In [774]:
```
import psycopg2

con = psycopg2.connect(database="store_database", user="cindy", password="Flamingosis01.", host="localhost", port="5432")

print("Database opened successfully")
```

```
Database opened successfully
```

In [775]:
```
cur = con.cursor()
```

In [776]:
```
import psycopg2 as pg
import pandas as pd
import pandas.io.sql as psql
from IPython import display
import matplotlib.image as mpimg
from matplotlib import rcParams
```

In [806]:
```
pd.DataFrame(psql.read_sql("SELECT * FROM stores", con)) #Displaying raw data from dable 'stores'
```

Out[806]:

	id	name	province	postal code
0	0	H&M Alkmaar	Alkmaar	1811 JJ
1	1	H&M Alkmaar	Alkmaar	1811 JK
2	2	H&M Almelo	Almelo	7607 HR
3	3	H&M Almere	Almere	1315 VN
4	4	H&M Alphen a/d Rijn	Alphen a/d Rijn	2405 DB
...	...	...	...	...
89	89	H&M Zaandam	Zaandam	1506 CC
90	90	H&M Zeist	Zeist	3701 DK
91	91	H&M Zoetermeer	Zoetermeer	2711 AN
92	92	H&M Zutphen	Zutphen	7201 CZ
93	93	H&M Zwolle	Zwolle	8011 RD

94 rows × 4 columns

In [807]:
```
pd.DataFrame(psql.read_sql("SELECT * FROM items", con)) #Displaying framed table 'items'
```

Out[807]:

	id	name	product_type	color	barcode	availability	price
0	1	Fijngebreide coltrui	Shirts & Blouses	Donkerbruin	673677036006	Online	15
1	2	Easy Iron-overhemd Regular Fit	Shirts & Blouses	Lichtblauw	977237004005	In Store	15
2	3	Capuchonsweater met motief	Jackets & Coats	Lichtroze/Keith	892036036004	In Store	30
3	4	Corduroy broek	Trousers	Donkerbruin	1012508002010	In Store	25
4	5	Gewatteerde overall	Jackets & Coats	Blauw	887085013004	Not available	35
5	6	Pyjama met wijde pijpen	Trousers	Gebroken	980646003012	Only in Store	15
6	7	Hoge waterdichte sneakers	Shoes	Zwart	901591003016	Only online	35
7	8	Wide lyocell-blend trousers	Trousers	Roze	1000880001	In Store	40
8	9	Oversized Shirt Jacket	Jackets & Coats	Blauw	934816001	In Store	35
9	10	Long Fit T-shirt	Shirts & Blouses	Wit	598755002	In Store/Online	10

In [808]:
```
pd.DataFrame(psql.read_sql("SELECT * FROM categories", con))#Displaying framed table 'categories'
```

Out[808]:

	id	name	parent_id
0	1	Men	NaN
1	2	Women	NaN
2	3	Divided	NaN
3	4	Baby	NaN
4	5	Kids	NaN
...	...	...	...
101	102	Shorts	7.0
102	103	Shorts	8.0
103	104	Shorts	9.0
104	105	Shorts	23.0
105	106	Shorts	24.0

106 rows × 3 columns

In [789]:
```
psql.read_sql("""
  SELECT categories.id, categories.name, store_items.item_id, store_items.store_id
  FROM categories AS categories
  LEFT JOIN store_items AS store_items ON categories.parent_id = store_items.store_id
;""", con)
```

Out[789]:

	id	name	item_id	store_id
0	1	Men	NaN	NaN
1	2	Women	NaN	NaN
2	3	Divided	NaN	NaN
3	4	Baby	NaN	NaN
4	5	Kids	NaN	NaN
...	...	...	...	...
334	104	Shorts	40.0	9.0
335	104	Shorts	45.0	9.0
336	104	Shorts	60.0	9.0
337	105	Shorts	NaN	NaN
338	106	Shorts	NaN	NaN

339 rows × 4 columns

In [792]:
```
pd.DataFrame(psql.read_sql("""

SELECT
    opening_times.store_id,
    opening_times.monday,
    opening_times.tuesday,
    opening_times.wednesday,
    opening_times.thursday,
    opening_times.friday,
    opening_times.saturday,
    opening_times.sunday,
    opening_time_exceptions.date,
    opening_time_exceptions.time
FROM opening_times
JOIN opening_time_exceptions ON opening_times.store_id = opening_time_exceptions.store_id

""", con))
```

