

Leaflet and Mapbox JavaScript API Fundamentals

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Mapbox

DESIGN THE MAP YOUR ADVENTURE DESERVES.

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what's covered

- Part I - Setting up your environment
- Part II - Creating an Interactive Map with the Leaflet API
- Part III - Adding Customized and Interactive Mapbox Maps
Mapbox.js API
- Part IV - Test Examples and Make an Interactive Map

Part I - Setting up your environment

Things you will need for this workshop:

- working laptop
- internet access

Good to haves:

- slide to follow along: <https://github.com/geografa/foss4g2014-workshops/blob/master/Leaflet-and-Mapbox-JavaScript-API-Fundamentals.md>
- local web server

Real time polls and surveys

Using crowdcast.io - crowdcast.io



Part

The Leaflet API

leafletjs.com/reference.html

Goal

Make an interactive map of places. The map will have:

- custom layers
- custom markers
- custom interface
- custom tooltips
- added plugins

Questions so far?

Creating a basic HTML page

<http://jsbin.com/jugoh/62/>

```
<!DOCTYPE html>
<html>
<head>
<meta charset=utf-8 />
<title>A Leaflet map!</title>
<meta name='viewport' content='initial-scale=1,maximum-scale=1,user-scalable=no' />

// include scripts and css here

</head>
<body>

//your scripts go here

</body>
<html>
```

Adding CSS and scripts

Use the hosted version of Leaflet as described at <http://leafletjs.com/download.html>.

```
<link rel="stylesheet" href="http://cdn.leafletjs.com/leaflet-0.7.3/leaflet.css" />  
<script src="http://cdn.leafletjs.com/leaflet-0.7.3/leaflet.js"></script>
```

Adding styles

Create a basic style that makes the map fit the entire page.

```
<style>
  body { margin:0; padding:0; }
  #map { position:absolute; top:0; bottom:0; width:100%; }
</style>
```

