Content

Scope

Exploration of georeferenced information viewers using Open Layers and Leaflet

1. Open Layers

1.1 Base Structure

index.html

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8">
    <title>OpenLayers</title>
    <style>
      html, body, #map-container {
        margin: 0;
        height: 100%;
        width: 100%;
        font-family: sans-serif;
      }
    </style>
  </head>
  <body>
    <div id="map-container"></div>
  </body>
</html>
```

+

main.js

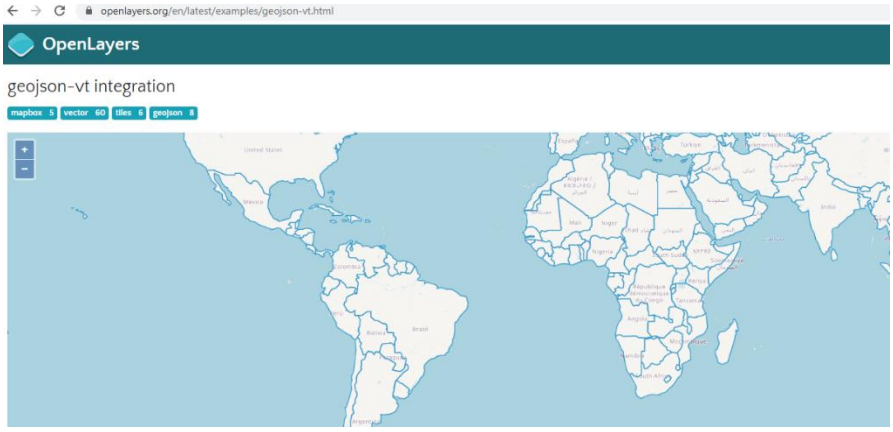
```
import 'ol/ol.css';
import {Map, View} from 'ol';
import TileLayer from 'ol/layer/Tile';
import XYZSource from 'ol/source/XYZ';
import {fromLonLat} from 'ol/proj';