Out[792]:

	store_id	monday	tuesday	wednesday	thursday	friday	saturday	sunday	date	time
0	2	11:00 - 18:00	10:00-18:00	10:00-18:00	10:00-21:00	10:00-18:00	10:00-17:30	Closed	2021-11-28	12:00 - 17:00
1	8	11:00 - 20:00	10:00-20:00	10:00-20:00	10:00-21:00	10:00-20:00	10:00-20:00	11:00-20:00	2021-11-10	Closed
2	18	12:00 - 18:00	10:00-18:00	10:00-18:00	10:00-21:00	10:00-18:00	10:00 -17:30	12:00-17:00	2021-11-28	12:00 - 17:00
3	30	13:00-18:00	10:00-18:00	10:00-18:00	10:00-21:00	10:00-18:00	10:00-17:00	10:00-17:00	2021-11-28	12:00 - 17:00
4	31	11:00 - 18:00	10:00-18:00	10:00-18:00	10:00-18:00	10:00-18:00	10:00-21:00	10:00-17:30	2021-11-28	12:00 - 17:00
5	35	13:00-18:00	10:00-18:00	10:00-18:00	10:00-21:00	10:00-18:00	10:00-17:30	Closed	2021-11-28	12:00 - 17:00
6	39	12:00 - 17:30	09:30-17:30	09:30-17:30	09:30-21:00	09:30-17:30	09:30-17:00	Closed	2021-11-28	12:00 - 17:00
7	44	13:00-18:00	10:00-18:00	10:00-18:00	10:00-21:00	10:00-18:00	10:00-17:30	Closed	2021-11-28	12:00 - 17:00
8	49	12:00 - 18:00	10:00-18:00	10:00-18:00	10:00-21:00	10:00-18:00	10:00 -18:00	12:00-17:00	2021-11-28	12:00 - 17:00
9	52	13:00-18:00	10:00-18:00	10:00-18:00	10:00-21:00	10:00-18:00	10:00-17:30	Closed	2021-11-28	12:00 - 17:00
10	81	13:00-18:00	10:00-18:00	10:00-18:00	10:00-21:00	10:00-18:00	09:30-17:00	Closed	2021-11-28	12:00 - 17:00
11	88	13:00-18:00	10:00-18:00	10:00-18:00	10:00-21:00	10:00-21:00	10:00-17:00	Closed	2021-11-28	12:00 - 17:00
12	92	13:00-18:00	10:00-18:00	10:00-18:00	10:00-21:00	10:00-18:00	10:00-17:30	09:30-17:30	2021-11-28	12:00 - 17:00

In [801]:
```
pd.DataFrame(psql.read_sql("""

SELECT
    stores.name ,
    items.name
FROM items
JOIN stores ON stores.id = stores.id
INNER JOIN store_items ON store_items.item_id = items.id;

""", con)) #Displaying joined framed tables 'items' and 'stores'
```

Out[801]:

	name	name
0	H&M Alkmaar	Fijngebreide coltrui
1	H&M Alkmaar	Fijngebreide coltrui
2	H&M Almelo	Fijngebreide coltrui
3	H&M Almere	Fijngebreide coltrui
4	H&M Alphen a/d Rijn	Fijngebreide coltrui
...	...	...
747	H&M Zaandam	Long Fit T-shirt
748	H&M Zeist	Long Fit T-shirt
749	H&M Zoetermeer	Long Fit T-shirt
750	H&M Zutphen	Long Fit T-shirt
751	H&M Zwolle	Long Fit T-shirt

