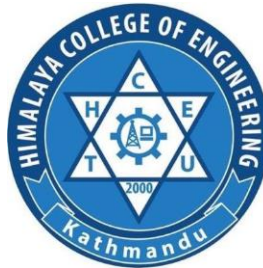# Tribhuvan University

Faculty of Humanities and Social Science

Balkhu, Nepal

Himalaya College of Engineering

Chyasal, Lalitpur

Lab Report of Mobile Programming

Submitted By	Submitted To
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Lab 1: Demonstrate the setup and installation of android project with java.

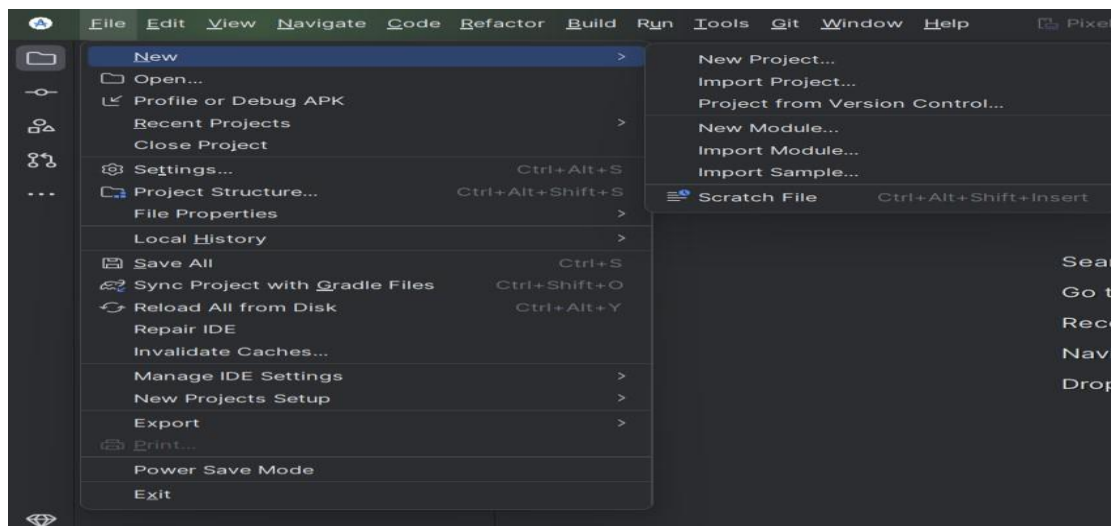## Objective

- Learn to install and setup android project.

Steps to setup and install the project

Step 1: Download the latest version of Android studio from the official website

Step 2: Install Android Studio and select Android SDK, Android Virtual Device (AVD).

Step 3: Setting up the project

- Open Android Studio
- Click "Start a new Android Studio project."

- In the "New Project" window:

o **Project Name:** Enter a descriptive name for your project.
o **Package Name:** Choose a unique package name. This acts as a namespace for your app's code.
o **Save Location:** Select a location on your computer to save your project files.
o **Minimum SDK:** Choose the minimum SDK level which support the maximum feature. o We use API 24 ("Nougat"; Android 7.0) o **Language:** Select "Java" as the development language.
o **Build configuration language:** choose Groovy DSL(build.gradle) Click "Finish". Click on File => New => New Project

