ConditionALs, Map Layers, and Visual Design

Today we will focus on styling our map through the use of Leaflet `Feature groups`, which means more JavaScript!

`Feature groups` are like containers that you can use to group your map content. For this lab we will be creating two layers for our survey question of `"Is your English your first language?"`

One group will be for `yes` and another group for `no`.

> ✏️ **Goals**
>
> - Use conditional statements to add content into Leaflet `FeatureGroups`
> - Use Leaflet's `circleMarkers` to visualize points
> - Change the basemap for our maps

Lab outline

1. Conditional statements in JavaScript
2. Adding `L.featureGroups()` in our `addMarker()` function
3. Adding `circleMarkers` to our map
4. Changing the basemap

Start by creating a `week7` folder in your lab assignments repo.

> ✏️ **Get ahead start**
>
> If you finished `lab 6` , you can also copy the contents of your `week_6` folder and skip the following setup section.

Starting template code for lab #7

index.html

```
1   <!DOCTYPE html>
2   <html>
3       <head>
4           <title>Lab 6</title>
5           <!-- hint: remember to change your page title! -->
6           <meta charset="utf-8" />
7           <link rel="shortcut icon" href="#">
8           <link rel="stylesheet" href="styles/style.css">
9
10          <!-- Leaflet's css-->
11          <link rel="stylesheet"
12  href="https://unpkg.com/leaflet@1.7.1/dist/leaflet.css" />
13
14          <!-- Leaflet's JavaScript-->
15          <script src="https://unpkg.com/leaflet@1.7.1/dist/leaflet.js">
16  </script>
17
18          <!-- Papa Parse -->
19          <script
20  src="https://cdnjs.cloudflare.com/ajax/libs/PapaParse/5.3.0/papaparse.min.js">
21  </script>
22      </head>
23
24      <body>
25          <header>
26              Covid Vaccination Stories
27          </header>
28
29          <div class="main">
30              <div id="contents">
31                  <div id="placeForButtons"></div>
32                  <!-- Be sure to use your own survey here!!!!!!! -->
33                  <div id="theSurvey">
34                      <iframe
35  src="https://docs.google.com/forms/d/e/1FAIpQLSfcElv5dlXInR7XHQz27_OcYJlWcIUr-
36  GBbc-ocefWlGd1uXg/viewform?embedded=true" width="100%" height="100%"
37  frameborder="0" marginheight="0" marginwidth="0">Loading…</iframe>
38                  </div>
39
```

```
40              </div>
41              <div id="the_map"></div>
            </div>
            <div id="footer">
                Copyright(2023)
            </div>
            <script src="js/init.js"></script>
        </body>
    </html>
```

js/init.js

```javascript
1   // declare variables
2   let mapOptions = {'center': [34.0709,-118.444],'zoom':5}
3
4   // use the variables
5   const map = L.map('the_map').setView(mapOptions.center, mapOptions.zoom);
6
7   L.tileLayer('https://{s}.tile.openstreetmap.org/{z}/{x}/{y}.png', {
8       attribution: '&copy; <a
9   href="https://www.openstreetmap.org/copyright">OpenStreetMap</a>
10  contributors'
11  }).addTo(map);
12
13  function addMarker(data){
14      // console.log(data)
15      // these are the names of our lat/long fields in the google sheets:
16      L.marker([data.lat,data.lng]).addTo(map).bindPopup(`<h2>${data['Where did
17  you get vaccinated?']}</h2> <h3>${data['Have you been vaccinated?']}</h3>`)
18      createButtons(data.lat,data.lng,data['Where did you get vaccinated?'])
19      return
20  }
21
22  function createButtons(lat,lng,title){
23      const newButton = document.createElement("button"); // adds a new button
24      newButton.id = "button"+title; // gives the button a unique id
25      newButton.innerHTML = title; // gives the button a title
26      newButton.setAttribute("lat",lat); // sets the latitude
27      newButton.setAttribute("lng",lng); // sets the longitude
28      newButton.addEventListener('click', function(){
29          map.flyTo([lat,lng]); //this is the flyTo from Leaflet
30      })
31      const spaceForButtons = document.getElementById('placeForButtons')
32      spaceForButtons.appendChild(newButton);//this adds the button to our
33  page.
34  }
35
36  const dataUrl = "https://docs.google.com/spreadsheets/d/e/2PACX-
37  1vSNq8_prhrSwK3CnY2pPptqMyGvc23Ckc5MCuGMMKljW-dDy6yq6j7XAT4m6GG69CISbD6kfBF0-
38  ypS/pub?output=csv"
39
40  function loadData(url){
```

```
41        Papa.parse(url, {
42            header: true,
43            download: true,
44            complete: results => processData(results)
45        })
46    }
47
48    function processData(results){
49        console.log(results)
50        results.data.forEach(data => {
              console.log(data)
              addMarker(data)
          })
      }

      loadData(dataUrl)
```

styles/style.css

```css
1    body{
2        display: grid;
3        grid-template-rows: 50px auto auto;
4        grid-template-areas: "header" "main_content" "footer";
5        background-color: aqua;
6        gap: 10px;
7    }
8
9    header{
10        grid-area: header;
11        justify-self: center;
12        align-self: center;
13    }
14
15    #footer{
16        grid-area: footer;
17    }
18
19    .main{
20        grid-area: main_content;
21        grid-template-columns: 1fr 1fr;
22        grid-template-areas: "main_map content";
23        display: grid;
24    }
25
26    #contents{
27        grid-area: content;
28        display: grid;
29        grid-template-rows: 1fr 3fr;
30        grid-template-areas: "buttonHome" "survey"
31    }
32
33    #the_map{
```

```css
34        height:80vh;
35        grid-area: main_map;
36    }
37
38    #theSurvey{
39        grid-area: survey;
40    }
41
42    #placeForButtons{
43        grid-area: buttonHome;
44        display:grid;
45        grid-template-columns: repeat(2, 1fr);
46    }
```

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`if` Conditional Statements in JavaScript

Conditional statements are important for being able to tell our code to **do** or **not do** something.

Evaluting an `if` condition

```
if(){
    // do something if this is true
}
```

1. `if` statments begin with the `if` keyword.

2. The `()` contains the evaluating condition.

3. The `{}` contains the function to do if the statement is true.

The syntax is similar to a `function` in that they both have parameters and open and close with brackets `{}`.

```
const hello = "hi"
if (hello){
    // do something if the `hello` variable exists
    console.log('this condition is true!')
    // optional: return something
}
```

Defined vs. undefined variables

Variables that do no have a `=` afterwards, means they have no value and are called `undefined`:

```
let goodbye
```

Undefined variables can also be created with the following variable definitions:

```
let goodbye = null
let goodbye = 0

// are all the same as
// let goodbye
```

Negating conditions

You can also **negate** a condition by adding a `!` in front, for example:

```javascript
const hello = "hi"
let goodbye

if (!hello){
    // do something if the `hello` variable is undefined
    // optional: return something
    console.log('in a conditional!')
}
```

This statement wouldn't work since `hello` is `defined` , but if we change the `if` evaluation variable insde the `()` to `goodbye` , it will evalue as true since `goodbye` is `undefined` :

```javascript
const hello = "hi"
let goodbye

if (!goodbye){
    // do something if the `hello` variable is undefined
    // optional: return something
    console.log('this condition is true!')
}
```

JavaScript Conditional Evaluation Types

Recall that the `if` keyword that evalutes the condition within the `()` , like the **parameters** in a JavaScript function.

There are different ways to set `conditions` inside the `()` , but it must has to either be `true` or `false` .

Here are some different types of evaluations:

Example	Meaning
`if(variable)`	Does this `variable` exist?
`if(variable == "yes")`	Does this `variable` equal to "yes"
`if(variable != "yEs")`	Does this `variable` NOT equal "yEs"

Example	Meaning
`if(variable > 10 )`	Is this `variable` greater than 10?
`if(variable == false)`	Is this `variable` false?
`if(variable == null)`	Is this `variable` null?
`if(variable == anotherVariable)`	Is this `variable` the same as another variable?
`if(variable > 1 && variable < 10)`	Is this `variable` greater than 1 **AND** is `variable` less than 10?

You can check this MDN article on `truthy` and `falsy` for more examples:

- https://developer.mozilla.org/en-US/docs/Glossary/Truthy

- https://developer.mozilla.org/en-US/docs/Glossary/Falsy

The `&&` is a logical `AND` operator where all statements have to be `True` in order to be statisfied.

