20INMCA533 –
Mobile Application Development Lab

Lab Report Submitted by

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In Partial fulfillment for the Award of the Degree of

INTEGRATED MASTER OF COMPUTER APPLICATIONS

(INMCA)

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

AMAL JYOTHI COLLEGE OF ENGINEERING AUTONOMOUS

KANJIRAPPALLY

[Affiliated to APJ Abdul Kalam Technological University, Kerala. Approved by AICTE, Accredited by NAAC. Koovappally, Kanjirappally, Kottayam, Kerala – 686518]

2024-2025

DEPARTMENT OF COMPUTER APPLICATIONS AMAL JYOTHI COLLEGE OF ENGINEERING AUTONOMOUS KANJIRAPPALLY

<u>CERTIFICATE</u>

This is to certify that the lab report, **"20INMCA533 – Mobile Application Development Lab"** is the bona fide work of **ALEENA GINU (Regno: AJC20MCA-I006)** in partial fulfillment of the requirements for the award of the Degree of Integrated Master of Computer Applications under APJ Abdul Kalam Technological University during the year **2024-25**.

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Internal Examiner   **External Examiner**

Course Code	Course Name	Syllabus Year	L-T-P-C
20INMCA533	Mobile Application Development Lab	2020	0-1-3-1

VISION

To promote an academic and research environment conducive for innovation centric technical education.

MISSION

MS1 -   Provide foundations and advanced technical education in both theoretical and applied Computer Applications in-line with Industry demands.

MS2 -   Create highly skilled computer professionals capable of designing and innovating real life solutions.

MS3 -   Sustain an academic environment conducive to research and teaching focused to generate up-skilled professionals with ethical values.

MS4 -   Promote entrepreneurial initiatives and innovations capable of bridging and contributing with sustainable, socially relevant technology solutions.

COURSE OUTCOME

CO	Outcome	Target
CO1	Understand UI Design: Widgets and Layouts, UI Events, Event Listeners	60
CO2	Learn Android components, Activities, Services, Broadcast Receivers and Intents	60
CO3	Debug Android applications using different tools and plugins	60
CO4	Design and build a functional Android application	60
CO5	Implement SQLite Database and content providers.	60

COURSE END SURVEY

CO	Survey Question	Answer Format
CO1	What extend you are able to understand UI Design: Widgets and Layouts, UI Events, Event Listeners	Excellent/Very Good/Good/Fair/Poor
CO2	What extend you are able to learn Android components, Activities, Services, Broadcast Receivers and Intents	Excellent/Very Good/Good/Fair/Poor
CO3	What extend you are able to debug Android applications using different tools and plugins	Excellent/Very Good/Good/Fair/Poor
CO4	What extent you are able to Design and build a functional Android application	Excellent/Very Good/Good/Fair/Poor
CO5	What extend you are able to Implement SQLite Database and content providers.	Excellent/Very Good/Good/Fair/Poor

CONTENT

Date: 24-07-2024

Experiment No. 1

Aim: Program to Design User Login form.
CO1: Understand UI Design: Widgets and Layouts, UI Events, Event Listeners

Procedure:

activity_main.xml

```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:id="@+id/main"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  tools:context=".MainActivity">
  <!-- Username Label -->
  <TextView
    android:id="@+id/TV1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Enter Username"
    android:textSize="20sp"
    android:layout_marginStart="32dp"
    android:layout_marginTop="24dp"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toStartOf="@+id/TVContent1"
    app:layout_constraintHorizontal_bias="0.1"
    app:layout_constraintVertical_bias="0.3" />
  <!-- Username Input Field -->
  <EditText
    android:id="@+id/TVContent1"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_marginStart="16dp"
    android:layout_marginEnd="32dp"
    android:layout_marginTop="24dp"
    android:inputType="text"
    android:hint="Username"
    android:textSize="20sp"
    app:layout_constraintStart_toEndOf="@+id/TV1"
    app:layout_constraintEnd_toEndOf="parent"
```

```xml
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintHorizontal_bias="0.9"
        app:layout_constraintVertical_bias="0.3" />
    <!-- Password Label -->
    <TextView
        android:id="@+id/TV2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enter Password"
        android:textSize="20sp"
        android:layout_marginStart="32dp"
        android:layout_marginTop="16dp"
        app:layout_constraintTop_toBottomOf="@+id/TVContent1"
        app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toStartOf="@+id/editTextTextPassword"
        app:layout_constraintHorizontal_bias="0.1"
        app:layout_constraintVertical_bias="0.4" />
    <!-- Password Input Field -->
    <EditText
        android:id="@+id/editTextTextPassword"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:layout_marginEnd="32dp"
        android:layout_marginTop="16dp"
        android:inputType="textPassword"
        android:hint="Password"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/TV2"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/TVContent1"
        app:layout_constraintHorizontal_bias="0.9"
        app:layout_constraintVertical_bias="0.4" />
    <!-- Login Button -->
    <Button
        android:id="@+id/sum"
        android:layout_width="200dp"
        android:layout_height="wrap_content"
        android:text="Login"
        android:textSize="20sp"
        android:layout_marginTop="32dp"
    app:layout_constraintTop_toBottomOf="@+id/editTextTextPassword"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
```

```xml
        app:layout_constraintVertical_bias="0.5" />
    <!-- Result TextView -->
    <TextView
        android:id="@+id/result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:gravity="center"
        android:text=""
        android:textSize="18sp"
        android:layout_marginTop="24dp"
        app:layout_constraintTop_toBottomOf="@+id/sum"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintVertical_bias="0.6" />
</androidx.constraintlayout.widget.ConstraintLayout>
```
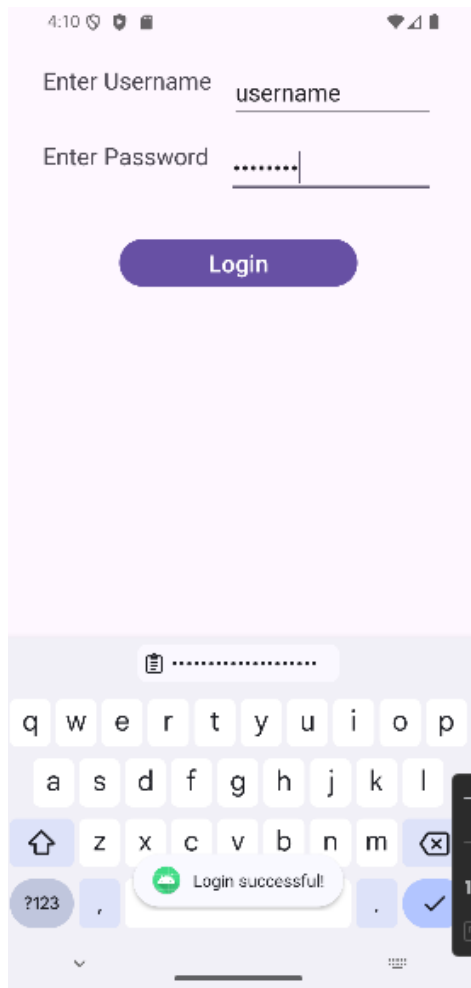
MainActivity.kt

```kotlin
package com.example.myapplication2_divide
import android.os.Bundle
import android.view.Gravity
import android.widget.Button
import android.widget.EditText
import android.widget.TextView
import android.widget.Toast
import androidx.activity.enableEdgeToEdge
import androidx.appcompat.app.AppCompatActivity
import androidx.core.view.ViewCompat
import androidx.core.view.WindowInsetsCompat

class MainActivity : AppCompatActivity() {
    private val username: String = "username"
    private val password: String = "password"
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        enableEdgeToEdge()
        setContentView(R.layout.activity_main)
        val usernameEditText = findViewById<EditText>(R.id.TVContent1)
        val passwordEditText = findViewById<EditText>(R.id.editTextTextPassword)
        val loginButton = findViewById<Button>(R.id.sum)
        loginButton.setOnClickListener {
            val inputUsername = usernameEditText.text.toString().trim()
            val inputPassword = passwordEditText.text.toString().trim()
            if (inputUsername == username && inputPassword == password
                Toast.makeText(this@MainActivity, "Login successful!",
```

Toast.LENGTH_SHORT).show()
      else
          Toast.makeText(this@MainActivity, "Invalid username or password",
Toast.LENGTH_SHORT).show()
      }
  }
}

Output:

Result:
The program was executed and the result was successfully obtained. Thus CO1 is obtained.

Experiment No. 2

Aim: Program to Display message in Edit text on button press.
CO1: Understand UI Design: Widgets and Layouts, UI Events, Event Listeners

Procedure:

activity_main.xml
```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:id="@+id/main"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  tools:context=".MainActivity">
  <TextView
    android:id="@+id/TV1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Enter the text"
    android:gravity="center"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    android:layout_marginTop="88dp"
    app:layout_constraintHorizontal_bias="0.164"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.057"/>
  <EditText
    android:id="@+id/TVContent"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:ems="10"
    android:gravity="center"
    android:inputType="text"
    android:text="Enter Name"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.75"
    app:layout_constraintStart_toEndOf="@id/TV1"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.155" />
```

```xml
    <Button
        android:id="@+id/Dis"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Display"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        tools:layout_editor_absoluteX="134dp"
        tools:layout_editor_absoluteY="219dp" />
    <TextView
        android:id="@+id/result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="44dp"
        android:text="Result"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.376" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.kt

```kotlin
package com.example.myapplication
import android.os.Bundle
import android.view.View
import android.widget.Button
import android.widget.EditText
import android.widget.TextView
import androidx.activity.enableEdgeToEdge
import androidx.appcompat.app.AppCompatActivity
import androidx.core.view.ViewCompat
import androidx.core.view.WindowInsetsCompat

class MainActivity : AppCompatActivity() {
    private lateinit var txtTV: EditText
    private lateinit var addButton: Button
    private lateinit var result1: TextView
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        enableEdgeToEdge()
        setContentView(R.layout.activity_main)
        txtTV = findViewById(R.id.TVContent)
        addButton = findViewById(R.id.Dis)
```

```
    result1 = findViewById(R.id.result)
    addButton.setOnClickListener {
        val inputText = txtTV.text.toString()
        result1.text = inputText
        result1.visibility = View.VISIBLE
    }
  }
}
```
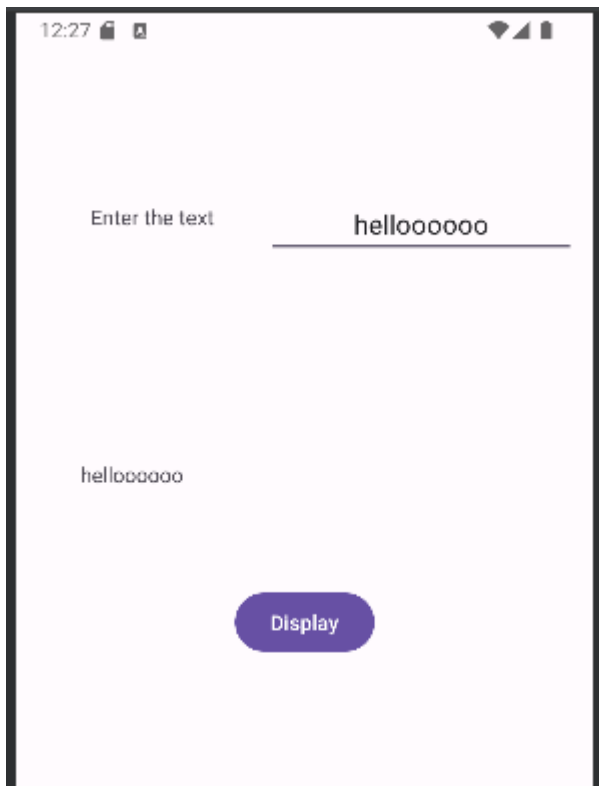
Output:

Result: The program was executed and the result was successfully obtained. Thus CO1 is obtained.

Experiment No. 3

Aim: Program to Check the given number in the Edit Text, is prime or not.
CO1: Understand UI Design: Widgets and Layouts, UI Events, Event Listeners

Procedure:

activity_main.xml

```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:id="@+id/main"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  tools:context=".MainActivity">
  <EditText
    android:id="@+id/editTextText"
    android:layout_width="212dp"
    android:layout_height="67dp"
    android:layout_marginTop="344dp"
    android:ems="10"
    android:hint="Enter Number"
    android:inputType="text"
    app:layout_constraintBottom_toTopOf="@+id/buttonPanel"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.776"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.502"
    tools:ignore="UnknownId" />
  <Button
    android:id="@+id/button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="84dp"
    android:text="Check Prime"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/editTextText" />
  <TextView
    android:id="@+id/textViewResult"
```

```
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textSize="24sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/button" />
    <TextView
        android:id="@+id/textView"
        android:layout_width="65dp"
        android:layout_height="60dp"
        android:text="Enter Number:"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toStartOf="@+id/editTextText"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
app:layout_constraintVertical_bias="0.523" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.kt
```
package com.example.myapplication2_divide
import android.os.Bundle
import android.widget.Button
import android.widget.EditText
import android.widget.TextView
import androidx.appcompat.app.AppCompatActivity

class MainActivity : AppCompatActivity() {
    private lateinit var inputBox: EditText
    private lateinit var btn: Button
    private lateinit var resultTextView: TextView
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
        inputBox = findViewById(R.id.editTextText)
        btn = findViewById(R.id.button)
        resultTextView = findViewById(R.id.textViewResult)
        btn.setOnClickListener {
            val num = inputBox.text.toString().toInt()
            if (isPrime(num)) {
                resultTextView.text = "$num is a Prime Number"
            } else {
                resultTextView.text = "$num is not a Prime Number"
            }
        }
```

```
    }
    private fun isPrime(num: Int): Boolean {
        if (num <= 1)
            return false
        for (i in 2 until num)
            if (num % i == 0)
                return false
        return true
    }
}
```

Output:

121 is not a Prime Number

Result: The program was executed and the result was successfully obtained. Thus CO1 is obtained.

