CS 696 Mobile Phone Application Development
Fall Semester, 2009
Doc 9 Location & Maps
Sept 29, 2009

References

MapView tutorial, http://developer.android.com/guide/tutorials/views/hello-mapview.html

GoogleMaps with Geocoder Class, http://www.anddev.org/simple_googlemaps_geocoder_-_convert_address_to_lon-lat-t2936.html

Simple GoogleMaps with Threads http://www.anddev.org/simple_googlemaps_with_threads-t2943.html

The Busy Coder's Guide to Android Development, V2.1, Mark L. Murphy

Location

Latitude		Longitude
32° 46' 29.9994"		-117° 4' 13.0008"
32.775		-117.070278
	* 1000000	
32775000		-117070278

Geo Coders

Map Address to latitude & longitude

Android Geocoder

```
Geocoder campus = new Geocoder(this);
String addressInput = "5500 Campanile Drive, San Diego CA";
try {
    int maxResults = 3;
    List<Address> foundAdresses;
    foundAdresses = campus.getFromLocationName(addressInput, maxResults);
    for (int i = 0; i < foundAdresses.size(); ++i) {
        Address x = foundAdresses.get(i);
        double latitude = x.getLatitude();
        double longitude = x.getLongitude();
     }
}
catch (Exception e) { blah }
```

If you get multiple result back you should ask the user which one is correct.
Don't forget to multiple by latitude and longitude by 1000000 to convert it to an integer.

