Dr. D.Y. Patil Unitech Society's

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Department of Computer Science
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Practical Assignment – 5

Class:- T.Y.B.C.A.(Science)

Subject:- Android Programming **Date:-21/03/2025**

1. **Write a program to find the specific location of an Android device and display details of the place like Address line, city with Geocoding.**

AndroidManifest.xml

```
<uses-permission android:name="android.permission.ACCESS_FINE_LOCATION"/>
<uses-permission
android:name="android.permission.ACCESS_COARSE_LOCATION"/>
```

MainActivity.java

```
package com.example.locationapp;

import android.Manifest;
import android.content.pm.PackageManager;
import android.location.Address;
import android.location.Geocoder;
import android.location.Location;
import android.os.Bundle;
import android.widget.TextView;
import android.widget.Toast;

import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;

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 FusedLocationProviderClient fusedLocationClient;
    private TextView locationText;
    private static final int LOCATION_PERMISSION_CODE = 100;

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

        locationText = findViewById(R.id.locationText);
        fusedLocationClient = LocationServices.getFusedLocationProviderClient(this);

        if (ActivityCompat.checkSelfPermission(this,
Manifest.permission.ACCESS_FINE_LOCATION)
            != PackageManager.PERMISSION_GRANTED) {
            ActivityCompat.requestPermissions(this, new
String[]{Manifest.permission.ACCESS_FINE_LOCATION},
LOCATION_PERMISSION_CODE);
        } else {
            getLocation();
        }
    }

    private void getLocation() {
        fusedLocationClient.getLastLocation().addOnSuccessListener(this, location -> {
            if (location != null) {
                getAddress(location);
            }
        });
    }

    private void getAddress(Location location) {
        Geocoder geocoder = new Geocoder(this, Locale.getDefault());
        try {
            List<Address> addresses = geocoder.getFromLocation(location.getLatitude(),
location.getLongitude(), 1);
            if (addresses != null && !addresses.isEmpty()) {
                Address address = addresses.get(0);
                String fullAddress = address.getAddressLine(0) + "\n" + address.getLocality();
                locationText.setText(fullAddress);
```

```
            }
        } catch (IOException e) {
            e.printStackTrace();
            Toast.makeText(this, "Unable to get address", Toast.LENGTH_SHORT).show();
        }
    }

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

activity_main.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">

    <TextView
        android:id="@+id/locationText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Fetching location..."
        android:textSize="18sp"
        android:textStyle="bold"
        android:padding="10dp"/>
```

```
</LinearLayout>
```

2. **Write a program to search a specific location on Google Map.**

AndroidManifest.xml

```
<uses-permission android:name="android.permission.INTERNET"/>
```

MainActivity.java

```
package com.example.mapsearch;

import android.content.Intent;
import android.net.Uri;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;

import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {
    private EditText locationInput;
    private Button searchButton;

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

        locationInput = findViewById(R.id.locationInput);
        searchButton = findViewById(R.id.searchButton);

        searchButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String location = locationInput.getText().toString();
                if (!location.isEmpty()) {
                    Uri gmmIntentUri = Uri.parse("geo:0,0?q=" + Uri.encode(location));
                    Intent mapIntent = new Intent(Intent.ACTION_VIEW, gmmIntentUri);
                    mapIntent.setPackage("com.google.android.apps.maps");
                    startActivity(mapIntent);
                }
```

```
            }
        });
    }
}
```

activity_main.xml

```
<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/locationInput"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter location"
        android:textSize="16sp"/>

    <Button
        android:id="@+id/searchButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Search on Map"
        android:layout_marginTop="10dp"/>
</LinearLayout>
```

3. **Write a program to perform Zoom In, Zoom Out operation and display Satellite view, Terrain view of current location on Google Map.**
4. **Write a program to calculate distance between two locations on Google Map.**

AndroidManifest.xml

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.distancecalculator">

    <uses-permission android:name="android.permission.INTERNET"/>
    <uses-permission android:name="android.permission.ACCESS_FINE_LOCATION"/>
```