Experiment No. 4

Aim: Program to demonstrate Toast.
CO1: Understand UI Design: Widgets and Layouts, UI Events, Event Listeners

Procedure:

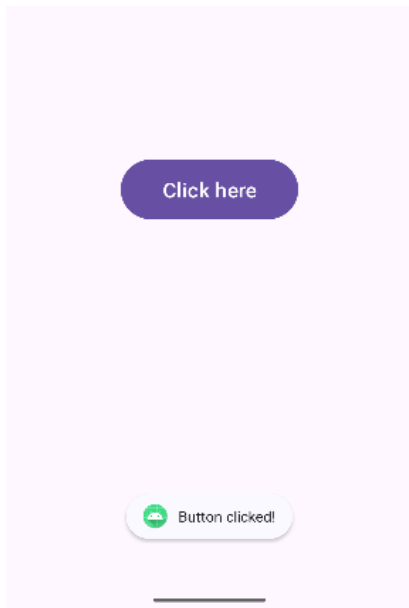**activity_main.xml**

```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:id="@+id/main"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  tools:context=".MainActivity">
  <Button
    android:id="@+id/button"
    android:layout_width="170dp"
    android:layout_height="67dp"
    android:text="Click here"
    android:textSize="20sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.kt

```kotlin
package com.example.myapplication2_divide
import android.os.Bundle
import android.view.Gravity
import android.widget.Button
import android.widget.EditText
import android.widget.TextView
import android.widget.Toast
import androidx.activity.enableEdgeToEdge
import androidx.appcompat.app.AppCompatActivity
import androidx.core.view.ViewCompat
import androidx.core.view.WindowInsetsCompat

class MainActivity : AppCompatActivity() {
    private lateinit var button: Button
```

```kotlin
override fun onCreate(savedInstanceState: Bundle?) {
    super.onCreate(savedInstanceState)
    enableEdgeToEdge()
    setContentView(R.layout.activity_main)
    button = findViewById(R.id.button)
    button.setOnClickListener {
        val toast= Toast.makeText(this,"Button clicked!", Toast.LENGTH_LONG)
        toast.setGravity(Gravity.START,100,100)
        toast.show()
    }
}
}
```

Output:

Result:

The program was executed and the result was successfully obtained. Thus CO1 is obtained.

Experiment No. 5

Aim: Program to add two numbers and display the result.
CO1: Understand UI Design: Widgets and Layouts, UI Events, Event Listeners

Procedure:

activity_main.xml

```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:id="@+id/main"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  tools:context=".MainActivity">
  <!-- First TextView and EditText for the first number -->
  <TextView
    android:id="@+id/textView1"
    android:layout_width="150dp"
    android:layout_height="48dp"
    android:layout_marginTop="72dp"
    android:text="Enter number 1"
    app:layout_constraintEnd_toStartOf="@+id/first_number"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent" />
  <EditText
    android:id="@+id/first_number"
    android:layout_width="150dp"
    android:layout_height="48dp"
    android:layout_marginTop="52dp"
    android:hint="number 1"
    android:inputType="number"
    android:textSize="16sp"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toEndOf="@+id/textView1"
    app:layout_constraintTop_toTopOf="parent" />
  <!-- Second TextView and EditText for the second number -->
  <TextView
    android:id="@+id/textView2"
    android:layout_width="159dp"
    android:layout_height="39dp"
    android:layout_marginTop="28dp"
```

```xml
        android:gravity="center_vertical"
        android:text="Enter number 2"
        app:layout_constraintEnd_toStartOf="@+id/second_number"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView1" />
    <EditText
        android:id="@+id/second_number"
        android:layout_width="143dp"
        android:layout_height="48dp"
        android:layout_marginTop="40dp"
        android:layout_marginEnd="10dp"
        android:hint="number 2"
        android:inputType="number"
        android:textSize="16sp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toEndOf="@+id/textView2"
        app:layout_constraintTop_toBottomOf="@+id/first_number" />
    <!-- Button to perform the addition -->
    <Button
        android:id="@+id/button"
        android:layout_width="139dp"
        android:layout_height="57dp"
        android:layout_marginTop="84dp"
        android:text="Sum"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView2" />
    <!-- Result TextViews to display the result -->
    <TextView
        android:id="@+id/result"
        android:layout_width="150dp"
        android:layout_height="40dp"
        android:layout_marginTop="88dp"
        android:gravity="center"
        android:text="result"
        android:textSize="16sp"
        android:visibility="gone"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toStartOf="@+id/result_value"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/button"
        app:layout_constraintVertical_bias="0.006" />
    <TextView
        android:id="@+id/result_value"
        android:layout_width="150dp"
```

```
          android:layout_height="40dp"
          android:gravity="center"
          android:textSize="16sp"
          android:visibility="gone"
          app:layout_constraintEnd_toEndOf="parent"
          app:layout_constraintStart_toEndOf="@+id/result"
          app:layout_constraintTop_toTopOf="@+id/result" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.kt

```kotlin
package com.example.myapplication
import android.os.Bundle
import android.view.View
import android.widget.Button
import android.widget.EditText
import android.widget.TextView
import androidx.activity.enableEdgeToEdge
import androidx.appcompat.app.AppCompatActivity
import androidx.core.view.ViewCompat
import androidx.core.view.WindowInsetsCompat

class MainActivity : AppCompatActivity() {
    private lateinit var firstNumberEditText: EditText
    private lateinit var secondNumberEditText: EditText
    private lateinit var resultTextView: TextView
    private lateinit var resultValueTextView: TextView
    private lateinit var sumButton: Button
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        enableEdgeToEdge()
        setContentView(R.layout.activity_main)
        firstNumberEditText = findViewById(R.id.first_number)
        secondNumberEditText = findViewById(R.id.second_number)
        resultTextView = findViewById(R.id.result)
        resultValueTextView = findViewById(R.id.result_value)
        sumButton = findViewById(R.id.button)
        sumButton.setOnClickListener {
            // Get text from EditTexts and convert to integers
            val firstNumber = firstNumberEditText.text.toString().toIntOrNull() ?: 0
            val secondNumber = secondNumberEditText.text.toString().toIntOrNull() ?: 0
            // Calculate the sum
            val sum = firstNumber + secondNumber
            // Update TextViews to show the result
            resultTextView.text = "Result:"
            resultValueTextView.text = sum.toString()
```

```
            resultTextView.visibility = View.VISIBLE
            resultValueTextView.visibility = View.VISIBLE
        }
    }
}
```
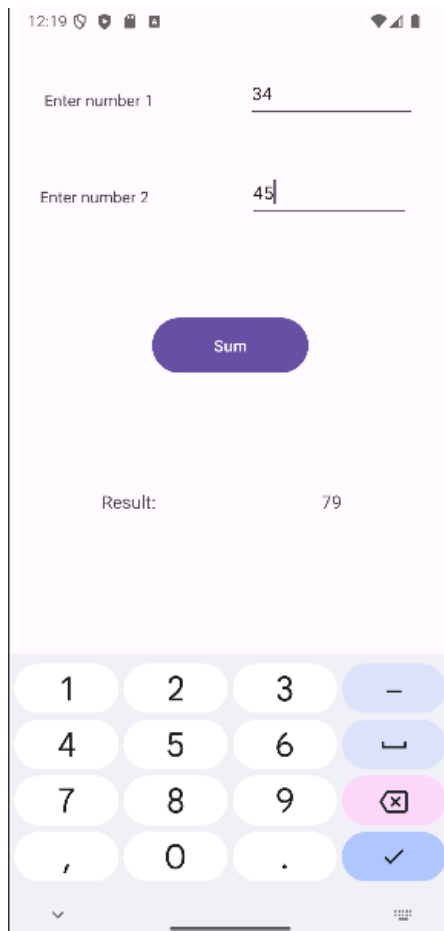
Output:

Result: The program was executed and the result was successfully obtained. Thus CO1 is obtained.

Experiment No. 6

Aim: Program to perform simple calculator using Linear Layout.
CO1: Understand UI Design: Widgets and Layouts, UI Events, Event Listeners

Procedure:

activity_main.xml
```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
  xmlns:app="http://schemas.android.com/apk/res-auto"
  xmlns:tools="http://schemas.android.com/tools"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:orientation="vertical"
  android:padding="16dp"
  tools:context=".MainActivity">
  <!-- First Number Input -->
  <EditText
    android:id="@+id/editTextNumber1"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Enter first number"
    android:inputType="numberDecimal"
    android:textSize="18sp"
    android:layout_marginBottom="16dp"/>
  <!-- Second Number Input -->
  <EditText
    android:id="@+id/editTextNumber2"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Enter second number"
    android:inputType="numberDecimal"
    android:textSize="18sp"
    android:layout_marginBottom="24dp"/>
  <!-- Horizontal Layout for Operation Buttons -->
  <LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="horizontal"
    android:gravity="center">
    <!-- Add Button -->
    <Button
      android:id="@+id/buttonAdd"
```

```xml
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="+"
      android:textSize="18sp"
      android:layout_margin="8dp"/>
    <!-- Subtract Button -->
    <Button
      android:id="@+id/buttonSubtract"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="-"
      android:textSize="18sp"
      android:layout_margin="8dp"/>
    <!-- Multiply Button -->
    <Button
      android:id="@+id/buttonMultiply"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="*"
      android:textSize="18sp"
      android:layout_margin="8dp"/>
    <!-- Divide Button -->
    <Button
      android:id="@+id/buttonDivide"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="/"
      android:textSize="18sp"
      android:layout_margin="8dp"/>
  </LinearLayout>
  <!-- Result Display -->
  <TextView
    android:id="@+id/textViewResult"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:textSize="20sp"
    android:gravity="center"
    android:layout_marginTop="24dp"
    android:text="" />
</LinearLayout>
```

MainActivity.kt
```kotlin
package com.example.myapplication2_divide
import android.os.Bundle
import android.view.Gravity
```

```kotlin
import android.widget.Button
import android.widget.EditText
import android.widget.TextView
import android.widget.Toast
import androidx.activity.enableEdgeToEdge
import androidx.appcompat.app.AppCompatActivity
import androidx.core.view.ViewCompat
import androidx.core.view.WindowInsetsCompat

class MainActivity : AppCompatActivity() {
    private lateinit var editTextNumber1: EditText
    private lateinit var editTextNumber2: EditText
    private lateinit var buttonAdd: Button
    private lateinit var buttonSubtract: Button
    private lateinit var buttonMultiply: Button
    private lateinit var buttonDivide: Button
    private lateinit var textViewResult: TextView
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
        editTextNumber1 = findViewById(R.id.editTextNumber1)
        editTextNumber2 = findViewById(R.id.editTextNumber2)
        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 { performOperation(Operation.ADD) }
        buttonSubtract.setOnClickListener { performOperation(Operation.SUBTRACT) }
        buttonMultiply.setOnClickListener { performOperation(Operation.MULTIPLY) }
        buttonDivide.setOnClickListener { performOperation(Operation.DIVIDE) }
    }
    enum class Operation {
        ADD, SUBTRACT, MULTIPLY, DIVIDE
    }
    private fun performOperation(operation: Operation) {
        val number1Str = editTextNumber1.text.toString()
        val number2Str = editTextNumber2.text.toString()
        if (number1Str.isEmpty() || number2Str.isEmpty()) {
            Toast.makeText(this, "Please enter both numbers",
Toast.LENGTH_SHORT).show()
            return
        }
        val number1 = number1Str.toDoubleOrNull()
        val number2 = number2Str.toDoubleOrNull()
```

```
    if (number1 == null || number2 == null) {
        Toast.makeText(this, "Please enter valid numbers",
Toast.LENGTH_SHORT).show()
        return
    }
    val result = when (operation) {
        Operation.ADD -> number1 + number2
        Operation.SUBTRACT -> number1 - number2
        Operation.MULTIPLY -> number1 * number2
        Operation.DIVIDE -> {
            if (number2 == 0.0) {
                Toast.makeText(this, "Cannot divide by zero",
Toast.LENGTH_SHORT).show()
                return
            }
            number1 / number2
        }
    }
    textViewResult.text = "Result: $result"
  }
}
```

Output:
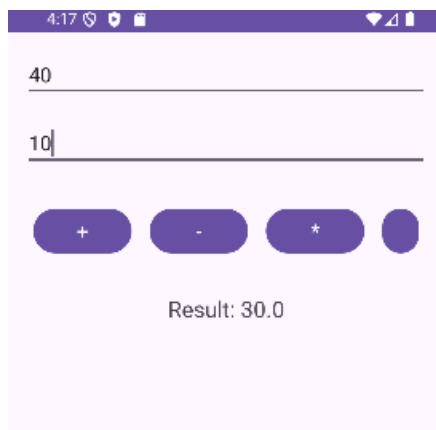
Result: The program was executed and the result was successfully obtained. Thus CO1 is obtained.

