Android Application Development

Codes

MainActivity.java

```java
package com.example.gps;

import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import android.Manifest;
import android.content.pm.PackageManager;
import android.location.Location;
import android.os.Bundle;
import android.widget.Button;
import android.widget.TextView;
import android.widget.Toast;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;
import com.google.android.gms.location.FusedLocationProviderClient;
import com.google.android.gms.location.LocationServices;
import com.google.android.gms.tasks.OnSuccessListener;

public class MainActivity extends AppCompatActivity {

    private FusedLocationProviderClient fusedLocationClient;
    private Location startLocation, stopLocation;
    private Button btnStart, btnStop;
    private TextView txtDistance;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        // Initialize location client
        fusedLocationClient =
LocationServices.getFusedLocationProviderClient(this);

        btnStart = findViewById(R.id.btn_start);
        btnStop = findViewById(R.id.btn_stop);
        txtDistance = findViewById(R.id.txt_distance);

        // Check for location permissions
        if (ContextCompat.checkSelfPermission(this,
Manifest.permission.ACCESS_FINE_LOCATION)
                != PackageManager.PERMISSION_GRANTED) {
            ActivityCompat.requestPermissions(this, new
String[]{Manifest.permission.ACCESS_FINE_LOCATION}, 1);
        }

        // Set the Start button functionality
        btnStart.setOnClickListener(v -> {
            fusedLocationClient.getLastLocation()
                    .addOnSuccessListener(MainActivity.this, new
OnSuccessListener<Location>() {
                        @Override
                        public void onSuccess(Location location) {
                            if (location != null) {
                                startLocation = location;
```

```java
                                Toast.makeText(MainActivity.this, "Start
location recorded!", Toast.LENGTH_SHORT).show();
                                }
                            }
                        });
            });

            // Set the Stop button functionality
            btnStop.setOnClickListener(v -> {
                fusedLocationClient.getLastLocation()
                        .addOnSuccessListener(MainActivity.this, new
OnSuccessListener<Location>() {
                            @Override
                            public void onSuccess(Location location) {
                                if (location != null) {
                                    stopLocation = location;
                                    Toast.makeText(MainActivity.this, "Stop
location recorded!", Toast.LENGTH_SHORT).show();
                                    calculateDistance();
                                }
                            }
                        });
            });
        }

        // Function to calculate the distance between two locations
        private void calculateDistance() {
            if (startLocation != null && stopLocation != null) {
                float[] results = new float[1];
                Location.distanceBetween(startLocation.getLatitude(),
startLocation.getLongitude(),
                        stopLocation.getLatitude(),
stopLocation.getLongitude(), results);
                float distanceInMeters = results[0];
                txtDistance.setText("Distance: " + distanceInMeters + " m");
            }
        }

        @Override
        public void onRequestPermissionsResult(int requestCode, @NonNull
String[] permissions, @NonNull int[] grantResults) {
            super.onRequestPermissionsResult(requestCode, permissions,
grantResults);
            if (requestCode == 1 && grantResults.length > 0 && grantResults[0]
== PackageManager.PERMISSION_GRANTED) {
                Toast.makeText(this, "Location permission granted",
Toast.LENGTH_SHORT).show();
            } else {
                Toast.makeText(this, "Location permission denied",
Toast.LENGTH_SHORT).show();
            }
        }
    }
}
```

AndroidManifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.gps">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">

        <!-- Fix for Android 12 and above: Explicitly declare
`android:exported` -->
        <activity android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER"
/>
            </intent-filter>
        </activity>

    </application>

    <!-- Permissions for accessing location -->
    <uses-permission
android:name="android.permission.ACCESS_COARSE_LOCATION"/>
    <uses-permission
android:name="android.permission.ACCESS_FINE_LOCATION"/>

</manifest>
```

Activity _main.xml

```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"
    android:padding="16dp"
    android:background="#1E1E2F"> <!-- Dark mode-inspired background -->

    <!-- Title for GPS Location Calculator with Modern Text Style -->
    <TextView
        android:id="@+id/txt_gps_label"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="GPS Location Calculator"
        android:textSize="34sp"
        android:textStyle="bold"
        android:textColor="#FFC107"
    android:layout_alignParentTop="true"
    android:layout_centerHorizontal="true"
    android:layout_marginBottom="30dp"/>

    <!-- Name with Subtle Color for Professional Look -->
    <TextView
        android:id="@+id/txt_name"
```