Android Maps - Add-on

http://code.google.com/android/add-ons/google-apis/index.html

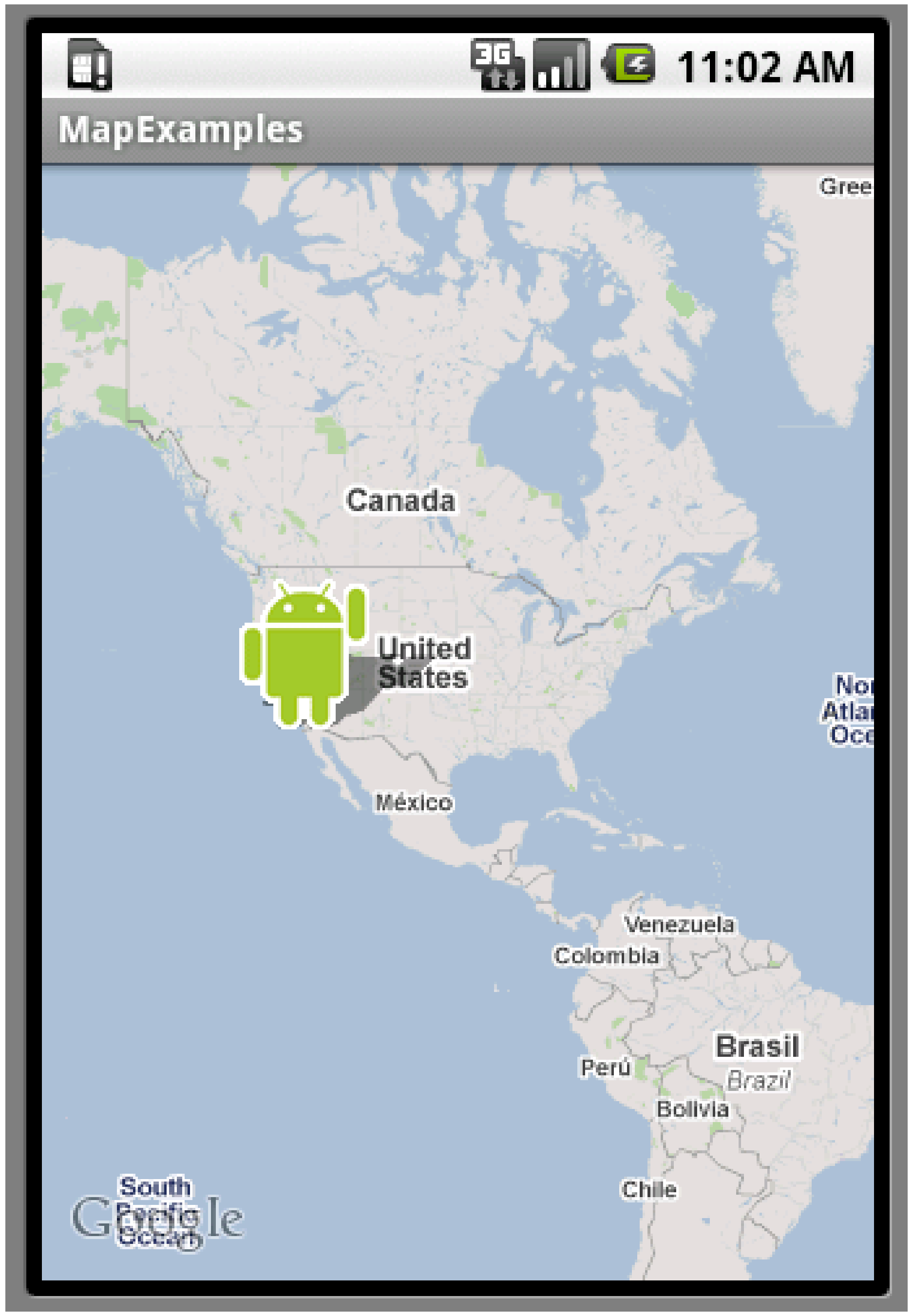
Mark Murphy

"Google Maps, particularly when integrated into third party applications, requires agreeing to a fairly lengthy set of legal terms. These terms include clauses that you may find unpalatable."

The Busy Coder's Guide to Android Development, V2.1, Mark L. Murphy page 399

First Map Example

Marker on GMCS



MapActivity

```
public class MapExample extends MapActivity {

    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
        LinearLayout linearLayout = (LinearLayout) findViewById(R.id.zoomview);
        MapView mapView = (MapView) findViewById(R.id.mapview);
        mapView.setBuiltInZoomControls(true);
        List<Overlay> mapOverlays = mapView.getOverlays();
        Drawable drawable = this.getResources().getDrawable(R.drawable.androidmarker);
        HelloItemizedOverlay itemizedOverlay = new HelloItemizedOverlay(drawable);
        GeoPoint gmcs = new GeoPoint(32776389, -117069167);
        OverlayItem overlayitem = new OverlayItem(gmcs, "GMCS",
                "This is where the Computer Science department is located at SDSU");
        itemizedOverlay.addOverlay(overlayitem);
        mapOverlays.add(itemizedOverlay);
    }

    protected boolean isRouteDisplayed() {
        return false;
    }
}
```

How to add png graphic to Project

Just add it to the res/drawable directory

Overlay

```
public class HelloItemizedOverlay extends ItemizedOverlay<OverlayItem> {
    private ArrayList<OverlayItem> mOverlays = new ArrayList<OverlayItem>();

    public HelloItemizedOverlay(Drawable defaultMarker) {
        super(boundCenterBottom(defaultMarker));
    }
    public void addOverlay(OverlayItem overlay) {
      mOverlays.add(overlay);
      populate();
    }

    protected OverlayItem createItem(int i) {
     return mOverlays.get(i);
    }

    public int size() {
        return mOverlays.size();
    }
}
```

Main XML

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/mainlayout"
    android:orientation="vertical"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent" >

    <com.google.android.maps.MapView
        android:id="@+id/mapview"
        android:layout_width="fill_parent"
        android:layout_height="fill_parent"
        android:clickable="true"
        android:apiKey="0EqsdoMWNHdDiPF9uHOYe-KJG328jz2ZpsfTUMg"
    />
<LinearLayout
    android:id="@+id/zoomview"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBottom="@id/mapview"
    android:layout_centerHorizontal="true"
/>
</RelativeLayout>
```

Map Keys

http://code.google.com/android/add-ons/google-apis/mapkey.html

You need a map key to use Google Maps

Generate certificate fingerprint