Experiment No. 7

Aim: Program to Load an Image in ImageView.
CO4: Design and build a functional Android application

Procedure:

activity_main.xml

```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:id="@+id/main"
android:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".MainActivity">


<ImageView android:id="@+id/imageView"
android:layout_width="336dp"
android:layout_height="354dp"
android:layout_marginStart="111dp"
android:layout_marginTop="114dp"
android:layout_marginEnd="60dp"
android:layout_marginBottom="394dp"
  app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintHorizontal_bias="0.77"
  app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent"
  app:layout_constraintVertical_bias="0.404"
app:srcCompat="@drawable/ic_launcher_background" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.kt

```kotlin
package com.example.imageapp

import android.os.Bundle
import android.widget.ImageView
```

import androidx.appcompat.app.AppCompatActivity

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

// Find the ImageView and set the image resource

val imgV = findViewById<ImageView>(R.id.imageView)
imgV.setImageResource(R.drawable.ic_launcher_background)
}

}

Output:

Result: The program was executed and the result was successfully obtained. Thus CO4 is obtained.

Experiment No. 8

Aim: Program to move an Image from one ImageView to another ImageView on button press.

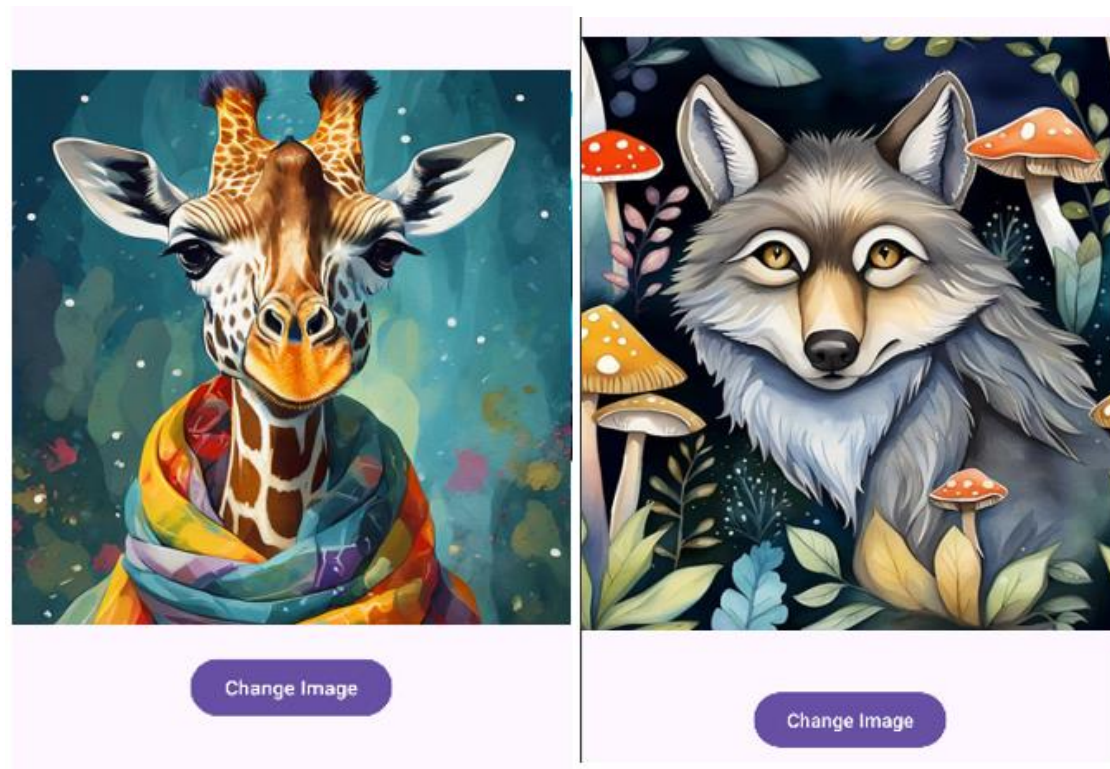**CO4:** Design and build a functional Android application.

Procedure:

activity_main.xml

```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:id="@+id/main"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  tools:context=".MainActivity">
  <ImageView
    android:id="@+id/imageView"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    app:srcCompat="@drawable/img"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintBottom_toTopOf="@+id/button" />
  <Button
    android:id="@+id/button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Change Image"
    app:layout_constraintTop_toBottomOf="@+id/imageView"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toEndOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.kt

```kotlin
package com.example.myapplication2_divide
import android.os.Bundle
import android.widget.Button
import android.widget.ImageView
import androidx.appcompat.app.AppCompatActivity
```

```
class MainActivity : AppCompatActivity() {
  private var flag = true
  override fun onCreate(savedInstanceState: Bundle?) {
    super.onCreate(savedInstanceState)
    setContentView(R.layout.activity_main)
    val imgV = findViewById<ImageView>(R.id.imageView)
    val button1 = findViewById<Button>(R.id.button)
    button1.setOnClickListener {
      if (flag) {
        imgV.setImageResource(R.drawable.img2)
        flag = false
      } else {
        imgV.setImageResource(R.drawable.img)
        flag = true
      }
    }
  }
}
```

Output:

Result:

The program was executed and the result was successfully obtained. Thus CO4 is obtained.

Experiment No. 9

Aim: Create a simple list view to list items.
CO1: Understand UI Design: Widgets and Layouts, UI Events, Event Listeners
Procedure:

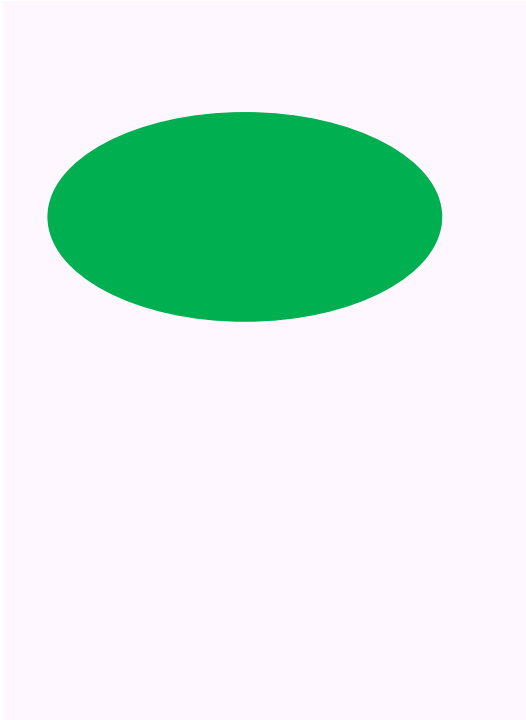**activity_main.xml**

```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:id="@+id/main"
android:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".MainActivity">
<ListView
android:layout_width="0dp"
android:layout_height="0dp"
android:id="@+id/listV"
app:layout_constraintTop_toTopOf="parent"
app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintEnd_toEndOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.kt

```kotlin
package com.example.myapplication2_divide
import android.os.Bundle
import android.widget.AdapterView
import android.widget.ArrayAdapter
import android.widget.ListView
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)
val lstview = findViewById<ListView>(R.id.listV)
val name = arrayOf("Android", "Java", "Python")
val arrayAdapter: ArrayAdapter<String> = ArrayAdapter(this,
android.R.layout.simple_list_item_1, name)
lstview.adapter = arrayAdapter
lstview.onItemClickListener = AdapterView.OnItemClickListener {
```

adapterView, view, position, id ->
Toast.makeText(this, "Item selected: " + name[position],
Toast.LENGTH_LONG).show()
    }
  }
}

Output:

Result: The program was executed and the result was successfully obtained. Thus CO1 is obtained.

Date: 04-09-2024

Experiment No. 10

Aim: Develop an application that draws basic graphical primitives on the screen.

CO3: Debug Android applications using different tools and plugins

Procedure:

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:id="@+id/main" android:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".MainActivity">
<TextView
 android:layout_width="220dp"
android:layout_height="220dp"
android:background="@drawable/oval"
app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

oval.xml

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

```
<shape xmlns:android="http://schemas.android.com/apk/res/android"
android:shape="oval">
<solid android:color="@color/green" />
</shape>
```

Output:

Result: The program was executed and the result was successfully obtained. Thus CO3 is obtained.

Experiment No. 11

Aim: Create a Custom List view that contains list of students with their name, place and photo.

CO3: Debug Android applications using different tools and plugins

Procedure:

custom_list.xml

```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="wrap_content" android:orientation="horizontal"

android:padding="10dp">

<ImageView android:id="@+id/icon"

android:layout_width="50dp"

android:layout_height="50dp"

android:src="@mipmap/ic_launcher"/>

<LinearLayout android:layout_width="match_parent"

android:layout_height="wrap_content"

android:layout_marginLeft="10dp"

android:orientation="vertical">

<TextView android:id="@+id/title"

android:layout_width="wrap_content"

android:layout_height="wrap_content"

android:text="Title" android:textStyle="bold"

android:textSize="18sp"/>

<TextView android:id="@+id/description"

android:layout_width="wrap_content"

android:layout_height="wrap_content"
```

android:text="Description"

android:textSize="16sp"/>

</LinearLayout>

</LinearLayout>

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">

<ListView android:id="@+id/listView"

android:layout_width="match_parent" android:layout_height="match_parent"/>

</RelativeLayout>

MainActivity.kt

package com.example.studentcustomlist

import android.os.Bundle import

android.widget.ListView import

android.widget.Toast

import androidx.appcompat.app.AppCompatActivity

class MainActivity : AppCompatActivity() {

// Array for student names private val

names = arrayOf(

"Ali", "Bob", "Don", "Elizabeth", "Susan"

)

// Array for places

private val places = arrayOf(

"Kanjirappally", "Ponkunnam", "Erumeli", "Adoor", "Kochi"

)

// Array for student images private val

imageId = arrayOf(

R.drawable.ali, R.drawable.bob, R.drawable.don, R.drawable.elizabeth, R.drawable.susan

)

override fun onCreate(savedInstanceState: Bundle?) {

super.onCreate(savedInstanceState)

setContentView(R.layout.activity_main)

val listView = findViewById<ListView>(R.id.listView)

// Create adapter with updated data

val myListAdapter = MyListAdapter(this, names, places, imageId) listView.adapter =

myListAdapter

// Set item click listener to show a Toast message with student details

listView.setOnItemClickListener { _, _, position, _ ->

val selectedName = names[position] val

selectedPlace = places[position] Toast.makeText(

this, "Clicked on $selectedName from $selectedPlace at position
$position", Toast.LENGTH_LONG

).show()

}

}

}

MyListAdapter.kt

package com.example.studentcustomlist import

android.app.Activity

import android.view.LayoutInflater

```kotlin
import android.view.View

import android.view.ViewGroup import

android.widget.ArrayAdapter import

android.widget.ImageView import

android.widget.TextView class

MyListAdapter(

private val context: Activity, private val

title: Array<String>,

private val description: Array<String>, private val

imgid: Array<Int>

) : ArrayAdapter<String>(context, R.layout.custom_list, title) {

override fun getView(position: Int, convertView: View?, parent: ViewGroup): View {

val inflater = context.layoutInflater

val rowView = convertView ?: inflater.inflate(R.layout.custom_list, parent, false)

val titleText = rowView.findViewById<TextView>(R.id.title)

val imageView = rowView.findViewById<ImageView>(R.id.icon)

val subtitleText = rowView.findViewById<TextView>(R.id.description) titleText.text

= title[position] imageView.setImageResource(imgid[position])

subtitleText.text = description[position] return

rowView

}

}
```

Output:
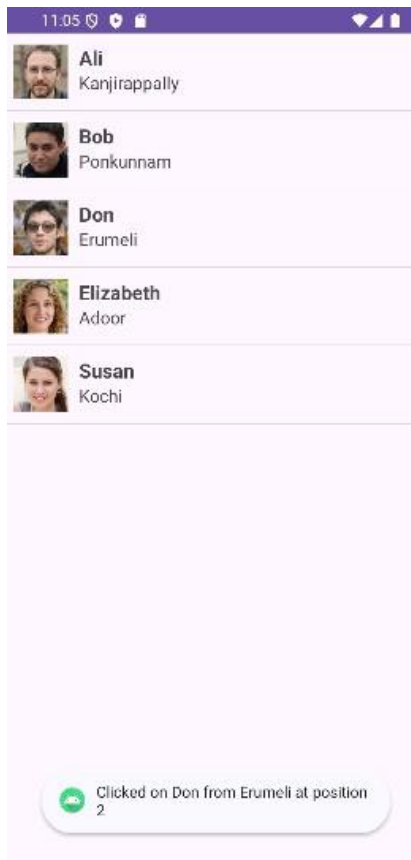
Result: The program was executed and the result was successfully obtained. Thus CO3 is obtained.

Experiment No. 12

Aim: Create an application to make calls to your friends contact number.
CO2: Learn Android components, Activities, Services, Broadcast Receivers and Intents

Procedure:

AndroidManifest.xml

```
<uses-feature
android:name="android.hardware.telephony"
android:required="false" />
<uses-permission android:name="android.permission.CALL_PHONE" />
```

activity_main.xml

```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">

    <!-- EditText for entering 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:maxLength="15"
        android:padding="10dp" />

    <!-- Button to initiate the call -->
    <Button
        android:id="@+id/callButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Call Friend"
        android:layout_marginTop="20dp"/>
</LinearLayout>
```

MainActivity.kt

```kotlin
package com.example.myapplication
import MyListAdapter
import android.content.Intent
import android.content.pm.PackageManager
import android.media.MediaPlayer
import android.net.Uri
import android.os.Bundle
import android.view.View
import android.Manifest
import android.widget.Button
import android.widget.EditText
import android.widget.ListView
import android.widget.Toast
import android.widget.VideoView
import androidx.activity.enableEdgeToEdge
import androidx.appcompat.app.AppCompatActivity
import androidx.core.app.ActivityCompat
import androidx.core.content.ContextCompat
import androidx.core.view.ViewCompat
import androidx.core.view.WindowInsetsCompat


class MainActivity : AppCompatActivity() {
    private val CALL_PHONE_PERMISSION = 1
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
        // Set up the call button listener
        val callButton = findViewById<View>(R.id.callButton)
        callButton.setOnClickListener {
            val phoneNumberEditText =
findViewById<EditText>(R.id.phoneNumberEditText)
            val phoneNumber = phoneNumberEditText.text.toString()
            if (phoneNumber.isNotEmpty()) {
                // Check if permission is granted
                if (ContextCompat.checkSelfPermission(this,
Manifest.permission.CALL_PHONE)
                    == PackageManager.PERMISSION_GRANTED
                ) {
                    makePhoneCall(phoneNumber)
                } else {
                    // Request permission if not granted
                    ActivityCompat.requestPermissions(
                        this,
                        arrayOf(Manifest.permission.CALL_PHONE),
```

```
                CALL_PHONE_PERMISSION
        )
    }
  } else {
      Toast.makeText(this, "Please enter a valid phone number",
Toast.LENGTH_SHORT).show()
    }
  }
}