752 rows × 2 columns

In [815]:
```
# read images
img_A = mpimg.imread("/Users/cindymendoncapaez/Documents/hmgoepprod.jpeg")
img_B = mpimg.imread("/Users/cindymendoncapaez/Documents/hmgoepprod (1).jpeg")
img_C = mpimg.imread("/Users/cindymendoncapaez/Documents/hmgoepprod (2).jpeg")
img_D = mpimg.imread("/Users/cindymendoncapaez/Documents/hmgoepprod (3).jpeg")
img_E = mpimg.imread("/Users/cindymendoncapaez/Documents/hmgoepprod (5).jpeg")
img_F = mpimg.imread("/Users/cindymendoncapaez/Documents/hmgoepprod (6).jpeg")
img_G = mpimg.imread("/Users/cindymendoncapaez/Documents/hmgoepprod (7).jpeg")
img_H = mpimg.imread("/Users/cindymendoncapaez/Documents/hmgoepprod (8).jpeg")

fig, ax = plt.subplots(1,2)
ax[0].imshow(img_A);
ax[1].imshow(img_B);

fig, ax = plt.subplots(1,2)
ax[0].imshow(img_C);
ax[1].imshow(img_D);

fig, ax = plt.subplots(1,2)
ax[0].imshow(img_E);
ax[1].imshow(img_F);

fig, ax = plt.subplots(1,2)
ax[0].imshow(img_G);
ax[1].imshow(img_H);


def path_to_image_html(path):
    return '<img src="'+ path + '" width="60" >'

pd.set_option('display.max_colwidth', None)

image_cols = ['imageUrls', 'otherImageUrls']  #<- define which columns will be used to convert to html

# Create the dictionariy to be passed as formatters
format_dict = {}
for image_col in image_cols:
    format_dict[image_col] = path_to_image_html
```

In [802]:
```
pd.DataFrame(psql.read_sql("""

SELECT stores.name ,
    categories.name
FROM categories
INNER JOIN stores ON stores.id = stores.id
INNER JOIN store_categories ON store_categories.categories_id = categories.id;"""
, con))

#Displaying joined framed tables 'stores' and 'categories'
```

Out[802]:

	name	name
0	H&M Alkmaar	Clothes
1	H&M Alkmaar	Clothes
2	H&M Almelo	Clothes
3	H&M Almere	Clothes
4	H&M Alphen a/d Rijn	Clothes
...	...	...
14471	H&M Zaandam	Shorts
14472	H&M Zeist	Shorts
14473	H&M Zoetermeer	Shorts
14474	H&M Zutphen	Shorts
14475	H&M Zwolle	Shorts

14476 rows × 2 columns

In [803]:
```
 pd.DataFrame(psql.read_sql("""

SELECT stores_locations.name,
    latitude_longitude_nl.city ,
    latitude_longitude_nl.lat,
    latitude_longitude_nl.lng,
    latitude_longitude_nl.admin_name
FROM latitude_longitude_nl
INNER JOIN join_store_locations ON join_store_locations.store_id  = latitude_longitude_nl.city_id
INNER JOIN stores_locations ON join_store_locations.store_id  = stores_locations.id """
,con))
```

Out[803]:

	name	city	lat	lng	admin_name
0	H&M Alkmaar	Alkmaar	52.632	4.751	Noord-Holland
1	H&M Alkmaar	Alkmaar	52.632	4.751	Noord-Holland
2	H&M Alkmaar	Alkmaar	52.632	4.751	Noord-Holland
3	H&M Alkmaar	Alkmaar	52.632	4.751	Noord-Holland
4	H&M Almelo	Almelo	52.3567	6.6625	Overijssel
...	...	...	...	...	...
195	H&M Zaandam	Zaandam	52.4417	4.8422	Noord-Holland
196	H&M Zeist	Zeist	52.0833	5.2333	Utrecht
197	H&M Zoetermeer	Zoetermeer	52.0575	4.4931	Zuid-Holland
198	H&M Zutphen	Zutphen	52.14	6.195	Gelderland
199	H&M Zwolle	Zwolle	52.5125	6.0944	Overijssel

200 rows × 5 columns

In [797]:
```
import folium
from folium import Choropleth, Circle, Marker
from folium.plugins import MarkerCluster
import csv
```

In [798]:
```
m_1 = folium.Map(location=[52.370216, 4.895168], tiles='openstreetmap', zoom_start=10)
```

