Double-click (or enter) to edit

written material

going to grab this data from gh: https://raw.githubusercontent.com/stefanbund/py3100/main/ProductList_118.csv

New Section

first, install the plotly visualization library.

```
!pip install plotly-geo
```

```
Collecting plotly-geo
  Downloading plotly_geo-1.0.0-py3-none-any.whl (23.7 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 23.7/23.7 MB 60.9 MB/s eta 0:00:00
Installing collected packages: plotly-geo
Successfully installed plotly-geo-1.0.0
```

our system depends on the use of the pandas and numpy libraries.

```
import pandas as pd
import numpy as np
```

Define "url" and "url_m" so they can be used in the system.

```
url ='https://raw.githubusercontent.com/stefanbund/py3100/main/ProductList_118.csv'
url_m = 'https://raw.githubusercontent.com/stefanbund/py3100/main/matrix.csv'
```

Define "df_m" as running python for "url_m" to put the data into a tabular format.

```
df_m = pd.read_csv(url_m) #make a pandas dataframe
```

Run "df_m" to make a table.

```
df_m
```

	City	1	2	3	4	5	6	7	8	9	...	32	33	34	35	36	37	38	39	40	41
0	Birmingham	8285	5343	6738	6635	5658	8118	4311	8535	3436	...	1340	6923	3082	5617	3555	1341	1756	7598	1509	1861
1	Montgomery	1287	6585	8300	8874	8208	5363	3552	3387	2765	...	4424	8813	6655	3986	2805	4601	4449	5727	2315	8822
2	Mobile	8035	5569	9492	5905	5024	1107	6937	5580	8044	...	5430	1601	9145	1493	9807	2652	9296	2815	4886	7458
3	Huntsville	6280	2841	3399	5448	6173	5451	7488	9981	5236	...	9169	7829	6879	4166	7935	2605	9982	3338	9116	3875
4	Tuscaloosa	4079	1066	3923	4177	4277	4219	9436	8160	4302	...	1556	5533	1884	2088	3657	2158	4469	2513	8135	6963
5	Hoover	9741	7377	9410	9790	8864	2522	5347	9145	8402	...	6031	7673	8403	7588	9748	7224	4628	8107	6143	1671
6	Dothan	7646	2060	4911	4976	7851	4277	7423	6183	6641	...	8253	1565	6052	5802	5650	4400	7842	4006	9335	3571
7	Auburn	4326	2659	6928	4656	1828	5199	5331	6294	3076	...	6128	3737	7785	3281	4387	6890	2833	5083	9707	2116
8	Decatur	3786	2891	8124	2469	3704	3623	2409	8287	2032	...	6622	9742	9382	8413	9305	6509	6848	5408	3707	8744
9	Madison	1934	3628	9190	3275	9344	5778	1256	3523	1781	...	6619	6128	5325	9976	1746	4470	7054	6573	3556	1374

Get column labels.

```
df_m.columns #dimensionality of the matrix
```

```
Index(['City', '1', '2', '3', '4', '5', '6', '7', '8', '9', '10', '11', '12',
       '13', '14', '15', '16', '17', '18', '19', '20', '21', '22', '23', '24',
       '25', '26', '27', '28', '29', '30', '31', '32', '33', '34', '35', '36',
       '37', '38', '39', '40', '41'],
      dtype='object')
```

list all cities in the matrix dataframe

```
df_m['City'] #explore a Series inside the dataframe
```

```
0          Birmingham
1          Montgomery
2              Mobile
3          Huntsville
4          Tuscaloosa
5              Hoover
6              Dothan
7              Auburn
8             Decatur
9             Madison
10           Florence
11            Gadsden
12     Vestavia Hills
13         Prattville
14        Phenix City
15          Alabaster
16           Bessemer
17         Enterprise
18            Opelika
19           Homewood
20          Northport
21             Pelham
22        Trussville
23     Mountain Brook
24           Fairhope
Name: City, dtype: object
```

investigate quartile as an analytic tool

```
df_m.dtypes
# df_m.columns
```

```
City    object
1        int64
2        int64
3        int64
4        int64
5        int64
6        int64
7        int64
8        int64
```

```
    9       int64
    10      int64
    11      int64
    12      int64
    13      int64
    14      int64
    15      int64
    16      int64
    17      int64
    18      int64
    19      int64
    20      int64
    21      int64
    22      int64
    23      int64
    24      int64
    25      int64
    26      int64
    27      int64
    28      int64
    29      int64
    30      int64
    31      int64
    32      int64
    33      int64
    34      int64
    35      int64
    36      int64
    37      int64
    38      int64
    39      int64
    40      int64
    41      int64
    dtype: object
```

Quantiles for each display, all stores

Transpose all cities into 0.25, 0.5, and 0.75 quartiles. The 0.25 quartile represents the lowest performing stores. The 0.5 quartile represents midrange performing stores. The 0.75 quartile represents the top performing stores.

```
df_3 = df_m.quantile([0.25, 0.5, 0.75], numeric_only=True, axis=1)
df_3
```

