

Mobile Applications

CSCI 448

Lecture 28

Google Maps

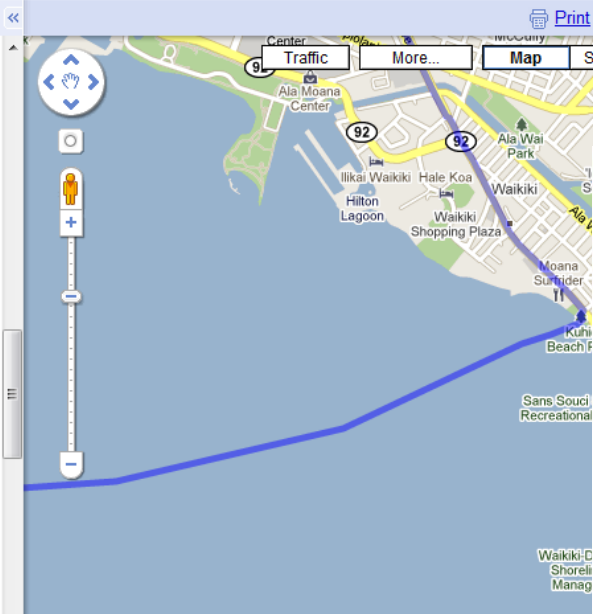
Google maps

Search Maps

Show search options

Get Directions My Maps

25. Keep **right** at the fork, follow signs for HI-78 E/Honolulu and merge onto HI-78 E/I-H-201 E 3.7 mi
Continue to follow I-H-201 E
26. Merge onto I-H-1 E 4.1 mi
27. Take exit 23 for Punahou St toward Waikiki/Manoa 0.2 mi
28. Turn **right** at Punahou St 0.1 mi
29. Take the 1st **right** onto S Beretania St 0.1 mi
30. Take the 1st **left** onto Kalakaua Ave 1.9 mi
31. **Kayak across the Pacific Ocean** 3,879 mi
Entering Japan
32. Turn **right** toward 県道263号線 0.3 mi
33. Turn **left** toward 県道263号線 0.2 mi
34. Turn **right** at 県道263号線 0.3 mi
35. Slight **left** to stay on 県道263号線 200 ft
36. Turn **left** to stay on 県道263号線 0.3 mi
37. Turn **right** at 国道125号線 0.4 mi
38. Turn **left** at 亀城公園北 (交差点) onto 国道354号線 0.4 mi



Google Maps

Web Images Video News Maps more

Stanford, California, United States

KTH-hallen, Stockholm, Sw

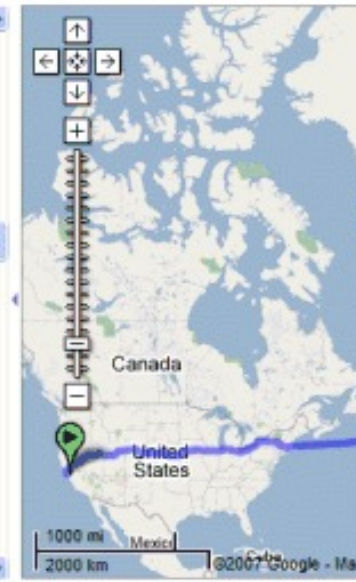
Search the map

Find businesses

Get directions

Maps

29. Take exit 24 A-B-C on the left toward I-93 N/Concord NH/S Station/I-93 S/Quincy 0.4 mi
30. Merge onto Atlantic Ave 0.8 mi
31. Turn **right** at Central St 0.1 mi
32. Turn **right** at Long Wharf 0.1 mi
33. **Swim across the Atlantic Ocean** 3,462 mi
34. Slight **right** at E05 0.5 mi
35. At the roundabout, take the 2nd exit onto E05/Pont Vauban 0.1 mi
36. Turn **right** at E05 5.7 mi
37. Take the exit onto A29/E44 toward Amiens Toll road 27.8 mi
38. Take the exit toward Dieppe/Amiens/Calais/A151/Rouen 1.1 mi

