Practical 32:

MainActivity.java

```
package com.students.ameer.findroutes;
import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;
import androidx.fragment.app.FragmentActivity;
import android.Manifest;
import android.content.pm.PackageManager;
import android.location.Location;
import android.os.Bundle;
import android.view.View;
import android.widget.Toast;
import com.directions.route.AbstractRouting;
import com.directions.route.Route;
import com.directions.route.RouteException;
import com.directions.route.Routing;
import com.directions.route.RoutingListener;
import com.google.android.gms.common.ConnectionResult;
import com.google.android.gms.common.api.GoogleApiClient;
import com.google.android.gms.maps.CameraUpdate;
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 com.google.android.material.snackbar.Snackbar;
import java.util.ArrayList;
import java.util.List;
public class MainActivity extends FragmentActivity implements OnMapReadyCallback,
        GoogleApiClient.OnConnectionFailedListener, RoutingListener {
    //google map object
    private GoogleMap mMap;
    //current and destination location objects
    Location myLocation=null;
    Location destinationLocation=null;
    protected LatLng start=null;
    protected LatLng end=null;
    //to get location permissions.
    private final static int LOCATION_REQUEST_CODE = 23;
    boolean locationPermission=false;
    //polyline object
    private List<Polyline> polylines=null;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        //request location permission.
        requestPermision();
        //init google map fragment to show map.
        SupportMapFragment mapFragment = (SupportMapFragment)
getSupportFragmentManager()
                .findFragmentById(R.id.map);
        mapFragment.getMapAsync(this);
    }
    private void requestPermision()
    {
        if(ContextCompat.checkSelfPermission(this,
                Manifest.permission.ACCESS_COARSE_LOCATION)
                != PackageManager.PERMISSION_GRANTED) {
            ActivityCompat.requestPermissions(this,
                    new String[]{Manifest.permission.ACCESS_COARSE_LOCATION},
                    LOCATION_REQUEST_CODE);
        }
        else{
            locationPermission=true;
        }
    }
    @Override
    public void onRequestPermissionsResult(int requestCode, String[] permissions, int[]
grantResults) {
        switch (requestCode) {
            case LOCATION_REQUEST_CODE: {
                if (grantResults.length > 0
                        && grantResults[0] == PackageManager.PERMISSION_GRANTED) {
                    //if permission granted.
                    locationPermission=true;
                    getMyLocation();
                }
                return;
            }
        }
    }
    //to get user location
    private void getMyLocation(){
        mMap.setMyLocationEnabled(true);
        mMap.setOnMyLocationChangeListener(new
GoogleMap.OnMyLocationChangeListener() {
            @Override
            public void onMyLocationChange(Location location) {
```

