Assignment - VII

Title :- Design a mobile app using Google map & GPS to trace the location.

Problem statement :-

Design a mobile app using Google maps & GPS to trace the location

Objection :- To implement mobile app to trace the location

Outcome :- students will be able to implement mobile app using google maps & GPS to trace the location

S/W & H/W package :- 64 bit Fedora OS
Andraid studio

Theory :-

Google maps is web-based service that provides detailed information about geographical regions & sites around the world. In addition to conventional road maps, google maps offers serial &

& sattelite views of many places. In some cities, Google maps offer street views, comprising photograph taken from vehicles.

- With google maps installed on your device you can view street & satelite maps of the whole world. Not only this, but it can be used to plot routes, find local places, socialize with people around you & 'walk' along the roads with google street view.
- Google maps is incredibly easy to use on an android ~~studio~~ device. It automatically detects your current location & displays it on the screen.
- You can move around by holding your fingers & dragging the screen & zoom in & out by pinching your fingers.
- The app allows you to save maps offlin & manage them from an easy-to-acce list.
- It shows you the total walking time of the trip by bus/train.
- Turn by turn navigation shows you distance & estimated arrival time & gives you acess to alternate routes & features lane assistance.

Google map Android Manifest file :-

We have to add the permission along with the google map API key in android manifest.

Permission :-

1) ACCESS_FINE_LOCATION → GPS location.
2) ACCESS_COARSE_LOCATION → permission for network provider location.

Syntax :-

```
<user permission android:name="android:
permission:permission-type" />
<!---- Google API KEY ----->
<meta data
    android:name="package_path"
    android:value="GOOGLE API KEY"
/>
```

Customizing Google maps :-

1. Adding marker using addmarker() in google map Android manifest.

```
add marker(Google map Android Manifest
().position(0) title("My loc");
```

2. Enable / disable zoom
google map. set uisitthings(). set zoom
geustures enabled (true);

3. To get current location → get my location

4. Zoon a particular area → map, move Camera
(CameraUpdate, up)

Test Cases :-

Sr. No.	Test case	Output	Expected o/p	Result
1	On Opening application & clicking main activity button	maps loads & shows devices current location	— " —	Success
2	Search "Pune" in search Edit Text	camera moves to the location of "pune" & red marker is placed	— " —	Success
3	on clicking the GPS icon	recenters the camera to device current location, shown with "blue" dot	— " —	Success

Conclusion :-

Thus, after successfully completing this assignment, students should be able to understand & implement mobile app to trace location.

MainActivity.java

```
package com.example.pract_googlemap;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Context;
import android.content.Intent;
import android.location.Address;
import android.location.Geocoder;
import android.os.Bundle;
import android.os.Message;
import android.os.Parcelable;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;

import java.io.IOException;
import java.util.ArrayList;
import java.util.List;
import java.util.Locale;
import java.util.logging.Handler;

public class Main extends AppCompatActivity {
    private static final String TAG = "Main";
    EditText ed1;
Button b;
   static List add;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        ed1=findViewById(R.id.ed1);
        b=findViewById(R.id.show);
        b.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                String s=ed1.getText().toString();
       add=  getAddress(s,getApplicationContext());

            }
        });
    }
    public static  List  getAddress(final String s,final Context context)
    {
        Thread t=new Thread(){
            @Override
            public void run() {
                Geocoder geocoder=new Geocoder(context, Locale.getDefault());
                String result=null;
                try {
                    List add=geocoder.getFromLocationName(s,1);
                     if (add!=null||add.size()>0)
                     {
                         Log.d(TAG, "run: "+"add is not null");
                         Address address= (Address) add.get(0);

                         Log.d(TAG, "onClick: "+address.getLatitude()
+" ,"+address.getLongitude());
                         Bundle bundle=new Bundle();
                         bundle.putParcelableArrayList("list", (ArrayList<? extends
Parcelable>) add);
                         Intent intent=new Intent(context,MapsActivity.class);
```

```
                        intent.setFlags(Intent.FLAG_ACTIVITY_NEW_TASK);

                        intent.putExtra("bundle",bundle);
                        context.startActivity(intent);
                    }
                    else {
                        Log.d(TAG, "run: "+"add iss Null");
                    }

                } catch (IOException e) {
                    e.printStackTrace();
                }
            }
        };
        t.start();
        Log.d(TAG, "getAddress: "+"in ");
        return add;
    }


}
```

