.Navigation;
import androidx.navigation.ui.AppBarConfiguration;
import androidx.navigation.ui.NavigationUI;
import androidx.drawerlayout.widget.DrawerLayout;
import androidx.appcompat.app.AppCompatActivity;
import com.example.navdrawer.databinding.ActivityMainBinding;
public class MainActivity extends AppCompatActivity {
    private AppBarConfiguration mAppBarConfiguration;
    private ActivityMainBinding binding;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        binding = ActivityMainBinding.inflate(getLayoutInflater());
        setContentView(binding.getRoot());
        setSupportActionBar(binding.appBarMain.toolbar);
        binding.appBarMain.fab.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Snackbar.make(view, "Replace with your own action", Snackbar.LENGTH_LONG)
                    .setAction("Action", null)
                    .setAnchorView(R.id.fab).show();
            }
        });
        DrawerLayout drawer = binding.drawerLayout;
        NavigationView navigationView = binding.navView;
        mAppBarConfiguration = new AppBarConfiguration.Builder(
            R.id.nav_home, R.id.nav_gallery, R.id.nav_slideshow)
            .setOpenableLayout(drawer)
            .build();
        NavController navController = Navigation.findNavController(this,
            R.id.nav_host_fragment_content_main);
        NavigationUI.setupActionBarWithNavController(this, navController, mAppBarConfiguration);
        NavigationUI.setupWithNavController(navigationView, navController);
    }
}
```

```

@Override
public boolean onCreateOptionsMenu(Menu menu) {
    getMenuInflater().inflate(R.menu.main, menu);
    return true;
}
@Override
public boolean onSupportNavigateUp() {
    NavController navController = Navigation.findNavController(this,
    R.id.nav_host_fragment_content_main);
    return NavigationUI.navigateUp(navController, mAppBarConfiguration)
    || super.onSupportNavigateUp();
}
}

```

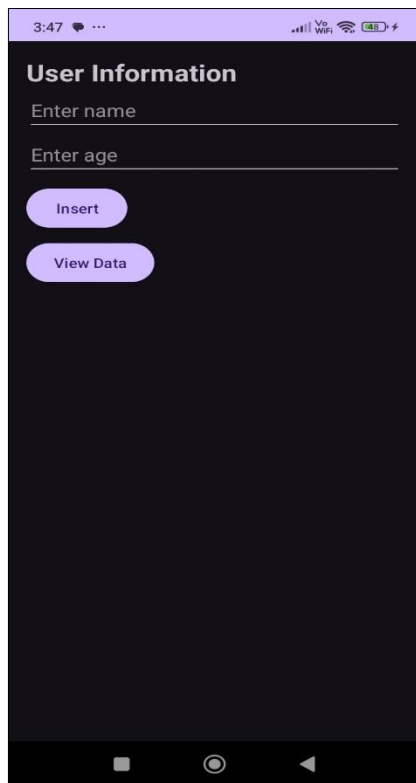
activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>
<androidx.drawerlayout.widget.DrawerLayout
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:id="@+id/drawer_layout"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:fitsSystemWindows="true"
    tools:openDrawer="start">
    <include
        android:id="@+id/app_bar_main"
        layout="@layout/app_bar_main"
        android:layout_width="match_parent"
        android:layout_height="match_parent" />
    <com.google.android.material.navigation.NavigationView
        android:id="@+id/nav_view"
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:layout_gravity="start"
        android:fitsSystemWindows="true"
        app:headerLayout="@layout/nav_header_main"
        app:menu="@menu/activity_main_drawer" />
</androidx.drawerlayout.widget.DrawerLayout>