  // Function to make a phone call
  private fun makePhoneCall(phoneNumber: String) {
     val intent = Intent(Intent.ACTION_CALL)
     intent.data = Uri.parse("tel:$phoneNumber")
     try {
        startActivity(intent)
     } catch (e: SecurityException) {
        Toast.makeText(this, "Permission denied: Unable to make the call",
Toast.LENGTH_SHORT).show()
     }
  }
}
```
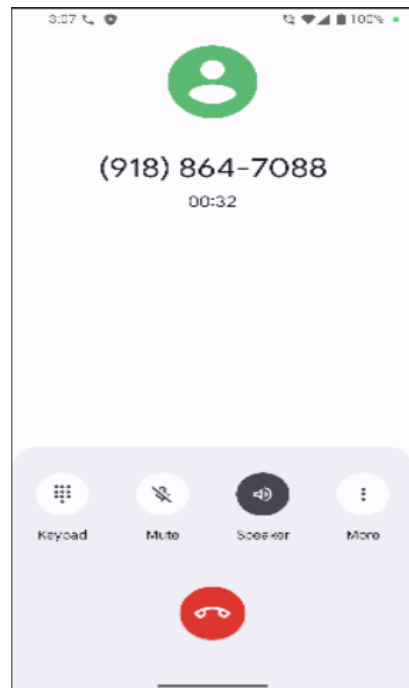
Output:

Result: The program was executed and the result was successfully obtained. Thus CO2 is obtained.

Experiment No. 13

Aim: Create the Application to play the Audio and Video clips.
CO4: Design and build a functional Android application

Procedure:

activity_main.xml

```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:id="@+id/main"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   tools:context=".MainActivity">

   <!-- Button to stop Audio -->
   <Button
      android:id="@+id/playButton"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_centerHorizontal="true"
      android:text="Play Video"
      app:layout_constraintBottom_toBottomOf="parent"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintHorizontal_bias="0.496"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent"
      app:layout_constraintVertical_bias="0.007" />

   <Button
      android:id="@+id/stopButton"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"

      android:layout_centerHorizontal="true"
      android:text="Stop Video"
      app:layout_constraintBottom_toBottomOf="parent"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintHorizontal_bias="0.498"
```

```
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.136" />

    <VideoView
        android:id="@+id/videoView"
        android:layout_width="214dp"
        android:layout_height="471dp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.563"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.811" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.kt
```kotlin
package com.example.myapplication

import MyListAdapter
import android.media.MediaPlayer
import android.net.Uri
import android.os.Bundle
import android.widget.Button
import android.widget.ListView
import android.widget.Toast
import android.widget.VideoView
import androidx.activity.enableEdgeToEdge
import androidx.appcompat.app.AppCompatActivity
import androidx.core.view.ViewCompat
import androidx.core.view.WindowInsetsCompat

class MainActivity : AppCompatActivity() {

    private lateinit var videoView: VideoView

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

        val playButton = findViewById<Button>(R.id.playButton)
        val stopButton = findViewById<Button>(R.id.stopButton)
        videoView = findViewById(R.id.videoView)
```

```kotlin
        // Initialize MediaPlayer for audio


        // Play Audio on button click
        playButton.setOnClickListener {
            if (!videoView.isPlaying) {
                videoView.start()
            }
        }

        // Stop Audio on button click
        stopButton.setOnClickListener {
            if (videoView.isPlaying) {
                videoView.pause()
                videoView.seekTo(0)
            }
        }

        // Play Video on button click
        playButton.setOnClickListener {
            val videoUri = Uri.parse("android.resource://" + packageName + "/" +
R.raw.sample) // Place video file in res/raw folder
            videoView.setVideoURI(videoUri)
            videoView.setOnPreparedListener {
                videoView.start()
            }
        }
    }

}
```
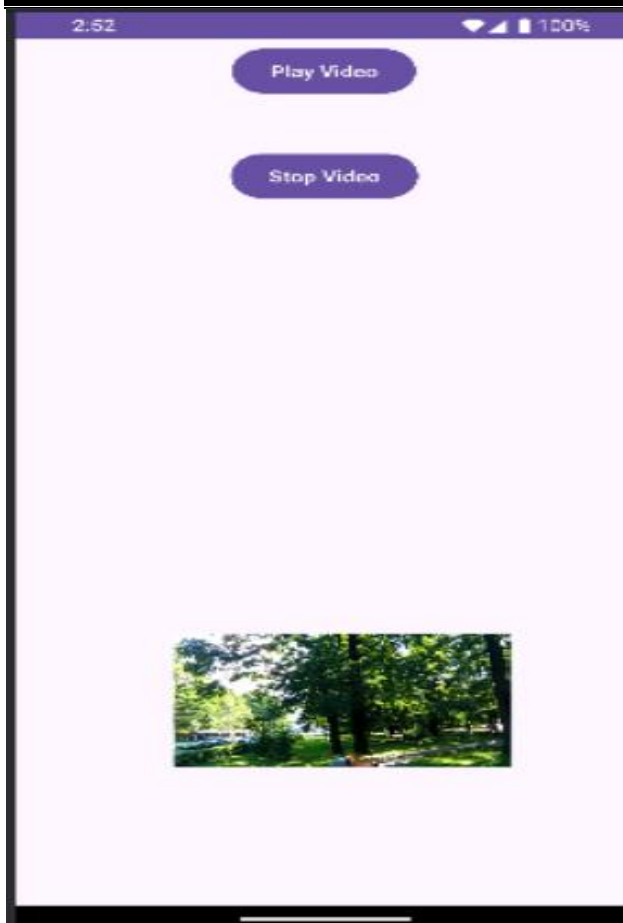**Output:**

Result: The program was executed and the result was successfully obtained. Thus CO4 is obtained.

Experiment No. 14

Aim: Create Application by Using Building Menus and Storing Data.
CO5: Implement SQLite Database and content providers.

Procedure:

menu_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android">
<item
android:id="@+id/action_add"
android:title="Add Name" />
<item
android:id="@+id/action_view"
android:title="View Names" />
</menu>
```

activity_main.xml

```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">
<androidx.appcompat.widget.Toolbar android:id="@+id/toolbar"
android:layout_width="match_parent"
android:layout_height="wrap_content" />

<TextView
android:id="@+id/tvData"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Names will appear here"
android:textSize="16sp" android:padding="10dp" />
</LinearLayout>
```

DatabaseHelper.kt

```kotlin
package com.example.application16 import
android.content.ContentValues import
android.content.Context
import android.database.sqlite.SQLiteDatabase import
android.database.sqlite.SQLiteOpenHelper
```

```kotlin
class DatabaseHelper(context: Context) : SQLiteOpenHelper(context,
DATABASE_NAME, null, DATABASE_VERSION) {

companion object {

const val DATABASE_NAME = "NamesDatabase" const val
DATABASE_VERSION = 1
const val TABLE_NAME = "Names" const val
COLUMN_ID = "id"
const val COLUMN_NAME = "name"

}

override fun onCreate(db: SQLiteDatabase?) {

val createTableQuery = "CREATE TABLE $TABLE_NAME ($COLUMN_ID
INTEGER PRIMARY KEY AUTOINCREMENT,
$COLUMN_NAME TEXT)"

db?.execSQL(createTableQuery)

}


override fun onUpgrade(db: SQLiteDatabase?, oldVersion: Int, newVersion: Int) {

db?.execSQL("DROP TABLE IF EXISTS $TABLE_NAME")

onCreate(db)

}

fun addName(name: String): Long { if
(name.isBlank()) {
throw IllegalArgumentException("Name cannot be empty or blank")

}

val db = writableDatabase

val values = ContentValues().apply {
put(COLUMN_NAME, name)
}
return db.insert(TABLE_NAME, null, values)

}

fun getAllNames(): List<String> {

val names = mutableListOf<String>() val db =
```

```kotlin
readableDatabase
val cursor = db.rawQuery("SELECT * FROM $TABLE_NAME", null)

if (cursor.moveToFirst()) { do {
val name =
cursor.getString(cursor.getColumnIndexOrThrow(COLUMN_NAME))

names.add(name)

} while (cursor.moveToNext())

}

cursor.close() return
names
}

}
```

MainActivity.kt

```kotlin
package com.example.application16 import

android.os.Bundle

import android.util.Log import

android.view.Menu

import android.view.MenuItem import

android.widget.EditText import

android.widget.TextView import

android.widget.Toast

import androidx.appcompat.app.AlertDialog

import androidx.appcompat.app.AppCompatActivity import

androidx.appcompat.widget.Toolbar

import com.example.application16.DatabaseHelper
class MainActivity : AppCompatActivity() {

private lateinit var databaseHelper: DatabaseHelper private

lateinit var tvData: TextView

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

```kotlin
super.onCreate(savedInstanceState)

setContentView(R.layout.activity_main)

val toolbar: Toolbar = findViewById(R.id.toolbar)

setSupportActionBar(toolbar) supportActionBar?.title =

"Database App"

tvData = findViewById(R.id.tvData) databaseHelper =

DatabaseHelper(this)

}
override fun onCreateOptionsMenu(menu: Menu?): Boolean {

menuInflater.inflate(R.menu.menu_main, menu)

return true

}
override fun onOptionsItemSelected(item: MenuItem): Boolean { when

(item.itemId) {

R.id.action_add -> {

showAddNameDialog() return true

}

R.id.action_view -> { showNames()

return true

}

}

return super.onOptionsItemSelected(item)

}

private fun showAddNameDialog() {

val builder = AlertDialog.Builder(this) builder.setTitle("Add

Name")


val input = EditText(this) input.hint =

"Enter name" builder.setView(input)
```

```
builder.setPositiveButton("Add") { _, _ -> val name =

input.text.toString()


try {

if (name.isNotEmpty()) {

val result = databaseHelper.addName(name) if (result > 0) {

Toast.makeText(this, "Name added successfully!", Toast.LENGTH_SHORT).show()

} else {

Toast.makeText(this, "Failed to add name.", Toast.LENGTH_SHORT).show()

}

} else {

Toast.makeText(this, "Name cannot be empty!", Toast.LENGTH_SHORT).show()

}

} catch (e: Exception) {

Log.e("MainActivity", "Error adding name: ${e.message}") Toast.makeText(this, "An

error occurred: ${e.message}",
Toast.LENGTH_SHORT).show()

}

}
builder.setNegativeButton("Cancel", null) builder.show()

}

private fun showNames() {

val names = databaseHelper.getAllNames() if

(names.isEmpty()) {

tvData.text = "No names found!"

} else {

tvData.text = names.joinToString("\n")

}
```

}

}

Output:
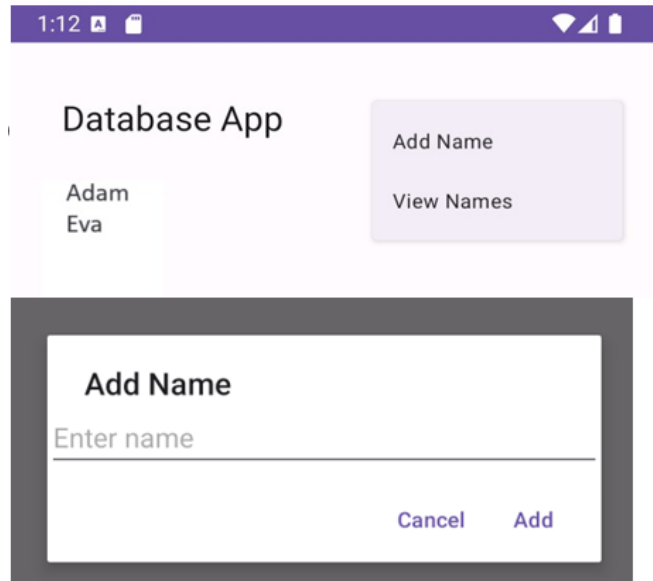
Result: The program was executed and the result was successfully obtained. Thus CO5 is obtained.

Experiment No. 15

Aim: Design the Application for Menus and Action Bar.
CO3: Debug Android applications using different tools and plugins

Procedure:

menu_main.xml

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

<menu xmlns:android="http://schemas.android.com/apk/res/android">
<item android:id="@+id/action_search" android:title="Search"
android:showAsAction="ifRoom"/>
<item android:id="@+id/action_settings" android:title="Settings"
android:showAsAction="ifRoom"/>
<item android:id="@+id/action_help" android:title="Help"
android:showAsAction="never"/>
</menu>
```

activity_main.xml

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

<androidx.coordinatorlayout.widget.CoordinatorLayout
xmlns:android="http://schemas.android.com/apk/res/android"

android:layout_width="match_parent"
android:layout_height="match_parent">
<androidx.appcompat.widget.Toolbar

android:id="@+id/toolbar"

android:layout_width="match_parent"

android:layout_height="?attr/actionBarSize"

android:background="?attr/colorPrimary"

android:title="My App"

android:titleTextColor="@android:color/white"

android:elevation="4dp"/>

<androidx.fragment.app.FragmentContainerView

android:id="@+id/fragment_container"

android:layout_width="match_parent"
```

android:layout_height="match_parent"/>

</androidx.coordinatorlayout.widget.CoordinatorLayout>

MainActivity.kt

package com.example.optionmenu import

android.os.Bundle

import android.view.Menu import

android.view.MenuItem

import androidx.appcompat.app.AppCompatActivity import

androidx.appcompat.widget.Toolbar

import com.google.android.material.snackbar.Snackbar
class MainActivity : AppCompatActivity() {
override fun onCreate(savedInstanceState: Bundle?) {

super.onCreate(savedInstanceState)

setContentView(R.layout.activity_main)

// Set up the Action Bar

val toolbar: Toolbar = findViewById(R.id.toolbar) setSupportActionBar(toolbar)