	0	1	2	3	4	5	6	7	8	9	...	15	16	17	18	19	20	
0.25	3082.0	3633.0	2236.0	3473.0	3657.0	4628.0	4254.0	3588.0	3704.0	3451.0	...	3449.0	4246.0	4375.0	3217.0	4259.0	2468.0	36
0.50	5343.0	5431.0	5311.0	5771.0	5131.0	7588.0	5156.0	5331.0	6589.0	5875.0	...	6478.0	5944.0	6315.0	5341.0	6472.0	5472.0	57
0.75	7242.0	8074.0	7508.0	7935.0	7490.0	9145.0	6840.0	7606.0	8221.0	7783.0	...	7437.0	8331.0	8436.0	8472.0	8389.0	7877.0	83

3 rows × 25 columns

List the quartile values per store.

```
l = df_3.T.columns  #transpose, T
l
```

```
    Float64Index([0.25, 0.5, 0.75], dtype='float64')
```

Find the mean (average) of each quartile.

```
df_3.T.mean()
```

```
    0.25    3535.24
    0.50    5826.36
    0.75    7953.00
    dtype: float64
```

define the global quartile boundary, per quartile.

Find the mean of the 0.25 quartile.

```
df_3.T[0.25].mean()
```

```
    3535.24
```

Find the mean of the 0.5 quartile.

```
df_3.T[0.5].mean()
```

```
    5826.36
```

Find the mean of the 0.75 quartile.

```
df_3.T[0.75].mean()
```

```
    7953.0
```

List each quartile and their means.

```
kk = df_3.T.mean()
kk #series
```

```
    0.25    3535.24
    0.50    5826.36
    0.75    7953.00
    dtype: float64
```

what percentage of displays are at or below the 25th quartile, per store? exercise

List the percentage of displays that are within the 0.25 quartile per store.

```
# n =
((df_m.iloc[:, 1:] <= kk[0.25]).sum(axis=1) / df_m.shape[1]) * 100
# print(round(n))
```

```
    0     28.571429
    1     21.428571
    2     38.095238
    3     26.190476
    4     21.428571
    5     16.666667
    6     19.047619
    7     23.809524
    8     21.428571
    9     28.571429
    10    26.190476
    11    19.047619
    12    26.190476
    13    23.809524
    14    28.571429
    15    28.571429
    16    14.285714
    17    19.047619
    18    28.571429
    19    19.047619
    20    28.571429
    21    23.809524
    22    33.333333
    23    19.047619
    24    33.333333
    dtype: float64
```

List the percentage of displays that are within each quartile for each store.

```
la = df_m['25qt'] = round(((df_m.iloc[:, 1:] <= kk[0.25]).sum(axis=1) / df_m.shape[1]) * 100,1)
ll = df_m['50qt'] = round(((df_m.iloc[:, 1:] <= kk[0.50]).sum(axis=1) / df_m.shape[1]) * 100,1)
```

```
lll = df_m['75qt'] = round(((df_m.iloc[:, 1:] <= kk[0.75]).sum(axis=1) / df_m.shape[1]) * 100,1)
print(la, ll, lll)
```

```
    0     28.6
    1     21.4
    2     38.1
    3     26.2
    4     21.4
    5     16.7
    6     19.0
    7     23.8
    8     21.4
    9     28.6
    10    26.2
    11    19.0
    12    26.2
    13    23.8
    14    28.6
    15    28.6
    16    14.3
    17    19.0
    18    28.6
    19    19.0
    20    28.6
    21    23.8
    22    33.3
    23    19.0
    24    33.3
    dtype: float64 0     55.8
    1     55.8
    2     60.5
    3     51.2
    4     60.5
    5     34.9
    6     55.8
    7     51.2
    8     46.5
    9     48.8
    10    48.8
    11    41.9
    12    53.5
    13    44.2
    14    48.8
    15    41.9
    16    46.5
    17    41.9
    18    55.8
    19    41.9
    20    53.5
    21    51.2
    22    48.8
    23    53.5
    24    67.4
    dtype: float64 0     77.3
    1     70.5
    2     79.5
    3     77.3
    4     79.5
    5     59.1
    6     90.9
    7     79.5
```

```
# df_m
```

Create a table that shows what percentage of displays in each store are in each quartile.

```
end_set = ['City','25qt','50qt','75qt']
df_m[end_set]
```