```

Output



3:47

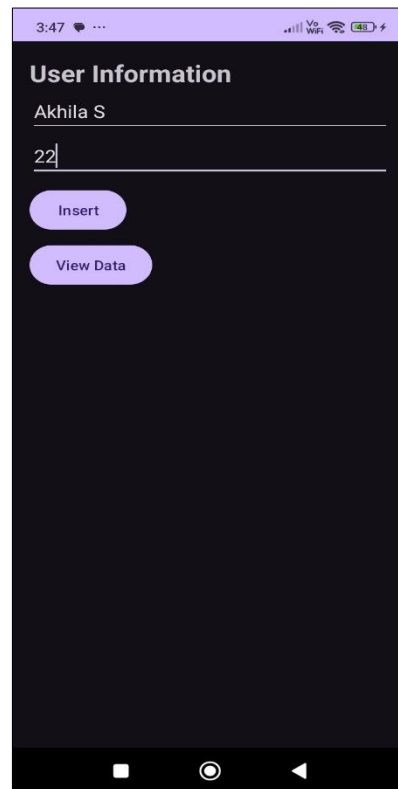
User Information

Enter name

Enter age

Insert

View Data



3:47

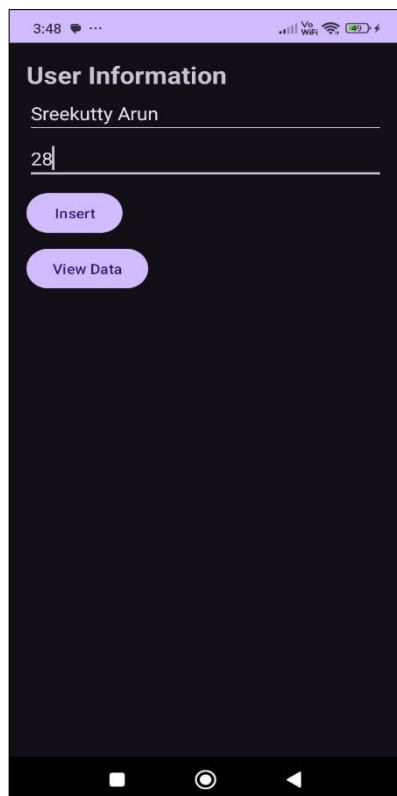
User Information

Akhila S

22

Insert

View Data



3:48

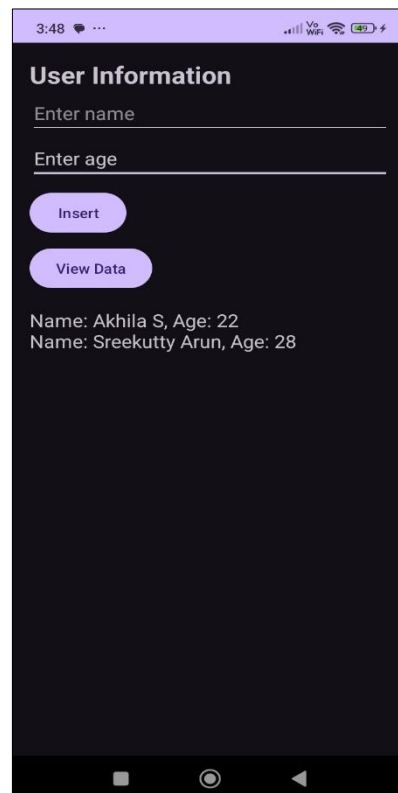
User Information

Sreekutty Arun

28

Insert

View Data



3:48

User Information

Enter name

Enter age

Insert

View Data

Name: Akhila S, Age: 22

Name: Sreekutty Arun, Age: 28

Course Outcome - 5

Experiment 1

Create an Android application that establishes an SQLite database. Implement functionality to insert data into the database and retrieve data using SELECT queries. You should be able to store and retrieve data effectively within your app.

MainActivity.java

```
package com.example.app_program;
import android.database.Cursor;
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;
public class MainActivity extends AppCompatActivity {
    DatabaseHelper db;
    EditText editTextName, editTextAge;
    Button buttonInsert, buttonView;
    TextView textViewData;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        db = new DatabaseHelper(this);
        editTextName = findViewById(R.id.editTextName);
        editTextAge = findViewById(R.id.editTextAge);
        textViewData = findViewById(R.id.textViewData);
        buttonInsert = findViewById(R.id.buttonInsert);
        buttonView = findViewById(R.id.buttonView);
        buttonInsert.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String name = editTextName.getText().toString();
                String age = editTextAge.getText().toString();
                db.insertData(name, age);
                editTextName.setText("");
                editTextAge.setText("");
            }
        });
        buttonView.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Cursor cursor = db.getAllData();
                StringBuilder stringBuilder = new StringBuilder();
                while (cursor.moveToNext()) {
```



```

        stringBuilder.append("Name: ").append(cursor.getString(1)).append(", Age:
").append(cursor.getString(2)).append("\n");
    }
    textViewData.setText(stringBuilder.toString());
    cursor.close();
}
});}}