**Add a div container to the body
that will contain your map.**

```
<div id='map'></div>
```

Initializing a map

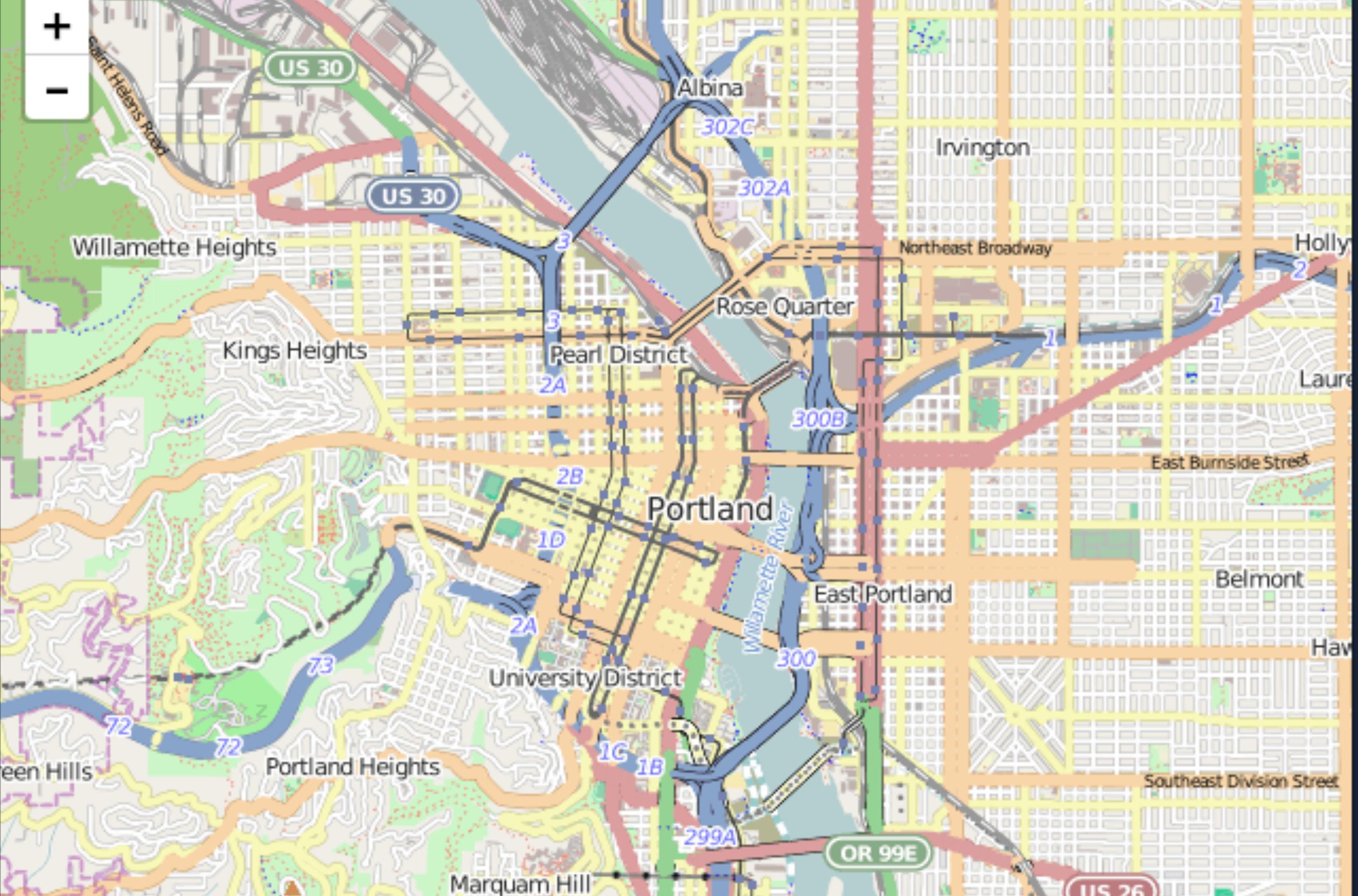
```
<script>  
// create a map in the "map" div  
var map = L.map('map');  
</script>
```

Add a tileLayer to the map element

```
var map = L.map('map');

L.tileLayer('http://{s}.tile.osm.org/{z}/{x}/{y}.png', {
    attribution: '&copy; <a href="http://osm.org/copyright">OpenStreetMap</a>contributors'
}).addTo(map);

map.setView([45.522, -122.6777], 13);
```



Map Controls

Default

- Zoom buttons
- Attribution

Things we can add:

- Layer switcher
- Scale

Map Property handlers

- dragging
- scrollWheelZoom
- attributionControl

Map state options

- center
- zoom
- layers
- minZoom
- maxZoom
- maxBounds

Add map options

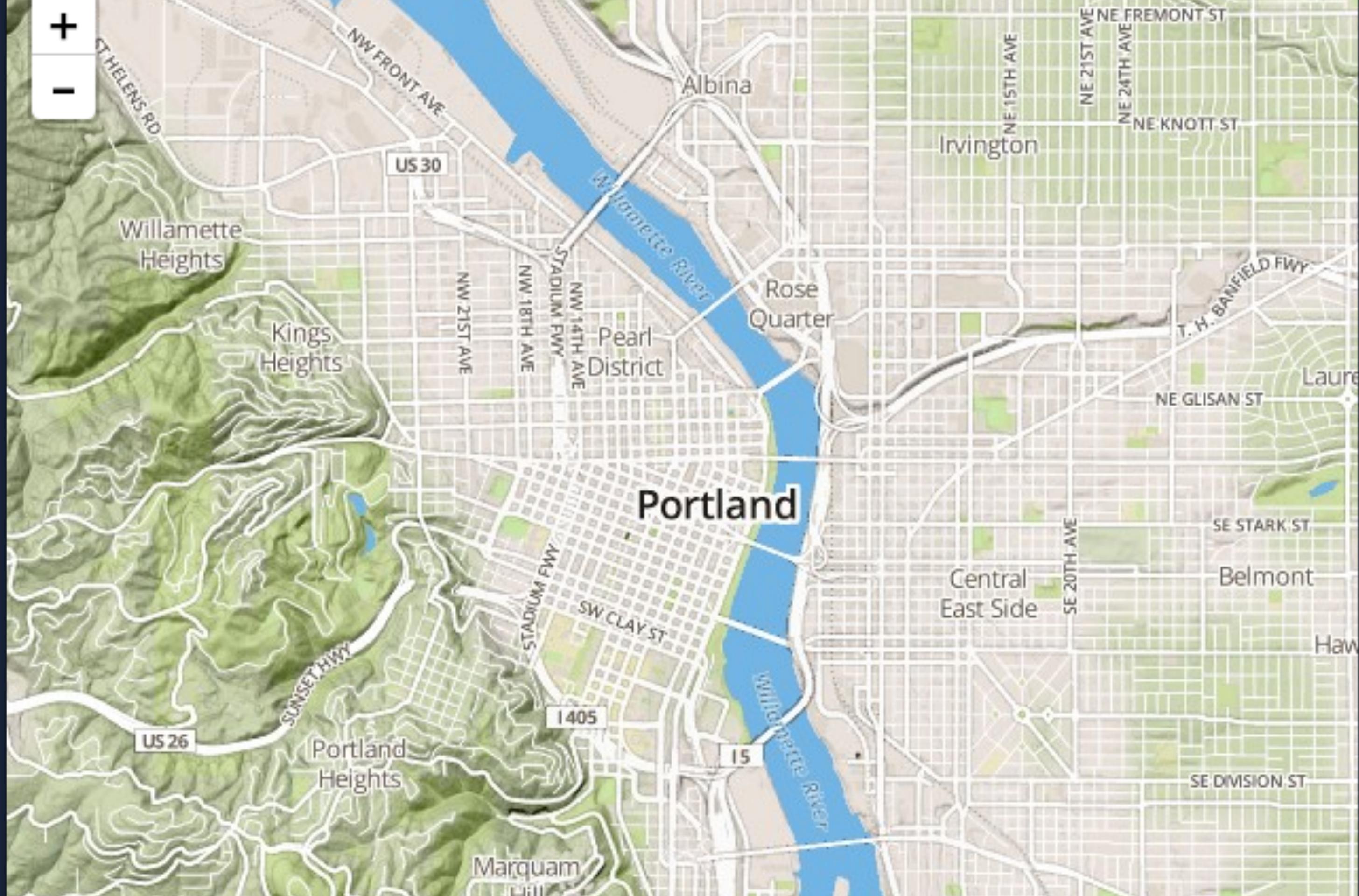
```
// initialize the map on the "map" div with a given center and zoom
var map = L.map('map', {
  center: [45.522, -122.677],
  zoom: 13
});
```

Review adding a tileLayer

```
// add an OpenStreetMap tile layer  
L.tileLayer('http://{s}.tile.osm.org/{z}/{x}/{y}.png').addTo(map);
```

Adding a different tileLayer

```
L.tileLayer('https://s.tiles.mapbox.com/v3/{id}/{z}/{x}/{y}.png', {
    attribution: 'Map data © ' +
        '<a href="http://openstreetmap.org">OpenStreetMap</a> contributors, ' +
        '<a href="http://creativecommons.org/licenses/by-sa/2.0/">CC-BY-SA</a>, ' +
        'Imagery © <a href="http://mapbox.com">Mapbox</a>',
    id: 'examples.map-i86knfo3'
}).addTo(map);
```