	City	25qt	50qt	75qt
0	Birmingham	28.6	55.8	77.3
1	Montgomery	21.4	55.8	70.5
2	Mobile	38.1	60.5	79.5
3	Huntsville	26.2	51.2	77.3
4	Tuscaloosa	21.4	60.5	79.5
5	Hoover	16.7	34.9	59.1
6	Dothan	19.0	55.8	90.9
7	Auburn	23.8	51.2	79.5
8	Decatur	21.4	46.5	70.5
9	Madison	28.6	48.8	75.0
10	Florence	26.2	48.8	63.6
11	Gadsden	19.0	41.9	68.2
12	Vestavia Hills	26.2	53.5	70.5
13	Prattville	23.8	44.2	75.0
14	Phenix City	28.6	48.8	75.0
15	Alabaster	28.6	41.9	84.1
16	Bessemer	14.3	46.5	70.5
17	Enterprise	19.0	41.9	72.7
18	Opelika	28.6	55.8	72.7
19	Homewood	19.0	41.9	68.2

create a chloropleth for each store

21	Pelham	23.8	51.2	72.7

```
#choropleth:
import pandas as pd

# Create a sample dataframe
data = {'City': ['Birmingham', 'Montgomery', 'Mobile', 'Huntsville', 'Tuscaloosa', 'Hoover', 'Dothan', 'Auburn', 'Decatur', 'Ma
        'Zip Code': ['35201','36101','36601','35801','35401','35216','36301','36830','35601','35756','35630','35901','35216','3

df = pd.DataFrame(data)

# Create a list of zip codes
zip_codes = ['35201', '36101', '36601', '35801', '35401', '35216',
             '36301', '36830', '35601', '35756', '35630', '35901',
             '35216', '36066', '36867', '35007', '35020',
             '36330', 36801, 35209, 35473, 35124, 35173, 35213, 36532]

# Add the list of zip codes as a new column to the dataframe
# df = df.assign(Zip_Codes=zip_codes)
df_m = df_m.assign(zip=zip_codes)


print(df_m)
```

```
              City     1     2     3     4     5     6     7     8     9  ...  \
0       Birmingham  8285  5343  6738  6635  5658  8118  4311  8535  3436  ...   
1       Montgomery  1287  6585  8300  8874  8208  5363  3552  3387  2765  ...   
2           Mobile  8035  5569  9492  5905  5024  1107  6937  5580  8044  ...   
3       Huntsville  6280  2841  3399  5448  6173  5451  7488  9981  5236  ...   
4       Tuscaloosa  4079  1066  3923  4177  4277  4219  9436  8160  4302  ...   
5           Hoover  9741  7377  9410  9790  8864  2522  5347  9145  8402  ...   
6           Dothan  7646  2060  4911  4976  7851  4277  7423  6183  6641  ...   
7           Auburn  4326  2659  6928  4656  1828  5199  5331  6294  3076  ...   
8          Decatur  3786  2891  8124  2469  3704  3623  2409  8287  2032  ...   
9          Madison  1934  3628  9190  3275  9344  5778  1256  3523  1781  ...   
10        Florence  8017  3187  1128  4706  9962  7547  4440  4530  9569  ...   
11         Gadsden  2290  6402  8598  7547  5158  9731  8038  4435  7357  ...   
12  Vestavia Hills  9471  9142  4419  3846  2016  5069  4853  6336  9062  ...   
13      Prattville  6039  8003  6180  4610  3548  7115  6720  8512  9954  ...   
```

```
14     Phenix City  8788  8269  6838  2863  6753  6608  4048  8774  4513  ...
15       Alabaster  1733  9767  3274  7125  7437  5748  5399  6513  3038  ...
16        Bessemer  6559  2453  1578  5158  3058  8075  7066  8530  8346  ...
17      Enterprise  8436  7800  7234  5063  4274  1948  7887  6647  1320  ...
18         Opelika  9998  8953  7923  6176  4369  9503  2126  1816  9224  ...
19        Homewood  2373  7188  9880  9236  5969  9998  8703  8440  4643  ...
20       Northport  3536  9231  8651  6374  4842  5704  8484  6322  2012  ...
21          Pelham  6830  3736  2734  6443  8494  6206  7290  8518  6176  ...
22      Trussville  2794  8273  9174  2850  8351  3978  5995  4632  7693  ...
23  Mountain Brook  8433  9368  2141  2357  6566  1482  4787  3900  6615  ...
24        Fairhope  8114  1464  2811  3090  4686  7995  7676  1304  7332  ...

      36    37    38    39    40    41  25qt  50qt  75qt    zip
0   3555  1341  1756  7598  1509  1861  28.6  55.8  77.3  35201
1   2805  4601  4449  5727  2315  8822  21.4  55.8  70.5  36101
2   9807  2652  9296  2815  4886  7458  38.1  60.5  79.5  36601
3   7935  2605  9982  3338  9116  3875  26.2  51.2  77.3  35801
4   3657  2158  4469  2513  8135  6963  21.4  60.5  79.5  35401
5   9748  7224  4628  8107  6143  1671  16.7  34.9  59.1  35216
6   5650  4400  7842  4006  9335  3571  19.0  55.8  90.9  36301
7   4387  6890  2833  5083  9707  2116  23.8  51.2  79.5  36830
8   9305  6509  6848  5408  3707  8744  21.4  46.5  70.5  35601
9   1746  4470  7054  6573  3556  1374  28.6  48.8  75.0  35756
10  5929  1123  7306  8746  4000  6943  26.2  48.8  63.6  35630
11  2549  5175  5997  9608  7230  9731  19.0  41.9  68.2  35901
12  5142  9619  9601  8099  1391  6276  26.2  53.5  70.5  35216
13  1591  4401  3457  4245  4341  2573  23.8  44.2  75.0  36066
14  3520  7654  6845  7738  3828  1202  28.6  48.8  75.0  36867
15  2479  9673  7478  7207  7006  3523  28.6  41.9  84.1  35007
16  4810  7641  5365  3545  6812  9483  14.3  46.5  70.5  35020
17  3461  2640  4375  8634  4917  2830  19.0  41.9  72.7  36330
18  5191  9304  2720  3100  3912  1548  28.6  55.8  72.7  36801
19  8787  5459  8389  5242  2224  6025  19.0  41.9  68.2  35209
20  6947  5401  6681  9018  1668  8307  28.6  53.5  75.0  35473
21  2777  4045  7309  4745  4284  2640  23.8  51.2  72.7  35124
22  1650  9470  6356  4700  3344  8743  33.3  48.8  75.0  35173
23  5765  3653  5198  9266  4945  3935  19.0  53.5  70.5  35213
24  3457  4808  7227  5482  6355  4553  33.3  67.4  86.4  36532

[25 rows x 46 columns]
```