new Map({
  target: 'map-container',
  layers: [
    new TileLayer({
      source: new XYZSource({
        url: 'http://tile.stamen.com/terrain/{z}/{x}/{y}.jpg'
      })
    })
  ],
  view: new View({
    center: fromLonLat([0, 0]),
    zoom: 2
  })
});
```

Result:

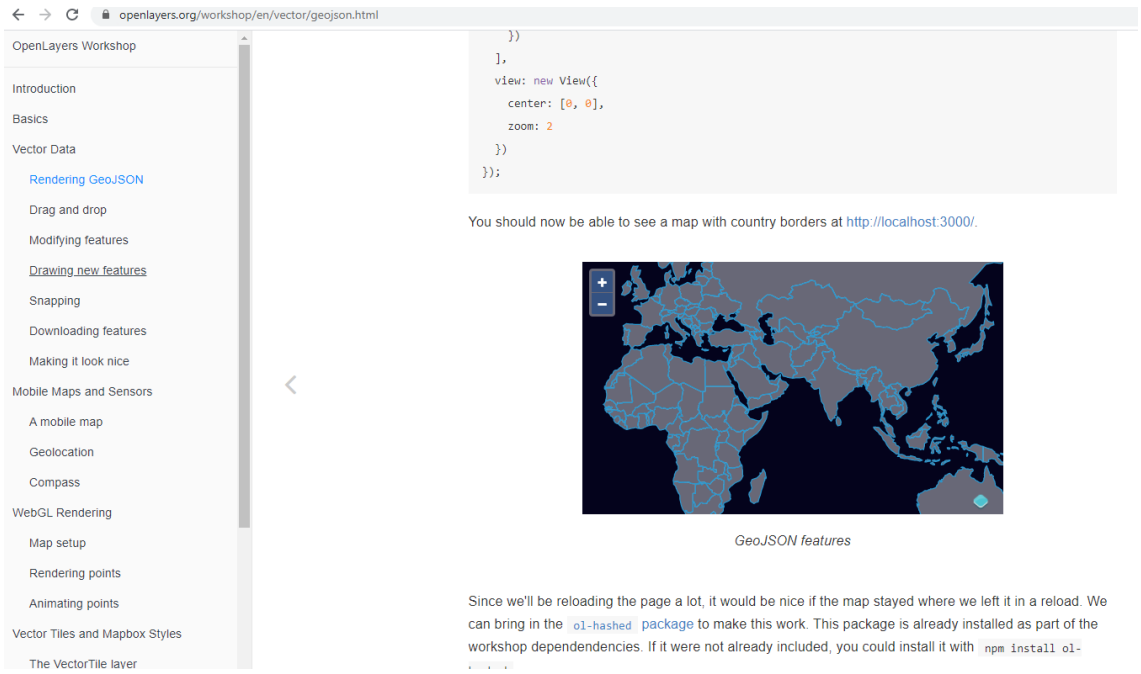
1.2 OpenLayers and GeoJSON

Consider the example of the tutorial available at:

- Countries: https://openlayers.org/en/latest/examples/geojson-vt.html

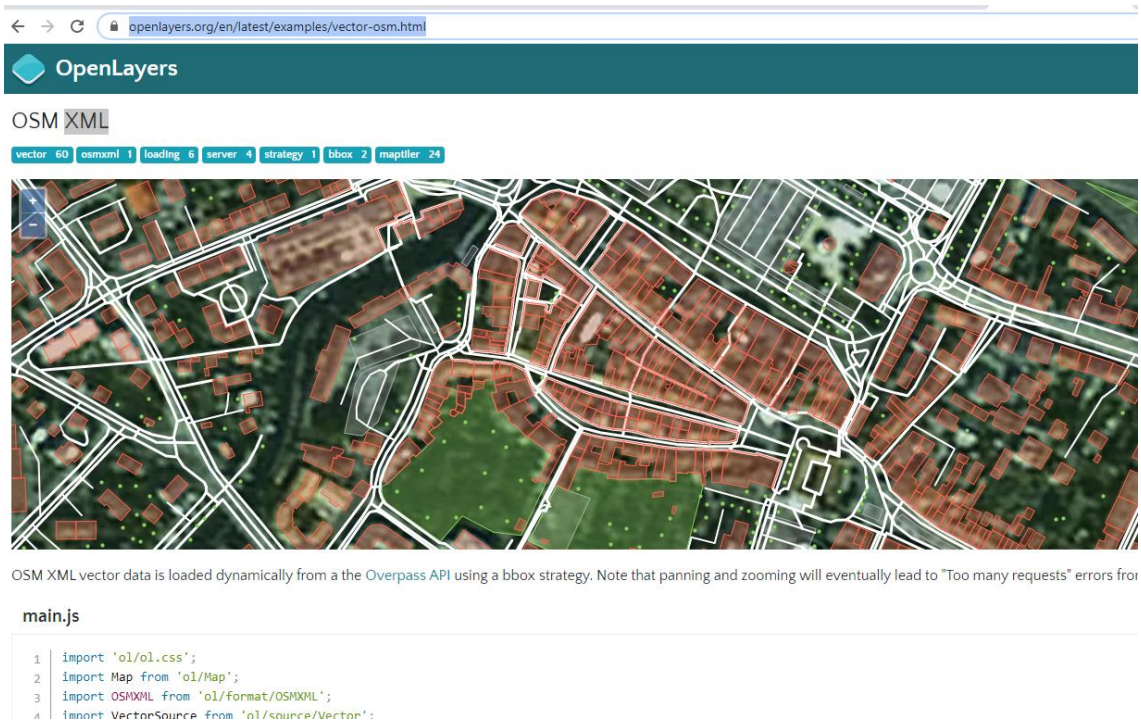


- Workshop: https://openlayers.org/workshop/en/vector/geojson.html



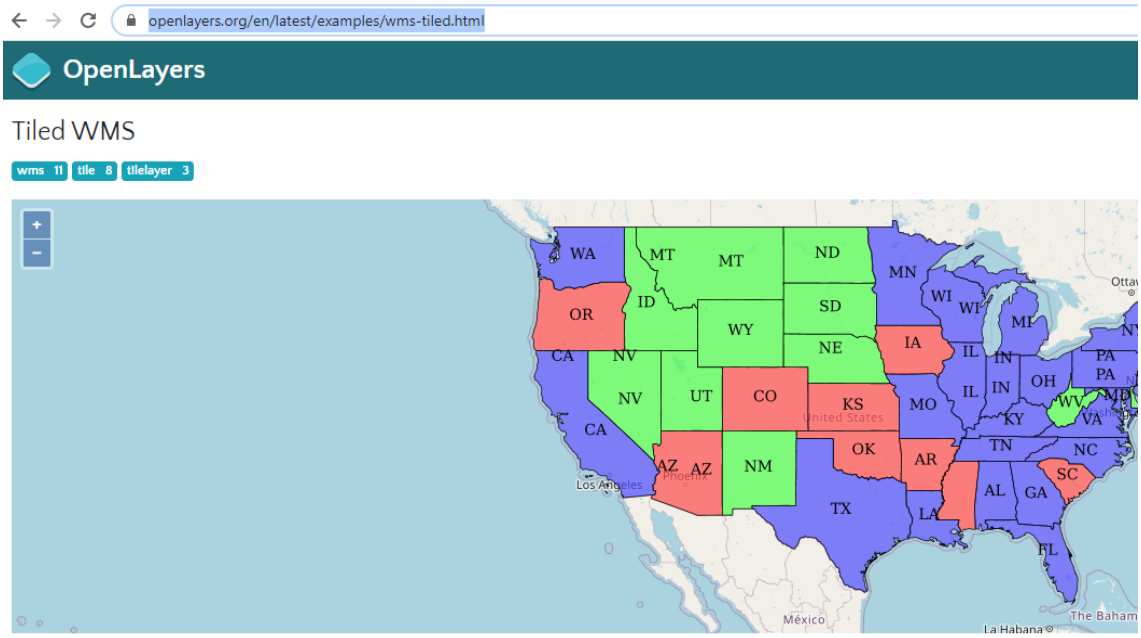
1.3 OpenLayers and XML