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:orientation="vertical"
    tools:context=".Main">
    <androidx.appcompat.widget.Toolbar
        android:id="@+id/toolbar"
        android:layout_width="match_parent"
        android:layout_height="?attr/actionBarSize"
        android:background="#5D77D6"
        android:theme="@style/ThemeOverlay.AppCompat.Dark.ActionBar"
        app:popupTheme="@style/ThemeOverlay.AppCompat.Dark"
        android:elevation="4dp"
        app:title="Map"
        />
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_below="@id/toolbar"
    android:layout_marginTop="230dp"
    >
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:layout_centerInParent="true"

        android:orientation="vertical">
        <EditText
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:padding="5dp"
            android:id="@+id/ed1"
            android:hint="search"
            android:textSize="20sp"
            android:layout_marginTop="50dp"
```

```
            />
        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginTop="15dp"
            android:layout_gravity="center_horizontal"
            android:background="#0C55D8"
            android:text="show"
            android:id="@+id/show"
            android:textColor="#fff"
            android:textSize="15sp" />
    </LinearLayout>

</LinearLayout>


</RelativeLayout>
```

MapActivity.java

```
package com.example.pract_googlemap;

import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.appcompat.widget.SearchView;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;

import androidx.core.view.MenuItemCompat;
import androidx.fragment.app.FragmentActivity;

import android.Manifest;
import android.content.Intent;
import android.content.pm.PackageManager;
import android.location.Address;
import android.location.Geocoder;
import android.location.Location;
import android.net.Uri;
import android.os.Bundle;
import android.os.Parcelable;
import android.util.Log;
import android.view.Menu;
import android.view.MenuInflater;
import android.view.MenuItem;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;

import com.google.android.gms.location.FusedLocationProviderClient;
import com.google.android.gms.location.LocationServices;
import com.google.android.gms.maps.CameraUpdateFactory;
import com.google.android.gms.maps.GoogleMap;
import com.google.android.gms.maps.OnMapReadyCallback;
import com.google.android.gms.maps.SupportMapFragment;
import com.google.android.gms.maps.model.LatLng;
import com.google.android.gms.maps.model.Marker;
import com.google.android.gms.maps.model.MarkerOptions;
import com.google.android.gms.maps.model.PointOfInterest;
import com.google.android.gms.maps.model.Polyline;
import com.google.android.gms.maps.model.PolylineOptions;
import com.google.android.gms.tasks.OnCompleteListener;
```

```
import com.google.android.gms.tasks.OnSuccessListener;
import com.google.android.gms.tasks.Task;

import java.io.IOException;
import java.util.ArrayList;
import java.util.List;
import java.util.Locale;

import static com.example.pract_googlemap.Main.add;

public class MapsActivity extends AppCompatActivity implements OnMapReadyCallback {

    private static final int REQUEST_LOCATION_PERMISSION = 101;
    private GoogleMap mMap;
    private Polyline currentPolyline;
    Button btn;
    ArrayList<LatLng> listPoints;
    private Location mLastLocation,myLocation;
    List list;
    private final LatLng defaultLocation = new LatLng(-33.8523341, 151.2106085);
    private static final int DEFAULT_ZOOM = 12;
    private Location lastKnownLocation;
    FusedLocationProviderClient mFusedLocationClient;
    private static final String TAG = "MapsActivity";
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_maps);
        Bundle bundle=getIntent().getBundleExtra("bundle");
        listPoints = new ArrayList<>();
        btn=findViewById(R.id.btn);
        if (bundle!=null)
        {
            Log.d(TAG, "onCreate: "+"bundle is not null");
            list=bundle.getParcelableArrayList("list");
            if (list!=null||list.size()>0) {
                Log.d(TAG, "run: " + "add is not null");
                Address address= (Address) list.get(0);

