

```
In [1]: from google.colab import drive  
drive.mount('/content/MyDrive/')
```

Drive already mounted at /content/MyDrive/; to attempt to forcibly remount, call drive.mount("/content/MyDrive/", force_remount=True).

Data Import and Preparation

```
In [2]: import pandas as pd  
import numpy as np  
import math  
import seaborn as sns  
import matplotlib.pyplot as plt  
import warnings  
warnings.filterwarnings('ignore')  
%matplotlib inline
```

Import data

```
In [3]: train = pd.read_csv('/content/MyDrive/MyDrive/Data-Science-Capstone-Proje  
cts/Project_1/Project 1/train.csv')  
test = pd.read_csv('/content/MyDrive/MyDrive/Data-Science-Capstone-Projec  
ts/Project_1/Project 1/test.csv')
```

```
In [4]: print(train.shape)  
print(test.shape)
```

(27321, 80)
(11709, 80)

```
In [5]: train.head()
```

Out[5]:

	UID	BLOCKID	SUMLEVEL	COUNTYID	STATEID	state	state_ab	city	
0	267822	NaN	140	53	36	New York	NY	Hamilton	Hai
1	246444	NaN	140	141	18	Indiana	IN	South Bend	Ros
2	245683	NaN	140	63	18	Indiana	IN	Danville	Da
3	279653	NaN	140	127	72	Puerto Rico	PR	San Juan	Guay
4	247218	NaN	140	161	20	Kansas	KS	Manhattan	Mant

5 rows × 80 columns

In [6]: test.head()

Out[6]:

	UID	BLOCKID	SUMLEVEL	COUNTYID	STATEID	state	state_ab	city
0	255504	NaN	140	163	26	Michigan	MI	Detroit
1	252676	NaN	140	1	23	Maine	ME	Auburn
2	276314	NaN	140	15	42	Pennsylvania	PA	Pine City
3	248614	NaN	140	231	21	Kentucky	KY	Monticello
4	286865	NaN	140	355	48	Texas	TX	Corpus Christi

5 rows × 80 columns

In [7]: train.describe()

Out[7]:

	UID	BLOCKID	SUMLEVEL	COUNTYID	STATEID	zip_code
count	27321.000000	0.0	27321.0	27321.000000	27321.000000	27321.000000
mean	257331.996303	NaN	140.0	85.646426	28.271806	50081.999524
std	21343.859725	NaN	0.0	98.333097	16.392846	29558.115660
min	220342.000000	NaN	140.0	1.000000	1.000000	602.000000
25%	238816.000000	NaN	140.0	29.000000	13.000000	26554.000000
50%	257220.000000	NaN	140.0	63.000000	28.000000	47715.000000
75%	275818.000000	NaN	140.0	109.000000	42.000000	77093.000000
max	294334.000000	NaN	140.0	840.000000	72.000000	99925.000000

8 rows × 74 columns

In [8]: test.describe()

Out[8]:

	UID	BLOCKID	SUMLEVEL	COUNTYID	STATEID	zip_code
count	11709.000000	0.0	11709.0	11709.000000	11709.000000	11709.000000
mean	257525.004783	NaN	140.0	85.710650	28.489196	50123.418396
std	21466.372658	NaN	0.0	99.304334	16.607262	29775.134038
min	220336.000000	NaN	140.0	1.000000	1.000000	601.000000
25%	238819.000000	NaN	140.0	29.000000	13.000000	25570.000000
50%	257651.000000	NaN	140.0	61.000000	28.000000	47362.000000
75%	276300.000000	NaN	140.0	109.000000	42.000000	77406.000000
max	294333.000000	NaN	140.0	810.000000	72.000000	99929.000000

8 rows × 74 columns

```
In [9]: train.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 27321 entries, 0 to 27320
Data columns (total 80 columns):
 #   Column           Non-Null Count Dtype  
 --- 
 0   UID              27321 non-null  int64   
 1   BLOCKID          0 non-null      float64 
 2   SUMLEVEL         27321 non-null  int64   
 3   COUNTYID         27321 non-null  int64   
 4   STATEID          27321 non-null  int64   
 5   state             27321 non-null  object  
 6   state_ab          27321 non-null  object  
 7   city              27321 non-null  object  
 8   place             27321 non-null  object  
 9   type              27321 non-null  object  
 10  primary            27321 non-null  object  
 11  zip_code          27321 non-null  int64   
 12  area_code         27321 non-null  int64   
 13  lat               27321 non-null  float64 
 14  lng               27321 non-null  float64 
 15  ALand             27321 non-null  float64 
 16  AWater            27321 non-null  int64   
 17  pop               27321 non-null  int64   
 18  male_pop          27321 non-null  int64   
 19  female_pop         27321 non-null  int64   
 20  rent_mean          27007 non-null  float64 
 21  rent_median        27007 non-null  float64 
 22  rent_stdev         27007 non-null  float64 
 23  rent_sample_weight 27007 non-null  float64 
 24  rent_samples        27007 non-null  float64 
 25  rent_gt_10          27007 non-null  float64 
 26  rent_gt_15          27007 non-null  float64 
 27  rent_gt_20          27007 non-null  float64 
 28  rent_gt_25          27007 non-null  float64 
 29  rent_gt_30          27007 non-null  float64 
 30  rent_gt_35          27007 non-null  float64 
 31  rent_gt_40          27007 non-null  float64 
 32  rent_gt_50          27007 non-null  float64 
 33  universe_samples    27321 non-null  int64   
 34  used_samples         27321 non-null  int64   
 35  hi_mean             27053 non-null  float64 
 36  hi_median            27053 non-null  float64 
 37  hi_stdev             27053 non-null  float64 
 38  hi_sample_weight     27053 non-null  float64 
 39  hi_samples            27053 non-null  float64 
 40  family_mean           27023 non-null  float64 
 41  family_median          27023 non-null  float64 
 42  family_stdev           27023 non-null  float64 
 43  family_sample_weight    27023 non-null  float64 
 44  family_samples          27023 non-null  float64 
 45  hc_mortgage_mean       26748 non-null  float64 
 46  hc_mortgage_median      26748 non-null  float64 
 47  hc_mortgage_stdev        26748 non-null  float64 
 48  hc_mortgage_sample_weight 26748 non-null  float64 
 49  hc_mortgage_samples       26748 non-null  float64 
 50  hc_mean                26721 non-null  float64 
 51  hc_median               26721 non-null  float64 
 52  hc_stdev                 26721 non-null  float64 
 53  hc_samples                26721 non-null  float64 
 54  hc_sample_weight          26721 non-null  float64
```

```
55 home_equity_second_mortgage    26864 non-null   float64
56 second_mortgage               26864 non-null   float64
57 home_equity                  26864 non-null   float64
58 debt                          26864 non-null   float64
59 second_mortgage_cdf          26864 non-null   float64
60 home_equity_cdf              26864 non-null   float64
61 debt_cdf                     26864 non-null   float64
62 hs_degree                    27131 non-null   float64
63 hs_degree_male               27121 non-null   float64
64 hs_degree_female             27098 non-null   float64
65 male_age_mean                27132 non-null   float64
66 male_age_median              27132 non-null   float64
67 male_age_stdev               27132 non-null   float64
68 male_age_sample_weight       27132 non-null   float64
69 male_age_samples             27132 non-null   float64
70 female_age_mean              27115 non-null   float64
71 female_age_median            27115 non-null   float64
72 female_age_stdev             27115 non-null   float64
73 female_age_sample_weight     27115 non-null   float64
74 female_age_samples            27115 non-null   float64
75 pct_own                      27053 non-null   float64
76 married                       27130 non-null   float64
77 married_snp                  27130 non-null   float64
78 separated                     27130 non-null   float64
79 divorced                      27130 non-null   float64
dtypes: float64(62), int64(12), object(6)
memory usage: 16.7+ MB
```

```
In [10]: test.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 11709 entries, 0 to 11708
Data columns (total 80 columns):
 #   Column           Non-Null Count Dtype  
--- 
 0   UID              11709 non-null  int64   
 1   BLOCKID          0 non-null      float64 
 2   SUMLEVEL         11709 non-null  int64   
 3   COUNTYID         11709 non-null  int64   
 4   STATEID          11709 non-null  int64   
 5   state             11709 non-null  object  
 6   state_ab          11709 non-null  object  
 7   city              11709 non-null  object  
 8   place             11709 non-null  object  
 9   type              11709 non-null  object  
 10  primary            11709 non-null  object  
 11  zip_code          11709 non-null  int64   
 12  area_code         11709 non-null  int64   
 13  lat               11709 non-null  float64 
 14  lng               11709 non-null  float64 
 15  ALand             11709 non-null  int64   
 16  AWater            11709 non-null  int64   
 17  pop               11709 non-null  int64   
 18  male_pop          11709 non-null  int64   
 19  female_pop         11709 non-null  int64   
 20  rent_mean          11561 non-null  float64 
 21  rent_median         11561 non-null  float64 
 22  rent_stdev          11561 non-null  float64 
 23  rent_sample_weight  11561 non-null  float64 
 24  rent_samples         11561 non-null  float64 
 25  rent_gt_10           11560 non-null  float64 
 26  rent_gt_15           11560 non-null  float64 
 27  rent_gt_20           11560 non-null  float64 
 28  rent_gt_25           11560 non-null  float64 
 29  rent_gt_30           11560 non-null  float64 
 30  rent_gt_35           11560 non-null  float64 
 31  rent_gt_40           11560 non-null  float64 
 32  rent_gt_50           11560 non-null  float64 
 33  universe_samples     11709 non-null  int64   
 34  used_samples          11709 non-null  int64   
 35  hi_mean             11587 non-null  float64 
 36  hi_median            11587 non-null  float64 
 37  hi_stdev             11587 non-null  float64 
 38  hi_sample_weight     11587 non-null  float64 
 39  hi_samples            11587 non-null  float64 
 40  family_mean           11573 non-null  float64 
 41  family_median          11573 non-null  float64 
 42  family_stdev          11573 non-null  float64 
 43  family_sample_weight   11573 non-null  float64 
 44  family_samples          11573 non-null  float64 
 45  hc_mortgage_mean       11441 non-null  float64 
 46  hc_mortgage_median      11441 non-null  float64 
 47  hc_mortgage_stdev        11441 non-null  float64 
 48  hc_mortgage_sample_weight 11441 non-null  float64 
 49  hc_mortgage_samples      11441 non-null  float64 
 50  hc_mean                11419 non-null  float64 
 51  hc_median               11419 non-null  float64 
 52  hc_stdev                11419 non-null  float64 
 53  hc_samples               11419 non-null  float64 
 54  hc_sample_weight          11419 non-null  float64
```

```
55 home_equity_second_mortgage    11489 non-null   float64
56 second_mortgage               11489 non-null   float64
57 home_equity                  11489 non-null   float64
58 debt                          11489 non-null   float64
59 second_mortgage_cdf          11489 non-null   float64
60 home_equity_cdf              11489 non-null   float64
61 debt_cdf                     11489 non-null   float64
62 hs_degree                    11624 non-null   float64
63 hs_degree_male               11620 non-null   float64
64 hs_degree_female             11604 non-null   float64
65 male_age_mean                11625 non-null   float64
66 male_age_median              11625 non-null   float64
67 male_age_stdev               11625 non-null   float64
68 male_age_sample_weight       11625 non-null   float64
69 male_age_samples             11625 non-null   float64
70 female_age_mean              11613 non-null   float64
71 female_age_median            11613 non-null   float64
72 female_age_stdev             11613 non-null   float64
73 female_age_sample_weight     11613 non-null   float64
74 female_age_samples            11613 non-null   float64
75 pct_own                      11587 non-null   float64
76 married                       11625 non-null   float64
77 married_snp                  11625 non-null   float64
78 separated                     11625 non-null   float64
79 divorced                      11625 non-null   float64
dtypes: float64(61), int64(13), object(6)
memory usage: 7.1+ MB
```

Figure out the primary key and look for the requirement of indexing

```
In [11]: train.set_index(keys=['UID'], inplace=True)
test.set_index(keys=['UID'], inplace=True)
```

Gauge the fill rate of the variables and devise plans for missing value treatment. Please explain explicitly the reason for the treatment chosen for each variable.

```
In [12]: missing_train_values = round(train.isnull().sum()*100/len(train),2)
missing_train_values_t = pd.DataFrame(missing_train_values,columns=[ 'Percentage_of_missing_values'])
missing_train_values_t.sort_values(by=[ 'Percentage_of_missing_values'],inplace=True,ascending=False)
```

```
In [13]: missing_train_values_t[missing_train_values_t['Percentage_of_missing_values']>0]
```

Out[13]:

	Percentage_of_missing_values
BLOCKID	100.00
hc_samples	2.20
hc_mean	2.20
hc_median	2.20
hc_stdev	2.20
hc_sample_weight	2.20
hc_mortgage_mean	2.10
hc_mortgage_stdev	2.10
hc_mortgage_sample_weight	2.10
hc_mortgage_samples	2.10
hc_mortgage_median	2.10
home_equity_second_mortgage	1.67
home_equity	1.67
debt	1.67
second_mortgage_cdf	1.67
home_equity_cdf	1.67
debt_cdf	1.67
second_mortgage	1.67
rent_gt_15	1.15
rent_gt_50	1.15
rent_gt_40	1.15
rent_gt_35	1.15
rent_gt_30	1.15
rent_gt_25	1.15
rent_gt_20	1.15
rent_samples	1.15
rent_gt_10	1.15
rent_sample_weight	1.15
rent_stdev	1.15
rent_median	1.15
rent_mean	1.15
family_median	1.09
family_samples	1.09
family_sample_weight	1.09
family_stdev	1.09

	Percentage_of_missing_values
family_mean	1.09
hi_stdev	0.98
hi_median	0.98
hi_sample_weight	0.98
hi_mean	0.98
pct_own	0.98
hi_samples	0.98
hs_degree_female	0.82
female_age_samples	0.75
female_age_sample_weight	0.75
female_age_stdev	0.75
female_age_median	0.75
female_age_mean	0.75
hs_degree_male	0.73
separated	0.70
married_snp	0.70
married	0.70
hs_degree	0.70
divorced	0.70
male_age_stdev	0.69
-----	^ ^

```
In [14]: missing_test_values = round(test.isnull().sum()*100/len(test),2)
missing_test_values_t = pd.DataFrame(missing_test_values,columns=[ 'Percentage_of_missing_values'])
missing_test_values_t.sort_values(by=[ 'Percentage_of_missing_values'],inplace=True,ascending=False)
```

```
In [15]: missing_test_values_t[missing_test_values_t['Percentage_of_missing_value  
s']>0]
```

Out[15]:

	Percentage_of_missing_values
BLOCKID	100.00
hc_samples	2.48
hc_mean	2.48
hc_median	2.48
hc_stdev	2.48
hc_sample_weight	2.48
hc_mortgage_mean	2.29
hc_mortgage_stdev	2.29
hc_mortgage_sample_weight	2.29
hc_mortgage_samples	2.29
hc_mortgage_median	2.29
home_equity_second_mortgage	1.88
home_equity	1.88
debt	1.88
second_mortgage_cdf	1.88
home_equity_cdf	1.88
debt_cdf	1.88
second_mortgage	1.88
rent_gt_20	1.27
rent_gt_50	1.27
rent_gt_40	1.27
rent_gt_35	1.27
rent_gt_30	1.27
rent_gt_25	1.27
rent_gt_10	1.27
rent_gt_15	1.27
rent_samples	1.26
rent_sample_weight	1.26
rent_stdev	1.26
rent_median	1.26
rent_mean	1.26
family_median	1.16
family_samples	1.16
family_sample_weight	1.16
family_stdev	1.16

	Percentage_of_missing_values
family_mean	1.16
hi_stdev	1.04
hi_median	1.04
pct_own	1.04
hi_mean	1.04
hi_sample_weight	1.04
hi_samples	1.04
hs_degree_female	0.90
female_age_mean	0.82
female_age_sample_weight	0.82
female_age_median	0.82
female_age_stdev	0.82
female_age_samples	0.82
hs_degree_male	0.76
hs_degree	0.73
married_snp	0.72
male_age_samples	0.72
male_age_sample_weight	0.72
male_age_stdev	0.72
male_age_median	0.72
...	...
	^ 70

BLOCKID can be dropped, since it is 100%missing values

```
In [16]: train.var()==0
```

```
Out[16]: BLOCKID      False
SUMLEVEL      True
COUNTYID      False
STATEID       False
zip_code      False
...
pct_own       False
married       False
married_snp   False
separated     False
divorced     False
Length: 73, dtype: bool
```

SUMLEVEL can be dropped due to no variance

```
In [17]: train.drop(columns=['BLOCKID','SUMLEVEL'],inplace=True)
test.drop(columns=['BLOCKID','SUMLEVEL'],inplace=True)
```

```
In [18]: for column in train:  
    if train[column].dtype == 'object':  
        print(f'{column}: {train[column].isnull().sum()}') # Object column do  
        esn't have any null values  
  
state: 0  
state_ab: 0  
city: 0  
place: 0  
type: 0  
primary: 0
```

```
In [19]: for column in train:  
    if train[column].dtype != 'object':  
        print(f'{column}: {train[column].isnull().sum()}')# numerical column  
contains null values
```

```
COUNTYID: 0
STATEID: 0
zip_code: 0
area_code: 0
lat: 0
lng: 0
ALand: 0
AWater: 0
pop: 0
male_pop: 0
female_pop: 0
rent_mean: 314
rent_median: 314
rent_stdev: 314
rent_sample_weight: 314
rent_samples: 314
rent_gt_10: 314
rent_gt_15: 314
rent_gt_20: 314
rent_gt_25: 314
rent_gt_30: 314
rent_gt_35: 314
rent_gt_40: 314
rent_gt_50: 314
universe_samples: 0
used_samples: 0
hi_mean: 268
hi_median: 268
hi_stdev: 268
hi_sample_weight: 268
hi_samples: 268
family_mean: 298
family_median: 298
family_stdev: 298
family_sample_weight: 298
family_samples: 298
hc_mortgage_mean: 573
hc_mortgage_median: 573
hc_mortgage_stdev: 573
hc_mortgage_sample_weight: 573
hc_mortgage_samples: 573
hc_mean: 600
hc_median: 600
hc_stdev: 600
hc_samples: 600
hc_sample_weight: 600
home_equity_second_mortgage: 457
second_mortgage: 457
home_equity: 457
debt: 457
second_mortgage_cdf: 457
home_equity_cdf: 457
debt_cdf: 457
hs_degree: 190
hs_degree_male: 200
hs_degree_female: 223
male_age_mean: 189
male_age_median: 189
male_age_stdev: 189
male_age_sample_weight: 189
```

```
male_age_samples: 189
female_age_mean: 206
female_age_median: 206
female_age_stdev: 206
female_age_sample_weight: 206
female_age_samples: 206
pct_own: 268
married: 191
married_snp: 191
separated: 191
divorced: 191
```

```
In [20]: for column in test:
    if test[column].dtype == 'object':
        print(f'{column}: {test[column].isnull().sum()}') # Object column doe
sn't have any null values
```

```
state: 0
state_ab: 0
city: 0
place: 0
type: 0
primary: 0
```

```
In [21]: for column in test:  
    if test[column].dtype != 'object':  
        print(f'{column}: {test[column].isnull().sum()}')#numerical column co  
ncontains null values
```

```
COUNTYID: 0
STATEID: 0
zip_code: 0
area_code: 0
lat: 0
lng: 0
ALand: 0
AWater: 0
pop: 0
male_pop: 0
female_pop: 0
rent_mean: 148
rent_median: 148
rent_stdev: 148
rent_sample_weight: 148
rent_samples: 148
rent_gt_10: 149
rent_gt_15: 149
rent_gt_20: 149
rent_gt_25: 149
rent_gt_30: 149
rent_gt_35: 149
rent_gt_40: 149
rent_gt_50: 149
universe_samples: 0
used_samples: 0
hi_mean: 122
hi_median: 122
hi_stdev: 122
hi_sample_weight: 122
hi_samples: 122
family_mean: 136
family_median: 136
family_stdev: 136
family_sample_weight: 136
family_samples: 136
hc_mortgage_mean: 268
hc_mortgage_median: 268
hc_mortgage_stdev: 268
hc_mortgage_sample_weight: 268
hc_mortgage_samples: 268
hc_mean: 290
hc_median: 290
hc_stdev: 290
hc_samples: 290
hc_sample_weight: 290
home_equity_second_mortgage: 220
second_mortgage: 220
home_equity: 220
debt: 220
second_mortgage_cdf: 220
home_equity_cdf: 220
debt_cdf: 220
hs_degree: 85
hs_degree_male: 89
hs_degree_female: 105
male_age_mean: 84
male_age_median: 84
male_age_stdev: 84
male_age_sample_weight: 84
```

```
male_age_samples: 84
female_age_mean: 96
female_age_median: 96
female_age_stdev: 96
female_age_sample_weight: 96
female_age_samples: 96
pct_own: 122
married: 84
married_snp: 84
separated: 84
divorced: 84
```

Deleting the rows which contain null values.Because most of the column null values percentage are not higher than 2.5%.So it's safe to delete these rows

```
In [22]: train.dropna(inplace=True)
```

```
In [23]: train.isnull().any().sum()
```

```
Out[23]: 0
```

```
In [24]: train.shape
```

```
Out[24]: (26585, 77)
```

```
In [25]: test.dropna(inplace=True)
```

```
In [26]: test.isnull().any().sum()
```

```
Out[26]: 0
```

```
In [27]: test.shape
```

```
Out[27]: (11355, 77)
```

Exploratory Data Analysis(EDA)

Perform debt analysis. You may take the following steps:

- Explore the top 2,500 locations where the percentage of households with a second mortgage is the highest and percent ownership is above 10 percent. Visualize using geo-map. You may keep the upper limit for the percent of households with a second mortgage to 50 percent

```
In [28]: train.nlargest(2500, ['second_mortgage', 'pct_own'])
```

Out[28]:

UID	COUNTYID	STATEID	state	state_ab	city	place	type	pr
264403	31	34	New Jersey	NJ	Passaic	Garfield City	City	
289712	147	51	Virginia	VA	Farmville	Farmville	Town	
222830	13	4	Arizona	AZ	Scottsdale	Tempe City	CDP	
251185	27	25	Massachusetts	MA	Worcester	Worcester City	City	
278178	101	42	Pennsylvania	PA	Philadelphia	Millbourne	Borough	
...
245335	3	18	Indiana	IN	Fort Wayne	Fort Wayne City	City	
260417	81	37	North Carolina	NC	High Point	Jamestown	Village	
286364	257	48	Texas	TX	Crandall	Talty	Town	
287041	397	48	Texas	TX	Royse City	Fate City	Town	
225435	37	6	California	CA	Los Angeles	South Pasadena City	City	

2500 rows × 77 columns

```
In [29]: train_2500 = train[['state','lat','lng','second_mortgage', 'pct_own', 'place', 'state', 'city', 'COUNTYID', 'STATEID', 'home_equity', 'home_equity_second_mortgage', 'debt', 'hi_median', 'family_median']].nlargest(2500, ['second_mortgage', 'pct_own'])
```

In [30]: train_2500

Out[30]:

	state	lat	lng	second_mortgage	pct_own	place	
UID							
264403	New Jersey	40.867944	-74.114633		0.60870	0.01157	Garfield City
289712	Virginia	37.297357	-78.396452		0.50000	0.62069	Farmville
222830	Arizona	33.458658	-111.955104		0.43750	0.05660	Tempe City
251185	Massachusetts	42.254262	-71.800347		0.43363	0.20247	Worcester City
278178	Pennsylvania	39.952954	-75.202767		0.39024	0.05041	Millbourne
...
245335	Indiana	41.074478	-85.305983		0.06880	0.87611	Fort Wayne City
260417	North Carolina	36.049499	-79.950157		0.06880	0.44992	Jamestown
286364	Texas	32.685568	-96.421242		0.06879	0.89705	Talty
287041	Texas	32.942220	-96.344575		0.06879	0.74929	Fate City
225435	California	34.115176	-118.189852		0.06875	0.29012	South Pasadena City