Click on Empty Views Activity
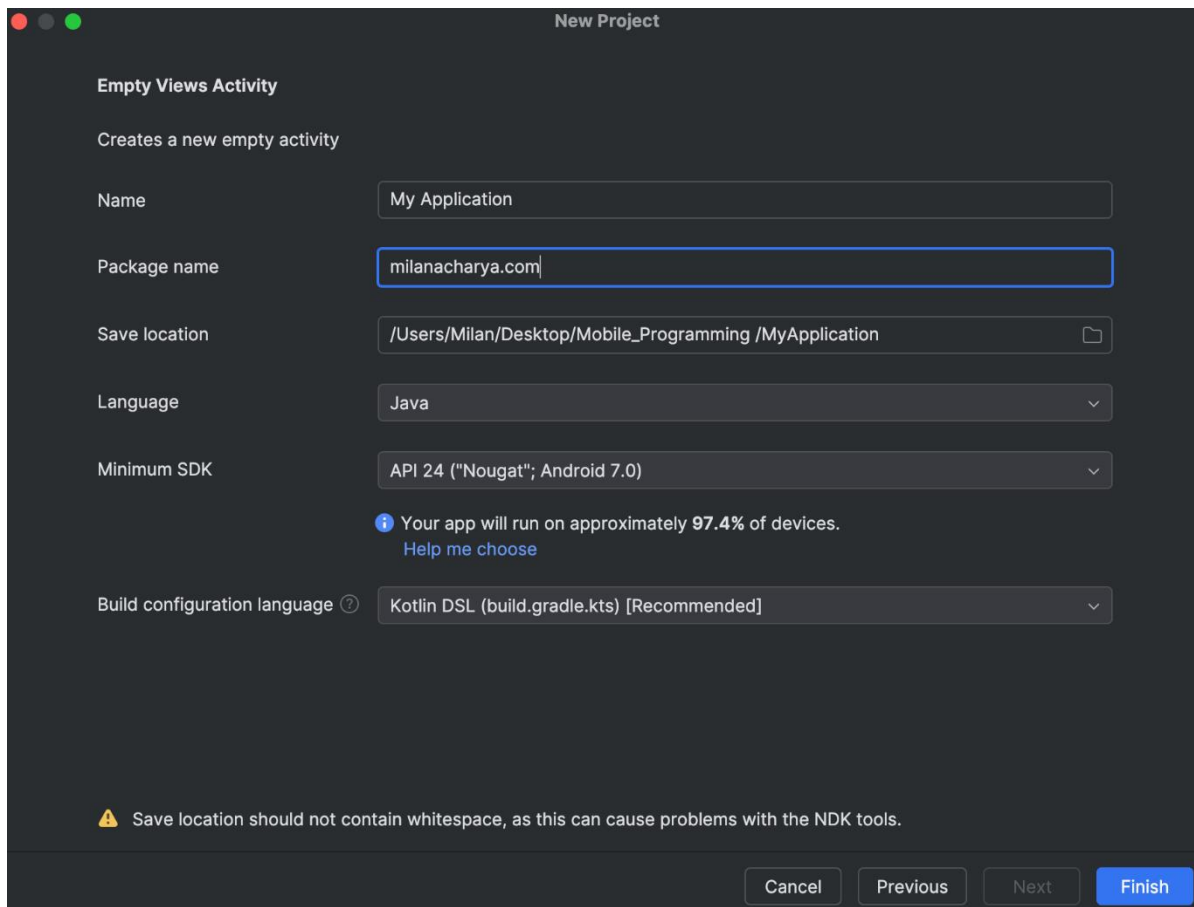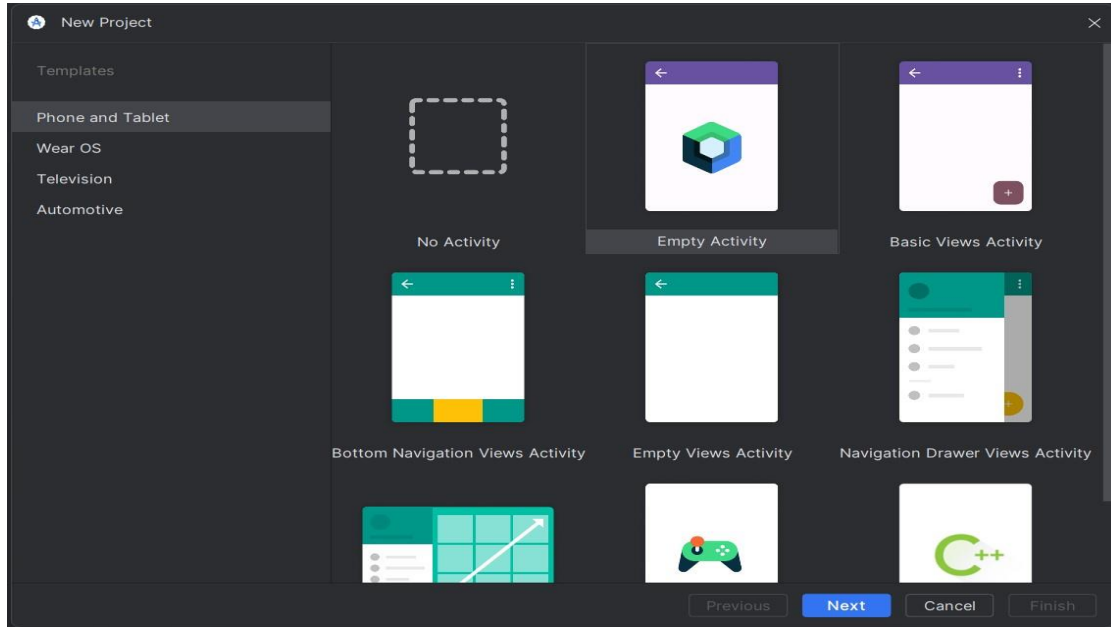
Lab 2: Develop an android application that prints "hello world" on the bottom of the page.