Consider the example in: https://openlayers.org/en/latest/examples/vector-osm.html



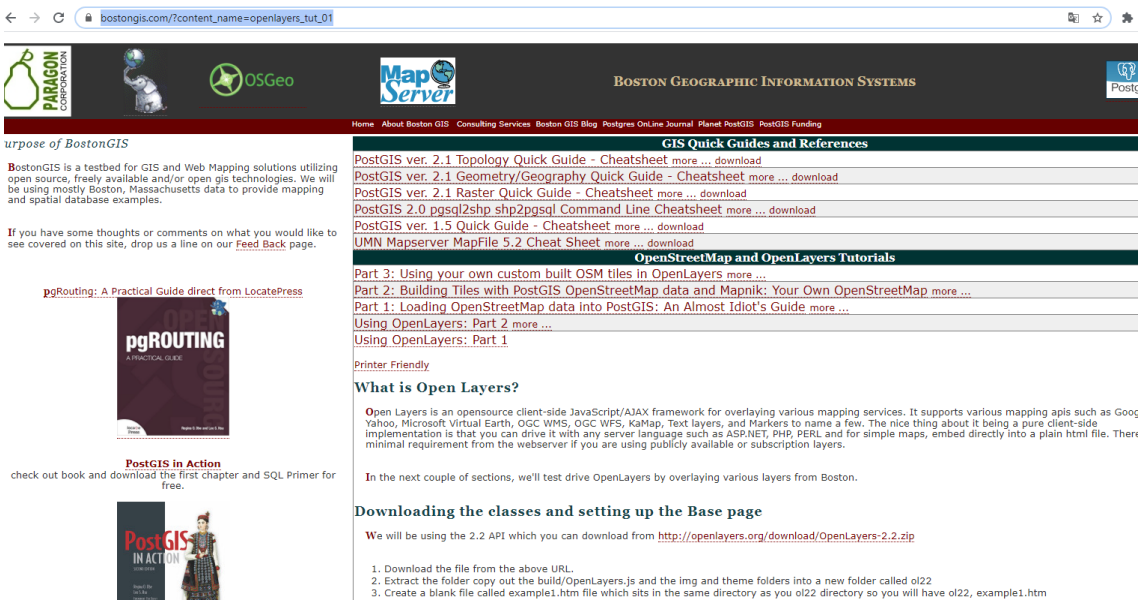
1.4 OpenLayers and WMS as a Service

Consider the example in: https://openlayers.org/en/latest/examples/wms-tiled.html



1.5 OpenLayers + PosGreSQL + Geoserver

Consider the examples available at:
https://www.bostongis.com/?content_name=openlayers_tut_01



2. Leaflet

2.1 Estrutura Base

Consider the information available at the link: https://leafletjs.com/examples.html Seguindo these bases, hereinafter a set of examples of exploration of the functionalities of the Leaflet.

Scripts for applying the Leaflet library to in a file JavaScript:

```
<link rel="stylesheet" href="https://unpkg.com/leaflet@1.3.4/dist/leaflet.css"
integrity="sha512-puBpdR0798OZvTTbP4A8Ix/l+A4dHDD0DGqYW6RQ+9jxkRFclaxxQb/SJAWZfWAkuyeQUytO7+7N4QKrDh+drA=="
crossorigin=""/>

<script src="https://unpkg.com/leaflet@1.3.4/dist/leaflet.js"
integrity="sha512-nMMmRyTVoLYqjP9hrbed9S+FzjZHW5gY1TWCHA5ckwXZBadntCNs8kEqAWdrb9O7rxbCaA4lKTIWjDXZxflOcA=="
crossorigin=""></script>
```

Stylization of the map to be presented in the browser:

```
<style>

    #mapid {
        height: 480px;
    }

</style>
```

Map declaration and layer creation (layer that presents the map):

```
var mymap = L.map('mapid').setView([51.505, -0.09], 13);

var token = "pk.eyJ1Ijoiam51bm9mZXJyZWlyYSIsImEiOiJjam5zMGdsb3owYjFqM2txcTA2bmN0OHZwIn0.UlhgHg316EPrNvALad0oqQ";

L.tileLayer('https://api.tiles.mapbox.com/v4/{id}/{z}/{x}/{y}.png?access_token={accessToken}', {
    attribution: 'Map data &copy; <a href="https://www.openstreetmap.org/">OpenStreetMap</a> contributors, <a href="https://c
    maxZoom: 18,
    id: 'mapbox.streets',
    accessToken: token
}).addTo(mymap);
```

Creating a point, circle and polygon on the map:

```
var marker = L.marker([51.5, -0.09]).addTo(mymap);

var circle = L.circle([51.508, -0.11], {
    color: 'red',
    fillColor: '#f03',
    fillOpacity: 0.5,
    radius: 500
}).addTo(mymap);

var polygon = L.polygon([
    [51.509, -0.08],
    [51.503, -0.06],
    [51.51, -0.047]
]).addTo(mymap);
```

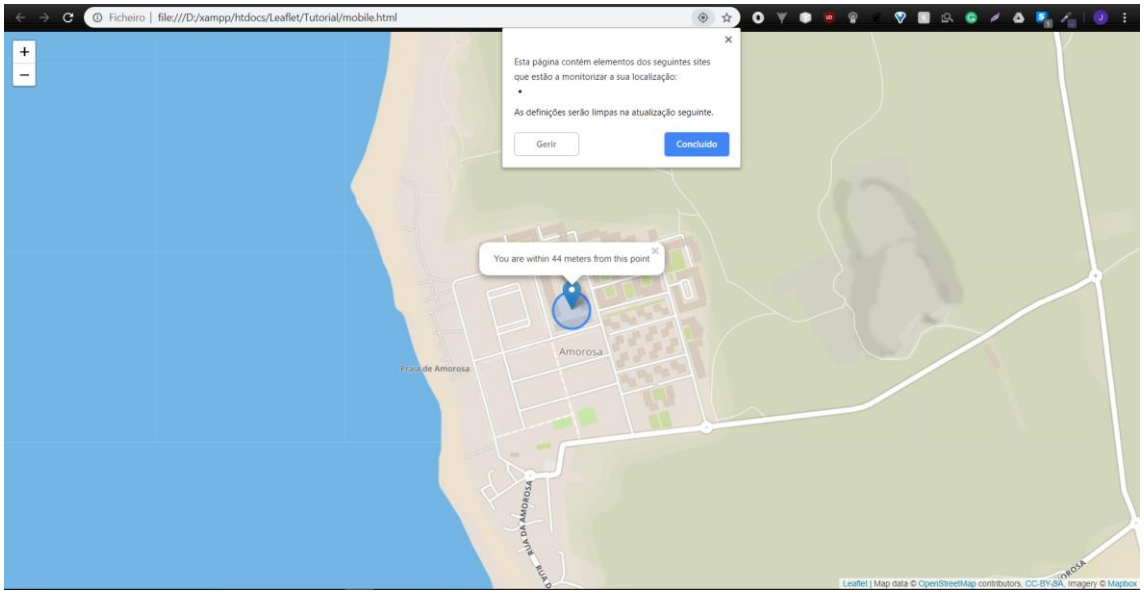
Assigning popups to created elements:

```
marker.bindPopup("<b>Hello world!</b><br> I am a popup.");
circle.bindPopup("I am a circle");
polygon.bindPopup("I am a polygon");
```

Click function that allows to display the latitude and longitude of the point:

```
function onMapClick(e){
    popup
        .setLatLng(e.latlng)
        .setContent("You clicked the map at " + e.latlng.toString())
        .openOn(mymap);
}
```

Result:



Creation of layers (light, streets and satellite):

```
//Definimos 3 Layers default (GrayScale, Streets e Satellite)
var grayscale = L.tileLayer('https://api.tiles.mapbox.com/v4/{id}/{z}/{x}/{y}.png?access_token={accessToken}', {id: 'mapbox.light', accessToken: 'pk.eyJ1IjoidmFh
    streets   = L.tileLayer('https://api.tiles.mapbox.com/v4/{id}/{z}/{x}/{y}.png?access_token={accessToken}', {id: 'mapbox.streets', accessToken: 'pk.eyJ1IjoidmF
    satellite   = L.tileLayer('https://api.tiles.mapbox.com/v4/{id}/{z}/{x}/{y}.png?access_token={accessToken}', {id: 'mapbox.satellite', accessToken: 'pk.eyJ1Ij
```

We add to the Leaflet's predefined attributes the 3 layers created:

```
//Dizemos que as 3 Layers default estão dentro da variavel "baseMaps"
var baseMaps = {
    "Grayscale": grayscale,
    "Streets": streets,
    "Satellite": satellite
};
```

Creation of the map and assign the layers that will be presented in the first instance:

```
//Pomos o Mapa (já preparado com as layers acima definidas) associado ao div com o id "mapid"
var mymap = L.map('mapid', {
    center: [41.50, -7.73],
    zoom: 9,
    layers: [streets, carros] //aqui definimos as layers que queremos que estejam visiveis numa primeira instancia
});
```

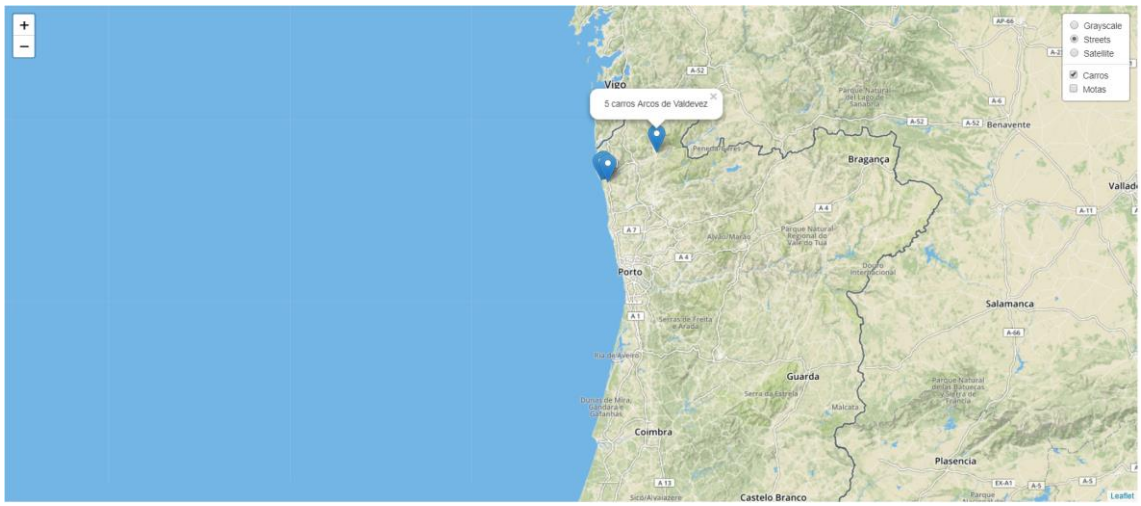
Creation of layers that can be presented simultaneously (overlay):

```
//Aqui definimos as restantes layers (para além das default). Podemos mostrar várias ao memos tempo
var overlayMaps = {
    "Carros": carros,
    "Motas": motas
};
```

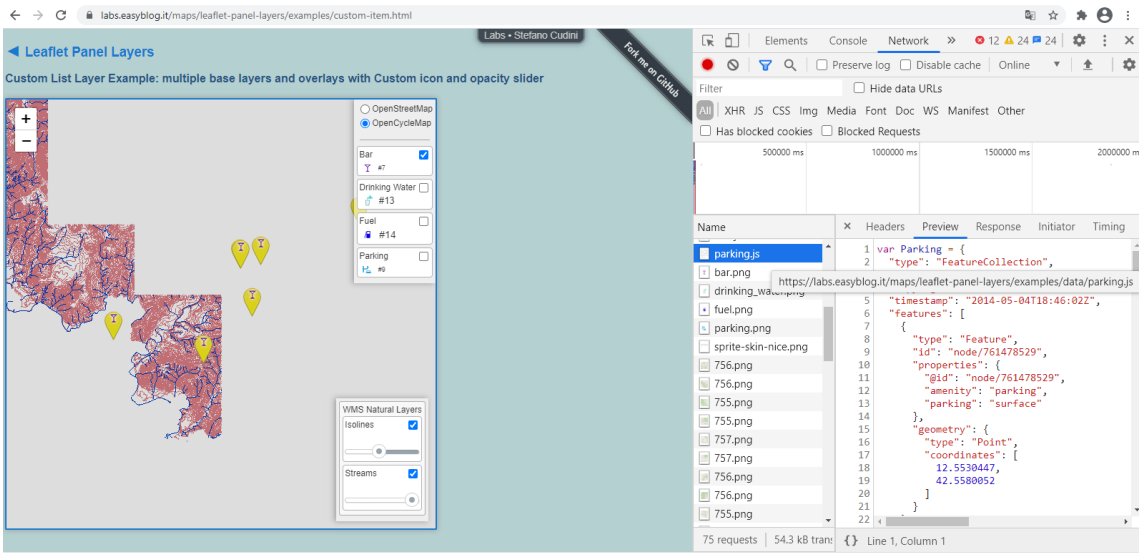
Addition of a controller on the page to view the created layers:

```
//No canto superior direito aparece um ocntrolador para por as layers visiveis ou invisiveis
L.control.layers(baseMaps, overlayMaps).addTo(mymap);
```

Result:

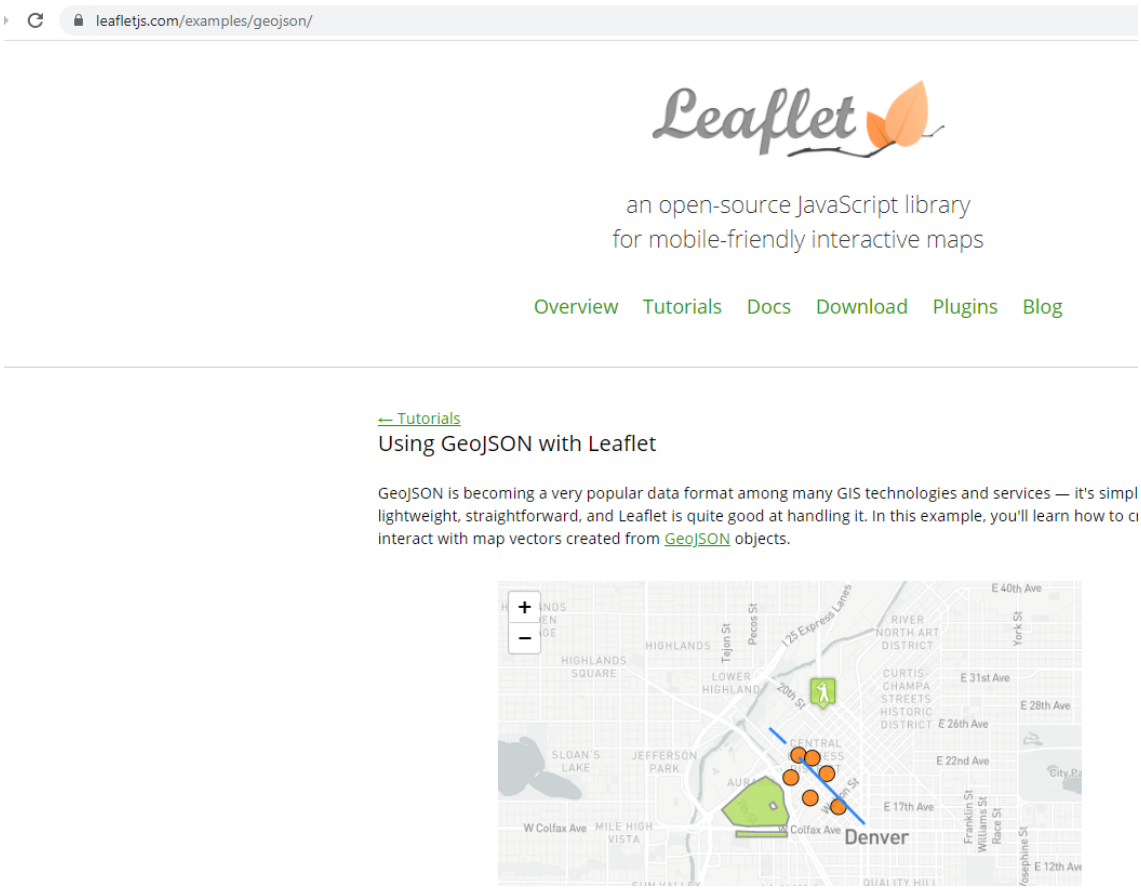


Consider the following examples, following the tutorials available at the following links:
https://labs.easyblog.it/maps/leaflet-panel-layers/examples/custom-item.html

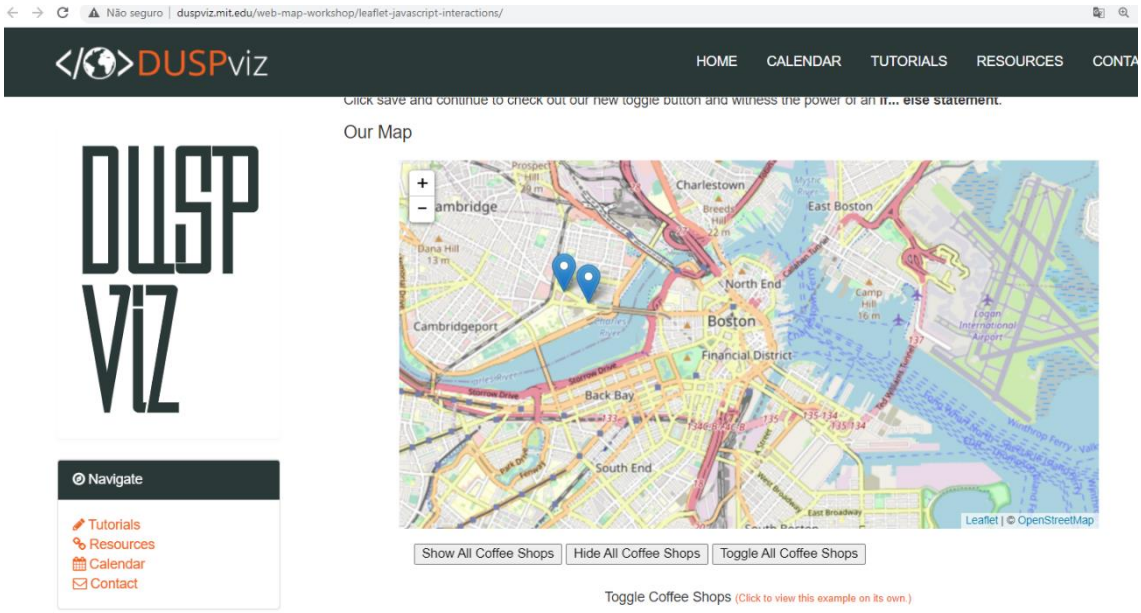


2.2 Leaflet and GeoJSON

Consider the examples in: https://leafletjs.com/examples/geojson/