- https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Operators/Logical_AND

```
const hello = "hello"
const goodbye
if (hello && goodbye){
    console.log('I dont know why you say goodbye, I say hello')
}
```

Great, what `else` is there?

`else` acts like a default in case the `if` condition never is true:

```
const hello = "hello"
const goodbye
if (hello && goodbye){
    // do something IF `hello` and `goodbye` exist
    console.log('I dont know why you say goodbye, I say hello')
}
else {
    // do something else
```

```
        console.log('you say goodbye, and i say hello')
}
```

⚽Class Exercise #1: Let's see `IF` you get the idea!

> ✏️ **Tasks**
>
> 1. Create an `if-else` statement for the dataset in your mapplication within the `addMarker()` function to only add markers when a certain condition exists

If you are using the lab dataset, filter out answers to the question `"Have you been vaccinated"`

```
function addMarker(data){
    L.marker([data.lat,data.lng]).addTo(map).bindPopup(`<h2>${data.timestamp}
</h2>`)
    createButtons(data.lat,data.lng,data['Where did you get vaccinated?'])
    return data
}
```
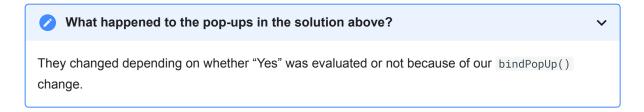
> ✏️ **Bonus**
>
> Use an `else` statement to show the number of those who speak other languages. **Hint**: You can add variables by using the syntax `anyVariable += 1`

✎ **Answer**   ⌄

js/init.js

```js
function addMarker(data){
    if(data['Have you been vaccinated'] == "Yes"){
        L.marker([data.lat,data.lng]).addTo(map).bindPopup(`<h2>Vaccinated</h2>`)
        createButtons(data.lat,data.lng,data.Location)
    }
    else{
        L.marker([data.lat,data.lng]).addTo(map).bindPopup(`<h2>Not
vaccinated</h2>`)
        createButtons(data.lat,data.lng,data.Location)
        // Bonus:
        // notVaccinated += 1
    }
    return data
}
// let notVaccinated = 0
function processData(results){
    console.log(results)
    results.data.forEach(data => {
        console.log(data)
        addMarker(data)
    })
    //document.body.append("Number of hidden records:"+notVaccinated)
}
```

Explaining the recommended solution

js/init.js

```js
function addMarker(data){  ❶
    if(data['Have you been vaccinated'] == "Yes"){  ❷
        L.marker([data.lat,data.lng]).addTo(map).bindPopup(`<h2>English first
language</h2>`)
        createButtons(data.lat,data.lng,data.Location)
    }
    else{
        L.marker([data.lat,data.lng]).addTo(map).bindPopup(`<h2>Non-English first
language</h2>`)
        createButtons(data.lat,data.lng,data.Location)
    }
    return data
}
```

1. The best place to change is the `addMarker()` function, since the function is already looping through all of our data (as per the previous lab).

2. Put an `if(){}` statement right at the start of `function` to indicate that the first thing that should happen is evaluating this function.

3. Then choose the variable to evaluate, which will be a field from our data object called, `Have you been vaccinated`. Remember, the field **MUST** match exactly how it is written in the CSV data set!

4. Next we use the `==` to evaluate the condition as **equals to**

5. Then we set the evaluation value, in this case **"Yes"**. The quotes is necessary because without it, it treats `Yes` as a variable called `Yes` !!

6. We change the pop-up to reflect the `True` nature of our question.

7. We then add an `else{}` after the closing `}` of the `if` statement.

8. We change the pop-up to reflect the `False` nature of our question.

✏️ **What happened to the pop-ups in the solution above?**   ⌄

They changed depending on whether "Yes" was evaluated or not because of our `bindPopUp()` change.

Before moving on, make sure your JavaScript is similar to the following:

🏁 Check point

js/init.js

```
1    // declare variables
2    let mapOptions = {'center': [34.0709,-118.444],'zoom':5}
3
4    // define the leaflet map
5    const map = L.map('the_map').setView(mapOptions.center, mapOptions.zoom);
6
7    L.tileLayer('https://{s}.tile.openstreetmap.org/{z}/{x}/{y}.png', {
8        attribution: '&copy; <a
9    href="https://www.openstreetmap.org/copyright">OpenStreetMap</a>
10   contributors'
11   }).addTo(map);
12
13   function addMarker(data){
14       if(data['Have you been vaccinated'] == "Yes"){
15
16   L.marker([data.lat,data.lng]).addTo(map).bindPopup(`<h2>Vaccinated</h2>`)
17           createButtons(data.lat,data.lng,data.Location)
18       }
```

```
19        else{
20            L.marker([data.lat,data.lng]).addTo(map).bindPopup(`<h2>Not
21   vaccinated</h2>`)
22            createButtons(data.lat,data.lng,data.Location)
23        }
24        return data
25    }
26
27    function createButtons(lat,lng,title){
28        const newButton = document.createElement("button"); // adds a new button
29        newButton.id = "button"+title; // gives the button a unique id
30        newButton.innerHTML = title; // gives the button a title
31        newButton.setAttribute("lat",lat); // sets the latitude
32        newButton.setAttribute("lng",lng); // sets the longitude
33        newButton.addEventListener('click', function(){
34            map.flyTo([lat,lng]); //this is the flyTo from Leaflet
35        })
36        const spaceForButtons = document.getElementById('placeForButtons')
37        spaceForButtons.appendChild(newButton);//this adds the button to our
38    page.
39    }
40
41    const dataUrl = "https://docs.google.com/spreadsheets/d/e/2PACX-
42    1vSNq8_prhrSwK3CnY2pPptqMyGvc23Ckc5MCuGMMKljW-dDy6yq6j7XAT4m6GG69CISbD6kfBF0-
43    ypS/pub?output=csv"
44
45    function loadData(url){
46        Papa.parse(url, {
47            header: true,
48            download: true,
49            complete: results => processData(results)
50        })
51    }
52
53    function processData(results){
54        console.log(results)
         results.data.forEach(data => {
             console.log(data)
             addMarker(data)
         })
     }

     loadData(dataUrl)
```

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Leaflet featureGroups`

A `feature group` , which is Leaflet's container for dealing with multiple groups of data layers.

In our `js/init.js` file we will add some variables to store our groups in:

```
let vaccinated = L.featureGroup();
let nonVaccinated = L.featureGroup();
```

> ⚡ **Important!**
>
> Important!!! These variables have to be OUTSIDE the function, because `Leaflet` needs to be able to use them. **Remember**: A variable outside of a function is said to be in the `global scope` .

Adding `L.featureGroups()` in our `addMarker()` function

Next we will need to change our `addMarker` function to add each marker to their respective groups instead of just directly onto the map:

```
// our Leaflet feature group layers waiting for content!
let vaccinated = L.featureGroup();
let nonVaccinated = L.featureGroup();

function addMarker(data){
    if(data['Have you been vaccinated?'] == "Yes"){

vaccinated.addLayer(L.marker([data.lat,data.lng]).addTo(map).bindPopup(`<h2>Vaccinat
        createButtons(data.lat,data.lng,data['Where did you get vaccinated?'])
        }
    else{

nonVaccinated.addLayer(L.marker([data.lat,data.lng]).addTo(map).bindPopup(`<h2>Unvac
        createButtons(data.lat,data.lng,data['Where did you get vaccinated?'])
    }
    return data
}
```

Awesome! Now let's see our beautiful layers!

Cleaning up the `addMarker()` function

We also need to delete the line `.addTo(map)` after each marker, because we will add the `featureGroup` to the map instead of individual markers:

```
// our Leaflet feature group layers waiting for content!
let vaccinated = L.featureGroup();
let nonVaccinated = L.featureGroup();

function addMarker(data){
    if(data['Have you been vaccinated?'] == "Yes"){
    vaccinated.addLayer(L.marker([data.lat,data.lng]).bindPopup(`<h2>Vaccinated</h2>`))
        createButtons(data.lat,data.lng,data['Where did you get vaccinated?'])
        }
    else{
    nonVaccinated.addLayer(L.marker([data.lat,data.lng]).bindPopup(`<h2>Unvaccinated</h2
        createButtons(data.lat,data.lng,data['Where did you get vaccinated?'])
    }
    return data
}
```

> (?) **Wait… our markers dispearred after we did that, why?**   ⌄
>
> Since we removed `addTo(map)`, we now need to add the `group layers` to to map!!