}
// Inflate the menu; this adds items to the action bar if it is present override

fun onCreateOptionsMenu(menu: Menu?): Boolean {

menuInflater.inflate(R.menu.menu_main, menu) return true

}
// Handle item selection

override fun onOptionsItemSelected(item: MenuItem): Boolean { return

when (item.itemId) {

R.id.action_search -> {

// Handle search action showMessage("Search

selected") true

}

R.id.action_settings -> {

showMessage("Settings selected") true

}

R.id.action_help -> {

// Handle help action showMessage("Help

selected") true

}

else -> super.onOptionsItemSelected(item)

}

}

private fun showMessage(message: String) {

Snackbar.make(findViewById(android.R.id.content), message, Snackbar.LENGTH_SHORT).show()
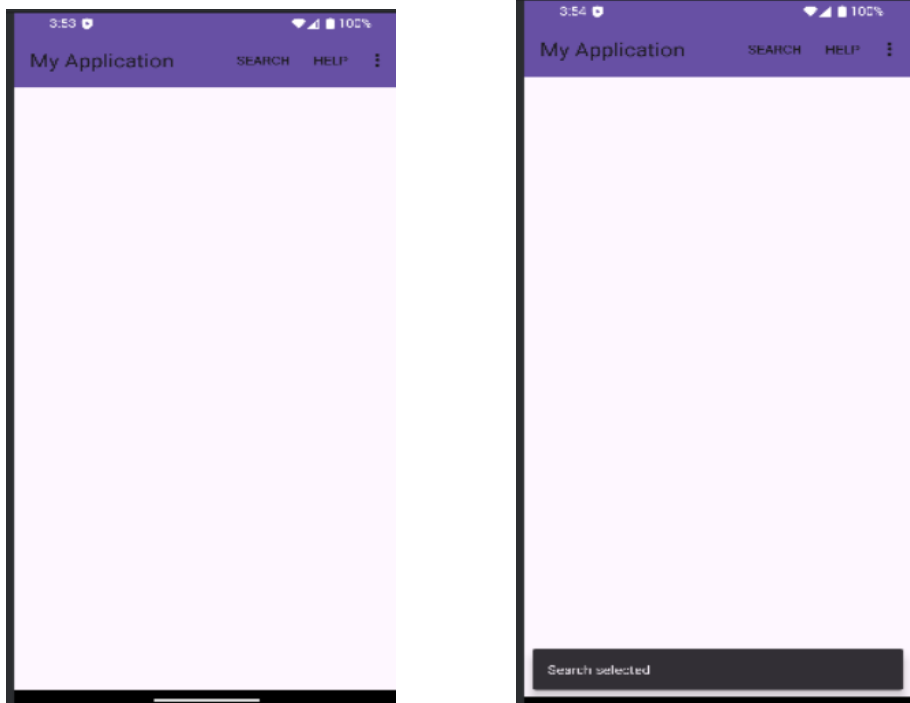
}

}

Output:

Result: The program was executed and the result was successfully obtained. Thus CO3 is obtained.

Experiment No. 16

Aim: Program to Select an item from the list and display in Label.
CO1: Understand UI Design: Widgets and Layouts, UI Events, Event Listeners

Procedure:

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:id="@+id/main"
android:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".MainActivity">
<ListView
android:layout_width="0dp"
android:layout_height="0dp"
android:id="@+id/listV"
app:layout_constraintTop_toTopOf="parent"
app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintEnd_toEndOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.kt

```
package com.example.myapplication2_divide
import android.os.Bundle
import android.widget.AdapterView
import android.widget.ArrayAdapter
import android.widget.ListView
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)
val lstview = findViewById<ListView>(R.id.listV)
val name = arrayOf("Android", "Java", "Python")
val arrayAdapter: ArrayAdapter<String> = ArrayAdapter(this,
android.R.layout.simple_list_item_1, name)
lstview.adapter = arrayAdapter
```

```
lstview.onItemClickListener = AdapterView.OnItemClickListener {
adapterView, view, position, id ->
Toast.makeText(this, "Item selected: " + name[position],
Toast.LENGTH_LONG).show()
    }
  }
}
```

Output:

Result: The program was executed and the result was successfully obtained. Thus CO1 is obtained.

Experiment No. 17

Aim: Program to perform all arithmetic operations with Menu.
CO4: Design and build a functional Android application
Procedure:
newmenu.xml
```xml
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android">
<item android:id="@+id/addition"
android:title="Addition" />
<item android:id="@+id/subtraction"
android:title="Subtraction" />
<item android:id="@+id/multiplication"
android:title="Multiplication" />
<item android:id="@+id/division"
android:title="Division" />
<item android:id="@+id/exit"
android:title="Exit" />
</menu>
```

activity_main.xml
```xml
<?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:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".MainActivity">
<TextView
android:id="@+id/iButton"
android:text="Select Operation"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="40dp"
android:padding="10dp"
android:background="#6200EE"
android:textColor="#FFFFFF"
android:gravity="center"
android:layout_alignParentTop="true"
android:layout_centerHorizontal="true"/>
<EditText
android:id="@+id/input1"
```

```
android:layout_width="match_parent"
android:layout_height="wrap_content"
andoid:hint="Enter First Number"
android:inputType="numberDecimal"
android:layout_below="@id/iButton" />
<EditText
android:id="@+id/input2"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:hint="Enter Second Number"
android:inputType="numberDecimal"
android:layout_below="@id/input1" />
<TextView
android:id="@+id/result"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="Result: "
android:layout_below="@id/input2"
android:layout_centerHorizontal="true"
android:textSize="20sp"/>
</RelativeLayout>
```

MainActicity.kt

```
package com.example.myapplication
import android.os.Bundle
import android.view.MenuInflater
import android.view.MenuItem
import android.widget.EditText
import android.widget.PopupMenu
import android.widget.TextView
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)
val input1 = findViewById<EditText>(R.id.input1)
val input2 = findViewById<EditText>(R.id.input2)
val resultView = findViewById<TextView>(R.id.result)
// Set up the TextView to show the PopupMenu
findViewById<TextView>(R.id.iButton).setOnClickListener { view ->
val popup = PopupMenu(this, view)
val inflater: MenuInflater = popup.menuInflater
inflater.inflate(R.menu.newmenu, popup.menu)
popup.setOnMenuItemClickListener { menuItem: MenuItem ->
```

```
// Fetch the input numbers
val num1 = input1.text.toString().toDoubleOrNull()
val num2 = input2.text.toString().toDoubleOrNull()
// Handle the exit option separately so it doesn't depend
on valid input
if (menuItem.itemId == R.id.exit) {
finish() // Exit the app
return@setOnMenuItemClickListener true
}
// If numbers are invalid, show a Toast but allow
operations to be skipped
if (num1 == null || num2 == null) {
Toast.makeText(this, "Please enter valid numbers",
Toast.LENGTH_SHORT).show()
return@setOnMenuItemClickListener false
}
// Handle the arithmetic operations
when (menuItem.itemId) {
R.id.addition -> {
val result = num1 + num2
resultView.text = "Result: $result"
true
}
R.id.subtraction -> {
val result = num1 - num2
resultView.text = "Result: $result"
true
}
R.id.multiplication -> {
val result = num1 * num2
resultView.text = "Result: $result"
true
}
R.id.division -> {
if (num2 != 0.0) {
val result = num1 / num2
resultView.text = "Result: $result"
} else {
resultView.text = "Cannot divide by zero"
}
true
}
else -> false
}
}
```

popup.show()
}
}
}

Output:
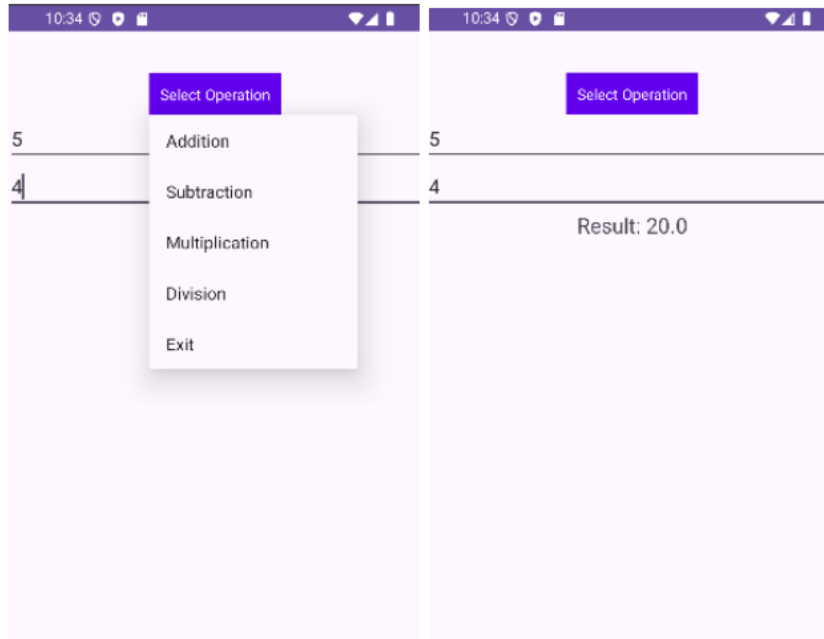
Result: The program was executed and the result was successfully obtained. Thus CO4 is obtained.

Experiment No. 18

Aim: Program to Demonstrate Implicit and Explicit Intent.
CO2: Learn Android components, Activities, Services, Broadcast Receivers and Intents

Procedure:

activity_main.xml
```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">
<Button
android:id="@+id/goToSecondActivity"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="Go to Second Activity" />
<Button
android:id="@+id/openWebPage"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="Open Webpage" />
</LinearLayout>
```

MainActivity.kt
```kotlin
package com.example.myapplication2
import android.content.Intent
import android.net.Uri
import android.os.Bundle
import android.widget.Button
import androidx.appcompat.app.AppCompatActivity
class MainActivity : AppCompatActivity() {
override fun onCreate(savedInstanceState: Bundle?) {
super.onCreate(savedInstanceState)
setContentView(R.layout.activity_main)
// Button to go to SecondActivity (Explicit Intent)
val goToSecondActivityButton: Button =
findViewById(R.id.goToSecondActivity)
goToSecondActivityButton.setOnClickListener {
// Explicit Intent: Transition to SecondActivity
val intent = Intent(this@MainActivity,
```

SecondActivity::class.java)
startActivity(intent)
}
// Button to open a webpage (Implicit Intent)
val openWebPageButton: Button = findViewById(R.id.openWebPage)
openWebPageButton.setOnClickListener {
// Implicit Intent: Open a webpage in the browser
val intent = Intent(Intent.ACTION_VIEW,
Uri.parse("https://www.geeksforgeeks.org"))
startActivity(intent)
}
}
}

activity_second.xml
```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">
<Button
android:id="@+id/goToMainActivity"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="Go to Main Activity" />
</LinearLayout>
```

SecondActivity.kt
```kotlin
package com.example.myapplication2
import android.content.Intent
import android.os.Bundle
import android.widget.Button
import androidx.appcompat.app.AppCompatActivity
class SecondActivity : AppCompatActivity() {
override fun onCreate(savedInstanceState: Bundle?) {
super.onCreate(savedInstanceState)
setContentView(R.layout.activity_second)
// Button to go back to MainActivity (Explicit Intent)
val goToMainActivityButton: Button =
findViewById(R.id.goToMainActivity)
goToMainActivityButton.setOnClickListener {
// Explicit Intent: Transition to MainActivity
val intent = Intent(this@SecondActivity,
```

MainActivity::class.java)
startActivity(intent)
}
}
}

Output:
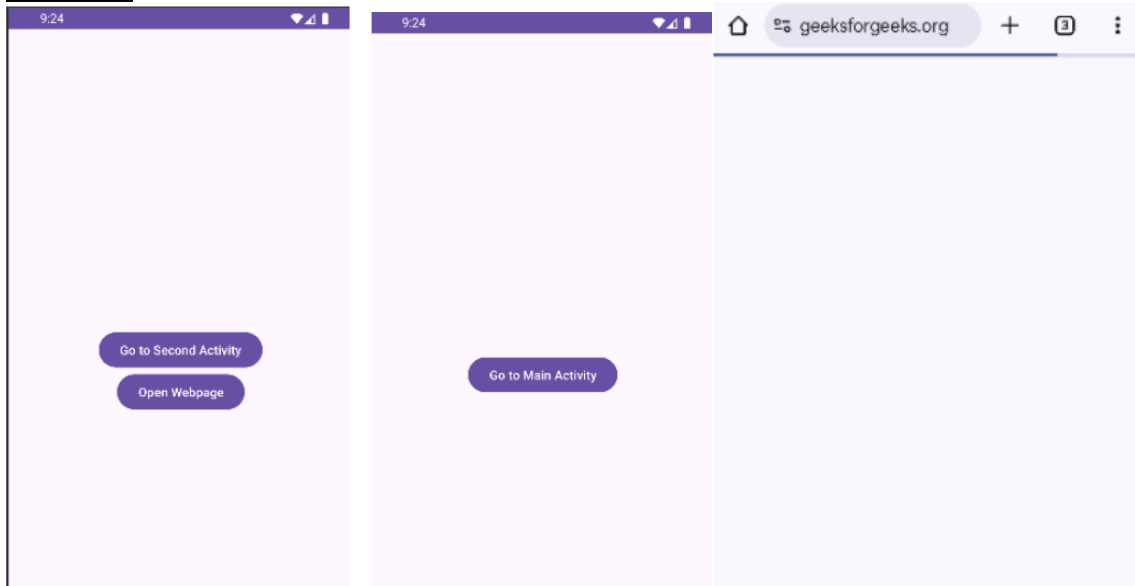
Result: The program was executed and the result was successfully obtained. Thus CO2 is obtained.

Experiment No. 19

Aim: Create Student Details App to read roll no, name and 3 marks, calculate total and store in DB.

CO5: Implement SQLite Database and content providers.

