MASTER OF COMPUTER APPLICATIONS
Mobile Application Programming
Lab Manual III Semester
23MCA3L01

Prepared by:

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1. a) Develop an activity to design a visting card:

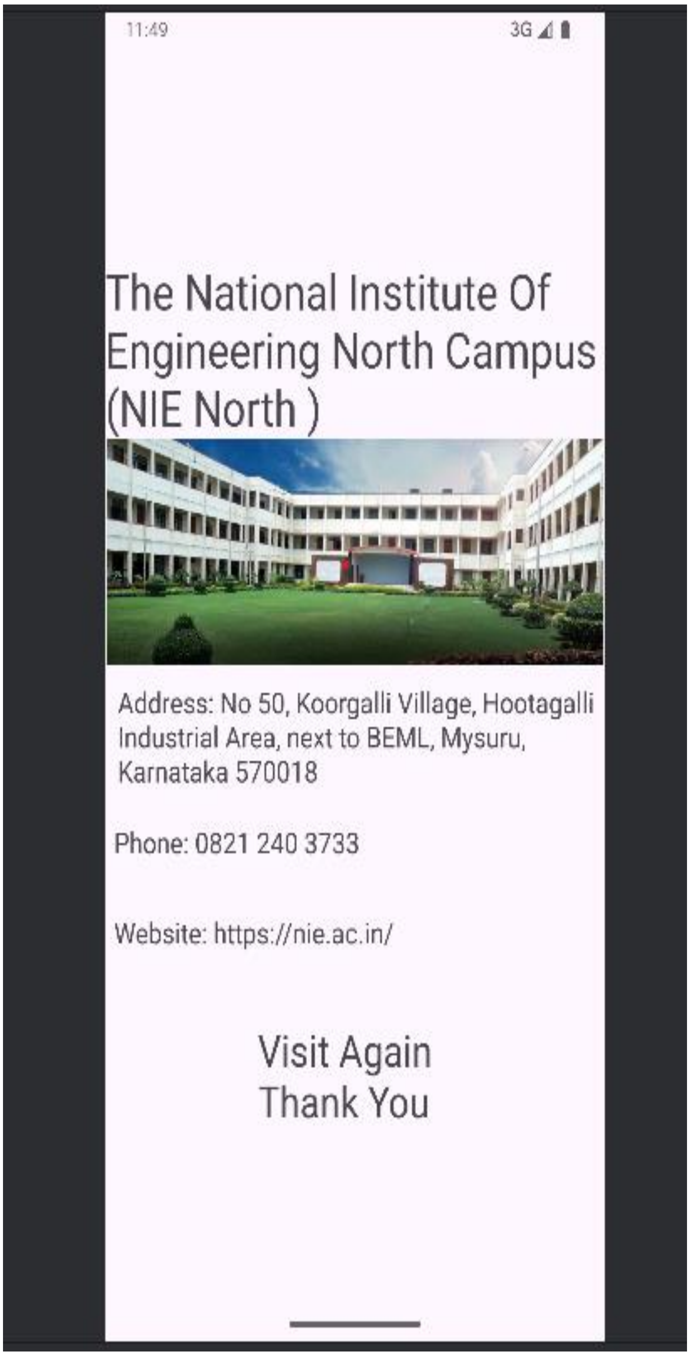
XML Code:

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout 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/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

 <TextView
    android:id="@+id/textView2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentEnd="true"
    android:layout_alignParentBottom="true"
    android:layout_marginEnd="3dp"
    android:layout_marginBottom="596dp"
    android:text="The National Institute Of Engineering North Campus (NIE North )"
    android:textSize="34sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent" />

 <TextView
    android:id="@+id/textView3"
    android:layout_width="401dp"
    android:layout_height="wrap_content"
    android:layout_alignParentEnd="true"
    android:layout_alignParentBottom="true"
    android:layout_marginEnd="0dp"
    android:layout_marginBottom="355dp"
    android:text="Address: No 50, Koorgalli Village, Hootagalli Industrial Area, next to BEML, Mysuru,
    Karnataka 570018"
    android:textSize="20sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent" />
```

```
<TextView
   android:id="@+id/textView4"
   android:layout_width="400dp"
   android:layout_height="56dp"
   android:layout_alignParentEnd="true"
   android:layout_alignParentBottom="true"
   android:layout_marginEnd="4dp"
   android:layout_marginBottom="277dp"
   android:text="Phone: 0821 240 3733"
   android:textSize="20sp"
   app:layout_constraintBottom_toBottomOf="parent"
   app:layout_constraintEnd_toEndOf="parent"
   app:layout_constraintStart_toStartOf="parent"

 <TextView
   android:layout_width="396dp"
   android:layout_height="61dp"
   android:layout_alignParentEnd="true"
   android:layout_alignParentBottom="true"
   android:layout_marginEnd="8dp"
   android:layout_marginBottom="210dp"
   android:text="Website: https://nie.ac.in/"
   android:textSize="20sp"
   app:layout_constraintBottom_toBottomOf="parent"
   app:layout_constraintEnd_toEndOf="parent"
   app:layout_constraintStart_toStartOf="parent"
   app:layout_constraintTop_toTopOf="parent" />

<TextView
   android:id="@+id/textView"
   android:layout_width="199dp"
   android:layout_height="118dp"
   android:layout_alignParentEnd="true"
   android:layout_alignParentBottom="true"
   android:layout_marginEnd="87dp"
   android:layout_marginBottom="79dp"
   android:text="Visit Again Thank You"
   android:textSize="30sp"
   app:layout_constraintBottom_toBottomOf="parent"
   app:layout_constraintEnd_toEndOf="parent"
   app:layout_constraintStart_toStartOf="parent"
   app:layout_constraintTop_toTopOf="parent" />

 <ImageView
   android:id="@+id/imageView2"
   android:layout_width="match_parent"
   android:layout_height="155dp"
   android:layout_alignParentEnd="true"
   android:layout_alignParentBottom="true"
   android:layout_marginEnd="0dp"
```

```
        android:layout_marginBottom="442dp"
        app:srcCompat="@drawable/nie" />

    </RelativeLayout>
```

Output:



11:49

3G

The National Institute Of Engineering North Campus (NIE North)

Address: No 50, Koorgalli Village, Hootagalli Industrial Area, next to BEML, Mysuru, Karnataka 570018

Phone: 0821 240 3733

Website: https://nie.ac.in/

Visit Again
Thank You

1. b) Write a program to display text using toast notification.

XML Code:

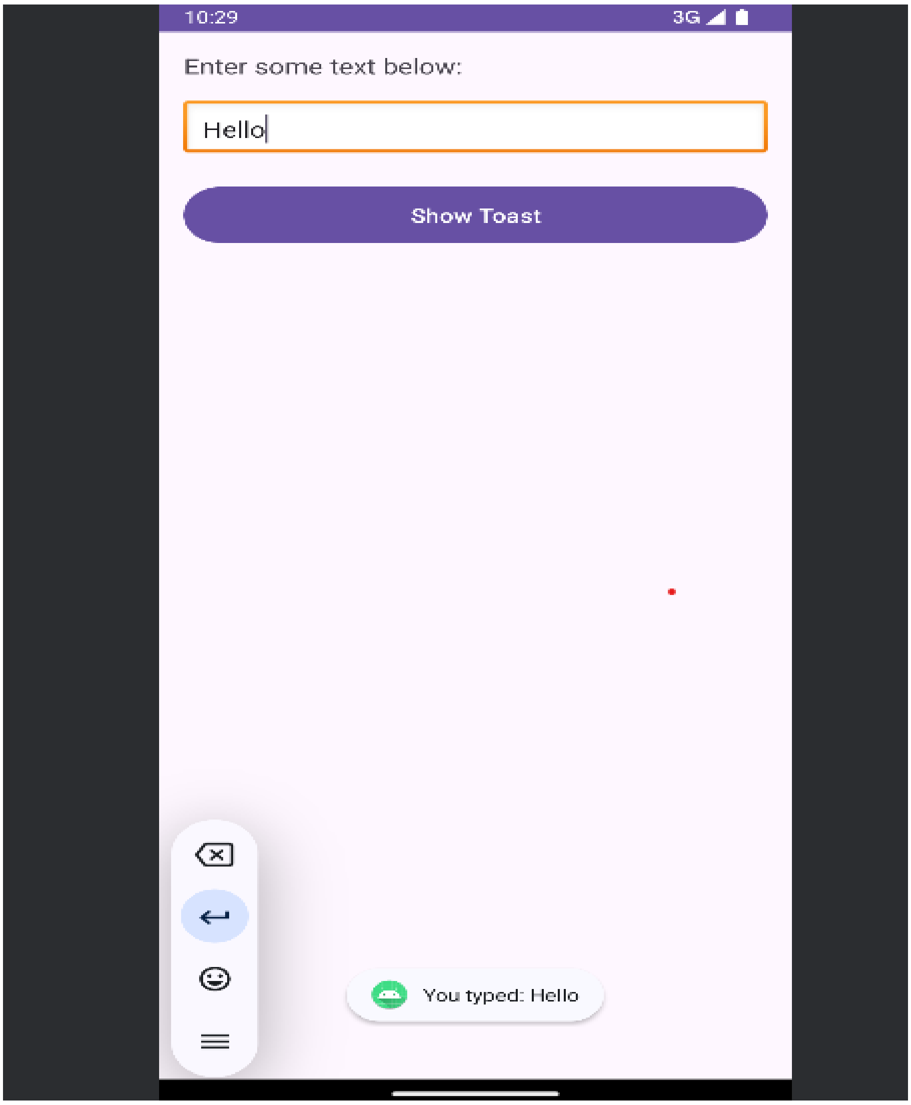
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:orientation="vertical"
  android:padding="16dp">

  <!-- TextView to display a message -->
  <TextView
      android:id="@+id/textView"
      android:layout_width="match_parent"
      android:layout_height="wrap_content"
      android:text="Enter some text below:"
      android:textSize="18sp"
      android:layout_marginBottom="16dp"/>

  <!-- EditText for user input -->
  <EditText
      android:id="@+id/editText"
      android:layout_width="match_parent"
      android:layout_height="wrap_content"
      android:hint="Type something..."
      android:padding="12dp"
      android:background="@android:drawable/edit_text"/>

  <!-- Button that triggers a Toast message -->
  <Button
      android:id="@+id/button"
      android:layout_width="match_parent"
      android:layout_height="wrap_content"
      android:text="Show Toast"
      android:textSize="16sp"
      android:layout_marginTop="20dp"
      android:padding="12dp"/>
</LinearLayout>
```