Adding our `group layers` to the `Leaflet` map

As alluded to in the answer above, we need to add the grouped layers to our Leaflet map. To do so, we will add the layers to the map, so we need to add this code somewhere:

```
vaccinated.addTo(map)
nonVaccinated.addTo(map)
```

Where to add the `groupLayers()`?

If you answered, at the end of the `processData()` function, you are correct (and sneaky if you read ahead during the lab!)!

```
function processData(results){
    console.log(results)
    results.data.forEach(data => {
```

```
        console.log(data)
        addMarker(data)
    })
    vaccinated.addTo(map) // add our layers after markers have been made
    nonVaccinated.addTo(map) // add our layers after markers have been made
}
```

Why?

We have to add our layers after the `forEach` loop finishes, otherwise the code will run only for the first marker.

Layer Controls

One big benefit of using Leaflet `FeatureGroups` is that we can add `controls` to the map which allows us to turn on and off layers.

Let's add our list of layers as an `object` :

```
// define layers
let layers = {
    "Vaccinated Respondent": vaccinated,
    "Unvaccinated Respondent": nonVaccinated
}
```

The first property name is our `alias` or what the users will see, and the property key is the Leaflet `FeatureGroup` that we created earlier.

Next we will add a Leaflet `controlGroup` right after the map is initalized.

```
// add layer control box
L.control.layers(null,layers).addTo(map)
```

You can actually turn on and off layers using buttons outside of Leaflet controls by creating a function to add and remove layers.

We can also add a `fitBounds` to our layers to make sure our map zooms into our layer:

```
// make the map zoom to the extent of markers
map.fitBounds(nonVaccinated.getBounds());
```

Hmm, that only works for one layer group, so let's create a new feature group that contains all of our layers:

```
let allLayers = L.featureGroup([vaccinated,nonVaccinated]);
map.fitBounds(allLayers.getBounds());
```

That code should go at the end of our `processData` function so it fits all of our layers and markers.

Our `processData` function should look like the following:

```
function processData(results){
    console.log(results)
    results.data.forEach(data => {
        console.log(data)
        addMarker(data)
    })
    vaccinated.addTo(map) // add our layers after markers have been made
    nonVaccinated.addTo(map) // add our layers after markers have been made
    let allLayers = L.featureGroup([vaccinated,nonVaccinated]);
    map.fitBounds(allLayers.getBounds());
}
```

Now that we have the pop-up change based on our fields, let's actually change how the marker looks!

▓ Check point

Before moving on, check to see if your JavaScript looks like the following:

js/init.js

```
 1  // declare variables
 2  let mapOptions = {'center': [34.0709,-118.444],'zoom':5}
 3
 4  let vaccinated = L.featureGroup();
 5  let nonVaccinated = L.featureGroup();
 6
 7  let layers = {
 8      "Vaccinated Respondent": vaccinated,
 9      "Unvaccinated Respondent": nonVaccinated
10  }
11
12  const dataUrl = "https://docs.google.com/spreadsheets/d/e/2PACX-
13  1vSNq8_prhrSwK3CnY2pPptqMyGvc23Ckc5MCuGMMKljW-dDy6yq6j7XAT4m6GG69CISbD6kfBF0-
14  ypS/pub?output=csv"
15
16  // define the leaflet map
17  const map = L.map('the_map').setView(mapOptions.center, mapOptions.zoom);
18
19  // add layer control box
```

```
20    L.control.layers(null,layers).addTo(map)
21
22    L.tileLayer('https://{s}.tile.openstreetmap.org/{z}/{x}/{y}.png', {
23        attribution: '&copy; <a
24    href="https://www.openstreetmap.org/copyright">OpenStreetMap</a>
25    contributors'
26    }).addTo(map);
27
28    function addMarker(data){
29        if(data['Have you been vaccinated?'] == "Yes"){
30
31    vaccinated.addLayer(L.marker([data.lat,data.lng]).bindPopup(`<h2>Vaccinated</h2
32            createButtons(data.lat,data.lng,data['Where did you get
33    vaccinated?'])
34            }
35        else{
36
37    nonVaccinated.addLayer(L.marker([data.lat,data.lng]).bindPopup(`<h2>Unvaccinate
38            createButtons(data.lat,data.lng,data['Where did you get
39    vaccinated?'])
40        }
41        return data
42    }
43
44    function createButtons(lat,lng,title){
45        const newButton = document.createElement("button"); // adds a new button
46        newButton.id = "button"+title; // gives the button a unique id
47        newButton.innerHTML = title; // gives the button a title
48        newButton.setAttribute("lat",lat); // sets the latitude
49        newButton.setAttribute("lng",lng); // sets the longitude
50        newButton.addEventListener('click', function(){
51            map.flyTo([lat,lng]); //this is the flyTo from Leaflet
52        })
53        const spaceForButtons = document.getElementById('placeForButtons')
54        spaceForButtons.appendChild(newButton);//this adds the button to our
55    page.
56    }
57
58    function loadData(url){
59        Papa.parse(url, {
60            header: true,
61            download: true,
62            complete: results => processData(results)
63        })
64    }
65
66    function processData(results){
67        console.log(results)
68        results.data.forEach(data => {
69            console.log(data)
            addMarker(data)
        })
        vaccinated.addTo(map) // add our layers after markers have been made
```

```
        nonVaccinated.addTo(map) // add our layers after markers have been made
        let allLayers = L.featureGroup([vaccinated,nonVaccinated]);
        map.fitBounds(allLayers.getBounds());
    }

    loadData(dataUrl)
```

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Time to Leaflet the `markers` go, and use `circleMarkers!`

The `blue` Leaflet markers are pretty ICONic to us now (pun intended). While we can change the markers to other icons, instead we will use `circle markers` because this allows us to have nice colorful markers without finding icons.

> ℹ️ **More about circleMarkers?**
>
> Circle markers are essentially SVG graphics that are drawn onto the map. If you add a lot of them, like over 100,000 they could start to slow down the browser. You can learn more about `circleMarkers` on the official documentation here: https://leafletjs.com/reference.html#circlemarker.

Adding circleMarkers

The format for adding `circleMarkers` in `Leaflet` looks like this:

```
L.circleMarker(<LatLng>, <CircleMarker options>)
```

The `latlng` is pretty familiar now, but the options for circleMarkers are a bit unexplored, except that one time I mentioned them when covering objects.

```
let circleOptions = {
    radius: 4,
    fillColor: "#ff7800",
    color: "#000",
    weight: 1,
    opacity: 1,
    fillOpacity: 0.8
}
```

Add the above `circleOptions` above our code in the variable declaration area in the **global** namespace and change the `L.marker` to `L.circleMarker` as follows:

```
let circleOptions = {
    radius: 4,
    fillColor: "#ff7800",
    color: "#000",
```

```
    weight: 1,
    opacity: 1,
    fillOpacity: 0.8
}

// ... other variables ...

function addMarker(data){
    if(data['Have you been vaccinated?'] == "Yes"){

vaccinated.addLayer(L.circleMarker([data.lat,data.lng],circleOptions).bindPopup(`<h2
        createButtons(data.lat,data.lng,data['Where did you get vaccinated?'])
        }
    else{

nonVaccinated.addLayer(L.circleMarker([data.lat,data.lng],circleOptions).bindPopup(`
Vaccinated</h2>`))
        createButtons(data.lat,data.lng,data['Where did you get vaccinated?'])
    }
    return data
}
```

Awesome! We got `circleMarkers`! But wait.. They are all the same..

Now this is where we need to consider design:

1. Be intentional in our design and choose colors to represent well.

2. Change the colors based on our `if-else` statement

Let's make `red` for `Vaccinated` and `blue` for `No`.

Since `circleOptions` is an object, we can change it's property value for `fillColor` when we are in the `if-else` statement.