You can also run the following tutorial: http://duspviz.mit.edu/web-map-workshop/leaflet-javascript-interactions/



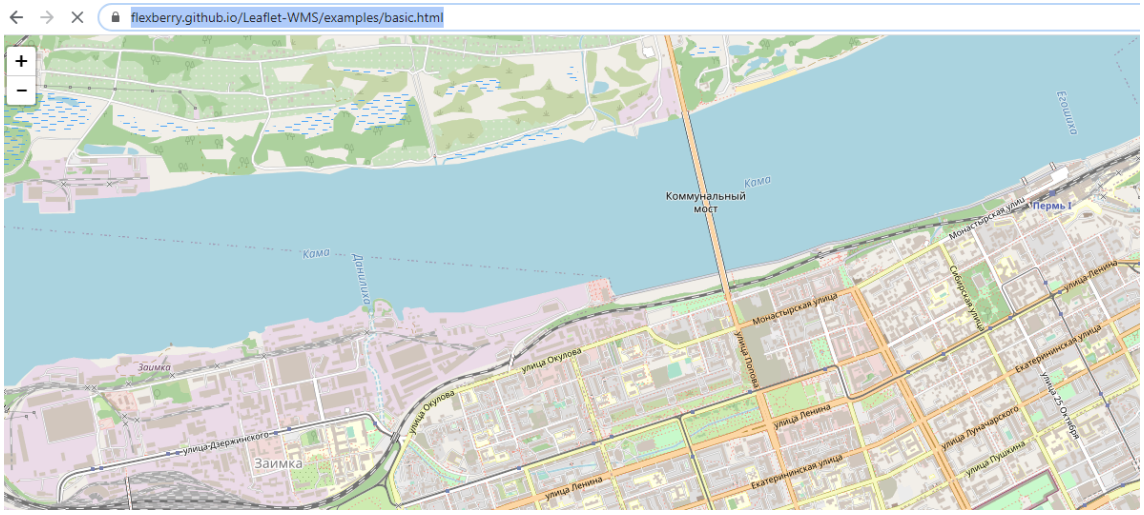
2.3. Leaflet with XML

Maps from a Database: Reading XML data into Leaflet: http://erica.altschul.info/Tutorial_XML-to-Leaflet.pdf

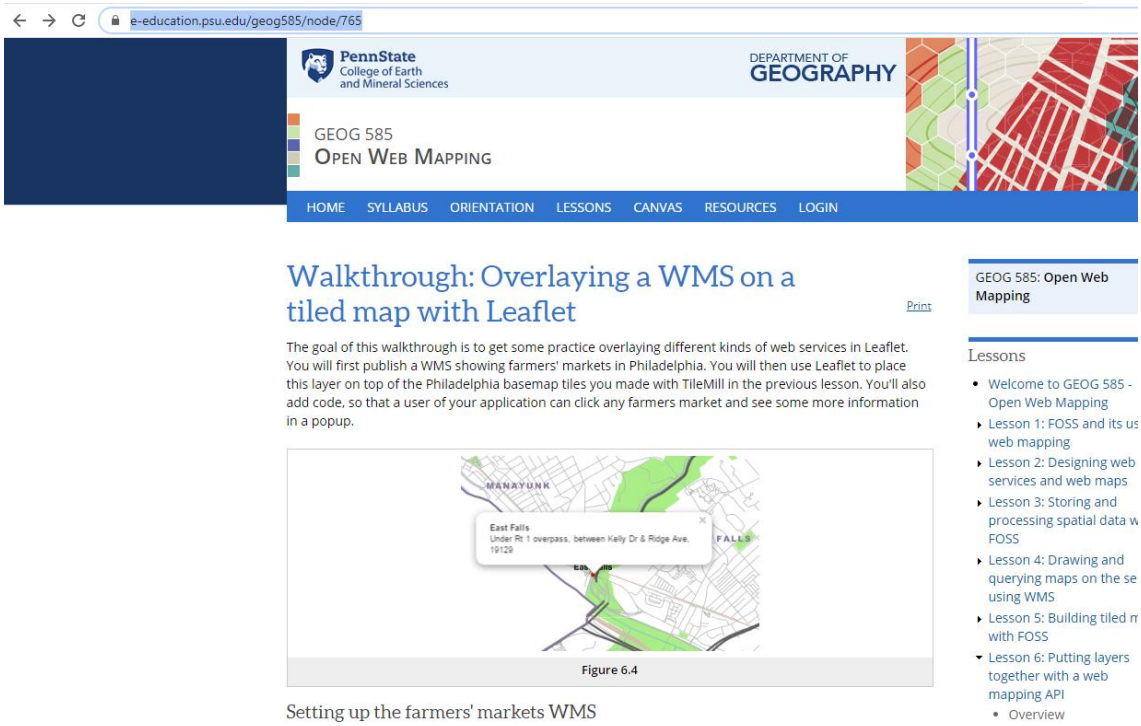
2.4 Leaflet and WMS as a service

Consider the example of the link: https://leafletjs.com/examples/wms/wms.html

Also consider the following example: https://flexberry.github.io/Leaflet-WMS/examples/basic.html