                Log.d(TAG, "onClick: "+address.getLatitude()
+" ,"+address.getLongitude());
            }
        }
        else {
            Log.d(TAG, "onCreate: "+"bundle is null");
        }
        // Obtain the SupportMapFragment and get notified when the map is ready to be
used.
        SupportMapFragment mapFragment = (SupportMapFragment)
getSupportFragmentManager()
                .findFragmentById(R.id.map);
        mFusedLocationClient= LocationServices.getFusedLocationProviderClient(this);
        assert mapFragment != null;
        mapFragment.getMapAsync(this);
           btn.setOnClickListener(new View.OnClickListener() {
               @Override
               public void onClick(View view) {
                   String url;
                   if (listPoints.size()>1)
                   {
                        url="http://maps.google.com/maps?
saddr="+listPoints.get(0).latitude+","+listPoints.get(0).longitude+"&daddr="+listPoints.
get(1).latitude+","+listPoints.get(1).longitude;
                   }
                   else
                   {
```

```
url="google.navigation:q="+listPoints.get(0).latitude+","+listPoints.get(0).longitude+"&
mode=d";
                    }
                                        Intent mapintent=new
Intent("android.intent.action.VIEW", Uri.parse(url));
                    mapintent.setPackage("com.google.android.apps.maps");
                    if (mapintent.resolveActivity(getPackageManager())!=null)

                    {
                        startActivity(mapintent);
                    }
                }
            });

    }
    @Override
    public void onMapReady(GoogleMap googleMap) {
        mMap = googleMap;
      //  getDeviceLocation();
        Address address= (Address) list.get(0);
        LatLng latLng=new LatLng(address.getLatitude(),address.getLongitude());
        listPoints.add(latLng);
        Log.d(TAG, "onClick: "+address.getLatitude()+" ,"+address.getLongitude());
        // Add a marker in Sydney and move the camera
        LatLng sydney = new LatLng(address.getLatitude(), address.getLongitude());
        mMap.addMarker(new MarkerOptions().position(sydney));
        mMap.moveCamera(CameraUpdateFactory.newLatLngZoom(sydney,12f));



        setMapLongClick(mMap);

        setPoiClick(mMap);
        enableMyLocation();
    }
    private void enableMyLocation() {
        if (ContextCompat.checkSelfPermission(this,
                Manifest.permission.ACCESS_FINE_LOCATION)
                == PackageManager.PERMISSION_GRANTED) {
            mMap.setMyLocationEnabled(true);
        } else {
            ActivityCompat.requestPermissions(this, new String[]
                            {Manifest.permission.ACCESS_FINE_LOCATION},
                    REQUEST_LOCATION_PERMISSION);
        }
    }
    @Override
    public void onRequestPermissionsResult(int requestCode,
                                           @NonNull String[] permissions,
                                           @NonNull int[] grantResults) {
        // Check if location permissions are granted and if so enable the
        // location data layer.
        switch (requestCode) {
            case REQUEST_LOCATION_PERMISSION:
                if (grantResults.length > 0
                        && grantResults[0]
                        == PackageManager.PERMISSION_GRANTED) {
                    enableMyLocation();
                    getLocation();
                    break;
                }
        }
    }
    private void getLocation() {
        if (ActivityCompat.checkSelfPermission(this,
                Manifest.permission.ACCESS_FINE_LOCATION)
                != PackageManager.PERMISSION_GRANTED) {
            ActivityCompat.requestPermissions(this, new String[]
```

```
                        {Manifest.permission.ACCESS_FINE_LOCATION},
                REQUEST_LOCATION_PERMISSION);
    } else {
        mFusedLocationClient.getLastLocation().addOnSuccessListener(
                new OnSuccessListener<Location>() {
                    @Override
                    public void onSuccess(Location location) {
                        if (location != null) {
                            mLastLocation = location;
                            Log.d(TAG, "onSuccess: ");
                        } else {