```
    <application
        android:allowBackup="true"
        android:theme="@style/Theme.AppCompat"
        android:usesCleartextTraffic="true">

        <meta-data
            android:name="com.google.android.geo.API_KEY"
            android:value="YOUR_GOOGLE_MAPS_API_KEY"/>

        <activity android:name=".MapsActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN"/>
                <category android:name="android.intent.category.LAUNCHER"/>
            </intent-filter>
        </activity>

    </application>
</manifest>
```

Build.gradle

```
dependencies {
    implementation 'com.google.android.gms:play-services-maps:18.2.0'
    implementation 'com.google.android.gms:play-services-location:21.0.1'
}
```

MapsActivity.java

```
package com.example.distancecalculator;

import android.location.Address;
import android.location.Geocoder;
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.fragment.app.FragmentActivity;

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.MarkerOptions;

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

public class MapsActivity extends FragmentActivity implements OnMapReadyCallback
{

    private GoogleMap mMap;
    private EditText sourceInput, destinationInput;
    private Button calculateButton;
    private TextView resultText;
    private Geocoder geocoder;

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

        sourceInput = findViewById(R.id.sourceInput);
        destinationInput = findViewById(R.id.destinationInput);
        calculateButton = findViewById(R.id.calculateButton);
        resultText = findViewById(R.id.resultText);

        geocoder = new Geocoder(this, Locale.getDefault());

        // Initialize Google Map
        SupportMapFragment mapFragment = (SupportMapFragment)
getSupportFragmentManager()
                .findFragmentById(R.id.map);
        if (mapFragment != null) {
            mapFragment.getMapAsync(this);
        }

        // Calculate Distance Button Click
        calculateButton.setOnClickListener(v -> calculateDistance());
    }
```

```
    @Override
    public void onMapReady(GoogleMap googleMap) {
        mMap = googleMap;
    }

    private void calculateDistance() {
        String sourceLocation = sourceInput.getText().toString();
        String destinationLocation = destinationInput.getText().toString();

        if (sourceLocation.isEmpty() || destinationLocation.isEmpty()) {
            Toast.makeText(this, "Please enter both locations",
Toast.LENGTH_SHORT).show();
            return;
        }

        try {
            // Get LatLng for Source
            LatLng sourceLatLng = getLatLngFromAddress(sourceLocation);
            if (sourceLatLng == null) {
                Toast.makeText(this, "Invalid Source Location",
Toast.LENGTH_SHORT).show();
                return;
            }

            // Get LatLng for Destination
            LatLng destinationLatLng = getLatLngFromAddress(destinationLocation);
            if (destinationLatLng == null) {
                Toast.makeText(this, "Invalid Destination Location",
Toast.LENGTH_SHORT).show();
                return;
            }

            // Add markers on the map
            mMap.clear();
            mMap.addMarker(new MarkerOptions().position(sourceLatLng).title("Source: "
+ sourceLocation));
            mMap.addMarker(new
MarkerOptions().position(destinationLatLng).title("Destination: " +
destinationLocation));
```

```
            mMap.moveCamera(CameraUpdateFactory.newLatLngZoom(sourceLatLng,
10));

            // Calculate distance
            double distance = calculateHaversineDistance(sourceLatLng.latitude,
sourceLatLng.longitude,
                                                         destinationLatLng.latitude,
destinationLatLng.longitude);

            resultText.setText("Distance: " + String.format(Locale.US, "%.2f", distance) + "
km");

        } catch (Exception e) {
            Toast.makeText(this, "Error calculating distance",
Toast.LENGTH_SHORT).show();
            e.printStackTrace();
        }
    }

    // Convert Address to LatLng
    private LatLng getLatLngFromAddress(String address) {
        try {
            List<Address> addresses = geocoder.getFromLocationName(address, 1);
            if (addresses != null && !addresses.isEmpty()) {
                Address location = addresses.get(0);
                return new LatLng(location.getLatitude(), location.getLongitude());
            }
        } catch (IOException e) {
            e.printStackTrace();
        }
        return null;
    }