```
keytool -list -alias androiddebugkey -keystore debug.keystore -
storepass android -keypass android
```

Generate key

http://code.google.com/android/add-ons/google-apis/maps-api-signup.html

Debug Certificate

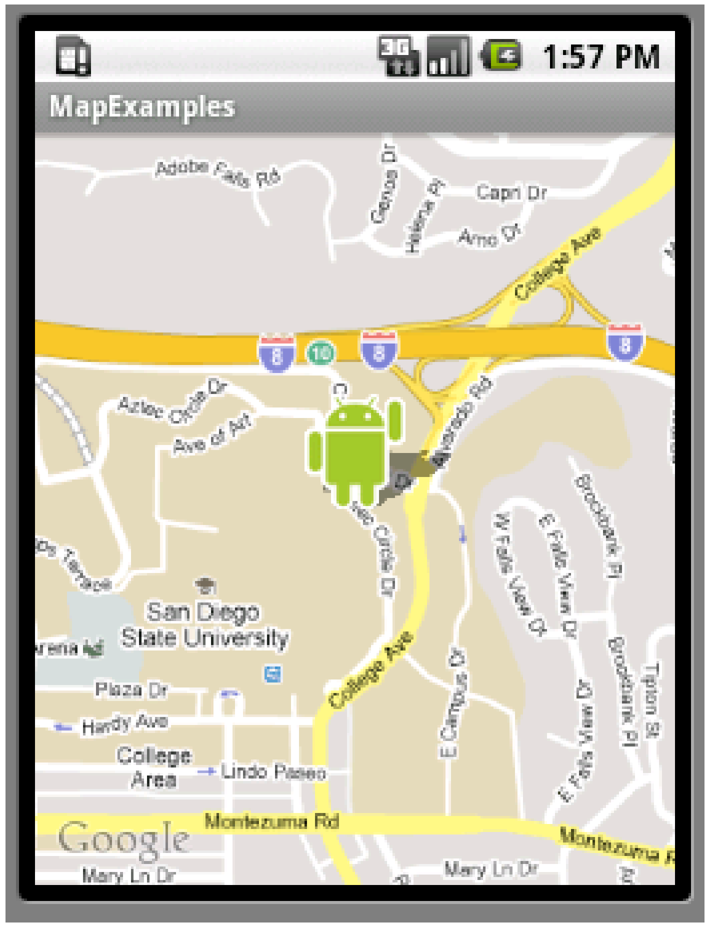
Good for one year

Permissions

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
      package="edu.sdsu.cs696"
      android:versionCode="1"
      android:versionName="1.0">
    <application android:icon="@drawable/icon" android:label="@string/app_name">
        <activity android:name=".MapExample"
                  android:label="@string/app_name">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
               <uses-library android:name="com.google.android.maps" />

    </application>
    <uses-sdk android:minSdkVersion="3" />
        <uses-permission android:name="android.permission.INTERNET" />
</manifest>
```

Zoom, Centering & Satellite



Map Example Again

```
public class MapExample extends MapActivity {
    MapView mapView;
    HelloItemizedOverlay itemizedOverlay;

    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
        mapView = (MapView) findViewById(R.id.mapview);
        setGMCSOverlay();

    }
```