This should go in the `if(data['Have you been vaccinated?'] == "Yes")` scope:

```
  circleOptions.fillColor = "red"
```

And this should go in the `else` scope:

```
  circleOptions.color = "blue"
```

Your final colorful `addMarker` function should look like this:

```
function addMarker(data){
    if(data['Have you been vaccinated?'] == "Yes"){
        circleOptions.fillColor = "red"
```

```
vaccinated.addLayer(L.circleMarker([data.lat,data.lng],circleOptions).bindPopup(`<h2
        createButtons(data.lat,data.lng,data['Where did you get vaccinated?'])
        }
    else{
        circleOptions.fillColor = "blue"

nonVaccinated.addLayer(L.circleMarker([data.lat,data.lng],circleOptions).bindPopup(`
Vaccinated</h2>`))
        createButtons(data.lat,data.lng,data['Where did you get vaccinated?'])
    }
    return data
}
```

▨ Check point

Before moving on, check to see if your JavaScript looks like the following:

js/init.js

```
 1   // declare variables
 2   let mapOptions = {'center': [34.0709,-118.444],'zoom':5}
 3
 4   let vaccinated = L.featureGroup();
 5   let nonVaccinated = L.featureGroup();
 6
 7   let layers = {
 8       "Vaccinated Respondent": vaccinated,
 9       "Unvaccinated Respondent": nonVaccinated
10   }
11
12   let circleOptions = {
13       radius: 4,
14       fillColor: "#ff7800",
15       color: "#000",
16       weight: 1,
17       opacity: 1,
18       fillOpacity: 0.8
19   }
20
21   const dataUrl = "https://docs.google.com/spreadsheets/d/e/2PACX-1vS2WyfKTyZJ-
22   _ja3GGrxoAXwranavyDGXYsxeFUO4nvHpCJrkKhChymXQqUEyhdGLnz9VN6BJv5tOjp/pub?
23   gid=1560504149&single=true&output=csv"
24
25   // define the leaflet map
26   const map = L.map('the_map').setView(mapOptions.center, mapOptions.zoom);
27
28   // add layer control box
29   L.control.layers(null,layers).addTo(map)
30
```

```
31   L.tileLayer('https://{s}.tile.openstreetmap.org/{z}/{x}/{y}.png', {
32       attribution: '&copy; <a
33   href="https://www.openstreetmap.org/copyright">OpenStreetMap</a>
34   contributors'
35   }).addTo(map);
36
37   function addMarker(data){
38       if(data['Have you been vaccinated?'] == "Yes"){
39           circleOptions.fillColor = "red"
40
41   vaccinated.addLayer(L.circleMarker([data.lat,data.lng],circleOptions).bindPopup
42           createButtons(data.lat,data.lng,data['Where did you get
43   vaccinated?'])
44           }
45       else{
46           circleOptions.fillColor = "blue"
47
48   nonVaccinated.addLayer(L.circleMarker([data.lat,data.lng],circleOptions).bindPo
49   Vaccinated</h2>`))
50           createButtons(data.lat,data.lng,data['Where did you get
51   vaccinated?'])
52       }
53       return data
54   }
55
56   function createButtons(lat,lng,title){
57       const newButton = document.createElement("button"); // adds a new button
58       newButton.id = "button"+title; // gives the button a unique id
59       newButton.innerHTML = title; // gives the button a title
60       newButton.setAttribute("lat",lat); // sets the latitude
61       newButton.setAttribute("lng",lng); // sets the longitude
62       newButton.addEventListener('click', function(){
63           map.flyTo([lat,lng]); //this is the flyTo from Leaflet
64       })
65       const spaceForButtons = document.getElementById('placeForButtons')
66       spaceForButtons.appendChild(newButton);//this adds the button to our
67   page.
68   }
69
70   function loadData(url){
71       Papa.parse(url, {
72           header: true,
73           download: true,
74           complete: results => processData(results)
75       })
76   }
77
78   function processData(results){
79       console.log(results)
80       results.data.forEach(data => {
             console.log(data)
             addMarker(data)
         })
```

```
        vaccinated.addTo(map) // add our layers after markers have been made
        nonVaccinated.addTo(map) // add our layers after markers have been made
        let allLayers = L.featureGroup([vaccinated,nonVaccinated]);
        map.fitBounds(allLayers.getBounds());
    }

    loadData(dataUrl)
```

Last update: 2023-05-18

Changing basemaps

Phew! That was a lot to go over! But now you should take sometime to think about the design choices we have to make as map makers. One important consideration is deciding on which basemap to use.

Recall the code here:

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

Explore basemap options

Go to:
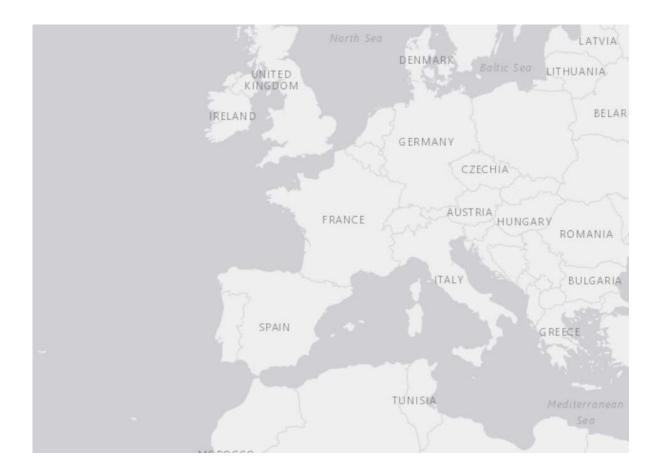
- https://leaflet-extras.github.io/leaflet-providers/preview/

And pick a basemap that you like, a simple basemap with few colors is always preferred over a **busy** basemap:

Busy

Less busy

> ⚡ **API Keys**
>
> Some may require an API Key and even try to charge you for views, it is recommend to avoid them if they do so, but you can learn more here on how to sign-up and use an API Key for the different Providers: https://github.com/leaflet-extras/leaflet-providers#providers
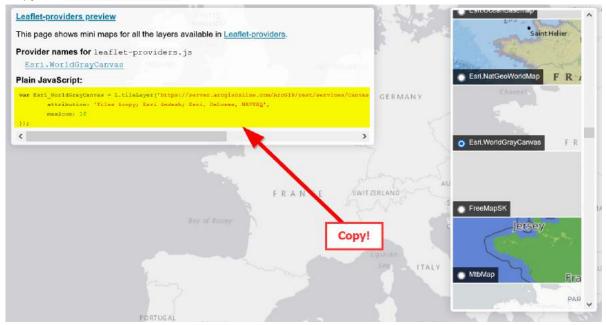
Click on the basemap you prefer:

Copy the basemap code

Copy the `Plain JavaScript` in the middle:

Adding the basemap

And put the code after `const map` delcaration in your `js/init.js` file:

js/init.js

```js
const map = L.map('the_map').setView(mapOptions.center, mapOptions.zoom);

let Esri_WorldGrayCanvas =
L.tileLayer('https://server.arcgisonline.com/ArcGIS/rest/services/Canvas/World_Light
{
    attribution: 'Tiles &copy; Esri &mdash; Esri, DeLorme, NAVTEQ',
    maxZoom: 16
});

Esri_WorldGrayCanvas.addTo(map)

// add layer control box
L.control.layers(null,layers).addTo(map)

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

Change the `var` to `let` and be sure to add the `variable` to your map, like so:

js/init.js

```js
const map = L.map('the_map').setView(mapOptions.center, mapOptions.zoom);

let Esri_WorldGrayCanvas =
L.tileLayer('https://server.arcgisonline.com/ArcGIS/rest/services/Canvas/World_Light
{
    attribution: 'Tiles &copy; Esri &mdash; Esri, DeLorme, NAVTEQ',
    maxZoom: 16
});

Esri_WorldGrayCanvas.addTo(map)

// add layer control box
L.control.layers(null,layers).addTo(map)

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

Be sure to delete or comment out the other basemap, as you don't need two basemaps!