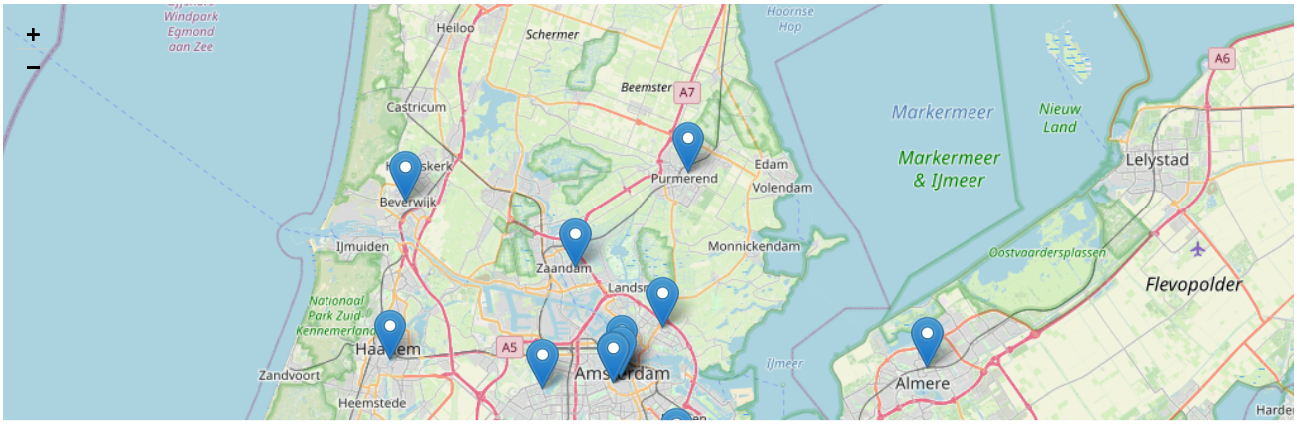
In [799]:
```
#Find stores location
stores_data = pd.read_csv('/Users/cindymendoncapaez/opt/anaconda3/lib/python3.8/site-packages/folium/join_table_stores_loc.csv')

# Drop rows with missing locations
stores_data.dropna(subset=['id','lat', 'lng'], inplace=True)

# Print the first five rows of the table
stores_data.head()
```

Out[799]:

	id	store	city	lat	lng	admin_name	postal_code
0	1	H&M Alkmaar	Alkmaar	52.632000	4.751000	Noord-Holland	1811 JJ
1	2	H&M Alkmaar	Alkmaar	52.632213	4.747423	Noord-Holland	1811 JK
2	3	H&M Almelo	Almelo	52.356700	6.662500	Overijssel	7607 HR
3	4	H&M Almere	Almere	52.375800	5.225600	Flevoland	1315 VN
4	5	H&M Alphen a/d Rijn	Alphen aan den Rijn	52.133300	4.650000	Zuid-Holland	2405 DB

In [800]:
```
for index,row in stores_data.iterrows():
    lat = row["lat"]
    lon = row["lng"]
    name = row["store"]
    postal_code = row["postal_code"]
    map_displayed_info = '{}  {}'.format(name, postal_code)
    folium.Marker([lat,lon],popup=map_displayed_info).add_to(m_1)
m_1
```

Out[800]:



In [756]:
```
#find categories in stores
find_categories = pd.read_csv('/Users/cindymendoncapaez/opt/anaconda3/lib/python3.8/site-packages/folium/find_categories.csv')

# Drop rows with missing locations
find_categories.dropna(subset=['lat', 'lng'], inplace=True)

# Print the first five rows of the table
find_categories.head()
```