2500 rows × 15 columns

In [31]: train_2500[train_2500['pct_own']>0.1].head()

Out[31]:

	state	lat	lng	second_mortgage	pct_own	place	
UID							
289712	Virginia	37.297357	-78.396452		0.50000	0.62069	Farmville
251185	Massachusetts	42.254262	-71.800347		0.43363	0.20247	Worcester City
269323	New York	40.751809	-73.853582		0.31818	0.15618	Harbor Hills
251324	Maryland	39.127273	-76.635265		0.30212	0.22380	Glen Burnie
235788	Florida	28.029063	-82.495395		0.28972	0.11618	Egypt Lake-leto

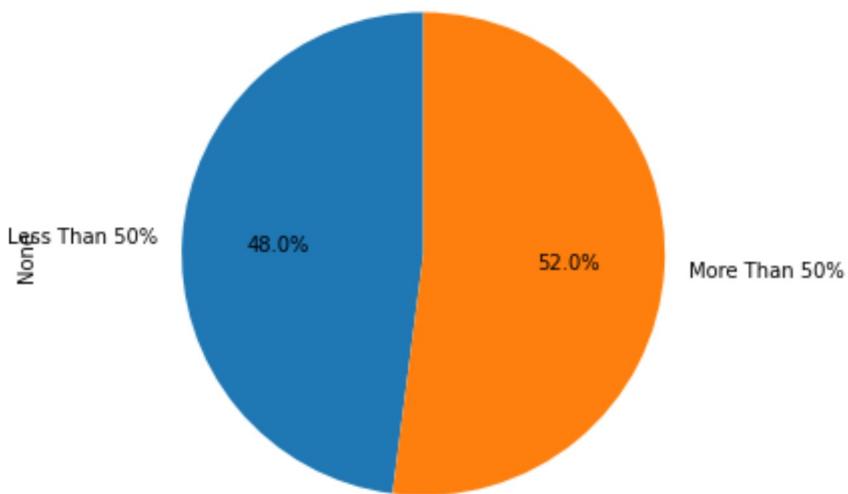
In [32]: `import plotly.express as px
import plotly.graph_objects as go`

```
In [33]: fig = go.Figure(data=go.Scattergeo(  
    lat = train_2500['lat'],  
    lon = train_2500['lng']),  
    )  
fig.update_layout(  
    geo=dict(  
        scope = 'north america',  
        showland = True,  
        landcolor = "rgb(212, 212, 212)",  
        subunitcolor = "rgb(255, 255, 255)",  
        countrycolor = "rgb(255, 255, 255)",  
        showlakes = True,  
        lakecolor = "rgb(255, 255, 255)",  
        showsubunits = True,  
        showcountries = True,  
        resolution = 50,  
        projection = dict(  
            type = 'conic conformal',  
            rotation_lon = -100  
        ),  
        lonaxis = dict(  
            showgrid = True,  
            gridwidth = 0.5,  
            range= [ -140.0, -55.0 ],  
            dtick = 5  
        ),  
        lataxis = dict (  
            showgrid = True,  
            gridwidth = 0.5,  
            range= [ 20.0, 60.0 ],  
            dtick = 5  
        )  
    ),  
    title='Top 2,500 locations with second mortgage is the highest and pe  
rcent ownership is above 10 percent')  
fig.show()
```

Use the following bad debt equation: Bad Debt = P (Second Mortgage ∩ Home Equity Loan) Bad Debt = second_mortgage + home_equity - home_equity_second_mortgage c) Create pie charts to show overall debt and bad debt

```
In [34]: train['bad_debt'] = train['second_mortgage']+train['home_equity']-train['home_equity_second_mortgage']
test['bad_debt'] = test['second_mortgage']+test['home_equity']-test['home_equity_second_mortgage']
```

```
In [35]: train['bins'] = pd.cut(train['bad_debt'],bins=[0,0.1,1.5], labels=["Less Than 50%","More Than 50%"])
train.groupby(['bins']).size().plot(kind='pie',subplots=True,startangle=90,autopct='%1.1f%%')
plt.axis('equal')
plt.tight_layout()
plt.show()
```



Create Box and whisker plot and analyze the distribution for 2nd mortgage, home equity, good debt, and bad debt for different cities

```
In [36]: pd.set_option('display.max_rows',None)
```

```
In [37]: train['city'].value_counts().to_frame()
```

Out[37]:

	city
	Chicago 286
	Brooklyn 261
	Los Angeles 219
	Houston 213
	Philadelphia 160
	San Antonio 138
	Baltimore 128
	Las Vegas 123
	Phoenix 114
	Miami 105
	Detroit 99
	Bronx 98
	Columbus 95
	Dallas 95
	Springfield 92
	Indianapolis 90
	San Diego 89
	Milwaukee 88
	Jacksonville 85
	Washington 85
	New York 79
	Louisville 76
	San Francisco 76
	Charlotte 76
	Rochester 75
	Portland 74
	Pittsburgh 74
	Kansas City 72
	Cleveland 70
	Cincinnati 69
	New Orleans 66
	Tucson 66
	Atlanta 65
	Denver 64
	Tampa 64
	Austin 63

	city
Richmond	62
San Jose	61
Oklahoma City	60
Omaha	60
St Louis	59
Fort Worth	58
Lexington	57
Sacramento	56
El Paso	56
Orlando	55
Greenville	55
Seattle	53
Albuquerque	51
Aurora	51
Memphis	50
Tulsa	50
Newark	49
Oakland	49
Arlington	48
Columbia	48
Minneapolis	47
Madison	47
Jackson	47
Nashville	46
Alexandria	44
San Juan	43
Glendale	42
Wilmington	42
Knoxville	40
Fayetteville	39
Long Beach	39
Lincoln	38
Lakewood	38
Decatur	37
Mesa	37
Raleigh	37
Lancaster	37
Colorado Springs	37

	city
Henderson	36
Fresno	36
Canton	36
Albany	36
Salt Lake City	36
Toledo	36
Honolulu	36
Bloomington	35
Salem	35
Buffalo	34
Monroe	34
Gainesville	34
Bakersfield	34
Warren	34
Fairfield	34
Fort Wayne	32
Spokane	32
Vancouver	32
Virginia Beach	32
Franklin	31
Grand Rapids	31
Pasadena	31
West Palm Beach	31
Marietta	31
Riverside	31
Dayton	31
Auburn	30
Des Moines	30
Baton Rouge	30
Manchester	30
Peoria	29
Norfolk	29
Wichita	29
Staten Island	29
Charleston	29
Lafayette	29
Troy	28
Danville	28

	city
Jamaica	27
Little Rock	27
Birmingham	27
Fremont	27
Florence	27
Savannah	27
Rockford	26
Burlington	26
St Petersburg	26
Durham	26
Marion	26
Saint Paul	25
Tacoma	25
Clinton	25
Greensboro	25
Bayamon	25
Westminster	24
Huntsville	24
Clearwater	24
Pensacola	24
Lakeland	24
Hampton	24
Macon	24
Akron	23
Naples	23
Shawnee Mission	23
Long Island City	23
Oxford	23
Clarksville	23
Silver Spring	23
Athens	23
Sarasota	23
Augusta	23
Brownsville	23
Plymouth	23
Anchorage	23
Middletown	23
Flushing	22

	city
Fort Collins	22
New Haven	22
Shreveport	22
Mount Vernon	22
Concord	22
Saginaw	21
Anderson	21
Fort Myers	21
Reno	21
Plano	21
Lewisville	21
Union City	21
Evansville	21
Newport	21
Garland	21
Stockton	21
Green Bay	21
Mobile	20
Duluth	20
Erie	20
Delray Beach	20
Garden Grove	20
Roseville	20
Hollywood	20
Syracuse	20
New Bedford	20
Flint	20
Scottsdale	20
Ashland	20
Harrisburg	19
Laredo	19
Carrollton	19
Frederick	19
Littleton	19
Bradenton	19
Portsmouth	19
Bellevue	19
Lansing	19

	city
	Midland 19
	Modesto 19
	Roanoke 19
	New Castle 19
	Hamilton 19
	Dublin 18
	Yuma 18
	Chandler 18
	Orange 18
	Hillsboro 18
	Sanford 18
	Irving 18
	Corona 18
	Youngstown 18
	Hartford 18
	Huntington Beach 18
	South Bend 18
	Jersey City 18
	Montgomery 18
	Amarillo 18
	Independence 18
	Ann Arbor 18
	Hialeah 18
	Davenport 17
	Norwalk 17
	North Las Vegas 17
	Lowell 17
	York 17
	Anaheim 17
	Tallahassee 17
	Chattanooga 17
	Corpus Christi 17
	Worcester 17
	Eugene 17
	Newport News 17
	Oxnard 17
	Dover 17
	Moreno Valley 17

	city
Ponce	17
Princeton	17
Yonkers	17
Ocala	17
Metairie	17
Bayside	17
Costa Mesa	17
Odessa	17
Boca Raton	17
Cambridge	16
Woodbridge	16
Boise	16
Allentown	16
Liberty	16
Covington	16
Salinas	16
Boston	16
Hendersonville	16
Medford	16
Garden City	16
Jonesboro	16
Bridgeport	16
Santa Ana	16
Lawrence	16
Daly City	15
Antioch	15
Utica	15
Bedford	15
Joliet	15
Watertown	15
EI Cajon	15
Clovis	15
Spartanburg	15
Reading	15
Apple Valley	15
North Hollywood	15
Sterling	15
Camden	15

	city
Quincy	15
Surprise	15
Topeka	15
Burbank	15
Frankfort	15
Asheville	15
Whittier	14
Milford	14
Grand Prairie	14
Naperville	14
Smyrna	14
Greensburg	14
Lubbock	14
High Point	14
Pueblo	14
Spring Hill	14
Kingston	14
Thornton	14
Ogden	14
Lebanon	14
Jamestown	14
Frisco	14
North Chesterfield	14
Winston Salem	14
Cumming	14
Elk Grove	14
Trenton	14
Marshall	14
Scranton	14
Milton	14
Cary	14
St. Louis	13
Germantown	13
Highland	13
Altoona	13
Mcallen	13
Gary	13
Chesapeake	13

	city
Somerville	13
Bristol	13
Lawrenceville	13
Chester	13
Fairfax	13
Riverdale	13
Santa Fe	13
Huntington	13
Caguas	13
Greeley	13
Vallejo	13
Hawthorne	13
Beaumont	13
Chula Vista	13
Vista	13
Hanover	13
Brandon	13
Palmdale	13
San Marcos	13
Gilbert	13
St Charles	13
Visalia	13
Fort Lauderdale	13
Waterloo	12
Freeport	12
Kalamazoo	12
Midlothian	12
Olathe	12
Coral Springs	12
Pittsburg	12
Johnstown	12
Norman	12
Inglewood	12
Loveland	12
Windsor	12
Waterford	12
Farmington	12
Binghamton	12

	city
Portage	12
Providence	12
Richfield	12
Muskegon	12
Largo	12
Manassas	12
Miami Beach	12
Hudson	12
Stratford	12
St Augustine	12
Stamford	12
Winchester	12
Redding	12
Holland	12
Las Cruces	12
Elmhurst	12
Conway	12
South Ozone Park	12
Ypsilanti	12
Mansfield	11
Hammond	11
Upper Marlboro	11
Myrtle Beach	11
Cedar Rapids	11
Paterson	11
Brentwood	11
Placentia	11
Kent	11
Perry	11
Homestead	11
La Mesa	11
Goshen	11
Lake Worth	11
Santa Rosa	11
Boynton Beach	11
Panama City	11
Irvine	11
Newton	11

	city
Fairbanks	11
Shelby	11
Gresham	11
Roswell	11
Kenosha	11
Alpharetta	11
Everett	11
Jefferson	11
Meridian	11
Seminole	11
Monticello	11
Napa	11
Murfreesboro	11
Sandy	11
Chillicothe	11
Georgetown	11
Appleton	11
Escondido	11
Sparta	11
Rome	11
Taylor	11
Butler	11
Belleville	11
Bethlehem	11
Sparks	11
Lawton	11
Bowling Green	11
Arcadia	11
Miramar	11
Longview	11
Winston-salem	11
Weston	11
White Plains	11
Schenectady	11
Woodstock	11
Rockville	11
Chesterfield	11
Dorchester	11

	city
Greenwood	11
Pawtucket	11
Simi Valley	11
Pomona	11
Yuba City	10
Chino	10
Campbell	10
Gulfport	10
Stone Mountain	10
Racine	10
Wheeling	10
Bradford	10
Van Nuys	10
Linden	10
West Hartford	10
Berkeley	10
El Monte	10
Elgin	10
Gaithersburg	10
Kissimmee	10
Overland Park	10
Torrance	10
Milpitas	10
Lagrange	10
Burnsville	10
Greenfield	10
Council Bluffs	10
Venice	10
Sunrise	10
Santa Barbara	10
Yakima	10
Wesley Chapel	10
Levittown	10
Waynesboro	10
Centerville	10
Jasper	10
Rock Hill	10
Lynchburg	10

	city
Saint Cloud	10
San Angelo	10
Brookfield	10
Avondale	10
Centreville	10
Guaynabo	10
Arnold	10
Brighton	10
Billings	10
Battle Creek	10
Berlin	10
Lumberton	10
Saint Albans	10
Macomb	10
Arvada	10
Summerville	10
Laurel	10
Fort Smith	10
Beaverton	10
Port Arthur	10
Great Falls	10
San Bernardino	10
Cleveland Heights	10
Katy	10
Fall River	10
Lake City	10
Union	10
Kingsport	10
Pompano Beach	10
Hayward	10
Downey	10
Fontana	10
Parma	10
Redwood City	10
Prescott	10
Vienna	10
North Miami	9
Bellingham	9

	city
Mount Pleasant	9
Morrisville	9
Rialto	9
New Albany	9
Lodi	9
Walnut Creek	9
Tyler	9
Port St Lucie	9
Colton	9
Broken Arrow	9
Mount Airy	9
La Crosse	9
Englewood	9
Kenner	9
Marysville	9
Richmond Hill	9
Hollis	9
Minnetonka	9
Hyde Park	9
Carolina	9
Federal Way	9
Klamath Falls	9
Farmington Hills	9
Helena	9
Mountain View	9
Indio	9
Mission	9
Toa Baja	9
Bellflower	9
Fredericksburg	9
Williamsport	9
Wakefield	9
Medina	9
Johnson City	9
Temecula	9
Owensboro	9
Gretna	9
San Mateo	9

	city
Douglasville	9
Petersburg	9
Pembroke Pines	9
Mesquite	9
Baytown	9
Clinton Township	9
Flower Mound	9
Norcross	9
Puyallup	9
Fargo	9
Morgantown	9
National City	9
Bloomfield	9
Daytona Beach	9
Abilene	9
Vernon	9
Wichita Falls	9
Hot Springs	9
New Britain	9
Norwich	9
Temple	9
Paris	9
Sunnyvale	9
Cuyahoga Falls	9
Oshkosh	9
Riverview	9
Rego Park	9
Salisbury	9
Springdale	9
Bothell	9
Glen Burnie	9
Wyoming	9
Saint Clair Shores	9
Herndon	9
Parker	9
Manteca	9
Elizabeth	9
Rochester Hills	9

	city
Plainfield	9
Waterbury	9
Rapid City	9
Sterling Heights	9
Abingdon	9
Tempe	9
Lewiston	9
Newburgh	9
Brockton	9
College Station	9
Mentor	9
Winter Park	9
Falls Church	9
Hemet	8
Cape Coral	8
Cheyenne	8
Bridgewater	8
Darien	8
Spring Valley	8
Chatsworth	8
Bethesda	8
Ventura	8
Elkton	8
Newbury Park	8
Castle Rock	8
Joplin	8
Bayonne	8
Northridge	8
Worthington	8
Gastonia	8
Denton	8
Canovanas	8
Niles	8
New Port Richey	8
Lehigh Acres	8
West Chester	8
Clifton	8
Wilson	8

	city
	Janesville 8
	Dearborn 8
New Brunswick	8
Carmichael	8
Royal Oak	8
Reseda	8
Salina	8
Harlingen	8
Port Orange	8
Ridgewood	8
Caldwell	8
Apex	8
Malden	8
Cranston	8
Tustin	8
Brookhaven	8
Spencer	8
Bolingbrook	8
Selma	8
Bangor	8
Kokomo	8
Kernersville	8
Melbourne	8
Hyattsville	8
Boulder	8
Lee's Summit	8
Woodside	8
Sherman Oaks	8
Batavia	8
Southfield	8
Waltham	8
Belton	8
Wilkes Barre	8
Orem	8
Grand Junction	8
Massillon	8
Shelton	8
Suffolk	8

	city
Forest Hills	8
Waynesville	8
Norristown	8
Oceanside	8
Murrieta	8
La Puente	8
Westland	8
St. Petersburg	8
Elizabethtown	8
Hobbs	8
Bartlett	8
Kettering	8
Pineville	8
Valley Stream	8
Nampa	8
Leesburg	8
Zephyrhills	8
Alamogordo	8
Mechanicsville	8
Highlands Ranch	8
Lacey	8
Williamsburg	8
New Braunfels	8
Magnolia	8
Jurupa Valley	8
Wheaton	8
Fenton	8
Aberdeen	8
Rocky Mount	8
Trinity	8
Baldwin	8
Pacoima	8
Deer Park	8
Muncie	8
Hempstead	7
Olympia	7
Duncanville	7
Centralia	7

	city
Martinez	7
Lake Charles	7
Thomasville	7
Sioux Falls	7
Ithaca	7
Brooksville	7
Delaware	7
Powder Springs	7
Cerritos	7
Lynn	7
Champaign	7
Alameda	7
Cypress	7
Astoria	7
Oneida	7
Cambria Heights	7
Reston	7
Citrus Heights	7
Bessemer	7
Suwanee	7
Eureka	7
Laporte	7
Fulton	7
Belmont	7
Bismarck	7
Elyria	7
Abbeville	7
Deltona	7
Moline	7
Amherst	7
Woonsocket	7
West Monroe	7
Saugus	7
Valparaiso	7
Santa Monica	7
Phenix City	7
Charlottesville	7
Vero Beach	7

	city
Wallingford	7
North Charleston	7
Gloucester	7
Pleasant Hill	7
Lewistown	7
West Seneca	7
Newnan	7
San Leandro	7
Easton	7
Trujillo Alto	7
Golden	7
Seffner	7
Alliance	7
Northfield	7
Mission Viejo	7
Lansdale	7
Gilroy	7
Titusville	7
Albion	7
Bountiful	7
Park Ridge	7
Graham	7
Orland Park	7
Minot	7
Pontiac	7
Los Lunas	7
Glendora	7
Somerset	7
Clarkston	7
Florissant	7
Euclid	7
Wayne	7
Avon	7
Benton	7
Richardson	7
Plant City	7
Dalton	7
Lenoir	7

	city
Texarkana	7
Andover	7
Ruskin	7
Oroville	7
Terre Haute	7
La Habra	7
Mcdonough	7
Shelbyville	7
Blaine	7
Redford	7
Conroe	7
San Clemente	7
Madisonville	7
Coon Rapids	7
Bel Air	7
Morristown	7
Grafton	7
Goldsboro	7
Bremerton	7
Ontario	7
San Pedro	7
Greenwich	7
Palm Springs	7
Weslaco	7
Murray	7
Bryant	7
Middle Village	7
Rosemead	7
Dubuque	7
Ashburn	7
Spring Lake	7
Lake Forest	7
Waverly	7
McKinney	7
Brunswick	7
Nashua	7
Palm Coast	7
Hastings	7

	city
O'fallon	7
Dothan	7
Gardena	7
Highland Park	7
Santa Clara	7
Bensalem	7
Harrison	7
Galveston	7
Hutchinson	7
Corvallis	7
Compton	7
Holiday	7
Spotsylvania	7
Bozeman	7
Palm Harbor	7
Okeechobee	7
Poughkeepsie	7
Crystal Lake	7
Rancho Cucamonga	7
Marshfield	7
Ozark	7
Kingman	7
Hilton Head Island	7
Palm Desert	7
Merced	7
Morehead City	7
San Rafael	7
Parkersburg	7
Tigard	7
Paducah	7
Seymour	7
New London	7
Versailles	6
Winona	6
Nacogdoches	6
Auburndale	6
Stoughton	6
Snellville	6

	city
Valdosta	6
Waianae	6
Waxahachie	6
Gahanna	6
Taylorsville	6
Centennial	6
Edinburg	6
West Union	6
Edmond	6
Livingston	6
Millington	6
Royal Palm Beach	6
Leominster	6
Cordova	6
Howell	6
Lindenhurst	6
Lakeville	6
Winthrop	6
Cullman	6
Eastpointe	6
White Lake	6
Waco	6
Beverly Hills	6
Hacienda Heights	6
Evanston	6
Piscataway	6
Media	6
Homewood	6
Garner	6
Mechanicsburg	6
Stillwater	6
Farmingdale	6
Stanton	6
West Des Moines	6
Warsaw	6
Williamsville	6
Griffin	6
Whitehall	6

	city
Longmont	6
Ridgefield	6
Clyde	6
Irvington	6
Woodbury	6
Sunbury	6
Victoria	6
Davis	6
Altamonte Springs	6
Killeen	6
Pottstown	6
West Jordan	6
Alhambra	6
Hurley	6
Kearny	6
Ossining	6
Pikeville	6
Perris	6
Juana Diaz	6
Mayaguez	6
Port Richey	6
Laguna Hills	6
Dexter	6
Port Charlotte	6
Carthage	6
Hagerstown	6
Goose Creek	6
Takoma Park	6
Tuscaloosa	6
Malvern	6
Fitchburg	6
Pennsauken	6
Fullerton	6
Norwood	6
Mankato	6
Bryan	6
Rogers	6
Westerville	6

	city
South Gate	6
Sherwood	6
Montclair	6
Livonia	6
Bennington	6
London	6
Northport	6
Niceville	6
Downingtown	6
Arecibo	6
Ozone Park	6
Sebring	6
Gray	6
Monrovia	6
Wausau	6
La Marque	6
Sugar Land	6
Carmel	6
Palm Bay	6
Endicott	6
Sioux City	6
Pocatello	6
Taunton	6
Sumter	6
Elkhart	6
Mooresville	6
Sheboygan	6
Lake Elsinore	6
Lynwood	6
Burton	6
Crystal	6
Sandusky	6
Santa Cruz	6
Brooklyn Park	6
Seneca	6
Granbury	6
Shelby Township	6
Canoga Park	6

	city
Arlington Heights	6
Laguna Niguel	6
East Orange	6
Missoula	6
Floral Park	6
Twentynine Palms	6
Lockport	6
Queens Village	6
Hoover	6
Danbury	6
San Luis Obispo	6
Lantana	6
Temple Hills	6
Winter Haven	6
Milwaukie	6
Northampton	6
Jennings	6
Bay City	6
Fort Pierce	6
Dekalb	6
Brooklyn Center	6
Clio	6
Carlsbad	6
Covina	6
South Boston	6
Maywood	6
Smithfield	6
La Jolla	6
Missouri City	6
Yauco	6
West Hills	6
Lorain	6
Seabrook	6
Tracy	6
Slidell	6
Maplewood	6
Geneva	6
Duncan	6

	city
Warwick	6
Ewa Beach	6
La Porte	6
Oak Ridge	6
North Little Rock	6
Wildomar	6
Snohomish	6
Sheridan	6
Sidney	6
Waldorf	6
Stafford	6
South Lake Tahoe	6
Niagara Falls	6
Michigan City	6
Morganton	6
Jeffersonville	6
Bowie	6
Wyandotte	6
Provo	6
Cathedral City	6
Edison	6
St Peters	6
Houma	6
Fairview	6
Wasilla	6
Pleasant Grove	5
Minden	5
Morton Grove	5
Westlake Village	5
Walla Walla	5
Annandale	5
Oak Lawn	5
Hillsborough	5
East Hartford	5
Inver Grove Heights	5
Cottage Grove	5
Ottawa	5
Miami Gardens	5

	city
East Lansing	5
Litchfield	5
Garfield Heights	5
Grapevine	5
Menifee	5
Chalmette	5
Statesville	5
Saint Louis Park	5
Cairo	5
Upper Darby	5
Carlisle	5
Russellville	5
Peru	5
Piedmont	5
Brookline	5
Annapolis	5
Southington	5
Dunedin	5
Tupelo	5
Springville	5
Upper Arlington	5
Port Huron	5
Claremore	5
Temple City	5
Asheboro	5
Holbrook	5
Eaton	5
Edgewater	5
New City	5
Bend	5
Atlantic City	5
Donna	5
Ceres	5
Mt Prospect	5
Cloverdale	5
Sebastian	5
Collinsville	5
St Joseph	5

	city
Uniontown	5
Douglas	5
Palo Alto	5
Natchez	5
Hilo	5
Folsom	5
Owings	5
Pleasantville	5
Upland	5
Rowland Heights	5
Whiting	5
Delta	5
Cherry Hill	5
Desoto	5
Horn Lake	5
Granada Hills	5
Custer	5
Logansport	5
Mililani	5
Westmont	5
Watsonville	5
Alta Loma	5
Liverpool	5
Mableton	5
Pekin	5
Rio Grande	5
Alma	5
San Carlos	5
Madera	5
Granger	5
Lyons	5
Queen Creek	5
Reynoldsburg	5
Jenks	5
Iowa City	5
Raymond	5
St George	5
Burleson	5