🏁 Final check point

js/init.js

```
1    // declare variables
2    let mapOptions = {'center': [34.0709,-118.444],'zoom':5}
3
4    let vaccinated = L.featureGroup();
5    let nonVaccinated = L.featureGroup();
6
7    let layers = {
8        "Vaccinated Respondent": vaccinated,
9        "Unvaccinated Respondent": nonVaccinated
10   }
11
12   let circleOptions = {
13       radius: 4,
14       fillColor: "#ff7800",
15       color: "#000",
16       weight: 1,
17       opacity: 1,
18       fillOpacity: 0.8
19   }
20
21   const dataUrl = "https://docs.google.com/spreadsheets/d/e/2PACX-1vS2WyfKTyZJ-
22   _ja3GGrxoAXwranavyDGXYsxeFUO4nvHpCJrkKhChymXQqUEyhdGLnz9VN6BJv5tOjp/pub?
23   gid=1560504149&single=true&output=csv"
24
25   // define the leaflet map
26   const map = L.map('the_map').setView(mapOptions.center, mapOptions.zoom);
27
28   // add layer control box
29   L.control.layers(null,layers).addTo(map)
30
31   let Esri_WorldGrayCanvas =
32   L.tileLayer('https://server.arcgisonline.com/ArcGIS/rest/services/Canvas/World_
33   {
34       attribution: 'Tiles &copy; Esri &mdash; Esri, DeLorme, NAVTEQ',
35       maxZoom: 16
36   });
37
38   Esri_WorldGrayCanvas.addTo(map);
39
40   function addMarker(data){
41       if(data['Have you been vaccinated?'] == "Yes"){
42           circleOptions.fillColor = "red"
43
44   vaccinated.addLayer(L.circleMarker([data.lat,data.lng],circleOptions).bindPopup
45           createButtons(data.lat,data.lng,data['Where did you get
46   vaccinated?'])
47           }
48       else{
49           circleOptions.fillColor = "blue"
50
```

```
51   nonVaccinated.addLayer(L.circleMarker([data.lat,data.lng],circleOptions).bindPo
52   Vaccinated</h2>`))
53          createButtons(data.lat,data.lng,data['Where did you get
54   vaccinated?'])
55       }
56       return data
57   }
58
59   function createButtons(lat,lng,title){
60       const newButton = document.createElement("button"); // adds a new button
61       newButton.id = "button"+title; // gives the button a unique id
62       newButton.innerHTML = title; // gives the button a title
63       newButton.setAttribute("lat",lat); // sets the latitude
64       newButton.setAttribute("lng",lng); // sets the longitude
65       newButton.addEventListener('click', function(){
66           map.flyTo([lat,lng]); //this is the flyTo from Leaflet
67       })
68       const spaceForButtons = document.getElementById('placeForButtons')
69       spaceForButtons.appendChild(newButton);//this adds the button to our
70   page.
71   }
72
73   function loadData(url){
74       Papa.parse(url, {
75           header: true,
76           download: true,
77           complete: results => processData(results)
78       })
79   }
80
81   function processData(results){
82       console.log(results)
83       results.data.forEach(data => {
             console.log(data)
             addMarker(data)
         })
         vaccinated.addTo(map) // add our layers after markers have been made
         nonVaccinated.addTo(map) // add our layers after markers have been made
         let allLayers = L.featureGroup([vaccinated,nonVaccinated]);
         map.fitBounds(allLayers.getBounds());
     }

     loadData(dataUrl)
```

Lab Assignment

Alright! Now you should be ready to take on the lab assignment for the week!

Refactor Challenge

If you are up for an extra challenge, try to do the refactoring challenge!

Last update: 2023-05-18

✅ Final Template Code

Your final code should look like the following:

index.html

```
1   <!DOCTYPE html>
2   <html>
3       <head>
4           <title>Hello World</title>
5           <!-- hint: remember to change your page title! -->
6           <meta charset="utf-8" />
7           <link rel="shortcut icon" href="#">
8           <link rel="stylesheet" href="styles/style.css">
9
10          <!-- Leaflet's css-->
11          <link rel="stylesheet"
12  href="https://unpkg.com/leaflet@1.7.1/dist/leaflet.css" />
13
14          <!-- Leaflet's JavaScript-->
15          <script src="https://unpkg.com/leaflet@1.7.1/dist/leaflet.js">
16  </script>
17          <script src="js/papaparse.min.js"></script>
18      </head>
19
20      <body>
21          <header>
22              Covid Vaccination Stories
23          </header>
24
25          <div class="main">
26              <div id="contents">
27                  <div id="placeForButtons"></div>
28                  <!-- Be sure to use your own survey here!!!!!!! -->
29                  <div id="theSurvey">
30                      <div id="surveyButton">
31                          <a
32  href="https://docs.google.com/forms/d/e/1FAIpQLScD0IOr_U4r0q4HlBkZ7olkA5OJpgIne
33  📝Take the survey</a>
34                      </div>
35                  </div>
36
37              </div>
38              <div id="the_map"></div>
39          </div>
40          <div id="footer">
41              Copyright(2022)
```

```
            </div>
            <script src="js/init.js"></script>
        </body>
    </html>
```

styles/style.css

```css
1   body{
2       display: grid;
3       grid-template-rows: 50px auto auto;
4       grid-template-areas: "header" "main_content" "footer";
5       background-color: aqua;
6       gap: 10px;
7   }
8
9   header{
10      grid-area: header;
11      justify-self: center;
12      align-self: center;
13  }
14
15  #footer{
16      grid-area: footer;
17  }
18
19  .main{
20      grid-area: main_content;
21      grid-template-columns: 1fr 1fr;
22      grid-template-areas: "main_map content";
23      display: grid;
24  }
25
26  #contents{
27      grid-area: content;
28      display: grid;
29      grid-template-rows: 3fr 1fr;
30      grid-template-areas: "buttonHome" "survey"
31  }
32
33  #the_map{
34      height:80vh;
35      grid-area: main_map;
36  }
37
38  #theSurvey{
39      grid-area: survey;
40      justify-self: center; /* added this to center the button in the div */
41  }
42
43  /* css for the button */
44  #surveyButton{
45      padding: 15px 32px;
```

```css
46        margin: 10px;
47        background-color: #4CAF50;
48        cursor: pointer;
49    }
50
51    /* css for button to get rid of the underline */
52    #surveyButton a{
53        text-decoration: none;
54    }
55
56    #placeForButtons{
57        grid-area: buttonHome;
58        display:grid;
59        grid-template-columns: repeat(2, 1fr);
60    }
```

js/init.js

```javascript
1    // declare variables
2    let mapOptions = {'center': [34.0709,-118.444],'zoom':5};
3
4    let englishFirst = L.featureGroup();
5    let nonEnglishFirst = L.featureGroup();
6
7    let layers = {
8        "Speaks English First": englishFirst,
9        "Doesn't Speak English First": nonEnglishFirst
10   };
11
12   let circleOptions = {
13       radius: 4,
14       fillColor: "#ff7800",
15       color: "#000",
16       weight: 1,
17       opacity: 1,
18       fillOpacity: 0.8
19   };
20
21   const dataUrl = "https://docs.google.com/spreadsheets/d/e/2PACX-1vS2WyfKTyZJ-
22   _ja3GGrxoAXwranavyDGXYsxeFUO4nvHpCJrkKhChymXQqUEyhdGLnz9VN6BJv5tOjp/pub?
23   gid=1560504149&single=true&output=csv";
24
25   const map = L.map('the_map').setView(mapOptions.center, mapOptions.zoom);
26
27   let Esri_WorldGrayCanvas =
28   L.tileLayer('https://server.arcgisonline.com/ArcGIS/rest/services/Canvas/World_
29   {
30       attribution: 'Tiles &copy; Esri &mdash; Esri, DeLorme, NAVTEQ',
31       maxZoom: 16
32   });
33
34   Esri_WorldGrayCanvas.addTo(map);
```

```
35
36    // add layer control box
37    L.control.layers(null,layers).addTo(map);
38
39    // L.tileLayer('https://{s}.tile.openstreetmap.org/{z}/{x}/{y}.png', {
40    //     attribution: '&copy; <a
41    href="https://www.openstreetmap.org/copyright">OpenStreetMap</a>
42    contributors'
43    // }).addTo(map);
44
45    function addMarker(data){
46        if(data['Is your English your first language?'] == "Yes"){
47            circleOptions.fillColor = "red"
48
49    englishFirst.addLayer(L.circleMarker([data.lat,data.lng],circleOptions).bindPop
50    First Language</h2>`))
51            createButtons(data.lat,data.lng,data.Location)
52            }
53        else{
54            circleOptions.fillColor = "blue"
55
56    nonEnglishFirst.addLayer(L.circleMarker([data.lat,data.lng],circleOptions).bind
57    English First Language</h2>`))
58            createButtons(data.lat,data.lng,data.Location)
59        }
60        return data
61    };
62
63    function createButtons(lat,lng,title){
64        const newButton = document.createElement("button"); // adds a new button
65        newButton.id = "button"+title; // gives the button a unique id
66        newButton.innerHTML = title; // gives the button a title
67        newButton.setAttribute("lat",lat); // sets the latitude
68        newButton.setAttribute("lng",lng); // sets the longitude
69        newButton.addEventListener('click', function(){
70            map.flyTo([lat,lng]); //this is the flyTo from Leaflet
71        })
72        const spaceForButtons = document.getElementById('placeForButtons')
73        spaceForButtons.appendChild(newButton);//this adds the button to our
74    page.
75    };
76
77    function loadData(url){
78        Papa.parse(url, {
79            header: true,
80            download: true,
81            complete: results => processData(results)
82        })
83    };
84
85    function processData(results){
86        console.log(results)
         results.data.forEach(data => {
```

```
            console.log(data)
            addMarker(data)
        })
        englishFirst.addTo(map) // add our layers after markers have been made
        nonEnglishFirst.addTo(map) // add our layers after markers have been made
        let allLayers = L.featureGroup([englishFirst,nonEnglishFirst]);
        map.fitBounds(allLayers.getBounds());
    };

    loadData(dataUrl)
```