    // Haversine Formula to Calculate Distance
    private double calculateHaversineDistance(double lat1, double lon1, double lat2,
double lon2) {
        final int R = 6371; // Radius of Earth in km
        double dLat = Math.toRadians(lat2 - lat1);
        double dLon = Math.toRadians(lon2 - lon1);
        double a = Math.sin(dLat / 2) * Math.sin(dLat / 2) +
```

```
            Math.cos(Math.toRadians(lat1)) * Math.cos(Math.toRadians(lat2)) *
            Math.sin(dLon / 2) * Math.sin(dLon / 2);
        double c = 2 * Math.atan2(Math.sqrt(a), Math.sqrt(1 - a));
        return R * c; // Distance in km
    }
}
```

Activity_maps.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">

    <fragment
        android:id="@+id/map"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        class="com.google.android.gms.maps.SupportMapFragment"/>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical"
        android:padding="10dp"
        android:background="#AAFFFFFF">

        <EditText
            android:id="@+id/sourceInput"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Enter Source Location"/>

        <EditText
            android:id="@+id/destinationInput"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Enter Destination Location"/>

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

```
        android:layout_height="wrap_content"
        android:text="Calculate Distance"/>

    <TextView
        android:id="@+id/resultText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textSize="16sp"
        android:text="Distance: "/>
  </LinearLayout>

</RelativeLayout>
```

5. **Write a program to modify the above program to draw the path along a route on Google Map.**

AndroidManifest.xml

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
  package="com.example.routepath">

  <uses-permission android:name="android.permission.INTERNET"/>
  <uses-permission android:name="android.permission.ACCESS_FINE_LOCATION"/>

  <application
    android:allowBackup="true"
    android:theme="@style/Theme.AppCompat"
    android:usesCleartextTraffic="true">

    <meta-data
      android:name="com.google.android.geo.API_KEY"
      android:value="YOUR_GOOGLE_MAPS_API_KEY"/>

    <activity android:name=".MapsActivity">
      <intent-filter>
        <action android:name="android.intent.action.MAIN"/>
        <category android:name="android.intent.category.LAUNCHER"/>
      </intent-filter>
```

```
        </activity>

    </application>
</manifest>
```

Build.gradle

```
dependencies {
    implementation 'com.google.android.gms:play-services-maps:18.2.0'
    implementation 'com.google.android.gms:play-services-location:21.0.1'
    implementation 'com.android.volley:volley:1.2.1'
}
```