```

activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp">
    <TextView
        android:id="@+id/textViewHeading"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="User Information"
        android:textSize="24sp"
        android:textStyle="bold" />
    <EditText
        android:id="@+id/editTextName"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/textViewHeading"
        android:hint="Enter name" />
    <EditText
        android:id="@+id/editTextAge"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/editTextName"
        android:hint="Enter age" />
    <Button
        android:id="@+id/buttonInsert"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/editTextAge"
        android:layout_marginTop="8dp"
        android:text="Insert" />
    <Button
        android:id="@+id/buttonView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/buttonInsert"
        android:layout_marginTop="8dp"
        android:text="View Data" />
    <TextView
        android:id="@+id/textViewData"

```

```

        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/buttonView"
        android:layout_marginTop="16dp"
        android:textSize="18sp" />
</RelativeLayout>

```

DatabaseHelper.java

```

package com.example.app_program;
import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
public class DatabaseHelper extends SQLiteOpenHelper {
    private static final String DATABASE_NAME = "mydatabase.db";
    private static final int DATABASE_VERSION = 1;
    public static final String TABLE_NAME = "mytable";
    public static final String COLUMN_ID = "id";
    public static final String COLUMN_NAME = "name";
    public static final String COLUMN_AGE = "age"; // New column for age
    public DatabaseHelper(Context context) {
        super(context, DATABASE_NAME, null, DATABASE_VERSION);
    }
    @Override
    public void onCreate(SQLiteDatabase db) {
        String CREATE_TABLE = "CREATE TABLE " + TABLE_NAME + " (" +
            COLUMN_ID + " INTEGER PRIMARY KEY AUTOINCREMENT, " +