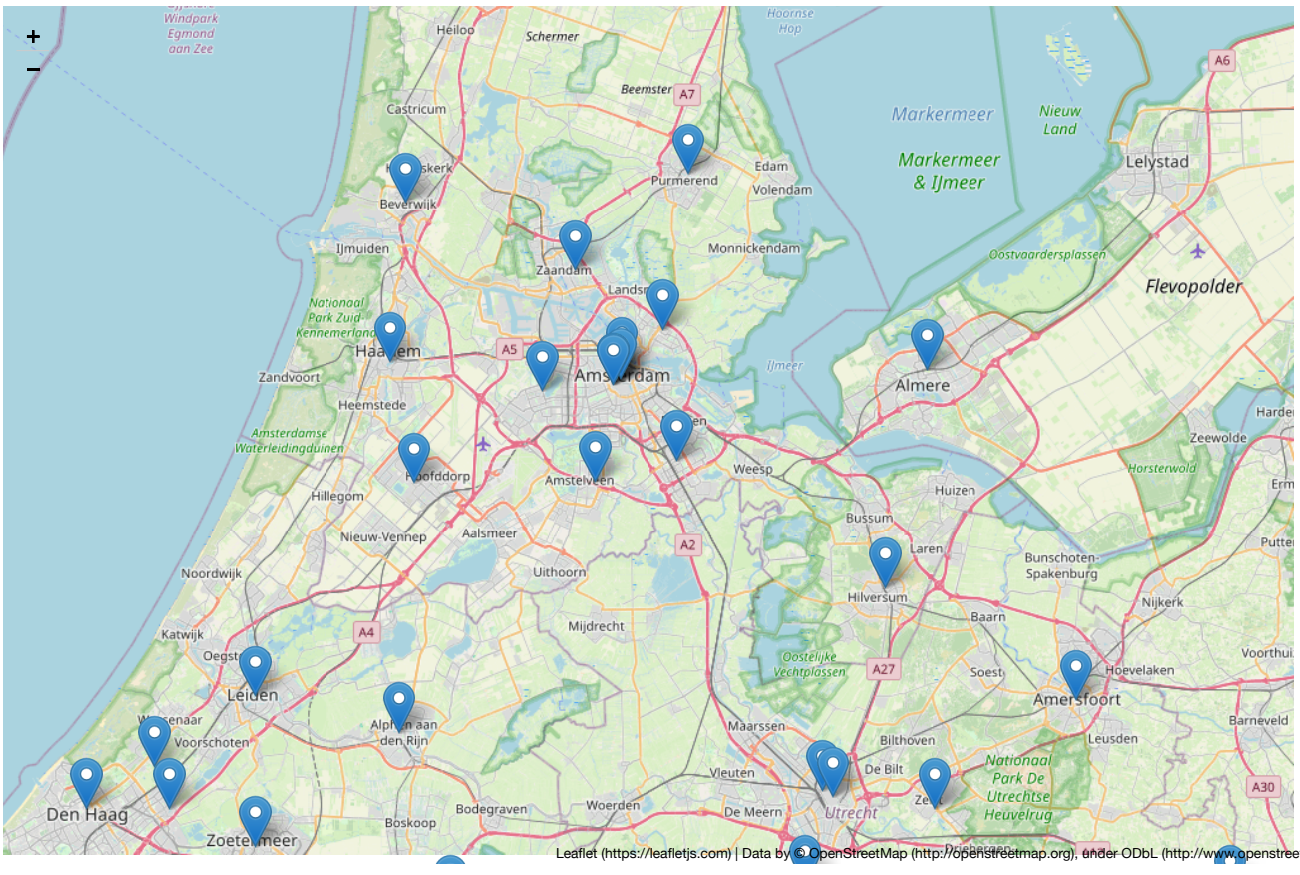
Out[756]:

	store	category	city	lat	lng	admin_name
0	H&M Almelo	Men	Almelo	52.3567	6.6625	Overijssel
1	H&M Almere	Women	Almere	52.3758	5.2256	Flevoland
2	H&M Alphen a/d Rijn	Divided	Alphen aan den Rijn	52.1333	4.6500	Zuid-Holland
3	H&M Amersfoort	Kids	Amersfoort	52.1550	5.3875	Utrecht
4	H&M Amstelveen	Clothes	Amstelveen	52.3008	4.8639	Noord-Holland

In [757]:
```
m_2 = folium.Map(location=[52.370216, 4.895168], tiles='openstreetmap', zoom_start=10)
```

In [758]:
```
for index,row in find_categories.iterrows():
    lat = row["lat"]
    lon = row["lng"]
    name = row["store"]
    categories = row["category"]
    map_displayed_info1 = '{} : {}'.format(name, categories)
    folium.Marker([lat,lon],popup=map_displayed_info1).add_to(m_2)
m_2
```

Out[758]:



In [804]:
```
pd.DataFrame(psql.read_sql("""
SELECT join_item_stores.id,
    join_item_stores.item,
    join_item_stores.store,
    join_item_stores.city,
    join_item_stores.postal_code,
    join_item_stores.lat,
    join_item_stores.lng
FROM join_item_stores
WHERE  join_item_stores.item = 'Long Fit T-shirt'
GROUP BY join_item_stores.id,
    join_item_stores.item,
    join_item_stores.store,
    join_item_stores.city,
    join_item_stores.postal_code,
    join_item_stores.lat,
    join_item_stores.lng"""
, con))
```