Kotlin Code:

```
package com.example.simplelayoutapp

import android.os.Bundle
import android.widget.Button
import android.widget.EditText
import android.widget.Toast
import androidx.appcompat.app.AppCompatActivity

class MainActivity : AppCompatActivity() {

override fun onCreate(savedInstanceState: Bundle?) {
```

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

    // Find views by their ID
    val editText = findViewById<EditText>(R.id.editText)
    val button = findViewById<Button>(R.id.button)

    // Set up the button click listener
    button.setOnClickListener {
     // Get the text from EditText
     val inputText = editText.text.toString()



// Display a Toast message
     if (inputText.isNotEmpty()) {
        Toast.makeText(this, "You typed: $inputText", Toast.LENGTH_SHORT).show()
     } else {
        Toast.makeText(this, "Please enter some text", Toast.LENGTH_SHORT).show()
    }
   }
  }
 }
```

Output:



Enter some text below:

Hello

You typed: Hello

2. a) Write a program to implement addition of two numbers

XML Code:

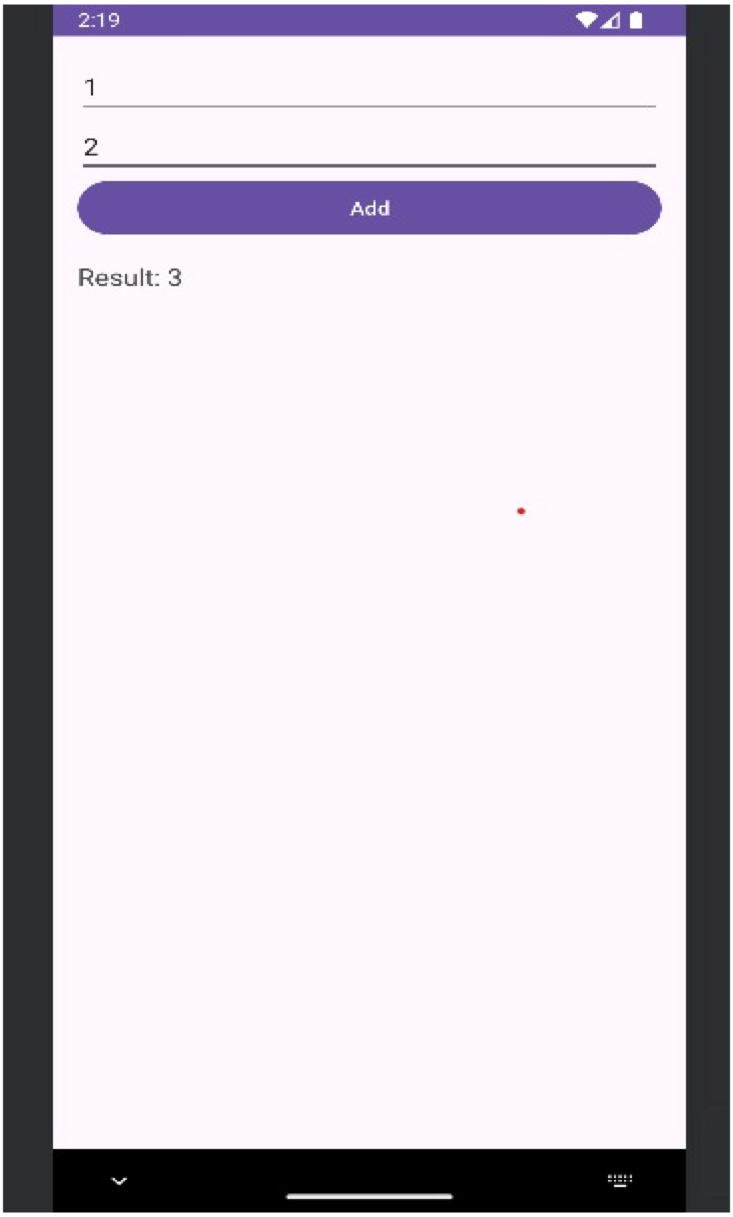
```
 <LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp">

<EditText
   android:id="@+id/number1"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:hint="Enter first number"
   android:inputType="number" />

 <EditText
   android:id="@+id/number2"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:hint="Enter second number"
   android:inputType="number" />

 <Button
   android:id="@+id/addButton"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:text="Add" />

 <TextView
   android:id="@+id/resultText"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:text="Result will be displayed here"
   android:textSize="18sp"
   android:paddingTop="16dp" />
</LinearLayout>
```

Kotlin Code:

```
  package com.example.myapplication
  import android.os.Bundle
  import android.widget.Button
  import android.widget.EditText
  import android.widget.TextView
  import androidx.appcompat.app.AppCompatActivity

  class MainActivity : AppCompatActivity() {
  override fun onCreate(savedInstanceState: Bundle?) {
  super.onCreate(savedInstanceState)
  setContentView(R.layout.activity_main)
```

```
 val number1 = findViewById<EditText>(R.id.number1)
 val number2 = findViewById<EditText>(R.id.number2)
 val addButton = findViewById<Button>(R.id.addButton)
 val resultText = findViewById<TextView>(R.id.resultText)

addButton.setOnClickListener {
        val num1 = number1.text.toString().toIntOrNull()
        val num2 = number2.text.toString().toIntOrNull()

        if (num1 != null && num2 != null) {
            val result = num1 + num2
            resultText.text = "Result: $result"
        } else {
            resultText.text = "Please enter valid numbers"
        }
      }
    }
  }
```

Output:



2. b) Devolop an activity to generate random numbers.

XML Code:

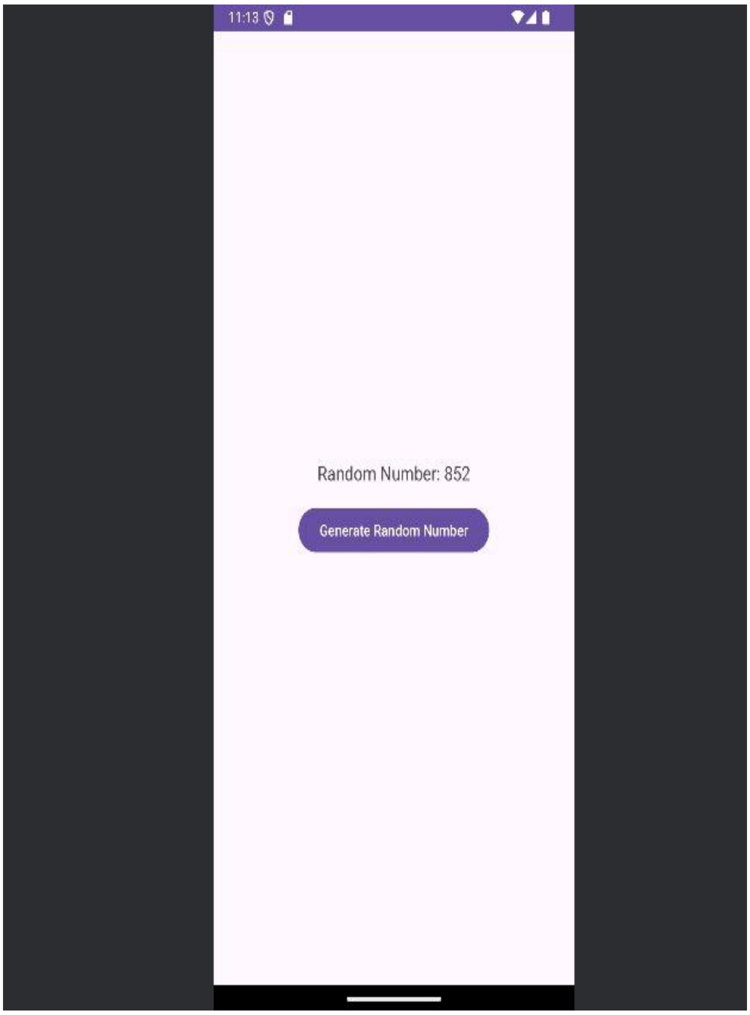
```
 <?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp"
    android:gravity="center">

 <TextView
     android:id="@+id/resultTextView"
     android:layout_width="wrap_content"
     android:layout_height="wrap_content"
     android:text="Press the button to generate a number"
     android:textSize="18sp"
     android:layout_marginBottom="16dp" />

  <Button
     android:id="@+id/generateButton"
     android:layout_width="wrap_content"
     android:layout_height="wrap_content"
     android:text="Generate Random Number" />
</LinearLayout>
```

Kotlin Code:

```
  package com.example.numbergenerator

  import android.annotation.SuppressLint
  import android.os.Bundle
  import android.widget.Button
  import android.widget.TextView
  import androidx.appcompat.app.AppCompatActivity
  import com.example.numbergenerator.R
  import kotlin.random.Random

  class MainActivity : AppCompatActivity() {

        override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
         setContentView(R.layout.activity_main)

         // Correctly reference the TextView and Button by their IDs
         val resultTextView: TextView = findViewById(R.id.resultTextView)
         val generateButton: Button = findViewById(R.id.generateButton)
```

