Analytics Jumpstart

folium maps and df.iterrows()

Nashville Software School

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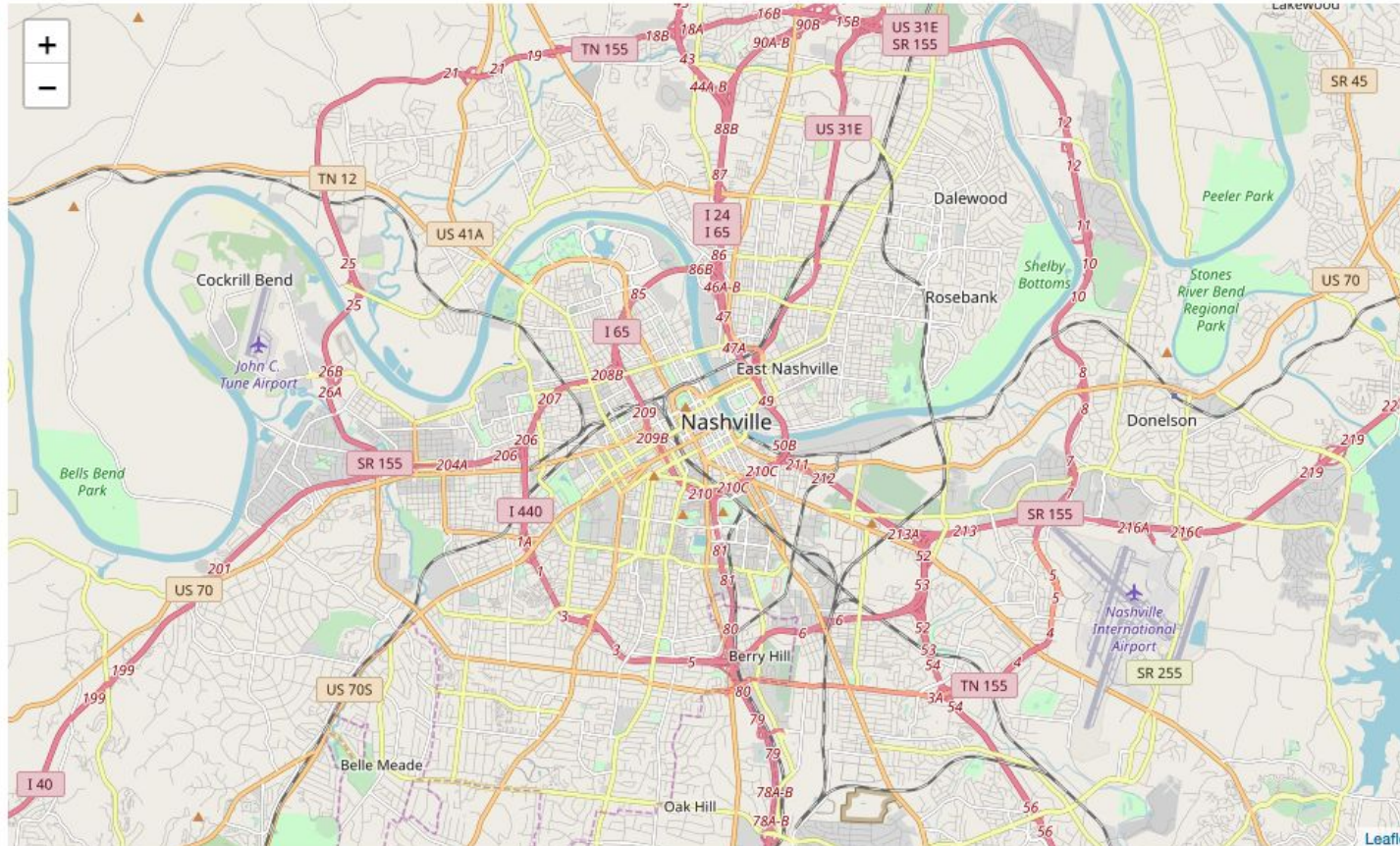
You will use iterrows() to build markers with popups for your folium maps, so let's look at how that works. Here are the first 4 rows of urban_art, a data frame of public art in Nashville.

```
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
```

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

```python
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)
```


Chet Atkins: A sculpture of a young Chet Atkins seated on a stool and playing the guitar.

Questions?