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Durango	5
Lapeer	5
Jackson Heights	5
New Berlin	5
Cumberland	5
Kensington	5
Ambler	5
Barrington	5
Richland	5
Yucaipa	5
Ramsey	5
Mustang	5
Lake Placid	5
Sierra Vista	5
Fond Du Lac	5
Idaho Falls	5
Marquette	5
Keller	5
Camarillo	5
Elizabethton	5
Vacaville	5
Cabo Rojo	5
Beloit	5
Lynnwood	5
Beaver	5
South San Francisco	5
Round Rock	5
Kailua	5
Midwest City	5
West Columbia	5
Crowley	5
Fort Washington	5
Grand Blanc	5
Grand Forks	5
Oak Park	5
Winfield	5
Phillipsburg	5
Orangevale	5

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Ladson	5
Lutz	5
Emporia	5
Muskogee	5
Wilkinsburg	5
Berea	5
Coraopolis	5
Carson	5
Porterville	5
Redondo Beach	5
Midvale	5
Forestville	5
San Gabriel	5
Lehi	5
Monroeville	5
Encinitas	5
Plantation	5
Framingham	5
Hamburg	5
Cave Creek	5
Williamstown	5
Marlton	5
Stuart	5
Crescent City	5
Waukegan	5
Layton	5
Kenmore	5
Spanish Fork	5
Pacific Grove	5
North Olmsted	5
Marrero	5
Pleasanton	5
Montebello	5
Westport	5
West Covina	5
Diamond Bar	5
Girard	5
Urbana	5

	city
Winnsboro	5
Maryville	5
Seaford	5
Northglenn	5
Saint Johns	5
Ormond Beach	5
Redmond	5
Fountain Hills	5
Dade City	5
Willingboro	5
Shoreline	5
Clarksburg	5
Prescott Valley	5
Sylmar	5
Perth Amboy	5
Grayson	5
Riviera Beach	5
Mullin	5
Margate	5
North Port	5
Aiken	5
Westbury	5
Des Plaines	5
Chelsea	5
EI Cerrito	5
Martinsville	5
Thousand Oaks	5
Enterprise	5
Apache Junction	5
Claremont	5
Willoughby	5
Charlestown	5
Bentonville	5
Woodland Hills	5
Carbondale	5
Pine Bluff	5
Torrington	5
Cicero	5

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Doylestown	5
Ripley	5
Murphy	5
Lincoln Park	5
Rocklin	5
Corning	5
Wooster	5
Northville	5
Santa Clarita	5
Hancock	5
Brookville	5
Kinston	5
Superior	5
Flagstaff	5
Casa Grande	5
Manhattan	5
Menasha	5
El Dorado	5
Alton	5
Maspeth	5
Taylors	5
The Woodlands	5
Clemmons	5
Bath	5
Klein	5
Newberry	5
Buena Park	5
Rio Rancho	5
Berwyn	5
Valrico	5
Mt. Pleasant	5
Starkville	5
Bloomfield Hills	5
Perkasie	5
Alamo	5
Santee	5
Greer	5
Enfield	5

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Thibodaux	4
Junction City	4
Hesperia	4
Martinsburg	4
Mill Creek	4
Ellenwood	4
Bethpage	4
Glen Allen	4
Cortland	4
Elmwood Park	4
Punta Gorda	4
Iselin	4
Westfield	4
Elizabeth City	4
Glenwood	4
Huber Heights	4
Mountain Home	4
Kennewick	4
Hartsville	4
Libertyville	4
Oviedo	4
Cordele	4
Eufaula	4
Commerce City	4
Delmar	4
Huntington Station	4
North Babylon	4
Belgrade	4
Randolph	4
East Meadow	4
Hernando	4
Hamtramck	4
Hackensack	4
Pittsfield	4
Columbia Heights	4
Hanford	4
Panorama City	4
Midway	4

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Pulaski	4
Baker City	4
Morgan Hill	4
Hudsonville	4
Clover	4
Leander	4
Summit	4
Fort Myers Beach	4
Beaver Dam	4
Chicopee	4
Darlington	4
Sicklerville	4
Middlebury	4
Glasgow	4
Blairsville	4
Syosset	4
Addison	4
Ravenna	4
Schertz	4
Barstow	4
Oakdale	4
Ft Lauderdale	4
Seaside	4
Foley	4
Elmira	4
Stockbridge	4
Los Alamitos	4
Rock Springs	4
Caledonia	4
Branford	4
Conshohocken	4
Linton	4
Evergreen	4
Middle Island	4
Chicago Heights	4
Newtown	4
Methuen	4
San Bruno	4

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Harrisonburg	4
League City	4
Murphysboro	4
San Dimas	4
Cornelius	4
Anthony	4
Forest City	4
Dickinson	4
West Haven	4
Xenia	4
Lakeport	4
Fajardo	4
Pearl River	4
Coventry	4
West Point	4
Eden	4
Perrysburg	4
San Lorenzo	4
Canaan	4
El Mirage	4
Wharton	4
Jeannette	4
Connersville	4
Attica	4
Guanica	4
Mandeville	4
Parsippany	4
Las Piedras	4
Deerfield Beach	4
Orocovis	4
Canyon	4
Paradise	4
East Saint Louis	4
Corinth	4
East Chicago	4
Riverbank	4
Friendswood	4
Streamwood	4

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Madison Heights	4
Lawrenceburg	4
Fishers	4
Dix Hills	4
Colchester	4
Ashtabula	4
Buckeye	4
Zanesville	4
Malone	4
Sweetwater	4
Rancho Cordova	4
Lockhart	4
Warrenville	4
New Rochelle	4
New Milford	4
Two Rivers	4
Kimball	4
Sherman	4
Millville	4
Key Largo	4
West Allis	4
Canandaigua	4
Rohnert Park	4
Kankakee	4
Jupiter	4
Eagan	4
Breckenridge	4
Passaic	4
Humboldt	4
Willowbrook	4
Sunny Isles Beach	4
Morgan City	4
Bluffton	4
Menlo Park	4
Osprey	4
Boone	4
Belle Glade	4
Oregon City	4

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Evans	4
Battle Ground	4
Greeneville	4
Monterey	4
Castro Valley	4
King Of Prussia	4
Holyoke	4
Oneonta	4
Beverly	4
Clairton	4
Mount Laurel	4
Turlock	4
Hawley	4
Loganville	4
Seguin	4
Pembroke	4
Kapolei	4
Kaneohe	4
Lake Oswego	4
Gettysburg	4
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Wauwatosa	4
Lakeside	4
Marlboro	4
Leland	4
Machesney Park	4
Hoffman Estates	4
Depew	4
Ewing	4
Cidra	4
Shawnee	4
Spring	4
Monterey Park	4
Oakley	4
Ferguson	4
Aston	4
Coamo	4
North Lauderdale	4

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Grandview	4
Edgewood	4
Waukesha	4
Americus	4
Nazareth	4
Andrews	4
Mc Donald	4
Waycross	4
Bossier City	4
Kihei	4
Doraville	4
Camuy	4
Fairborn	4
Cedar City	4
Santa Maria	4
Rock Island	4
Rockland	4
Nicholasville	4
Newington	4
Broomfield	4
Clearfield	4
White Bear Lake	4
Ramona	4
West Valley City	4
Olney	4
Kearney	4
Bridgeton	4
Moore	4
Saint Marys	4
East Elmhurst	4
Hurst	4
Roseburg	4
Sedona	4
Attleboro	4
Novi	4
Argyle	4
Aliso Viejo	4
North Tonawanda	4

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Elmont	4
Penfield	4
Burien	4
Ponca City	4
Canyon Country	4
Saint Joseph	4
Easley	4
Towson	4
Grand Island	4
Walnut	4
Napoleon	4
Benton Harbor	4
Lima	4
Marathon	4
Livermore	4
Mount Holly	4
Bemidji	4
Golden Valley	4
Red Wing	4
Amsterdam	4
Maysville	4
Waipahu	4
Temperance	4
Goleta	4
Westbrook	4
Mitchell	4
Vicksburg	4
Huntingdon Valley	4
Bluefield	4
Southampton	4
Muskego	4
Ridgeland	4
Laveen	4
Middlesboro	4
San Ramon	4
South Jordan	4
Corozal	4
Middleton	4

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Baldwin Park	4
Roma	4
Logan	4
Clayton	4
Plattsburgh	4
Huntersville	4
Miles City	4
West Lawn	4
Placerville	4
Calumet City	4
Bartlesville	4
Lauderdale Lakes	4
Melrose	4
Bell	4
Glenview	4
West New York	4
Hazel Park	4
Whitesboro	4
Haverhill	4
Chico	4
Ringgold	4
Desert Hot Springs	4
Latham	4
Green Valley	4
Fort Walton Beach	4
Sun Valley	4
Sun City	4
Rockledge	4
Schaumburg	4
North Highlands	4
San Jacinto	4
Blair	4
Kannapolis	4
Carson City	4
Plainboro	4
East Boston	4
Bessemer City	4
Wabash	4

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Muscatine	4
Clawson	4
Hattiesburg	4
Brenham	4
Langhorne	4
Roxbury	4
Harvey	4
Oberlin	4
Anniston	4
Winder	4
Freehold	4
Acworth	4
North Richland Hills	4
Bellaire	4
Plainview	4
Simpsonville	4
Sequim	4
Villa Park	4
Jefferson City	4
Gladstone	4
Washingtonville	4
Huron	4
Galesburg	4
Land O Lakes	4
Humble	4
Quinton	4
Mount Carmel	4
Orange Park	4
Lawndale	4
Gurnee	4
Peekskill	4
Wenatchee	4
Pendleton	4
Rancho Palos Verdes	4
Manati	4
Timonium	4
Belvidere	4
Casper	4

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Shakopee	4
Roslindale	4
Shaker Heights	4
Valencia	4
Sylvania	4
Traverse City	4
New Lenox	4
Quitman	4
Fayette	4
Long Branch	4
Amityville	4
Gig Harbor	4
Hoboken	4
Little Canada	4
Lilburn	4
El Centro	3
Weymouth	3
Chapel Hill	3
Gwinn	3
Butte	3
Cayey	3
State College	3
Loris	3
Royersford	3
Crossville	3
Belle Vernon	3
Cheektowaga	3
Christiansburg	3
Morovis	3
Mingo Junction	3
Arkansas City	3
Scotch Plains	3
Mchenry	3
Lewis	3
Chambersburg	3
Raeford	3
Mckinleyville	3
Tukwila	3

	city
Brook Park	3
Sonora	3
Uniondale	3
Mahopac	3
Maricopa	3
Derby	3
Wellsville	3
Bullhead City	3
Tamarac	3
Pelham	3
Orange City	3
Fords	3
Pinehurst	3
Mt Sterling	3
Clifton Park	3
Wendell	3
Lomita	3
Silverton	3
Long Grove	3
Petal	3
Moorhead	3
Beacon	3
Wisconsin Rapids	3
Garfield	3
Baker	3
Steilacoom	3
Warrenton	3
Tullahoma	3
Sanger	3
Talladega	3
Manahawkin	3
Swainsboro	3
Hermitage	3
Loves Park	3
Helotes	3
Woodville	3
Cocoa	3
Lavergne	3

	city
Bernalillo	3
Eustis	3
Ferndale	3
Normal	3
Tuskegee	3
Aliquippa	3
Bay Shore	3
Gonzales	3
Draper	3
Colfax	3
Larksville	3
Forest Park	3
Warm Springs	3
Elwood	3
Heath	3
New Brighton	3
Mahwah	3
Dawson	3
Mineral Wells	3
Corbin	3
Inverness	3
Big Spring	3
North Ridgeville	3
Pinckney	3
Stilwell	3
Juneau	3
Biloxi	3
Ocean	3
Petaluma	3
New Windsor	3
Coppell	3
North Arlington	3
Miller	3
Huntington Park	3
Hope	3
Ketchikan	3
Orangeburg	3
Pewaukee	3

	city
Rockingham	3
Kearns	3
Pico Rivera	3
Vidor	3
Speedway	3
Lufkin	3
Enola	3
Lincolnton	3
Circleville	3
Glendale Heights	3
Suffern	3
Grass Valley	3
Ruston	3
Del Rio	3
Owosso	3
Keizer	3
Stanley	3
Scottsburg	3
Centereach	3
West Roxbury	3
Avon Park	3
Brodheadsville	3
Cudahy	3
Rutland	3
Strasburg	3
American Fork	3
Randallstown	3
La Mirada	3
Port Washington	3
Overton	3
Madeira Beach	3
Big Rapids	3
Fallbrook	3
Bardstown	3
Orcutt	3
Ellijay	3
Ocoee	3
Mapleton	3

	city
Cuba	3
Brockport	3
Kalispell	3
Wahiawa	3
Landover	3
Wickliffe	3
Lovington	3
Guttenberg	3
Fleetwood	3
Maple Valley	3
Coatesville	3
Fernandina Beach	3
Socorro	3
Sharpsburg	3
Newberg	3
Lithonia	3
Beaver Falls	3
East Liverpool	3
Maitland	3
Maryland Heights	3
Rancho Santa Margarita	3
Gilman	3
Chestnut Hill	3
Tunnel Hill	3
Harrison Township	3
Siloam Springs	3
Tesuque	3
Wintererville	3
Carnegie	3
Rosemont	3
Central	3
Sewell	3
New Oxford	3
Belcamp	3
Hephzibah	3
Ironton	3
Park City	3
Cranberry Twp	3

	city
Manitowoc	3
Salyersville	3
North Hills	3
Vincennes	3
Horseheads	3
Red Lion	3
Lisle	3
Pinellas Park	3
West Memphis	3
La Grange	3
Freeland	3
La Vista	3
Rittman	3
Fridley	3
Falmouth	3
Crete	3
Cape Carteret	3
Merritt Island	3
Tolleson	3
Moncks Corner	3
Fowlerville	3
Montpelier	3
Mount Clemens	3
South Euclid	3
Granite City	3
Holt	3
Red Bank	3
Queen City	3
Ardmore	3
Runge	3
Trumbull	3
Fletcher	3
Little River	3
Durand	3
Lake Ronkonkoma	3
Coeur D'alene	3
Durant	3
Leeds	3

	city
	Novato 3
	Kirkland 3
	Woburn 3
	De Leon Springs 3
	Williston 3
	Hayden 3
	North Kingstown 3
	Rogersville 3
	Warner Robins 3
	Chatham 3
	South Haven 3
	Freedom 3
	Hummelstown 3
	Crawfordsville 3
	Reidsville 3
	Steubenville 3
	Hayden Lake 3
	Lake Geneva 3
	University City 3
	Rolla 3
	Webster 3
	Palatka 3
	Cabot 3
	Mcalester 3
	Homer 3
	Rosemount 3
	San Benito 3
	Falls City 3
	Kaukauna 3
	Mebane 3
	Canutillo 3
	Fort Meade 3
	Vineland 3
	Nekoosa 3
	Oak View 3
	Rembert 3
	Orchard Park 3
	La Crescenta 3

	city
Baxter	3
Smithville	3
Raymore	3
Lavonia	3
Commack	3
Saratoga	3
Glenolden	3
Keokuk	3
Harlan	3
Raytown	3
Gurabo	3
Nogales	3
Green Cove Springs	3
Manalapan	3
Detroit Lakes	3
Billerica	3
College Point	3
Carteret	3
Lady Lake	3
Selden	3
Conneaut	3
Eagle Mountain	3
Tuscumbia	3
Euless	3
Sumner	3
Brick	3
Rockaway	3
Massapequa Park	3
Fort Lee	3
North Bergen	3
Brewton	3
Rosedale	3
Colonia	3
Maple Heights	3
Cleburne	3
Fillmore	3
Angier	3
Atwater	3

	city
New Kensington	3
Far Rockaway	3
Perryville	3
Carpentersville	3
Boonville	3
Dubois	3
Leona Valley	3
Guilford	3
Pawling	3
Bethany	3
Kingwood	3
Bloomsburg	3
Tifton	3
Yankton	3
Loomis	3
Lanham	3
Nevada	3
Azle	3
Ottumwa	3
Culver City	3
Houghton Lake	3
Richmond Heights	3
Rockwood	3
Punxsutawney	3
Wellington	3
Wentzville	3
Pacific Palisades	3
Christiana	3
Wappingers Falls	3
Cassopolis	3
Searcy	3
St. Helena	3
Marshalltown	3
Sullivan	3
Jenison	3
Pearl	3
Buena Vista	3
Rincon	3

	city
Rio Grande City	3
Atglen	3
Hazleton	3
Wells	3
West Bloomfield	3
Hatfield	3
Adrian	3
Lamar	3
Susanville	3
Carver	3
Dacula	3
Pearland	3
South Milwaukee	3
Sedalia	3
Brookings	3
Thief River Falls	3
Bainbridge Island	3
Doral	3
Opelika	3
Tarzana	3
Mineola	3
Goodyear	3
Whitewater	3
Los Osos	3
Ellisville	3
Moca	3
Pollock Pines	3
Menomonee Falls	3
Spanaway	3
Utuado	3
Vinton	3
River Falls	3
Valley Center	3
Pataskala	3
Del City	3
New Iberia	3
Blacksburg	3
Berkley	3

	city
Hiram	3
Palestine	3
Creston	3
Parlin	3
Londonderry	3
Adelphi	3
Cutler Bay	3
Bay Village	3
Forest Hill	3
Delhi	3
Colorado City	3
Adamsville	3
Havertown	3
Oakland Park	3
Jonesville	3
Sonoma	3
Natick	3
Rock Falls	3
Elkridge	3
Defiance	3
Buford	3
Pittston	3
Fairport	3
Williams	3
Forest	3
Scotia	3
New Paltz	3
Fairdale	3
Bonita Springs	3
Ninety Six	3
North Bend	3
Franklinton	3
Haltom City	3
Hartland	3
Elmwood	3
Okmulgee	3
Kennedale	3
Hollister	3

	city
Lombard	3
Guthrie	3
Hereford	3
Oswego	3
Palmetto	3
Skokie	3
Mundelein	3
Burke	3
North Miami Beach	3
Morris Plains	3
Dunmore	3
New Hope	3
Nutley	3
Ada	3
Neptune Beach	3
West Mifflin	3
East Aurora	3
Dracut	3
Pampa	3
Ponchatoula	3
Cody	3
Stroudsburg	3
Moriarty	3
Glastonbury	3
Ballwin	3
Leavenworth	3
Vidalia	3
Streator	3
Hicksville	3
Maynard	3
Calhoun	3
Winslow	3
Newburg	3
Watkinsville	3
Grove City	3
Rossville	3
Harleysville	3
Rutherfordton	3

	city
Findlay	3
Sylva	3
Baraboo	3
Dearborn Heights	3
Quakertown	3
Brussels	3
Brooklet	3
New Bern	3
Tavares	3
Redlands	3
Ojai	3
Coconut Creek	3
Moon Township	3
Crosby	3
West Islip	3
Opa Locka	3
South Windsor	3
Mason	3
Solon	3
Ishpeming	3
Antelope	3
Marco Island	3
Crestview	3
Palmyra	3
Scott	3
Orinda	3
Comerio	3
Cheney	3
Hebron	3
Hickory	3
Farmville	3
Tooele	3
Fountain Valley	3
North Augusta	3
Belen	3
Riceville	3
Monongahela	3
Mohawk	3

	city
	Rahway 3
	Cookeville 3
	Eagle Pass 3
	South Pasadena 3
	Anacortes 3
	North Syracuse 3
	Oregon 3
	Catano 3
	Maple Shade 3
	Stanhope 3
	Watauga 3
	Gallatin 3
	Struthers 3
	Oak Harbor 3
	Blue Island 3
	Shingle Springs 3
	Ashford 3
	West Salem 3
	Hobe Sound 3
	Buckley 3
	Drexel Hill 3
	Sussex 3
	Estherville 3
	East Cleveland 3
	Townsend 3
	Lake Mary 3
	Bristow 3
	Hanover Park 3
	Tinley Park 3
	Victorville 3
	Vestal 3
	Choctaw 3
	Bishop 3
	Artesia 3
	Apollo Beach 3
	Aguadilla 3
	Crossett 3
	Clear Lake 3

	city
Corryton	3
La Quinta	3
Revere	3
Wimauma	3
Glens Falls	3
Fairmont	3
Northwood	3
Conover	3
Yorba Linda	3
Turner	3
Braintree	3
Mishawaka	3
East Providence	3
Loxahatchee	3
Hinsdale	3
Potomac	3
Port Jervis	3
Marianna	3
Poplarville	3
Hopkinsville	3
Brazil	3
Kaufman	3
Greenacres	3
Sulphur	3
Indiana	3
Brainerd	3
Sandston	3
Edwards	3
Wyckoff	3
Renton	3
Hilliard	3
Tillamook	3
West Warwick	3
Kentwood	3
Alvin	3
Sauk Village	3
Denison	3
Williamson	3

	city
North Chicago	3
Snow Hill	3
Waxhaw	3
Clark	3
Cadiz	3
Wheat Ridge	3
Kirkwood	3
Waynesburg	3
Mars Hill	3
Guntersville	3
Grinnell	3
Russell Springs	3
Breaux Bridge	3
Southern Pines	3
Inkster	3
Ridgeway	3
Oconomowoc	3
Old Bridge	3
Poway	3
Haddonfield	3
Larkspur	3
Robinson	3
Greenbrier	3
Sunland Park	3
Allegan	3
Shippensburg	3
Ellicott City	3
Dixon	3
Peabody	3
Elko	3
North Haven	3
Pratt	3
Conyers	3
Coal Township	3
Allison Park	3
Poplar Bluff	3
Gardner	3
Willachochee	3

	city
Hugo	3
Albert Lea	3
Sturgis	3
New Hyde Park	3
Swansea	3
North Canton	3
Osceola	3
Bellmore	3
Dunbar	3
Chagrin Falls	3
Lorton	3
Saratoga Springs	3
Ballston Spa	3
Coronado	3
Pickerington	3
Latrobe	3
Stevensville	3
Juncos	3
Broadview	3
Mequon	3
Pennsville	3
Maple Grove	3
Saluda	3
Voorhees	3
Ingleside	3
Cedar Springs	3
Lake Stevens	3
Tomball	3
Lemon Grove	3
Etiwanda	3
Lake Orion	3
Mayo	3
Corsicana	3
Rockwell	3
Cartersville	3
Otisville	3
Rochelle	3
Vega Alta	3