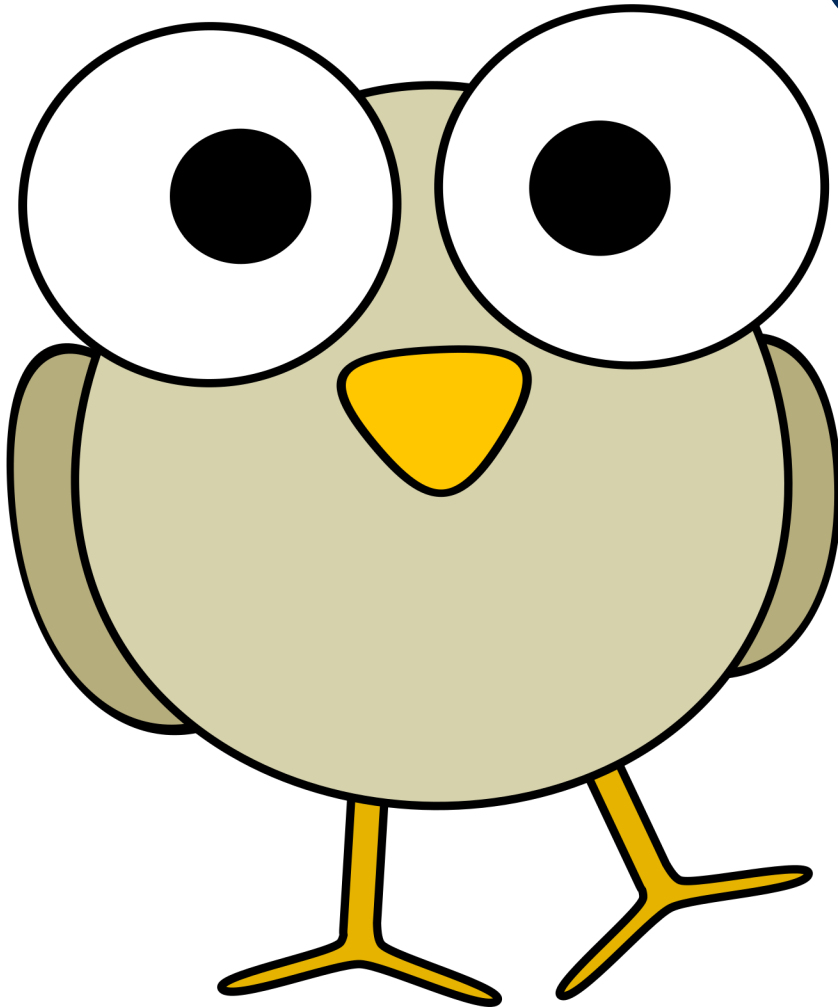


Previously in CSCI 448



- Location
 - fusedLocationProvider
 - Requires ACCESS_FINE_LOCATION & ACCESS_COARSE_LOCATION

Questions?



??

Final Project Extra Credit Opportunity



- CS@Mines Computing Innovation Fair
- May 3 6:30p-8p
 1. Option 1 (3 pts XC): attend fair
 2. Option 2 (6 pts XC): present/demo your final project app at the fair
 - Complete “Sales Pitch Participation” survey by Wed 4/5 2p
 - Does not need to be entire team, done at individual level

Learning Outcomes For Today



- Discuss how to add a Map in our app
- Discuss how to place markers onto the Map
- Discuss how to interact with a Map

On Tap For Today



- Accessing Google Maps
- Adding a Map
- Practice

On Tap For Today



- Accessing Google Maps
- Adding a Map
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Google Maps Compose



- Part of Play Services
 - Need to follow steps for adding and connecting to Play Services
 - Add `com.google.android.gms:play-services-maps` dependency
 - Add `com.google.maps.android:maps-compose` dependency
- Need Maps API Key
 - Need Google account
 - Go to <https://console.developers.google.com>
 - Select Google Maps Android API

Manifest Destiny



- Add Maps API key

```
<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/Theme.GeoLocatrCompose">
    <meta-data
        android:name="com.google.android.geo.API_KEY"
        android:value="${MAPS_API_KEY}" />
    <activity
        android:name=".ui.MainActivity"
        android:exported="true"
        android:theme="@style/Theme.GeoLocatrCompose">
        <intent-filter>
            <action android:name="android.intent.action.MAIN" />

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

Google Maps API Key



- Complete steps to generate API Key in lab writeup
- However...
 - Don't put your personal API Keys into your repo!
 - Use the “secrets-gradle-plugin”
 - Store API Key in local.properties file

On Tap For Today



- Accessing Google Maps
- Adding a Map
- Practice

GoogleMap()



- Just another composable!

```
val cameraPositionState =  
    rememberCameraPositionState {}
```

```
GoogleMap(  
    modifier = Modifier.fillMaxSize(),  
    cameraPositionState = cameraPositionState  
)
```

Adding Marker Composable



- Set position, title, etc. & add to map

```
val myPosition = LatLng(myLocation.latitude, myLocation.longitude)
```

```
GoogleMap(  
    ...  
) {  
    val markerState = MarkerState().apply { position = myPosition }  
    Marker(  
        state = markerState,  
        title = "I Am Here",  
        snippet = "Subtext to display"  
    )  
}
```

- Can set an icon to change the marker image that displays
- Can set many other options

Clicking a Marker



- Set an onClick method to the Marker composable
 - Method then returns which marker was clicked
 - Would need to track marker tags against a data structure map of associated data

Marker Clicking



```
@Composable
fun MyMapper(dataList: List<LocationData>, onMarkerClick: (Marker) -> Boolean) {
    val cameraPositionState =
        rememberCameraPositionState {}
    GoogleMap(
        ...
    ) {
        dataList.forEach { locData ->
            Marker(
                state = MarkerState().apply(position = locData.loc.lat, locData.loc.long),
                tag = locData.uniqueIdentifier,
                onClick = onMarkerClick
            )
        }
    }
    ...
    val dataMap: Map<UUID, LocationData> = ...
    MyMapper(
        dataList = dataMap.values,
        onMarkerClick = { marker ->
            val markerData = dataMap[ marker.tag ]
            false
        }
    )
}
```

Zoom



- To zoom in on an area of interest
 1. Create bounding box that includes all points of interest (based on lat/long)

```
val bounds = LatLngBounds.Builder()  
    .include(myLocationPoint)  
    .include(myLocationPoint2)  
    .build()
```

2. Determine a margin

```
val margin = resources.getDimensionPixelSize(R.dimen.map_inset_margin)
```


Zoom Zoom



3. Update the camera!

```
val cameraUpdate = CameraUpdateFactory.newLatLngBounds(bounds, margin)
// jump to location
cameraPositionState.move(cameraUpdate)
// smoothly zoom in on location
coroutineScope.launch {
    cameraPositionState.animate(cameraUpdate)
}
```

Demo!



On Tap For Today



- Accessing Google Maps
- Adding a Map
- Practice

Lab10B / A4



- Can now complete Lab10
- And start A4 (will be posted after class)