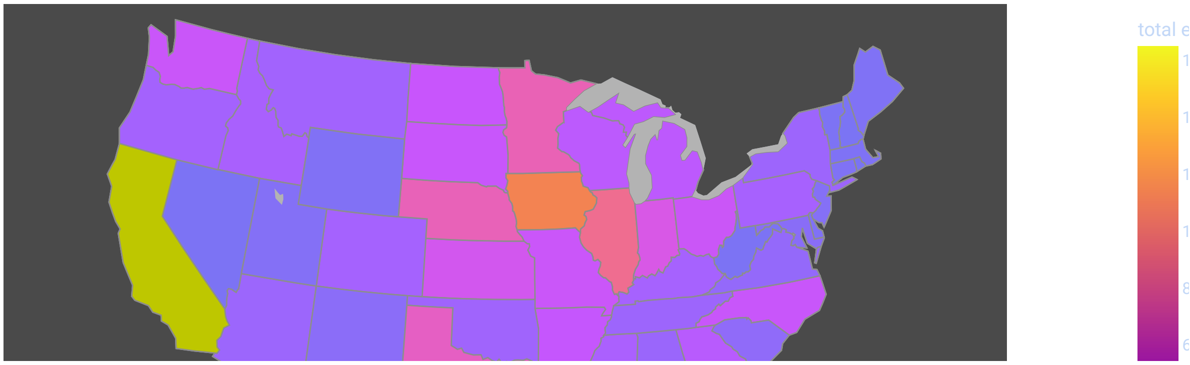
experiment with chloropleths

```
df_m.columns
```

```
Index(['City', '1', '2', '3', '4', '5', '6', '7', '8', '9', '10', '11', '12',
       '13', '14', '15', '16', '17', '18', '19', '20', '21', '22', '23', '24',
       '25', '26', '27', '28', '29', '30', '31', '32', '33', '34', '35', '36',
       '37', '38', '39', '40', '41', '25qt', '50qt', '75qt', 'zip'],
      dtype='object')
```

Demo for a chloropleth showing the degree of total exports for each state.

```
import plotly.express as px
import pandas as pd

# Load data
df_demo = pd.read_csv('https://raw.githubusercontent.com/plotly/datasets/master/2011_us_ag_exports.csv')

# Create choropleth map
fig = px.choropleth(df_demo, locations='code', locationmode='USA-states', color='total exports', scope='usa')

# Show map
fig.show()
```



Create a table for all exports for each state. Each state has each product that is being exported and the sum of all those exports.

```
df_demo
```