MapsActivity.java

```
package com.example.routepath;

import android.location.Address;
import android.location.Geocoder;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;

import androidx.fragment.app.FragmentActivity;

import com.android.volley.Request;
import com.android.volley.RequestQueue;
import com.android.volley.Response;
import com.android.volley.VolleyError;
import com.android.volley.toolbox.StringRequest;
import com.android.volley.toolbox.Volley;
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.MarkerOptions;
import com.google.android.gms.maps.model.Polyline;
import com.google.android.gms.maps.model.PolylineOptions;
```

```
import org.json.JSONArray;
import org.json.JSONObject;

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

public class MapsActivity extends FragmentActivity implements OnMapReadyCallback
{

   private GoogleMap mMap;
   private EditText sourceInput, destinationInput;
   private Button findRouteButton;
   private Geocoder geocoder;
   private Polyline polyline;

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

      sourceInput = findViewById(R.id.sourceInput);
      destinationInput = findViewById(R.id.destinationInput);
      findRouteButton = findViewById(R.id.findRouteButton);

      geocoder = new Geocoder(this, Locale.getDefault());

      // Initialize Google Map
      SupportMapFragment mapFragment = (SupportMapFragment)
getSupportFragmentManager()
            .findFragmentById(R.id.map);
      if (mapFragment != null) {
         mapFragment.getMapAsync(this);
      }

      // Find Route Button Click
      findRouteButton.setOnClickListener(v -> findRoute());
   }
```

```
    @Override
    public void onMapReady(GoogleMap googleMap) {
        mMap = googleMap;
    }

    private void findRoute() {
        String sourceLocation = sourceInput.getText().toString();
        String destinationLocation = destinationInput.getText().toString();

        if (sourceLocation.isEmpty() || destinationLocation.isEmpty()) {
            Toast.makeText(this, "Please enter both locations",
Toast.LENGTH_SHORT).show();
            return;
        }

        try {
            // Get LatLng for Source
            LatLng sourceLatLng = getLatLngFromAddress(sourceLocation);
            if (sourceLatLng == null) {
                Toast.makeText(this, "Invalid Source Location",
Toast.LENGTH_SHORT).show();
                return;
            }

            // Get LatLng for Destination
            LatLng destinationLatLng = getLatLngFromAddress(destinationLocation);
            if (destinationLatLng == null) {
                Toast.makeText(this, "Invalid Destination Location",
Toast.LENGTH_SHORT).show();
                return;
            }

            // Add markers on the map
            mMap.clear();
            mMap.addMarker(new MarkerOptions().position(sourceLatLng).title("Source: "
+ sourceLocation));
            mMap.addMarker(new
MarkerOptions().position(destinationLatLng).title("Destination: " +
destinationLocation));
```

```
            mMap.moveCamera(CameraUpdateFactory.newLatLngZoom(sourceLatLng,
10));

            // Fetch and draw route
            fetchRoute(sourceLatLng, destinationLatLng);

        } catch (Exception e) {
            Toast.makeText(this, "Error finding route", Toast.LENGTH_SHORT).show();
            e.printStackTrace();
        }
    }

    private LatLng getLatLngFromAddress(String address) {
        try {
            List<Address> addresses = geocoder.getFromLocationName(address, 1);
            if (addresses != null && !addresses.isEmpty()) {
                Address location = addresses.get(0);
                return new LatLng(location.getLatitude(), location.getLongitude());
            }
        } catch (IOException e) {
            e.printStackTrace();
        }
        return null;
    }

    private void fetchRoute(LatLng source, LatLng destination) {
        String apiKey = "YOUR_GOOGLE_MAPS_API_KEY";
        String url = "https://maps.googleapis.com/maps/api/directions/json?" +
                "origin=" + source.latitude + "," + source.longitude +
                "&destination=" + destination.latitude + "," + destination.longitude +
                "&key=" + apiKey;

        RequestQueue queue = Volley.newRequestQueue(this);
        StringRequest request = new StringRequest(Request.Method.GET, url,
                response -> {
                    try {
                        JSONObject jsonResponse = new JSONObject(response);
                        JSONArray routes = jsonResponse.getJSONArray("routes");
                        if (routes.length() > 0) {
                            JSONObject route = routes.getJSONObject(0);
```

```
                    JSONObject overviewPolyline =
route.getJSONObject("overview_polyline");
                    String encodedPolyline = overviewPolyline.getString("points");
                    drawRoute(encodedPolyline);
                }
            } catch (Exception e) {
                e.printStackTrace();
                Toast.makeText(this, "Error parsing route data",
Toast.LENGTH_SHORT).show();
            }
        },
        error -> Toast.makeText(this, "Failed to fetch route",
Toast.LENGTH_SHORT).show());

    queue.add(request);
  }

  private void drawRoute(String encodedPolyline) {
    List<LatLng> points = decodePolyline(encodedPolyline);
    if (polyline != null) {
      polyline.remove();
    }
    polyline = mMap.addPolyline(new
PolylineOptions().addAll(points).width(10).color(0xFF0000FF));
  }

  private List<LatLng> decodePolyline(String encoded) {
    List<LatLng> polyline = new ArrayList<>();
    int index = 0, len = encoded.length(), lat = 0, lng = 0;
    while (index < len) {
      int b, shift = 0, result = 0;
      do {
        b = encoded.charAt(index++) - 63;
        result |= (b & 0x1F) << shift;
        shift += 5;
      } while (b >= 0x20);
      lat += (result & 1) != 0 ? ~(result >> 1) : (result >> 1);
      shift = result = 0;
      do {
        b = encoded.charAt(index++) - 63;
```

```
            result |= (b & 0x1F) << shift;
            shift += 5;
        } while (b >= 0x20);
        lng += (result & 1) != 0 ? ~(result >> 1) : (result >> 1);
        polyline.add(new LatLng(lat / 1E5, lng / 1E5));
    }
    return polyline;
  }
}
```