js/papaparse.min.js

```
/* @license
Papa Parse
v5.3.2
https://github.com/mholt/PapaParse
License: MIT
*/
!function(e,t){"function"==typeof define&&define.amd?
define([],t):"object"==typeof module&&"undefined"!=typeof exports?
module.exports=t():e.Papa=t()}(this,function s(){"use strict";var
f="undefined"!=typeof self?self:"undefined"!=typeof window?window:void 0!==f?f:
{};var n=!f.document&&!!f.postMessage,o=n&&/blob:/i.test((f.location||
{}).protocol),a={},h=0,b={parse:function(e,t){var i=(t=t||
{}).dynamicTyping||!1;M(i)&&(t.dynamicTypingFunction=i,i=
{});if(t.dynamicTyping=i,t.transform=!!M(t.transform)&&t.transform,t.worker&&b.WORKE
{var r=function(){if(!b.WORKERS_SUPPORTED)return!1;var e=
(i=f.URL||f.webkitURL||null,r=s.toString(),b.BLOB_URL||
(b.BLOB_URL=i.createObjectURL(new Blob(["(",r,")();"],
{type:"text/javascript"})))),t=new f.Worker(e);var i,r;return
t.onmessage=_,t.id=h++,a[t.id]=t}();return
r.userStep=t.step,r.userChunk=t.chunk,r.userComplete=t.complete,r.userError=t.error,
t.worker,void r.postMessage({input:e,config:t,workerId:r.id})}var
n=null;b.NODE_STREAM_INPUT,"string"==typeof e?n=t.download?new l(t):new
p(t):!0===e.readable&&M(e.read)&&M(e.on)?n=new g(t):(f.File&&e instanceof File||e
instanceof Object)&&(n=new c(t));return n.stream(e)},unparse:function(e,t){var
n=!1,_=!0,m=",",y="\r\n",s='"',a=s+s,i=!1,r=null,o=!1;!function()
{if("object"!=typeof t)return;"string"!=typeof
t.delimiter||b.BAD_DELIMITERS.filter(function(e){return-
1!==t.delimiter.indexOf(e)}).length||(m=t.delimiter);("boolean"==typeof
t.quotes||"function"==typeof t.quotes||Array.isArray(t.quotes))&&
(n=t.quotes);"boolean"!=typeof t.skipEmptyLines&&"string"!=typeof
t.skipEmptyLines||(i=t.skipEmptyLines);"string"==typeof t.newline&&
(y=t.newline);"string"==typeof t.quoteChar&&(s=t.quoteChar);"boolean"==typeof
t.header&&(_=t.header);if(Array.isArray(t.columns)){if(0===t.columns.length)throw
new Error("Option columns is empty");r=t.columns}void 0!==t.escapeChar&&
(a=t.escapeChar+s);("boolean"==typeof t.escapeFormulae||t.escapeFormulae
instanceof RegExp)&&(o=t.escapeFormulae instanceof RegExp?
t.escapeFormulae:/^[=+\-@\t\r].*$/)}();var h=new
RegExp(j(s),"g");"string"==typeof e&&(e=JSON.parse(e));if(Array.isArray(e))
{if(!e.length||Array.isArray(e[0]))return u(null,e,i);if("object"==typeof
```

```
e[0])return u(r||Object.keys(e[0]),e,i)}else if("object"==typeof
e)return"string"==typeof e.data&&
(e.data=JSON.parse(e.data)),Array.isArray(e.data)&&(e.fields||
(e.fields=e.meta&&e.meta.fields||r),e.fields||(e.fields=Array.isArray(e.data[0])?
e.fields:"object"==typeof e.data[0]?Object.keys(e.data[0]):
[]),Array.isArray(e.data[0])||"object"==typeof e.data[0]||(e.data=
[e.data])),u(e.fields||[],e.data||[],i);throw new Error("Unable to serialize
unrecognized input");function u(e,t,i){var r="";"string"==typeof e&&
(e=JSON.parse(e)),"string"==typeof t&&(t=JSON.parse(t));var
n=Array.isArray(e)&&0<e.length,s=!Array.isArray(t[0]);if(n&&_){for(var
a=0;a<e.length;a++)0<a&&(r+=m),r+=v(e[a],a);0<t.length&&(r+=y)}for(var
o=0;o<t.length;o++){var h=n?e.length:t[o].length,u=!1,f=n?
0===Object.keys(t[o]).length:0===t[o].length;if(i&&!n&&
(u="greedy"===i?""===t[o].join("").trim():1===t[o].length&&0===t[o]
[0].length),"greedy"===i&&n){for(var d=[],l=0;l<h;l++){var c=s?e[l]:l;d.push(t[o]
[c])}u=""===d.join("").trim()}if(!u){for(var p=0;p<h;p++){0<p&&!f&&(r+=m);var
g=n&&s?e[p]:p;r+=v(t[o][g],p)}o<t.length-1&&(!i||0<h&&!f)&&(r+=y)}}return
r}function v(e,t){if(null==e)return"";if(e.constructor===Date)return
JSON.stringify(e).slice(1,25);var i=!1;o&&"string"==typeof e&&o.test(e)&&
(e="'"+e,i=!0);var
r=e.toString().replace(h,a);return(i=i||!0===n||"function"==typeof
n&&n(e,t)||Array.isArray(n)&&n[t]||function(e,t){for(var
i=0;i<t.length;i++)if(-1<e.indexOf(t[i]))return!0;return!1}
(r,b.BAD_DELIMITERS)||-1<r.indexOf(m)||" "===r.charAt(0)||"
"===r.charAt(r.length-1))?
s+r+s:r}}};if(b.RECORD_SEP=String.fromCharCode(30),b.UNIT_SEP=String.fromCharCode(31
["\r","\n",'"',b.BYTE_ORDER_MARK],b.WORKERS_SUPPORTED=!n&&!!f.Worker,b.NODE_STREAM_I
{var d=f.jQuery;d.fn.parse=function(o){var i=o.config||{},h=[];return
this.each(function(e){if(!
("INPUT"===d(this).prop("tagName").toUpperCase()&&"file"===d(this).attr("type").toLo
t=0;t<this.files.length;t++)h.push({file:this.files[t],inputElem:this,instanceConfig
e(){if(0!==h.length){var e,t,i,r,n=h[0];if(M(o.before)){var
s=o.before(n.file,n.inputElem);if("object"==typeof s)
{if("abort"===s.action)return
e="AbortError",t=n.file,i=n.inputElem,r=s.reason,void(M(o.error)&&o.error({name:e},t
void u();"object"==typeof s.config&&
(n.instanceConfig=d.extend(n.instanceConfig,s.config))}else if("skip"===s)return
void u()}var a=n.instanceConfig.complete;n.instanceConfig.complete=function(e)
{M(a)&&a(e,n.file,n.inputElem),u()},b.parse(n.file,n.instanceConfig)}else
M(o.complete)&&o.complete()}function u(){h.splice(0,1),e()}}})}function u(e)
{this._handle=null,this._finished=!1,this._completed=!1,this._halted=!1,this._input=
{data:[],errors:[],meta:{}},function(e){var
t=w(e);t.chunkSize=parseInt(t.chunkSize),e.step||e.chunk||
(t.chunkSize=null);this._handle=new i(t),
(this._handle.streamer=this)._config=t}.call(this,e),this.parseChunk=function(e,t)
{if(this.isFirstChunk&&M(this._config.beforeFirstChunk)){var
i=this._config.beforeFirstChunk(e);void 0!==i&&
(e=i)}this.isFirstChunk=!1,this._halted=!1;var
r=this._partialLine+e;this._partialLine="";var
n=this._handle.parse(r,this._baseIndex,!this._finished);if(!this._handle.paused()&&!
{var s=n.meta.cursor;this._finished||(this._partialLine=r.substring(s-
this._baseIndex),this._baseIndex=s),n&&n.data&&
(this._rowCount+=n.data.length);var
```

```
a=this._finished||this._config.preview&&this._rowCount>=this._config.preview;if(o)f.
if(M(this._config.chunk)&&!t)
{if(this._config.chunk(n,this._handle),this._handle.paused()||this._handle.aborted()
void(this._halted=!0);n=void 0,this._completeResults=void 0}return
this._config.step||this._config.chunk||
(this._completeResults.data=this._completeResults.data.concat(n.data),this._complete
(this._config.complete(this._completeResults,this._input),this._completed=!0),a||n&&
{M(this._config.error)?
this._config.error(e):o&&this._config.error&&f.postMessage({workerId:b.WORKER_ID,err
l(e){var r;(e=e||{}).chunkSize||
(e.chunkSize=b.RemoteChunkSize),u.call(this,e),this._nextChunk=n?function()
{this._readChunk(),this._chunkLoaded()}:function()
{this._readChunk()},this.stream=function(e)
{this._input=e,this._nextChunk()},this._readChunk=function()
{if(this._finished)this._chunkLoaded();else{if(r=new
XMLHttpRequest,this._config.withCredentials&&
(r.withCredentials=this._config.withCredentials),n||
(r.onload=v(this._chunkLoaded,this),r.onerror=v(this._chunkError,this)),r.open(this.
{var e=this._config.downloadRequestHeaders;for(var t in
e)r.setRequestHeader(t,e[t])}if(this._config.chunkSize){var
i=this._start+this._config.chunkSize-
1;r.setRequestHeader("Range","bytes="+this._start+"-
"+i)}try{r.send(this._config.downloadRequestBody)}catch(e)
{this._chunkError(e.message)}n&&0===r.status&&this._chunkError()}},this._chunkLoaded
{4===r.readyState&&(r.status<200||400<=r.status?this._chunkError():
(this._start+=this._config.chunkSize?
this._config.chunkSize:r.responseText.length,this._finished=!this._config.chunkSize|
{var t=e.getResponseHeader("Content-Range");if(null===t)return-1;return
parseInt(t.substring(t.lastIndexOf("/")+1))}
(r),this.parseChunk(r.responseText)))},this._chunkError=function(e){var
t=r.statusText||e;this._sendError(new Error(t))}}function c(e){var r,n;(e=e||
{}).chunkSize||(e.chunkSize=b.LocalChunkSize),u.call(this,e);var
s="undefined"!=typeof FileReader;this.stream=function(e)
{this._input=e,n=e.slice||e.webkitSlice||e.mozSlice,s?((r=new
FileReader).onload=v(this._chunkLoaded,this),r.onerror=v(this._chunkError,this)):r=n
FileReaderSync,this._nextChunk()},this._nextChunk=function()
{this._finished||this._config.preview&&!
(this._rowCount<this._config.preview)||this._readChunk()},this._readChunk=function()
{var e=this._input;if(this._config.chunkSize){var
t=Math.min(this._start+this._config.chunkSize,this._input.size);e=n.call(e,this._sta
i=r.readAsText(e,this._config.encoding);s||this._chunkLoaded({target:
{result:i}})},this._chunkLoaded=function(e)
{this._start+=this._config.chunkSize,this._finished=!this._config.chunkSize||this._s
{this._sendError(r.error)}}function p(e){var i;u.call(this,e=e||
{}),this.stream=function(e){return
i=e,this._nextChunk()},this._nextChunk=function(){if(!this._finished){var
e,t=this._config.chunkSize;return t?(e=i.substring(0,t),i=i.substring(t)):
(e=i,i=""),this._finished=!i,this.parseChunk(e)}}}function g(e){u.call(this,e=e||
{});var t=[],i=!0,r=!1;this.pause=function()
{u.prototype.pause.apply(this,arguments),this._input.pause()},this.resume=function()
{u.prototype.resume.apply(this,arguments),this._input.resume()},this.stream=function
{this._input=e,this._input.on("data",this._streamData),this._input.on("end",this._st
{r&&1===t.length&&(this._finished=!0)},this._nextChunk=function()
```

```
{this._checkIsFinished(),t.length?
this.parseChunk(t.shift()):i=!0},this._streamData=v(function(e)
{try{t.push("string"==typeof e?e:e.toString(this._config.encoding)),i&&
(i=!1,this._checkIsFinished(),this.parseChunk(t.shift()))}catch(e)
{this._streamError(e)}},this),this._streamError=v(function(e)
{this._streamCleanUp(),this._sendError(e)},this),this._streamEnd=v(function()
{this._streamCleanUp(),r=!0,this._streamData("")},this),this._streamCleanUp=v(functi
{this._input.removeListener("data",this._streamData),this._input.removeListener("end
i(m){var a,o,h,r=Math.pow(2,53),n=-r,s=/^\s*-?(\d+\.?|\.\d+|\d+\.\d+)([eE][-+]?
\d+)?\s*$/,u=/^(\d{4}-[01]\d-[0-3]\dT[0-2]\d:[0-5]\d:[0-5]\d\.\d+([+-][0-2]\d:[0-
5]\d|Z))|(\d{4}-[01]\d-[0-3]\dT[0-2]\d:[0-5]\d:[0-5]\d([+-][0-2]\d:[0-5]\d|Z))|
(\d{4}-[01]\d-[0-3]\dT[0-2]\d:[0-5]\d([+-][0-2]\d:[0-
5]\d|Z))$/,t=this,i=0,f=0,d=!1,e=!1,l=[],c={data:[],errors:[],meta:
{}};if(M(m.step)){var p=m.step;m.step=function(e)
{if(c=e,_())g();else{if(g(),0===c.data.length)return;i+=e.data.length,m.preview&&i>m
o.abort():(c.data=c.data[0],p(c,t))}}}function y(e)
{return"greedy"===m.skipEmptyLines?""===e.join("").trim():1===e.length&&0===e[0].len
g(){return c&&h&&(k("Delimiter","UndetectableDelimiter","Unable to auto-detect
delimiting character; defaulted to
'"+b.DefaultDelimiter+"'"),h=!1),m.skipEmptyLines&&
(c.data=c.data.filter(function(e){return!y(e)})),_()&&function()
{if(!c)return;function e(e,t){M(m.transformHeader)&&
(e=m.transformHeader(e,t)),l.push(e)}if(Array.isArray(c.data[0])){for(var
t=0;_()&&t<c.data.length;t++)c.data[t].forEach(e);c.data.splice(0,1)}else
c.data.forEach(e)}(),function()
{if(!c||!m.header&&!m.dynamicTyping&&!m.transform)return c;function e(e,t){var
i,r=m.header?{}:[];for(i=0;i<e.length;i++){var n=i,s=e[i];m.header&&
(n=i>=l.length?"__parsed_extra":l[i]),m.transform&&
(s=m.transform(s,n)),s=v(n,s),"__parsed_extra"===n?(r[n]=r[n]||
[],r[n].push(s)):r[n]=s}return m.header&&(i>l.length?
k("FieldMismatch","TooManyFields","Too many fields: expected "+l.length+" fields
but parsed "+i,f+t):i<l.length&&k("FieldMismatch","TooFewFields","Too few fields:
expected "+l.length+" fields but parsed "+i,f+t)),r}var
t=1;!c.data.length||Array.isArray(c.data[0])?
(c.data=c.data.map(e),t=c.data.length):c.data=e(c.data,0);m.header&&c.meta&&
(c.meta.fields=l);return f+=t,c}()}function _(){return
m.header&&0===l.length}function v(e,t){return i=e,m.dynamicTypingFunction&&void
0===m.dynamicTyping[i]&&(m.dynamicTyping[i]=m.dynamicTypingFunction(i)),!0===
(m.dynamicTyping[i]||m.dynamicTyping)?"true"===t||"TRUE"===t||"false"!==t&&"FALSE"!=
(function(e){if(s.test(e)){var t=parseFloat(e);if(n<t&&t<r)return!0}return!1}(t)?
parseFloat(t):u.test(t)?new Date(t):""===t?null:t):t;var i}function k(e,t,i,r)
{var n={type:e,code:t,message:i};void 0!==r&&
(n.row=r),c.errors.push(n)}this.parse=function(e,t,i){var
r=m.quoteChar||'"';if(m.newline||(m.newline=function(e,t)
{e=e.substring(0,1048576);var i=new RegExp(j(t)+"([^]*?)"+j(t),"gm"),r=
(e=e.replace(i,"")).split("\r"),n=e.split("\n"),s=1<n.length&&n[0].length<r[0].lengt
a=0,o=0;o<r.length;o++)"\n"===r[o][0]&&a++;return a>=r.length/2?"\r\n":"\r"}
(e,r)),h=!1,m.delimiter)M(m.delimiter)&&
(m.delimiter=m.delimiter(e),c.meta.delimiter=m.delimiter);else{var
n=function(e,t,i,r,n){var s,a,o,h;n=n||
[",","\t","|",";",b.RECORD_SEP,b.UNIT_SEP];for(var u=0;u<n.length;u++){var
f=n[u],d=0,l=0,c=0,o=void 0;for(var p=new
E({comments:r,delimiter:f,newline:t,preview:10}).parse(e),g=0;g<p.data.length;g++)if
```

