

# Tools for creating interactive online maps

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# How to follow along

<http://github.com/smmaurer/web-mapping-demo>

Download these text files for later:

- `awesome_map.html`
- `dataset.js`

# History of web maps

- Dynamic, interactive online maps were invented/popularized by Google Maps in 2005
- Early implementations were either private (Google) or tied up in complex infrastructure (GeoServer, OpenLayers)
- Recently, open and lightweight tools have been getting better and better (OpenStreetMap, Leaflet, Mapbox, CartoDB)

# Motivation: what are these maps for?

- **Navigation**  
(driving, transit, cycling, hiking)
- **Information provision**  
(civic information, shopping, recreation, etc.)
- **Data visualization**  
(research, advocacy, infotainment)

# Fundamental building blocks of web maps (1)

**points // lines // polygons // labels**

(+ marker icons, strokes, fills, patterns)

# Fundamental building blocks of web maps (2)

- **Basemap**
  - generated as image tiles which are only loaded as needed
  - not interactive
- **Overlays**
  - either created in the browser or provided as tiles
  - often interactive

# Tiles vs. layers created in the browser

- **Tiles...**

- make it easy to break big datasets into pieces, in order to load only what's needed
- cannot be changed dynamically
- require special server software or extensive pre-processing

- **Layers created in the browser...**

- are easy to change dynamically
- but require visitors to download the entire dataset (for now)

# “dynamic”? “interaction”?

- **Panning and zooming** (basic requirement)
- **Obtaining extra information about features**  
(example: hovering or clicking for an info window)
- **Changing the appearance or location of features on the map based on user input**  
(example: Google directions)



# Tools

- The general model is to create a webpage, then add Javascript code to generate & control the map
- Free basemaps are provided by Mapbox, Stamen, and others using a standard URL scheme
- We'll use the **Leaflet** Javascript library, pull basemaps from Mapbox, and create an overlay directly from a GeoJSON data file

Demo...

# Independent exercises

- Fix the two broken buttons
- Add a button to zoom into Wurster Hall
- Edit the “map position” popup to include the distance from Wurster Hall (hint: the Leaflet function you need is under Basic Types > LatLng > Methods)
- Add some more points using a second color (hint: you’ll either need a new data column for the categories, or a separate data file)

Leaflet code reference: [leafletjs.com/reference.html](https://leafletjs.com/reference.html)