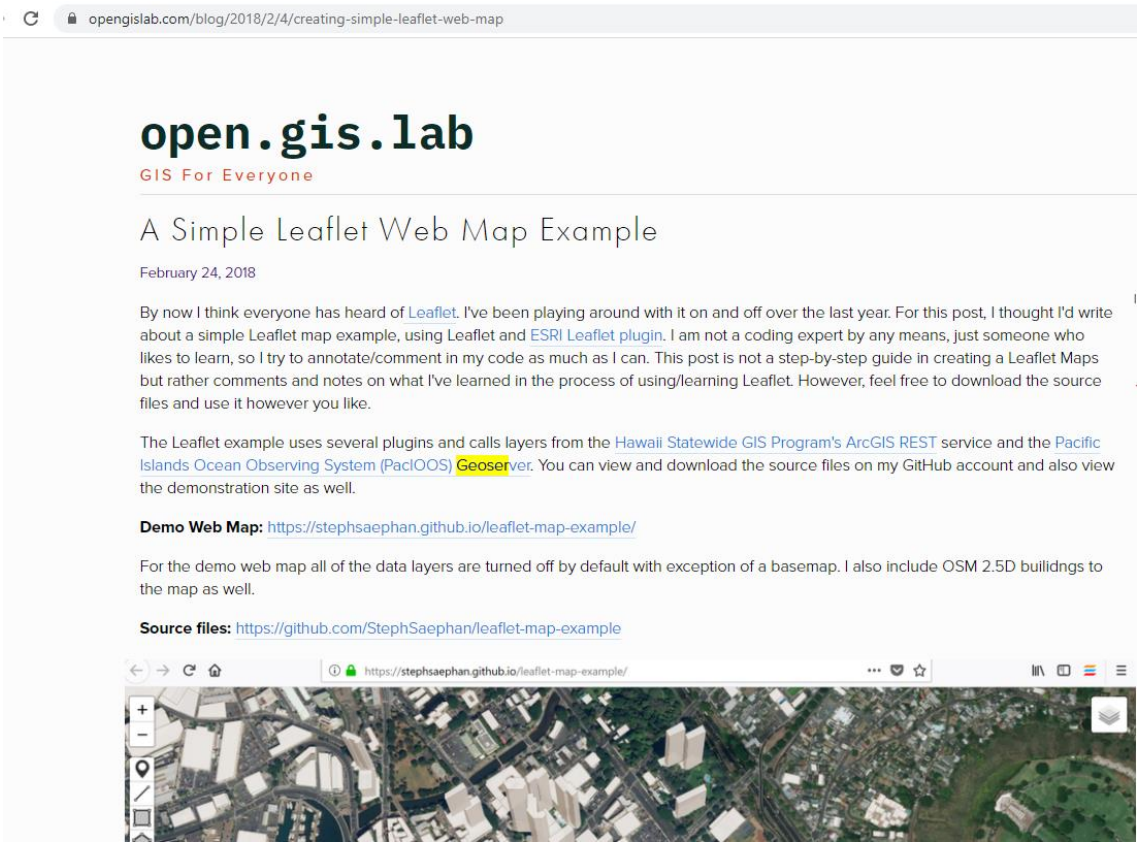
Also consider the following example: https://www.e-education.psu.edu/geog585/node/765



2.5 PostGIS + GeoServer + Leaflet

Consider the example of exploring the Leaflet with Geoserver, available at:

https://opengislab.com/blog/2018/2/4/creating-simple-leaflet-web-map



Consider the example of exploring the Leaflet with Geoserver and PostgreSQL, available at: https://www.earder.com/tutorials/postgis_geoserver_leaflet/