            COLUMN_NAME + " TEXT, " + // Include name
            COLUMN_AGE + " INTEGER)"; // Include age
        db.execSQL(CREATE_TABLE);
    }
    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
        db.execSQL("DROP TABLE IF EXISTS " + TABLE_NAME);
        onCreate(db);
    }
    public void insertData(String name, String age) {
        SQLiteDatabase db = this.getWritableDatabase();
        ContentValues values = new ContentValues();
        values.put(COLUMN_NAME, name);
        values.put(COLUMN_AGE, age); // Add age to the values
        db.insert(TABLE_NAME, null, values);
        db.close();
    }
    public Cursor getAllData() {
        SQLiteDatabase db = this.getReadableDatabase();
        return db.rawQuery("SELECT * FROM " + TABLE_NAME, null);
    }
}

```

Output

4:08

User Information Management

8

Akhila S

22

Insert

Update

Delete

View Data

4:08

User Information Management

Enter ID (for Update/Delete)

Enter name

Enter age

Insert

Update

Delete

View Data

Data Inserted

4:08

User Information Management

9

Anumol K V

29

Insert

Update

Delete

View Data

4:09

User Information Management

10

Arjun K Saji

26

Insert

Update

Delete

View Data

4:09

User Information Management

11

Anumol Shiju

26

Insert

Update

Delete

View Data

4:14

User Information Management

Enter ID (for Update/Delete)

Enter name

Enter age

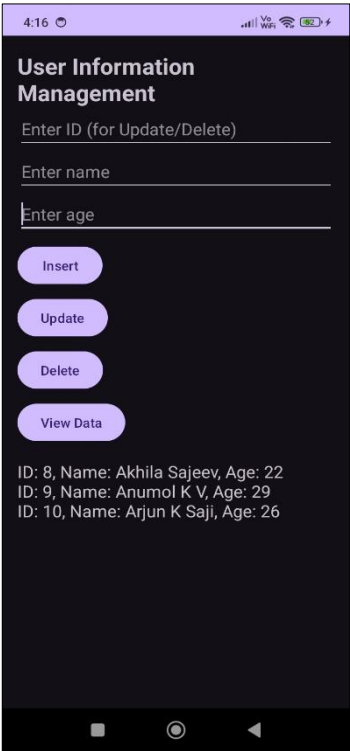
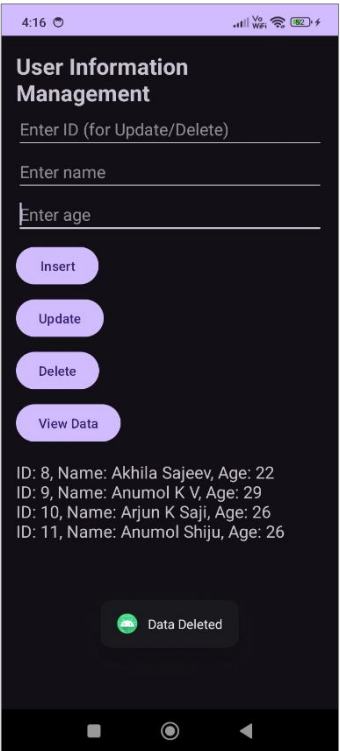
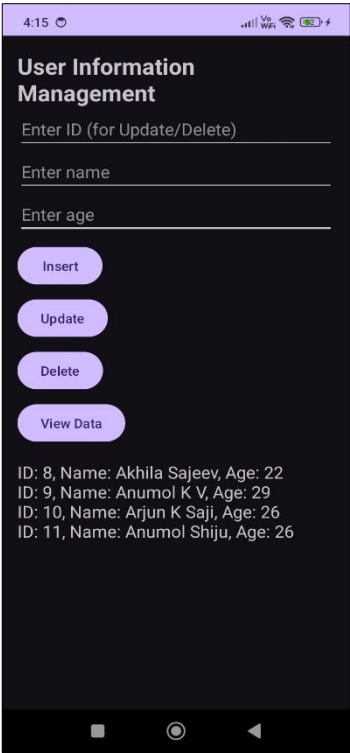
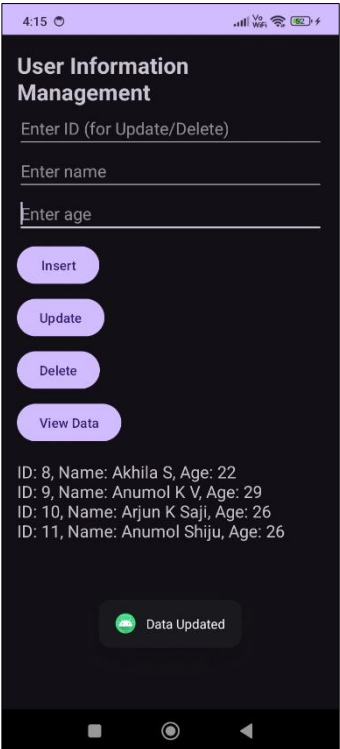
Insert

Update

Delete

View Data

ID: 8, Name: Akhila S, Age: 22
ID: 9, Name: Anumol K V, Age: 29
ID: 10, Name: Arjun K Saji, Age: 26
ID: 11, Name: Anumol Shiju, Age: 26



Experiment 2

Design an Android app that works with an SQLite database. Implement features to update existing records and delete records from the database. Your app should provide a user-friendly interface for these operations.

MainActivity.java