	city
Natrona Heights	3
Carol Stream	3
South Lyon	3
Lake Zurich	3
West Lafayette	3
Crozet	2
Wayland	2
Hinton	2
Abington	2
Moultrie	2
Beebe	2
Morehead	2
Lajas	2
Toa Alta	2
Mayer	2
Bergenfield	2
Wadsworth	2
Heflin	2
Hazlehurst	2
Fort Valley	2
San Anselmo	2
Brea	2
Penacook	2
Calabasas	2
Exton	2
Lompoc	2
Pepper Pike	2
Charlevoix	2
E Brunswick	2
Tonawanda	2
Stevens Point	2
New Providence	2
White House	2
Plainville	2
Walpole	2
Gallup	2
Saint Johnsbury	2
Gilmer	2

	city
Gearhart	2
Hector	2
Rowland	2
Bridgeville	2
Atherton	2
Whitmore Lake	2
Prince Frederick	2
Hialeah Gardens	2
Oak Creek	2
Goodland	2
Hedgesville	2
Sciota	2
Cape May Court House	2
Kennett	2
Lynbrook	2
Daniels	2
Florahome	2
New Glarus	2
Slayton	2
Clay Center	2
Celina	2
Crookston	2
The Plains	2
St Robert	2
Norridgewock	2
Mastic Beach	2
Fort Payne	2
Walker	2
Sapulpa	2
Arroyo Grande	2
Coupeville	2
Mcfarland	2
Pleasant Valley	2
Isle	2
Mayville	2
Waupun	2
Lansdowne	2
Manning	2

	city
Lake Arrowhead	2
Water Valley	2
East Rochester	2
Bogalusa	2
Cedarville	2
Crandall	2
Oelwein	2
Elkhart Lake	2
Mc Keesport	2
Wiggins	2
Eden Prairie	2
Cedar Falls	2
Derry	2
Sterling City	2
Schuylkill Haven	2
Mount Orab	2
Cedar Grove	2
St. Martinville	2
Harriman	2
Orono	2
Sault Sainte Marie	2
New Hartford	2
Coxsackie	2
Upper Montclair	2
Arcata	2
Booneville	2
Orland	2
Baxley	2
Wilmette	2
Battle Lake	2
Centertown	2
Converse	2
St. Albans	2
Hawaiian Gardens	2
Nixa	2
Weeki Wachee	2
East Setauket	2
Center Point	2

	city
Chalfont	2
Rye	2
Mclemoresville	2
Ste Genevieve	2
Wapello	2
Forestburg	2
Vandalia	2
Gaylord	2
Browns Mills	2
South El Monte	2
Seneca Falls	2
Scottdale	2
Gaffney	2
North Brunswick	2
Gadsden	2
Mountaintop	2
Mendota Heights	2
Anasco	2
Zapata	2
Palos Verdes Estates	2
Windsor Locks	2
Roscommon	2
Dyersburg	2
Rawlins	2
Mays Landing	2
Aibonito	2
Cannelton	2
Paulding	2
Washington Court House	2
Henrico	2
Sharpsville	2
Birdsboro	2
Okemah	2
Pine Grove	2
Sadler	2
Pearl City	2
Omak	2
West Reading	2

	city
Ballston Lake	2
Custer Park	2
Waupaca	2
Farrell	2
Lee	2
Needville	2
Sabana Grande	2
Westerly	2
Collins	2
Dillon	2
Bennett	2
Staunton	2
Paw Paw	2
Sevierville	2
The Villages	2
Van Buren	2
Viera	2
Elm Grove	2
Saline	2
Downers Grove	2
Pawleys Island	2
Temple Terrace	2
Massena	2
Penitas	2
Elberton	2
Herald	2
Fairbury	2
Delphos	2
Newhall	2
Hooper	2
Sheffield	2
EI Campo	2
Ruidoso	2
Dendron	2
Encino	2
Spotswood	2
Glenmoore	2
Laughlin	2

	city
Flagler Beach	2
Oxon Hill	2
Nocona	2
Trabuco Canyon	2
Pearson	2
Cordell	2
Quarryville	2
University Place	2
Wilmer	2
Donaldsonville	2
Crawford	2
Dorado	2
Clarinda	2
Moss Point	2
Haines City	2
Canastota	2
Tunkhannock	2
Harmony	2
South Richmond Hill	2
Sedro-woolley	2
Mountainhome	2
Havre	2
Buffalo Grove	2
Knox	2
Palos Heights	2
West Fargo	2
Glenville	2
Kendall Park	2
Galax	2
Cold Spring	2
Edmonds	2
Cottageville	2
Azusa	2
Buda	2
Fort Lupton	2
Lenoir City	2
Indian Trail	2
Itasca	2

	city
Mountain Brook	2
Peotone	2
Defuniak Springs	2
Slanesville	2
Hidalgo	2
Starke	2
Tarpon Springs	2
Hiawatha	2
Franklin Square	2
Weatherford	2
Port Jefferson	2
Bastrop	2
North Jackson	2
Glen Ellyn	2
Loiza	2
Iowa	2
Rupert	2
Lisbon	2
South Burlington	2
Clive	2
Deland	2
Peachtree City	2
Mayesville	2
Universal City	2
Lake View	2
Llano	2
Cedar Park	2
Bellerose	2
Gate City	2
Rockwall	2
Powell	2
Manor	2
New Caney	2
Richland Center	2
Colts Neck	2
Bordentown	2
Pierre	2
Arkadelphia	2

	city
Newton Falls	2
Clarion	2
Scottsboro	2
Southport	2
So Houston	2
Ore City	2
Stratton	2
Alden	2
North Ft Myers	2
Destrehan	2
Williamston	2
Mcgregor	2
Saco	2
Phil Campbell	2
Craig	2
Stanford	2
Ludington	2
Piqua	2
Edgerton	2
North Adams	2
Hollidaysburg	2
Pilot Mountain	2
Sand Springs	2
Marbury	2
Saint Clair	2
Red Oak	2
Bella Vista	2
Mannford	2
Loyal	2
Catonsville	2
Pinon	2
Laramie	2
Holly Hill	2
Key West	2
Colonial Heights	2
Westchester	2
Colma	2
Alba	2

	city
Friendsville	2
Columbia Falls	2
Lake In The Hills	2
Kahului	2
Globe	2
Saranac Lake	2
Charles Town	2
Chamblee	2
Arp	2
Ridgely	2
Nebraska City	2
Shirley	2
Waterville	2
Boulder City	2
New York Mills	2
Grenada	2
Corry	2
Melville	2
Herlong	2
Toppenish	2
Niantic	2
Cottonwood	2
Zebulon	2
Proctor	2
Waikoloa	2
Angola	2
Toms River	2
Mt Juliet	2
West Springfield	2
Dillsburg	2
Fair Oaks	2
Lookout Mtn	2
Morris	2
Belding	2
Holden	2
West Bend	2
Harding	2
Ash	2

	city
Lolo	2
Mabank	2
Commerce	2
Blytheville	2
Haymarket	2
North East	2
Slinger	2
Atkinson	2
Buhl	2
Ashville	2
Windham	2
Rocky Hill	2
Pomfret	2
Doerun	2
Potsdam	2
Coachella	2
Hauppauge	2
Kamiah	2
De Pere	2
Vivian	2
Cortez	2
Neosho	2
East Moline	2
Bellefonte	2
Sulphur Springs	2
Fort Dodge	2
Laona	2
Teaneck	2
Crestline	2
Southbury	2
Ellensburg	2
Chubbuck	2
Little Neck	2
Milton-freewater	2
Woodbine	2
Hebronville	2
Goodrich	2
Dinuba	2

	city
Cheshire	2
Cadillac	2
Salida	2
Safford	2
Matawan	2
Van Wert	2
Staffordsville	2
Castaic	2
Tekonsha	2
Broussard	2
Rothschild	2
Vinita	2
Steelville	2
Pinole	2
Jacksboro	2
Crystal City	2
Jamesburg	2
Charlton	2
Thomson	2
Famersville	2
Steelton	2
Putnam	2
Seward	2
Bexley	2
Steamboat Springs	2
Locust Grove	2
Covington Twp	2
Yankeetown	2
Smith Center	2
Marceline	2
Roslyn	2
Whittemore	2
Tarrytown	2
Eagle Lake	2
Gatlinburg	2
Arab	2
East Hampton	2
Brownsburg	2

	city
Atascadero	2
Mountain City	2
Springerville	2
Sayre	2
Winnemucca	2
Soperton	2
Lake Helen	2
Kings Park	2
Blountville	2
Smithsburg	2
Beltsville	2
Hays	2
Redwood City Ca	2
Nevis	2
Kenly	2
Simpson	2
Lewisburg	2
Cornville	2
Bellville	2
Deridder	2
Iola	2
Deal	2
Whitefish Bay	2
Laplace	2
Beavercreek	2
Voorheesville	2
Yorktown	2
Cornwall	2
Rockport	2
Walkerton	2
Lecanto	2
Big Sur	2
Walkersville	2
Hyannis	2
Port Gibson	2
Caseyville	2
Heber City	2
Lenox	2

	city
Ocean City	2
Fort Gratiot	2
Dalhart	2
Kingsley	2
Central Islip	2
Harbor City	2
Silverdale	2
Holladay	2
Coeymans	2
Lander	2
Atlantic Beach	2
Lavallette	2
Hammonton	2
Refugio	2
Wagoner	2
Collegeville	2
Strongsville	2
Bolivar	2
Monmouth	2
Toney	2
Mine Hill	2
New Market	2
So Sioux City	2
Aiea	2
Brandywine	2
Berwick	2
Austell	2
Indianola	2
High Springs	2
Windber	2
Roselle Park	2
Colville	2
Dubach	2
Bryn Mawr	2
Destin	2
South Daytona	2
Dartmouth	2
Merrillville	2

	city
Bad Axe	2
Ramseur	2
Amesbury	2
Keene	2
New	2
Denham Springs	2
Sitka	2
Chinle	2
Mt Hope	2
Palm Beach Gardens	2
Whiteville	2
Grant	2
Alpine	2
Sierra Madre	2
Cranford	2
Zachary	2
Caney	2
Lugoff	2
Bowdon	2
Nanticoke	2
Southlake	2
Yardley	2
Ortonville	2
Newburgh Heights	2
Denmark	2
Inwood	2
Savage	2
Navarre	2
Johnston	2
Coleman	2
Shallotte	2
Country Club Hill	2
Royal City	2
Glenwood Springs	2
Inman	2
Camillus	2
Hamden	2
McKees Rocks	2

	city
Plover	2
Verona	2
Rio Linda	2
Larned	2
New Smyrna Beach	2
Ripon	2
Damascus	2
Ocean View	2
Leighton	2
Rocky River	2
Oak Forest	2
East Amherst	2
Villa Rica	2
Pacific	2
Middleburg	2
Bentleyville	2
Natalbany	2
Vega Baja	2
Harveys Lake	2
Hazen	2
Mammoth Lakes	2
Adena	2
Silver City	2
Aubrey	2
Honeoye	2
Ellaville	2
Lares	2
Mendon	2
Avondale Estates	2
Ellicott	2
Ciales	2
Clay	2
Columbia City	2
Bloomingdale	2
Twinsburg	2
Pearblossom	2
West Babylon	2
Benicia	2

	city
Meadow Bridge	2
Cooper City	2
Dryden	2
San Ysidro	2
Ocean Springs	2
Rowlett	2
Tualatin	2
Cape Girardeau	2
Tarboro	2
Nowata	2
Warrington	2
Hannibal	2
Walterboro	2
Eunice	2
Union Springs	2
Port Allen	2
Port St Joe	2
Nevada City	2
Mitchellville	2
Hampton Bays	2
Yates Center	2
Suitland	2
Cedar Bluff	2
Church Hill	2
Terrell	2
Jay	2
Gardnerville	2
Daphne	2
Johnsonburg	2
Croton-on-hudson	2
Chanhassen	2
Soddy Daisy	2
Burns	2
Enid	2
Sikeston	2
Ames	2
Front Royal	2
Gorham	2

	city
Macedon	2
Springfield Gardens	2
Leroy	2
Bolivia	2
Avoca	2
Lake Katrine	2
Owings Mills	2
Orangeville	2
Annville	2
Adelanto	2
Banks	2
Satellite Beach	2
Panama City Beach	2
Copperas Cove	2
Leadville	2
Corunna	2
Paxton	2
White	2
Mercer Island	2
Moorpark	2
Camp Hill	2
Port Orchard	2
Holly Springs	2
Shafter	2
Redfield	2
Lutherville	2
Granby	2
Willcox	2
Meriden	2
Sartell	2
Morrison	2
Kennesaw	2
Auburn Hills	2
Palos Hills	2
West Alexandria	2
Dawsonville	2
Manhasset	2
Silsbee	2

	city
Export	2
Lone Jack	2
Shiprock	2
East Grand Forks	2
Moorestown	2
Old Orchard Beach	2
Glennville	2
Bay Minette	2
Winter Garden	2
East Northport	2
Humacao	2
Manhattan Beach	2
Meadowview	2
Valinda	2
Dyer	2
Lahaina	2
Farmersville	2
Tuba City	2
Los Altos Hills	2
Lake Wales	2
Flowery Branch	2
Brownstown	2
Miller Place	2
Kerrville	2
Greenwood Village	2
Wellesley	2
Onalaska	2
Stanfield	2
Willimantic	2
Old Forge	2
Westover	2
Circle Pines	2
Effingham	2
Ridley Park	2
San Manuel	2
North Royalton	2
Chestertown	2
Colebrook	2

	city
River Rouge	2
Guayama	2
Center	2
Northbrook	2
Villalba	2
Maricao	2
Carleton	2
Prichard	2
La Vernia	2
Ennis	2
Neenah	2
Great Bend	2
Bayboro	2
Glen Rose	2
Phelan	2
Munster	2
Fredonia	2
Cheverly	2
Hiawassee	2
Galloway	2
Mccormick	2
Incline Village	2
Marblehead	2
Acton	2
South Holland	2
Bainbridge	2
Coos Bay	2
Weir	2
Erwin	2
Owasso	2
San Tan Valley	2
West Hempstead	2
Hatboro	2
Maumee	2
Walnut Hill	2
Big Pine Key	2
Fulshear	2
Bolton	2

	city
Central City	2
Sunrise Beach	2
Upper Sandusky	2
Saltsburg	2
Endwell	2
Harvest	2
Afton	2
Yellow Springs	2
Mc Bain	2
Hampstead	2
Jamesville	2
Schwenksville	2
Britt	2
Los Fresnos	2
Ashland City	2
Davison	2
Metropolis	2
Millen	2
Yosemite	2
Schuylerville	2
Murdock	2
Weirton	2
Hubbard	2
Thatcher	2
Colby	2
Penuelas	2
Philadelphia	2
Seagrove	2
Hull	2
Zephyr Cove	2
Clintonville	2
Raritan	2
Sebastopol	2
Vassar	2
Goodman	2
Hurricane	2
Kilgore	2
Wingate	2

	city
	Wilton 2
	Berthoud 2
	Stafford Springs 2
	West Bath 2
	Port Isabel 2
	Truckee 2
	Santa Rosa Beach 2
	Los Altos 2
	Hazelwood 2
	Altadena 2
	Eatonton 2
	South Point 2
	West Grove 2
	Anna 2
	Spearfish 2
	Willmar 2
	Roff 2
	Brigham City 2
	Clackamas 2
	Capitol Heights 2
	Kirtland 2
	Poland 2
	Keystone Heights 2
	Millbrae 2
	Milledgeville 2
	Ruffin 2
	Manville 2
	Liberty Hill 2
	Foyil 2
	Immokalee 2
	Kountze 2
	Fort Mc Coy 2
	Vermilion 2
	Hardy 2
	Show Low 2
	Riverton 2
	Hayti 2
	Glen Cove 2

	city
White Sulphur Springs	2
Craryville	2
Macungie	2
Hopewell	2
Enumclaw	2
Vineyard	2
Elm City	2
Rathdrum	2
Pennsburg	2
Mill City	2
Marina Del Rey	2
Gilbertown	2
West Chicago	2
Lincolnshire	2
Barberton	2
Pawhuska	2
Cayce	2
Byron	2
Whitestone	2
Milan	2
Metuchen	2
Buchanan	2
Trumann	2
Norton	2
Liberal	2
Hoopa	2
Phillips	2
Hanover Township	2
Plains	2
Ridge	2
Newellton	2
Linwood	2
Middlesex	2
Walhalla	2
Arroyo	2
Chuckey	2
Forked River	2
Semmes	2

	city
Downsview	2
Beckley	2
Simms	2
Weaverville	2
Flora	2
Bonney Lake	2
Halifax	2
Hambleton	2
Tiverton	2
Blacklick	2
Oil City	2
Fairhope	2
Gibson ton	2
Oskaloosa	2
Jersey Shore	2
Spring Grove	2
Malta	2
Pullman	2
Alva	2
Winter Springs	2
Saint Simons Island	2
Chewelah	2
Port Matilda	2
Ellwood City	2
Goddard	2
Rosebud	2
Gillette	2
Selinsgrove	2
Pahoa	2
Bradley	2
Chantilly	2
Carmi	2
Jesup	2
Lyndonville	2
Vail	2
Pharr	2
Wildwood	2
Agoura	2

	city
Negaunee	2
Harvard	2
Borger	2
Anson	2
Hatillo	2
Shepherdsville	2
Plymouth Meeting	2
Oak Hill	2
Topanga	2
Leicester	2
Gatesville	2
Idabel	2
Cochran	2
Tappahannock	2
Roselle	2
Clintwood	2
Clanton	2
Roosevelt	2
Ecorse	2
Southbridge	2
Five Points	2
North Bay Village	2
College Park	2
Mount Washington	2
Flat Rock	2
Yulee	2
Great Neck	2
Hercules	2
Happy Valley	2
Metamora	2
Pascagoula	2
Dakota City	2
Foster City	2
Lake Mills	2
Parker City	2
Goliad	2
Eveleth	2
Zellwood	2

	city
East Point	2
Hanahan	2
Solvay	2
Burtonsville	2
Cascade	2
Brecksville	2
Mclean	2
Cape Elizabeth	2
Morven	2
Jessieville	2
Opp	2
Enon	2
Bonaire	2
Chickasha	2
Mayfield	2
Leetsdale	2
Ephrata	2
Langdon	2
Whitinsville	2
Sykesville	2
Nedrow	2
Kinnelon	2
Brookport	2
Pittsford	2
Iron Mountain	2
Sophia	2
Lake Alfred	2
Branson	2
Woodland	2
Soledad	2
Higganum	2
Malakoff	2
Little Falls	2
Virginia	2
Galena	2
San Juan Capistrano	2
Eastvale	2
Mason City	2

	city
Matthews	2
Sisseton	2
Washougal	2
Wadesboro	2
Corcoran	2
Southaven	2
Ladera Ranch	2
Vincent	2
White Hall	2
Red Bluff	2
Forsyth	2
Port Chester	2
North Branch	2
Manson	2
Apopka	2
Newtonville	2
Justice	2
Genoa	2
Bluff City	2
Montrose	2
Vieques	2
Hazel Green	2
Louisburg	2
Ukiah	2
Ellsworth	2
Estero	2
Long Lake	2
Checotah	2
Bettendorf	2
Kyle	2
Havana	2
Pagosa Springs	2
Rudyard	2
Buras	2
Firestone	2
Cotulla	2
Canon City	2
Woodridge	2

	city
Keaau	2
Bethel Park	2
East Haven	2
Palmer	2
Troutdale	2
Turtle Creek	2
Chiefland	2
Mcminnville	2
Pompano	2
Parsons	2
Lemont	2
Texas City	2
Jamaica Plain	2
Urbandale	2
Painesville	2
Parma Heights	2
Pueblo West	2
Spirit Lake	2
St Clair	2
Marina	2
Port Vue	2
Vinemont	2
Clermont	2
Falfurrias	2
Moses Lake	2
Bow	2
Harrisonville	2
Islip	2
Hazard	2
Grosse Ile	2
West Terre Haute	2
Hartselle	2
Fairmount	2
Rushville	2
Beach Haven	2
Lindstrom	2
Newton Centre	2
North Huntingdon	2

	city
	Shalimar 2
	Lafollette 2
	Crab Orchard 2
	West Caldwell 2
	Mountain Lake 2
	Paradise Valley 2
	Mc Veytown 2
	Palatine 2
	Shrewsbury 2
	North Andover 2
	Anoka 2
	Issaquah 2
	Indiantown 2
	Eau Claire 2
	Quantico 2
	Winnebago 2
	Churchville 2
	North Falmouth 2
	Boerne 2
	Sahuarita 2
	Lusby 2
	Forest Lake 2
	Rolling Fork 2
	Barre 2
	Lauderhill 2
	Tallapoosa 2
	Wheatfield 2
	Morrow 2
	Santa Isabel 2
	Millersville 2
	Bay Point 2
	Bunn 2
	San Sebastian 2
	El Reno 2
	Papillion 2
	Stephenville 2
	Western Springs 2
	Cave Junction 2

	city
Owatonna	2
Port Byron	2
Forest Grove	2
Hope Mills	2
Davie	2
Tyngsborough	2
Fountain City	2
Darby	2
Channelview	2
Diamond	2
Beatrice	2
Southwest Ranches	2
Pinedale	2
Spokane Valley	2
Quebradillas	2
Calumet	2
Mio	2
Comodore	2
Wyandanch	2
Bellefontaine	2
Hightstown	2
East Alton	2
Cedartown	2
Lehighton	2
Fredericktown	2
Farmerville	2
Ralston	2
Marlow	2
Uxbridge	2
Muldrow	2
Rosston	2
Ponte Vedra Beach	2
Beaufort	2
East Falmouth	2
North Wales	2
Parkside	2
Allen	2
Essexville	2

	city
Slaughter	2
Mccomb	2
Kewaskum	2
Long Valley	2
Van	2
Dana Point	2
Mill Valley	2
Dacono	2
Presque Isle	2
New Philadelphia	2
Concordia	2
Pickens	2
Ft Myers	2
Watkins Glen	2
Haslett	2
Delano	2
Pflugerville	2
Dewitt	2
Cedar Hill	2
Laconia	2
Newcastle	2
Cheboygan	2
Hollandale	2
Beeville	2
Grand Saline	2
Jefferson Hills	2
Colden	2
Haddon Heights	2
Vandergrift	2
Edcouch	2
Hydro	2
Rockaway Park	2
Vacherie	2
Tontogany	2
Aventura	2
Sharon	2
Emory	2
Cherokee	2

	city
Carsonville	2
Edwardsville	2
Uvalde	2
Thompson	2
Leawood	2
Castleton	2
Sunnyside	2
Bellport	2
Bergholz	2
Snoqualmie	2
Drummond	2
Amity	2
Oglethorpe	2
Fishkill	2
Cohoes	2
Los Alamos	2
Metter	2
Cupertino	2
Gaston	2
Dania Beach	2
Ventnor	2
Merchantville	2
Castroville	2
San German	2
Bogota	2
Richlands	2
Zionsville	2
Aguas Buenas	2
Canby	2
Nederland	2
Reedsville	2
Point Pleasant	2
Eight Mile	2
Lititz	2
Longwood	2
Old Lyme	2
Tucker	2
Badin	2