6. **Create an Android application to demonstrate Progress Dialog Box using AsyncTask**

activityMain.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:gravity="center"
   android:padding="20dp">

   <Button
      android:id="@+id/btnStart"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Start Task"
      android:onClick="startTask"/>
</LinearLayout>
```

MainActivity.java

```
package com.example.progressdialogdemo;
```

```
import android.app.ProgressDialog;
import android.os.AsyncTask;
import android.os.Bundle;
import android.view.View;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

    private ProgressDialog progressDialog;

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

    // Method triggered when the button is clicked
    public void startTask(View view) {
        new MyAsyncTask().execute();
    }

    private class MyAsyncTask extends AsyncTask<Void, Integer, String> {

        @Override
```

```
protected void onPreExecute() {
    super.onPreExecute();
    // Initialize and show ProgressDialog
    progressDialog = new ProgressDialog(MainActivity.this);
    progressDialog.setTitle("Processing...");
    progressDialog.setMessage("Please wait...");
    progressDialog.setProgressStyle(ProgressDialog.STYLE_HORIZONTAL);
    progressDialog.setMax(100);
    progressDialog.setCancelable(false);
    progressDialog.show();
}

@Override
protected String doInBackground(Void... voids) {
    for (int i = 1; i <= 100; i += 10) {
        try {
            Thread.sleep(500); // Simulate work by pausing for 500ms
            publishProgress(i); // Update progress
        } catch (InterruptedException e) {
            e.printStackTrace();
        }
    }
    return "Task Completed!";
}

@Override
```

```
        protected void onProgressUpdate(Integer... values) {
            super.onProgressUpdate(values);
            progressDialog.setProgress(values[0]);
        }

        @Override
        protected void onPostExecute(String result) {
            super.onPostExecute(result);
            progressDialog.dismiss(); // Hide ProgressDialog
            Toast.makeText(MainActivity.this, result, Toast.LENGTH_SHORT).show();
        }
    }
}
```

7. **Create an Android application that plays an audio(song) in the background. Audio will not be stopped even if you switch to another activity. To stop the audio, you need to stop the service.**

   AndroidManifest.xml

   ```
   <service android:name=".MusicService" android:enabled="true"
   android:exported="false"/>
   ```

   MusicService.java

   ```
   package com.example.musicbackground;

   import android.app.Service;
   import android.content.Intent;
   import android.media.MediaPlayer;
   import android.os.IBinder;
   ```

```
import android.widget.Toast;

public class MusicService extends Service {
    private MediaPlayer mediaPlayer;

    @Override
    public void onCreate() {
        super.onCreate();
        mediaPlayer = MediaPlayer.create(this, R.raw.song); // Use the audio file in res/raw
        mediaPlayer.setLooping(true); // Loop the song
    }

    @Override
    public int onStartCommand(Intent intent, int flags, int startId) {
        if (!mediaPlayer.isPlaying()) {
            mediaPlayer.start(); // Start playing music
            Toast.makeText(this, "Music Started", Toast.LENGTH_SHORT).show();
        }
        return START_STICKY; // Restart service if it's killed
    }

    @Override
    public void onDestroy() {
        super.onDestroy();
        if (mediaPlayer != null) {
            mediaPlayer.stop();
            mediaPlayer.release();
            Toast.makeText(this, "Music Stopped", Toast.LENGTH_SHORT).show();
```