Procedure:

activity_main.xml

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

<androidx.coordinatorlayout.widget.CoordinatorLayout
xmlns:android="http://schemas.android.com/apk/res/android"
android:layout_width="match_parent" android:layout_height="match_parent">

<androidx.appcompat.widget.Toolbar
android:id="@+id/toolbar"
android:layout_width="match_parent"
android:layout_height="?attr/actionBarSize"
android:elevation="4dp" />

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

</LinearLayout>
</androidx.coordinatorlayout.widget.CoordinatorLayout>
```

MainActivity.kt

```kotlin
package com.example.application22

import android.content.Intent import

android.os.Bundle

import android.view.Menu import

android.view.MenuItem

import androidx.appcompat.app.AppCompatActivity import
```

```kotlin
androidx.appcompat.widget.Toolbar

class MainActivity : AppCompatActivity() {

override fun onCreate(savedInstanceState: Bundle?) {

super.onCreate(savedInstanceState)

setContentView(R.layout.activity_main)

// Set up the Toolbar

val toolbar: Toolbar = findViewById(R.id.toolbar)

setSupportActionBar(toolbar) supportActionBar?.title =

"Student Details App"

}
override fun onCreateOptionsMenu(menu: Menu?): Boolean {

menuInflater.inflate(R.menu.menu_main, menu)

return true

}
override fun onOptionsItemSelected(item: MenuItem): Boolean { when

(item.itemId) {

R.id.action_add_student -> {

startActivity(Intent(this, AddStudentActivity::class.java)) return true

}

R.id.action_view_students -> {

startActivity(Intent(this, ViewStudentsActivity::class.java)) return true

}

}

return super.onOptionsItemSelected(item)

}

}
```

activity_add_student.xml

```xml
<androidx.coordinatorlayout.widget.CoordinatorLayout
xmlns:android="http://schemas.android.com/apk/res/android"
```

```xml
android:layout_width="match_parent"

android:layout_height="match_parent">

<androidx.appcompat.widget.Toolbar

android:id="@+id/toolbar"

android:layout_width="match_parent"

android:layout_height="?attr/actionBarSize"

android:background="?attr/colorPrimary"

android:theme="@style/ThemeOverlay.AppCompat.Dark.ActionBar"

android:elevation="4dp" />

<LinearLayout

android:layout_width="match_parent"

android:layout_height="match_parent"

android:orientation="vertical"

android:padding="16dp"

android:layout_marginTop="?attr/actionBarSize>

<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/etRollNo" android:hint="Roll

Number" android:layout_width="match_parent"

android:layout_height="wrap_content" />

<EditText android:id="@+id/etName" android:hint="Name"

android:layout_width="match_parent"

android:layout_height="wrap_content" />

<EditText android:id="@+id/etMark1" android:hint="Mark 1"

android:layout_width="match_parent"

android:layout_height="wrap_content" />
```

```xml
<EditText android:id="@+id/etMark2" android:hint="Mark 2"

android:layout_width="match_parent"

android:layout_height="wrap_content" />

<EditText android:id="@+id/etMark3" android:hint="Mark 3"

android:layout_width="match_parent"

android:layout_height="wrap_content" />

<Button android:id="@+id/btnSave" android:text="Save"

android:layout_width="wrap_content"

android:layout_height="wrap_content" />

</LinearLayout>
</LinearLayout>

</androidx.coordinatorlayout.widget.CoordinatorLayout>
```

activity_view_students.xml

```xml
<androidx.coordinatorlayout.widget.CoordinatorLayout
xmlns:android="http://schemas.android.com/apk/res/android"

android:layout_width="match_parent"

android:layout_height="match_parent">

<androidx.appcompat.widget.Toolbar

android:id="@+id/toolbar"

android:layout_width="match_parent"

android:layout_height="?attr/actionBarSize"

android:background="?attr/colorPrimary"

android:theme="@style/ThemeOverlay.AppCompat.D

ark.ActionBar" android:elevation="4dp" />

<LinearLayout android:layout_width="match_parent"

android:layout_height="match_parent"

android:orientation="vertical" android:padding="16dp"

android:layout_marginTop="?attr/actionBarSize">
```

```xml
<ScrollView android:layout_width="match_parent"

android:layout_height="match_parent">

<TextView android:id="@+id/tvStudents"

android:layout_width="match_parent"

android:layout_height="wrap_content"

android:padding="16dp"

android:textSize="16sp"/>

</ScrollView>

</LinearLayout>

</androidx.coordinatorlayout.widget.CoordinatorLayout>
```

menu_main.xml

```xml
<menu xmlns:android="http://schemas.android.com/apk/res/android">

<item android:id="@+id/action_add_student" android:title="Add

Student" android:showAsAction="never" />

<item android:id="@+id/action_view_students"

android:title="View Students"

android:showAsAction="never"  />

</menu>
```

AddStudentActivity.kt

```kotlin
package com.example.application22 import

android.os.Bundle

import android.widget.Button import

android.widget.EditText import

android.widget.Toast

import androidx.appcompat.app.AppCompatActivity import

androidx.appcompat.widget.Toolbar

class AddStudentActivity : AppCompatActivity() { private
```

```
lateinit var databaseHelper: DatabaseHelper

override fun onCreate(savedInstanceState: Bundle?) {

super.onCreate(savedInstanceState) setContentView(R.layout.activity_add_student)

// Set up the Toolbar

val toolbar: Toolbar = findViewById(R.id.toolbar)

setSupportActionBar(toolbar) supportActionBar?.title = "Add

Student"

supportActionBar?.setDisplayHomeAsUpEnabled(true)

databaseHelper = DatabaseHelper(this)

val etRollNo: EditText = findViewById(R.id.etRollNo) val etName:

EditText = findViewById(R.id.etName)

val etMark1: EditText = findViewById(R.id.etMark1) val

etMark2: EditText = findViewById(R.id.etMark2) val etMark3:

EditText = findViewById(R.id.etMark3) val btnSave: Button =

findViewById(R.id.btnSave)

btnSave.setOnClickListener {

val rollNo = etRollNo.text.toString().toIntOrNull() val name =

etName.text.toString()

val mark1 = etMark1.text.toString().toIntOrNull() val mark2 =

etMark2.text.toString().toIntOrNull()        val        mark3        =

etMark3.text.toString().toIntOrNull()

if (rollNo != null && name.isNotEmpty() && mark1 != null && mark2
!= null && mark3 != null) {

val result = databaseHelper.addStudent(rollNo, name, mark1, mark2,
mark3)

if (result > 0) {

                Toast.makeText(this, "Student added successfully!",
Toast.LENGTH_SHORT).show()
```

finish()

} else {

Toast.makeText(this, "Error adding student.", Toast.LENGTH_SHORT).show()

}

} else {

Toast.makeText(this, "Please fill all fields correctly.", Toast.LENGTH_SHORT).show()

}

}

}
override fun onSupportNavigateUp(): Boolean { onBackPressed()

return true

}

}

ViewStudentsActivity.kt

package com.example.application22 import

android.os.Bundle

import android.widget.TextView import

android.widget.Toast

import androidx.appcompat.app.AppCompatActivity import

androidx.appcompat.widget.Toolbar

class ViewStudentsActivity : AppCompatActivity() { private

lateinit var databaseHelper: DatabaseHelper override fun

onCreate(savedInstanceState: Bundle?) {

super.onCreate(savedInstanceState)

setContentView(R.layout.activity_view_students)

// Set up the Toolbar

val toolbar: Toolbar = findViewById(R.id.toolbar)

setSupportActionBar(toolbar) supportActionBar?.title =

"View Students"

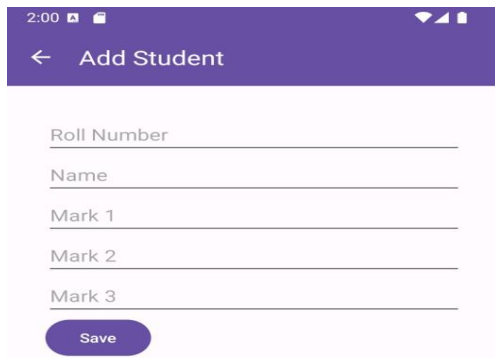supportActionBar?.setDisplayHomeAsUpEnabled(true)

databaseHelper = DatabaseHelper(this)

val tvStudents: TextView = findViewById(R.id.tvStudents)

try {

val students = databaseHelper.getAllStudents() if

(students.isEmpty()) {

tvStudents.text = "No students found."

} else {

val studentDetails = students.joinToString("\n") { student ->

"Roll No: ${student["roll_no"]}, Name: ${student["name"]}, Total:
        ${student["total"]}"

                }

tvStudents.text = studentDetails

}

} catch (e: Exception) {

Toast.makeText(this, "Error retrieving students: ${e.message}",
Toast.LENGTH_SHORT).show()

tvStudents.text = "Error loading student data."

}

}

override fun onSupportNavigateUp(): Boolean { onBackPressed()
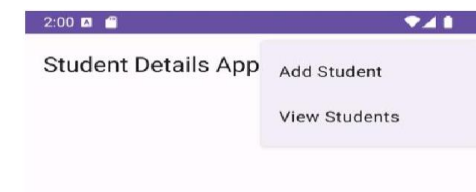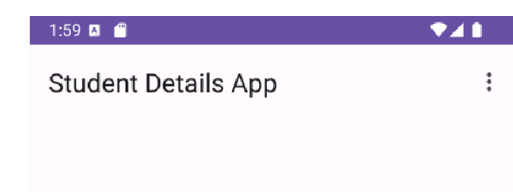
return true

}

}

Output:

Result: The program was executed and the result was successfully obtained. Thus CO5 is obtained.

Date: 13-11-2024

Experiment No. 20

Aim: Create a login form with username and password and check successful login.

CO1: Understand UI Design: Widgets and Layouts, UI Events, Event Listeners

Procedure:

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:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <!-- Username Label -->
    <TextView
        android:id="@+id/TV1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enter Username"
        android:textSize="20sp"
        android:layout_marginStart="32dp"
        android:layout_marginTop="24dp"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintEnd_toStartOf="@+id/TVContent1"
        app:layout_constraintHorizontal_bias="0.1"
        app:layout_constraintVertical_bias="0.3" />
    <!-- Username Input Field -->
    <EditText
        android:id="@+id/TVContent1"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:layout_marginEnd="32dp"
        android:layout_marginTop="24dp"
        android:inputType="text"
        android:hint="Username"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/TV1"
```

```
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintTop_toTopOf="parent"
      app:layout_constraintHorizontal_bias="0.9"
      app:layout_constraintVertical_bias="0.3" />
  <!-- Password Label -->
  <TextView
      android:id="@+id/TV2"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Enter Password"
      android:textSize="20sp"
      android:layout_marginStart="32dp"
      android:layout_marginTop="16dp"
      app:layout_constraintTop_toBottomOf="@+id/TVContent1"
      app:layout_constraintStart_toStartOf="parent"
   app:layout_constraintEnd_toStartOf="@+id/editTextTextPassword"
      app:layout_constraintHorizontal_bias="0.1"
      app:layout_constraintVertical_bias="0.4" />
  <!-- Password Input Field -->
  <EditText
      android:id="@+id/editTextTextPassword"
      android:layout_width="0dp"
      android:layout_height="wrap_content"
      android:layout_marginStart="16dp"
      android:layout_marginEnd="32dp"
      android:layout_marginTop="16dp"
      android:inputType="textPassword"
      android:hint="Password"
      android:textSize="20sp"
      app:layout_constraintStart_toEndOf="@+id/TV2"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintTop_toBottomOf="@+id/TVContent1"
      app:layout_constraintHorizontal_bias="0.9"
      app:layout_constraintVertical_bias="0.4" />
  <!-- Login Button -->
  <Button
      android:id="@+id/sum"
      android:layout_width="200dp"
      android:layout_height="wrap_content"
      android:text="Login"
      android:textSize="20sp"
      android:layout_marginTop="32dp"
   app:layout_constraintTop_toBottomOf="@+id/editTextTextPassword"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintEnd_toEndOf="parent"
```

```
    app:layout_constraintHorizontal_bias="0.5"
    app:layout_constraintVertical_bias="0.5" />
  <!-- Result TextView -->
  <TextView
    android:id="@+id/result"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:gravity="center"
    android:text=""
    android:textSize="18sp"
    android:layout_marginTop="24dp"
    app:layout_constraintTop_toBottomOf="@+id/sum"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.5"
    app:layout_constraintVertical_bias="0.6" />
</androidx.constraintlayout.widget.ConstraintLayout>
```
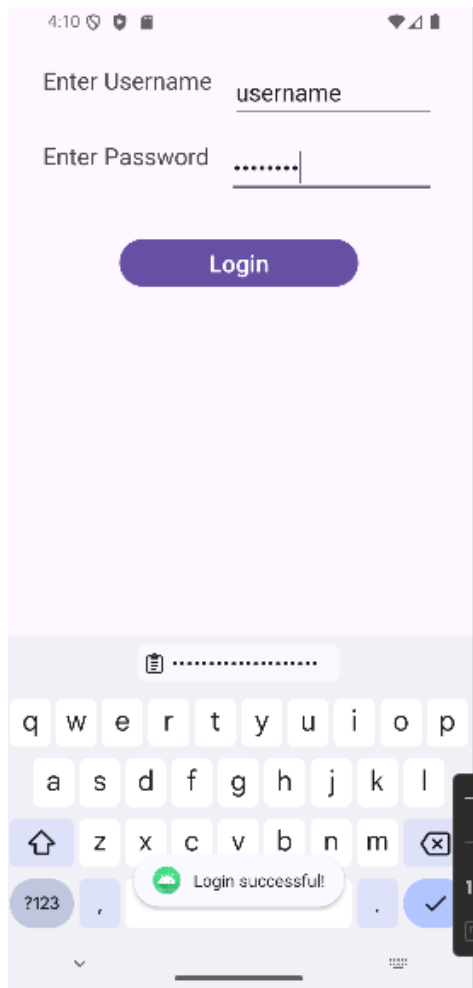
MainActivity.kt
```
package com.example.myapplication2_divide
import android.os.Bundle
import android.view.Gravity
import android.widget.Button
import android.widget.EditText
import android.widget.TextView
import android.widget.Toast
import androidx.activity.enableEdgeToEdge
import androidx.appcompat.app.AppCompatActivity
import androidx.core.view.ViewCompat
import androidx.core.view.WindowInsetsCompat

class MainActivity : AppCompatActivity() {
  private val username: String = "username"
  private val password: String = "password"
  override fun onCreate(savedInstanceState: Bundle?) {
    super.onCreate(savedInstanceState)
    enableEdgeToEdge()
    setContentView(R.layout.activity_main)
    val usernameEditText = findViewById<EditText>(R.id.TVContent1)
    val passwordEditText = findViewById<EditText>(R.id.editTextTextPassword)
    val loginButton = findViewById<Button>(R.id.sum)
    loginButton.setOnClickListener {
      val inputUsername = usernameEditText.text.toString().trim()
      val inputPassword = passwordEditText.text.toString().trim()
      if (inputUsername == username && inputPassword == password
```

```
                Toast.makeText(this@MainActivity, "Login successful!",
        Toast.LENGTH_SHORT).show()
        else
                Toast.makeText(this@MainActivity, "Invalid username or password",
        Toast.LENGTH_SHORT).show()
        }
    }
}
```

Output:

Result: The program was executed and the result was successfully obtained. Thus CO1 is obtained.