```xml
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Sai Pavan Rangu"
        android:textSize="22sp"
        android:textStyle="bold"
        android:textColor="#FFFFFF"
        android:layout_below="@id/txt_gps_label"
        android:layout_centerHorizontal="true"
        android:layout_marginBottom="8dp"/>

    <!-- Roll Number with matching subtle colors -->
    <TextView
        android:id="@+id/txt_roll_number"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="CH.EN.U4CYS21064"
        android:textSize="20sp"
        android:textStyle="bold"
        android:textColor="#FFFFFF"
        android:layout_below="@id/txt_name"
        android:layout_centerHorizontal="true"
        android:layout_marginBottom="20dp"/>


    <!-- Start Button with gradient and elevation -->
    <Button
        android:id="@+id/btn_start"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Start"
        android:background="@drawable/btn_gradient_primary"
        android:textColor="#FFFFFF"
        android:elevation="6dp"
        android:layout_below="@id/txt_roll_number"
        android:layout_centerHorizontal="true"
        android:layout_marginBottom="16dp"/>

    <!-- Stop Button with gradient and elevation -->
    <Button
        android:id="@+id/btn_stop"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Stop"
        android:background="@drawable/btn_gradient_secondary"
        android:textColor="#FFFFFF"
        android:elevation="6dp"
        android:layout_below="@id/btn_start"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="16dp"/>

    <!-- Distance text -->
    <TextView
        android:id="@+id/txt_distance"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Distance: 0 m"
        android:textSize="20sp"
        android:textStyle="bold"
        android:textColor="#29B6F6"
        android:layout_below="@id/btn_stop"
        android:layout_centerHorizontal="true"
```
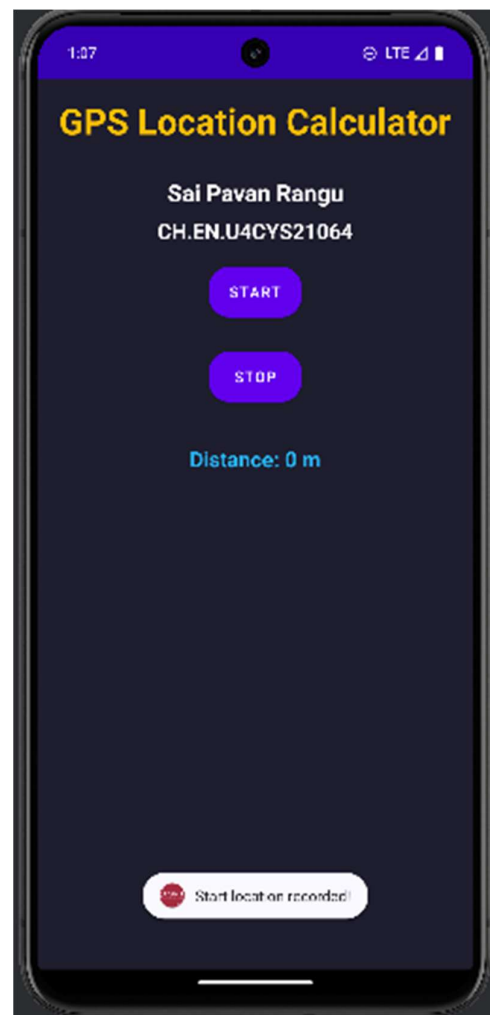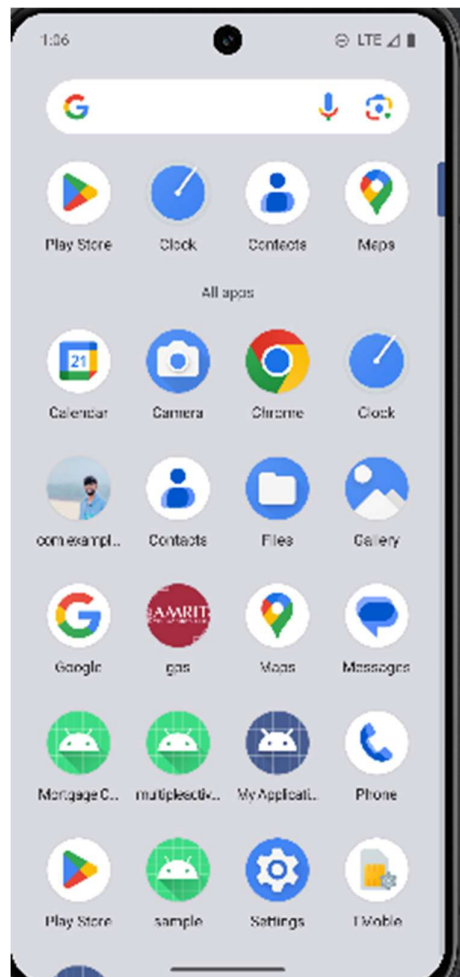
```
        android:layout_marginTop="40dp"/>