```
        }
    }

    @Override
    public IBinder onBind(Intent intent) {
        return null; // No binding required
    }
}
```

Activity_main.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:gravity="center"
    android:padding="20dp">

    <Button
        android:id="@+id/btnStartMusic"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Start Music" />

    <Button
        android:id="@+id/btnStopMusic"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Stop Music"
```

```
        android:layout_marginTop="10dp"/>

    <Button
        android:id="@+id/btnNext"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Go to Next Activity"
        android:layout_marginTop="10dp"/>
</LinearLayout>
```

MainActivity.java

```
package com.example.musicbackground;

import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

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

        findViewById(R.id.btnStartMusic).setOnClickListener(new View.OnClickListener()
{
            @Override
            public void onClick(View v) {
```

```
            startService(new Intent(MainActivity.this, MusicService.class));
        }
    });

    findViewById(R.id.btnStopMusic).setOnClickListener(new View.OnClickListener()
{
        @Override
        public void onClick(View v) {
            stopService(new Intent(MainActivity.this, MusicService.class));
        }
    });

    findViewById(R.id.btnNext).setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            Intent intent = new Intent(MainActivity.this, SecondActivity.class);
            startActivity(intent);
        }
    });
  }
}
```

SecondActivity.java

```
package com.example.musicbackground;

import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import androidx.appcompat.app.AppCompatActivity;
```

```
public class SecondActivity extends AppCompatActivity {

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

        findViewById(R.id.btnBack).setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent intent = new Intent(SecondActivity.this, MainActivity.class);
                startActivity(intent);
                finish();
            }
        });
    }
}
```

Activity_second.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:gravity="center"
    android:padding="20dp">
```

```
    <Button
        android:id="@+id/btnBack"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Go Back"/>
</LinearLayout>
```

8. **Create an Android Application that sends the Notification on click of the button and displays the notification message on the second activity.**

AndroidManifest.xml

```
<uses-permission android:name="android.permission.POST_NOTIFICATIONS"/>
```

Activity_main.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:gravity="center"
    android:padding="20dp">

    <Button
        android:id="@+id/btnSendNotification"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Send Notification"/>
</LinearLayout>
```

MainActivity.java

```
package com.example.notificationapp;

import android.app.NotificationChannel;
import android.app.NotificationManager;
import android.app.PendingIntent;
import android.content.Context;
import android.content.Intent;
import android.os.Build;
import android.os.Bundle;
```

```
import android.view.View;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.NotificationCompat;
import androidx.core.app.NotificationManagerCompat;

public class MainActivity extends AppCompatActivity {

    private static final String CHANNEL_ID = "notification_channel";

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

        // Create notification channel (needed for Android 8+)
        createNotificationChannel();

        findViewById(R.id.btnSendNotification).setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                sendNotification();
            }
        });
    }

    private void createNotificationChannel() {
        if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {
            CharSequence name = "MyChannel";
            String description = "Channel for notifications";
            int importance = NotificationManager.IMPORTANCE_DEFAULT;
            NotificationChannel channel = new NotificationChannel(CHANNEL_ID, name,
importance);
            channel.setDescription(description);

            NotificationManager notificationManager =
getSystemService(NotificationManager.class);
            if (notificationManager != null) {
                notificationManager.createNotificationChannel(channel);
            }
```

```
        }
    }

    private void sendNotification() {
        // Intent to open SecondActivity when notification is clicked
        Intent intent = new Intent(this, SecondActivity.class);
        intent.putExtra("message", "Hello from Notification!");
        PendingIntent pendingIntent = PendingIntent.getActivity(this, 0, intent,
PendingIntent.FLAG_UPDATE_CURRENT | PendingIntent.FLAG_IMMUTABLE);

        // Create notification
        NotificationCompat.Builder builder = new NotificationCompat.Builder(this,
CHANNEL_ID)
                .setSmallIcon(R.drawable.ic_launcher_foreground) // Ensure you have an icon
                .setContentTitle("New Notification")
                .setContentText("Tap to see the message")
                .setPriority(NotificationCompat.PRIORITY_DEFAULT)
                .setContentIntent(pendingIntent)
                .setAutoCancel(true); // Removes notification when clicked

        NotificationManagerCompat notificationManager =
NotificationManagerCompat.from(this);
        notificationManager.notify(1, builder.build()); // Send notification
    }
}
```

activity_second.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:gravity="center"
    android:padding="20dp">