Add tileLayer options

```
// add an OpenStreetMap tile layer
L.tileLayer('http://{s}.tile.osm.org/{z}/{x}/{y}.png', {
  attribution: '&copy; <a href="http://osm.org/copyright">OpenStreetMap</a> contributors'
}).addTo(map);
```

lawyers

Available Map Layers

- Tile layers
- Markers
- Popups
- Vector layers: polylines, polygons, circles, rectangles, circle markers
- GeoJSON layers
- Image overlays
- WMS layers

Adding markers

```
// add a marker in the given location  
// attach some popup content to it and  
// open the popup  
var myMarker = L.marker([45.52245801087795, -122.6777386665344]).addTo(map);
```

Marker options

- icon
- clickable
- draggable
- opacity
- riseOnHover

```
var myMarker = L.marker([45.52245801087795, -122.67773866653444], {  
  draggable: true  
}) .addTo(map);
```

Custom icons

```
var myIcon = L.icon({  
    iconUrl: 'https://cldup.com/jSXu-0Reqo-3000x3000.png',  
    iconSize: [50,50],  
    iconAnchor: [24,50],  
    popupAnchor: [1,-50]  
});
```

```
L.marker([45.52245801087795, -122.67773866653444], {  
    icon: myIcon  
})  
.addTo(map);
```

Chaining methods

```
myMarker  
  .bindPopup("Hi. I'm a popup. <br> Customize me.")  
  .openPopup();
```

Marker events

- click
- dblclick
- mousedown
- mouseover
- contextmenu
- drag
- move

Popups

```
myMarker.bindPopup('Hi there').openPopup();
```

```
var myPopup = L.popup()  
  .setLatLng([45.54, -122.65])  
  .setContent('<p>Hello world!<br />This is a nice popup.</p>')  
  .openOn(map);
```

Back to the map

Methods for getting map state

- getCenter()
- getZoom()
- getBounds()

Console time

Open your browser's console to issue commands

- Chrome - console
- Firefox - Firebug

```
map.getCenter();
map.panTo( [38.8,-77] );
map.setZoom(3);
map.setView( [38.89063199187812,-77.01313018798828],8);
```

Interact with the map

```
map.on('click', function() { alert('Clicked on the map!'); });
```

```
map.on('click', function() {
  alert('Coordinates are: ' +
    map.getCenter().lat +
    ', ' +
    map.getCenter().lng);
});
```

Map events

- click
- dblclick
- mousedown
- mouseover
- layeradd

Available Map Layers

- Tile layers
- Markers
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- Vector layers: polylines, polygons, circles, rectangles, circle markers
- GeoJSON layers
- Image overlays
- WMS layers

polylines, polygons, circles, rectangles, circle markers

```
var latlngs = [[45.52, -122.67],  
[45.53, -122.68]];
```

```
var myPolyline = L.polyline(latlngs, {  
    color: 'red'  
})  
.addTo(map);
```

```
// zoom the map to the polyline  
map.fitBounds(myPolyline);
```

Methods for Layers and Controls

- addLayer(layer)
- removeLayer(layer)
- hasLayer(layer)
- eachLayer(function)
- openPopup(popup)
- openPopup(html,latlng,popup options)
- closePopup(popup)

**Remove addTo(map)
from myMarker and
myPolyline**

LayerGroup

```
var myLayers = L.layerGroup([myMarker])  
    .addLayer(myPolyline)  
    .addTo(map);
```

Example

```
myLayers.eachLayer(function (layer) {  
    layer.bindPopup('Hello')  
});
```

Share methods between layers with FeatureGroup

```
L.featureGroup([myMarker, myPolyline])
  .bindPopup('Hello world!')
  .on('click', function() {
    alert('Clicked on a group!');
  })
  .addTo(map);
```