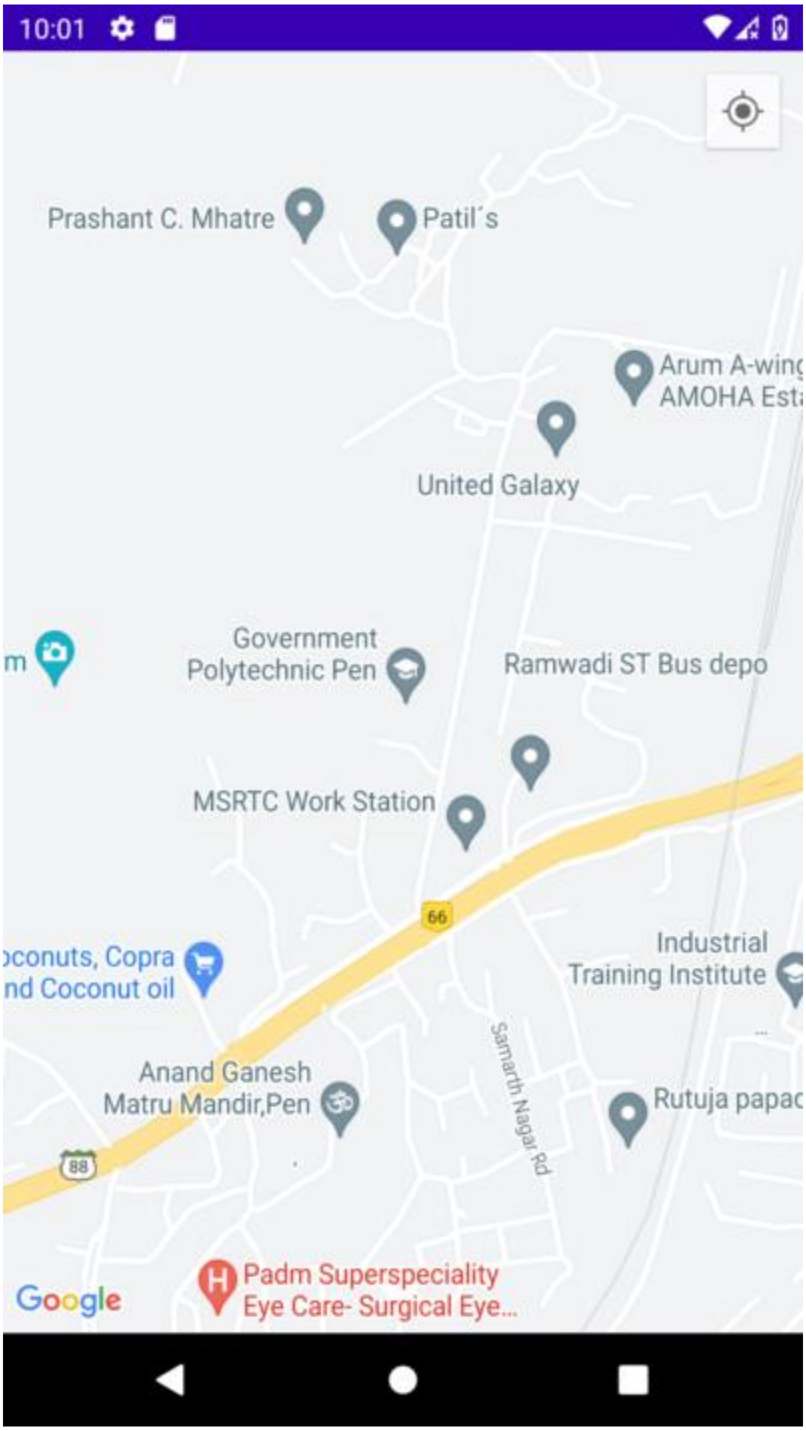
```
        myLocation=location;
        LatLng ltlng=new LatLng(18.732806201795565, 73.08225718311864);
        CameraUpdate cameraUpdate = CameraUpdateFactory.newLatLngZoom(
            ltlng, 16f);
        mMap.animateCamera(cameraUpdate);
      }
    });
    //get destination location when user click on map
    mMap.setOnMapClickListener(new GoogleMap.OnMapClickListener() {
      @Override
      public void onMapClick(LatLng latLng) {
        end=latLng;
        mMap.clear();
        start=new LatLng(myLocation.getLatitude(),myLocation.getLongitude());
        //start route finding
        Findroutes(start,end);
      }
    });

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

    if(locationPermission) {
      getMyLocation();
    }
  }
  // function to find Routes.
  public void Findroutes(LatLng Start, LatLng End)
  {
    if(Start==null || End==null) {
      Toast.makeText(MainActivity.this,"Unable to get location",
Toast.LENGTH_LONG).show();
    }
    else
    {
      Routing routing = new Routing.Builder()
          .travelMode(AbstractRouting.TravelMode.DRIVING)
          .withListener(this)
          .alternativeRoutes(true)
          .waypoints(Start, End)
          .key("AIzaSyAAl7T5IB74VSYRkOVs1F25Vv_EtKJKddA")  //also define your api key
here.
          .build();
      routing.execute();
    }
    }
    //Routing call back functions.
    @Override
    public void onRoutingFailure(RouteException e) {
        View parentLayout = findViewById(android.R.id.content);
        Snackbar snackbar= Snackbar.make(parentLayout, e.toString(),
Snackbar.LENGTH_LONG);
        snackbar.show();
//        Findroutes(start,end);
    }
    @Override
    public void onRoutingStart() {
        Toast.makeText(MainActivity.this,"Finding Route...",Toast.LENGTH_LONG).show();
    }
    //If Route finding success..
    @Override
    public void onRoutingSuccess(ArrayList<Route> route, int shortestRouteIndex) {
        CameraUpdate center = CameraUpdateFactory.newLatLng(start);
        CameraUpdate zoom = CameraUpdateFactory.zoomTo(16);
        if(polylines!=null) {
            polylines.clear();
        }
        PolylineOptions polyOptions = new PolylineOptions();
        LatLng polylineStartLatLng=null;
        LatLng polylineEndLatLng=null;
        polylines = new ArrayList<>();
        //add route(s) to the map using polyline
        for (int i = 0; i <route.size(); i++) {
            if(i==shortestRouteIndex)
            {
                polyOptions.color(getResources().getColor(R.color.colorPrimary));
                polyOptions.width(7);
                polyOptions.addAll(route.get(shortestRouteIndex).getPoints());
                Polyline polyline = mMap.addPolyline(polyOptions);
                polylineStartLatLng=polyline.getPoints().get(0);
                int k=polyline.getPoints().size();
                polylineEndLatLng=polyline.getPoints().get(k-1);
                polylines.add(polyline);
            }
        }
        //Add Marker on route starting position
        MarkerOptions startMarker = new MarkerOptions();
        startMarker.position(polylineStartLatLng);
        startMarker.title("My Location");
        mMap.addMarker(startMarker);
        //Add Marker on route ending position
        MarkerOptions endMarker = new MarkerOptions();
        endMarker.position(polylineEndLatLng);
        endMarker.title("Destination");
        mMap.addMarker(endMarker);
    }
    @Override
    public void onRoutingCancelled() {
        Findroutes(start,end);
    }
    @Override
    public void onConnectionFailed(@NonNull ConnectionResult connectionResult) {
        Findroutes(start,end);
    }
}
```

Activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
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"
    tools:context=".MainActivity">

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

</androidx.constraintlayout.widget.ConstraintLayout>
```

AndroidManifest.xml

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

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

    <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">
        <meta-data
            android:name="com.google.android.geo.API_KEY"
            android:value="AIzaSyAAl7T5IB74VSYRkOVs1F25Vv_EtKJKddA" />
        <!-- Don't use my api key, it will not work for you.-->


        <meta-data android:name="com.google.android.gms.version"
            android:value="@integer/google_play_services_version" />

        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

</manifest>
```


10:01
Prashant C. Mhatre
Patil's
Arum A-wing
AMOHA Esta
United Galaxy
m
Government
Polytechnic Pen
Ramwadi ST Bus depo
MSRTC Work Station
66
oconuts, Copra
nd Coconut oil
Industrial
Training Institute
Samarth Nagar Rd
Anand Ganesh
Matru Mandir,Pen
Rutuja papa
88
Padm Superspeciality
Eye Care- Surgical Eye...
Google