	code	state	category	total exports	beef	pork	poultry	dairy	fruits fresh	fruits proc	total fruits	veggies fresh	veggies proc	total veggies	c
0	AL	Alabama	state	1390.63	34.4	10.6	481.0	4.06	8.0	17.1	25.11	5.5	8.9	14.33	3
1	AK	Alaska	state	13.31	0.2	0.1	0.0	0.19	0.0	0.0	0.00	0.6	1.0	1.56	
2	AZ	Arizona	state	1463.17	71.3	17.9	0.0	105.48	19.3	41.0	60.27	147.5	239.4	386.91	
3	AR	Arkansas	state	3586.02	53.2	29.4	562.9	3.53	2.2	4.7	6.88	4.4	7.1	11.45	6
4	CA	California	state	16472.88	228.7	11.1	225.4	929.95	2791.8	5944.6	8736.40	803.2	1303.5	2106.79	3
5	CO	Colorado	state	1851.33	261.4	66.0	14.0	71.94	5.7	12.2	17.99	45.1	73.2	118.27	18
6	CT	Connecticut	state	259.62	1.1	0.1	6.9	9.49	4.2	8.9	13.10	4.3	6.9	11.16	
7	DE	Delaware	state	282.19	0.4	0.6	114.7	2.30	0.5	1.0	1.53	7.6	12.4	20.03	2
8	FL	Florida	state	3764.09	42.6	0.9	56.9	66.31	438.2	933.1	1371.36	171.9	279.0	450.86	
9	GA	Georgia	state	2860.84	31.0	18.9	630.4	38.38	74.6	158.9	233.51	59.0	95.8	154.77	5
10	HI	Hawaii	state	401.84	4.0	0.7	1.3	1.16	17.7	37.8	55.51	9.5	15.4	24.83	
11	ID	Idaho	state	2078.89	119.8	0.0	2.4	294.60	6.9	14.7	21.64	121.7	197.5	319.19	2
12	IL	Illinois	state	8709.48	53.7	394.0	14.0	45.82	4.0	8.5	12.53	15.2	24.7	39.95	222
13	IN	Indiana	state	5050.23	21.9	341.9	165.6	89.70	4.1	8.8	12.98	14.4	23.4	37.89	112
14	IA	Iowa	state	11273.76	289.8	1895.6	155.6	107.00	1.0	2.2	3.24	2.7	4.4	7.10	252
15	KS	Kansas	state	4589.01	659.3	179.4	6.4	65.45	1.0	2.1	3.11	3.6	5.8	9.32	45
16	KY	Kentucky	state	1889.15	54.8	34.2	151.3	28.27	2.1	4.5	6.60	0.0	0.0	0.00	17
17	LA	Louisiana	state	1914.23	19.8	0.8	77.2	6.02	5.7	12.1	17.83	6.6	10.7	17.25	9
18	ME	Maine	state	278.37	1.4	0.5	10.4	16.18	16.6	35.4	52.01	24.0	38.9	62.90	
19	MD	Maryland	state	692.75	5.6	3.1	127.0	24.81	4.1	8.8	12.90	7.8	12.6	20.43	5
21	MI	Michigan	state	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25	MT	Montana	state	1718.00	105.0	16.7	1.7	6.82	1.1	2.2	3.30	17.3	28.0	45.27	
27	NV	Nevada	state	139.89	21.8	0.2	0.0	16.57	0.4	0.8	1.19	10.6	17.3	27.93	

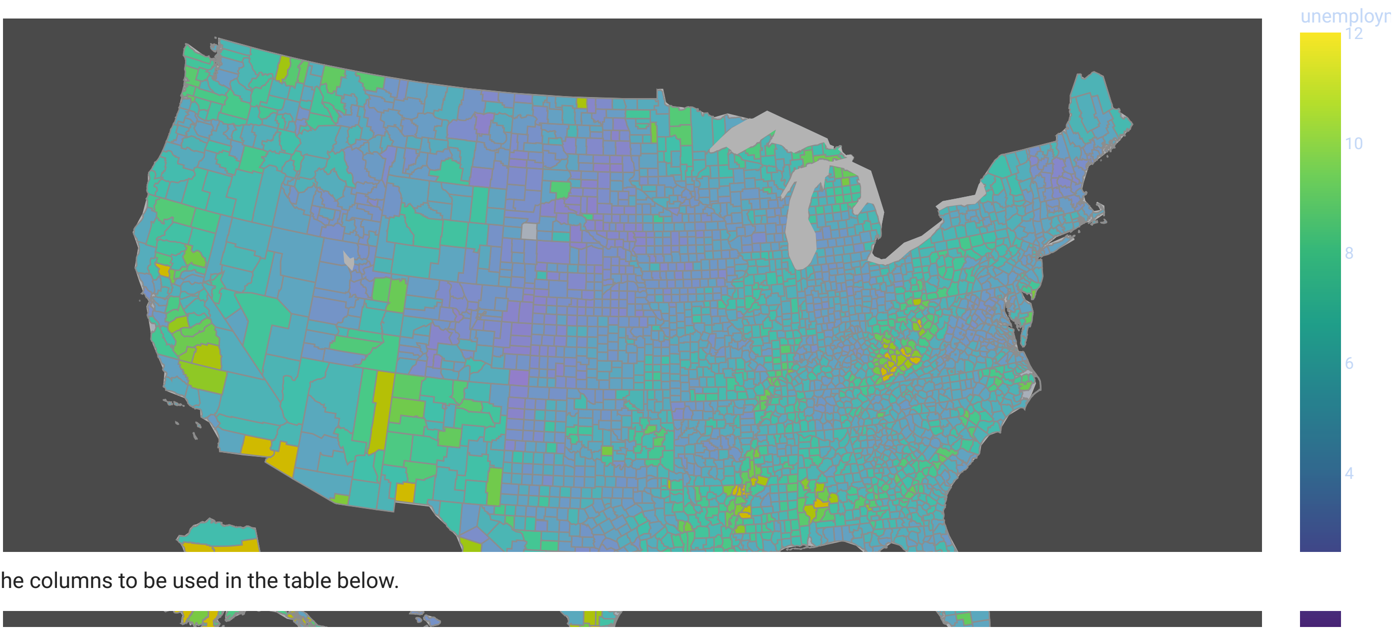
Identify columns of the table above.

```
df_demo.columns
```

```
    Index(['code', 'state', 'category', 'total exports', 'beef', 'pork', 'poultry',
           'dairy', 'fruits fresh', 'fruits proc', 'total fruits', 'veggies fresh',
           'veggies proc', 'total veggies', 'corn', 'wheat', 'cotton'],
          dtype='object')
```