	city
Dresher	2
San Pablo	2
Mount Olive	2
Othello	2
Romeo	2
Fraser	2
Healdsburg	2
Lindale	2
Spring City	2
Columbiana	2
Ryland Heights	2
Warrensville	2
Libby	2
Spooner	2
Mounds	2
Tionesta	2
Avon Lake	2
Frankford	2
Sunman	2
Saint Francis	2
Lake Havasu City	2
Wolfforth	2
Macedonia	2
Yelm	2
Cinnaminson	2
Edgefield	2
Skiatook	2
Pine River	2
Statenville	2
N Plainfield	2
Wetumpka	2
Twin Falls	2
Lake Elmo	2
Woods Cross	2
Kelso	2
Chariton	2
La Fayette	2
Cunningham	2

	city
Thomaston	2
Valley City	2
Centre	2
Rising Sun	2
Umatilla	2
Kingsville	2
Campbellsville	2
Newburyport	2
Heidelberg	2
South Charleston	2
Dumas	2
Martin	2
Chauvin	2
Sissonville	2
Wailuku	2
Broomall	2
Holtsville	2
Collingdale	2
Knightdale	2
Bicknell	2
Liberty Township	2
Goodlettsville	2
Ira	2
Kaysville	2
Guyton	2
Payson	2
Garrison	2
Park River	2
Essex Fells	2
Nokesville	2
Villas	2
Taneytown	2
Coweta	2
Hinesville	1
Elmore	1
Carney	1
Swartz Creek	1
Magee	1

	city
Essington	1
Ridgecrest	1
Sanbornville	1
Hope Valley	1
Angels Camp	1
East Syracuse	1
Surf City	1
Birch Run	1
Adna	1
Demorest	1
Bremond	1
Eastlake	1
Sherburne	1
Round Lake Park	1
Barnesville	1
Idyllwild	1
Raven	1
Prospect Park	1
Lake Odessa	1
Comstock Park	1
Worth	1
Broxton	1
Ferris	1
Floresville	1
Zoarville	1
Calera	1
Irmo	1
Manlius	1
Ronkonkoma	1
Alabaster	1
Laurel Hill	1
Mantua	1
Pillager	1
Mcgehee	1
Lithia	1
Grand Ledge	1
Wellsboro	1
Lost Creek	1

	city
Hallock	1
Nettleton	1
Fort Pierre	1
Wallace	1
Morningside	1
Meadville	1
Sugar Grove Va	1
Stedman	1
Victor	1
Gauley Bridge	1
Gridley	1
Newville	1
Lockney	1
Olive Hill	1
Ryan	1
Rock	1
Cut Bank	1
Baltic	1
Rankin	1
Nome	1
Cardiff-by-the-sea	1
Bronxville	1
Provincetown	1
Travelers Rest	1
Sturtevant	1
Zumbrota	1
Robbinston	1
Merkel	1
Old Hickory	1
Caroga Lake	1
Moscow	1
Holdenville	1
Huffman	1
Cameron Park	1
Oblong	1
South Amherst	1
Bunkerville	1
Camilla	1

	city
Lindenwold	1
Coram	1
Orwell	1
Monsey	1
Tewksbury	1
Eldon	1
Black River	1
Sunol	1
Suches	1
South Webster	1
Belle Fourche	1
Conneaut Lake	1
Port Sulphur	1
Cardington	1
Boyne City	1
Grove Hill	1
Holly	1
Dedham	1
Colcord	1
Comanche	1
North Bay	1
Shinglehouse	1
Walls	1
Smithtown	1
Ephraim	1
Phelps	1
Everson	1
Terra Alta	1
Rhinelander	1
Prosper	1
Nipomo	1
Dyersville	1
Cardwell	1
Woodland Park	1
Cambria	1
Earlysville	1
Salome	1
Monument	1

	city
Maud	1
Crewe	1
Van Etten	1
Mendenhall	1
Chipley	1
Seat Pleasant	1
Valley Mills	1
Shidler	1
Grapeview	1
Larue	1
Cokato	1
Berkeley Springs	1
Gallipolis Ferry	1
Mcbee	1
Elliott	1
Fort Stewart	1
Glenwood City	1
Colbert	1
Canyon City	1
Commerce Township	1
Grand Prarie	1
Herminie	1
Ankeny	1
Hilham	1
Des Arc	1
Yellville	1
Kew Gardens	1
Olean	1
Sacaton	1
Baldwyn	1
Breinigsville	1
Maple Park	1
Tiller	1
College Grove	1
Wills Point	1
Rose Hill	1
Montoursville	1
Seibert	1

	city
Grimsley	1
Lake Luzerne	1
La Salle	1
Mulvane	1
Pleasureville	1
Armona	1
Talkeetna	1
Penbrook	1
Island City	1
Ansonia	1
Ontario Center	1
Cottondale	1
O'donnell	1
East Wenatchee	1
Union Point	1
Dumfries	1
Sellersburg	1
Centerport	1
Glassboro	1
Hawkinsville	1
Hamler	1
Houghton	1
Bethel	1
Mooresboro	1
Leesville	1
Wilson's Mills	1
Dime Box	1
Perryopolis	1
Etowah	1
East Peoria	1
Camby	1
Belle Plaine	1
Nellis	1
Desert Center	1
Baird	1
Friars Point	1
Rockaway Beach	1
Laureldale	1

	city
Madill	1
Johnsonville	1
St Helens	1
Galt	1
Lucas	1
Point Reyes Station	1
Magna	1
Ligonier	1
Saltillo	1
Healy	1
Fruitland Park	1
Wartrace	1
Charleroi	1
Wakarusa	1
Webster Springs	1
Palermo	1
Oak Bluffs	1
Berne	1
Cass City	1
Deep River	1
Wantage	1
Joelton	1
Aulander	1
Agency Village	1
Coloma	1
Pen Argyl	1
Deep Run	1
Pitsburg	1
Polo	1
Philo	1
Brown Deer	1
Cushing	1
Diamondville	1
Lemoore	1
Coward	1
Jonesburg	1
Dollar Bay	1
Maurice	1

	city
Central Village	1
Bridgeview	1
Haines	1
Coal Hill	1
Orange Cove	1
Prairie City	1
Yamhill	1
Unicoi	1
Groton	1
Odenton	1
Sellersville	1
St Regis Falls	1
Webb City	1
Bingham Farms	1
Emmett	1
Bergen	1
Crown King	1
Minotola	1
Broken Bow	1
Gillespie	1
Rampart	1
Davisville	1
Horse Branch	1
Hackettstown	1
Cedarhurst	1
Black Diamond	1
Spring Lake Park	1
Mohegan Lake	1
Wittensville	1
Rusk	1
Yermo	1
New Prague	1
Fernwood	1
Bear River City	1
Teachey	1
Ft Stanton	1
Pacifica	1
Lesage	1

	city
James Creek	1
Disputanta	1
Fairless Hills	1
Denville	1
Accokeek	1
Cresco	1
Coal City	1
Cashmere	1
Mccoll	1
Saint Charles	1
Viper	1
Harrogate	1
Lovelock	1
Farmers Branch	1
Petersham	1
Adams Center	1
Mars	1
Oak Hall	1
Pecatonica	1
Warrensville Heights	1
Mattituck	1
Manheim	1
Valley	1
Nesquehoning	1
Fruitland	1
Garretson	1
Harman	1
Odell	1
Naturita	1
Lore City	1
Carter	1
West Helena	1
Tazewell	1
Unionville	1
Rehoboth Beach	1
South Vienna	1
Wright City	1
Waukomis	1

	city
Goldston	1
Roan Mountain	1
Rollingstone	1
Brownwood	1
Brooklawn	1
Gowrie	1
Sycamore	1
Tidioute	1
Fitzgerald	1
South Hill	1
Swan Quarter	1
Lordsburg	1
Missouri Valley	1
Rock River	1
San Elizario	1
Ettrick	1
Sligo	1
West Greenwich	1
Rollinsford	1
Dunsmuir	1
Ulysses	1
Bladenboro	1
Sugarloaf	1
Henniker	1
Caneyville	1
Windom	1
Strathmore	1
Lewisport	1
Little Ferry	1
Smithton	1
Ben Lomond	1
Tierra Amarilla	1
Young	1
Traer	1
Moab	1
Des Lacs	1
Kittanning	1
Hermann	1

	city
Mullica Hill	1
Blacksville	1
Poinciana	1
Fries	1
Pilot Point	1
Sherburn	1
Mc Cook	1
Lake Park	1
Weedville	1
Grovetown	1
Nobleboro	1
Neah Bay	1
Tahlequah	1
Bay Springs	1
Bonne Terre	1
Hinesburg	1
Centerview	1
Gardiner	1
Mineral Ridge	1
Jeanerette	1
Centerbrook	1
Choudrant	1
Stanwood	1
Falling Waters	1
Stayton	1
Chicago Ridge	1
Dundee	1
Interlochen	1
Mcadenville	1
Lapel	1
Donnellson	1
Poth	1
Perry Hall	1
Sauk Centre	1
Douglassville	1
Marriottsville	1
Salters	1
Shawano	1

	city
Flemington	1
Mc Dermott	1
Bussey	1
Port Hueneme	1
Dyer Brook	1
Lake View Terrace	1
Terrebonne	1
Channahon	1
Huntingdon	1
Hookstown	1
New Middletown	1
Millbury	1
Naytahwaush	1
Gilboa	1
Margaretville	1
Frankton	1
Poyen	1
Ashdown	1
West Orange	1
Upton	1
Patrick	1
Blue Eye	1
Hartwood	1
Kasilof	1
Laurens	1
Devers	1
Arock	1
Deer Isle	1
Hillsville	1
Como	1
Willow River	1
Streetsboro	1
Orwigsburg	1
Central Falls	1
Blue Mound	1
Sugar Grove	1
Pierson	1
Niwot	1

	city
Weldona	1
Kremmling	1
Pismo Beach	1
Dupuyer	1
Greene	1
Rock Hall	1
East Rockaway	1
Marlborough	1
Red Rock	1
Hood River	1
Kershaw	1
Pell City	1
Truxton	1
Blue Bell	1
Byars	1
Guin	1
New Stanton	1
San Joaquin	1
Palacios	1
Cecilton	1
Osgood	1
Blum	1
Cape Canaveral	1
La Grande	1
Holley	1
Coffeyville	1
New Concord	1
Archdale	1
Shillington	1
Landisville	1
Stuttgart	1
Santa Paula	1
Naguabo	1
Henryville	1
Magdalena	1
Sergeantsville	1
Mosier	1
Daleville	1

	city
Hammondsport	1
Termo	1
Avalon	1
Nathalie	1
South Kortright	1
Readyville	1
Winter	1
Halls	1
Kaplan	1
Bayport	1
West Richland	1
West Tisbury	1
Mystic	1
Felicity	1
Tularosa	1
Sardis	1
Hunt	1
Alsip	1
Tawas City	1
Kingfisher	1
Elkins	1
Seatac	1
Brevard	1
Coulee City	1
Emmetsburg	1
Ridgeview	1
Katonah	1
Granite Shoals	1
Millsboro	1
Trout Lake	1
Orrville	1
Springtown	1
North Attleborough	1
Delanco	1
Rainbow	1
Arkport	1
Renville	1
Florham Park	1

	city
Big Bear Lake	1
Seal Beach	1
Jena	1
Osage Beach	1
Cando	1
Emerson	1
Balch Springs	1
Wadmalaw Island	1
Lyerly	1
Pettus	1
Casco	1
Bemus Point	1
Tetonia	1
Glen	1
Calhoun Falls	1
Ostrander	1
Fort Stockton	1
Boise City	1
Conehatta	1
New Cumberland	1
Windermere	1
Myersville	1
Fawn Grove	1
Stonewood	1
Alice	1
Scottville	1
Warminster	1
Rayland	1
Morgan Mill	1
Readfield	1
Hill City	1
Mounds View	1
Seville	1
Floral City	1
Castalia	1
Indian Wells	1
Calais	1
Pahrump	1

	city
Ooltewah	1
Mayodan	1
Millersburg	1
Lyndon	1
Honeoye Falls	1
Sugarcreek	1
Big Timber	1
Washington Pk	1
Robesonia	1
Narberth	1
Kaibeto	1
Pierre Part	1
Willits	1
Newton Highlands	1
Omega	1
Avery	1
Yettem	1
Pixley	1
Kingsford	1
Fort Kent	1
Hockley	1
Flanders	1
Exeter	1
Mt. Hope	1
Kewanee	1
Bettsville	1
Asotin	1
Las Marias	1
West Windsor	1
Three Springs	1
Eutaw	1
Cerro Gordo	1
Pomfret Center	1
New Sharon	1
Briggsdale	1
West Liberty	1
Moreauville	1
Siler City	1

	city
Saucier	1
Holdrege	1
Falconer	1
Cle Elum	1
Schoolcraft	1
West Burlington	1
Starr	1
Leonard	1
Peninsula	1
Burna	1
Hemphill	1
Pingree	1
Lake Ozark	1
Platte City	1
Comstock	1
Deming	1
Highland Falls	1
Presidio	1
Panguitch	1
Hokes Bluff	1
Robbinsville	1
Springport	1
Lake Como	1
Cameron	1
Stewarts Point	1
New Paris	1
Francisco	1
Harlowton	1
Pope Valley	1
Aspen	1
Pemberton	1
Susquehanna	1
Daingerfield	1
Hallsboro	1
Davidson	1
Nemo	1
Gretzel	1
Marilla	1

	city
Tujunga	1
Carnation	1
Hysham	1
North English	1
Pecos	1
Homosassa	1
Piney Creek	1
Highwood	1
Weirsdale	1
Swannanoa	1
Blue Diamond	1
Fort Sumner	1
West Long Branch	1
Malverne	1
Philipsburg	1
Sciotoville	1
Nachusa	1
Amite	1
South Toms River	1
Secretary	1
City Of Industry	1
Capac	1
Kittery	1
Lovettsville	1
Thousand Palms	1
Reynoldsville	1
Gerlach	1
Mt Rainier	1
Scott Air Force B	1
Salamanca	1
Stallings	1
Eagle Rock	1
Coquille	1
Sinclairville	1
Estancia	1
Karns City	1
Mascot	1
Round Lake Beach	1

	city
Willsboro	1
Pottsboro	1
Eminence	1
Austinville	1
Waseca	1
Lakeview	1
New Columbia	1
Amagansett	1
Norco	1
Perrin	1
Questa	1
Willard	1
Riley	1
Fallsburg	1
Wallowa	1
Finleyville	1
Timnath	1
Fennville	1
Hillside	1
Bear	1
Crosbyton	1
Hopewell Junction	1
Robertsdale	1
Calico Rock	1
Dorr	1
Wynne	1
Progreso	1
Selah	1
Winn	1
Rhinebeck	1
Tupper Lake	1
Glen Rock	1
Fuquay-varina	1
Forman	1
Leipsic	1
Rockmart	1
El Dorado Hills	1
Cottonwood Heights	1

	city
Tipton	1
Penasco	1
Babson Park	1
Vanderbilt	1
Shelburne	1
Arden	1
East Greenwich	1
Notasulga	1
Aloha	1
Mathis	1
Cambridge Springs	1
Summerfield	1
Moulton	1
Earth	1
Ozona	1
Kennett Square	1
Sorento	1
Pensacola Beach	1
College Springs	1
Stewart Manor	1
Coto De Caza	1
Glen Head	1
Fryeburg	1
Purcell	1
Mandan	1
Ellettsville	1
Chinook	1
Scituate	1
Heathsville	1
Tulia	1
Estill	1
Hellertown	1
Newland	1
Okanogan	1
Warden	1
Lovell	1
Gambrills	1
Star	1

	city
Westwood	1
Mt Vernon	1
Gladwin	1
Kenneth City	1
West Middlesex	1
Comfort	1
Mullan	1
Angie	1
Crystal River	1
Lake Waccamaw	1
Banning	1
Morrill	1
Worland	1
Ridgeley	1
Bonham	1
Fairfax Station	1
Harwich	1
Barnardsville	1
Summerland Key	1
Conesville	1
Brown City	1
Clara City	1
Lipscomb	1
Berlin Center	1
Wanaque	1
Lake Linden	1
Kingsland	1
Leechburg	1
Loup City	1
West Branch	1
Chapman	1
Boulder Creek	1
Closter	1
Nineveh	1
West Olive	1
Dodd City	1
Owendale	1
Marengo	1

	city
Grand Ridge	1
Shamokin	1
Faucett	1
Bunker Hill	1
Tiptonville	1
Basehor	1
North Carrollton	1
Cato	1
Haslet	1
Wixom	1
Old Westbury	1
Waldoboro	1
Cashiers	1
Dennison	1
Winston	1
Sultan	1
Bermuda Dunes	1
Pea Ridge	1
Goffstown	1
Earlimart	1
Howard	1
Lamberton	1
Hopkins	1
Koshkonong	1
Tabernacle	1
Moxee	1
Edisto Island	1
Canyon Lake	1
Sagle	1
Hudson Falls	1
Hiwassee	1
Gilford	1
Good Thunder	1
Henrietta	1
Gower	1
Haughton	1
Byesville	1
Cooper	1

	city
Ville Platte	1
Clarksdale	1
Sandia Park	1
Montello	1
Clatskanie	1
Paramount	1
Nantucket	1
Coopersville	1
East Windsor	1
Rindge	1
Skipwith	1
Eagleville	1
Alta	1
Mickleton	1
Wrightsville	1
Wolf Lake	1
Ruther Glen	1
Wauseon	1
Pollok	1
Winnabow	1
Delanson	1
Anawalt	1
Chaptico	1
Roaring Spring	1
Studio City	1
Stevenson Ranch	1
Stockdale	1
New Johnsonville	1
Graysville	1
Gunnison	1
Arcade	1
Iona	1
Gans	1
Payne	1
Bakersville	1
Nine Mile Falls	1
North Lewisburg	1
Barnsdall	1

	city
Peshtigo	1
Secaucus	1
Glenshaw	1
Vian	1
Cheswick	1
S Orange	1
Wyomissing	1
Stronghurst	1
Selfridge	1
Strum	1
Brock	1
Los Gatos	1
Dunkirk	1
Woodward	1
Luquillo	1
Opelousas	1
South Weber	1
Rockdale	1
Chazy	1
Grady	1
Bridge City	1
Naranjito	1
Mathews	1
Elkland	1
Alexander	1
Lithia Springs	1
Chatom	1
Dripping Springs	1
Mattoon	1
Morley	1
Mount Morris	1
Big Creek	1
Ehrenberg	1
Delphi	1
Topton	1
Asbury Park	1
Bensenville	1
Granite Bay	1

	city
Elma	1
Marble Falls	1
Vestavia Hills	1
Walnut Springs	1
Newbury	1
Simsbury	1
Barnum	1
Leslie	1
Dousman	1
Erlanger	1
Huxford	1
Pine Ridge	1
Blue Anchor	1
Central Square	1
Amery	1
Blissfield	1
Naruna	1
Basalt	1
Smackover	1
Bala Cynwyd	1
Sanostee	1
El Rito	1
Henning	1
Wexford	1
Blue Hill	1
Phoenixville	1
Leoti	1
Samson	1
Hooksett	1
Nags Head	1
Mary Esther	1
Green Island	1
Emeryville	1
Jenkins	1
Broadus	1
Rice Lake	1
Marquand	1
Spencerville	1

	city
College Place	1
Palos Park	1
Phippsburg	1
Donalds	1
Netcong	1
Chino Hills	1
St Joe	1
Pt Charlotte	1
Blue Rapids	1
Wolf Creek	1
The Dalles	1
East Dover	1
Encampment	1
Purvis	1
Rydal	1
Madras	1
Brunson	1
Parkville	1
Willows	1
Carrboro	1
Tonopah	1
Jenkintown	1
Foreman	1
Carneys Point	1
Inkom	1
Brackenridge	1
Inez	1
Tuskegee Institute	1
Scurry	1
Grant City	1
Everest	1
Leclaire	1
Mount Sinai	1
Clarence Center	1
S Bound Brook	1
Freer	1
Loganton	1
Gwinner	1

	city
Myakka City	1
Somers Point	1
Shiocton	1
Walnut Valley	1
Marcy	1
Flowood	1
Silver Peak	1
Newell	1
Luckey	1
Mechanicville	1
Nauvoo	1
Bois D'arc	1
West End	1
Fernley	1
Heber Springs	1
Sunflower	1
Le Center	1
Marana	1
Ten Mile	1
St. Amant	1
Delran	1
Langley A F B	1
Sarahsville	1
Hampton Falls	1
Wiscasset	1
Stockton Springs	1
Chana	1
St. Francisville	1
Bottineau	1
Critz	1
Cowiche	1
Saint Libory	1
Kenyon	1
Spruce Pine	1
Rosharon	1
Brisbane	1
Beggs	1
Halstad	1

	city
Archer	1
Wagon Mound	1
South Riding	1
East Palestine	1
Midway City	1
Three Oaks	1
Broadview Heights	1
Congress	1
East Helena	1
St Ann	1
Beardstown	1
Blackey	1
Mcintosh	1
Attalla	1
Calvert	1
Imlay City	1
Tylertown	1
Lanse	1
Batesville	1
Cochranton	1
Monument Valley	1
Tony	1
New Palestine	1
Pauline	1
Mamaroneck	1
Skanee	1
Lithopolis	1
North Platte	1
Fort Dix	1
Carbon Hill	1
Dansville	1
Licking	1
Glenpool	1
Chemung	1
Jackman	1
Epworth	1
Crowheart	1
Sleepy Eye	1

	city
Springhill	1
Clay City	1
Crofton	1
Harshaw	1
Gallipolis	1
Bealeton	1
Eastland	1
Waymart	1
Yanceyville	1
Cooter	1
Ascutney	1
Howard City	1
Poneto	1
Minocqua	1
Treynor	1
Shady Cove	1
Barco	1
Ahoskie	1
Saint Michael	1
Waretown	1
Herrin	1
White Earth	1
Shipman	1
Massapequa	1
Queensbury	1
Hamlin	1
Noblesville	1
Headland	1
Santa Fe Springs	1
Lorena	1
South Pittsburg	1
Barceloneta	1
Albia	1
Pretty Prairie	1
Saint Helen	1
Cockeysville	1
Palisades Park	1
Del Rey	1

	city
Paynes Creek	1
Tripp	1
Congers	1
Remsen	1
Somerton	1
Greenback	1
Safety Harbor	1
Maunabo	1
Fairview Park	1
Park Hall	1
Hathorne	1
North Baltimore	1
Grosse Pointe Woods	1
Bristolville	1
Bell City	1
Reese	1
Colusa	1
Erin	1
Cliffwood Beach	1
Ashton	1
Shelbina	1
Montague	1
North Providence	1
Boscobel	1
Vernonia	1
Maupin	1
Dolton	1
Beach	1
Flintstone	1
Royal	1
Harbor Beach	1
Flandreau	1
Vineyard Haven	1
Nikiski	1
South Bristol	1
Fort Plain	1
Tunbridge	1
Grant Park	1

	city
Winnett	1
Frostburg	1
Zuni	1
Dora	1
Lake	1
Boon	1
Lone Tree	1
Boligee	1
New Town	1
Ft Riley	1
North Grafton	1
New Hudson	1
Baraga	1
North Versailles	1
Mineral Point	1
Swarthmore	1
Kuna	1
Circle	1
Bostic	1
Wortham	1
Illinois City	1
Bonesteel	1
Prineville	1
Novelty	1
Tool	1
Dresden	1
Tom Bean	1
Diberville	1
Prince George	1
Louise	1
Merrick	1
Holmdel	1
Hatley	1
Kosciusko	1
Waldron	1
Athol	1
Cazadero	1
Barnwell	1

	city
Cosmopolis	1
Wallington	1
Hurlock	1
Longmeadow	1
Milford Center	1
Ruckersville	1
Louisiana	1
Clarkesville	1
River Edge	1
St. Stephen	1
Truman	1
Brundidge	1
Playa Del Rey	1
Cantonment	1
Ft Payne	1
Social Circle	1
Brookside	1
River Ridge	1
White City	1
Silvis	1
Saint John	1
San Ardo	1
St Marys	1
Lower Peachtree	1
Sells	1
Loreauville	1
Fort Calhoun	1
Clarks	1
Hosford	1
Oreana	1
Bisbee	1
West Sayville	1
Luling	1
Solana Beach	1
Lathrup Village	1
Skagway	1
New Martinsville	1
Jones	1

	city
Palm City	1
Toronto	1
Davisburg	1
Walden	1
Arabi	1
Mulino	1
Oyster Bay	1
Gosport	1
Deer River	1
Canfield	1
Reeds Spring	1
Albemarle	1
Donaldson	1
Holtville	1
East Palo Alto	1
Pelahatchie	1
Hawesville	1
District Heights	1
Coolidge	1
Nash	1
Pevely	1
Mashpee	1
Alfred	1
Glide	1
Bethune	1
Duette	1
Marsing	1
Rogers City	1
Alto	1
Claverack	1
Mt Charleston	1
Florida	1
Elnora	1
Lanett	1
Pinconning	1
Mcpherson	1
Citra	1
Omro	1

	city
Patterson	1
Oconto	1
Cuyahoga Heights	1
South Hero	1
Mooers	1
Labelle	1
Fall Branch	1
Mccrory	1
Platte	1
Green Lane	1
Bena	1
Sublimity	1
Wittenberg	1
Neches	1
Paulsboro	1
Wadesville	1
Alberton	1
Port Murray	1
Gregory	1
Peterborough	1
Nolensville	1
Oconto Falls	1
Elkhorn	1
Carl Junction	1
Hickory Corners	1
Tenafly	1
Hardyville	1
Edinboro	1
Stamping Ground	1
Minto	1
Rome City	1
Hoisington	1
Ayden	1
Sweet Springs	1
Aguila	1
Mascotte	1
Brewerton	1
Toone	1

	city
Terryville	1
Bell Gardens	1
Darrington	1
Pembina	1
Iota	1
Lovingston	1
San Perlita	1
Harviell	1
So. Charleston	1
Gleason	1
Patillas	1
Glen Carbon	1
Shoals	1
Birch River	1
Galion	1
West	1
Shepherd	1
Fleming	1
Indian Harbour Beach	1
Linthicum	1
Yadkinville	1
Kirksville	1
Hunters	1
Clinton	1
Dos Palos	1
South Coffeyville	1
Esparto	1
Budd Lake	1
Minersville	1
Raceland	1
Turbotville	1
Pierz	1
Leatherwood	1
Vernon Hills	1
Broadway	1
Clifton Springs	1
Crockett	1
New Carrollton	1

	city
Ponder	1
Imbler	1
Allison	1
Garden Valley	1
Lutcher	1
Plantersville	1
Galway	1
Karnes City	1
Poteet	1
Mentone	1
Spearville	1
Havelock	1
Midwest	1
Fitzwilliam	1
Fort Hood	1
Freeman	1
Wales	1
Tulalip	1
Piermont	1
Vermontville	1
Calvin	1
Errol	1
Brownsboro	1
Dilworth	1
Grover	1
Galena Park	1
Cimarron	1
Boyle	1
Johnsburg	1
Lathrop	1
Ogdensburg	1
Shoemakersville	1
Hueytown	1
Cosmos	1
Green River	1
Hagerhill	1
Port Barre	1
Decorah	1

	city
Lindsay	1
King William	1
Pittsville	1
Willow Springs	1
Etters	1
La Pryor	1
Highland City	1
Cache	1
Charmco	1
Double Springs	1
Drums	1
Shady Side	1
Parlier	1
Glenn Dale	1
Roxana	1
Elysian Fields	1
North Lake	1
Folcroft	1
Duson	1
Lexington Park	1
Kalkaska	1
South Glens Falls	1
Orion	1
Bayfield	1
Wyndmere	1
Okolona	1
Oldsmar	1
Woodstown	1
China	1
Mattapan	1
St. Rose	1
Hale Center	1
Puryear	1
Coffeeville	1
South San Gabriel	1
Youngsville	1
Elsie	1
Monaca	1

	city
Mansfield Center	1
Tulare	1
Mount Union	1
Bells	1
Chattahoochee	1
Flintville	1
Breese	1
Beryl	1
Bloomdale	1
Haverstraw	1
Calhan	1
Bendersville	1
Stroud	1
Lind	1
Maple Glen	1
Mukwonago	1
Lambert	1
Waukon	1
Swayzee	1
Bridgman	1
Idalou	1
Tehachapi	1
Jemison	1
Raton	1
Stover	1
Sloatsburg	1
Smithland	1
Garrett	1
Aroma Park	1
Candler	1
Lake Butler	1
Ridgefield Park	1
Hugoton	1
Clearmont	1
Sentinel	1
Adamstown	1
Reisterstown	1
Togo	1

	city
Cambridge City	1
Dayville	1
George	1
Ariton	1
Sandy Springs	1
Farwell	1
Drummonds	1
Saegertown	1
Roselawn	1
Cattaraugus	1
Ashburg	1
Buttonwillow	1
Tyndall	1
Dickerson	1
Knights Ferry	1
Kenilworth	1
Bird Island	1
St. George	1
Allegany	1
West Winfield	1
Gooding	1
Carterville	1
Naylor	1
Chase City	1
Menlo	1
Ham Lake	1
Chickasaw	1
Kalama	1
Supply	1
Coon Valley	1
South Royalton	1
Cocoa Beach	1
Tellico Plains	1
Runnemedede	1
Camas	1
Greenfield Center	1
Lance Creek	1
Union Grove	1

	city
Maynardville	1
Remington	1
Talbotton	1
Mousie	1
Deerfield	1
Bynum	1
Lake Ariel	1
Apalachin	1
Dudley	1
Feds creek	1
Bonita	1
Monona	1
West Hollywood	1
De Kalb Junction	1
Reynolds	1
Paia	1
Pioneer	1
Rolling Prairie	1
Richland Hills	1
Tenino	1
South Salt Lake	1
Camano Island	1
Roundup	1
Ovid	1
Center Line	1
Westampton	1
Sausalito	1
Clifton Heights	1
Broad Channel	1
Hodges	1
Hockessin	1
Farnhamville	1
Kill Devil Hills	1
Laurinburg	1
Weldon	1
Congerville	1
Cheraw	1
Penn Valley	1

	city
Port Angeles	1
Hartley	1
Lake Benton	1
Egegik	1
Chetopa	1
Ambridge	1
Mamers	1
Honaker	1
Cheltenham	1
Bolinas	1
Ola	1
Rutherford	1
Nokomis	1
Marvell	1
California	1
W Orange	1
Frewsburg	1
Berry Creek	1
Shell Lake	1
Machiasport	1
Shell Rock	1
Port Republic	1
Telford	1
Canterbury	1
Brookland	1
Lake George	1
Brantley	1
Dale	1
Plum	1
North Aurora	1
Manteno	1
Bay	1
Lanoka Harbor	1
Hayes	1
West Dundee	1
Union Mills	1
Homerville	1
Currituck	1

	city
Bosworth	1
Broaddus	1
Onida	1
Woodhull	1
Seeley	1
Joshua	1
Lino Lakes	1
Mc Leansboro	1
Wilmot	1
Bedminster	1
Winterset	1
Belfast	1
Munroe Falls	1
Anaconda	1
Prairie Du Sac	1
Port Graham	1
Baxter Springs	1
Standish	1
Cathlamet	1
Cedar Creek	1
Parkton	1
Dorset	1
Whitefield	1
Sour Lake	1
St. Petersburg Beach	1
Benson	1
East Brewton	1
Whitfield	1
La Canada	1
Pocono Pines	1
St Leon	1
Carolina Beach	1
Watkins	1
Burnside	1
Locust Hill	1
Spring Creek	1
Rileyville	1
Mount Kisco	1

	city
Wellburg	1
Cramerton	1
South Beloit	1
Baudette	1
Elon	1
Pasco	1
Orchard Lake	1
Oaks	1
Red Springs	1
Bruce	1
Topsfield	1
West Dennis	1
Taberg	1
Port Clinton	1
Kinsley	1
Nanjemoy	1
Pablo	1
Elida	1
Weatogue	1
Roberts	1
Bayville	1
Mullinville	1
Horsham	1
Heppner	1
Pavilion	1
Burr Oak	1
Hopatcong	1
Picture Rocks	1
Mecosta	1
Deckerville	1
Frazeysburg	1
Fellows	1
Spur	1
Reddick	1
Ennice	1
Milburn	1
Barranquitas	1
Duxbury	1

	city
Manderson	1
Planada	1
Wilder	1
Mehoopany	1
Scribner	1
Edna	1
Oak Brook	1
Wikieup	1
Mishicot	1
West Kingston	1
Ilion	1
Union Bridge	1
North Garden	1
Marked Tree	1
Culdesac	1
Griswold	1
Sterling Hts	1
Lindsborg	1
Bremen	1
Marseilles	1
Forty Fort	1
Warrior	1
Groveland	1
Catskill	1
Surrency	1
Basking Ridge	1
Freemansburg	1
Sublette	1
Arbor Vitae	1
Arthur	1
Berwyn Heights	1
Yarmouth	1
Culbertson	1
Lemoyne	1
Gibsland	1
Eatontown	1
Wernersville	1
Fort Yates	1

	city
Park Hills	1
Honesdale	1
Rocky Point	1
Medway	1
Ridgeville	1
Gages Lake	1
Archbald	1
Malinta	1
Mills River	1
Tate	1
Tonasket	1
Murrysburg	1
Boissevain	1
Franksville	1
Conklin	1
Blountsville	1
Strafford	1
Haskell	1
South Portland	1
Mccloud	1
Buena	1
Osseo	1
Bement	1
Fountain Green	1
East Harwich	1
Snook	1
Stark	1
Shannon	1
Cherry Hills Village	1
International Falls	1
Colona	1
Neillsville	1
Convoy	1
Knightstown	1
Purchase	1
Garden Plain	1
Sayreville	1
Gilchrist	1

	city
Chattaroy	1
Paso Robles	1
Quaker Hill	1
Little Silver	1
Ainsworth	1
Chapin	1
Westby	1
Allons	1
Bourne	1
Tornillo	1
Fort Ann	1
Hawkins	1
Sandy Ridge	1
Bangs	1
Brush	1
New Site	1
Shasta	1
Ansted	1
Lake Lure	1
Aquilla	1
Darrouzett	1
Parksley	1
St Francis	1
Patricksburg	1
Minonk	1
Lafayette Hill	1
Plumas Lake	1
Whiteriver	1
Tinton Falls	1
Wray	1
Del Norte	1
Griffith	1
Wellpinit	1
Stoneville	1
Panhandle	1
Genesee	1
Potwin	1
Rural Hall	1

	city
Alviso	1
New Durham	1
Fort Morgan	1
Town And Country	1
Kennebec	1
Lake Village	1
Geneseo	1
Fishers Island	1
Galesville	1
Falkville	1
Lake Hopatcong	1
Montgomery	1
Rawson	1
Sloan	1
Sawyer	1
Hodgkins	1
Russell	1
Scottsville	1
Coshocton	1
Hornersville	1
Mabelvale	1
Goose Lake	1
Old Saybrook	1
The Colony	1
Eyota	1
Arimo	1
Post Falls	1
Pleasant Lake	1
Hershey	1
Davidsville	1
Barrett	1
Fort Mohave	1
Kingsburg	1
Russiaville	1
Mineral	1
Mancelona	1
Thurmont	1
Allendale	1

	city
Avenel	1
Yampa	1
Lindon	1
Feasterville	1
Kingsford Heights	1
Mukilteo	1
Greeleyville	1
Marine	1
Cedar	1
Gothenburg	1
Kaunakakai	1
North Chelmsford	1
Worcetser	1
Richardton	1
Lick Creek	1
Stoneboro	1
Mescalero	1
Rosenhayn	1
North Mankato	1
Drumright	1
Yerington	1
Tunnelton	1
Okemos	1
Kemp	1
Bushnell	1
Bruceton Mills	1
Valley Cottage	1
Bigfork	1
Albertson	1
Grantsville	1
Lignite	1
Blackwell	1
York Springs	1
Sturgeon Bay	1
Gilsum	1
Woodlake	1
Powers	1
Avenal	1

	city
Lowville	1
Prentice	1
Pepperell	1
Rancho Mirage	1
Rib Lake	1
Mccool	1
Scott Township	1
Fort Towson	1
Chetek	1
Mt. Hermon	1
Spottsville	1
Rebersburg	1
Chardon	1
Chandlerville	1
Smith	1
Tallulah	1
Graceville	1
Thorntown	1
Washington Depot	1
Coats	1
Tiffin	1
Grants Pass	1
Wedgefield	1
Appalachia	1
Woodhaven	1
Pilgrim Knob	1
Clarkfield	1
Romeoville	1
Hotchkiss	1
Levant	1
Maiden	1
Crystal Springs	1
Monessen	1
Courtland	1
Faith	1
Ruleville	1
Island Lake	1
Tohatchi	1

	city
Tully	1
Aromas	1
Splendora	1
Renner	1
Herington	1
Juliaetta	1
Gruetli- Laager	1
Sandyville	1
Frametown	1
Rustburg	1
Woolwich Township	1
Sharon Hill	1
Hingham	1
Bishopville	1
Lempster	1
Merrill	1
Hemingway	1
Holland Patent	1
Pacomia	1
West Collingswood	1
North Fort Myers	1
Patchogue	1
Dauphin Island	1
Bonifay	1
Rehobeth	1
Mapaville	1
Shortsville	1
Simla	1
Chino Valley	1
Pennville	1
Keavy	1
Honokaa	1
Chilhowie	1
Orleans	1
East Millinocket	1
Medicine Lodge	1
South Easton	1
Merrimack	1

	city
Castella	1
Baden	1
Cape Charles	1
Westmoreland	1
Mont Vernon	1
Knob Noster	1
Kenwood	1
Tatitlek	1
Saint Anthony	1
Mccall	1
Garden City Park	1
Bevinsville	1
Crest Hill	1
Shandon	1
Aguada	1
Ubly	1
North Judson	1
Red Creek	1
Baldwinsville	1
New Buffalo	1
Owenton	1
Alpena	1
Corydon	1
Mc Arthur	1
Rineyville	1
Clarkson	1
Cottonwood Falls	1
Blackshear	1
Pipestone	1
Escalon	1
Grand Bay	1
Keenesburg	1
Jaffrey	1
Fanshawe	1
Nescopeck	1
Ft Worth	1
Hornell	1
White Deer	1

	city
Lecompton	1
Korbel	1
Sammamish	1
Shorter	1
Carlinville	1
Columbus Junction	1
Glasco	1
Biddeford	1
Stony Point	1
Plummer	1
Newaygo	1
La Farge	1
Moody	1
Taholah	1
Bladensburg	1
Mc Ewen	1
Catoosa	1
Chester Springs	1
Clemson	1
Axtell	1
St. Cloud	1
Pleasant Garden	1
Mattawan	1
North Middletown	1
Burney	1
Bly	1
Taylorville	1
Canonsburg	1
Pahokee	1
Saint Mary's	1
Mount Ephraim	1
Caro	1
Jellico	1
West Fork	1
Slaton	1
Valatie	1
North Windham	1
Gowanda	1

	city
Wescosville	1
Midfield	1
Unity	1
Port Neches	1
Gentry	1
North Branford	1
Bunkie	1
Era	1
Corsica	1
Maquoketa	1
Acushnet	1
Eclectic	1
Lihue	1
Carnesville	1
Middlefield	1
Kayenta	1
Page	1
Pinnacle	1
Millstone Township	1
Trappe	1
Fair Haven	1
Happy Camp	1
Penhook	1
Bahama	1
Keymar	1
Welsh	1
Colliers	1
Mobridge	1
Sewickley	1
Heath Springs	1
St Stephens Church	1
Blowing Rock	1
Blackwood	1
Severance	1
Glen Mills	1
Tea	1
Ellicottville	1
Bourbon	1

	city
Overbrook	1
Pima	1
Packwood	1
Bohemia	1
Mather	1
Exmore	1
North Fond Du Lac	1
Edina	1
St. David	1
Wallins	1
Markleysburg	1
Ellington	1
Waldport	1
Duncansville	1
Bulls Gap	1
Owensville	1
St. James	1
La Plata	1
Everman	1
Roy	1
Hixson	1
Pelion	1
Shreve	1
Hague	1
Menominee	1
Medford Lakes	1
South Otselic	1
South Amboy	1
Matoaca	1
Duquesne	1
Callaway	1
Suffield	1
Mount Desert	1
Monkton	1
Lena	1
East Lansdowne	1
Penelope	1
South Saint Paul	1

	city
Keshena	1
Blythe	1
Stokesdale	1
Crystal Falls	1
Wurtsboro	1
Troutman	1
Wellston	1
Nassau	1
Hermiston	1
Valley Home	1
Pittsboro	1
Cotter	1
Dry Fork	1
Eldred	1
Kimberly	1
Hoquiam	1
Telluride	1
Bowler	1
Bagley	1
Random Lake	1
Blue Point	1
Eureka Springs	1
Mossville	1
Ordway	1
Cross City	1
Ironwood	1
Poolesville	1
Willis	1
Zalma	1
Menomonie	1
Throop	1
Kitty Hawk	1
Caribou	1
Califon	1
Wolf Point	1
Home	1
Oak Grove	1
Granite Falls	1

	city
Howard Lake	1
Cottontown	1
Marstons Mills	1
Spangle	1
South Yarmouth	1
Hallandale Beach	1
Prestonsburg	1
Miami Shores	1
Colwyn	1
Cherryville	1
West Yarmouth	1
Montara	1
Sealy	1
Yorkshire	1
Senoia	1
Stoneham	1
Kodiak	1
Mexia	1
Gardendale	1
Bargersville	1
Wolverine	1
Diagonal	1
Earle	1
Clewiston	1
Snowflake	1
Deptford	1
Tobaccoville	1
Otsego	1
Latta	1
Fennimore	1
Foxworth	1
Norridge	1
Sewaren	1
Royalston	1
Somis	1
Perkinston	1
Delbarton	1
Oakwood	1

	city
Nottingham	1
Penryn	1
Webster City	1
Kansasville	1
Dupree	1
Coplay	1
Lillington	1
Cynthiana	1
Lost Springs	1
Brigantine	1
Lummi Island	1
Rock Port	1
Middleburg Hts	1
Romulus	1
Arvin	1
Hartford City	1
Alamosa	1
Edon	1
Coal Grove	1
Shickshinny	1
Lemay	1
Chilhowee	1
Iowa Falls	1
South Chesterfield	1
Eagle River	1
West Berlin	1
Damiansville	1
Riegelwood	1
Fortson	1
Loxley	1
Elkin	1
Trinity Center	1
Tecumseh	1
Yeadon	1
Whitney Point	1
Eupora	1
Newton Corner	1
Charlotte C H	1

	city
	Vernal 1
	Gibsonia 1
	Mifflinburg 1
	Munfordville 1
	Parkdale 1
	Branch 1
	Sopchoppy 1
	Louisa 1
	Owens Cross Roads 1
	Benavides 1
	Coarsegold 1
	Rose Creek 1
	Chilton 1
	Monmouth Beach 1
	Haleiwa 1
	Westmorland 1
	Sunset 1
	Egg Harbor Township 1
	Eagle Creek 1
	Peebles 1
	Harahan 1
	Yukon 1
	Molalla 1
	Ossineke 1
	Madrid 1
	St Anthony 1
	Eagle Butte 1
	West Milton 1
	Starks 1
	Ava 1
	Cloquet 1
	Hanoverton 1
	Otis 1
	Hutto 1
	West Brookfield 1
	Greenview 1
	Lower Lake 1
	La Crescent 1

	city
La Center	1
Fort Yukon	1
Fabius	1
Woodinville	1
Munford	1
Merrionette Park	1
Mooreland	1
Muenster	1
Edgeley	1
Connellsville	1
Chireno	1
East Moriches	1
Old Mill Creek	1
Colstrip	1
Ipswich	1
West Deptford	1
Sheffield Lake	1
Sebree	1
La Luz	1
Carney's Point	1
Ray	1
Isabela	1
Delavan	1
Allen Park	1
Litchfield Park	1
Weare	1
East Bernstadt	1
Salmon	1
EI Portal	1
Canal Winchester	1
Gulf Breeze	1
Pond Creek	1
Hastings On Hudson	1
Cayuga	1
Oley	1
New Madrid	1
Dimondale	1
Hanceville	1

	city
Bogart	1
Randleman	1
Bay Harbor Islands	1
Solon Springs	1
Little Chute	1
Hopedale	1
Sheldon	1
Green Brook	1
Valhalla	1
Twin Lake	1
Prairie Lea	1
Gloversville	1
Redwood Falls	1
Pinetops	1
Harrington	1
Hampden	1
Roseboro	1
Hughes	1
Montour Falls	1
Mccurtain	1
Wartburg	1
Pike Road	1
Wapakoneta	1
Back Bay	1
Hilton	1
Newcomb	1
Bowman	1
Berkeley Hts	1
North Pole	1
Guilderland	1
Royston	1
Deatsville	1
Burwell	1
Mocksville	1
Millbrook	1
Ramsay	1
Brownsdale	1
Markham	1

	city
Le Mars	1
Burgettstown	1
Steuben	1
Bay St Louis	1
Fair Oaks Ranch	1
Preston	1
Finksburg	1
Naches	1
Saint Paris	1
Gramercy	1
Manitowish Waters	1
Nebo	1
Mantachie	1
West Warren	1
Armuchee	1
Boone Grove	1
Rainsville	1
East Dublin	1
Barryton	1
Tekamah	1
North Haverhill	1
Aldie	1
Rolling Meadows	1
Soap Lake	1
Van Alstyne	1
Grand Haven	1
Stewartville	1
Espanola	1
Fleming Island	1
Yakutat	1
Sparland	1
Lopez Island	1
Tompkinsville	1
Amoret	1
Franklin Park	1
Bowersville	1
West Sand Lake	1
Delton	1

	city
Estell Manor	1
Robbinsdale	1
Cherryvale	1
Apison	1
Brownfield	1
Howards Grove	1
Mccool Junction	1
Eastanollee	1
Lohn	1
Wethersfield	1
Archer City	1
Burnham	1
Indian Land	1
Wausaukee	1
Loogootee	1
Eielson Afb	1
Carrolltown	1
Suisun City	1
Saugerties	1
Grundy	1
Brawley	1
New Summerfield	1
New Riegel	1
Prospect	1
Isanti	1
Lake Hughes	1
Mazomanie	1
Spanishburg	1
Paragould	1
East Canton	1
Brogue	1
Arapaho	1
Lennox	1
Hinckley	1
Elmsford	1
Southgate	1
Nancy	1
Belzoni	1

	city
Mill Spring	1
Hughson	1
Sag Harbor	1
Echo	1
East Lyme	1
Adel	1
Airway Heights	1
Bogata	1
Scipio	1
Jordan	1
Jameson	1
Hazel Crest	1
Gilbertsville	1
Nanty Glo	1
Middle Amana	1
Wheatland	1
Dell Rapids	1
Blooming Prairie	1
Cherry Valley	1
Greentown	1
Kirbyville	1
Rainbow City	1
Brooks	1
Purcellville	1
Greencastle	1
Okawville	1
Letts	1
Morgantown	1
Triangle	1
Lakefield	1
Churdan	1
Tuolumne	1
Evarts	1
Clarendon	1
Green Sea	1
New Bremen	1
Antigo	1
Bainville	1

	city
Nixon	1
Whitehouse	1
Dobbs Ferry	1
Lanesborough	1
Ball	1
Wrentham	1
Harwood	1
Pitman	1
Roanoke Rapids	1
Steger	1
Ossian	1
Kingstree	1
Wesson	1
Kipling	1
S. Hutchinson	1
Stewartstown	1
Friendship	1
Wantagh	1
Howe	1
Lampasas	1
Cana	1
Gas City	1
Fort Mitchell	1
Flatonia	1
Elk Point	1
Dunn	1
Wood River	1
Center Ridge	1
North Billerica	1
Reserve	1
Harpswell	1
Port Jefferson Station	1
Chambers	1
Fox River Grove	1
Duarte	1
Little Egg Harbor	1
Clairfield	1
Highlands	1

	city
Tubac	1
Winside	1
Wylie	1
Powhatan	1
Chesapeake City	1
Calverton	1
Oberon	1
Saint James	1
Mappsville	1
Hartshorne	1
Wilsonville	1
Lineville	1
Niland	1
Mahtomedi	1
Bixby	1
Carey	1
Moraga	1
Boling	1
Campobello	1
Keswick	1
Creede	1
Timberville	1
Woodvile	1
Pep	1
Wainwright	1
Weiner	1
Cedar Hills	1
Normalville	1
Copper Center	1
Oaklyn	1
Mount Wolf	1
San Augustine	1
Algonquin	1
Moose Pass	1
Boiling Springs	1
Neopit	1
Severn	1
Bellwood	1

	city
Cusick	1
Bonnieville	1
Garnet Valley	1
Lynn Haven	1
Hallsville	1
Church Point	1
Lonaconing	1
Jber	1
North Easton	1
Westville	1
Larsen Bay	1
Argillite	1
Mount Gilead	1
Orchard	1
Skowhegan	1
Skykomish	1
Saxonburg	1
Seagoville	1
Poulsbo	1
Leggett	1
Stoutland	1
Salt Rock	1
Montville	1
Jamison	1
Morganville	1
Levelland	1
Greenlawn	1
Nicholls	1
Blue	1
Stowe	1
Hillsdale	1
Jericho	1
North Zulch	1
Prosperity	1
Hartville	1
Dupont	1
Sleepy Hollow	1
Fort Thomas	1

	city
Peterstown	1
Silver Lake	1
Betsy Layne	1
White Heath	1
Three Bridges	1
Hilmar	1
Eloy	1
New Ellenton	1
Conestoga	1
Tuttle	1
Tumwater	1
Blairstown	1
North Webster	1
Lake Providence	1
Vilonia	1
Bertram	1
Papaikou	1
Alachua	1
Hulett	1
Lookeba	1
Stanberry	1
Kailua-kona	1
Boothwyn	1
Scarsdale	1
Wrenshall	1
Boonsboro	1
Reedsburg	1
Port Henry	1
Dry Prong	1
Middleport	1
Milbank	1
Ketchum	1
Sandoval	1
East St Louis	1
Bovina	1
Wrightstown	1
St. Bernard	1
Lake Arthur	1

	city
Ruffsdale	1
Highland Home	1
China Grove	1
Gervais	1
Hughes Springs	1
Lucama	1
Oologah	1
Center Valley	1
Bald Knob	1
Rison	1
Shenandoah	1
Hyrum	1
North Logan	1
Dodge Center	1
Wanette	1
Bay St. Louis	1
Walled Lake	1
Rice	1
Belle Rose	1
Rock Creek	1
Hoosick Falls	1
O Fallon	1
Neoga	1
Jones Mills	1
Frostproof	1
Dumont	1
Slaterville	1
Mexico	1
Thermal	1
Sandersville	1
East Bernard	1
Lumber Bridge	1
Vermillion	1
Fountain Inn	1
Tolland	1
Port Wing	1
Moro	1
Mt Pleasant	1

	city
Miamisburg	1
Colquitt	1
Benton City	1
Ronda	1
Radford	1
Edmore	1
Fairchild Afb	1
Somers	1
Marcola	1
East Prospect	1
South Hempstead	1
Park Hill	1
White Cloud	1
Battleboro	1
Coalinga	1
Slocumb	1
Chesaning	1
Tuckerman	1
Pinetown	1
Bland	1
Charm	1
Flatwoods	1
Altus	1
Corinna	1
New Hampton	1
Volga	1
Gibson	1
Magalia	1
Sauk City	1
Flemingsburg	1
Bullard	1
Henry	1
Frenchglen	1
Pinola	1
Bandera	1
Beulah	1
Post	1
Holliston	1

	city
Aztec	1
Douglaston	1
Brielle	1
Pelican Rapids	1
Ohatchee	1
University Heights	1
Crestwood	1
Pompton Lakes	1
Beckville	1
Shipshewana	1
Loudon	1
Copperopolis	1
Mc Connelsville	1
Plaquemine	1
Mountain Top	1
Prairie Du Chien	1
Island Heights	1
Linesville	1
Fogelsville	1
Bassett	1
Elk Park	1
Mt. Holly	1
Rayne	1
Babylon	1
House Springs	1
Silver Springs	1
Harlem	1
Hayesville	1
Tallmadge	1
Marcellus	1
Albert City	1
Stony River	1
Nocatee	1
Caruthers	1
Elk City	1
Hiddenite	1
Grasonville	1
Armagh	1

	city
Hauula	1
Prior Lake	1
Signal Hill	1
West Sunbury	1
Moffett	1
West Saint Paul	1
Gobles	1
Ely	1
Cranbury	1
Zeeland	1
Pella	1
Pompton Plains	1
Eatonville	1
Irwin	1
Mora	1
Pescadero	1
Ashley	1
Chehalis	1
Wewoka	1
Rock Srpings	1
South River	1
Larchmont	1
Lake Tomahawk	1
Matagorda	1
Bernie	1
Elkins Park	1
Havre De Grace	1
Tiltonsville	1
Mission Hills	1
Dell City	1
Chesnee	1
Cape May	1
Deepwater	1
Lingleville	1
Tampico	1
Higley	1
Hartly	1
North Saint Paul	1

	city
Vashon	1
Lake Panasoffkee	1
Calhoun City	1
Poquoson	1
New Carlisle	1
Marcus Hook	1
Sau tee Nacoochee	1
Mineral Springs	1
Harkers Island	1
Pawnee	1
Fort Atkinson	1
East Layton	1
Town Creek	1
Burns Flat	1
Imperial	1
Atlantic	1
Cropwell	1
Polk City	1
Sutton Mills	1
Zieglerville	1
Maben	1
Lucerne Valley	1
Orange Beach	1
High Bridge	1
Pine Bush	1
Croydon	1
Foxborough	1
Wrens	1
Union Beach	1
Buies Creek	1
Catasauqua	1
Audubon	1
Port Norris	1
Leonardo	1
White Haven	1
Monson	1
Hamlet	1
Wake Forest	1

	city
Pope	1
Boxford	1
Ravena	1
Shoreview	1
Canisteo	1
Saint Clairsville	1
Barbourville	1
Isleta	1
Brushton	1
La Palma	1
Glenn	1
Middleborough	1
Science Hill	1
Holly Pond	1
Sandy Hook	1
Carpinteria	1
Bethalto	1
North Baldwin	1
Chappaqua	1
Watford City	1
Haiku	1
Elmira Heights	1
Manistee	1
Raymondville	1
Lake Villa	1
Mauston	1
Pine	1
Tchula	1
Lindenwood	1
Osage	1
Continental	1
Fort Loramie	1
N Bergen	1
Tioga	1
Sudan	1
Maxwell	1
Traver	1
Cut Off	1

	city
Barlow	1
Milnor	1
Woodburn	1
Gilmanton	1
Oradell	1
Montgomery Village	1
Sallisaw	1
Kiowa	1
Friday Harbor	1
Burnet	1
Pitkin	1
Sunbright	1
Contoocook	1
Mtik Terrace	1
Coldwater	1
Laneville	1
Rosendale	1
River Forest	1
Bracketville	1
Hoxie	1
Rich Hill	1
Westlake	1
Ivydale	1
Kathleen	1
Waynesfield	1
Scottsbluff	1
Coalfield	1
Port Hadlock	1
Wolcott	1
Gage	1
George West	1
Sun Prairie	1
Farmer City	1
Foster	1
Robstown	1
Irondale	1
Yorktown Heights	1
West Linn	1

	city
Pinckneyville	1
Sodus	1
Glidden	1
Elloree	1
Coxs Creek	1
Goodwell	1
Whitesville	1
Adams	1
Walkertown	1
New Ipswich	1
Somonauk	1
Sutherlin	1
Newfolden	1
Yalesville	1
Spring Arbor	1
Mcmechen	1
Scotland Neck	1
Wayzata	1
Alvarado	1
El Segundo	1
East Montpelier	1
Sandwich	1
Pointe Aux Pins	1
Kermit	1
Tennyson	1
Kendallville	1
Calumet Park	1
Patagonia	1
Notus	1
Steward	1
Tarkio	1
Blackfoot	1
Lincoln City	1
Chowchilla	1
Eddystone	1
Mound City	1
Pine Grove Mills	1
Coopersburg	1

	city
Howey In The Hills	1
Dieterich	1
Tipp City	1
Monroe Township	1
Santaquin	1
Three Rivers	1
Pontotoc	1
Hanson	1
Cotati	1
Woolwich Twp	1
Cement	1
Ontonagon	1
Ft Meade	1
Hewlett	1
Scriven	1
Redkey	1
Oriska	1
Holly Ridge	1
Thunderbolt	1
N. Lakewood	1
Highland Hills	1
Plantsville	1
Pierceton	1
Sumterville	1
Brethren	1
Keysville	1
Shady Spring	1
Leopold	1
Roseland	1
Liberty Twp	1
Armonk	1
Royse City	1
Fellsmere	1
Hohenwald	1
Aitkin	1
Weehawken	1
Grand Marais	1
Grove	1

	city
Terrytown	1
Montgomery Center	1
Eudora	1
Pangburn	1
Pomeroy	1
New Ulm	1
Hopkinton	1
Paisley	1
Beresford	1
Readlyn	1
Rodeo	1
Calexico	1
Vestaburg	1
Columbus Grove	1
Stone Harbor	1
Shamong	1
New Tripoli	1
Curtis	1
Rueter	1
Hertford	1
Fish Creek	1
Stetsonville	1
Quicksburg	1
Morton	1
Shade Gap	1
East Stroudsburg	1
Vardaman	1
Counce	1
New Meadows	1
Ballinger	1
East Springfield	1
Yacolt	1
Sully	1
Elbridge	1
San Marino	1
Catlettsburg	1
Eads	1
New Ringgold	1

	city
South Dayton	1
Whiteland	1
McKeesport	1
Washington Boro	1
Weleetka	1
Deer Trail	1
Loretto	1
McClellanville	1
Roscoe	1
Staunton Va	1
La Conner	1
Henrico Virginia	1
Chadron	1
Rosalia	1
Chestnut Ridge	1
Eben Junction	1
Crosslake	1
Toulon	1
Boyne Falls	1
Tower City	1
McCleary	1
Kilmarnock	1
Egg Harbor City	1
Whippany	1
Powhatan Point	1
Bienville	1
Lidgerwood	1
Burr Ridge	1
Joppa	1
Beech Grove	1
Loleta	1
Littlestown	1
Kenton	1
Big Lake	1
Leon	1
Willow Wood	1
Newfoundland	1
Teague	1

	city
Conrad	1
Culpeper	1
Paola	1
Blue Lake	1
Batesburg-leesville	1
Hasbrouck Heights	1
Romoland	1
Childress	1
Pine Hills	1
Fallon	1
Perrine	1
Roberta	1
Tomah	1
Hermleigh	1
Byron Center	1
Nolanville	1
Coral Gables	1
Browning	1
Great Meadows	1
Bennettsville	1
Danforth	1
Wadley	1
N Massapequa	1
Ogilvie	1
Wellton	1
Grosse Pointe Park	1
Sabinal	1
Saint Peter	1
Medfield	1
Scarborough	1
Tavernier	1
Cole Camp	1
Cadott	1
Helix	1
Kalaheo	1
Hanna	1
Sallis	1
Granville	1

	city
Turin	1
Lucedale	1
Elk Rapids	1
De Kalb	1
Grayling	1
Klawock	1
Cliffside Park	1
Bergman	1
Panora	1
Montezuma Creek	1
Wolfe City	1
Luther	1
Swanton	1
Cotton Valley	1
Gering	1
Waimanalo	1
Brick Town	1
Central Point	1
Ila	1
Fort Branch	1
Navajo	1
Hazlet	1
Onaway	1
Lincolnwood	1
East Rutherford	1
Cedarburg	1
Fort Mill	1
Willow Grove	1
Skamania	1
Wanblee	1
Fern Park	1
Downs	1
Bon Secour	1
Skaneateles	1
Sharon Center	1
Viola	1
Berryville	1
Big Prairie	1

	city
East Walpole	1
Excelsior	1
Due West	1
Hart	1
Chrisney	1
Aptos	1
Los Banos	1
Hales Corners	1
Pottsville	1
Westborough	1
Tybee Island	1
Upsala	1
Jacksonville Beach	1
Oriskany	1
Rensselaer	1
Mulberry	1
Northumberland	1
Holmen	1
Miami Lakes	1
Wauchula	1
Dingmans Ferry	1
Timmonsville	1
Ijamsville	1
Rio Vista	1
Sierraville	1
Loon Lake	1
Crown Point	1
North Wilkesboro	1
Index	1
Maria Stein	1
Grain Valley	1
Mer Rouge	1
Del Mar	1
Forest Falls	1
Algood	1
Scotts	1
Great Barrington	1
Lenorah	1

	city
Orrum	1
Guntown	1
Greendale	1
Milliken	1
Mims	1
Copley	1
Killen	1
Zolfo Springs	1
Tonto Basin	1
Blue Ridge	1
Tallassee	1
Rockville Centre	1
Gloverville	1
West Frankfort	1
Floyds Knobs	1
Lacassine	1
Blue Grass	1
Buffalo Center	1
Spring Hope	1
Perdido	1
Muscle Shoals	1
Atchison	1
Appomattox	1
Lake Station	1
Norway	1
San Luis	1
Montross	1
Swampscott	1
Mosheim	1
East Troy	1
West Carrollton	1
Bedford Park	1
Great Mills	1
Gurley	1
Wilburton	1
Caryville	1
Mahanoy City	1
Shady Valley	1

	city
Southborough	1
Sylacauga	1
Laingsburg	1
Ceiba	1
Rutledge	1
Grayslake	1
Byers	1
New Tazewell	1
Sayville	1
Baileyton	1
Lula	1
Charlemont	1
Lost Hills	1
Manila	1
Camino	1
Galatia	1
Upper Saddle River	1
Mc Guffey	1
Hoskinston	1
Wall	1
Maineville	1
French Settlement	1
Boaz	1
Wynnewood	1
Churubusco	1
North St Paul	1
Gibbon	1
Cohasset	1
Arma	1
Lindrith	1
Coeur D Alene	1
Pennsboro Wv 26415	1
Big Stone Gap	1
Cromwell	1
Pennington Gap	1
St Cloud	1
Festus	1
Richton Park	1

```
city
Kemah      1
Kealakekua 1
North Salem 1
Montvale    1
Hico        1
Minneola    1
```

Since it is difficult to show all locations, without compromising readability, I have limited my selection to Top 10 cities

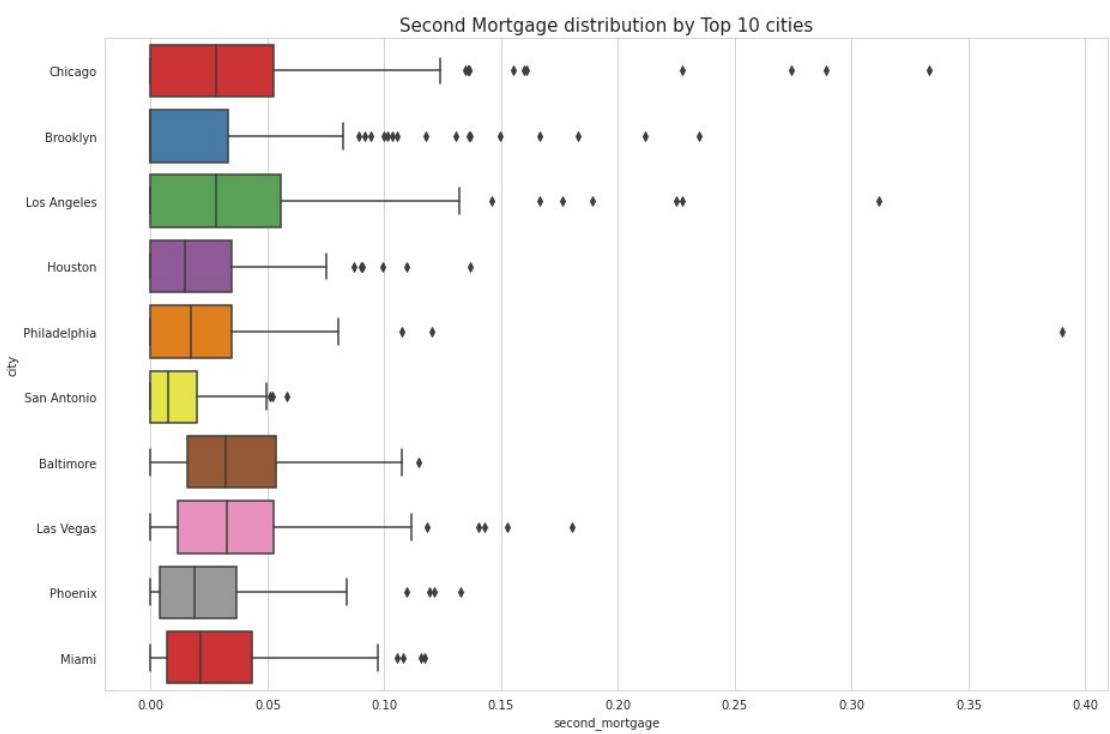
```
In [38]: train['city'].value_counts()[:10].index
```

```
Out[38]: Index(['Chicago', 'Brooklyn', 'Los Angeles', 'Houston', 'Philadelphia',
                 'San Antonio', 'Baltimore', 'Las Vegas', 'Phoenix', 'Miami'],
                dtype='object')
```

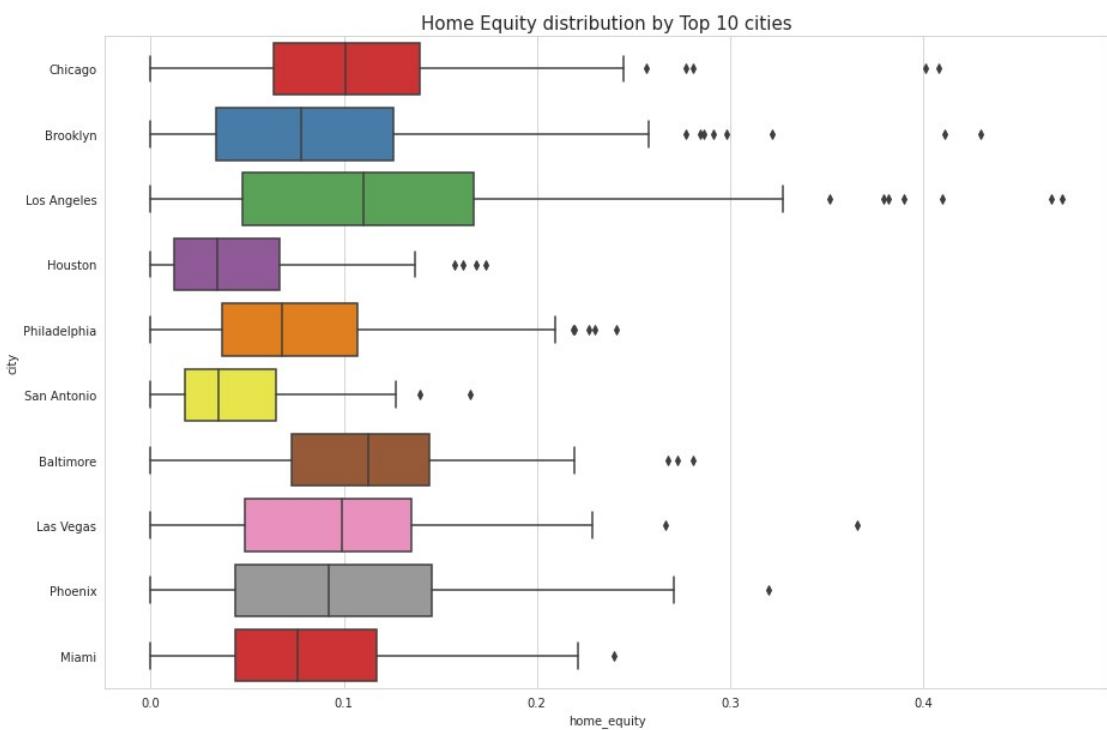
```
In [39]: Top10_cities=['Chicago', 'Brooklyn', 'Los Angeles', 'Houston', 'Philadelphia',
                     'San Antonio', 'Baltimore', 'Las Vegas', 'Phoenix', 'Miami']
```

```
In [40]: bplot = train[train['city'].isin(Top10_cities)]
```

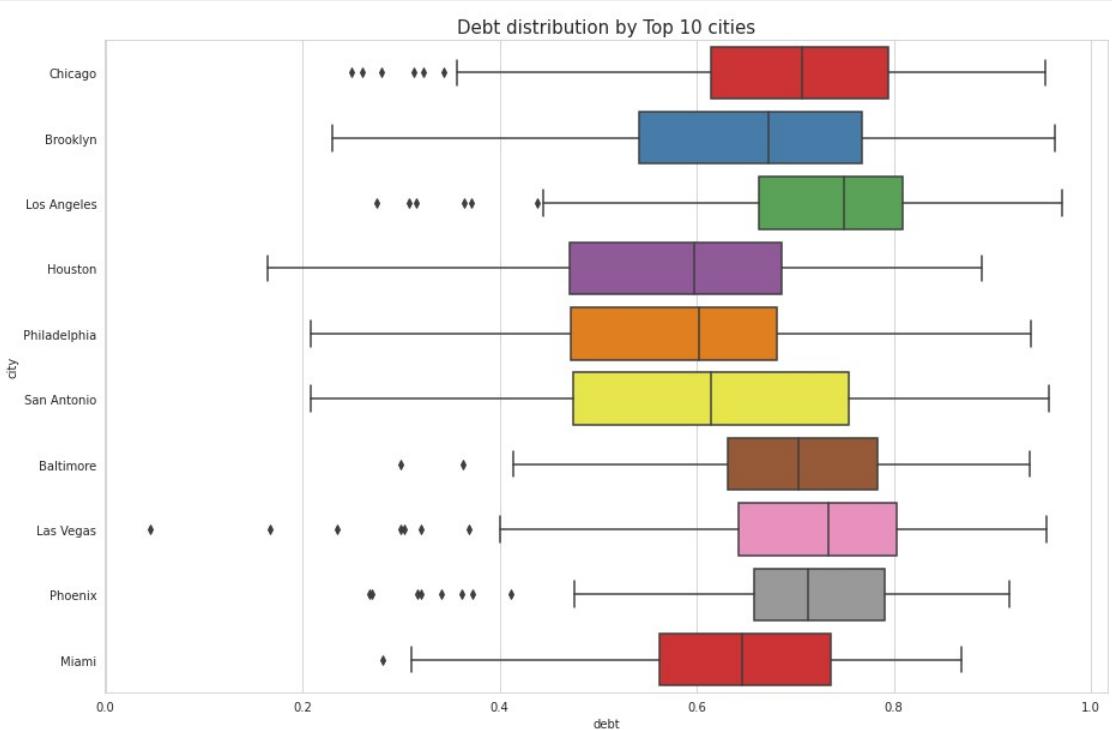
```
In [41]: sns.set_style("whitegrid")
plt.figure(figsize=(15,10))
sns.boxplot(data=bplot,x='second_mortgage', y='city',palette="Set1",order
=['Chicago', 'Brooklyn', 'Los Angeles', 'Houston', 'Philadelphia','San An
tonio',
         'Baltimore', 'Las Vegas', 'Phoenix', 'Miami']).set_
title('Second Mortgage distribution by Top 10 cities', fontsize = 15)
plt.show()
```