Experiment No. 21

Aim: Read details of N employees (EID, Ename, Basic Pay) calculate HRA,DA,TA, PF and Net Salary finally store in DB(HRA=50%of BP, DA=20% of BP, TA=100,PF=2%ofBP, NS=BP+HRA+DA+TA-PF

CO5: Implement SQLite Database and content providers.

Procedure:

activity_main.xml

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

<LinearLayout
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:orientation="vertical">

<EditText android:id="@+id/editTextEID"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:hint="Enter Employee ID"
android:inputType="text"/>

<EditText android:id="@+id/editTextEName"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:hint="Enter Employee Name"
android:inputType="text"/>

<EditText android:id="@+id/editTextBasicPay"
android:layout_width="match_parent"
android:layout_height="wrap_content"

android:hint="Enter                Basic                Pay"
android:inputType="numberDecimal"/>

<Button android:id="@+id/buttonCalculate"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Calculate Salary"/>
```

```xml
<TextView android:id="@+id/textViewResults"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:layout_marginTop="16dp"
android:textSize="16sp"/>

<Button android:id="@+id/buttonSave"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Save to Database"/>

<Button android:id="@+id/buttonViewAll"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="View All Employees"/>

</LinearLayout>
</ScrollView>
```

MainActivity.kt

```kotlin
package com.example.application24 import

android.os.Bundle

import android.widget.Button import

android.widget.EditText import

android.widget.TextView import

android.widget.Toast

import

androidx.appcompat.app.AppCompatActi

vity

class MainActivity : AppCompatActivity() { private

lateinit var editTextEID: EditText private lateinit var

editTextEName: EditText private lateinit var

editTextBasicPay: EditText private lateinit var

buttonCalculate: Button private lateinit var

textViewResults: TextView private lateinit var
```

```kotlin
buttonSave: Button

private lateinit var buttonViewAll: Button
private lateinit var databaseHelper: DatabaseHelper
override fun onCreate(savedInstanceState: Bundle?) {

super.onCreate(savedInstanceState)

setContentView(R.layout.activity_main)

// Initialize views

editTextEID = findViewById(R.id.editTextEID) editTextEName =

findViewById(R.id.editTextEName) editTextBasicPay =

findViewById(R.id.editTextBasicPay) buttonCalculate =

findViewById(R.id.buttonCalculate) textViewResults =

findViewById(R.id.textViewResults) buttonSave =

findViewById(R.id.buttonSave) buttonViewAll =

findViewById(R.id.buttonViewAll)

// Initialize database helper databaseHelper =

DatabaseHelper(this)

// Calculate button click listener

buttonCalculate.setOnClickListener {

calculateSalary()

}
// Save button click listener buttonSave.setOnClickListener {

saveSalaryToDatabase()

}
// View All button click listener buttonViewAll.setOnClickListener

{

viewAllEmployees()

}

}


private fun calculateSalary() {
```

```kotlin
val eid = editTextEID.text.toString()

val ename = editTextEName.text.toString()

val basicPay = editTextBasicPay.text.toString().toDoubleOrNull()

if (eid.isEmpty() || ename.isEmpty() || basicPay == null) { Toast.makeText(this, "Please
enter all details",
Toast.LENGTH_SHORT).show() return

}

// Salary Calculations

val hra = basicPay * 0.5  // 50% of Basic Pay val da =
basicPay * 0.2  // 20% of Basic Pay val ta = 100.0  //
Fixed TA

val pf = basicPay * 0.02 // 2% of Basic Pay val netSalary
= basicPay + hra + da + ta - pf

// Display Results val resultText
= """

Employee ID: $eid Employee Name:
$ename Basic Pay: $basicPay HRA

(50%): $hra

DA (20%): $da

TA: $ta

PF (2%): $pf

Net Salary: $netSalary """.trimIndent()

textViewResults.text = resultText

}

private fun saveSalaryToDatabase() { val eid =
editTextEID.text.toString()

val ename = editTextEName.text.toString()

val basicPay = editTextBasicPay.text.toString().toDoubleOrNull() if
(eid.isEmpty() || ename.isEmpty() || basicPay == null) {
```

```
Toast.makeText(this, "Please calculate salary first", Toast.LENGTH_SHORT).show()
return

}

// Recalculate for database val hra =

basicPay * 0.5 val da = basicPay *

0.2 val ta = 100.0

val pf = basicPay * 0.02

val netSalary = basicPay + hra + da + ta - pf val

employee = Employee(

eid = eid,  ename = ename,

basicPay = basicPay, hra = hra,

da = da, ta = ta, pf =

pf,

netSalary = netSalary

)

databaseHelper.addEmployee(employee) Toast.makeText(this,

"Employee salary saved to database",
Toast.LENGTH_SHORT).show()

}


private fun viewAllEmployees() {

val employees = databaseHelper.getAllEmployees() if

(employees.isEmpty()) {

textViewResults.text = "No employees found in database" return


}

val resultText = StringBuilder() resultText.append("All

Employees:\n\n") employees.forEach { emp ->

resultText.append(""" Employee ID:

${emp.eid} Name: ${emp.ename}
```

Basic Pay: ${emp.basicPay} Net Salary:

${emp.netSalary}

""".trimIndent())

}

textViewResults.text = resultText.toString()

}

}

Employee.kt

package com.example.application24 data

class Employee(

val eid: String, val ename:

String,

val basicPay: Double, val hra:

Double,

val da: Double, val ta:

Double, val pf: Double,

val netSalary: Double

)

DatabaseHelper.kt

package com.example.application24 import

android.content.ContentValues import

android.content.Context

import android.database.sqlite.SQLiteDatabase import

android.database.sqlite.SQLiteOpenHelper

class DatabaseHelper(context: Context) : SQLiteOpenHelper(context, DATABASE_NAME, null, DATABASE_VERSION) {

companion object {

private const val DATABASE_NAME = "EmployeeSalaryDB" private const

```kotlin
val DATABASE_VERSION = 1

private const val TABLE_EMPLOYEES = "employees"


// Columns

private const val KEY_EID = "eid"

private const val KEY_ENAME = "ename"

private const val KEY_BASIC_PAY = "basic_pay" private

const val KEY_HRA = "hra"

private const val KEY_DA = "da" private const

val KEY_TA = "ta" private const val KEY_PF =

"pf"

private const val KEY_NET_SALARY = "net_salary"

}


override fun onCreate(db: SQLiteDatabase) {

        val createTable = """CREATE TABLE $TABLE_EMPLOYEES(

$KEY_EID TEXT PRIMARY KEY,

$KEY_ENAME TEXT,

$KEY_BASIC_PAY REAL,

$KEY_HRA REAL,

$KEY_DA REAL,

$KEY_TA REAL,

$KEY_PF REAL,

$KEY_NET_SALARY REAL

)"""

db.execSQL(createTable)

}

override fun onUpgrade(db: SQLiteDatabase, oldVersion: Int, newVersion: Int) {
```

```
db.execSQL("DROP TABLE IF EXISTS $TABLE_EMPLOYEES")

onCreate(db)

}

fun addEmployee(employee: Employee) { val db =

this.writableDatabase

val values = ContentValues().apply { put(KEY_EID,

employee.eid) put(KEY_ENAME, employee.ename)

put(KEY_BASIC_PAY, employee.basicPay)

put(KEY_HRA, employee.hra) put(KEY_DA,

employee.da)

put(KEY_TA, employee.ta) put(KEY_PF,

employee.pf)

put(KEY_NET_SALARY, employee.netSalary)

}

db.insert(TABLE_EMPLOYEES, null, values) db.close()

}

fun getAllEmployees(): List<Employee> {

val employeeList = mutableListOf<Employee>()

val selectQuery = "SELECT * FROM $TABLE_EMPLOYEES"
val db = this.readableDatabase

val cursor = db.rawQuery(selectQuery, null)

cursor.use {

val eidIndex = it.getColumnIndex(KEY_EID)

val enameIndex = it.getColumnIndex(KEY_ENAME)

val basicPayIndex = it.getColumnIndex(KEY_BASIC_PAY) val hraIndex

= it.getColumnIndex(KEY_HRA)

val daIndex = it.getColumnIndex(KEY_DA) val taIndex =

it.getColumnIndex(KEY_TA) val pfIndex =
```

```kotlin
it.getColumnIndex(KEY_PF)

val netSalaryIndex = it.getColumnIndex(KEY_NET_SALARY)

while (it.moveToNext()) { val employee =

Employee(

eid = it.getString(eidIndex), ename =

it.getString(enameIndex),

basicPay = it.getDouble(basicPayIndex), hra =

it.getDouble(hraIndex),

da = it.getDouble(daIndex), ta =

it.getDouble(taIndex), pf =

it.getDouble(pfIndex),

netSalary = it.getDouble(netSalaryIndex)

)

employeeList.add(employee)

}

}

db.close()

return employeeList

}

}
```

Output:

Result: The program was executed and the result was successfully obtained. Thus CO5 is obtained.

Experiment No. 22

Aim: Create a menu (Store, Display) to store and retrieve data of students marks from the DB.

CO5: Implement SQLite Database and content providers.

Procedure:

activity_main.xml

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

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"

xmlns:app="http://schemas.android.com/apk/res-auto"

android:layout_width="match_parent" android:layout_height="match_parent"

android:orientation="vertical">


<androidx.appcompat.widget.Toolbar

android:id="@+id/toolbar"

android:layout_width="match_parent"

android:layout_height="?attr/actionBarSize"

/>
<LinearLayout

android:layout_width="match_parent"

android:layout_height="match_parent"

android:orientation="vertical"

android:gravity="center"

android:padding="16dp">


<TextView android:layout_width="wrap_content"

android:layout_height="wrap_content"

android:text="Student Marks Management"

android:textSize="24sp" android:textStyle="bold"

android:layout_marginBottom="32dp"/>
```

```xml
<TextView android:layout_width="wrap_content"

android:layout_height="wrap_content"

android:text="Use the menu to:\n\n- Store Student Marks\n- Display Student
Marks"

android:textSize="18sp"

android:gravity="center"/>

</LinearLayout>

</LinearLayout>
```

activity_store_marks.xml

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

<LinearLayout
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:orientation="vertical">

<EditText

android:id="@+id/editTextRollNumber"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:hint="Enter Roll Number"
android:inputType="text"/>

<EditText android:id="@+id/editTextName"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:hint="Enter Student Name"
android:inputType="text"/>

<EditText android:id="@+id/editTextSubject1"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:hint="Subject 1 Marks"
android:inputType="number"/>
```

```xml
<EditText android:id="@+id/editTextSubject2"
android:layout_width="match_parent"
andoid:layout_height="wrap_content"
android:hint="Subject 2 Marks"
android:inputType="number"/>

<EditText android:id="@+id/editTextSubject3"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:hint="Subject 3 Marks"
android:inputType="number"/>

<Button android:id="@+id/buttonSave"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Save Marks"/>

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

android:layout_height="wrap_content" android:text="Go to Display
Marks"/>

</LinearLayout>
</ScrollView>
```

activity_display_marks.xml

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

<LinearLayout
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:orientation="vertical">

<EditText android:id="@+id/editTextSearchRollNumber"
android:layout_width="match_parent"
android:layout_height="wrap_content" android:hint="Enter Roll
Number to Search" android:inputType="text"/>

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

```xml
android:layout_height="wrap_content"
android:text="Search"/>

<Button android:id="@+id/buttonDisplayAll"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Display All Students"/>

<TextView android:id="@+id/textViewResults"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:layout_marginTop="16dp"
android:textSize="16sp" android:padding="8dp"
android:background="#F0F0F0"/>

</LinearLayout>
</ScrollView>
```

menu_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android"
xmlns:app="http://schemas.android.com/apk/res-auto">
<item
android:id="@+id/menu_store_marks"
android:title="Store Marks"
app:showAsAction="never"/>
<item
android:id="@+id/menu_display_marks"
android:title="Display Marks"
app:showAsAction="never"/>
</menu>
```

MainActivity.kt

```kotlin
package com.example.application25
import android.content.Intent import
android.os.Bundle
import android.view.Menu import
android.view.MenuItem
import androidx.appcompat.app.AppCompatActivity import
androidx.appcompat.widget.Toolbar


class MainActivity : AppCompatActivity() {
```

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

val toolbar: Toolbar = findViewById(R.id.toolbar)
setSupportActionBar(toolbar)
supportActionBar?.title = "Student Marks Management"

}
```

```kotlin
// Create options menu
```

```kotlin
override fun onCreateOptionsMenu(menu: Menu?): Boolean {
menuInflater.inflate(R.menu.main_menu, menu)
return true