map demo #2: state of AL

```
from urllib.request import urlopen
import json
with urlopen('https://raw.githubusercontent.com/plotly/datasets/master/geojson-counties-fips.json') as response:
    counties = json.load(response)

import pandas as pd
df_us = pd.read_csv("https://raw.githubusercontent.com/plotly/datasets/master/fips-unemp-16.csv",
                   dtype={"fips": str})

import plotly.express as px

fig = px.choropleth(df_us, geojson=counties, locations='fips', color='unemp',
                           color_continuous_scale="Viridis",
                           range_color=(0, 12),
                           scope="usa",
                           labels={'unemp':'unemployment rate'})
fig.update_layout(margin={"r":0,"t":0,"l":0,"b":0})
fig.show()
```



List the columns to be used in the table below.

```
df_us.columns
```

```
    Index(['fips', 'unemp'], dtype='object')
```

Provide fips for all counties in Alabama.

```
df_us
```

	fips	unemp
0	01001	5.3
1	01003	5.4
2	01005	8.6
3	01007	6.6
4	01009	5.5
...	...	...
3214	72145	13.9
3215	72147	10.6
3216	72149	20.2
3217	72151	16.9
3218	72153	18.8

3219 rows × 2 columns

documentation here, with more discusssion here, and specifially to do counties, here

county list for ulta stores in Alabama, by FIPS code

```
al_fips =[
    {'County': 'Autauga', 'FIPS Code': '01001'},
    {'County': 'Baldwin', 'FIPS Code': '01003'},
    {'County': 'Barbour', 'FIPS Code': '01005'},
    {'County': 'Bibb', 'FIPS Code': '01007'},
    {'County': 'Blount', 'FIPS Code': '01009'},
    {'County': 'Bullock', 'FIPS Code': '01011'},
    {'County': 'Butler', 'FIPS Code': '01013'},
    {'County': 'Calhoun', 'FIPS Code': '01015'},
    {'County': 'Chambers', 'FIPS Code': '01017'},
    {'County': 'Cherokee', 'FIPS Code': '01019'},
    {'County': 'Chilton', 'FIPS Code': '01021'},
    {'County': 'Choctaw', 'FIPS Code': '01023'},
    {'County': 'Clarke', 'FIPS Code': '01025'},
    {'County': 'Clay', 'FIPS Code': '01027'},
    {'County': 'Cleburne', 'FIPS Code': '01029'},
    {'County': 'Coffee', 'FIPS Code': '01031'},
    {'County': 'Colbert', 'FIPS Code': '01033'},
    {'County': 'Conecuh', 'FIPS Code': '01035'},
    {'County':'Greene', 'FIPS Code' : '28073'},
    {'County':'Hale', 'FIPS Code' : '28065'},
    {'County':'Henry','FIPS Code' : '28067'},
    {'County':'Houston', 'FIPS Code' : '28069'},
    {'County':'Jackson', 'FIPS Code' : '28071'},
    {'County':'Jefferson', 'FIPS Code' : '28073'},
    {'County':'Lamar', 'FIPS Code' : '28073'}]
len(al_fips)
```

```
    25
```

List all columns to be used in the table below.

```
df_m.columns
```

```
    Index(['City', '1', '2', '3', '4', '5', '6', '7', '8', '9', '10', '11', '12',
           '13', '14', '15', '16', '17', '18', '19', '20', '21', '22', '23', '24',
           '25', '26', '27', '28', '29', '30', '31', '32', '33', '34', '35', '36',
           '37', '38', '39', '40', '41', '25qt', '50qt', '75qt', 'zip'],
          dtype='object')
```

Create a table for all cities and their displays.

```
df_m
```

	City	1	2	3	4	5	6	7	8	9	...	36	37	38	39	40	41	25qt	50qt	75qt	z
0	Birmingham	8285	5343	6738	6635	5658	8118	4311	8535	3436	...	3555	1341	1756	7598	1509	1861	28.6	55.8	77.3	352
1	Montgomery	1287	6585	8300	8874	8208	5363	3552	3387	2765	...	2805	4601	4449	5727	2315	8822	21.4	55.8	70.5	361
3	Huntsville	6280	2841	3399	5448	6175	5431	7488	9981	5236	...	7935	2665	9982	5538	9116	3875	26.2	51.2	77.3	358
6	Dothan	7646	2060	4911	4976	7851	4277	7423	6183	6641	...	5650	4400	7842	4006	9335	3571	19.0	55.8	90.9	363
8	Decatur	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	...	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	21.4	46.5	70.5	[illegible]
14	Phenix City	8788	8269	6838	2863	6753	6608	4048	8774	4513	...	3520	7654	6845	7738	3828	1202	28.6	48.8	75.0	368
16	Bessemer	6559	2453	1578	5158	3058	8075	7066	8530	8346	...	4810	7641	5365	3545	6812	9483	14.3	46.5	70.5	350
23	Mountain	8433	9368	2141	2357	6566	1482	4787	3900	6615	...	5765	3653	5198	9266	4945	3935	19.0	53.5	70.5	352

