Exercise 6 – Finding Geo-coordinates of a Location and Reverse Geocoding

Aim:

a) Develop an android application to find the latitude and longitude of current location and the selected location in a google map using anyone of the below options:
        1) Location Manager
        2) Network Provider
        3) GPS Provider
b) Also perform Reverse Geocoding i.e. given a latitude and longitude of a location, app should display the location name or given a location name it should display the latitude and longitude of that place.

Code:

```xml
//activity_main.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"
    android:padding="16dp"
    tools:context=".MainActivity">


    <!-- Previous UI elements -->
    <Button
        android:id="@+id/getLocationButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:text="Get Location" />


    <TextView
        android:id="@+id/latitudeTextView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/getLocationButton"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="16dp"
        android:text="Latitude: "
```

```
            android:textSize="18sp" />


    <TextView
        android:id="@+id/longitudeTextView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/latitudeTextView"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="8dp"
        android:text="Longitude: "
        android:textSize="18sp" />


    <!-- New UI elements for search -->
    <EditText
        android:id="@+id/locationNameEditText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/longitudeTextView"
        android:layout_marginTop="16dp"
        android:hint="Enter Location Name" />


    <Button
        android:id="@+id/searchLocationButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/locationNameEditText"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="16dp"
        android:text="Search Location" />
    <TextView
        android:id="@+id/searchLatitudeTextView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/searchLocationButton"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="16dp"
        android:text="Searched Latitude: "
        android:textSize="18sp" />


    <TextView
        android:id="@+id/searchLongitudeTextView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
```

```xml
        android:layout_below="@id/searchLatitudeTextView"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="8dp"
        android:text="Searched Longitude: "
        android:textSize="18sp" />


</RelativeLayout>
```

```java
//MainActivity.java
package com.example.app6;


import android.content.pm.PackageManager;
import android.location.Address;
import android.location.Geocoder;
import android.location.Location;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;
import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;


import com.example.app6.R;
import com.google.android.gms.location.FusedLocationProviderClient;
import com.google.android.gms.location.LocationServices;
import com.google.android.gms.tasks.OnSuccessListener;
import java.io.IOException;
import java.util.List;
import java.util.Locale;
public class MainActivity extends AppCompatActivity {


    private static final int LOCATION_PERMISSION_REQUEST = 1;
    private FusedLocationProviderClient fusedLocationProviderClient;
    private EditText locationNameEditText;
    private Button searchLocationButton;
    private TextView latitudeTextView, longitudeTextView, searchLatitudeTextView,
searchLongitudeTextView;
```

```java
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        fusedLocationProviderClient =
LocationServices.getFusedLocationProviderClient(this);


        locationNameEditText = findViewById(R.id.locationNameEditText);
        searchLocationButton = findViewById(R.id.searchLocationButton);
        latitudeTextView = findViewById(R.id.latitudeTextView);
        longitudeTextView = findViewById(R.id.longitudeTextView);
        searchLatitudeTextView = findViewById(R.id.searchLatitudeTextView);
        searchLongitudeTextView = findViewById(R.id.searchLongitudeTextView);


        findViewById(R.id.getLocationButton).setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View view) {
                getLocation();
            }
        });


        searchLocationButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                searchLocation();
            }
        });
    }


    private void getLocation() {
        if (ContextCompat.checkSelfPermission(this,
android.Manifest.permission.ACCESS_FINE_LOCATION) ==
PackageManager.PERMISSION_GRANTED) {
            fusedLocationProviderClient.getLastLocation().addOnSuccessListener(new
OnSuccessListener<Location>() {
                @Override
                public void onSuccess(Location location) {
                    if (location != null) {
                        double latitude = location.getLatitude();
                        double longitude = location.getLongitude();
                        latitudeTextView.setText("Latitude: " + latitude);
```

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```java
                    longitudeTextView.setText("Longitude: " + longitude);
                } else {
                    showToast("Location not available");
                }
            }
        });
    } else {
        ActivityCompat.requestPermissions(this, new
String[]{android.Manifest.permission.ACCESS_FINE_LOCATION},
LOCATION_PERMISSION_REQUEST);
    }
}
private void searchLocation() {
    String locationName = locationNameEditText.getText().toString().trim();


    if (!locationName.isEmpty()) {
        Geocoder geocoder = new Geocoder(this, Locale.getDefault());
        try {
            List<Address> addresses =
geocoder.getFromLocationName(locationName, 1);
            if (addresses != null && !addresses.isEmpty()) {
                Address address = addresses.get(0);
                double latitude = address.getLatitude();
                double longitude = address.getLongitude();
                searchLatitudeTextView.setText("Searched Latitude: " +
latitude);
                searchLongitudeTextView.setText("Searched Longitude: " +
longitude);
            } else {
                showToast("Location not found");
            }
        } catch (IOException e) {
            e.printStackTrace();
            showToast("Geocoding error");
        }
    } else {
        showToast("Please enter a location name");
    }
}
@Override
public void onRequestPermissionsResult(int requestCode, @NonNull String[]
permissions, @NonNull int[] grantResults) {
    super.onRequestPermissionsResult(requestCode, permissions, grantResults);
    if (requestCode == LOCATION_PERMISSION_REQUEST) {
        if (grantResults.length > 0 && grantResults[0] ==
PackageManager.PERMISSION_GRANTED) {
```
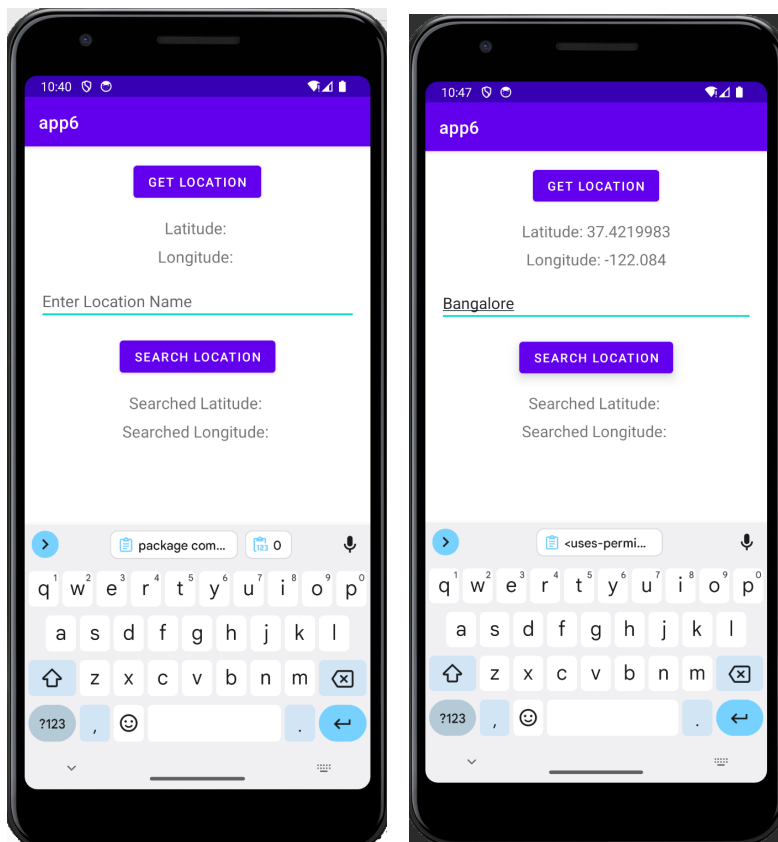
```
            getLocation();
        } else {
            showToast("Location permission denied");
        }
    }
}


    private void showToast(String message) {
        Toast.makeText(this, message, Toast.LENGTH_SHORT).show();
    }
}
```

Output:

Learning outcomes:

- An android application to find the latitude and longitude of a selected location was implemented.
- Geocoding and Reverse geocoding was implemented.

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