Centering & set Zoom level

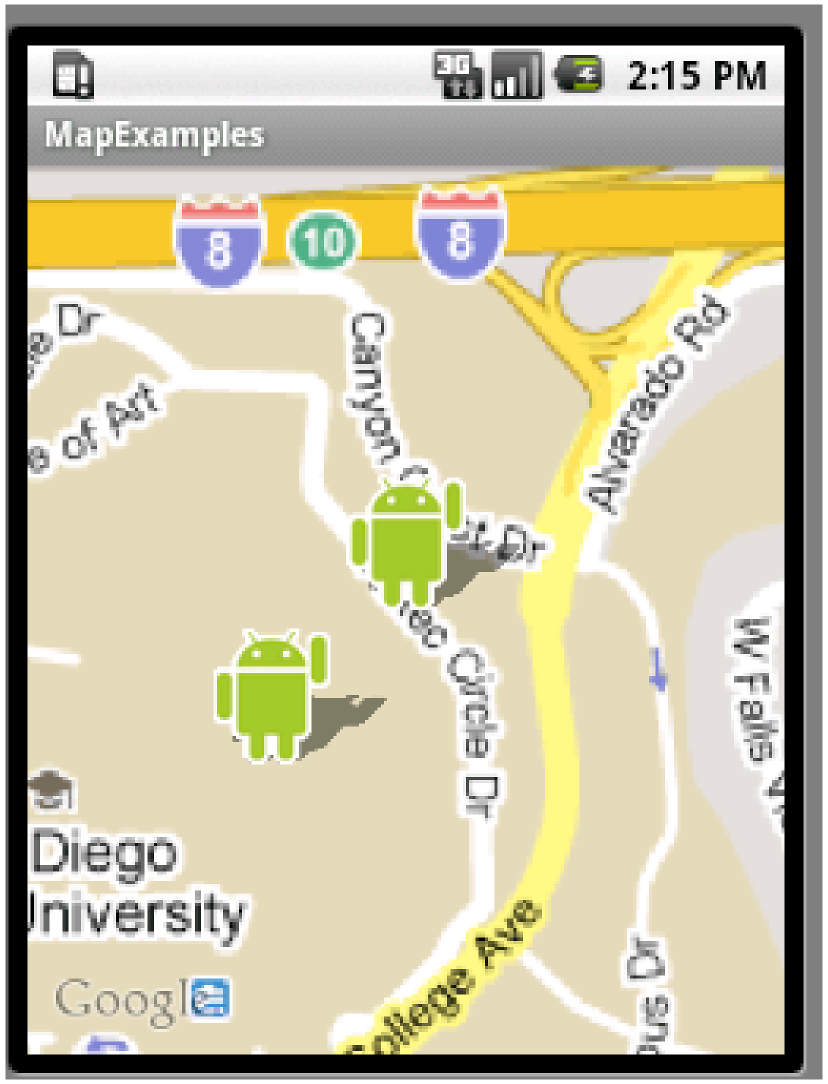
```
    private void setGMCSOverlay() {
        mapView.setBuiltInZoomControls(true);
        List<Overlay> mapOverlays = mapView.getOverlays();
        Drawable drawable = this.getResources().getDrawable(
                R.drawable.androidmarker);
        itemizedOverlay = new HelloItemizedOverlay(this, drawable);
        GeoPoint gmcs = new GeoPoint(32776389, -117069167);
        OverlayItem overlayitem = new OverlayItem(gmcs, "GMCS",
                "This is where the Computer Science department is located at
SDSU");
        itemizedOverlay.addOverlay(overlayitem);
        mapOverlays.add(itemizedOverlay);
        MapController controls = mapView.getController();
        controls.setZoom(16);
        controls.setCenter(gmcs);
    }
```

Handling Key Down

```
public boolean onKeyDown(int keyCode, KeyEvent event) {
    if (keyCode == KeyEvent.KEYCODE_S) {
        mapView.setSatellite(!mapView.isSatellite());
        return (true);
    }

    return (super.onKeyDown(keyCode, event));
}
```

Multiple Locations, My Location, GSP, Taps



32776389, -117069167

Nearly The Same

```
public class MapExample extends MapActivity {
    private MapView mapView;
    private HelloItemizedOverlay itemizedOverlay;
    private MyLocationOverlay currentLocation;
    private LocationListener locationUpdater;

    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
        mapView = (MapView) findViewById(R.id.mapview);
        setOverlays();
        getLocationUpdates();
    }
```

Handling the Life Cycle

```
public void onResume() {
      super.onResume();
      currentLocation.enableCompass();   //MyLocation
      getLocationUpdates();  //Get GSP updates
}

@Override
public void onPause() {
      super.onPause();
      currentLocation.disableCompass();
      LocationManager location = (LocationManager)
        getSystemService(Context.LOCATION_SERVICE);
      location.removeUpdates(locationUpdater);
}
```