Number of counties

```
df_m.shape[0]
```

```
    25
```

List the number of counties and size.

```
print(len(al_fips))
df_counties = pd.DataFrame(al_fips)
df_counties.size
# df_m['key'] = 0
# df_counties['key'] =0
# df_merged = pd.merge(df_m, df_counties, on='key')
# df_merged.drop('key', axis=1, inplace=True)
```

```
    25
    50
```

List the columns within the dataframe "counties."

```
print(df_counties.columns)
```

```
    Index(['County', 'FIPS Code'], dtype='object')
```

Number of counties

```
df_m.shape[0]
```

```
    25
```

Number of counties

```
df_counties.shape[0]
```

```
    25
```

List the columns within the dataframe "counties."

```
df_counties.columns
```

```
    Index(['County', 'FIPS Code'], dtype='object')
```

Merge the county fips codes with the store sales results.

```
merged_df = pd.concat([df_m, df_counties], axis=1)
merged_df.head()
```

```
        City    1    2    3    4    5    6    7    8    9   ...   38   39   40   41  25qt  50qt  75qt    zip  County
```

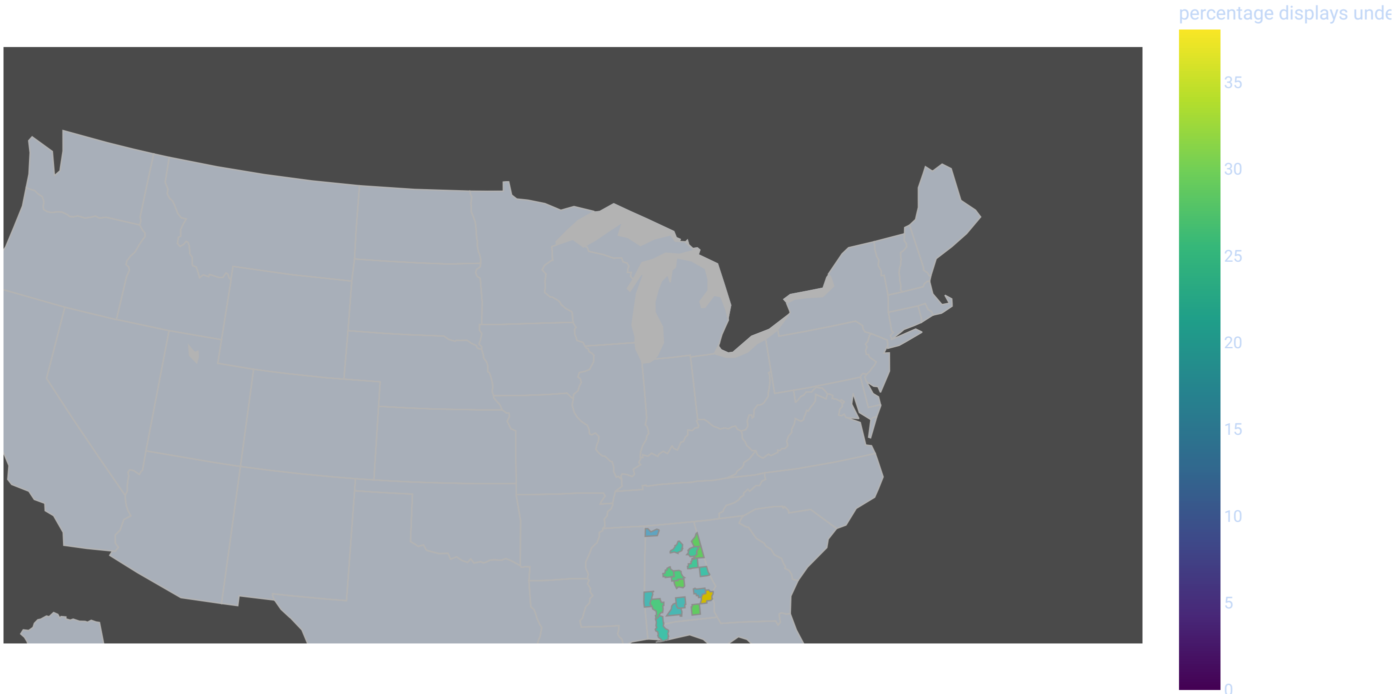
Use the merged dataframe as code for chloropleth.

```
merged_df.columns
```

```
     Index(['City', '1', '2', '3', '4', '5', '6', '7', '8', '9', '10', '11', '12',
            '13', '14', '15', '16', '17', '18', '19', '20', '21', '22', '23', '24',
            '25', '26', '27', '28', '29', '30', '31', '32', '33', '34', '35', '36',
            '37', '38', '39', '40', '41', '25qt', '50qt', '75qt', 'zip', 'County',
            'FIPS Code'],
           dtype='object')
```