}
```

```kotlin
// Handle menu item selections
```

```kotlin
override fun onOptionsItemSelected(item: MenuItem): Boolean { return
when (item.itemId) {
R.id.menu_store_marks -> {

val intent = Intent(this, StoreMarksActivity::class.java) startActivity(intent)
true

}

R.id.menu_display_marks -> {

val intent = Intent(this, DisplayMarksActivity::class.java) startActivity(intent)
true

}

else -> super.onOptionsItemSelected(item)

}

}

}
```

StoreMarksActivity.kt

package com.example.application25

import android.content.Intent import android.os.Bundle

import android.widget.Button import android.widget.EditText import
android.widget.Toast

```kotlin
import androidx.appcompat.app.AppCompatActivity

class StoreMarksActivity : AppCompatActivity() {
private lateinit var editTextRollNumber: EditText private
lateinit var editTextName: EditText private lateinit var
editTextSubject1: EditText private lateinit var
editTextSubject2: EditText private lateinit var
editTextSubject3: EditText private lateinit var
buttonSave: Button
private lateinit var buttonDisplayMenu: Button private lateinit

var databaseHelper: DatabaseHelper

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

// Initialize views
editTextRollNumber = findViewById(R.id.editTextRollNumber)
editTextName = findViewById(R.id.editTextName) editTextSubject1 =
findViewById(R.id.editTextSubject1) editTextSubject2 =
findViewById(R.id.editTextSubject2) editTextSubject3 =
findViewById(R.id.editTextSubject3) buttonSave =
findViewById(R.id.buttonSave) buttonDisplayMenu =
findViewById(R.id.buttonDisplayMenu)

// Initialize database helper databaseHelper =
DatabaseHelper(this)

// Save button click listener buttonSave.setOnClickListener {
saveStudentMarks()
}
// Display Menu button click listener

buttonDisplayMenu.setOnClickListener {
val intent = Intent(this, DisplayMarksActivity::class.java) startActivity(intent)
}
}

private fun saveStudentMarks() {
val rollNumber = editTextRollNumber.text.toString() val name =
editTextName.text.toString()
val subject1 = editTextSubject1.text.toString().toIntOrNull() val subject2
=   editTextSubject2.text.toString().toIntOrNull()   val   subject3   =
editTextSubject3.text.toString().toIntOrNull()
```

```kotlin
// Validate inputs
if (rollNumber.isEmpty() || name.isEmpty() ||
subject1 == null || subject2 == null || subject3 == null) { Toast.makeText(this, "Please enter all details",
Toast.LENGTH_SHORT).show() return
}

// Calculate total marks and percentage
val totalMarks = subject1 + subject2 + subject3
val percentage = (totalMarks.toDouble() / 300) * 100

// Create Student object val student =
Student(
rollNumber = rollNumber, name = name,
subject1 = subject1, subject2 =
subject2, subject3 = subject3,
totalMarks = totalMarks, percentage =
percentage
)

// Save to database
databaseHelper.addStudent(student)

// Clear input fields
editTextRollNumber.text.clear()
editTextName.text.clear()
editTextSubject1.text.clear()

editTextSubject2.text.clear()
editTextSubject3.text.clear()

// Show success message
Toast.makeText(this, "Student marks saved successfully",
Toast.LENGTH_SHORT).show()
}
}
```

DisplayMarksActivity.kt

```kotlin
package com.example.application25

import android.os.Bundle import
android.widget.Button import
android.widget.EditText
import android.widget.TextView import
```

```kotlin
android.widget.Toast
import androidx.appcompat.app.AppCompatActivity

class DisplayMarksActivity : AppCompatActivity() { private
lateinit var editTextSearchRollNumber: EditText private lateinit
var buttonSearch: Button
private lateinit var buttonDisplayAll: Button private
lateinit var textViewResults: TextView

private lateinit var databaseHelper: DatabaseHelper override fun

onCreate(savedInstanceState: Bundle?) {
super.onCreate(savedInstanceState)
setContentView(R.layout.activity_display_marks)

// Initialize views editTextSearchRollNumber =
findViewById(R.id.editTextSearchRollNumber) buttonSearch
= findViewById(R.id.buttonSearch)
buttonDisplayAll = findViewById(R.id.buttonDisplayAll)
textViewResults = findViewById(R.id.textViewResults)

// Initialize database helper databaseHelper =
DatabaseHelper(this)

// Search button click listener

buttonSearch.setOnClickListener { searchStudentByRollNumber()
}

// Display All button click listener
buttonDisplayAll.setOnClickListener {
displayAllStudents()
}
}

private fun searchStudentByRollNumber() {
val rollNumber = editTextSearchRollNumber.text.toString()

if (rollNumber.isEmpty()) {
Toast.makeText(this, "Please enter Roll Number", Toast.LENGTH_SHORT).show()
return
}

val student = databaseHelper.getStudentByRollNumber(rollNumber) if (student
```

```kotlin
!= null) {
val resultText = """
Roll    Number:    ${student.rollNumber}    Name:
${student.name}
Subject 1 Marks: ${student.subject1} Subject 2 Marks:
${student.subject2}        Subject     3      Marks:
${student.subject3}            Total           Marks:
${student.totalMarks}
Percentage: ${String.format("%.2f", student.percentage)}% """.trimIndent()

textViewResults.text = resultText
} else {
textViewResults.text = "No student found with this Roll Number"
}
}

private fun displayAllStudents() {
val students = databaseHelper.getAllStudents()

if (students.isEmpty()) {
textViewResults.text = "No students found in database"

return
}

val resultText = StringBuilder() resultText.append("All
Students:\n\n")

students.forEach { student ->
resultText.append("""
Roll Number: ${student.rollNumber} Name:
${student.name}
Total Marks: ${student.totalMarks}
Percentage: ${String.format("%.2f", student.percentage)}%

""".trimIndent())
}

textViewResults.text = resultText.toString()
}
}
```

Student.kt

```kotlin
package com.example.application25

data class Student(
val rollNumber: String, val name:
String,
val subject1: Int, val
subject2: Int, val subject3:
Int, val totalMarks: Int,
val percentage: Double
)
```

DatabaseHelper.kt

```kotlin
package com.example.application25 import

android.content.ContentValues import

android.content.Context

import android.database.sqlite.SQLiteDatabase

import android.database.sqlite.SQLiteOpenHelper

class DatabaseHelper(context: Context) : SQLiteOpenHelper(context,
DATABASE_NAME, null, DATABASE_VERSION) {

companion object {

private const val DATABASE_NAME = "StudentMarksDB" private const

val DATABASE_VERSION = 1

private const val TABLE_STUDENTS = "students"

private const val KEY_ROLL_NUMBER = "roll_number" private

const val KEY_NAME = "name"

private const val KEY_SUBJECT1 = "subject1" private

const val KEY_SUBJECT2 = "subject2" private const val

KEY_SUBJECT3 = "subject3"

private const val KEY_TOTAL_MARKS = "total_marks" private

const val KEY_PERCENTAGE = "percentage"

}

override fun onCreate(db: SQLiteDatabase) {
```

```kotlin
val createTable = """CREATE TABLE $TABLE_STUDENTS(

$KEY_ROLL_NUMBER TEXT PRIMARY KEY,

$KEY_NAME TEXT,

$KEY_SUBJECT1 INTEGER,

$KEY_SUBJECT2 INTEGER,

$KEY_SUBJECT3 INTEGER,

$KEY_TOTAL_MARKS INTEGER,

$KEY_PERCENTAGE REAL

)"""

db.execSQL(createTable)

}

override fun onUpgrade(db: SQLiteDatabase, oldVersion: Int, newVersion: Int) {

db.execSQL("DROP TABLE IF EXISTS $TABLE_STUDENTS")

onCreate(db)

}

fun addStudent(student: Student) { val db =

this.writableDatabase

val values = ContentValues().apply { put(KEY_ROLL_NUMBER,

student.rollNumber) put(KEY_NAME, student.name)

put(KEY_SUBJECT1, student.subject1) put(KEY_SUBJECT2,

student.subject2) put(KEY_SUBJECT3, student.subject3)

put(KEY_TOTAL_MARKS, student.totalMarks)

put(KEY_PERCENTAGE, student.percentage)

}

db.insert(TABLE_STUDENTS, null, values) db.close()

}
fun getAllStudents(): List<Student> {

val studentList = mutableListOf<Student>()
```

```
val selectQuery = "SELECT * FROM $TABLE_STUDENTS"
val db = this.readableDatabase
val cursor = db.rawQuery(selectQuery, null)
cursor.use {

val rollNumberIndex = it.getColumnIndex(KEY_ROLL_NUMBER) val

nameIndex = it.getColumnIndex(KEY_NAME)

val subject1Index = it.getColumnIndex(KEY_SUBJECT1) val

subject2Index = it.getColumnIndex(KEY_SUBJECT2) val subject3Index

= it.getColumnIndex(KEY_SUBJECT3)

val totalMarksIndex = it.getColumnIndex(KEY_TOTAL_MARKS) val

percentageIndex = it.getColumnIndex(KEY_PERCENTAGE)

while (it.moveToNext()) { val student =

Student(

rollNumber = it.getString(rollNumberIndex), name =

it.getString(nameIndex),

subject1 = it.getInt(subject1Index), subject2 =

it.getInt(subject2Index), subject3 = it.getInt(subject3Index),

totalMarks = it.getInt(totalMarksIndex), percentage =

it.getDouble(percentageIndex)

)studentList.add(student)

}

}
db.close()

return studentList

}
```
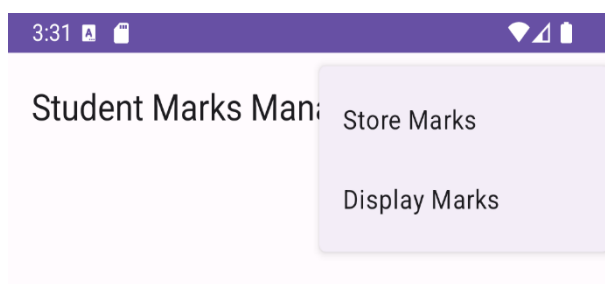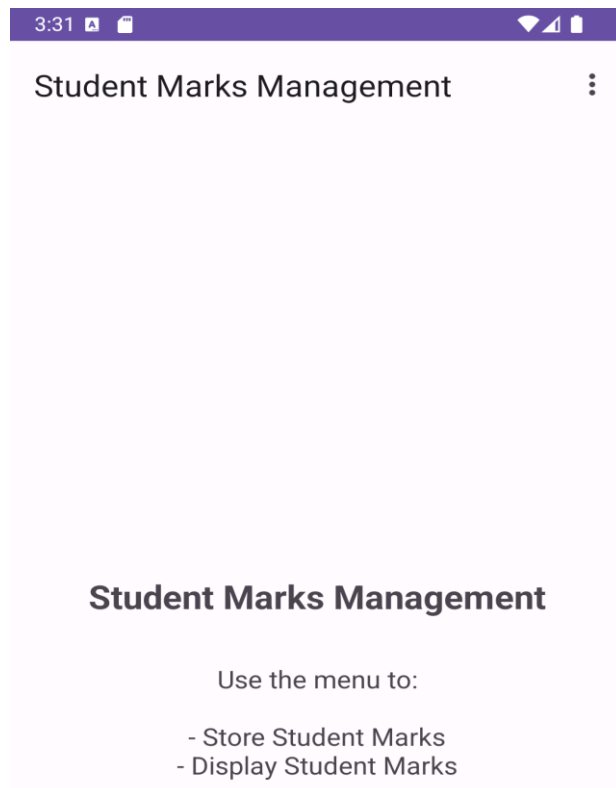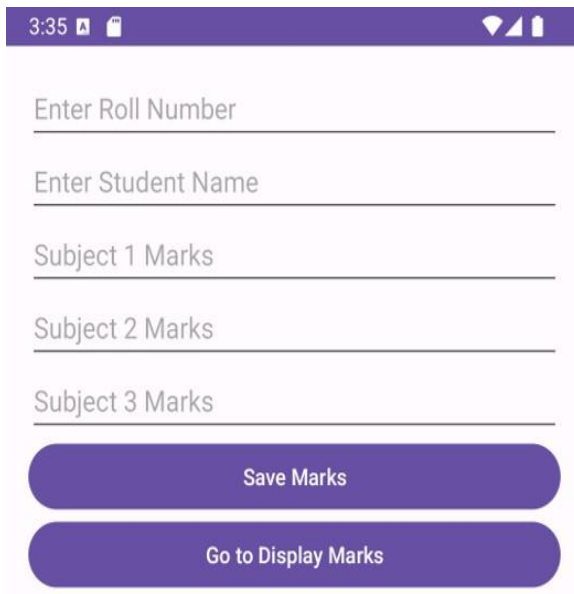
```kotlin
fun getStudentByRollNumber(rollNumber: String): Student? { val db =
this.readableDatabase
val cursor = db.query(
TABLE_STUDENTS,
null,
"$KEY_ROLL_NUMBER = ?",
arrayOf(rollNumber), null,
null, null
)
return cursor.use {
if (it.moveToFirst()) {
val rollNumberIndex = it.getColumnIndex(KEY_ROLL_NUMBER) val nameIndex =
it.getColumnIndex(KEY_NAME)
val subject1Index = it.getColumnIndex(KEY_SUBJECT1) val
subject2Index = it.getColumnIndex(KEY_SUBJECT2) val subject3Index =
it.getColumnIndex(KEY_SUBJECT3)
val totalMarksIndex = it.getColumnIndex(KEY_TOTAL_MARKS) val
percentageIndex = it.getColumnIndex(KEY_PERCENTAGE)
Student(
rollNumber = it.getString(rollNumberIndex), name =
it.getString(nameIndex),
subject1 = it.getInt(subject1Index), subject2 =
it.getInt(subject2Index), subject3 =
it.getInt(subject3Index),

totalMarks = it.getInt(totalMarksIndex), percentage =
it.getDouble(percentageIndex)
)
```

    } } else null

}   }

Output:

Result: The program was executed and the result was successfully obtained. Thus CO5 is obtained.