Requesting GPS Updates

```
private void getLocationUpdates() {
      LocationManager location = (LocationManager)
   getSystemService(Context.LOCATION_SERVICE);
      locationUpdater = getLocationListener();
      // Use GPS since we can sent location via DDMS
      location.requestLocationUpdates(LocationManager.GPS_PROVIDER,
                  1000 * 60 * 2, 5, locationUpdater);
}

private void showLocation(Location location) {
      // really should show location on map
      Toast.makeText(this, "New Location " + location, Toast.LENGTH_SHORT)
                  .show();
}
```

Requesting GPS Updates - the Listener

```
private LocationListener getLocationListener() {
    return new LocationListener() {
        public void onLocationChanged(Location location) {
            showLocation(location);
        }

        public void onProviderDisabled(String provider) {
        }

        public void onProviderEnabled(String provider) {
        }

        public void onStatusChanged(String provider, int status,
                Bundle extras) {

        }
    };
}
```

Overlays - The Same

```
private void setOverlays() {
        mapView.setBuiltInZoomControls(true);
        setCurrentLocation();
        GeoPoint gmcs = setGMCSLocation();
        MapController controls = mapView.getController();
        controls.setZoom(16);
        controls.setCenter(gmcs);
}

private void setCurrentLocation() {
        currentLocation = new MyLocationOverlay(this, mapView);
        mapView.getOverlays().add(currentLocation);
}

private GeoPoint setGMCSLocation() {
        Drawable drawable = this.getResources().getDrawable(
                        R.drawable.androidmarker);
        itemizedOverlay = new HelloItemizedOverlay(this, drawable);
        GeoPoint gmcs = new GeoPoint(32776389, -117069167);
        OverlayItem overlayitem = new OverlayItem(gmcs, "GMCS",
                        "This is where the Computer Science department is located at SDSU");
        itemizedOverlay.addOverlay(overlayitem);
        mapView.getOverlays().add(itemizedOverlay);
        return gmcs;
}
```

Added a second Locations

```
public class HelloItemizedOverlay extends ItemizedOverlay<OverlayItem> {
    private ArrayList<OverlayItem> mOverlays = new ArrayList<OverlayItem>();
    private Context mContext;

    public HelloItemizedOverlay(Context context, Drawable defaultMarker) {
        super(boundCenterBottom(defaultMarker));
        mContext = context;
        GeoPoint gmcs = new GeoPoint(32775210, -117070398);
        OverlayItem overlayitem = new OverlayItem(gmcs, "Library",
                "SDSU Library Entrance");
        this.addOverlay(overlayitem);
    }

    public void addOverlay(OverlayItem overlay) {
        mOverlays.add(overlay);
        populate();
    }
```

Handling Tap in Overlay Class

```
    protected OverlayItem createItem(int i) {
        return mOverlays.get(i);
    }

    @Override
    protected boolean onTap(int i) {
        Toast.makeText(mContext, mOverlays.get(i).getSnippet(),
                Toast.LENGTH_SHORT).show();
        return (true);
    }

    public int size() {
        return mOverlays.size();
    }
}
```