Objective:

- Learn to develop and run the android project

Lab work:

MainActivity.java

```java
package example.com;
import android.os.Bundle;
import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.graphics.Insets;
import androidx.core.view.ViewCompat;
import androidx.core.view.WindowInsetsCompat;
public class MainActivity extends AppCompatActivity {
    @Override
 protected void onCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
 EdgeToEdge.enable(this);
 setContentView(R.layout.activity_main);
     ViewCompat.setOnApplyWindowInsetsListener(findViewById(R.id.main), (v, insets) -> {
        Insets systemBars = insets.getInsets(WindowInsetsCompat.Type.systemBars());
        v.setPadding(systemBars.left, systemBars.top, systemBars.right, systemBars.bottom);
        return insets;
    });
  } }
```

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:id="@+id/main"     android:layout_width="match_parent"
android:layout_height="match_parent"     android:gravity="bottom|center_horizontal"
tools:context=".MainActivity">
   <TextView       android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="@string/hello"
    />
```

</LinearLayout>

strings.xml

<resources>
    <string name="app_name">ProfileApp</string>
    <string name="hello">Hello World!!</string>
</resources>

Output:
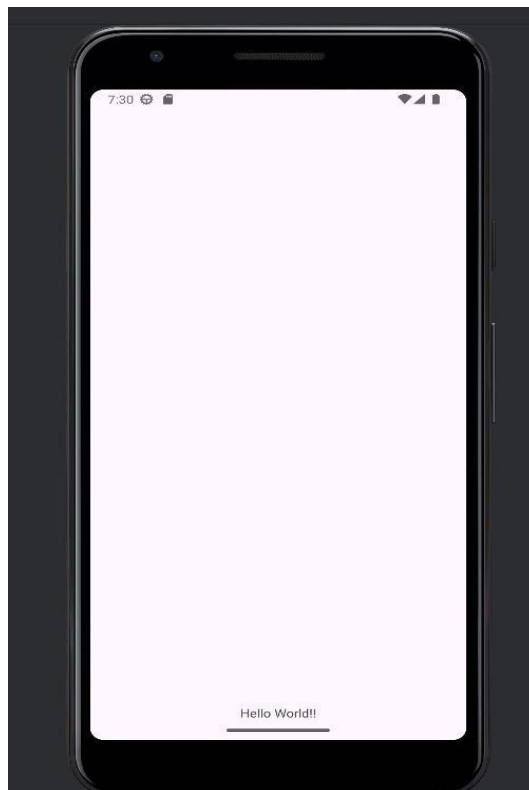
Discussion and Conclusion:

In this lab, we create a simple App to print "Hello world!!" in the bottom of the page layout. We set layout gravity bottom and center_horizontal and in string file we write the string value as "hello world" as set its name as hello and in activity_main.xml file we return the value of string in text as @string/hello.

Lab 3

Develop an android application with two activities, mainactivity and greetactivity .mainactivity should contain a textbox and button with label " submit'. when clicked on submit greetactivity should open with message hello {name} where name is submitted from mainactivity.

Objective:

       • Learn how to deal with two activities

Lab work:

MainActivity.java

Package com.example.lab3;

public class MainActivity extendsAppCompatActivity {

   private EditText name;

   private Button submit;

   @Override

   protected void onCreate(Bundle savedInstanceState) {

     super.onCreate(savedInstanceState);

     EdgeToEdge.enable(this);

     setContentView(R.layout.activity_main);name = findViewById(R.id.name);

     submit= findViewById(R.id.btn);

     submit.setOnClickListener(new View.OnClickListener() {

       @Override

       public void onClick(View view) {

         String input = name.getText().toString();

         Intent i = new Intent(MainActivity.this,GreetActivity.class);

         i.putExtra("name",input);

         startActivity(i);

       }

     });

  }}

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_height="match_parent"
    android:layout_width="match_parent"
    android:orientation="vertical"
    android:padding="20dp"
    android:layout_margin="20dp"
    >
    <EditText
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/name"
        android:hint="Enter Your Name"
        android:layout_marginTop="50dp"
        android:padding="20dp"
        />
    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/btn"
        android:text="Submit"
        android:layout_below="@+id/name"
        android:padding="50dp"
        android:layout_marginTop="10dp"
        />
</RelativeLayout>
```

GreetActivity.java

```java
package com.example.lab3;

import android.content.Intent;

import android.os.Bundle;

import android.widget.TextView;

import androidx.annotation.Nullable;

import androidx.appcompat.app.AppCompatActivity;

public class GreetActivity extends AppCompatActivity {

    @Override

    protected void onCreate(@Nullable Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.greetactivity);

        Intent i = getIntent();

        String name = i.getStringExtra("name");

        TextView =findViewById(R.id.showtext);

        textView.setText("hello "+name);

    }}
```

Greetactivity.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
  xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_height="match_parent"
    android:layout_width="match_parent"
    android:orientation="vertical"
    android:padding="60dp"
    android:layout_margin="50dp"
    >
    <TextView
```
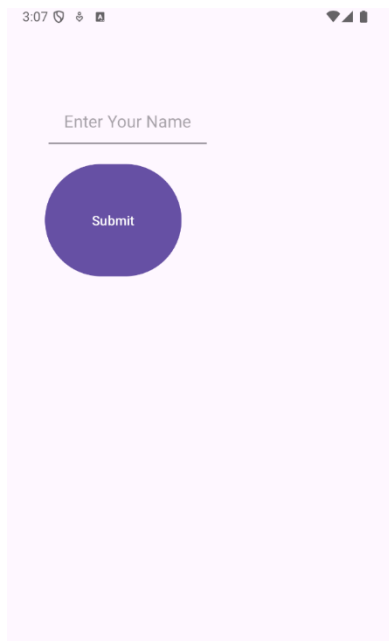
android:layout_width="match_parent"

android:layout_height="wrap_content"

android:id="@+id/showtext"

android:layout_gravity="center"

/>

</LinearLayout>

Output

Discussion and conclusion:

In this lab, we learn and deal with two activities as MainActivity and GreetActivity. The activities are store in stack. The MainActivity contains the Text input field and the submit button after click the submit button the activity is change and goes to GreetActivity which contains the user input value and Hello as default value as its UI.

We use Intent feature to communicate between two activities. We create an object of the Intent and pass the MainActivity and GreetActivity as parameter and use startActivity to run the activity.

Lab 4: Google Map

Objective

- To implement google map in android application

Lab work

MainActivity.java

```java
package com.example.googlemap;

import com.google.android.gms.maps.GoogleMap;

import com.google.android.gms.maps.model.LatLng;

public class MainActivity extends AppCompatActivity implements OnMapReadyCallback {

    private GoogleMap gmap;

    @Override

    protected void onCreate(@Nullable Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.mapactivity);

        SupportMapFragment mfragmet = (SupportMapFragment) getSupportFragmentManager().findFragmentById(R.id.map);

        if(mfragmet!=null){

            mfragmet.getMapAsync(this);

        }}

    @Override

    public void onMapReady(@NonNull GoogleMap googleMap) {

        gmap=googleMap;

        LatLng location = new LatLng(-34,151);

        gmap.addMarker(new MarkerOptions().position(location).title("Sydney"));

        gmap.moveCamera(CameraUpdateFactory.newLatLngZoom(location,15));

    }}
```

Mapactivity.xml

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

```xml
<RelativeLayout  xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_height="match_parent"
    android:layout_width="match_parent"
    >
    <fragment
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:id="@+id/map"
        android:name="com.google.android.gms.maps.SupportMapFragment"
        />
</RelativeLayout>
```

Androidmanifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">
    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.GoogleMap"
        tools:targetApi="31"  >
        <activity android:name=".MainActivity"
        android:exported="true">
            <intent-filter>
```

```xml
            <category android:name="android.intent.category.LAUNCHER"/>

            <action android:name="android.intent.action.MAIN"/>

        </intent-filter>

    </activity>

    <meta-data

        android:name="com.google.android.geo.API_KEY"

        android:value="AIzaSyBiK29ZZJ9hjSho0c9UhX1hKujvygh8UVY"  />

    </application>

</manifest>
```
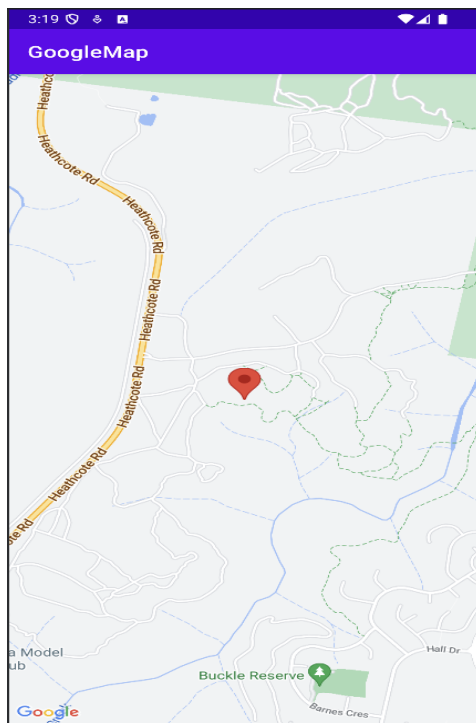
Output:

Discussion and conclusion:
In this lab, we implement google map using API key. We implement the OnMapReadyCallBack method to add google map feature in the application. In this lab we try to pin points on our own current location and add marker there as You are here.

Lab 5: Simple SQLite operations on android

1. Create a sqlite database named "noteApp.db".

2. Create a table named "notes" with following columns:

a. _id (autoincrement primary key)

b. UUID string

c. Title string

d. Description string

3. Create two buttons in MainActivity

a. Insert

b. List

4. When clicked on insert, make a database operation to insert dummy data on notes table.
a. Insert at least 5 dummy notes

5. When clicked on List, make a database operation to query all data on notes table and show it in a listView just below the buttons.

MainActivity.java

```
package com.example.lab2;

import android.database.Cursor;

import androidx.activity.EdgeToEdge;

public class MainActivity extends AppCompatActivity {

private Button insert ,show_data;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        EdgeToEdge.enable(this);

        setContentView(R.layout.activity_main);

      ListView listview=findViewById(R.id.listview);

      insert=findViewById(R.id.insert);

      show_data=findViewById(R.id.show);
```

```java
        DBhelper helper = new DBhelper(this);
    insert.setOnClickListener(new View.OnClickListener() {
      @Override
      public void onClick(View view) {
        helper.InsertData("110","Ram Sharma","he is a bca student");
        helper.InsertData("111","Ram Gurung","he is a btec student");
        helper.InsertData("112","Ram Lama","he is a bm student");
        helper.InsertData("113","Ram Khatri","he is a bba student");
        helper.InsertData("114","Ram Adhikari","he is a ba student");
        Toast.makeText(MainActivity.this,"Data Inserted
Succssfylly",Toast.LENGTH_SHORT).show();
      }
    });
    show_data.setOnClickListener(new View.OnClickListener() {
      @Override
      public void onClick(View view) {
        String uid = "";
        String title = "";
        String description = "";
        ArrayList<Note> noteList = new ArrayList<>();
        Cursor cursor=helper.SelectData();
        while(cursor.moveToNext()){
          uid=cursor.getString(1);
          title=cursor.getString(2);
          description=cursor.getString(3);
         noteList.add(new Note(uid, title, description));
        }
        NoteAdapter adapter = new NoteAdapter(MainActivity.this, noteList);
```

```java
                listview.setAdapter(adapter);

                cursor.close();

        }

    });

    }

}
```