Use the plotly api, feed it the merged if information

```
import plotly.express as px

fig = px.choropleth(merged_df, geojson=counties, locations='FIPS Code', color='25qt',
                           color_continuous_scale="Viridis",
                           range_color=(0, 38),
                           scope="usa",
                    hover_name="City",
                    hover_data=["City"],
                           labels={'25qt':'percentage displays under 25th qt'}  #
                          )
fig.update_layout(margin={"r":0,"t":0,"l":0,"b":0})
fig.show()
```

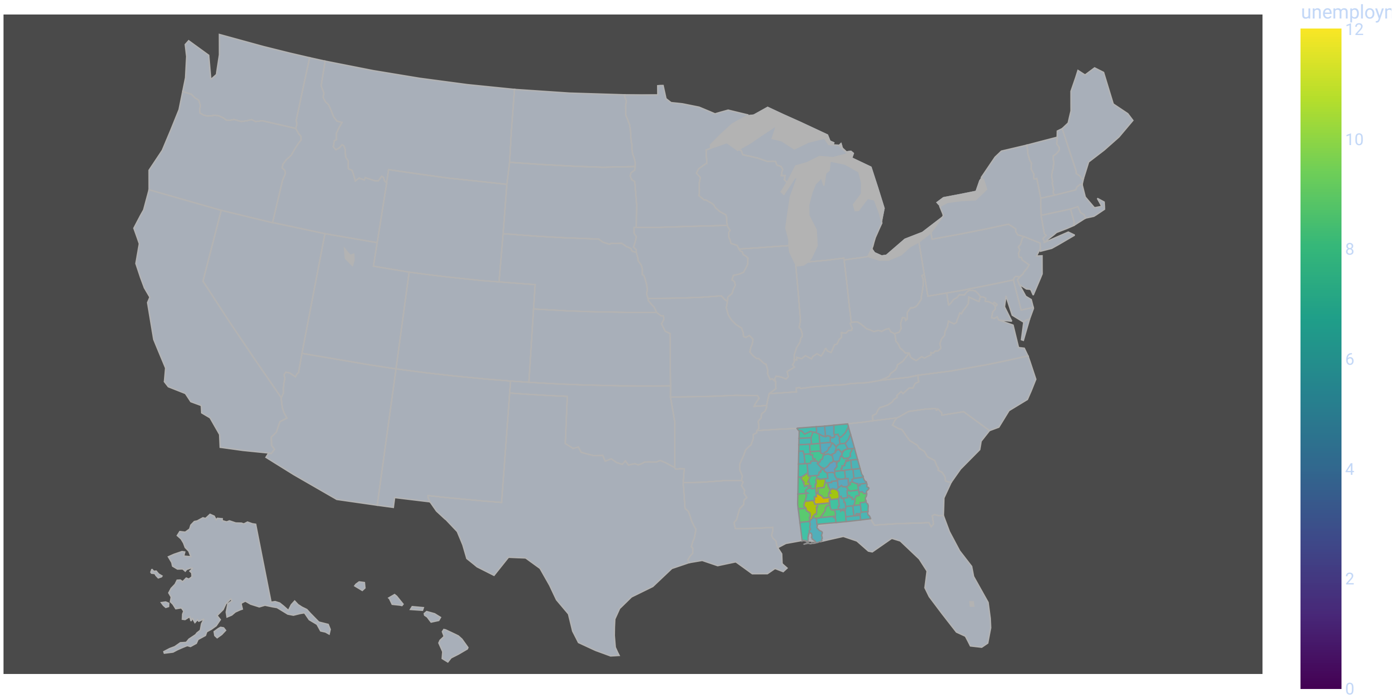


```
Depends on the use of plotly, requests, json, and pandas.
```

Depends on the use of plotly, requests, json, and pandas.

```
import plotly.express as px
import requests
import json
import pandas as pd

# Load the geojson data for Alabama's counties
r = requests.get('https://raw.githubusercontent.com/plotly/datasets/master/geojson-counties-fips.json')
counties = json.loads(r.text)

# Filter the geojson data to only include Alabama's counties
target_states = ['01']
```

```
counties['features'] = [f for f in counties['features'] if f['properties']['STATE'] in target_states]

# Load the sample data for Alabama's counties
df = pd.read_csv('https://raw.githubusercontent.com/plotly/datasets/master/fips-unemp-16.csv', dtype={'fips': str})

# Create the choropleth map
fig = px.choropleth(df, geojson=counties, locations='fips', color='unemp',
                    color_continuous_scale='Viridis', range_color=(0, 12),
                    scope='usa', labels={'unemp': 'unemployment rate'})
fig.update_layout(margin={'r': 0, 't': 0, 'l': 0, 'b': 0})
fig.show()
```



unemployr
12
10
8
6
4
2
0