```
package com.example.app_program;
import android.database.Cursor;
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 {
    DatabaseHelper db;
    EditText editTextId, editTextName, editTextAge;
    Button buttonInsert, buttonUpdate, buttonDelete, buttonView;
    TextView textViewData;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        db = new DatabaseHelper(this);
        editTextId = findViewById(R.id.editTextId);
        editTextName = findViewById(R.id.editTextName);
        editTextAge = findViewById(R.id.editTextAge);
        textViewData = findViewById(R.id.textViewData);
        buttonInsert = findViewById(R.id.buttonInsert);
        buttonUpdate = findViewById(R.id.buttonUpdate);
        buttonDelete = findViewById(R.id.buttonDelete);
        buttonView = findViewById(R.id.buttonView);
        buttonInsert.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String name = editTextName.getText().toString();
                String age = editTextAge.getText().toString();
                db.insertData(name, age);
                clearInputs();
                Toast.makeText(MainActivity.this, "Data Inserted", Toast.LENGTH_SHORT).show();
            }
        });
        buttonUpdate.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String id = editTextId.getText().toString();
```

```

        String name = editTextName.getText().toString();
        String age = editTextAge.getText().toString();
        db.updateData(id, name, age);
        clearInputs();
        Toast.makeText(MainActivity.this, "Data Updated", Toast.LENGTH_SHORT).show();
    }
});
buttonDelete.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        String id = editTextId.getText().toString();
        db.deleteData(id);
        clearInputs();
        Toast.makeText(MainActivity.this, "Data Deleted", Toast.LENGTH_SHORT).show();
    }
});
buttonView.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        Cursor cursor = db.getAllData();
        StringBuilder stringBuilder = new StringBuilder();
        while (cursor.moveToNext()) {
            stringBuilder.append("ID: ").append(cursor.getString(0))
                .append(", Name: ").append(cursor.getString(1))
                .append(", Age: ").append(cursor.getString(2)).append("\n");
        }
        textViewData.setText(stringBuilder.toString());
        cursor.close();
    }
});
}
private void clearInputs() {
    editTextId.setText("");
    editTextName.setText("");
    editTextAge.setText("");
}
}

```

activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp">
    <TextView
        android:id="@+id/textViewHeading"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="User Information Management"
    >

```

```
        android:textSize="24sp"
        android:textStyle="bold" />
<EditText
    android:id="@+id/editTextId"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_below="@id/textViewHeading"
    android:hint="Enter ID (for Update/Delete)" />
<EditText
    android:id="@+id/editTextName"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_below="@id/editTextId"
    android:hint="Enter name" />
<EditText
    android:id="@+id/editTextAge"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_below="@id/editTextName"
    android:hint="Enter age" />
<Button
    android:id="@+id/buttonInsert"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@id/editTextAge"
    android:layout_marginTop="8dp"
    android:text="Insert" />
<Button
    android:id="@+id/buttonUpdate"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@id/buttonInsert"
    android:layout_marginTop="8dp"
    android:text="Update" />
<Button
    android:id="@+id/buttonDelete"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@id/buttonUpdate"
    android:layout_marginTop="8dp"
    android:text="Delete" />
<Button
    android:id="@+id/buttonView"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@id/buttonDelete"
    android:layout_marginTop="8dp"
    android:text="View Data" />
```

```

<TextView
    android:id="@+id/textViewData"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_below="@id/buttonView"
    android:layout_marginTop="16dp"
    android:textSize="18sp" />
</RelativeLayout>

```

DatabaseHelper.java

```

package com.example.app_program;
import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
public class DatabaseHelper extends SQLiteOpenHelper {
    private static final String DATABASE_NAME = "mydatabase.db";
    private static final int DATABASE_VERSION = 1;
    public static final String TABLE_NAME = "mytable";
    public static final String COLUMN_ID = "id";
    public static final String COLUMN_NAME = "name";
    public static final String COLUMN_AGE = "age";
    public DatabaseHelper(Context context) {
        super(context, DATABASE_NAME, null, DATABASE_VERSION);
    }
    @Override
    public void onCreate(SQLiteDatabase db) {
        String CREATE_TABLE = "CREATE TABLE " + TABLE_NAME + " (" +
            COLUMN_ID + " INTEGER PRIMARY KEY AUTOINCREMENT, " +
            COLUMN_NAME + " TEXT, " +
            COLUMN_AGE + " INTEGER)";
        db.execSQL(CREATE_TABLE);
    }
    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
        db.execSQL("DROP TABLE IF EXISTS " + TABLE_NAME);
        onCreate(db);
    }
    public void insertData(String name, String age) {
        SQLiteDatabase db = this.getWritableDatabase();
        ContentValues values = new ContentValues();
        values.put(COLUMN_NAME, name);
        values.put(COLUMN_AGE, age);
        db.insert(TABLE_NAME, null, values);
        db.close();
    }
    public void updateData(String id, String name, String age) {
        SQLiteDatabase db = this.getWritableDatabase();

```



```
        ContentValues values = new ContentValues();
        values.put(COLUMN_NAME, name);
        values.put(COLUMN_AGE, age);
        db.update(TABLE_NAME, values, COLUMN_ID + "=?", new String[]{id});
        db.close();
    }
    public void deleteData(String id) {
        SQLiteDatabase db = this.getWritableDatabase();
        db.delete(TABLE_NAME, COLUMN_ID + "=?", new String[]{id});
        db.close();
    }
    public Cursor getAllData() {
        SQLiteDatabase db = this.getReadableDatabase();
        return db.rawQuery("SELECT * FROM " + TABLE_NAME, null);
    }
}
```

Output

4:50

Student Information System

Student ID

Student Name

Age

Department

Insert Student

Update Student

Delete Student

View All Students

4:59

Student Information System

3

Akhila S

22

MCA

Insert Student

Update Student

Delete Student

View All Students

4:59

Student Information System

Student ID

Student Name

Age

Department

Insert Student

Update Student

Delete Student

View All Students

Student Added

4:59

Student Information System

4

Anumol P G

27

BTech

Insert Student

Update Student

Delete Student

View All Students

ID: 3, Name: Akhila S, Age: 22, Department: MCA

4:59

Student Information System

Student ID

Student Name

Age

Department

Insert Student

Update Student

Delete Student

View All Students

ID: 3, Name: Akhila S, Age: 22, Department: MCA

Student Added

5:01

Student Information System

Student ID

Student Name

Age

Department

Insert Student

Update Student

Delete Student

View All Students

ID: 3, Name: Akhila S, Age: 22, Department: MCA
ID: 4, Name: Anumol P G, Age: 27, Department: BTech

5:02

Student Information System

3

Akhila Sajeev

23

MCA

Insert Student

Update Student

Delete Student

View All Students

ID: 3, Name: Akhila S, Age: 22, Department: MCA

ID: 4, Name: Anumol P G, Age: 27, Department: BTech

5:02

Student Information System

Student ID

Student Name

Age

Department

Insert Student

Update Student

Delete Student

View All Students

ID: 3, Name: Akhila S, Age: 22, Department: MCA

ID: 4, Name: Anumol P G, Age: 27, Department: BTech

Student Updated

5:02

Student Information System

Student ID

Student Name

Age

Department

Insert Student

Update Student

Delete Student

View All Students

ID: 3, Name: Akhila Sajeev, Age: 23, Department: MCA

ID: 4, Name: Anumol P G, Age: 27, Department: BTech

5:03

Student Information System

4

Student Name

Age

Department

Insert Student

Update Student

Delete Student

View All Students

ID: 3, Name: Akhila Sajeev, Age: 23, Department: MCA

ID: 4, Name: Anumol P G, Age: 27, Department: BTech

5:03

Student Information System

Student ID

Student Name

Age

Department

Insert Student

Update Student

Delete Student

View All Students

ID: 3, Name: Akhila Sajeev, Age: 23, Department: MCA

ID: 4, Name: Anumol P G, Age: 27, Department: BTech

Student Deleted

5:03

Student Information System

Student ID

Student Name

Age

Department

Insert Student

Update Student

Delete Student

View All Students

ID: 3, Name: Akhila Sajeev, Age: 23, Department: MCA

Experiment 3

Create an Android application as a micro project assignment, focusing on the practical use of an SQLite database. Your app should incorporate database operations such as INSERT, SELECT, UPDATE, and DELETE. The project should demonstrate a real-world scenario where an SQLite database enhances functionality.

MainActivity.java

```
package com.example.app_program;
import android.database.Cursor;
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 {
    DatabaseHelper db;
    EditText editTextId, editTextName, editTextAge, editTextDepartment;
    Button buttonInsert, buttonUpdate, buttonDelete, buttonView;
    TextView textViewData;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        db = new DatabaseHelper(this);
        editTextId = findViewById(R.id.editTextId);
        editTextName = findViewById(R.id.editTextName);
        editTextAge = findViewById(R.id.editTextAge);
        editTextDepartment = findViewById(R.id.editTextDepartment);
        textViewData = findViewById(R.id.textViewData);
        buttonInsert = findViewById(R.id.buttonInsert);
        buttonUpdate = findViewById(R.id.buttonUpdate);
        buttonDelete = findViewById(R.id.buttonDelete);
        buttonView = findViewById(R.id.buttonView);
        buttonInsert.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String name = editTextName.getText().toString();
                String age = editTextAge.getText().toString();
                String department = editTextDepartment.getText().toString();
                db.insertStudent(name, age, department);
                clearInputs();
                Toast.makeText(MainActivity.this, "Student Added", Toast.LENGTH_SHORT).show();
            }
        });
    }
}
```

```
buttonUpdate.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        String id = editTextId.getText().toString();
        String name = editTextName.getText().toString();
        String age = editTextAge.getText().toString();
        String department = editTextDepartment.getText().toString();
        db.updateStudent(id, name, age, department);
        clearInputs();
        Toast.makeText(MainActivity.this, "Student Updated",
Toast.LENGTH_SHORT).show();
    }
});
buttonDelete.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        String id = editTextId.getText().toString();
        db.deleteStudent(id);
        clearInputs();
        Toast.makeText(MainActivity.this, "Student Deleted", Toast.LENGTH_SHORT).show();
    }
});
buttonView.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        Cursor cursor = db.getAllStudents();
        StringBuilder stringBuilder = new StringBuilder();
        while (cursor.moveToNext()) {
            stringBuilder.append("ID: ").append(cursor.getString(0))
                .append(", Name: ").append(cursor.getString(1))
                .append(", Age: ").append(cursor.getString(2))
                .append(", Department: ").append(cursor.getString(3)).append("\n");
        }
        textViewData.setText(stringBuilder.toString());
        cursor.close();
    }
});
}
private void clearInputs() {
    editTextId.setText("");
    editTextName.setText("");
    editTextAge.setText("");
    editTextDepartment.setText("");
}
}
```

activity_main.xml

```
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp"
    android:background="@drawable/background_image">
    <TextView
        android:id="@+id/headingText"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Student Information System"
        android:textSize="20sp"
        android:textStyle="bold"
        android:layout_alignParentTop="true"
        android:layout_centerHorizontal="true"
        android:layout_marginBottom="20dp"
        android:textColor="#000000" />
    <EditText
        android:id="@+id/editTextId"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Student ID"
        android:padding="12dp"
        android:background="@drawable/black_border"
        android:layout_below="@id/headingText"
        android:layout_marginBottom="10dp"
        android:textColor="#000000"
        android:textColorHint="#777777" />
    <EditText
        android:id="@+id/editTextName"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Student Name"
        android:padding="12dp"
        android:background="@drawable/black_border"
        android:layout_below="@id/editTextId"
        android:layout_marginBottom="10dp"
        android:textColor="#000000"
        android:textColorHint="#777777" />
    <EditText
        android:id="@+id/editTextAge"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Age"
        android:padding="12dp"
        android:background="@drawable/black_border"
        android:layout_below="@id/editTextName"
        android:layout_marginBottom="10dp"
        android:textColor="#000000"
```

```
        android:textColorHint="#777777" />
<EditText
    android:id="@+id/editTextDepartment"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Department"
    android:padding="12dp"
    android:background="@drawable/black_border"
    android:layout_below="@id/editTextAge"
    android:layout_marginBottom="20dp"
    android:textColor="#000000"
    android:textColorHint="#777777" />
<LinearLayout
    android:id="@+id/buttonLayout"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="vertical"
    android:layout_below="@id/editTextDepartment"
    android:layout_marginBottom="20dp">
    <Button
        android:id="@+id/buttonInsert"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Insert Student"
        android:backgroundTint="#000000"
        android:textColor="#FFFFFF"
        android:padding="12dp"
        android:layout_marginBottom="10dp" />
    <Button
        android:id="@+id/buttonUpdate"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Update Student"
        android:backgroundTint="#000000"
        android:textColor="#FFFFFF"
        android:padding="12dp"
        android:layout_marginBottom="10dp" />
    <Button
        android:id="@+id/buttonDelete"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Delete Student"
        android:backgroundTint="#000000"
        android:textColor="#FFFFFF"
        android:padding="12dp"
        android:layout_marginBottom="10dp" />
    <Button
        android:id="@+id/buttonView"
        android:layout_width="match_parent"
```

```

        android:layout_height="wrap_content"
        android:text="View All Students"
        android:backgroundTint="#000000"
        android:textColor="#FFFFFF"
        android:padding="12dp" />
    </LinearLayout>
    <RelativeLayout
        android:id="@+id/dataContainer"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/buttonLayout"
        android:layout_marginTop="16dp"
        android:padding="16dp"
        android:background="#FFFFFF"
        android:elevation="4dp"
        android:layout_marginLeft="10dp"
        android:layout_marginRight="10dp"
        android:layout_centerHorizontal="true">
        <TextView
            android:id="@+id/textViewData"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:textSize="16sp"
            android:textColor="#333333" />
    </RelativeLayout>
</RelativeLayout>

```

DatabaseHelper.java

```

package com.example.app_program;
import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
public class DatabaseHelper extends SQLiteOpenHelper {
    private static final String DATABASE_NAME = "student.db";
    private static final int DATABASE_VERSION = 1;
    public static final String TABLE_NAME = "students";
    public static final String COLUMN_ID = "id";
    public static final String COLUMN_NAME = "name";
    public static final String COLUMN_AGE = "age";
    public static final String COLUMN_DEPARTMENT = "department";
    public DatabaseHelper(Context context) {
        super(context, DATABASE_NAME, null, DATABASE_VERSION);
    }
    @Override
    public void onCreate(SQLiteDatabase db) {
        String CREATE_TABLE = "CREATE TABLE " + TABLE_NAME + " (" +
            COLUMN_ID + " INTEGER PRIMARY KEY AUTOINCREMENT, " +

```



```
        COLUMN_NAME + " TEXT, " +
        COLUMN_AGE + " INTEGER, " +
        COLUMN_DEPARTMENT + " TEXT)";
    db.execSQL(CREATE_TABLE);
}
@Override
public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
    db.execSQL("DROP TABLE IF EXISTS " + TABLE_NAME);
    onCreate(db);
}
public void insertStudent(String name, String age, String department) {
    SQLiteDatabase db = this.getWritableDatabase();
    ContentValues values = new ContentValues();
    values.put(COLUMN_NAME, name);
    values.put(COLUMN_AGE, age);
    values.put(COLUMN_DEPARTMENT, department);
    db.insert(TABLE_NAME, null, values);
    db.close();
}
public void updateStudent(String id, String name, String age, String department) {
    SQLiteDatabase db = this.getWritableDatabase();
    ContentValues values = new ContentValues();
    values.put(COLUMN_NAME, name);
    values.put(COLUMN_AGE, age);
    values.put(COLUMN_DEPARTMENT, department);
    db.update(TABLE_NAME, values, COLUMN_ID + "=?", new String[]{id});
    db.close();
}
public void deleteStudent(String id) {
    SQLiteDatabase db = this.getWritableDatabase();
    db.delete(TABLE_NAME, COLUMN_ID + "=?", new String[]{id});
    db.close();
}
public Cursor getAllStudents() {
    SQLiteDatabase db = this.getReadableDatabase();
    return db.rawQuery("SELECT * FROM " + TABLE_NAME, null);
}
}
```