                            Log.d(TAG, "onSuccess: "+R.string.no_location);
                        }
                    }
    });
}
}

private void setMapLongClick(final GoogleMap map) {
    map.setOnMapLongClickListener(new GoogleMap.OnMapLongClickListener() {
        @Override

        public void onMapLongClick(LatLng latLng) {
            String snippet = String.format(Locale.getDefault(),
                    "Lat: %1$.5f, Long: %2$.5f",
                    latLng.latitude,
                    latLng.longitude);

            map.addMarker(new MarkerOptions()
                    .position(latLng)
                    .title(getString(R.string.dropped_pin))
                    .snippet(snippet));

            if (listPoints.size() == 2) {
                listPoints.clear();
                mMap.clear();
                btn.setVisibility(View.GONE);
            }
            //Save first point select
            listPoints.add(latLng);
            //Create marker
            MarkerOptions markerOptions = new MarkerOptions();
            markerOptions.position(latLng);

            mMap.addMarker(markerOptions);

        }

    });
}
private void setPoiClick(final GoogleMap map) {
    map.setOnPoiClickListener(new GoogleMap.OnPoiClickListener() {
        @Override
        public void onPoiClick(PointOfInterest poi) {
            Marker poiMarker = mMap.addMarker(new MarkerOptions()
                    .position(poi.latLng)
                    .title(poi.name));
            poiMarker.showInfoWindow();
        }
    });
}
@Override
public boolean onCreateOptionsMenu(Menu menu) {
    MenuInflater inflater = getMenuInflater();
    inflater.inflate(R.menu.menu, menu);
```

```
        MenuItem menuItem=menu.findItem(R.id.search);
        SearchView searchView=(SearchView)menuItem.getActionView();
        searchView.setQueryHint("search here");
        searchView.setOnQueryTextListener(new SearchView.OnQueryTextListener() {
            @Override
            public boolean onQueryTextSubmit(String query) {
                callsearch(query);
                return false;
            }

            @Override
            public boolean onQueryTextChange(String newText) {
                return false;
            }
        });

        return true;
    }
    @Override
    public boolean onOptionsItemSelected(MenuItem item) {
        // Change the map type based on the user's selection.
        switch (item.getItemId()) {
            case R.id.normal_map:
                mMap.setMapType(GoogleMap.MAP_TYPE_NORMAL);
                return true;
            case R.id.hybrid_map:
                mMap.setMapType(GoogleMap.MAP_TYPE_HYBRID);
                return true;
            case R.id.satellite_map:
                mMap.setMapType(GoogleMap.MAP_TYPE_SATELLITE);
                return true;
            case R.id.terrain_map:
                mMap.setMapType(GoogleMap.MAP_TYPE_TERRAIN);
                return true;
            case R.id.search:
                //callsearch();
                return true;
            default:
                return super.onOptionsItemSelected(item);
        }
    }

    private void callsearch(String str) {


        Geocoder geocoder=new Geocoder(getApplicationContext(), Locale.getDefault());
        String result=null;
        try {
            List add = geocoder.getFromLocationName(str, 1);
            if (add != null || add.size() > 0) {
                Log.d(TAG, "run: " + "add is not null");
                Address address = (Address) add.get(0);

                LatLng latLng = new LatLng(address.getLatitude(),
address.getLongitude());
                if (listPoints.size() == 2) {

                    listPoints.clear();
                    mMap.clear();
                   // btn.setVisibility(View.GONE);
                }
                //Save first point select
                listPoints.add(latLng);
                //Create marker
                MarkerOptions markerOptions = new MarkerOptions();
                markerOptions.position(latLng);
```