</RelativeLayout>
```

Outputs and Screen shots

Virtual Device

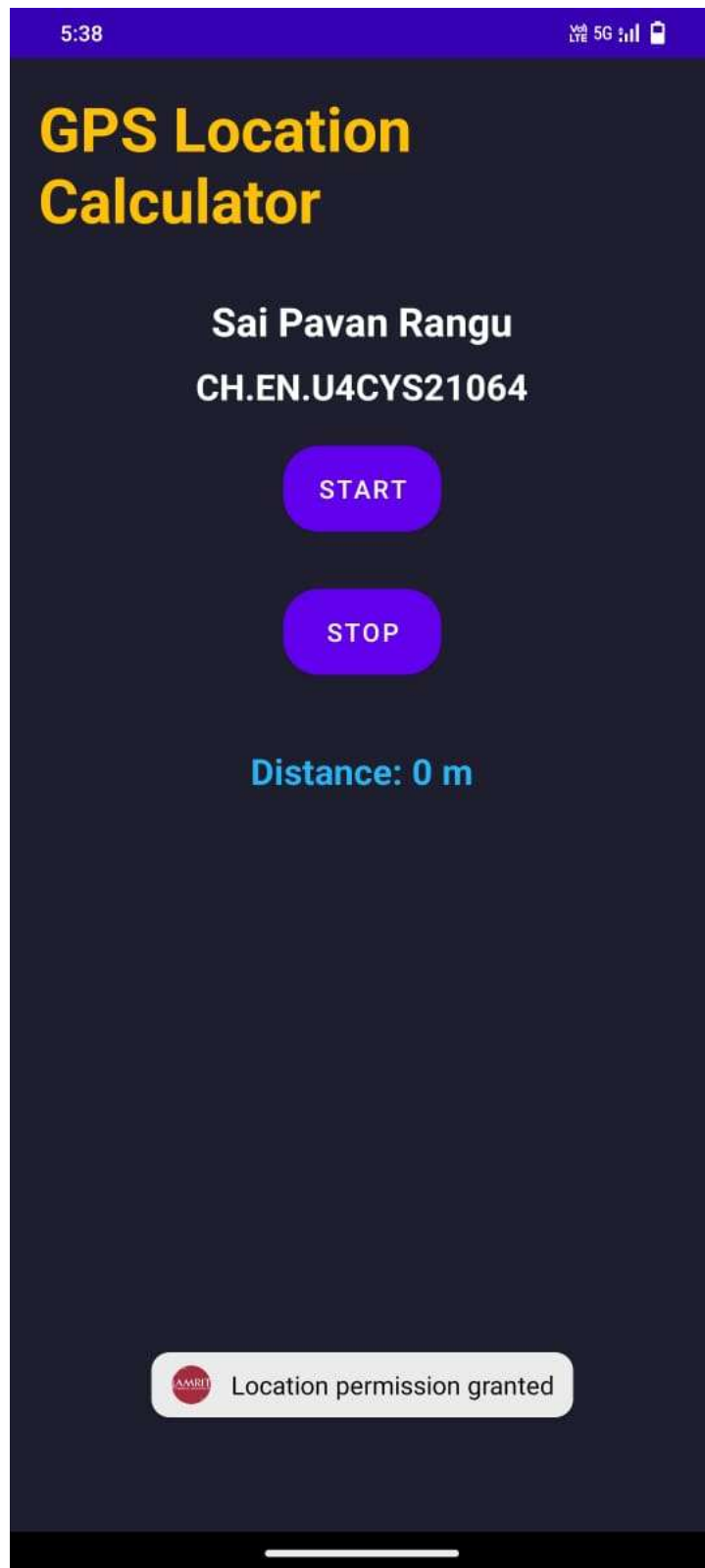# GPS Location Calculator

Sai Pavan Rangu
CH.EN.U4CYS21064

START

STOP

Distance: 0.0 m

Stop location recorded!

Physical Device

Done by:
Sai Pavan R