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_=p.data[g].length;l+=_,void 0!==o?0<_&&(d+=Math.abs(_-
o),o=_):o=_}0<p.data.length&&(l/=p.data.length-c),(void 0===a||d<=a)&&(void
0===h||h<l)&&1.99<l&&(a=d,s=f,h=l)}return{successful:!!
(m.delimiter=s),bestDelimiter:s}}
(e,m.newline,m.skipEmptyLines,m.comments,m.delimitersToGuess);n.successful?
m.delimiter=n.bestDelimiter:
(h=!0,m.delimiter=b.DefaultDelimiter),c.meta.delimiter=m.delimiter}var
s=w(m);return m.preview&&m.header&&s.preview++,a=e,o=new
E(s),c=o.parse(a,t,i),g(),d?{meta:{paused:!0}}:c||{meta:
{paused:!1}}},this.paused=function(){return d},this.pause=function()
{d=!0,o.abort(),a=M(m.chunk)?"":a.substring(o.getCharIndex())},this.resume=function(
{t.streamer._halted?
(d=!1,t.streamer.parseChunk(a,!0)):setTimeout(t.resume,3)},this.aborted=function()
{return e},this.abort=function()
{e=!0,o.abort(),c.meta.aborted=!0,M(m.complete)&&m.complete(c),a=""}}function
j(e){return e.replace(/[.*+?^${}()|[\]\\]/g,"\\$&")}function E(e){var S,O=(e=e||
{}).delimiter,x=e.newline,I=e.comments,T=e.step,D=e.preview,A=e.fastMode,L=S=void
0===e.quoteChar||null===e.quoteChar?'"':e.quoteChar;if(void 0!==e.escapeChar&&
(L=e.escapeChar),("string"!=typeof O||-1<b.BAD_DELIMITERS.indexOf(O))&&
(O=","),I===O)throw new Error("Comment character same as delimiter");!0===I?
I="#":("string"!=typeof I||-1<b.BAD_DELIMITERS.indexOf(I))&&
(I=!1),"\n"!==x&&"\r"!==x&&"\r\n"!==x&&(x="\n");var
F=0,z=!1;this.parse=function(r,t,i){if("string"!=typeof r)throw new Error("Input
must be a string");var n=r.length,e=O.length,s=x.length,a=I.length,o=M(T),h=[],u=
[],f=[],d=F=0;if(!r)return C();if(A||!1!==A&&-1===r.indexOf(S)){for(var
l=r.split(x),c=0;c<l.length;c++){if(f=l[c],F+=f.length,c!==l.length-
1)F+=x.length;else if(i)return C();if(!I||f.substring(0,a)!==I){if(o){if(h=
[],k(f.split(O)),R(),z)return C()}else k(f.split(O));if(D&&D<=c)return
h=h.slice(0,D),C(!0)}}return C()}for(var p=r.indexOf(O,F),g=r.indexOf(x,F),_=new
RegExp(j(L)+j(S),"g"),m=r.indexOf(S,F);;)if(r[F]!==S)if(I&&0===f.length&&r.substring
{if(-1===g)return C();F=g+s,g=r.indexOf(x,F),p=r.indexOf(O,F)}else if(-1!==p&&
(p<g||-1===g))f.push(r.substring(F,p)),F=p+e,p=r.indexOf(O,F);else{if(-1===g)break;i
(R(),z))return C();if(D&&h.length>=D)return C(!0)}else for(m=F,F++;;){if(-1===
(m=r.indexOf(S,m+1)))return
i||u.push({type:"Quotes",code:"MissingQuotes",message:"Quoted field
unterminated",row:h.length,index:F}),E();if(m===n-1)return
E(r.substring(F,m).replace(_,S));if(S!==L||r[m+1]!==L){if(S===L||0===m||r[m-
1]!==L){-1!==p&&p<m+1&&(p=r.indexOf(O,m+1)),-1!==g&&g<m+1&&
(g=r.indexOf(x,m+1));var y=b(-1===g?p:Math.min(p,g));if(r.substr(m+1+y,e)===O)
{f.push(r.substring(F,m).replace(_,S)),r[F=m+1+y+e]!==S&&
(m=r.indexOf(S,F)),p=r.indexOf(O,F),g=r.indexOf(x,F);break}var
v=b(g);if(r.substring(m+1+v,m+1+v+s)===x)
{if(f.push(r.substring(F,m).replace(_,S)),w(m+1+v+s),p=r.indexOf(O,F),m=r.indexOf(S,
(R(),z))return C();if(D&&h.length>=D)return
C(!0);break}u.push({type:"Quotes",code:"InvalidQuotes",message:"Trailing quote on
quoted field is malformed",row:h.length,index:F}),m++}}else m++}return
E();function k(e){h.push(e),d=F}function b(e){var t=0;if(-1!==e){var
i=r.substring(m+1,e);i&&""===i.trim()&&(t=i.length)}return t}function E(e){return
i||(void 0===e&&(e=r.substring(F)),f.push(e),F=n,k(f),o&&R()),C()}function w(e)
{F=e,k(f),f=[],g=r.indexOf(x,F)}function C(e){return{data:h,errors:u,meta:
{delimiter:O,linebreak:x,aborted:z,truncated:!!e,cursor:d+(t||0)}}}function R()
{T(C()),h=[],u=[]}},this.abort=function(){z=!0},this.getCharIndex=function()
{return F}}function _(e){var
```