GeoJSON

```
var data = {
  "type": "Feature",
  "features": [
    {
      "type": "Feature",
      "properties": {
        "title": "DoubleTree Hotel",
        "address": "1000 NE Multnomah Street, Portland, Oregon, 97232",
        "phone": "+1-503-281-6111",
        "marker-symbol": "lodging",
        "color": "#23344c",
        "radius": 300
      },
      "geometry": {
        "type": "Point",
        "coordinates": [
          -122.65522956848145,
          45.53050807819899
        ]
      }
    }
  ]
};
```

```
var geoJson = L.geoJson(data, {
    pointToLayer: function(feature, latlng) {
        return L.circleMarker(latlng, {
            radius: feature.properties.radius,
            fillColor: '#bada55',
            fillOpacity: .8
        })
    }
});
```

```
var geoJson = L.geoJson(data, {
  pointToLayer: function(feature, latlng) {
    return L.circleMarker(latlng, {
      radius: feature.properties.radius,
      fillColor: '#bada55',
      fillOpacity: .8
    })
  },
  onEachFeature: onEachFeature
});
```

```
function onEachFeature(feature, layer) {
  layer.on({
    click: zoomToFeature
  });
}
```

Questions?



Part II

The background of the image is a dark, somber landscape. In the foreground, there are many tall, thin, dark brown or blackened tree trunks, likely from a forest fire, standing vertically. Above them, the sky is filled with heavy, dark clouds, with some lighter, greyish areas suggesting a setting or rising sun. The overall mood is somber and dramatic.

Mapbox.js API



Mapbox.js is a plugin for the Leaflet API

Adding CSS and scripts

Use the hosted version of Mapbox as described at <https://www.mapbox.com/mapbox.js/>.

```
<script src='https://api.tiles.mapbox.com/mapbox.js/v2.0.1/mapbox.js'></script>
<link href='https://api.tiles.mapbox.com/mapbox.js/v2.0.1/mapbox.css' rel='stylesheet' />
```

The background of the slide is a dark, moody landscape. On the right side, there's a large, leafless tree with many gnarled branches. To its left is a steep, rocky cliff face with some sparse vegetation at the bottom. The sky is a uniform, dark grey, suggesting either dawn or dusk. The overall mood is somber and mysterious.

Initializing the map

```
// L.mapbox.map(element, id|url|tilejson, options)
```

```
var map = L.mapbox.map('map')
.setView([45.512,-122.684], 7);
```

Add a tileLayer to the map

```
var layer = L.mapbox.tileLayer('grafa.a962eabc');  
layer.addTo(Map);
```

gridLayers

Add gridLayers to the map

```
// The visible tile layer
L.mapbox.tileLayer('examples.map-8ced9urs')
  .addTo(map);

// Load interactivity data into the map with a gridLayer
var myGridLayer = L.mapbox.gridLayer('examples.map-8ced9urs')
  .addTo(map);

// And use that interactivity to drive a control the user can see.
var myGridControl = L.mapbox.gridControl(myGridLayer)
  .addTo(map);
```