DBhelper.java

```java
package com.example.lab2;

public class DBhelper extends SQLiteOpenHelper {

    private static final int DB_version=2;

    private static final String DB_name="noteApp";

    public DBhelper(@Nullable Context context) {

        super(context, DB_name, null, DB_version);

    }

    @Override

    public void onCreate(SQLiteDatabase db) {

        String query="CREATE TABLE notes (_id INTEGER PRIMARY KEY
AUTOINCREMENT,UUID VARCHAR(250),Title VARCHAR(250),Description
VARCHAR(250))";

        db.execSQL(query);

    }

    @Override

    public void onUpgrade(SQLiteDatabase db, int i, int i1) {

        String query ="DROP TABLE IF EXISTS notes ";

        db.execSQL(query);

        onCreate(db);

    }

    public void InsertData(String uuid,String title,String description){
```

```java
        SQLiteDatabase db = this.getWritableDatabase();

        ContentValues values = new ContentValues();

        values.put("UUID",uuid);

        values.put("Title",title);

        values.put("Description",description);

        db.insert("notes",null,values);

        db.close();

    }

    public Cursor SelectData(){

        SQLiteDatabase db = this.getReadableDatabase();

        String query ="SELECT * FROM notes";

        Cursor = db.rawQuery(query,null);

        return cursor;


    }
}
```

Note.java

```java
package com.example.lab2;

public class Note {

        private String uid;

        private String title;

        private String description;

    public Note(String uid, String title, String description) {

        this.uid = uid;

        this.title = title;

        this.description = description;

    }

    public String getUid() {
```

```java
        return uid;

    }

    public String getTitle() {

        return title;

    }

    public String getDescription() {

        return description;

    }

}
```

NoteAdapter.java

```java
package com.example.lab2;

public class NoteAdapter extends ArrayAdapter {

    private ArrayList<Note> notelist;

    public NoteAdapter(@NonNull Context, ArrayList<Note>notelist) {

        super(context,0,notelist);

        this.notelist=notelist;

    }

    @NonNull

    @Override

    public View getView(int position, @Nullable View convertView, @NonNull ViewGroup
parent) {

        if (convertView == null) {

            convertView = LayoutInflater.from(getContext()).inflate(R.layout.listitem, parent, false);

        }


        Note = (Note) getItem(position);

        TextView idView = convertView.findViewById(R.id.uid);

        TextView nameView = convertView.findViewById(R.id.title);
```

```java
        TextView addressView = convertView.findViewById(R.id.description);

        idView.setText(String.valueOf(note.getUid()));

        nameView.setText(note.getTitle());

        addressView.setText(note.getDescription());

        return convertView;

    }

}
```

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"

    >

    <Button

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:id="@+id/insert"

        android:text="Insert"

        />

    <Button

        android:layout_marginTop="10dp"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:id="@+id/show"

        android:text="Show data"

        android:layout_gravity="center"
```

```
        />
    <ListView
        android:layout_marginTop="10dp"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/listview"
        />
</LinearLayout>
```

Listitem.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_height="wrap_content"
    android:orientation="horizontal"
    android:layout_width="match_parent"
    >
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/uid"
        android:layout_marginLeft="10dp"
        />
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/title"
        android:layout_marginLeft="10dp"
        />
```
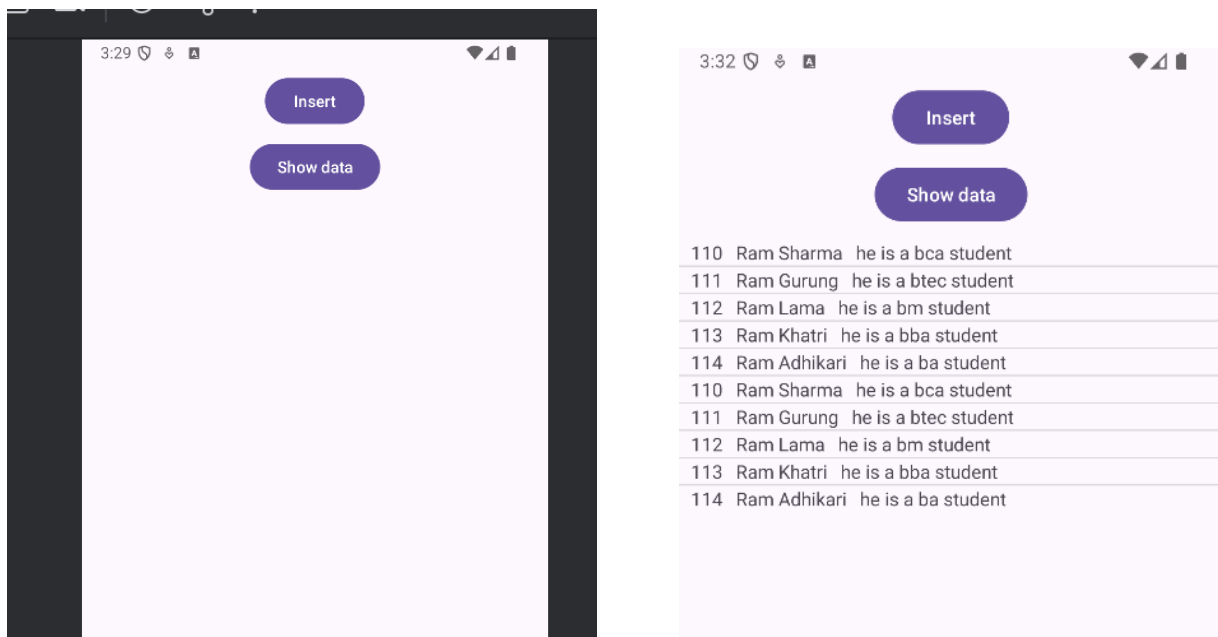
```
<TextView

    android:layout_width="wrap_content"

    android:layout_height="wrap_content"

    android:id="@+id/description"

    android:layout_marginLeft="10dp"

    />

</LinearLayout>
```

Output:

Discussion and Conclusion:
In this lab, we learn about the database SQlite to store data. We insert dummy data in the database and show that data in list form. We create two button as Insert and List. The insert button function as it help to insert data in the database and List button function as to show the list of item store in the database.

Lab:6

Develop an android application to input your Name, Age, gender, email address, phone number and a submit button. When clicked on the button, show this information on another activity. Perform given validation on the following input fields:

Name:	Must not be empty, must satisfy the following expression: "FirstName LastName".

Email	Must not be empty, must be a valid email address
Phone Number	Must not be empty
Gender	One gender must be selected

