Analytics Jumpstart

folium maps and df.iterrows()

Nashville Software School

For today

- folium maps
- df.iterrows()

Folium

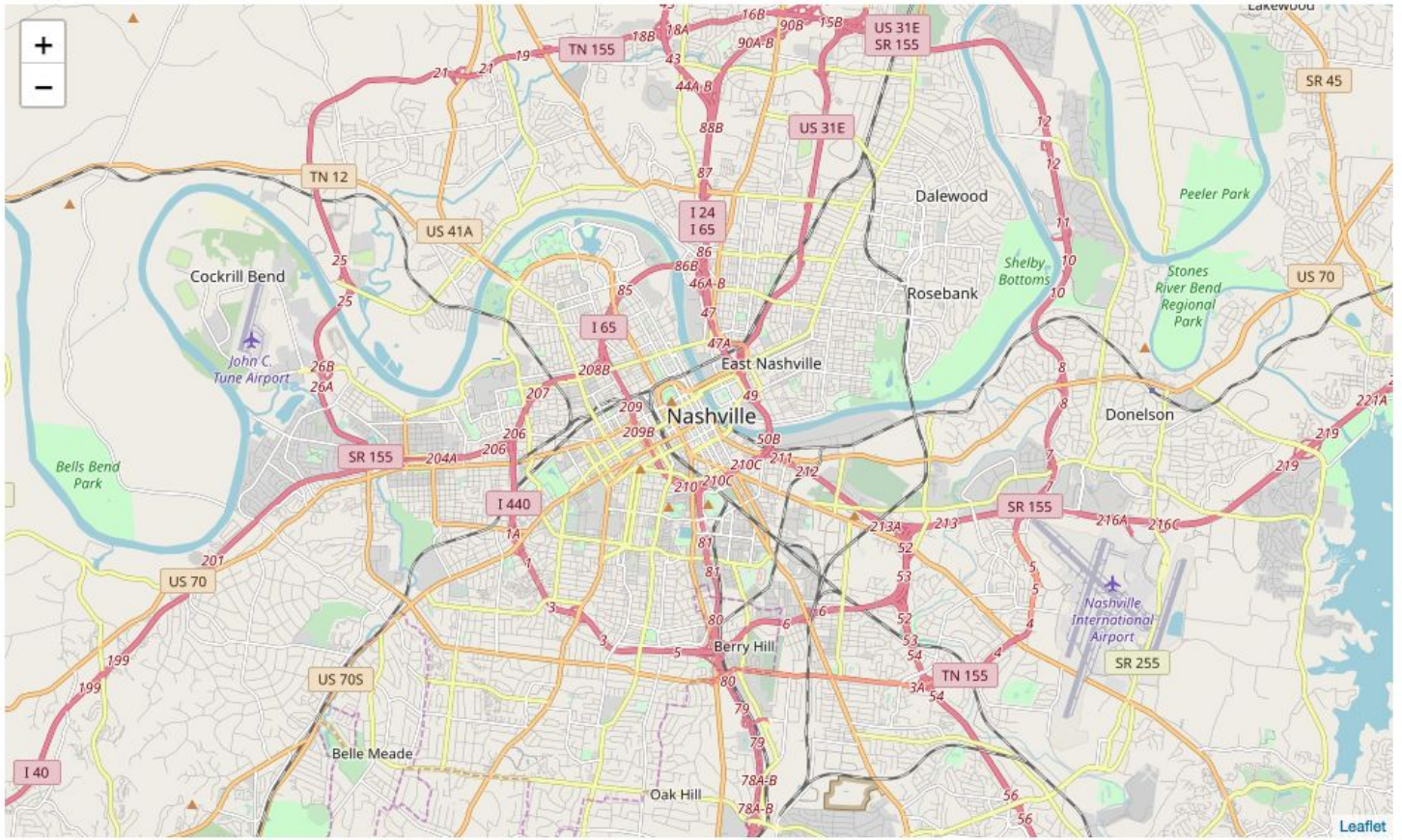
- Python package built upon the leaflet javascript library
- Create interactive maps
- Build markers
- Easily customized popups

To initialize a map in folium, you need a location + (optionally) a beginning zoom_level:

- a folium **location** is a list with latitude first and longitude second
- **the zoom_start** tells folium how close to zoom into the location
- pass **location** and **zoom_start** to the **folium.Map()** constructor
- call the map in jupyter to display it

```
In [68]: nashville = [36.1612, -86.7775]
         nashville_map = folium.Map(location = nashville, zoom_start = 12)
         nashville_map
```

Out[68]:



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You will use iterrows() to build markers with popups for your folium maps, so let's look at how that works. Here are the first 4 rows of urban_art, a data frame of public art in Nashville.

```
In [16]: urban_art.head(4)
```

Out[16]:

	title	last_name	first_name	address	medium	type	desc	lat	lng	loc	geometry	index_right	name
1	[Fourth and Commerce Sculpture]	Walker	Lin	333 Commerce Street, Nashville TN	NaN	Sculpture		36.16234	-86.77774	(36.16234, -86.77774)	POINT (-86.77774000000001 36.16234)	41	Urban Residents
4	A Story of Nashville	Ridley	Greg	615 Church Street, Nashville TN	Hammered copper repousse	Frieze	Inside the Grand Reading Room, this is a serie...	36.16215	-86.78205	(36.16215, -86.78205)	POINT (-86.78205 36.16215)	41	Urban Residents
21	Chet Atkins	Faxon	Russell	Corner of Fifth Avenue North and Union Street,...	Bronze stool and guitar on a granite plynth	Sculpture	A sculpture of a young Chet Atkins seated on a...	36.16466	-86.78102	(36.16466, -86.78102)	POINT (-86.78102 36.16466)	41	Urban Residents
22	Children's Chairs For The Seasons	McGraw	Deloss	615 Church Street, Nashville TN	Mixed Media - wood and paint	Furniture	chairs depicting the four seasons	36.16215	-86.78205	(36.16215, -86.78205)	POINT (-86.78205 36.16215)	41	Urban Residents

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Here we use a for-loop with iterrows() to iterate through the urban_art data frame. We grab each row, print it, then move on to the next row, grab it, print it, until we reach the end of the data frame:

```
In [11]: for row in urban_art.iterrows():
             print(row)
```

```
(1, title                [Fourth and Commerce Sculpture]
last_name                                         Walker
first_name                                           Lin
address            333 Commerce Street, Nashville TN
medium                                               NaN
type                                            Sculpture
desc
lat                                               36.1623
lng                                              -86.7777
loc                                (36.16234, -86.77774)
geometry           POINT (-86.77774000000001 36.16234)
index_right                                           41
name                                  Urban Residents
Name: 1, dtype: object)
(4, title                                    A Story of Nashville
last_name                                              Ridley
first_name                                               Greg
address                          615 Church Street, Nashville TN
medium                                 Hammered copper repousse
```

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Each data frame row returned with iterrows() is a tuple with 2 elements. The first element is the row id and the second element holds all of the values for that row.

```
In [13]: for row in urban_art.iterrows():
             print('first element:', row[0])
             print('second element:', row[1])
             print("---------------------")
```

```
first element: 1
second element: title                [Fourth and Commerce Sculpture]
last_name                                             Walker
first_name                                               Lin
address            333 Commerce Street, Nashville TN
medium                                                  NaN
type                                               Sculpture
desc
lat                                                  36.1623
lng                                                 -86.7777
loc                                  (36.16234, -86.77774)
geometry          POINT (-86.77774000000001 36.16234)
index_right                                              41
name                                       Urban Residents
Name: 1, dtype: object
---------------------
first element: 4
second element: title                                  A Story of Nashville
last_name                                                            Ridley
```

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We can drill further down in each data frame row using iterrows() by using slicing a column by name from the row values. Here we are grabbing and printing the locations and title of each art work in the urban_art data frame.

```
In [14]: for row in urban_art.iterrows():
             print('latitude:', row[1]['lat'])
             print('longitude:', row[1]['lng'])
             print('title of work:', row[1]['title'])
             print("----------------------")
```

```
latitude: 36.16234
longitude: -86.77774000000001
title of work: [Fourth and Commerce Sculpture]
----------------------
latitude: 36.16215
longitude: -86.78205
title of work: A Story of Nashville
----------------------
latitude: 36.16466
longitude: -86.78102
title of work: Chet Atkins
----------------------
latitude: 36.16215
longitude: -86.78205
title of work: Children's Chairs For The Seasons
----------------------
latitude: 36.16215
longitude: -86.78205
title of work: Foliated Scroll
----------------------
latitude: 36.16298
longitude: -86.78184
title of work: Gone Fishing
----------------------
latitude: 36.1647
longitude: -86.78043000000001
title of work: Happy Times at The Arcade
----------------------
latitude: 36.158301
longitude: -86.774955
title of work: Johnny Cash Mural
```

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By using iterrows() in a for-loop, we create a location from each row's latitude and longitude values and popups from each row's title and description.

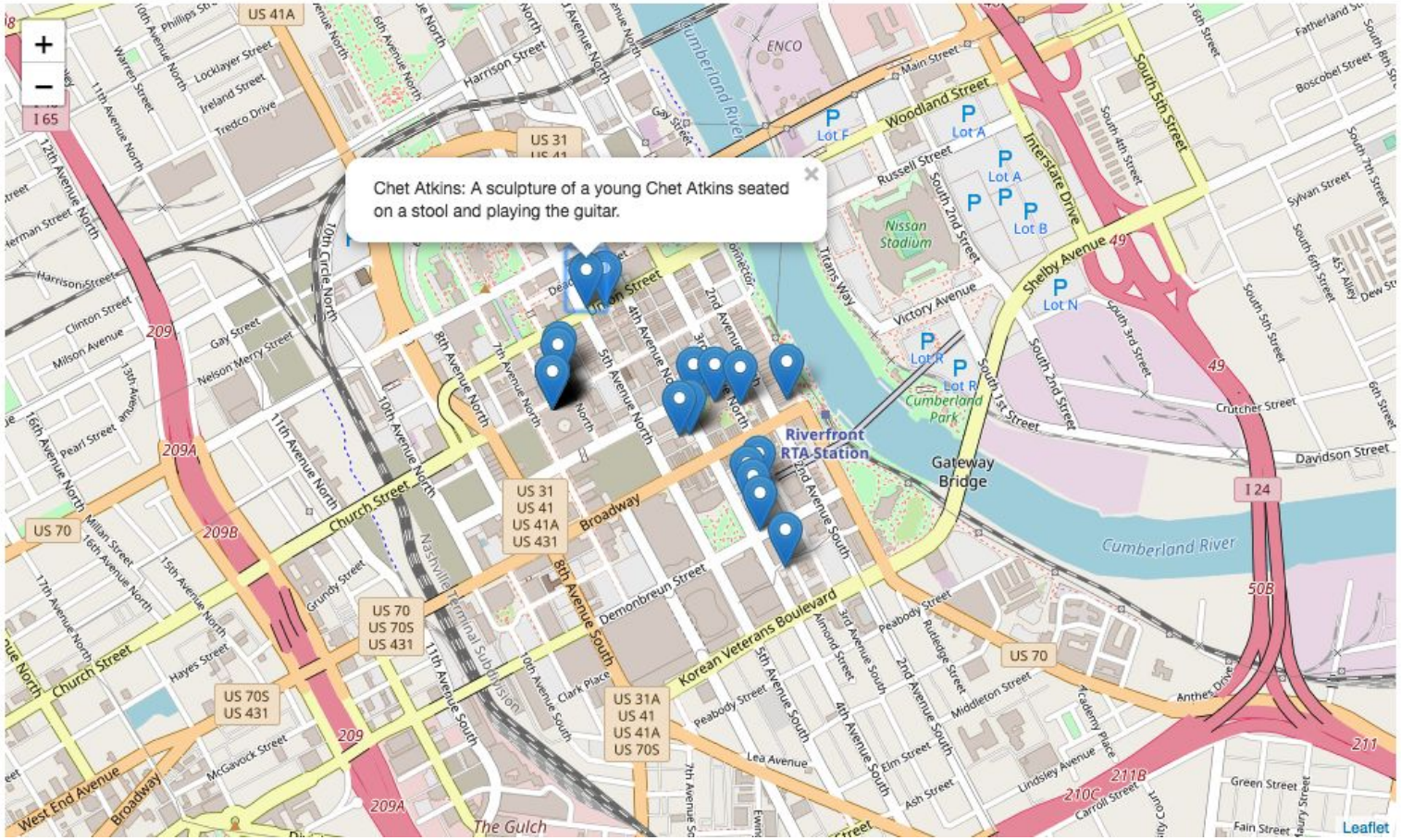
We create a marker each time through the loop by passing the location and the popup to the folium.Marker() constructor.

We use the .add_to() method to add the marker to the map.

After exiting the loop, we display the map.

```
In [17]: for row in urban_art.iterrows():
             row_values = row[1]
             location = [row_values['lat'], row_values['lng']]
             popup = (str(row_values['title']) + ': ' +
                      str(row_values['desc'])).replace("'", "`")
             marker = folium.Marker(location = location, popup = popup)
             marker.add_to(downtown_map)


         display(downtown_map)
```



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Questions?