featureLayers

featureLayers

```
var myFeatureLayer = L.mapbox.featureLayer(geojson)
    .addTo(map);

// or

var myFeatureLayer = L.mapbox.featureLayer()
    .addTo(map);

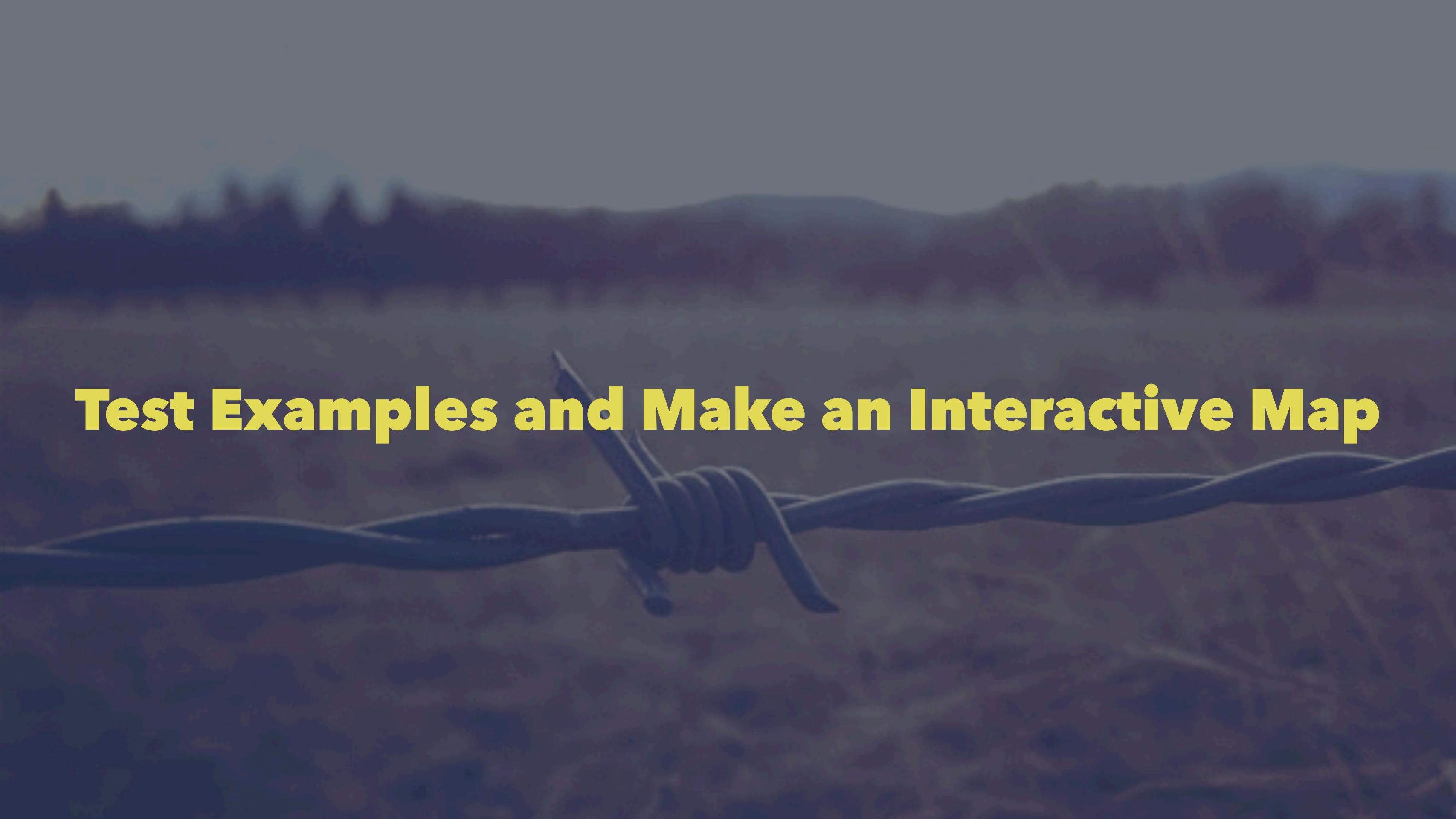
// then

myFeatureLayer.loadURL('my_local_markers.geojson')
    .addTo(map);

// loads markers from the map `examples.map-0153fhk2` on Mapbox,
// if that map has markers
myFeatureLayer.loadID('examples.map-0153fhk2');
```

```
var featureLayer = L.mapbox.featureLayer()
  .loadURL('things.geojson')
  .addTo(map);
```

Part IV

A photograph of a person's hand holding a blue pen, pointing it towards a map of the United States. The map is a standard political map with state boundaries and names. The background is a dark, slightly out-of-focus landscape with hills or mountains. The overall composition suggests a presentation or a guide.

Test Examples and Make an Interactive Map

Resources

- help@mapbox.com
- <https://groups.google.com/forum/#!forum/leaflet-js>
- <https://github.com/Leaflet/Leaflet>
- <https://github.com/mapbox/mapbox.js>