    <TextView
        android:id="@+id/tvMessage"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Notification Message"
```

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

SecondActivity.java

```
package com.example.notificationapp;

import android.os.Bundle;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;

public class SecondActivity extends AppCompatActivity {

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

        TextView tvMessage = findViewById(R.id.tvMessage);

        // Get the message from the intent
        String message = getIntent().getStringExtra("message");
        if (message != null) {
            tvMessage.setText(message);
        }
    }
}
```

9. **Create an Android application to demonstrate phone call using Implicit Intent.**

AndroidManifest.xml

```
<uses-permission android:name="android.permission.CALL_PHONE"/>
```

Activity_main.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:gravity="center"
    android:padding="20dp">

    <EditText
        android:id="@+id/etPhoneNumber"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter Phone Number"
        android:inputType="phone"/>

    <Button
        android:id="@+id/btnCall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Make Call"
        android:layout_marginTop="10dp"/>
</LinearLayout>
```

MainActivity.java

```
package com.example.phonecallapp;

import android.Manifest;
import android.content.Intent;
import android.content.pm.PackageManager;
import android.net.Uri;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
```

```
import android.widget.EditText;
import android.widget.Toast;
import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;

public class MainActivity extends AppCompatActivity {

    private static final int REQUEST_CALL_PERMISSION = 1;
    private EditText etPhoneNumber;

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

        etPhoneNumber = findViewById(R.id.etPhoneNumber);
        Button btnCall = findViewById(R.id.btnCall);

        btnCall.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                makePhoneCall();
            }
        });
    }
```

```
    private void makePhoneCall() {
        String phoneNumber = etPhoneNumber.getText().toString().trim();

        if (!phoneNumber.isEmpty()) {
            // Check permission before making a call
            if (ContextCompat.checkSelfPermission(MainActivity.this,
Manifest.permission.CALL_PHONE)
                    == PackageManager.PERMISSION_GRANTED) {

                Intent callIntent = new Intent(Intent.ACTION_CALL);
                callIntent.setData(Uri.parse("tel:" + phoneNumber));
                startActivity(callIntent);
            } else {
                // Request CALL_PHONE permission
                ActivityCompat.requestPermissions(MainActivity.this,
                        new String[]{Manifest.permission.CALL_PHONE},
REQUEST_CALL_PERMISSION);
            }
        } else {
            Toast.makeText(MainActivity.this, "Enter a phone number",
Toast.LENGTH_SHORT).show();
        }
    }

    @Override
    public void onRequestPermissionsResult(int requestCode, @NonNull String[]
permissions, @NonNull int[] grantResults) {
        super.onRequestPermissionsResult(requestCode, permissions, grantResults);
```

```
        if (requestCode == REQUEST_CALL_PERMISSION) {
            if (grantResults.length > 0 && grantResults[0] ==
    PackageManager.PERMISSION_GRANTED) {
                makePhoneCall();
            } else {
                Toast.makeText(this, "Permission Denied",
    Toast.LENGTH_SHORT).show();
            }
        }
    }
}
```

10. **Create an android application to demonstrate how to use a service to download a file fromthe Internet on click of Download Button. Once done, the service notifies the activity via a broadcast receiver that the download is complete.**

AndroidManifest.xml

```
<uses-permission android:name="android.permission.INTERNET"/>
<uses-permission android:name="android.permission.FOREGROUND_SERVICE"/>
```

Activity_main.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:gravity="center"
    android:padding="20dp">

    <Button
        android:id="@+id/btnDownload"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Download File"/>
```

