Geolocation in HTML5 and Android

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Agenda

- Introduction to Geolocation
- Geolocation in Android
- Geolocation in HTML5
- Conclusion

Introduction to Geolocation

- To get user's location
- Common methods:
  a. GPS
     - Requires a GPS chip
     - Highly accurate but cannot work indoor and takes a long time
  b. Cell tower triangulation
     - Requires device in vicinity of 3+ cell towers
     - Distance to tower estimated using ping time
  c. Wi-fi Positioning System (fast and can be very accurate)
     - Requires an external database of wifi hotspots
     - Database needs to be constantly updated
     - Distance estimated using wifi signal strength
  d. IP address (Also uses an external database, city-level acc.)

Geolocation in Android

- Permissions:
  - ACCESS_FINE_LOCATION
  - ACCESS_COARSE_LOCATION
  - INTERNET
  - ACCESS_MOCK_LOCATION is required if using an emulator
- Get a reference to LocationManager
  - You do not instantiate this class directly; instead, retrieve it through Context.getSystemService (Context.LOCATION_SERVICE)

Pick a Location Provider

- locationManager.getProvider(String providerName)
- providerName can be: GPS_PROVIDER, NETWORK_PROVIDER, or PASSIVE_PROVIDER
- providerName can also be retrieved from the system given criteria.
- Criteria can be set based on: power requirement, accuracy, bearing, speed, altitude, and cost.

```
// Retrieve a list of location providers that have fine accuracy, no monetary cost
Criteria criteria = new Criteria();
criteria.setAccuracy(Criteria.ACCURACY_FINE);
criteria.setCostAllowed(false);
...
String providerName = locManager.getBestProvider(criteria, true);
```

Verify the Location Provider is Enabled

- Some location providers such as the GPS can be disabled in Settings
- To check whether the desired location provider is currently enabled, call the isProviderEnabled() method
- If not, allow the user to enable it in the Settings by firing an Intent with ACTION_LOCATION_SOURCE_SETTINGS action.

```
if (!(locationManager.isProviderEnabled(providerName))){
    Intent settingsIntent = new Intent(Settings.ACTION_LOCATION_SOURCE_SETTINGS);
    startActivity(settingsIntent);
}
```

Get the Location

- requestLocationUpdates
  - Periodically receive location updates
  - Supply a providerName or a Criteria
  - Supply a LocationListener or a PendingIntent
  - Specify minTime and minDistance
  - call removeUpdates to cancel request
- requestSingleUpdate
  - Same as requestLocationUpdates, use this if you want to receive only one location update
- getLastKnownLocation(String providerName)
  - It may take a while to receive the first location update. Use this if a location is needed immediately
  - Use getTime(), getAccuracy(), and getSpeed() to decide whether to use it.

Using the Location object

- Some common methods:
  - getLatitude in degrees
  - getLongitude in degrees
  - getTime in milliseconds UTC time since Jan. 1, 1970
  - getAccuracy in meters -> check with hasAccuracy first
  - getAltitude in meters -> check with hasAltitude first
  - getBearing in degrees -> check with hasBearing first
  - getSpeed in m/s -> check with hasSpeed first
  - distanceTo in meters
  - static distanceBetween in meters

Geolocation in HTML5

Some facts:

- Geolocation is actually NOT part of the W3C HTML5 specification. But a separate W3C specification by itself.
- Is not the same as the Google Maps API
- However, it is well supported by popular web browsers, on both desktop and mobile.

The Methods of Geolocation API

Only 3 methods:

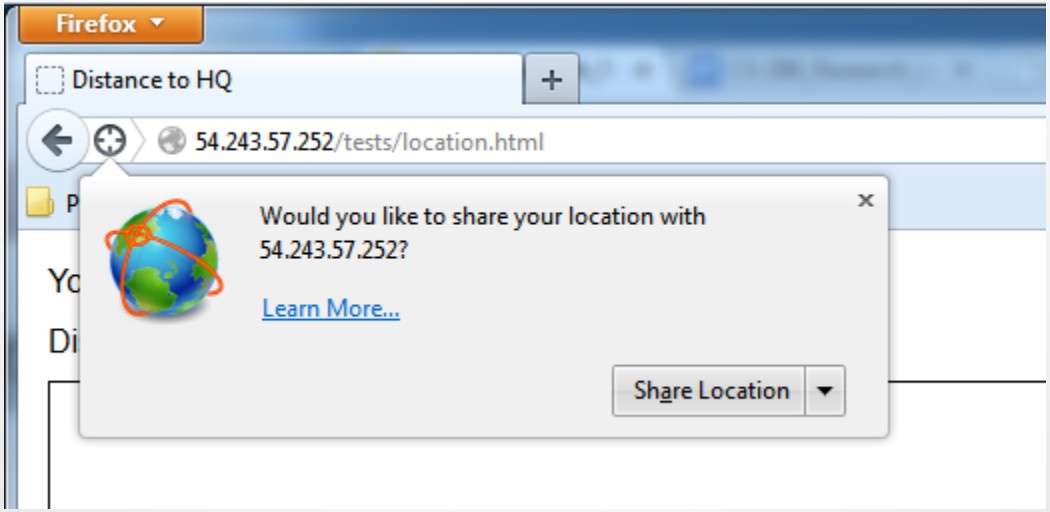
1. getCurrentPosition
   - To get the current position one time
2. watchPosition
   - To track user's movement by repeatedly calling getCurrentPosition
3. clearWatch
   - To cancel watchPosition call