Out[804]:

	id	item	store	city	postal_code	lat	lng
0	159	Long Fit T-shirt	H&M Middelburg	Middelburg	4331 AN	51.4997	3.6136
1	77	Long Fit T-shirt	H&M Delft	Delft	2611 DC	52.0119	4.3599
2	42	Long Fit T-shirt	H&M Alkmaar	Alkmaar	1811 JK	52.6322128	4.747422515
3	152	Long Fit T-shirt	H&M Heerhugowaard	Heerhugowaard	1703 SC	52.668	4.841
4	21	Long Fit T-shirt	H&M Amsterdam Noord	Amsterdam	1025 ET	52.40200912	4.937660298
5	119	Long Fit T-shirt	H&M Heerenveen	Heerenveen	8442 BR	52.95	5.9333
6	49	Long Fit T-shirt	H&M Amstelveen	Amstelveen	1181 ZL	52.3008	4.8639
7	14	Long Fit T-shirt	H&M Amersfoort	Amersfoort	3811 DC	52.155	5.3876
8	112	Long Fit T-shirt	H&M Eindhoven Piazza	Eindhoven	5611 AE	51.44210871	5.476364785
9	70	Long Fit T-shirt	H&M Apeldoorn	Apeldoorn	7311 KG	52.216	5.97
10	28	Long Fit T-shirt	H&M Amsterdam Osdorp	Amsterdam	1068SR	52.36092561	4.80714581
11	63	Long Fit T-shirt	H&M HOME Amsterdam	Amsterdam	1012 PK	52.3699454	4.891077067
12	7	Long Fit T-shirt	H&M Almelo	Almelo	7607 HR	52.3567	6.6625
13	105	Long Fit T-shirt	H&M Veenendaal	Veenendaal	3901 AT	52.025	5.555
14	35	Long Fit T-shirt	H&M Amsterdam Zuidoost	Amsterdam	1102 DB	52.31493597	4.95276298
15	133	Long Fit T-shirt	H&M Oosterhout	Oosterhout	4901 NE	51.6431	4.8569
16	145	Long Fit T-shirt	H&M Groningen	Groningen	9711LD	53.2167	6.5667
17	84	Long Fit T-shirt	H&M Den Haag	Den Haag	2511 PA	52.0119	4.3599
18	144	Long Fit T-shirt	H&M Emmen	Emmen	7811 DH	52.78338	6.9
19	137	Long Fit T-shirt	H&M Eindhoven Woensel	Eindhoven	5625 AG	51.4408	5.4778
20	126	Long Fit T-shirt	H&M Leiden	Leiden	2311 EC	52.1583	4.4931
21	98	Long Fit T-shirt	H&M Utrecht Hoog Catharijne	Utrecht	3541 DG	52.09492731	5.111640256
22	56	Long Fit T-shirt	H&M Amsterdam	Amsterdam	1012 NP	52.3667	4.8839
23	91	Long Fit T-shirt	H&M Rotterdam Zuidplein Kids	Rotterdam	3083BS	51.9225	4.3599

In [765]:
```
df.to_csv('join_item_stores.csv', index=False, header=False)
```

In [766]:
```
#find item in stores
find_items = pd.read_csv('/Users/cindymendoncapaez/opt/anaconda3/lib/python3.8/site-packages/folium/join_item_stores.csv')

# Drop rows with missing locations
find_items.dropna(subset=['lat','lng'], inplace=True)

# Print the first five rows of the table
find_items.head()
```

Out[766]:

	id	item	store	city	postal_code	lat	lng
0	42	Long Fit T-shirt	H&M Alkmaar	Alkmaar	1811 JK	52.632213	4.747423
1	7	Long Fit T-shirt	H&M Almelo	Almelo	7607 HR	52.356700	6.662500
2	14	Long Fit T-shirt	H&M Amersfoort	Amersfoort	3811 DC	52.155000	5.387600
3	49	Long Fit T-shirt	H&M Amstelveen	Amstelveen	1181 ZL	52.300800	4.863900
4	56	Long Fit T-shirt	H&M Amsterdam	Amsterdam	1012 NP	52.366700	4.883900

In [767]:
```
m_3 = folium.Map(location=[52.370216, 4.895168], tiles='openstreetmap', zoom_start=10)
```

In [818]:
```
for index,row in find_items.iterrows():
    lat = row["lat"]
    lon = row["lng"]
    name = row["store"]
    items = row["item"]
    map_displayed_info2 = '{} : {}'.format(name, items)
    folium.Marker([lat,lon],popup=map_displayed_info2).add_to(m_3)
m_3
```

Out[818]: