

User Interaction: Google Maps API

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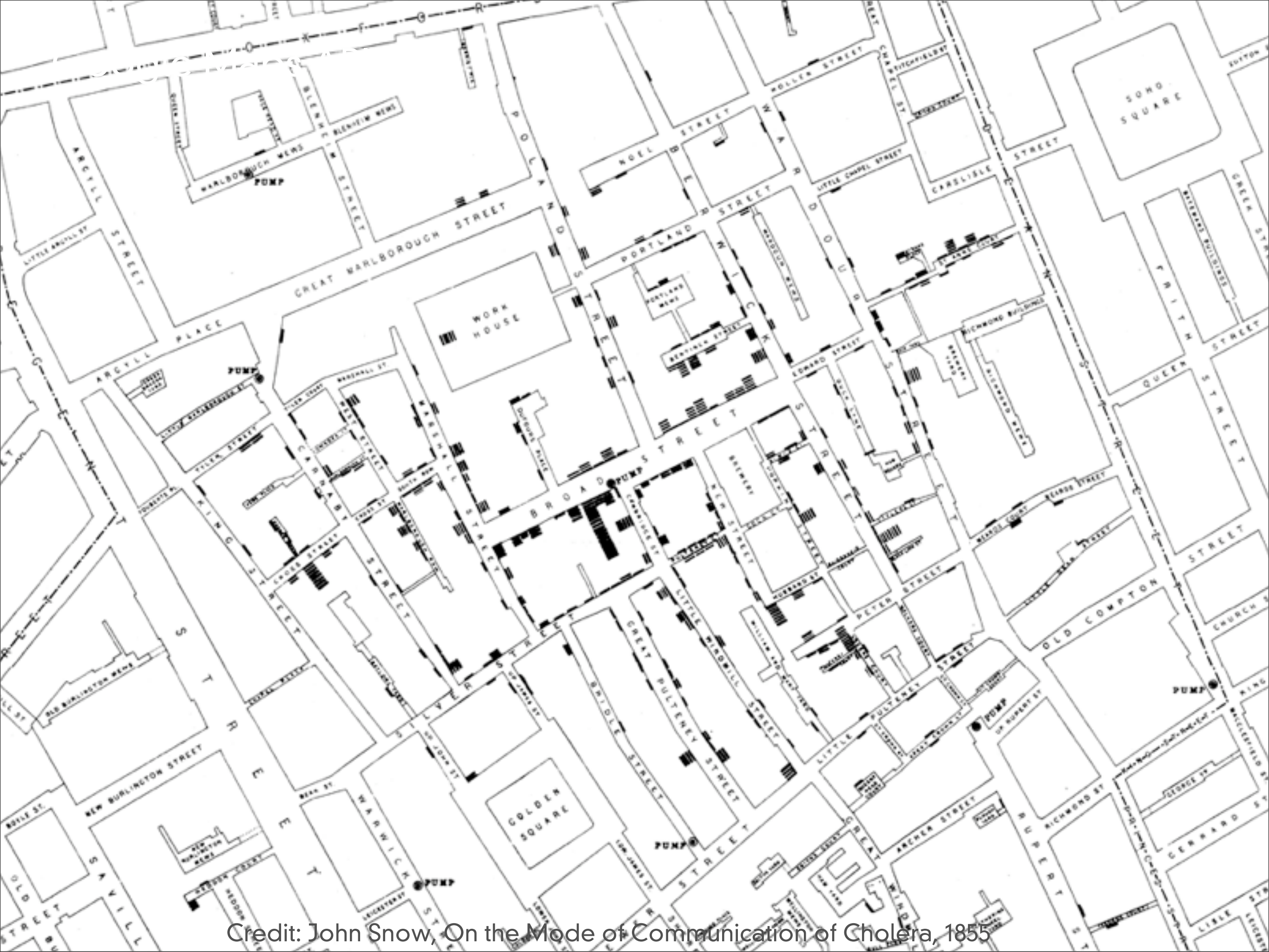
Why maps?

- Central to much mobile interaction work.
- It can be generalized to interactions with enormous images very easily.
- Mapping data is a natural visualization that helps to reveal patterns.



Why maps?

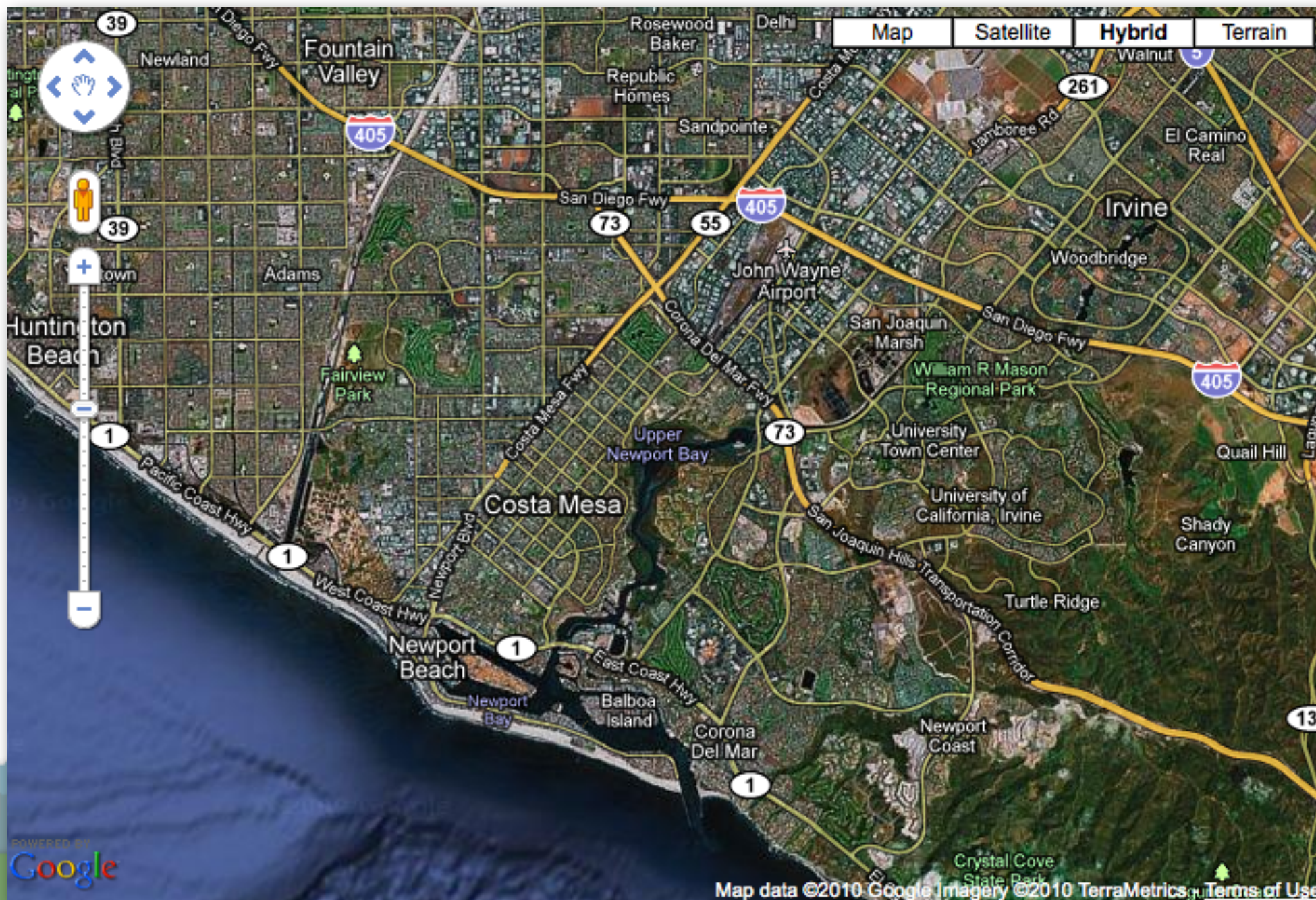




Credit: John Snow, On the Mode of Communication of Cholera, 1855

Google Maps API

- Google Maps v3 is optimized for mobile
- It used to be just for mobile but is being adapted as the standard Maps API for all platforms



Basics

- Google hosts most of the code in a javascript library
- A developer includes the javascript library
 - Just like jQuery
- A developer makes calls to the library to:
 - display the map
 - display controls
 - display points
 - display other U/I elements



Basics

- You can register event handlers
 - So that when a user does something on the map, you can do something on the webpage also (through JavaScript)



Basic Map Objects

- Create a placeholder in your webpage to hold the map object

```
<html>
  <head>
    <script src="http://ajax.googleapis.com/ajax/libs/jquery/1.4/jquery.min.js"></script>
    <script src="http://ajax.googleapis.com/ajax/libs/jqueryui/1.8/jquery-ui.min.js"></script>
    <script src="Step01.js"></script>
  </head>
  <body>
    <div id="map_canvas" style="float:right;width:500px;height:353px;border:black">
      <p>
        </a>
      </p>
    </div>

    <div class="dataXML">Replace this with XML</div>
    <hr/>
    <div class="dataJSON">Replace this with JSON</div>
    <hr/>
    <div class="dataJSONP">Replace this with JSONP</div>
  </body>
</html>
```

AJAX XML call returned:

- photo.JPG
- Log_n_Light-4r
- Economía y derechos humanos- Manuel Humberto Restrepo Domínguez - UPTC
- Bike parking, Portland style. <3
- Narrow Coastal Road
- Playful
- Hospedería del Santuario de Montgrony
- Singapore CBD
- Under the Cottonwood
- Tomatillo 061
- 2011-07-28T14_02_20_v1
- P9163859.JPG
- Evening Delta Departure - N844MH
- P9153520.JPG
- IMG_1546
- DSC00004
- White tiger
- The shopping lady

AJAX JSON call returned:

• undefined

AJAX JSONP call returned:

- IMG_6381
- IMG_6383
- IMG_6384
- IMG_6382
- IMG_6379
- IMG_6375
- IMG_6371
- IMG_6380
- IMG_6378
- IMG_6377
- IMG_6373
- IMG_6369
- IMG_6370
- IMG_6372
- IMG_6376
- IMG_6362
- IMG_6363
- IMG_6367
- IMG_6360
- IMG_6358



Credit: PlanetObserver, <http://www.flickr.com/photos/planetobserver/4770854356/>

Basic Map Objects

- The size is up to you
 - Android/iPhone work best at
 - full screen
- Javascript can detect this for you

List of Data	Location
63790) Schhafer Park Elementry in Hayward, Ca Last Updated: 10/23/2009	Hayward, Ca
63770) 427 S. Cabrillo Ave. (rear upstairs unit) in San Pedro, Ca Last Updated: 10/20/2009	San Pedro, Ca
63755) Coffin Creek in Corona, CA Last Updated: 10/20/2009	Corona, CA
63754) Callson Manor in Roseville, CA Last Updated: 10/20/2009	Roseville, CA
63753) Fear Overload in Sacramento, CA Last Updated: 10/20/2009	Sacramento, CA
63752) Los Angeles Haunted Hayride in Calabasas, CA Last Updated: 10/20/2009	Calabasas, CA
63703) CSUF Library, old wing in Fullerton, CA Last Updated: 9/27/2009	Fullerton, CA
63693) haunted forest pasadena in pasadena, ca Last Updated: 9/18/2009	pasadena, ca
63691) The Haunted Ponds. in palmdale, ca Last Updated: 9/16/2009	palmdale, ca
63680) Simon Magus House in Riverside, CA Last Updated: 9/8/2009	Riverside, CA
63667) Niles Canyon White Witch in Fremont, CA Last Updated: 9/2/2009	Fremont, CA
63666) Secret Sidewalk in Fremont, CA Last Updated: 9/2/2009	Fremont, CA
63665) Drawbridge in Drawbridge, CA Last Updated: 9/2/2009	Drawbridge, CA
63664) Oak Knolls Naval Base in Oakland, CA Last Updated: 9/2/2009	Oakland, CA
63663) Bulb Castle in Albany, CA Last Updated: 9/2/2009	Albany, CA
63661) SAN BERNARDINO,CA in SB, CA Last Updated: 8/29/2009	SB, CA
63660) SAINT SOPHIAS GREEK ORTHODOX CHURCH CAMP in SAN BERNARDINO, CA Last Updated: 8/29/2009	SAN BERNARDINO, CA
63659) SAN BERNARDINO MOUNTAIN AREA in SAN BERNARDINO, CA Last Updated: 8/29/2009	SAN BERNARDINO, CA
63643) watsonville institute of cosmetology in watsonville, ca Last Updated: 8/19/2009	watsonville, ca
63641) Old house in modesto, ca Last Updated: 8/19/2009	modesto, ca
63631) Date Palm Apartments in Riverside, CA Last Updated: 8/7/2009	Riverside, CA
63621) Sunny Acres Asylum in San Luis Obispo, CA Last Updated: 7/31/2009	San Luis Obispo, CA
63618) Santa Lucian Mountains in Santa Lucian Mountains, Ca Last Updated: 10/8/2009	Santa Lucian Mountains, Ca
63617) Giant Skeletons in Lompoc, Ca Last Updated: 7/31/2009	Lompoc, Ca
63616) Finance District in Los Angeles, CA Last Updated: 7/30/2009	Los Angeles, CA
63611) Billawack Dairy in Ventura, Ca Last Updated: 7/29/2009	Ventura, Ca
63610) Tick Canyon in Canyon Country, Ca Last Updated: 7/29/2009	Canyon Country, Ca
63609) 105 Freeway in Fillmore, Ca Last Updated: 7/29/2009	Fillmore, Ca
63599) Twin Lakes Tamarack Cabin #28 in Mammoth Lakes, CA Last Updated: 7/21/2009	Mammoth Lakes, CA
63594) Point Loma Nazaren University in San Diego, CA Last Updated: 7/20/2009	San Diego, CA
63581) Ohlone Burial Grounds in Fremont, CA Last Updated: 7/17/2009	Fremont, CA
63576) Westin St Francis Hotel in San Francisco, ca Last Updated: 7/16/2009	San Francisco, ca
63558) fleming middle school in lomita, california Last Updated: 7/9/2009	lomita, california
63557) San Jacinto Cemetery in San Jacinto , Ca Last Updated: 7/8/2009	San Jacinto , Ca
63554) La Vista Cemetery in National City, ca Last Updated: 7/6/2009	National City, ca



```
<script type="text/javascript">
  function detectBrowser() {
    var useragent = navigator.userAgent;
    var mapdiv = document.getElementById("map_canvas");

    if (useragent.indexOf('iPhone') != -1 || useragent.indexOf('Android') != -1 ) {
      mapdiv.style.width = '100%';
      mapdiv.style.height = '100%';
    }
  }
</script>
```



Basic Map Loading

- Loading the Google Maps Library

```
<script type="text/javascript" src="http://maps.google.com/maps/api/js?sensor=set_to_true_or_false">
```

- Parameters for the library
 - “sensor”: does your location come from a sensor?
 - mandatory parameter
 - allows Google to respect business agreements
 - “language”: what language are the labels in?
 - “region”: bias behavior toward a region
 - “Paris” in TX or “Paris” in France?



Putting the map on the web page

```
function initializeMap(){
    var latlng = new google.maps.LatLng(33.643298,-117.841983);
    var myOptions = {
        zoom: 8,
        center: latlng,
        mapTypeId: google.maps.MapTypeId.ROADMAP
    };
    var map = new google.maps.Map(document.getElementById("map_canvas"), myOptions);
}
```

AJAX XML call returned:

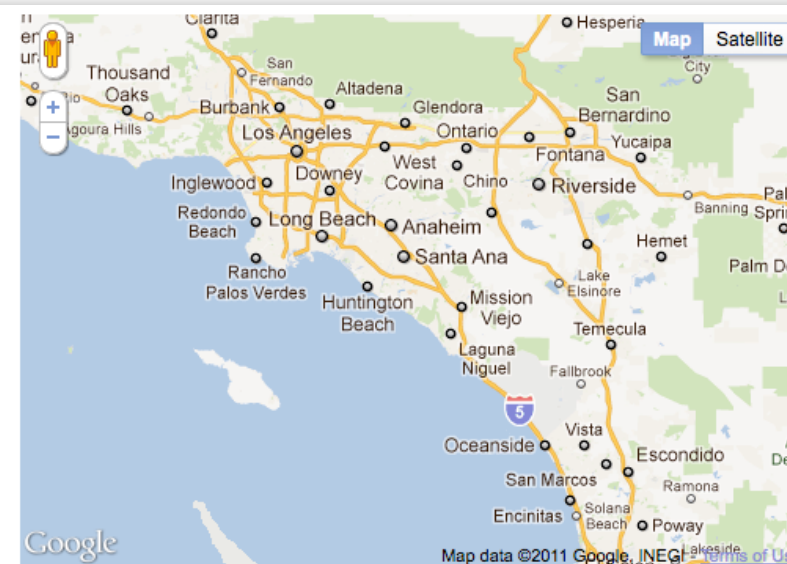
- P1050119.JPG
- luz
-
- #
- Greenwich and Docklands International Festival
- 我好飽！竟然還提了依堆宵夜回去！
-
-
- Stitch, fearing he's had one too many strudels, decides to step on the scales.
-
-
-
-
-
-
-
- P9153653.JPG
-
-
- Compagnia Carri

AJAX JSON call returned:

- undefined

AJAX JSONP call returned:

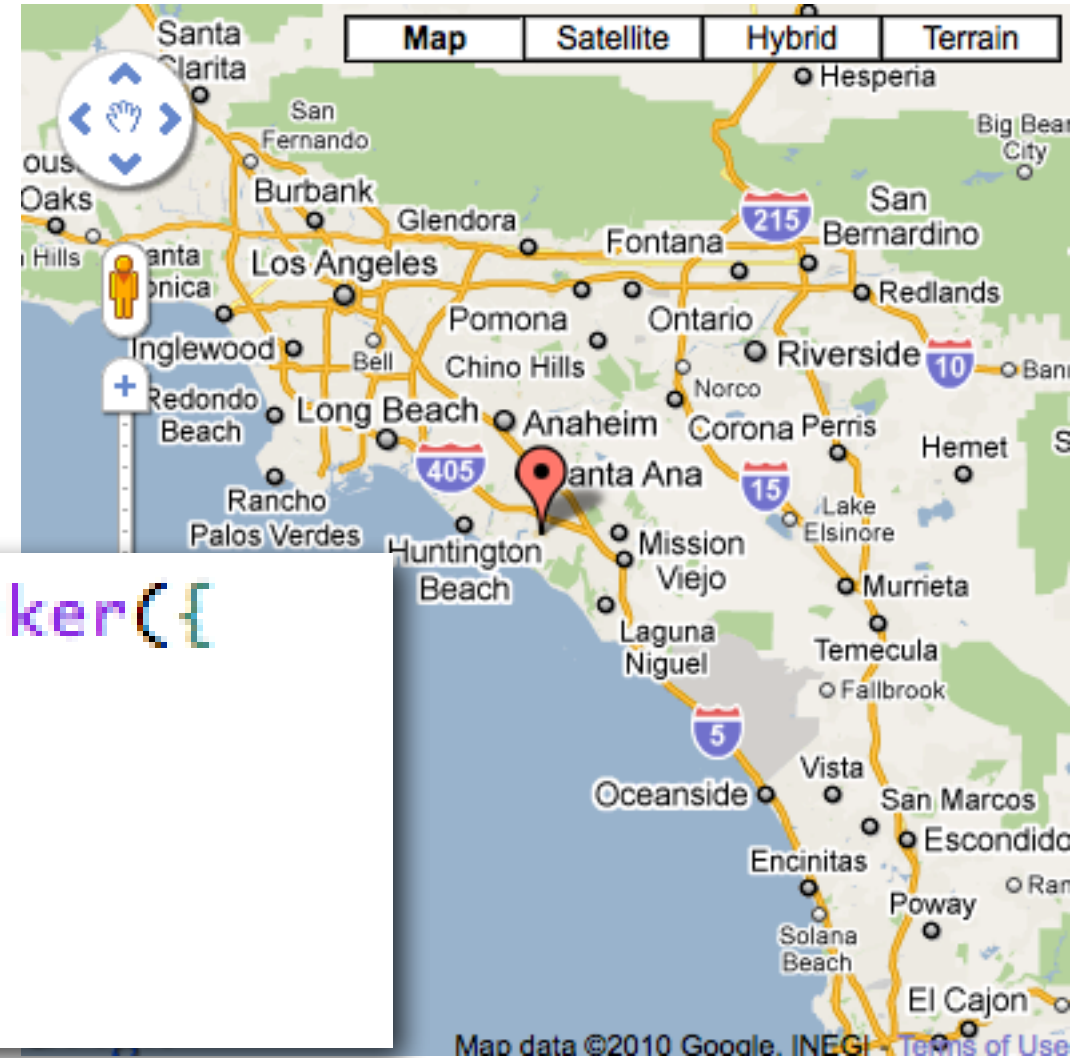
- IMG_6381
- IMG_6383
- IMG_6384



Putting the things on the web page

- Markers

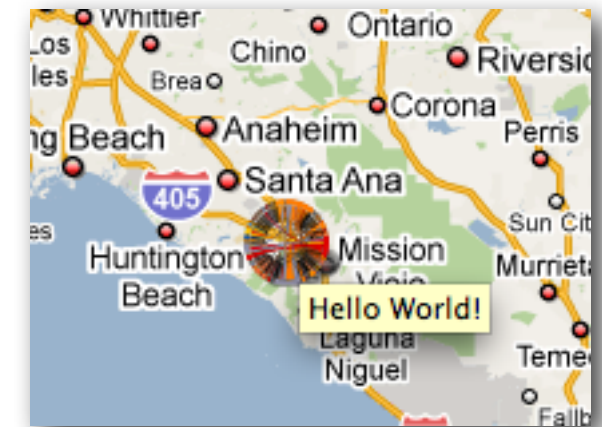
```
var marker = new google.maps.Marker({  
  position: latlng,  
  map: map,  
  title: "Hello World!"  
});
```



Putting the things on the web page

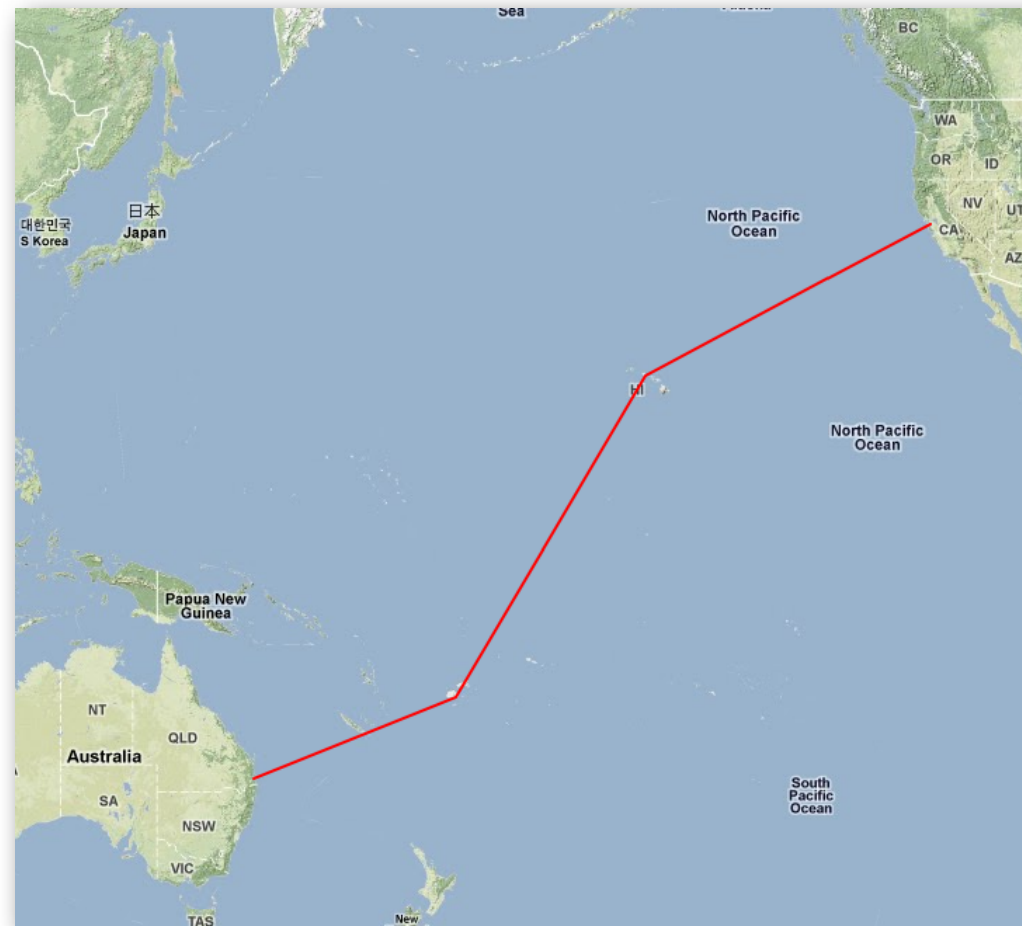
- Icons

```
var image = new google.maps.MarkerImage('images/icon.png',  
    // This marker is 32 pixels wide by 32 pixels tall.  
    new google.maps.Size(32, 32),  
    // The origin for this image is 0,0.  
    new google.maps.Point(0,0),  
    // The anchor for this image is at 0,16.  
    new google.maps.Point(0, 16));  
  
var shadow = new google.maps.MarkerImage('images/shadow.png',  
    // The shadow image is larger in the horizontal dimension  
    // while the position and offset are the same as for the main image.  
    new google.maps.Size(41, 18),  
    new google.maps.Point(0,0),  
    new google.maps.Point(0,0));  
  
var marker = new google.maps.Marker({  
    position: latlng,  
    map: map,  
    shadow: shadow,  
    icon: image,  
    title: "Hello World!"  
});
```



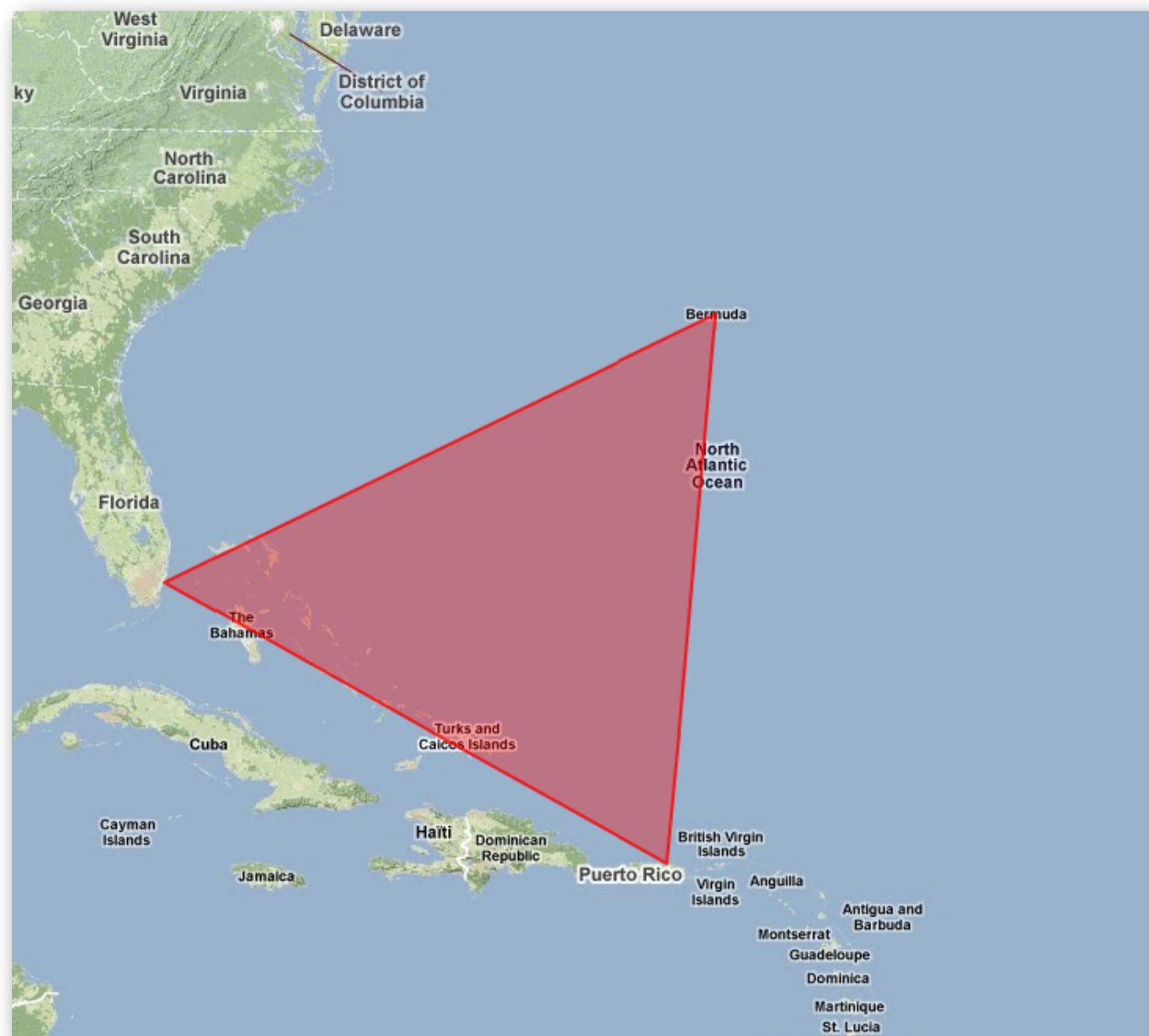
Putting the things on the web page

- Polylines



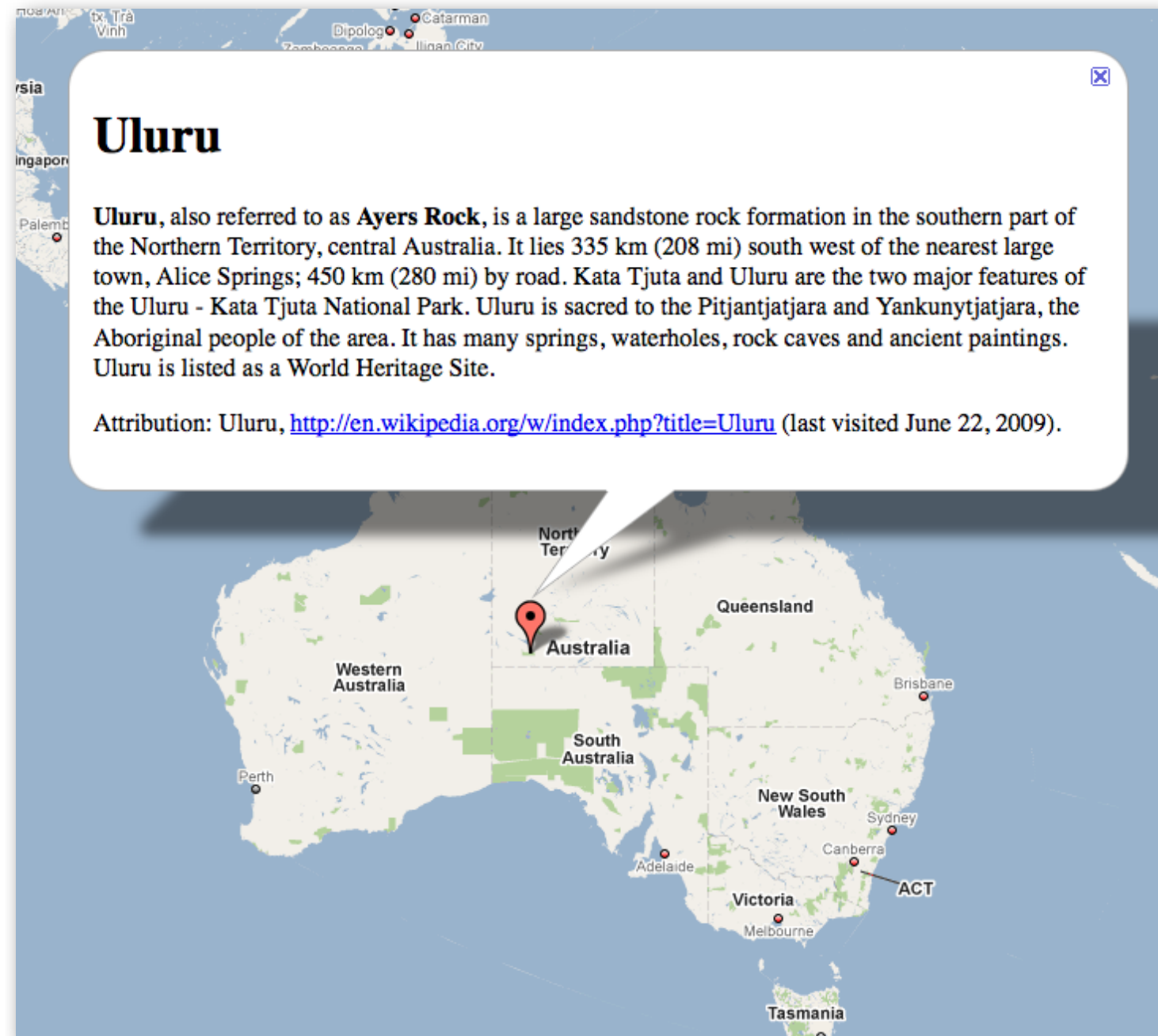
Putting the things on the web page

- Polygons



Putting the things on the web page

- Info Windows



Uluru

Uluru, also referred to as **Ayers Rock**, is a large sandstone rock formation in the southern part of the Northern Territory, central Australia. It lies 335 km (208 mi) south west of the nearest large town, Alice Springs; 450 km (280 mi) by road. Kata Tjuta and Uluru are the two major features of the Uluru - Kata Tjuta National Park. Uluru is sacred to the Pitjantjatjara and Yankunytjatjara, the Aboriginal people of the area. It has many springs, waterholes, rock caves and ancient paintings. Uluru is listed as a World Heritage Site.

Attribution: Uluru, <http://en.wikipedia.org/w/index.php?title=Uluru> (last visited June 22, 2009).

Putting the things on the web page

- Info Windows

```
var contentString = '<div id="content">'+
  '<div id="siteNotice">'+
  '</div>'+
  '<h1 id="firstHeading" class="firstHeading">Uluru</h1>'+
  '<div id="bodyContent">'+
  '<p><b>Uluru</b>, also referred to as <b>Ayers Rock</b>, is a large ' +
  'sandstone rock formation in the southern part of the ' +
  'Northern Territory, central Australia. It lies 335 km (208 mi) ' +
  'south west of the nearest large town, Alice Springs; 450 km ' +
  '(280 mi) by road. Kata Tjuta and Uluru are the two major ' +
  'features of the Uluru - Kata Tjuta National Park. Uluru is ' +
  'sacred to the Pitjantjatjara and Yankunytjatjara, the ' +
  'Aboriginal people of the area. It has many springs, waterholes, ' +
  'rock caves and ancient paintings. Uluru is listed as a World ' +
  'Heritage Site.</p>'+
  '<p>Attribution: Uluru, <a href="http://en.wikipedia.org/w/index.php?title=Uluru&oldid=297882'+
  'http://en.wikipedia.org/w/index.php?title=Uluru</a> (last visited June 22, 2009).</p>'+
  '</div>'+
  '</div>';

var infowindow = new google.maps.InfoWindow({
  content: contentString
});

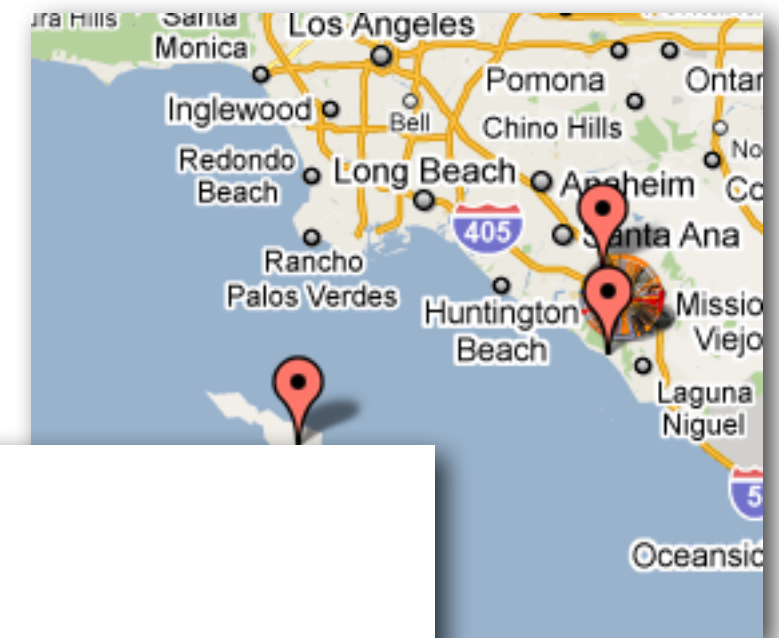
var marker = new google.maps.Marker({
  position: myLatLng,
  map: map,
  title: "Uluru (Ayers Rock)"
});

google.maps.event.addListener(marker, 'click', function() {
  infowindow.open(map, marker);
});
```



Geocoding Addresses

- Icons



```
function codeAddressHelper(results, status) {
    if (status == google.maps.GeocoderStatus.OK) {
        map.setCenter(results[0].geometry.location);
        var marker = new google.maps.Marker({
            map: map,
            position: results[0].geometry.location
        });
    } else {
        alert("Geocode was not successful for the following reason: " + status);
    }
}

function codeAddress() {
    var geocoder = new google.maps.Geocoder();
    var address = document.getElementById("address").value;
    geocoder.geocode( { 'address': address }, codeAddressHelper);
}
```



More info

- Google Maps API v3
 - <http://code.google.com/apis/maps/documentation/javascript/>



How do you debug?

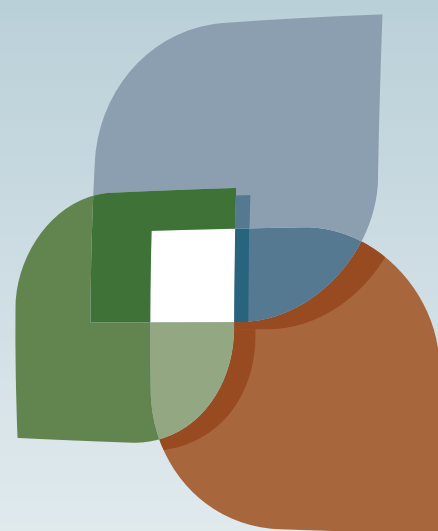
- Web Developer Toolbar
- Firefox Error Console
- Internet Explorer Script Debugger
- Firebug
- Google's GLog library
 - For adding your own debugging statements
- screencast tutorials here:
 - <http://code.google.com/apis/maps/articles/debuggingmaps.html>



Assignment #3

- Add a map to Assignment #2
- AJAX call
- Make your table entries link to the map (center on click)
- Plot the table entries on the map
- Enhance the map in one interesting way
 - For example, multiple map marker icons
 - More than a custom marker or an info window





L U C I