Testing for Geolocation Support

```
window.onload = getMyLocation;
function getMyLocation() {
    if (navigator.geolocation) {
        navigator.geolocation.getCurrentPosition
    (displayLocation);
    } else {
        alert("Oops, no geolocation support");
    }
}
```

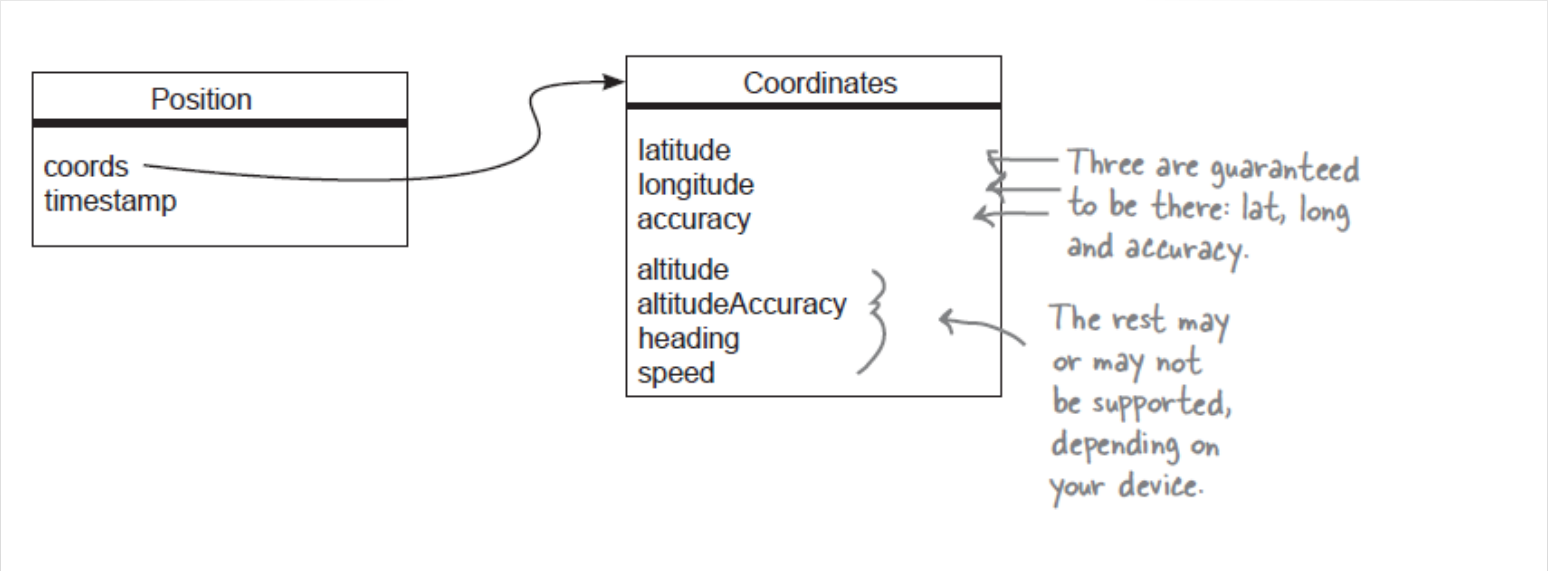
Obtain User's Permission

Browsers will ask for user's permission before allowing a webpage to access their locations



How to get the Position

```
function displayLocation(position) {
    var latitude = position.coords.latitude;
    var longitude = position.coords.longitude;
    var accuracy = position.coords.accuracy;
}
```



More on getCurrentPosition Method

```
getCurrentPosition(successHandler, errorHandler, positionOptions)
```

```
var positionOptions = {
    enableHighAccuracy: false,
    timeout: Infinity,
    maximumAge: 0
}
```

- timeout: the time the browser has to determine the current position. Set to Infinity by default
- maximumAge: the position age in the cache. Default is 0 meaning browser always calculates new position.

Conclusion

- Use Geolocation when you need to find user's location
- Available in Android through the LocationManager class
- Very well supported in HTML5 by popular web browsers (both mobile and desktop)
- Use getCurrentPosition function and the Position object to get the location

References

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Question?