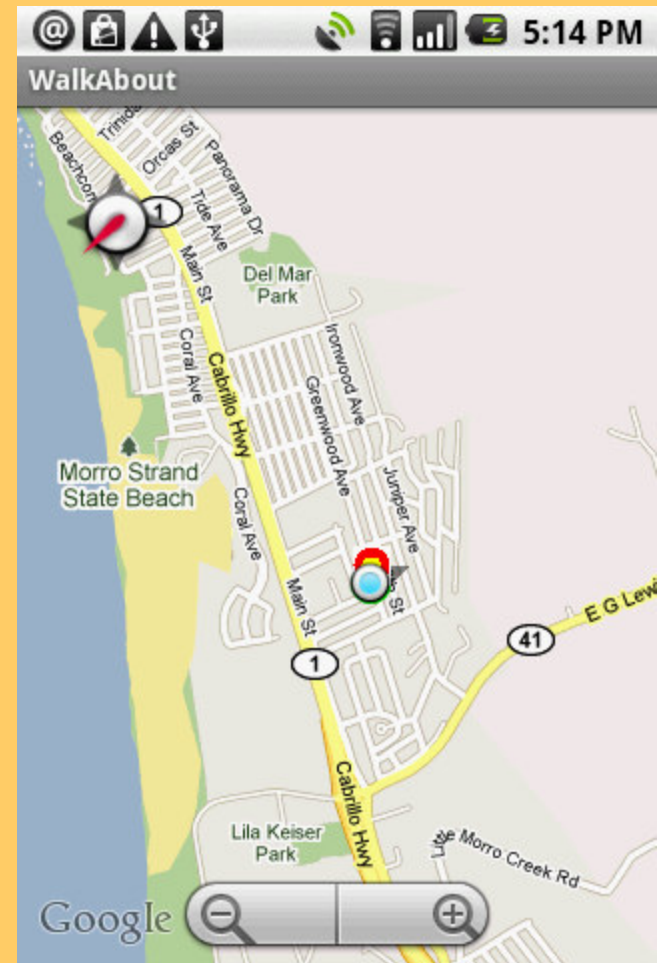


Upcoming Assignments

- Quiz today
- Web Ad due Monday, February 22
- Lab 5 due Wednesday, February 24
- Alpha Version due Friday, February 26
 - To be reviewed by a few class members
 - Usability study by CPE 484 students

Finally, we can start coding

- MapView
 - Contains a map
 - via Google Maps API
 - Map tile retrieval and caching is all done for you
 - Includes pan
 - Includes zoom
 - use `setBuiltInZoomControls(true);`



MapView Modes

- MapView
 - You determine mode
 - `setSatellite(true);` →
 - `setTraffic(true);`
 - `setStreetView(true);`



MapActivity

- MapView can only be constructed or inflated in a MapActivity

```
public class MyActivity extends MapActivity {  
    ...  
    @Override  
    public void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        ...  
        MapView myMap = (MapView)findViewById(R.id.myMap);  
        myMap.setBuiltInZoomControls();  
        myMap.setSatellite(true);  
    }  
}
```

MapController

- You can pan and zoom the map programmatically

```
MapView myMap = (MapView)findViewById(R.id.myMap);
MapController mapController = myMap.getController();
mapController.setZoom(1); //widest zoom/far away
...
mapController.setZoom(21); //narrowest zoom/close in
mapController.zoomIn(); //one level
mapController.zoomOut(); //one level
```

GeoPoint

- You can move to a particular point
- GeoPoints use microdegrees (lat/long * 1,000,000)

```
MapView myMap = (MapView)findViewById(R.id.myMap);  
MapController mapController = myMap.getController();
```

```
Double lat = 37.123456 * 1E6;
```

```
Double long = -122.123456 * 1E6;
```

```
GeoPoint point = new GeoPoint(lat.intValue(), long.intValue());  
mapController.setCenter(point); //jump to point
```

```
...
```

```
mapController.animateTo(point); //smooth transition to point
```

Reverse Geocoding

- Find address from longitude/latitude

```
location = locationManager.getLastKnownLocation(  
    locationManager.GPS_PROVIDER);  
double lat = location.getLatitude();  
double lng = location.getLongitude();  
  
Geocoder gc = new Geocoder(this, Locale.getDefault());  
List<Address> addresses = null;  
try {  
    addresses = gc.getFromLocation(lat, lng, 10);  
} catch (IOException e) {}
```

Forward Geocoding

- Find longitude/latitude (and more) from address

```
Geocoder gc = new Geocoder(this, Locale.US);
List<Address> addresses = null;
try {
    addresses = gc.getFromLocationName(
        "123 Main St., Newton, Kansas", 10);
} catch (IOException e) {}
double lat = addresses.get(0).getLatitude();
String zip = addresses.get(0).getPostalCode();
```


Geolocation

- Options
 - GPS, cell network
 - Wifi-based (Skyhook Wireless)

Setting up location services

```
public MyActivity() {
    criteria = new Criteria();
    criteria.setAccuracy(Criteria.ACCURACY_FINE);
    criteria.setAltitudeRequired(false);
    criteria.setBearingRequired(false);
    criteria.setCostAllowed(true);
    criteria.setPowerRequirement(Criteria.POWER_LOW);
};
private final LocationListener locationListener = new LocationListener() {
    public void onLocationChanged(Location location) {
        updateWithNewLocation(location);
    }
    public void onProviderDisabled(String provider) {
        updateWithNewLocation(null);
    }
    public void onProviderEnabled(String provider) {}
    public void onStatusChanged(String provider, int status, Bundle extras) {}
};
```

```
@Override
protected void onStart() {
    super.onStart();
    locationManager = (LocationManager) getSystemService(
        Context.LOCATION_SERVICE);
    provider = locationManager.getBestProvider(criteria, true);
        // or could be LocationManager.GPS_PROVIDER
    try {
        updateWithNewLocation(locationManager.getLastKnownLocation(
            provider));
    } catch (Exception e) {}
    locationManager.requestLocationUpdates(provider, 2000, 10,
        locationManager);
}
private void updateWithNewLocation(Location location) {
    double latitude = 0.0;
    double longitude = 0.0;
    if (location != null) {
        latitude = location.getLatitude();
        longitude = location.getLongitude();
        //do something with latitude and longitude (e.g. print or move map there)
    }
}
```

Turn GPS on and off to save battery

```
@Override
protected void onPause() {
    super.onPause();
    //stop receiving GPS
    locationManager.removeUpdates(locationListener);
}
@Override
protected void onResume() {
    super.onResume();
    //restart receiving GPS
    locationManager.requestLocationUpdates(provider, 2000, 10,
                                           locationListener);
}
```

Skyhook Wireless

- See

http://www.skyhookwireless.com/developers/Android_Integration_Manual.php