Note: You can use Google's material UI for better looking Input fields and error messages.
Mainactivity.java
package com.example.lab4;
public class MainActivity extends AppCompatActivity {
   private Button submit;
   private RadioGroup rg;
   private EditText name,age,phone_number,email;
   private RadioButton r1,r2;
   @Override
   protected void onCreate(Bundle savedInstanceState) {
     super.onCreate(savedInstanceState);
     EdgeToEdge.enable(this);
     setContentView(R.layout.activity_main);
     name = findViewById(R.id.name);
     rg=findViewById(R.id.rgroup);
     r1=findViewById(R.id.rmale);
     r2=findViewById(R.id.rfemale);
     age=findViewById(R.id.age);
     phone_number=findViewById(R.id.number);
     email=findViewById(R.id.email);
     submit=findViewById(R.id.submit);
     submit.setOnClickListener(new View.OnClickListener() {
       @Override
       public void onClick(View view) {
         String sname =name.getText().toString();
         int sage;
         try {
           sage = Integer.parseInt(age.getText().toString());
         } catch (NumberFormatException e) {
           age.setError("Please enter a valid age");
           return;
         }
         String number = phone_number.getText().toString();
         String semail =email.getText().toString();
         String gender = "";
         int selectedId = rg.getCheckedRadioButtonId();

```java
                if (selectedId == r1.getId()) {
                    gender = "Male";
                } else if (selectedId == r2.getId()) {
                    gender = "Female";
                }
                if (validateInputs(sname, sage, number, semail, gender)) {
                    Intent i = new Intent(MainActivity.this, SecondActivity.class);
                    i.putExtra("name", sname);
                    i.putExtra("age", sage);
                    i.putExtra("email", semail);
                    i.putExtra("gender", gender);
                    i.putExtra("number", number);
                    startActivity(i);
                }
            }
        });

    }
    private boolean validateInputs(String sname, int sage, String number, String semail, String gender) {
        if (sname == null || sname.isEmpty() || !sname.matches("[A-Za-z]+\\s[A-Za-z]+")) {
            name.setError("Please enter a valid name (FirstName LastName)");
            return false;
        }
        if (sage <= 0){
            age.setError("Please enter a valid age");
            return false;
        }
        if (rg.getCheckedRadioButtonId() == -1) {
            Toast.makeText(MainActivity.this, "Please select a gender",
Toast.LENGTH_SHORT).show();
            return false;
        }
        if (semail == null || semail.isEmpty() ||
!android.util.Patterns.EMAIL_ADDRESS.matcher(semail).matches()) {
            email.setError("Please enter a valid email");
            return false;
        }
  if (number == null || number.isEmpty() || !number.matches("\\d+")|| number.length() != 10) {
phone_number.setError("Please enter a valid phone number (digits only) and must be 10 digits
");
  return false;
    }
return true;
    }
```

```
}
Secondactivity.java
package com.example.lab4;
public class SecondActivity extends AppCompatActivity {
    private TextView name , age , gender , email,number ;
    @Override
    protected void onCreate(@Nullable Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.secondactivity);
        name=findViewById(R.id.name);
        age = findViewById(R.id.age);
        gender=findViewById(R.id.gender);
        email=findViewById(R.id.email);
        number=findViewById(R.id.number);
        Intent i =getIntent();
        name.setText(i.getStringExtra("name"));
        age.setText(String.valueOf(i.getIntExtra("age",10)));
        gender.setText(i.getStringExtra("gender"));
        email.setText(i.getStringExtra("email"));
        number.setText(i.getStringExtra("number"));
    }
}


 Activitymain.xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_height="match_parent"
    android:layout_width="match_parent"
    android:orientation="vertical"
    android:padding="30dp" >
<EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/name"
        android:hint="Enter Your name "/>
    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/age"
        android:hint="Enter Your Age"
        android:layout_below="@+id/name"
        />
    <RadioGroup
        android:layout_width="match_parent"
```

```xml
        android:layout_height="wrap_content"
        android:id="@+id/rgroup"
        android:orientation="horizontal"
        android:layout_below="@id/age"/>

        <RadioButton
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Male"
            android:id="@+id/rmale"/>

        <RadioButton
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Female"
            android:id="@+id/rfemale"/>
    </RadioGroup>
    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/email"
        android:hint="Enter Your email"
        android:layout_below="@+id/rgroup"
        />
    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/number"
        android:hint="Enter Your Number"
        android:layout_marginTop="10dp"
        android:layout_below="@+id/email"
        />
    <Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/submit"
        android:text="Submit"
        android:layout_below="@+id/number"
        />

</RelativeLayout>

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

```xml
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_height="match_parent"
    android:layout_width="match_parent"
    android:orientation="vertical"
    >
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/name"
        />
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/age"
        android:layout_below="@+id/name"
        />
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/gender"
        android:layout_below="@+id/age"
        />
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/email"
        android:layout_below="@+id/gender"
        />
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/number"
        android:layout_below="@+id/email"
        />
</RelativeLayout>
```

Output:

Discussion and Conclusion:

In this lab, we learn about the multiple activity and how to handle them. we create a simple form and validate them and that form information is submitted and show in another activity.

Intent class is used to build connection between to activity. Main activity has simple form and second activity is used to show the details of form input.