```
                mMap.addMarker(markerOptions);
                Log.d(TAG, "onClick: " + address.getLatitude() + " ," +
address.getLongitude());
                // Add a marker in Sydney and move the camera
                LatLng sydney = new LatLng(address.getLatitude(),
address.getLongitude());
                mMap.addMarker(new MarkerOptions().position(sydney).title("Marker in
Sydney"));
                mMap.moveCamera(CameraUpdateFactory.newLatLngZoom(sydney, 12f));
            } else {
                Log.d(TAG, "run: " + "add iss Null");
            }


        } catch (IOException e) {
            e.printStackTrace();
        }



    }

    private void getDeviceLocation() {
        /*
         * Get the best and most recent location of the device, which may be null in
rare
         * cases when a location is not available.
         */
        try {
            //if (locationPermissionGranted)
            {
                Task<Location> locationResult = mFusedLocationClient.getLastLocation();
                locationResult.addOnCompleteListener(this, new
OnCompleteListener<Location>() {
                    @Override
                    public void onComplete(@NonNull Task<Location> task) {
                        if (task.isSuccessful()) {
                            // Set the map's camera position to the current location of
the device.
                            lastKnownLocation = task.getResult();
                            if (lastKnownLocation != null) {
                                mMap.moveCamera(CameraUpdateFactory.newLatLngZoom(
                                        new LatLng(lastKnownLocation.getLatitude(),
                                                lastKnownLocation.getLongitude()),
DEFAULT_ZOOM));
                            }
                        } else {
                            Log.d(TAG, "Current location is null. Using defaults.");
                            Log.e(TAG, "Exception: %s", task.getException());
                            mMap.moveCamera(CameraUpdateFactory
                                    .newLatLngZoom(defaultLocation, DEFAULT_ZOOM));
                            mMap.getUiSettings().setMyLocationButtonEnabled(false);
                        }
                    }
                });
            }
        } catch (SecurityException e)  {
            Log.e("Exception: %s", e.getMessage(), e);
        }
    }