```
// Set up click listener for the button
        generateButton.setOnClickListener {
            // Generate a random number between 1 and 100
            val randomNumber = Random.nextInt(1, 1000)
            resultTextView.text = "Random Number: $randomNumber"
        }
    }
}
```

Output:



Random Number: 852

3. a) Develop a simple list view to select an item from list.

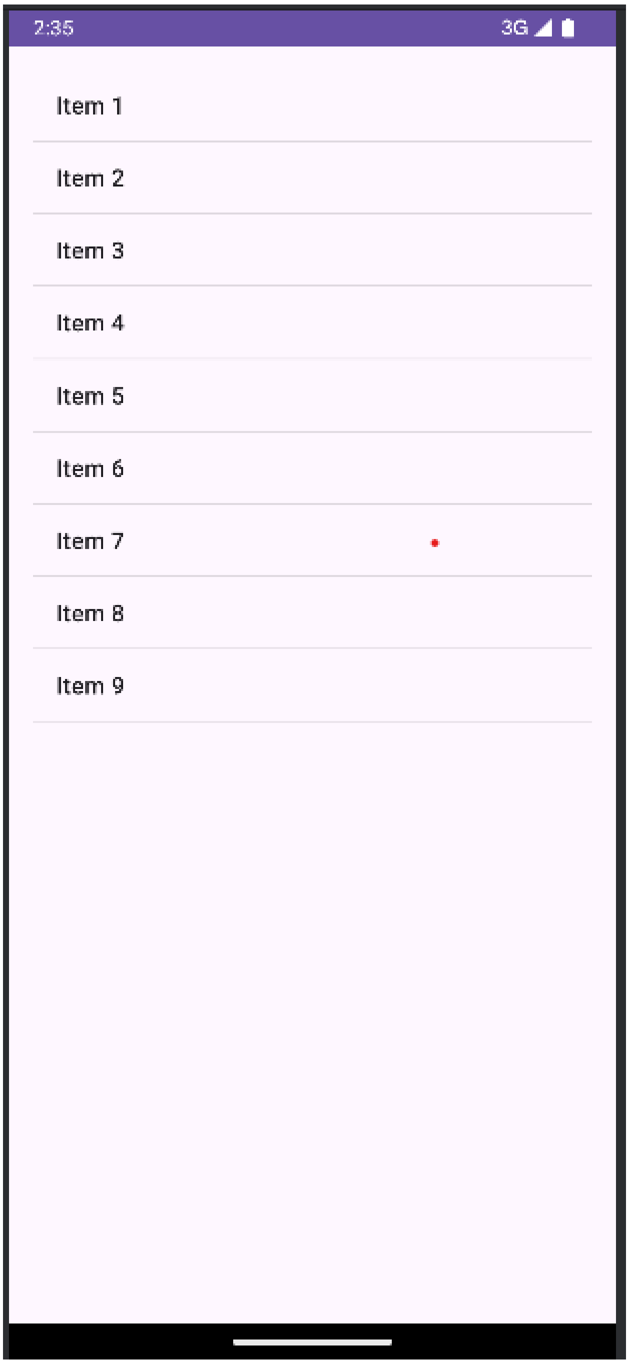
XML Code:

```
<?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">

  <!-- ListView to display the list of items -->
  <ListView
   android:id="@+id/listView"
   android:layout_width="match_parent"
   android:layout_height="match_parent" />
</LinearLayout>
```

Kotlin Code:

```
package com.example.listviewexample

import android.os.Bundle
import android.widget.ArrayAdapter
import android.widget.ListView
import android.widget.Toast
import androidx.appcompat.app.AppCompatActivity
import com.example.frag.R

class MainActivity : AppCompatActivity() {

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

// Find the ListView from the layout
        val listView: ListView = findViewById(R.id.listView)

        // Data to be displayed in the list
        val data = arrayOf(
            "Item 1", "Item 2", "Item 3",
            "Item 4", "Item 5", "Item 6",
            "Item 7", "Item 8", "Item 9"
        )

// Create an ArrayAdapter to handle the data
        val adapter = ArrayAdapter(this, android.R.layout.simple_list_item_1, data)

        // Set the adapter to the ListView
        listView.adapter = adapter
//Handle item clicks
        listView.setOnItemClickListener { parent, view, position, id ->
            val selectedItem = data[position]
            // Display a Toast with the selected item
            Toast.makeText(this, "You selected: $selectedItem", Toast.LENGTH_SHORT).show()
        }
    }
}
```

Output:



Item 1

Item 2

Item 3

Item 4

Item 5

Item 6

Item 7

Item 8

Item 9

3. b) Develop a simple grid view to select an item from list.

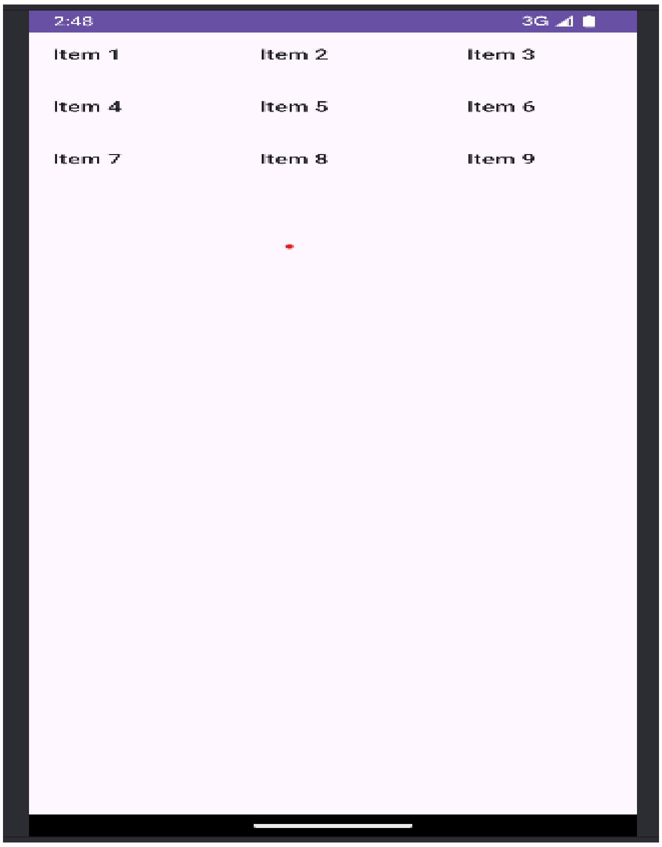
XML Code:

```
 <?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">

 <!-- GridView to display items -->
     <GridView
        android:id="@+id/gridView"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:numColumns="3"
        android:verticalSpacing="10dp"
        android:horizontalSpacing="10dp"
        android:columnWidth="100dp"
        android:stretchMode="columnWidth"
        android:gravity="center"
        android:scrollbars="none"/>

  </LinearLayout>
```

Kotlin Code:

```
package com.example.frag

import android.os.Bundle
import android.widget.GridView
import android.widget.ArrayAdapter
import android.widget.Toast
import androidx.appcompat.app.AppCompatActivity
import com.example.frag.R

class MainActivity : AppCompatActivity() {

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
// Find the GridView from the layout
        val gridView: GridView = findViewById(R.id.gridView)

// Data to be displayed in the grid (can be images, strings, etc.)
        val data = arrayOf(
            "Item 1", "Item 2", "Item 3",
            "Item 4", "Item 5", "Item 6",
            "Item 7", "Item 8", "Item 9"
        )

             // Create an ArrayAdapter to handle the data
             val adapter = ArrayAdapter(this, android.R.layout.simple_list_item_1, data)

             // Set the adapter to the GridView
             gridView.adapter = adapter

            // Handle item clicks with a Toast
            gridView.setOnItemClickListener { parent, view, position, id ->
            val selectedItem = data[position]
            // Display a Toast with the selected item
            Toast.makeText(this, "You clicked on: $selectedItem", Toast.LENGTH_SHORT).show()
        }
    }
}
```

Output:



```
Item 1        Item 2        Item 3

Item 4        Item 5        Item 6

Item 7        Item 8        Item 9
```

4. a) Devolop an activity using radio button to display selected option.

XML Code:

```
    <?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">

  <!-- RadioGroup containing multiple RadioButtons -->
  <RadioGroup
     android:id="@+id/radioGroup"
     android:layout_width="wrap_content"
     android:layout_height="wrap_content"
     android:orientation="vertical">

   <!-- RadioButton 1 -->
   <RadioButton
    android:id="@+id/radioButton1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Option 1" />

    <!-- RadioButton 2 -->
   <RadioButton
    android:id="@+id/radioButton2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Option 2" />

    <!-- RadioButton 3 -->
    <RadioButton
    android:id="@+id/radioButton3"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Option 3" />
    </RadioGroup>
```

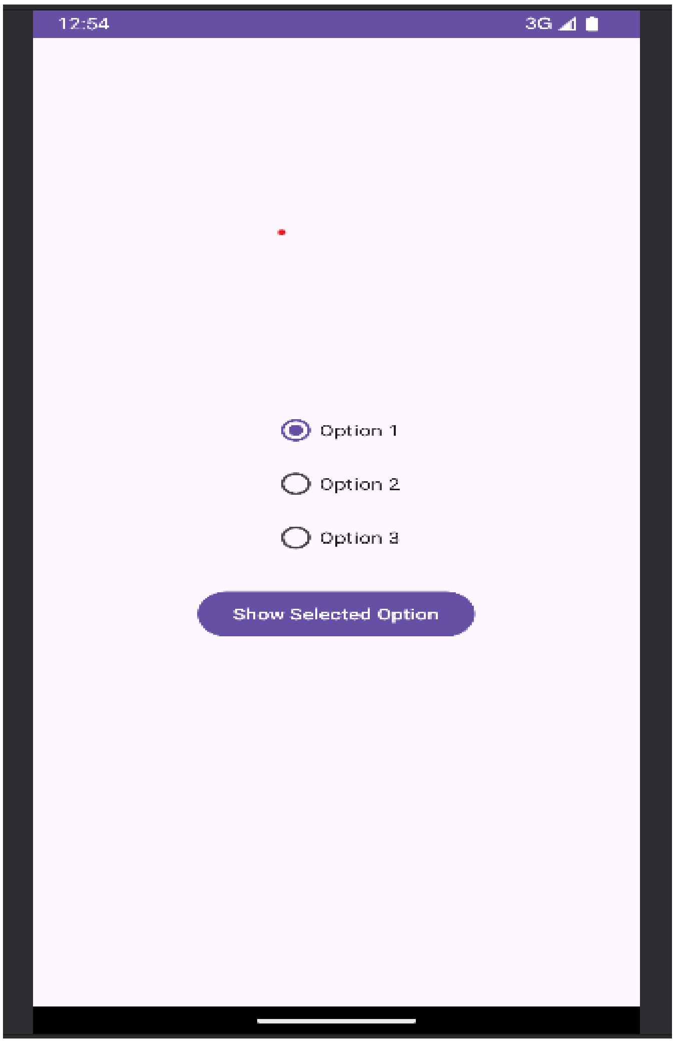
```
<!-- Button to trigger action after selection -->
 <Button
   android:id="@+id/showSelectionButton"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:text="Show Selected Option"
   android:layout_marginTop="20dp"/>
</LinearLayout>
```

Kotlin Code:

```
package com.example.frag

import android.annotation.SuppressLint
import android.os.Bundle
import android.widget.Button
import android.widget.RadioButton
import android.widget.RadioGroup
import android.widget.Toast
import androidx.appcompat.app.AppCompatActivity

class MainActivity : AppCompatActivity() {

 @SuppressLint("MissingInflatedId")
 override fun onCreate(savedInstanceState: Bundle?) {
 super.onCreate(savedInstanceState)
 setContentView(R.layout.activity_main)

 // Get references to the RadioGroup, RadioButtons, and Button
 val radioGroup = findViewById<RadioGroup>(R.id.radioGroup)
 val showSelectionButton = findViewById<Button>(R.id.showSelectionButton)

 // Set an OnClickListener for the button
 showSelectionButton.setOnClickListener {
 // Get the selected radio button ID
 val selectedId = radioGroup.checkedRadioButtonId

 // If a radio button is selected
 if (selectedId != -1) {
 // Find the RadioButton using the selected ID
 val selectedRadioButton = findViewById<RadioButton>(selectedId)
```

```
        // Show a Toast with the selected radio button's text
          Toast.makeText(this, "You selected: ${selectedRadioButton.text}", Toast.LENGTH_SHORT).show()
        } else {

    // If no radio button is selected, show a Toast to prompt the user
         Toast.makeText(this, "Please select an option", Toast.LENGTH_SHORT).show()
        }
      }
    }
```

Output:



4. b) Develop an activity using Toggle switch to display on/off status.

XML Code:

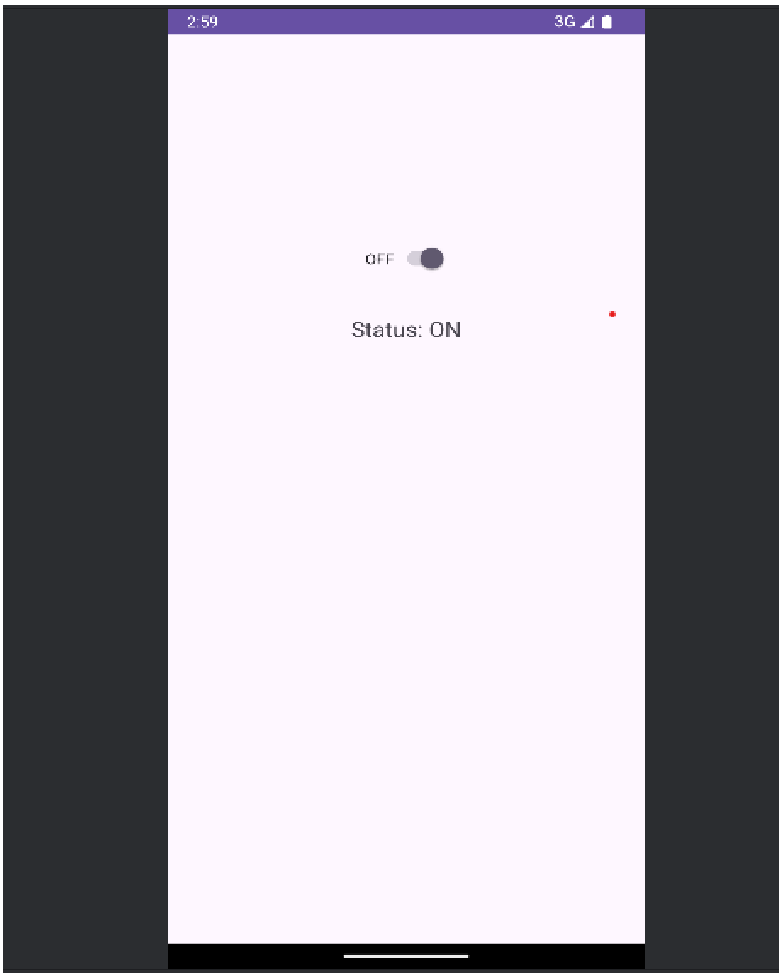
```
<?xml version="1.0" enco ding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
  xmlns:android="http://schemas.android.com/apk/res/android"
  xmlns:app="http://schemas.android.com/apk/res-auto"
  xmlns:tools="http://schemas.android.com/tools"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  tools:context=".MainActivity">

 <!-- Toggle Switch -->
 <Switch
  android:id="@+id/toggleSwitch"
  android:layout_width="wrap_content"
  android:layout_height="wrap_content"
  android:text="OFF"
  app:layout_constraintTop_toTopOf="parent"
  app:layout_constraintStart_toStartOf="parent"
  app:layout_constraintEnd_toEndOf="parent"
  android:layout_marginTop="200dp"/>

 <!-- TextView to show current state -->
 <TextView
  android:id="@+id/statusText"
  android:layout_width="wrap_content"
  android:layout_height="wrap_content"
  android:text="Status: OFF"
  android:textSize="20sp"
  app:layout_constraintTop_toBottomOf="@id/toggleSwitch"
  app:layout_constraintStart_toStartOf="parent"
  app:layout_constraintEnd_toEndOf="parent"
  android:layout_marginTop="40dp"/>

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

Kotlin Code:

```
package com.example.edit

import android.os.Bundle
import android.widget.Switch
import android.widget.TextView
import androidx.appcompat.app.AppCompatActivity
import com.example.toggleswitch.R
```

```
class MainActivity : AppCompatActivity() {

private lateinit var toggleSwitch: Switch
private lateinit var statusText: TextView

override fun onCreate(savedInstanceState: Bundle?) {
super.onCreate(savedInstanceState)
setContentView(R.layout.activity_main)

//Initialize the views
 toggleSwitch = findViewById(R.id.toggleSwitch)
 statusText = findViewById(R.id.statusText)

 // Set an OnCheckedChangeListener to the Switch
 toggleSwitch.setOnCheckedChangeListener { _, isChecked ->
 // Update the TextView based on the switch position
 if (isChecked) {
 statusText.text = "Status: ON"
 } else {
 statusText.text = "Status: OFF"
        }
      }
    }
  }
```

Output:



Status: ON

5. a) Develop an activity to edit and save text to display.

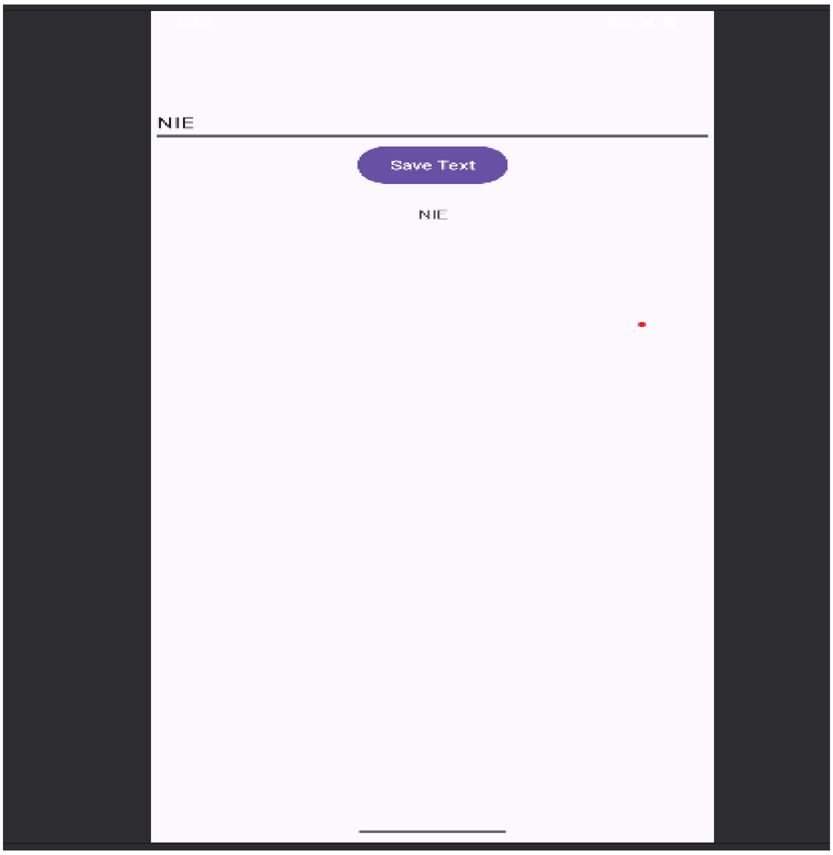
XML C ode:

```
<?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">

 <EditText
   android:id="@+id/editText"
   android:layout_width="0dp"
   android:layout_height="wrap_content"
   android:layout_marginTop="100dp"
   android:hint="Enter some text"
   android:inputType="text"
   app:layout_constraintBottom_toTopOf="@+id/button"
   app:layout_constraintEnd_toEndOf="parent"
   app:layout_constraintStart_toStartOf="parent"
   app:layout_constraintTop_toTopOf="parent" />

 <Button
   android:id="@+id/buttonSave"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:text="Save Text"
   app:layout_constraintTop_toBottomOf="@+id/editText"
   app:layout_constraintEnd_toEndOf="parent"
   app:layout_constraintStart_toStartOf="parent" />

<TextView
   android:id="@+id/textViewDisplay"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:text="Entered text will appear here"
   app:layout_constraintTop_toBottomOf="@+id/buttonSave"
   app:layout_constraintEnd_toEndOf="parent"
   app:layout_constraintStart_toStartOf="parent"
   android:layout_marginTop="20dp" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Kotlin Code:

```
package com.example.edit


import android.os.Bundle
import android.widget.Button
import android.widget.EditText
import android.widget.TextView
import androidx.appcompat.app.AppCompatActivity


class MainActivity : AppCompatActivity() {

 // Declare views
 private lateinit var editText: EditText
 private lateinit var buttonSave: Button
 private lateinit var textViewDisplay: TextView

 override fun onCreate(savedInstanceState: Bundle?) {
 super.onCreate(savedInstanceState)
 setContentView(R.layout.activity_main)

  // Initialize views
  editText = findViewById(R.id.editText)
  buttonSave = findViewById(R.id.buttonSave)
  textViewDisplay = findViewById(R.id.textViewDisplay)

  // Set a click listener for the button
  buttonSave.setOnClickListener {
  // Get the text from the EditText
  val enteredText = editText.text.toString()

   // Set the text in the TextView
   textViewDisplay.text = enteredText
      }
    }
  }
```

Output:


NIE

NIE

5. b) Develop an activity to display dialog window.

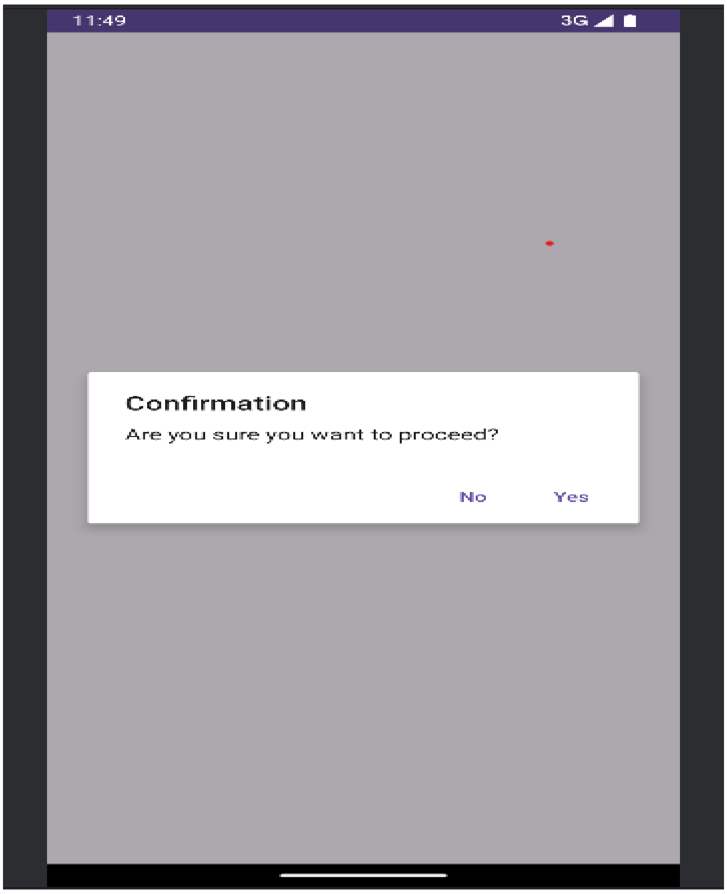
XML Code:

```
<?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">

 <!-- Button to show the dialog -->
 <Button
   android:id="@+id/showDialogButton"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:text="Show Dialog" />
 </LinearLayout>
```

Kotlin Code:

```
package com.example.frag
import android.os.Bundle
import android.widget.Button
import android.widget.Toast
import androidx.appcompat.app.AlertDialog
import androidx.appcompat.app.AppCompatActivity
import com.example.frag.R

class MainActivity : AppCompatActivity() {

override fun onCreate(savedInstanceState: Bundle?) {
super.onCreate(savedInstanceState)
setContentView(R.layout.activity_main)

val showDialogButton = findViewById<Button>(R.id.showDialogButton)

 // Button click listener to show an AlertDialog
 showDialogButton.setOnClickListener {
 showAlertDialog()
       }
  }

private fun showAlertDialog() {
// Create an AlertDialog
val builder = AlertDialog.Builder(this)
builder.setTitle("Confirmation")
builder.setMessage("Are you sure you want to proceed?")

// Positive button
builder.setPositiveButton("Yes") { dialog, which ->
   Toast.makeText(this, "You clicked Yes!", Toast.LENGTH_SHORT).show()
}

// Negative button
builder.setNegativeButton("No") { dialog, which ->
   Toast.makeText(this, "You clicked No!", Toast.LENGTH_SHORT).show()
}

// Create and show the dialog
val dialog = builder.create()
dialog.show()
  }
}
```

Output:



11:49 3G

Confirmation

Are you sure you want to proceed?

No Yes

6. a) Develop an activity to validate user using username and password.

XML Code:

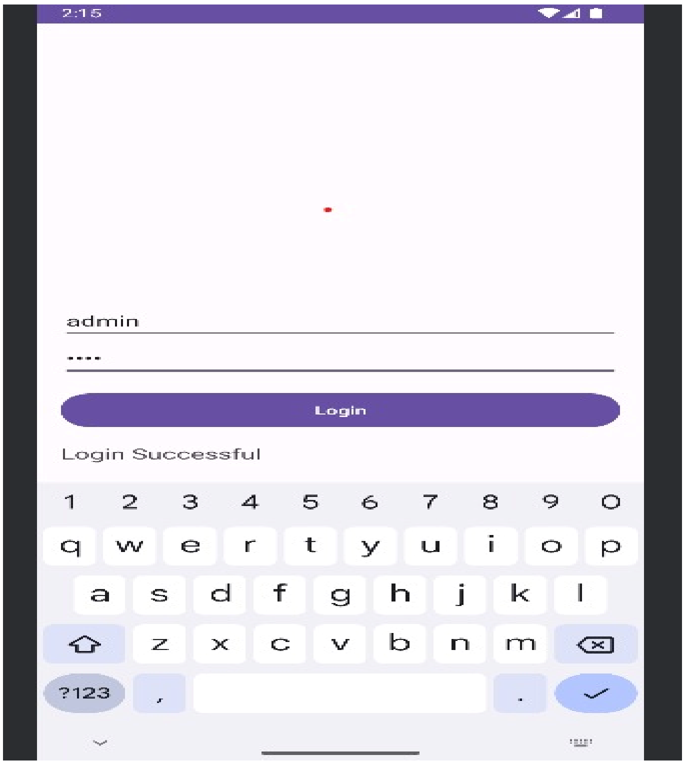
```
xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp"
    android:gravity="center">

<EditText
   android:id="@+id/username"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:hint="Enter Username"
   android:inputType="textPersonName" />

<EditText
  android:id="@+id/password"
  android:layout_width="match_parent"
  android:layout_height="wrap_content"
  android:hint="Enter Password"
  android:inputType="textPassword" />
```

```
 <Button
   android:id="@+id/loginButton"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:text="Login"
   android:layout_marginTop="16dp" />

<TextView
   android:id="@+id/resultText"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:paddingTop="16dp"
   android:text=""
   android:textSize="18sp" />
</LinearLayout>
```

Kotlin Code:

```
 import android.os.Bundle
 import android.widget.Button
 import android.widget.EditText
 import android.widget.TextView
 import androidx.appcompat.app.AppCompatActivity

 class MainActivity : AppCompatActivity() {
  override fun onCreate(savedInstanceState: Bundle?) {
  super.onCreate(savedInstanceState)
  setContentView(R.layout.activity_main)
 val usernameField = findViewById<EditText>(R.id.username)
 val passwordField = findViewById<EditText>(R.id.password)
 val loginButton = findViewById<Button>(R.id.loginButton)
 val resultText = findViewById<TextView>(R.id.resultText)

 val validUsername = "admin"
 val validPassword = "1234"

 loginButton.setOnClickListener {
 val username = usernameField.text.toString()
 val password = passwordField.text.toString()

  if (username == validUsername && password == validPassword) {
  resultText.text = "Login Successful"
  } else {
  resultText.text = "Invalid Username or Password"
   }
   } } }
```

Output:



admin

····

Login Successful

6. b) Write a program to check network connection of the device

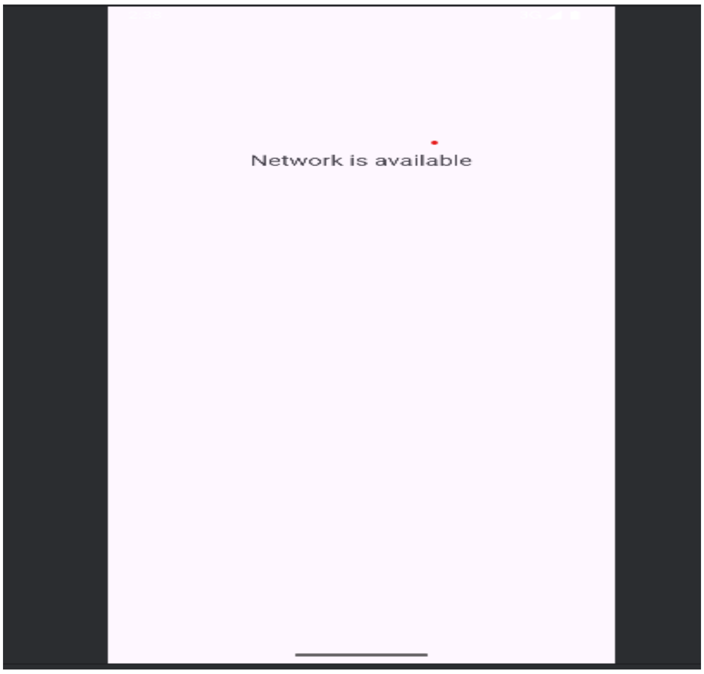
XML Code:

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
  xmlns:android="http://schemas.android.com/apk/res/android"
  xmlns:app="http://schemas.android.com/apk/res-auto"
  xmlns:tools="http://schemas.android.com/tools"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  tools:context=".MainActivity">

<TextView
  android:id="@+id/connectionStatusTextView"
  android:layout_width="wrap_content"
  android:layout_height="wrap_content"
  android:text="Checking network..."
  android:textSize="20sp"
  android:layout_marginTop="200dp"
  android:layout_centerHorizontal="true"
  app:layout_constraintTop_toTopOf="parent"
  app:layout_constraintStart_toStartOf="parent"
  app:layout_constraintEnd_toEndOf="parent"/>

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

Kotlin code:

```
package com.example.counter

import android.net.ConnectivityManager
import android.net.NetworkCapabilities
import android.os.Bundle
import android.widget.TextView
import androidx.appcompat.app.AppCompatActivity
import android.content.Context

class MainActivity : AppCompatActivity() {
private lateinit var connectionStatusTextView: TextView

override fun onCreate(savedInstanceState: Bundle?) {
super.onCreate(savedInstanceState)
setContentView(R.layout.activity_main)
connectionStatusTextView = findViewById(R.id.connectionStatusTextView)

// Check network connectivity
if (isNetworkAvailable()) {
connectionStatusTextView.text = "Network is available"
} else {
connectionStatusTextView.text = "No network connection"
   }
}

private fun isNetworkAvailable(): Boolean {
val connectivityManager = getSystemService(Context.CONNECTIVITY_SERVICE) as
ConnectivityManager
val network = connectivityManager.activeNetwork
val networkCapabilities = connectivityManager.getNetworkCapabilities(network)

//Check if the device is connected to a network (Wi-Fi or Mobile)
return networkCapabilities != null &&
networkCapabilities.hasCapability(NetworkCapabilities.NET_CAPABILITY_INTERNET)
   }
}
```

Output:


Network is available

7. a) Develop an activity using timepicker to select and display time.

XML Code:

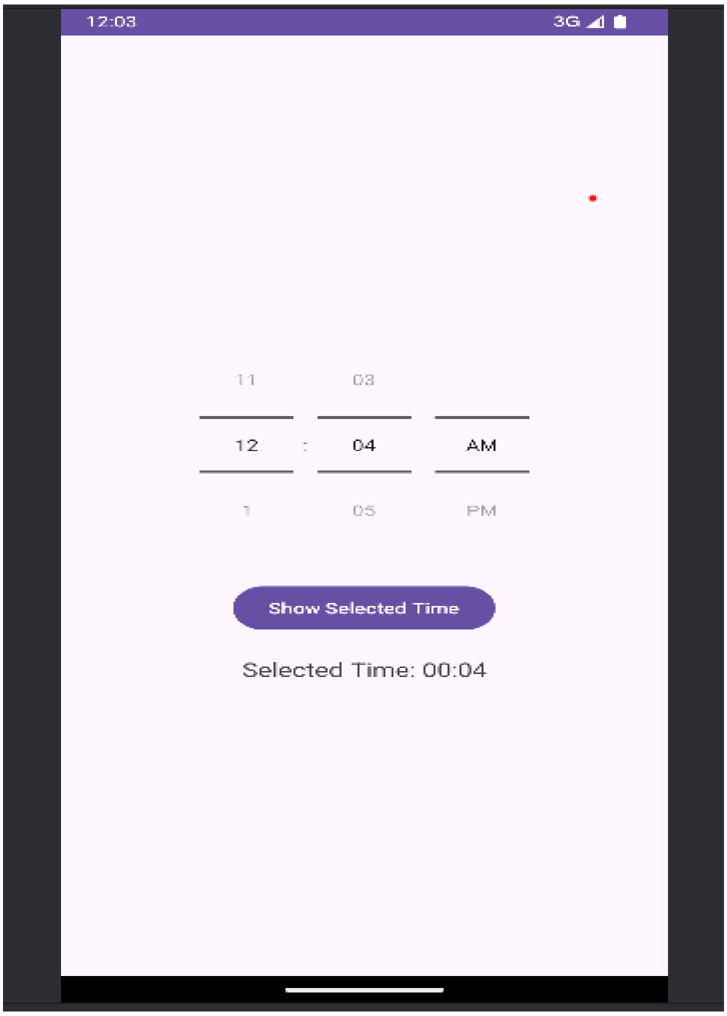
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:orientation="vertical"
  android:padding="16dp"
  android:gravity="center">

 <!-- TimePicker widget -->
 <TimePicker
   android:id="@+id/timePicker"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:timePickerMode="spinner"
   android:layout_marginBottom="20dp"/>

  <!-- Button to display selected time -->
  <Button
    android:id="@+id/showTimeButton"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Show Selected Time" />
```

```
<!-- TextView to display the selected time -->
  <TextView
    android:id="@+id/timeDisplay"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Selected Time: "
    android:textSize="18sp"
    android:layout_marginTop="20dp"/>

</LinearLayout>
```

Kotlin Code:

```
package com.example.frag

import android.os.Bundle
import android.widget.Button
import android.widget.TextView
import android.widget.TimePicker
import androidx.appcompat.app.AppCompatActivity

class MainActivity : AppCompatActivity() {

override fun onCreate(savedInstanceState: Bundle?) {
super.onCreate(savedInstanceState)
setContentView(R.layout.activity_main)

// Get references to the UI components
val timePicker = findViewById<TimePicker>(R.id.timePicker)
val showTimeButton = findViewById<Button>(R.id.showTimeButton)
val timeDisplay = findViewById<TextView>(R.id.timeDisplay)

// Set a listener for the button click
showTimeButton.setOnClickListener {
// Get the selected hour and minute from the TimePicker
val hour = timePicker.hour
val minute = timePicker.minute

 // Format the time to display
 val formattedTime = String.format("%02d:%02d", hour, minute)
 // Display the selected time in the TextView
timeDisplay.text = "Selected Time: $formattedTime"
    }
  }
```

Output:



Selected Time: 00:04

7. b) Develop an activity to display current time in digital clock format.

XML Code:

```
<?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:background="#000000"
  android:padding="16dp">
```

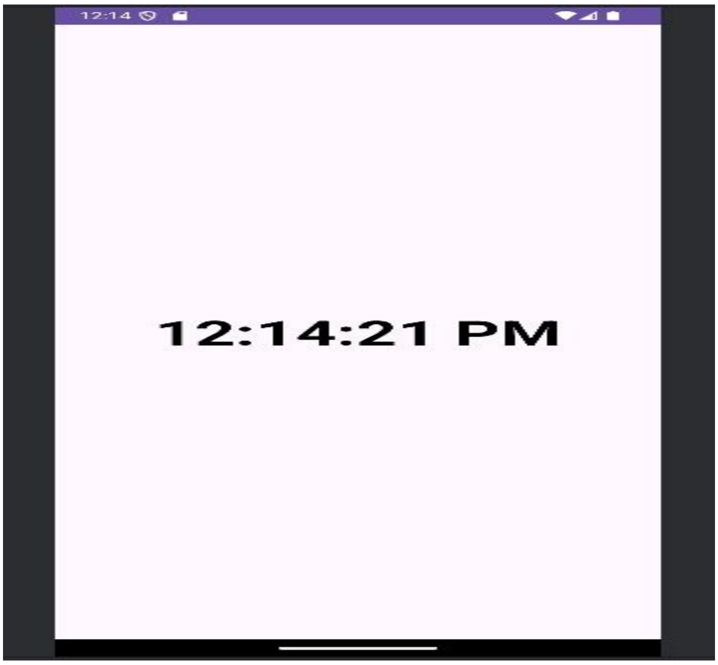
```
<TextView
  android:id="@+id/clockTextView"
  android:layout_width="wrap_content"
  android:layout_height="wrap_content"
  android:text="00:00:00"
  android:textSize="48sp"
  android:textColor="#FFFFFF"
  android:textStyle="bold" />

</LinearLayout>
```

Kotlin Code:

```
package com.example.numbergenerator

 import android.os.Bundle
 import android.os.Handler
 import android.os.Looper
 import android.widget.TextView
 import androidx.appcompat.app.AppCompatActivity
 import com.example.numbergenerator.R
 import java.text.SimpleDateFormat
 import java.util.*

 class MainActivity : AppCompatActivity() {

private lateinit var clockTextView: TextView
 private val handler = Handler(Looper.getMainLooper())

  override fun onCreate(savedInstanceState: Bundle?) {
 super.onCreate(savedInstanceState)
 setContentView(R.layout.activity_main)



  // Find the TextView by ID
  clockTextView = findViewById(R.id.clockTextView)

  // Start updating the clock
  updateClock()
  }

  private fun updateClock() {
  handler.post(object : Runnable {
  override fun run() {
```

```
// Get the current time
val currentTime = Calendar.getInstance().time
val formatter = SimpleDateFormat("hh:mm:ss a", Locale.getDefault())
val formattedTime = formatter.format(currentTime)

// Update the TextView
clockTextView.text = formattedTime

// Schedule the next update after 1 second
handler.postDelayed(this, 1000)
     }
   })
 }

 override fun onDestroy() {
 super.onDestroy()
 handler.removeCallbacksAndMessages(null) // Stop updates when the activity is destroyed
   }
 }
```

Output:



12:14:21 PM

8. a) Develop an activity to display counter using increment, decrement and reset button.

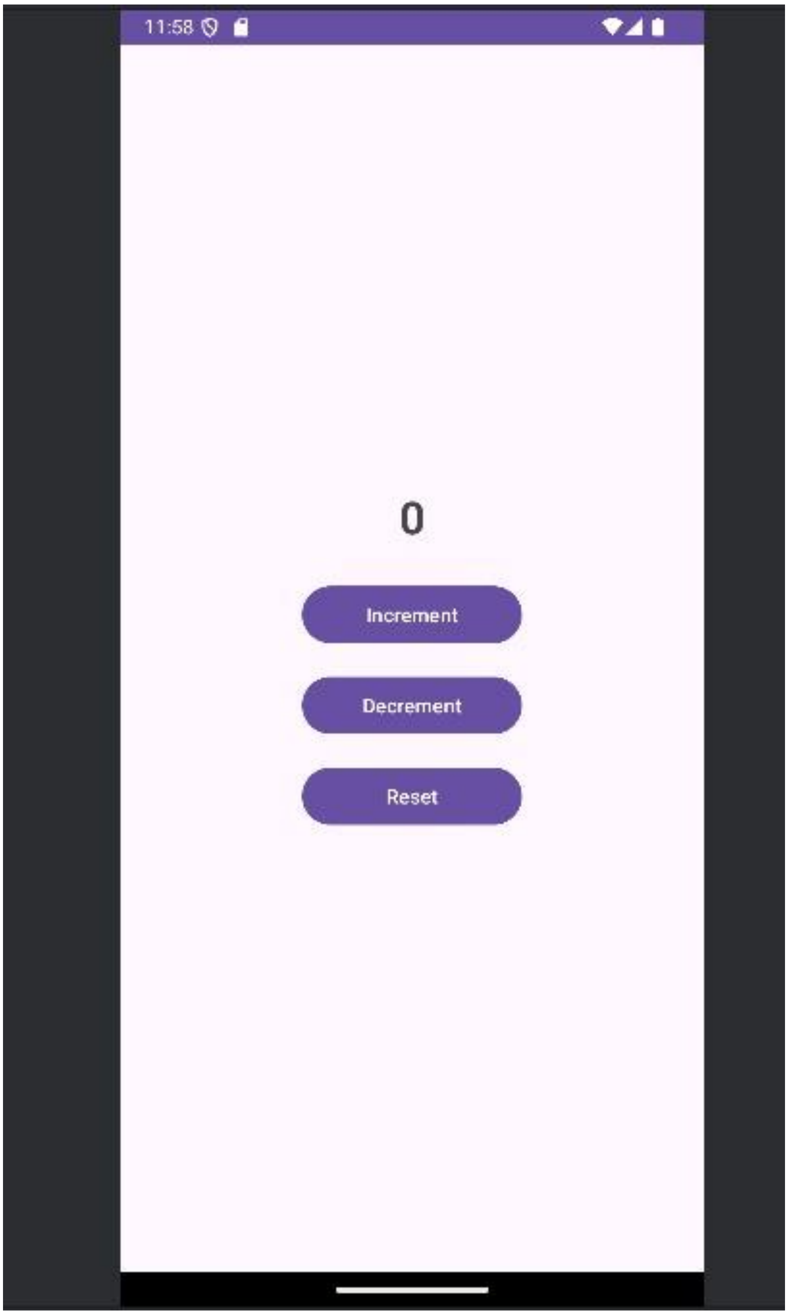
XML Code:

```
<?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/counterTextView"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_marginBottom="24dp"
   android:text="0"
   android:textSize="32sp"
   android:textStyle="bold" />

<Button
   android:id="@+id/incrementButton"
   android:layout_width="155dp"
   android:layout_height="wrap_content"
   android:layout_marginBottom="16dp"
   android:text="Increment" />

<Button
   android:id="@+id/decrementButton"
   android:layout_height="wrap_content"
   android:layout_marginBottom="16dp"
   android:layout_width="155dp"
   android:text="Decrement" />

<Button
   android:id="@+id/resetButton"
   android:layout_height="wrap_content"
   android:layout_width="155dp"
   android:text="Reset" />
</LinearLayout>
```

Kotlin Code:

```
package com.example.numbergenerator

import android.annotation.SuppressLint
import android.os.Bundle
import android.widget.Button
import android.widget.TextView
import androidx.appcompat.app.AppCompatActivity
import com.example.numbergenerator.R

class MainActivity : AppCompatActivity() {
private var counter = 0

override fun onCreate(savedInstanceState: Bundle?) {
super.onCreate(savedInstanceState)
setContentView(R.layout.activity_main)


// Find views by ID
val counterTextView: TextView = findViewById(R.id.counterTextView)
val incrementButton: Button = findViewById(R.id.incrementButton)
val decrementButton: Button = findViewById(R.id.decrementButton)
val resetButton: Button = findViewById(R.id.resetButton)

// Update the counter display
fun updateCounter() {
   counterTextView.text = counter.toString()
 }

// Increment button logic
incrementButton.setOnClickListener {
   counter++
   updateCounter()
 }

// Decrement button logic
decrementButton.setOnClickListener {
   if (counter > 0) counter--  // Prevent negative values
   updateCounter()
 }

// Reset button logic
resetButton.setOnClickListener {
   counter = 0
   updateCounter()
 }
 // Initialize counter display
        updateCounter()
    }
 }
```

Output:



8. b) Devolop an application to implement simple calculator

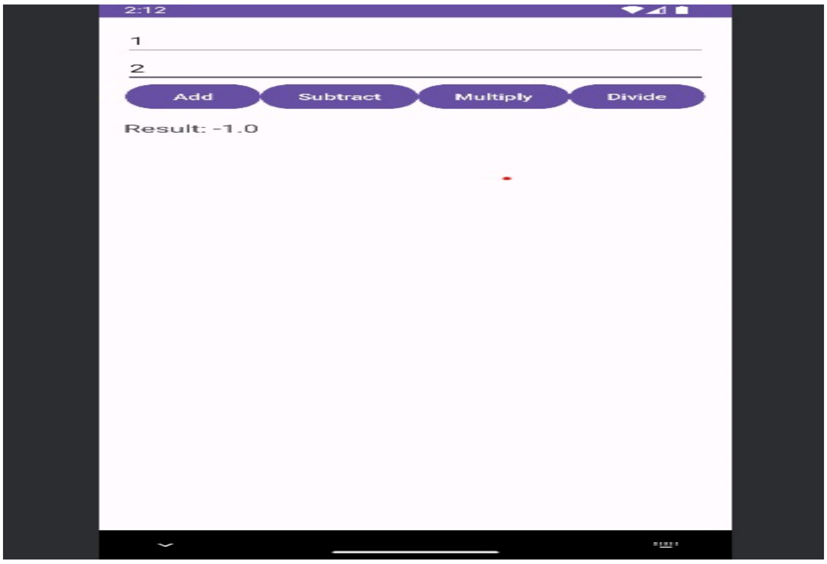
XML Code:

```
 <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">

  <EditText
   android:id="@+id/number1"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:hint="Enter first number"
   android:inputType="numberDecimal" />

  <EditText
   android:id="@+id/number2"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:hint="Enter second number"
   android:inputType="numberDecimal" />

 <LinearLayout
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:orientation="horizontal"
   android:gravity="center">

  <Button
   android:id="@+id/addButton"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:text="Add" />

   <Button
   android:id="@+id/subtractButton"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:text="Subtract" />
 <Button
   android:id="@+id/multiplyButton"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:text="Multiply" />

 <Button
   android:id="@+id/divideButton"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:text="Divide" />
 </LinearLayout>

 <TextView
  android:id="@+id/resultText"
  android:layout_width="match_parent"
  android:layout_height="wrap_content"
  android:text="Result will be displayed here"
  android:textSize="18sp"
  android:paddingTop="16dp" />
</LinearLayout>
```

Kotlin Code:

```
package com.example.calcu

import android.os.Bundle
import android.widget.Button
import android.widget.EditText
import android.widget.TextView
import androidx.appcompat.app.AppCompatActivity

class MainActivity : AppCompatActivity() {
override fun onCreate(savedInstanceState: Bundle?) {
super.onCreate(savedInstanceState)
setContentView(R.layout.activity_main)

val number1 = findViewById<EditText>(R.id.number1)
val number2 = findViewById<EditText>(R.id.number2)
val resultText = findViewById<TextView>(R.id.resultText)

val addButton = findViewById<Button>(R.id.addButton)
val subtractButton = findViewById<Button>(R.id.subtractButton)
val multiplyButton = findViewById<Button>(R.id.multiplyButton)
val divideButton = findViewById<Button>(R.id.divideButton)
addButton.setOnClickListener {
            calculate(number1, number2, resultText) { a, b -> a + b }
        }

 subtractButton.setOnClickListener {
            calculate(number1, number2, resultText) { a, b -> a - b }
        }



multiplyButton.setOnClickListener {
            calculate(number1, number2, resultText) { a, b -> a * b }
        }

 divideButton.setOnClickListener {
            calculate(number1, number2, resultText) { a, b ->
                if (b != 0.0) a / b else null
            }
        }
    }

  private fun calculate(
   num1Field: EditText,
   num2Field: EditText,
   resultText: TextView,
   operation: (Double, Double) -> Double?
    ) {
   val num1 = num1Field.text.toString().toDoubleOrNull()
   val num2 = num2Field.text.toString().toDoubleOrNull()

   if (num1 != null && num2 != null) {
   val result = operation(num1, num2)
   resultText.text = if (result != null) "Result: $result" else "Error: Division by zero"
   } else {
   resultText.text = "Please enter valid numbers"
        }
      }
    }
```

Output:



```
1
2
Result: -1.0
```

9) Develop a phone dialer activity with call and save options.