```
t=e.data,i=a[t.workerId],r=!1;if(t.error)i.userError(t.error,t.file);else
if(t.results&&t.results.data){var n={abort:function(){r=!0,m(t.workerId,{data:
[],errors:[],meta:{aborted:!0}})},pause:y,resume:y};if(M(i.userStep)){for(var
s=0;s<t.results.data.length&&
(i.userStep({data:t.results.data[s],errors:t.results.errors,meta:t.results.meta},n),
t.results}else M(i.userChunk)&&(i.userChunk(t.results,n,t.file),delete
t.results)}t.finished&&!r&&m(t.workerId,t.results)}function m(e,t){var
i=a[e];M(i.userComplete)&&i.userComplete(t),i.terminate(),delete a[e]}function
y(){throw new Error("Not implemented.")}function w(e){if("object"!=typeof
e||null===e)return e;var t=Array.isArray(e)?[]:{};for(var i in
e)t[i]=w(e[i]);return t}function v(e,t){return function()
{e.apply(t,arguments)}}function M(e){return"function"==typeof e}return o&&
(f.onmessage=function(e){var t=e.data;void 0===b.WORKER_ID&&t&&
(b.WORKER_ID=t.workerId);if("string"==typeof
t.input)f.postMessage({workerId:b.WORKER_ID,results:b.parse(t.input,t.config),finish
if(f.File&&t.input instanceof File||t.input instanceof Object){var
i=b.parse(t.input,t.config);i&&f.postMessage({workerId:b.WORKER_ID,results:i,finishe
(l.prototype=Object.create(u.prototype)).constructor=l,
(c.prototype=Object.create(u.prototype)).constructor=c,
(p.prototype=Object.create(p.prototype)).constructor=p,
(g.prototype=Object.create(u.prototype)).constructor=g,b});
```

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