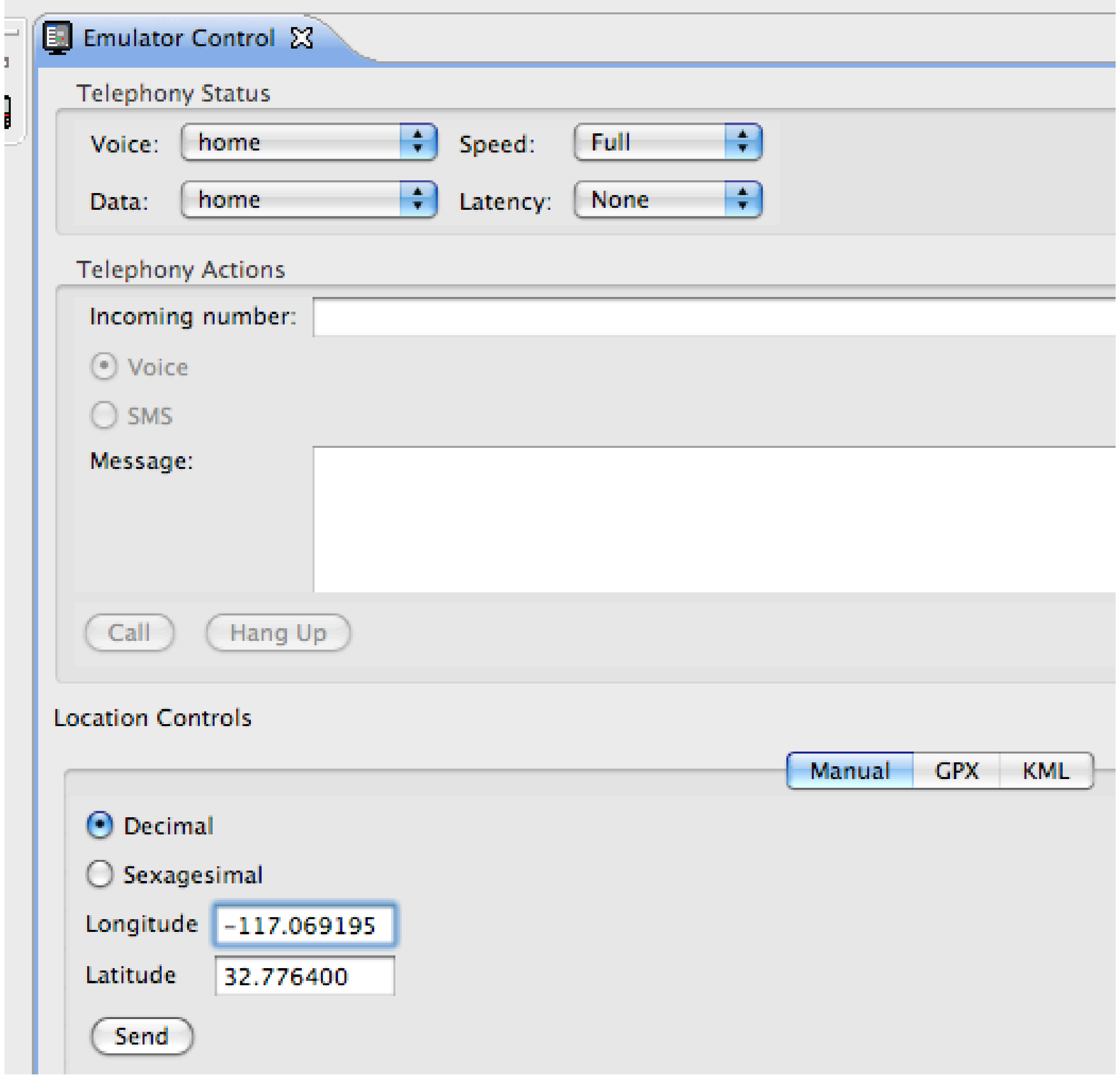
Need to Request Location Access

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
      package="edu.sdsu.cs696"
      android:versionCode="1"
      android:versionName="1.0">
    <uses-permission android:name="android.permission.INTERNET" />
    <uses-permission android:name="android.permission. ACCESS_FINE_LOCATION" />
    <application android:icon="@drawable/icon" android:label="@string/app_name">
        <activity android:name=".MapExample"
                  android:label="@string/app_name">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
                  <uses-library android:name="com.google.android.maps" />

    </application>
    <uses-sdk android:minSdkVersion="3" />
</manifest>
```

You can also access ACCESS_COARSE_LOCATION. GPS is ACCESS_FINE_LOCATION. Can only send GPS locations to the emulator.

How to test Location


Emulator Control
Telephony Status
Voice: home
Speed: Full
Data: home
Latency: None
Telephony Actions
Incoming number:
○ Voice
○ SMS
Message:
Call
Hang Up
Location Controls
Manual
GPX
KML
● Decimal
○ Sexagesimal
Longitude -117.069195
Latitude 32.776400
Send