}
```

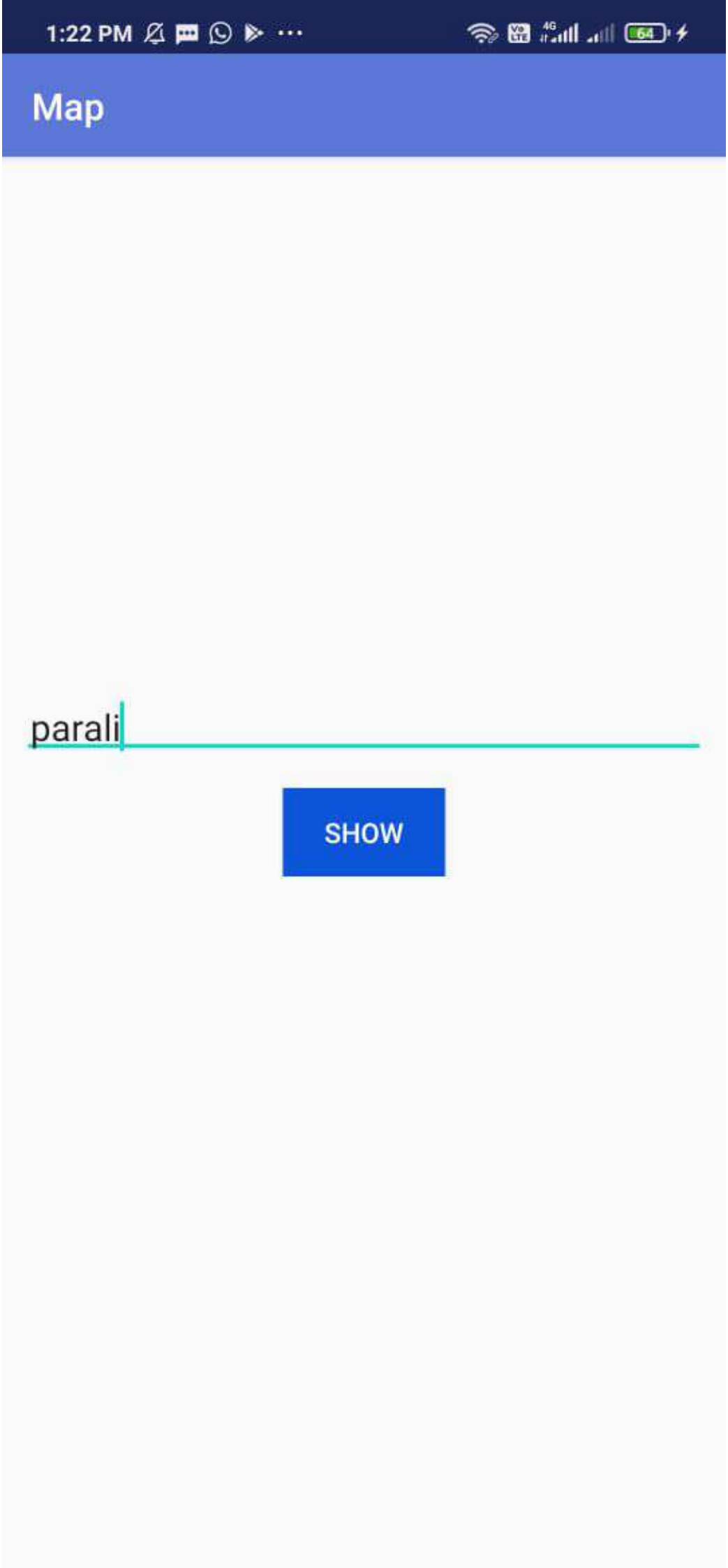
activity_maps.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:map="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"

    android:name="com.google.android.gms.maps.SupportMapFragment"
    android:layout_width="match_parent"
    android:orientation="vertical"
    android:layout_height="match_parent"
    tools:context=".MapsActivity">
    <androidx.appcompat.widget.Toolbar
        android:id="@+id/toolbar2"
        android:layout_width="match_parent"
        android:layout_height="?attr/actionBarSize"
        android:background="#5D77D6"
        android:theme="@style/ThemeOverlay.AppCompat.Dark.ActionBar"
        />
    <fragment xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_weight="1"
        android:id="@+id/map"
        android:name="com.google.android.gms.maps.SupportMapFragment"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        />

    <Button
        android:layout_marginTop="0dp"
        android:id="@+id/btn"
        android:layout_marginLeft="5dp"
        android:layout_marginRight="5dp"
        android:layout_marginBottom="2dp"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"

        android:text="start"

        />
</LinearLayout>
```