```
</LinearLayout>
```

MainActivity.java

```
package com.example.downloadapp;

import android.content.BroadcastReceiver;
import android.content.Context;
import android.content.Intent;
import android.content.IntentFilter;
import android.os.Bundle;
import android.widget.Button;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

   private static final String DOWNLOAD_URL = "https://example.com/sample.pdf";
   public static final String DOWNLOAD_COMPLETE =
"com.example.downloadapp.DOWNLOAD_COMPLETE";

   private BroadcastReceiver downloadReceiver = new BroadcastReceiver() {
      @Override
      public void onReceive(Context context, Intent intent) {
         Toast.makeText(context, "Download Complete!",
Toast.LENGTH_LONG).show();
      }
   };

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

      Button btnDownload = findViewById(R.id.btnDownload);

      btnDownload.setOnClickListener(v -> {
         Intent intent = new Intent(MainActivity.this, DownloadService.class);
         intent.putExtra("file_url", DOWNLOAD_URL);
         startService(intent);
      });
```

```
    }

    @Override
    protected void onResume() {
        super.onResume();
        registerReceiver(downloadReceiver, new
IntentFilter(DOWNLOAD_COMPLETE));
    }

    @Override
    protected void onPause() {
        super.onPause();
        unregisterReceiver(downloadReceiver);
    }
}
```

DownloadService.java

```
package com.example.downloadapp;

import android.app.NotificationChannel;
import android.app.NotificationManager;
import android.app.Service;
import android.content.Intent;
import android.os.Build;
import android.os.IBinder;
import android.util.Log;
import androidx.annotation.Nullable;
import androidx.core.app.NotificationCompat;
import java.io.BufferedInputStream;
import java.io.FileOutputStream;
import java.io.InputStream;
import java.net.HttpURLConnection;
import java.net.URL;

public class DownloadService extends Service {

    private static final String CHANNEL_ID = "DownloadChannel";

    @Override
    public void onCreate() {
```

```
        super.onCreate();
        createNotificationChannel();
    }

    @Override
    public int onStartCommand(Intent intent, int flags, int startId) {
        String fileUrl = intent.getStringExtra("file_url");

        new Thread(() -> downloadFile(fileUrl)).start();

        return START_NOT_STICKY;
    }

    private void downloadFile(String fileUrl) {
        try {
            URL url = new URL(fileUrl);
            HttpURLConnection connection = (HttpURLConnection) url.openConnection();
            connection.connect();

            if (connection.getResponseCode() != HttpURLConnection.HTTP_OK) {
                Log.e("DownloadService", "Server returned HTTP " +
connection.getResponseCode());
                return;
            }

            InputStream input = new BufferedInputStream(connection.getInputStream());
            FileOutputStream output = openFileOutput("downloaded_file.pdf",
MODE_PRIVATE);

            byte[] data = new byte[1024];
            int count;
            while ((count = input.read(data)) != -1) {
                output.write(data, 0, count);
            }

            output.flush();
            output.close();
            input.close();

            sendDownloadCompleteBroadcast();
```

```
        } catch (Exception e) {
            Log.e("DownloadService", "Download error: " + e.getMessage());
        }
    }

    private void sendDownloadCompleteBroadcast() {
        Intent intent = new Intent(MainActivity.DOWNLOAD_COMPLETE);
        sendBroadcast(intent);

        NotificationCompat.Builder builder = new NotificationCompat.Builder(this,
CHANNEL_ID)
                .setSmallIcon(R.drawable.ic_download)
                .setContentTitle("Download Complete")
                .setContentText("File downloaded successfully!")
                .setPriority(NotificationCompat.PRIORITY_HIGH)
                .setAutoCancel(true);

        NotificationManager notificationManager = (NotificationManager)
getSystemService(NOTIFICATION_SERVICE);
        notificationManager.notify(1, builder.build());

        stopSelf();
    }

    private void createNotificationChannel() {
        if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {
            NotificationChannel channel = new NotificationChannel(CHANNEL_ID,
"Download Channel",
                    NotificationManager.IMPORTANCE_HIGH);
            NotificationManager manager = getSystemService(NotificationManager.class);
            if (manager != null) {
                manager.createNotificationChannel(channel);
            }
        }
    }

    @Nullable
    @Override
    public IBinder onBind(Intent intent) {
```

```
        return null;
    }
}
```