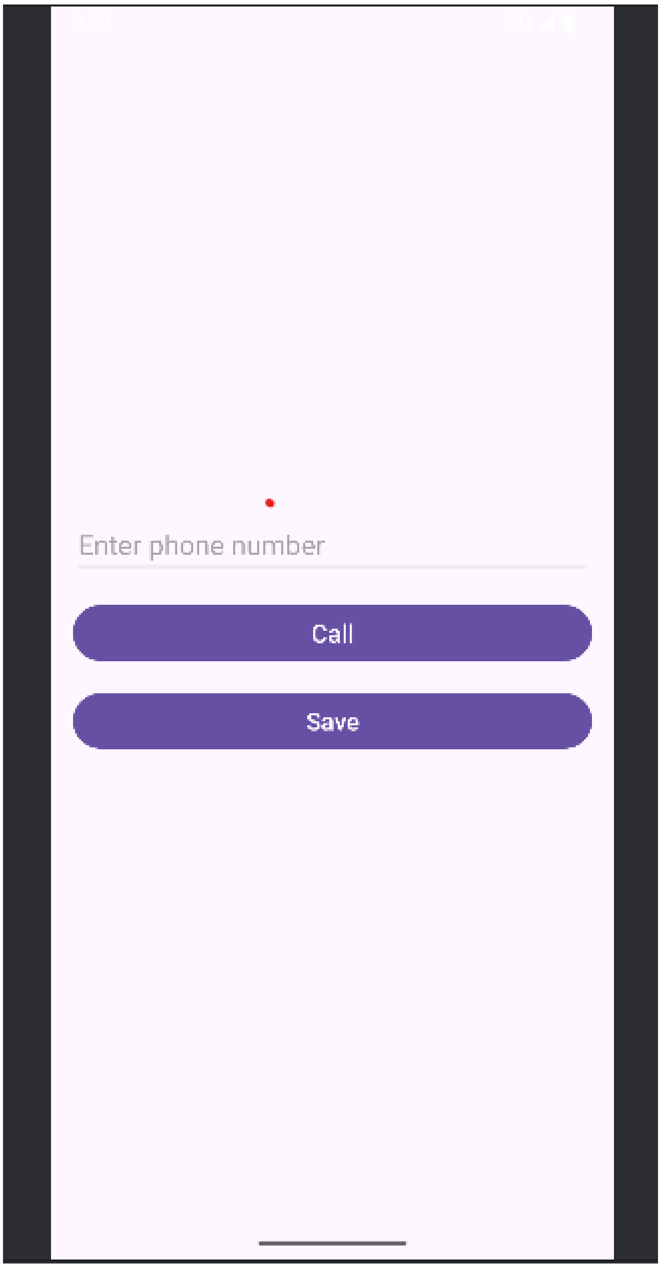
XML Code:

```
<?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"
    android:gravity="center">

    <!-- EditText to enter the phone number -->
<EditText
   android:id="@+id/phoneNumberEditText"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:hint="Enter phone number"
   android:inputType="phone"
   android:textSize="20sp"/>

    <!-- Call Button -->
<Button
   android:id="@+id/callButton"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:text="Call"
   android:textSize="18sp"
   android:layout_marginTop="16dp"/>

<!-- Save Button -->
<Button
   android:id="@+id/saveButton"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:text="Save"
   android:textSize="18sp"
   android:layout_marginTop="16dp"/>
</LinearLayout>
```

Kotlin code:

```
package com.example.dialer

import android.content.Intent
import android.net.Uri
import android.os.Bundle
import android.widget.Button
import android.widget.EditText
import android.widget.Toast
import androidx.appcompat.app.AppCompatActivity

class MainActivity : AppCompatActivity() {

 private lateinit var phoneNumberEditText: EditText
 private lateinit var callButton: Button
 private lateinit var saveButton: Button

 override fun onCreate(savedInstanceState: Bundle?) {
 super.onCreate(savedInstanceState)
 setContentView(R.layout.activity_main)

 // Initialize views
 phoneNumberEditText = findViewById(R.id.phoneNumberEditText)
 callButton = findViewById(R.id.callButton)
 saveButton = findViewById(R.id.saveButton)

 // Call button functionality
 callButton.setOnClickListener {
 val phoneNumber = phoneNumberEditText.text.toString().trim()
 if (phoneNumber.isNotEmpty()) {
 // Use an intent to initiate a phone call
 val dialIntent = Intent(Intent.ACTION_DIAL, Uri.parse("tel:$phoneNumber"))
 startActivity(dialIntent)
 } else {
 Toast.makeText(this, "Please enter a phone number", Toast.LENGTH_SHORT).show()
    }
  }

 // Save button functionality
 saveButton.setOnClickListener {
 val phoneNumber = phoneNumberEditText.text.toString().trim()
 if (phoneNumber.isNotEmpty()) {
  // Save the phone number, for simplicity we'll just display it in a Toast
  Toast.makeText(this, "Phone number saved: $phoneNumber", Toast.LENGTH_SHORT).show()

  // Clear the input field
  phoneNumberEditText.text.clear()
   } else {
  Toast.makeText(this, "Please enter a phone number", Toast.LENGTH_SHORT).show()
          }
        }
     }
   }
```

Output:



10) Develop an activity to display push notification using notification manager

XML Code:

```
<?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">

 <Button
  android:id="@+id/notifyButton"
  android:layout_width="wrap_content"
  android:layout_height="wrap_content"
  android:text="Send Notification" />
 </LinearLayout>
```

MainActivity.kt :

```
package com.example.dial

 import android.annotation.SuppressLint
 import android.os.Bundle
 import androidx.appcompat.app.AppCompatActivity
 import android.widget.Button

 class MainActivity : AppCompatActivity() {

 private lateinit var notificationHelper: NotificationHelper

 @SuppressLint("MissingInflatedId")
  override fun onCreate(savedInstanceState: Bundle?) {
  super.onCreate(savedInstanceState)
  setContentView(R.layout.activity_main)

  //Initialize NotificationHelper
  notificationHelper = NotificationHelper(this)

  //Get reference to your button and set click listener
   val notifyButton: Button = findViewById(R.id.notifyButton)
   notifyButton.setOnClickListener {
   //Send a notification when the button is clicked
   notificationHelper.sendNotification("Hello", "This is your notification!")
           }
       }
   }
```

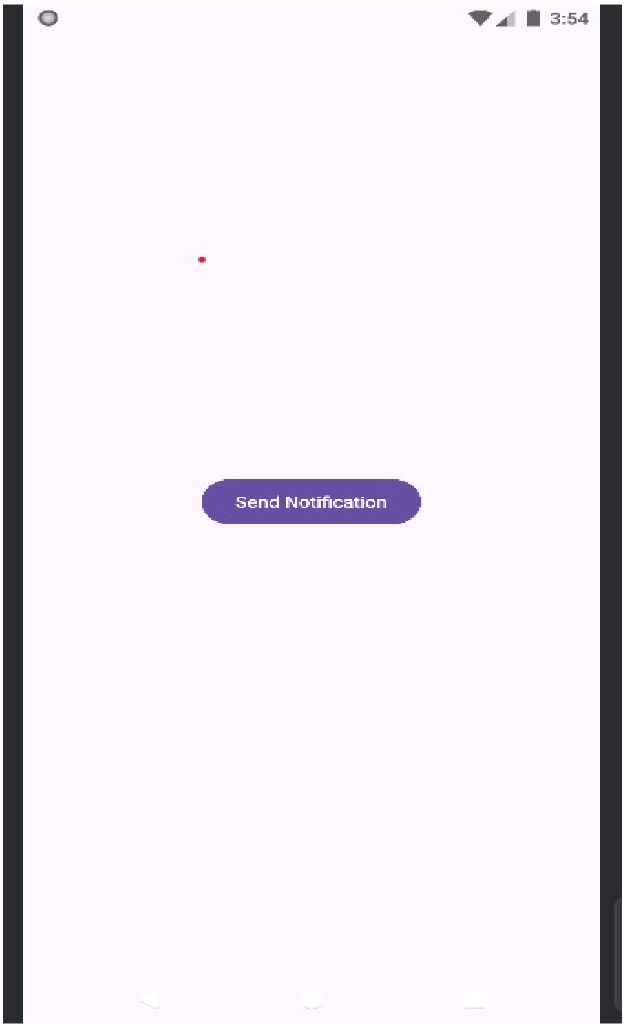
NotificationHelper.kt :

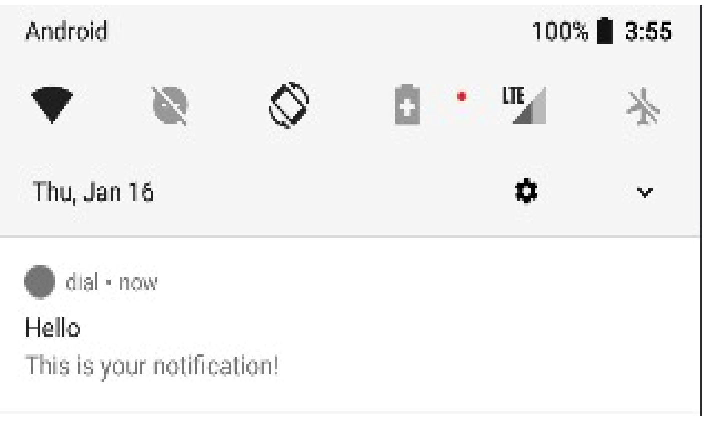
```
package com.example.dial

import android.app.Notification
import android.app.NotificationChannel
import android.app.NotificationManager
import android.content.Context
import android.os.Build
import androidx.core.app.NotificationCompat

class NotificationHelper(private val context: Context) {

private val channelId = "default_channel"
private val notificationManager: NotificationManager =
context.getSystemService(Context.NOTIFICATION_SERVICE) as NotificationManager

init {
  // Create Notification Channel for API 26 and above (Oreo and newer)
  if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {
  val channel = NotificationChannel(channelId, "Default Channel",
  NotificationManager.IMPORTANCE_DEFAULT).apply {
  description = "Channel for general notifications"
          }
  notificationManager.createNotificationChannel(channel)
      }
   }

// Method to create and send a notification
fun sendNotification(title: String, message: String) {
val notification: Notification = NotificationCompat.Builder(context, channelId)
.setContentTitle(title)
.setContentText(message)
.setSmallIcon(android.R.drawable.ic_notification_overlay)  // You can add a custom icon here
.setAutoCancel(true)
.build()

 notificationManager.notify(1, notification)
    }
 }
```

Androidmanifest.xml:

```
<uses-permission android:name="android.permission.POST_NOTIFICATIONS" />
```

Output:





dial • now

Hello

This is your notification!