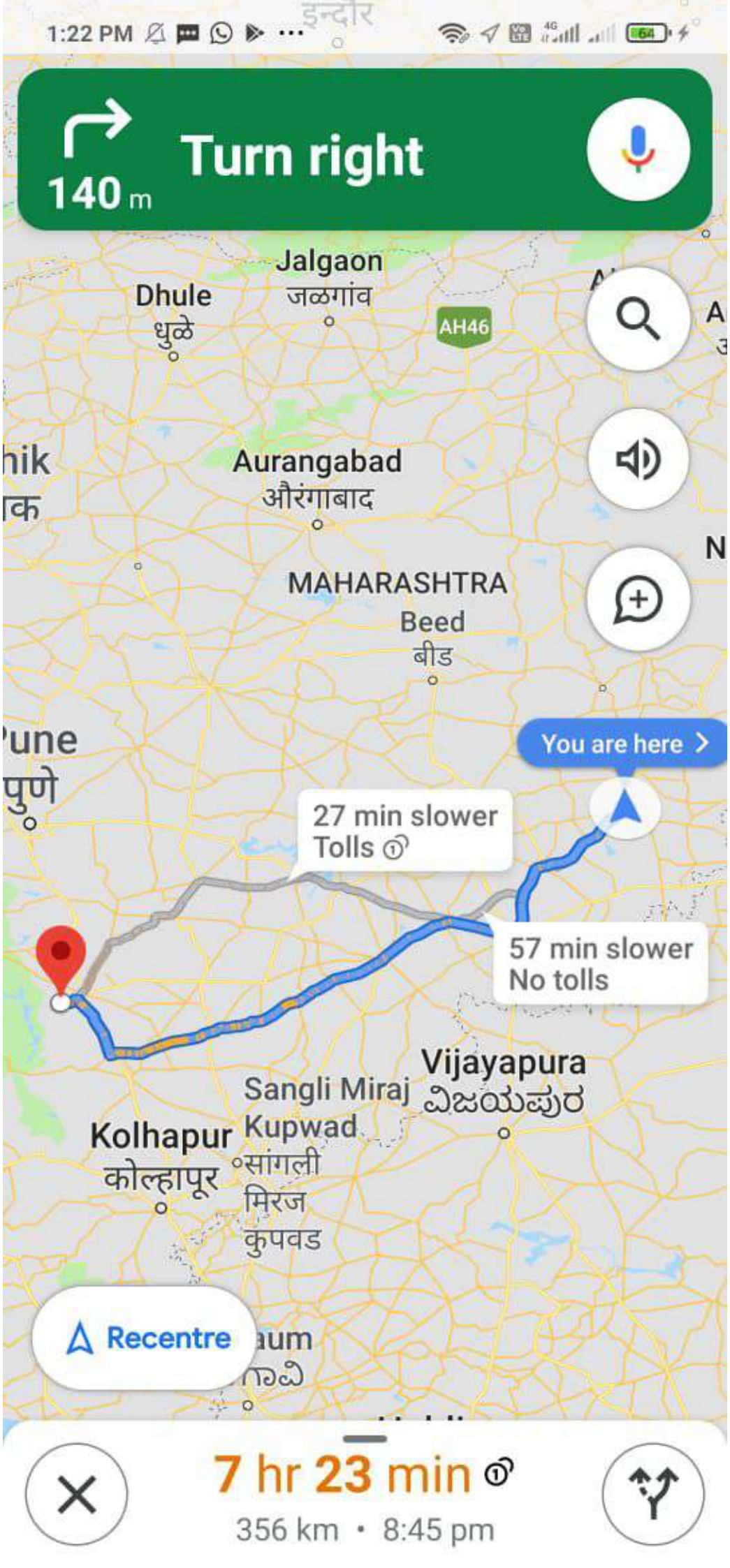
menu.xml

```
<?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/normal_map"
        android:title="@string/normal_map"
        app:showAsAction="never"/>
    <item android:id="@+id/hybrid_map"
        android:title="@string/hybrid_map"
        app:showAsAction="never"/>
    <item android:id="@+id/satellite_map"
        android:title="@string/satellite_map"
        app:showAsAction="never"/>
    <item android:id="@+id/terrain_map"
```

```
        android:title="@string/terrain_map"
        app:showAsAction="never"/>
    <item android:id="@+id/search"
        app:showAsAction="always"
        android:icon="@drawable/search"
        android:title="search"
        app:actionViewClass="androidx.appcompat.widget.SearchView" />
</menu>
```


1:22 PM
Map
parali
SHOW


1:22 PM
Map
Kenjal
Kanher Dam
Dhawadshi
Dhanakwadi
Nele
Kanher
Kalambe
Gavadi
Lawanghar
Rohot
Ummodi Project
Sambarwadi
Palali
Nitral
Banghar
Gajawadi
Revande
Raighar
eghar
Parmale
Maloshi
Tavali Dam
Google
START


1:22 PM
Turn right
140 m
Jalgaon
जळगांव
Dhule
धुळे
AH46
Aurangabad
औरंगाबाद
MAHARASHTRA
Beed
बीड
You are here
27 min slower
Tolls
57 min slower
No tolls
Vijayapura
ವಿಜಯಪುರ
Sangli Miraj
Kupwad
सांगली
मिरज
कुपवड
Kolhapur
कोल्हापूर
Recentre
7 hr 23 min
356 km • 8:45 pm