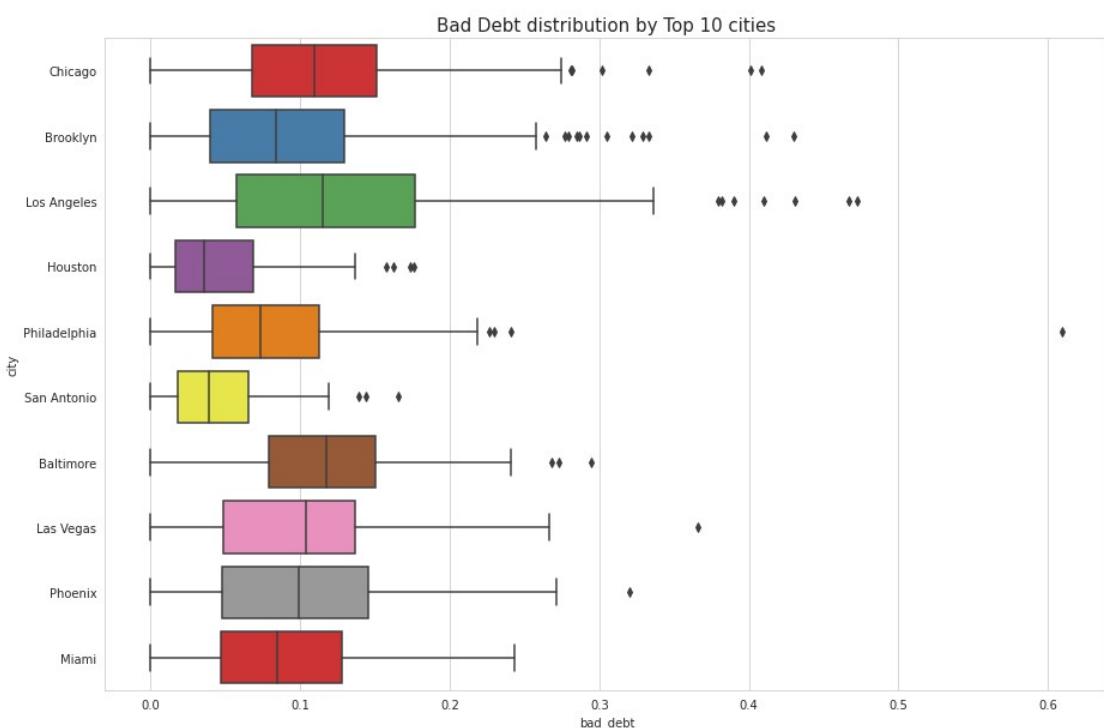
```
In [42]: sns.set_style("whitegrid")
plt.figure(figsize=(15,10))
sns.boxplot(data=bplot,x='home_equity', y='city',palette="Set1",order=[ 'Chicago', 'Brooklyn', 'Los Angeles', 'Houston', 'Philadelphia','San Antonio',
                     'Baltimore', 'Las Vegas', 'Phoenix', 'Miami']).set_
title('Home Equity distribution by Top 10 cities', fontsize = 15)
plt.show()
```



```
In [43]: sns.set_style("whitegrid")
plt.figure(figsize=(15,10))
sns.boxplot(data=bplot,x='debt', y='city', palette="Set1", order=['Chicago',
', 'Brooklyn', 'Los Angeles', 'Houston', 'Philadelphia','San Antonio',
'Baltimore', 'Las Vegas', 'Phoenix', 'Miami']).set_
title('Debt distribution by Top 10 cities', fontsize = 15)
plt.show()
```

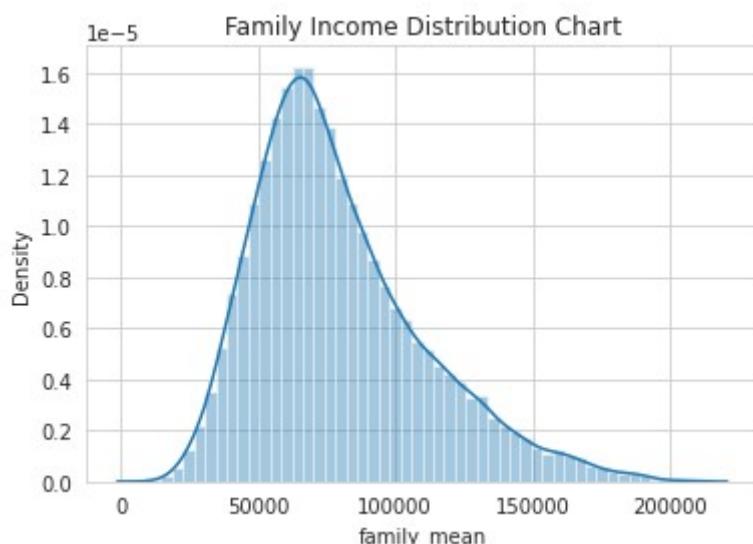


```
In [44]: sns.set_style("whitegrid")
plt.figure(figsize=(15,10))
sns.boxplot(data=bplot,x='bad_debt', y='city', palette="Set1",order=[ 'Chicago', 'Brooklyn', 'Los Angeles', 'Houston', 'Philadelphia','San Antonio', 'Baltimore', 'Las Vegas', 'Phoenix', 'Miami']).set_
title('Bad Debt distribution by Top 10 cities', fontsize = 15)
plt.show()
```

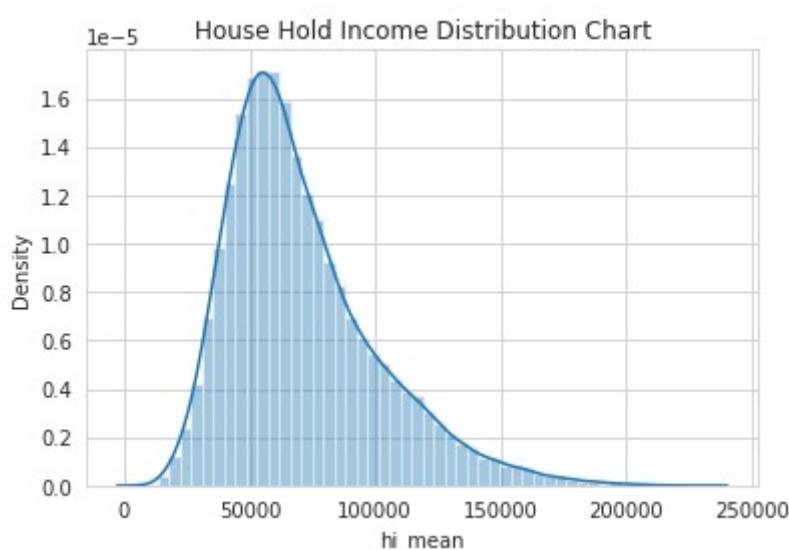


Create a collated income distribution chart for family income, house hold income, and remaining income

```
In [45]: sns.distplot(train['family_mean'])
plt.title("Family Income Distribution Chart")
plt.show()
```

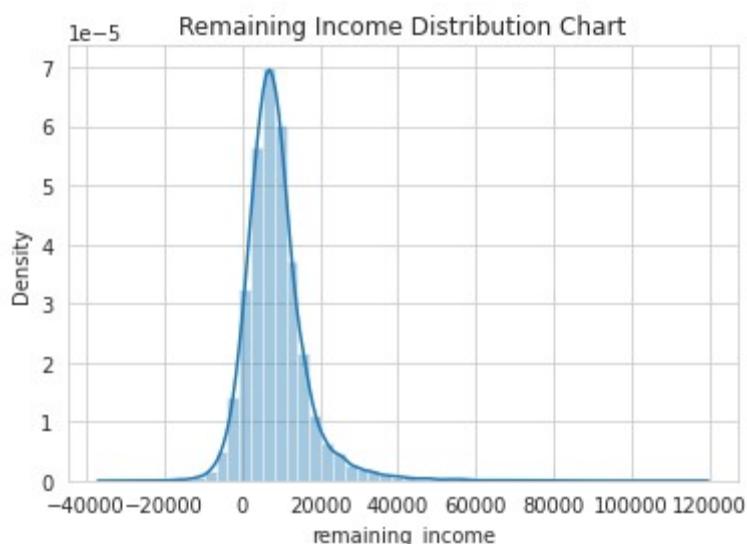


```
In [46]: sns.distplot(train['hi_mean'])
plt.title("House Hold Income Distribution Chart")
plt.show()
```

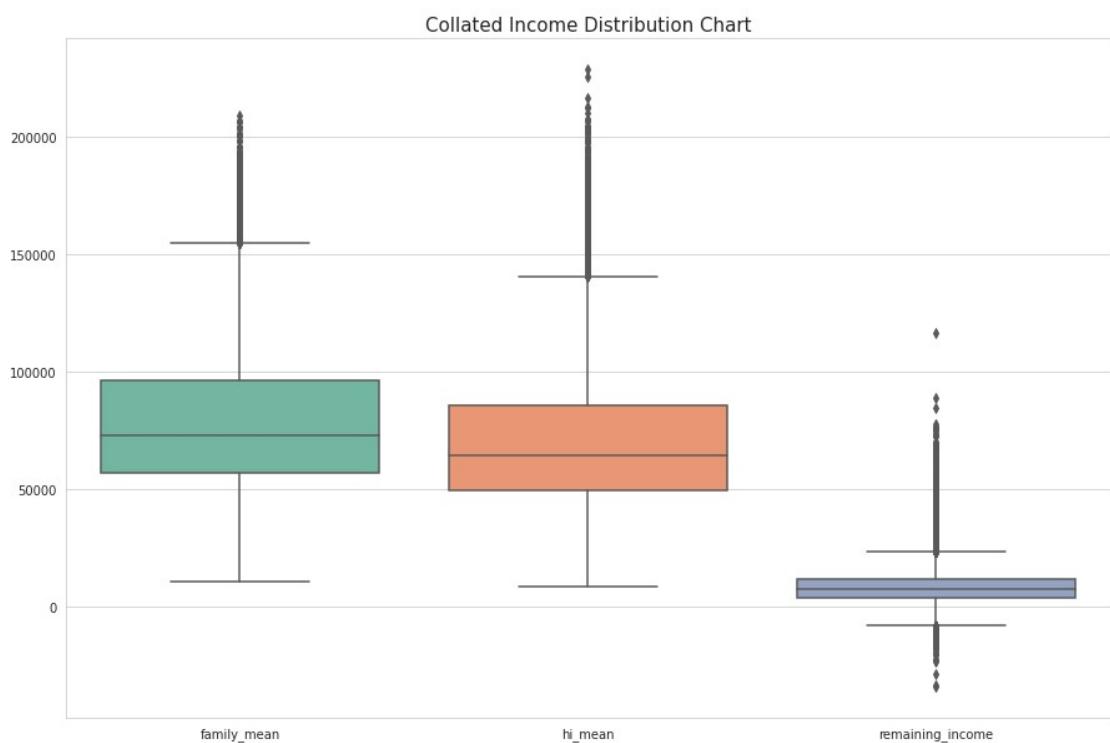


```
In [47]: train['remaining_income'] = train['family_mean']-train['hi_mean']
```

```
In [48]: sns.distplot(train['remaining_income'])
plt.title("Remaining Income Distribution Chart")
plt.show()
```



```
In [49]: sns.set_style("whitegrid")
plt.figure(figsize=(15,10))
sns.boxplot(data=train[['family_mean','hi_mean','remaining_income']],pale
tte="Set2").set_title('Collated Income Distribution Chart',fontsize=15)
plt.show()
```

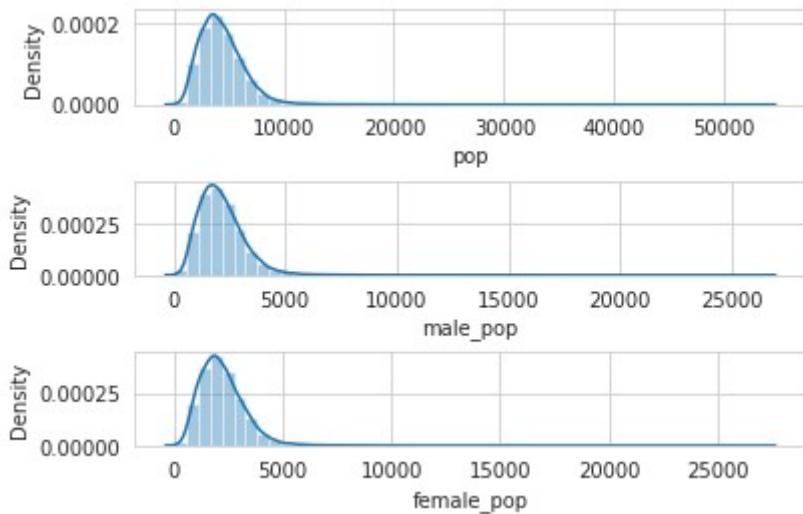


Project Task: Week 2

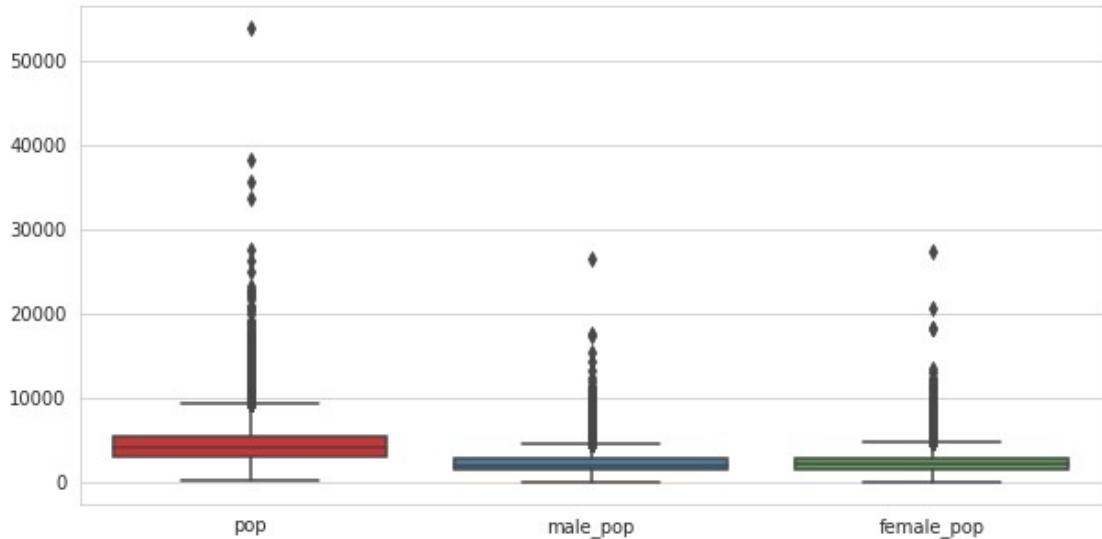
Exploratory Data Analysis (EDA):

Perform EDA and come out with insights into population density and age. You may have to derive new fields (make sure to weight averages for accurate measurements):

```
In [50]: fig,(ax1,ax2,ax3)= plt.subplots(3,1)
sns.distplot(train['pop'],ax=ax1)
sns.distplot(train['male_pop'],ax=ax2)
sns.distplot(train['female_pop'],ax=ax3)
plt.subplots_adjust(wspace=0.8,hspace=0.8)
plt.tight_layout()
plt.show()
```



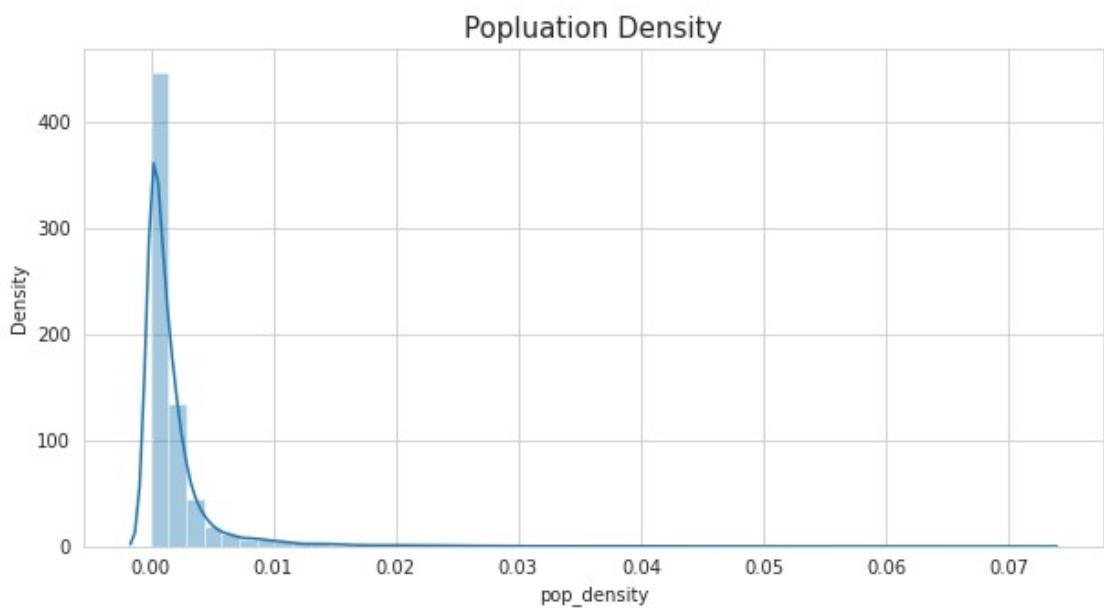
```
In [51]: plt.figure(figsize=(10,5))
sns.boxplot(data=train[['pop','male_pop','female_pop']],palette="Set1")
plt.show()
```



a) Use pop and ALand variables to create a new field called population density

```
In [52]: train['pop_density'] = train['pop']/train['ALand']
test['pop_density'] = test['pop']/train['ALand']
```

```
In [53]: plt.figure(figsize=(10,5))
sns.distplot(train['pop_density']).set_title("Popluation Density",font-size=15)
plt.show()
```



b) Use male_age_median, female_age_median, male_pop, and female_pop to create a new field called median age

c) Visualize the findings using appropriate chart type

```
In [54]: train['median_age'] = (train['male_age_median']*train['male_pop']+train['female_age_median']*train['female_pop'])/train['pop']
test['median_age'] = (test['male_age_median']*test['male_pop']+test['female_age_median']*test['female_pop'])/test['pop']
```

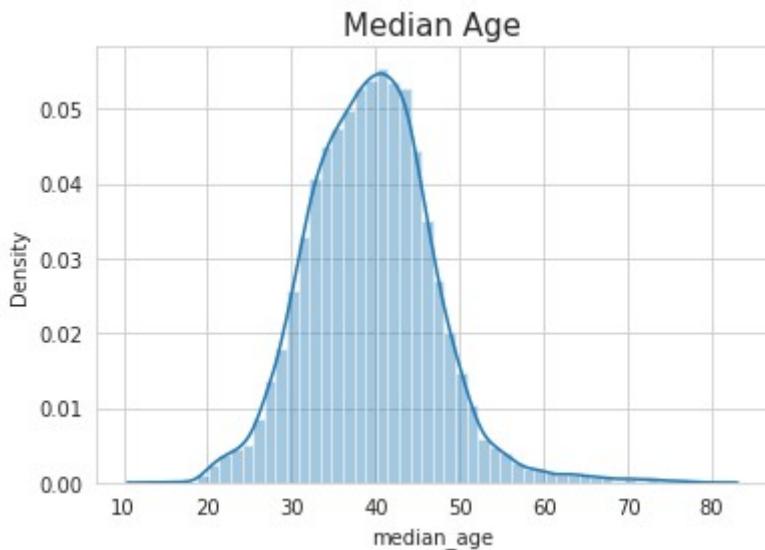
```
In [55]: train.head(5)
```

Out[55]:

UID	COUNTYID	STATEID	state	state_ab	city	place	type	primary	zip_
267822	53	36	New York	NY	Hamilton	Hamilton	City	tract	
246444	141	18	Indiana	IN	South Bend	Roseland	City	tract	
245683	63	18	Indiana	IN	Danville	Danville	City	tract	
279653	127	72	Puerto Rico	PR	San Juan	Guaynabo	Urban	tract	
247218	161	20	Kansas	KS	Manhattan	Manhattan City	City	tract	

5 rows × 82 columns

```
In [56]: sns.distplot(train['median_age']).set_title('Median Age', fontsize=15)  
plt.show()
```



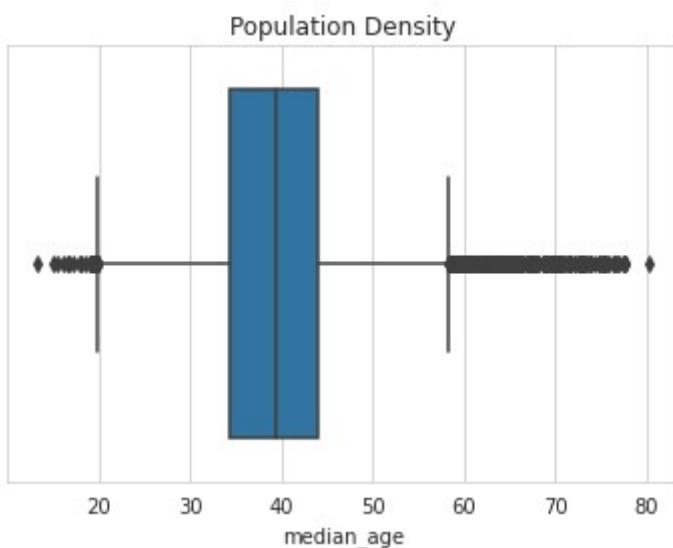
Age of population is mostly between 20 and 60

Majority are of age around 40

Median age distribution has a gaussian distribution

Some right skewness is noticed

```
In [57]: sns.boxplot(train['median_age']).set_title("Population Density")
plt.show()
```



Create bins for population into a new variable by selecting appropriate class interval so that the number of categories don't exceed 5 for the ease of analysis.

```
In [58]: train['pop'].value_counts()
```

Out[58]:

4028	14
4824	14
3842	14
3706	14
4409	14
3534	13
4387	13
4566	13
2872	13
4946	13
2451	13
2551	12
3370	12
3495	12
3570	12
4902	12
3813	12
3273	12
3947	12
4603	12
4048	12
3401	12
3963	12
4557	12
2555	12
3655	12
2749	12
3485	12
4514	12
4035	12
4452	11
4853	11
2977	11
2508	11
3288	11
3752	11
3163	11
4828	11
5245	11
3598	11
3558	11
5019	11
3417	11
4388	11
2961	11
4735	11
2493	11
3059	11
4223	11
2385	11
3369	11
4318	11
3644	11
3496	11
3463	11
2707	11
3356	11
6083	11
4019	11
3528	11

5154	11
3265	11
3438	11
3510	10
4289	10
2930	10
5114	10
4478	10
4067	10
3497	10
3024	10
4481	10
3901	10
3866	10
4125	10
4779	10
3468	10
3726	10
3257	10
3275	10
3702	10
3656	10
2395	10
3634	10
3527	10
4100	10
4111	10
3456	10
3120	10
4457	10
3046	10
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3306	10
3916	10
2412	10
4249	10
4091	10
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2784	10
5184	10
3965	10
3483	10

2822	10
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3516	10
4480	10
3800	10
3118	10
3975	10
3521	10
4044	10
3259	10
3125	10
2975	10
2919	10
3612	10
4517	10
3603	10
2981	10
3079	10
3038	10
3785	10
3617	10
3011	10
5097	10
3562	10
3385	10
5392	10
2797	10
4234	9
3748	9
2913	9
5810	9
4202	9
3362	9
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2762	9
3847	9
2401	9
4164	9
3150	9
3772	9
3809	9
3625	9
2278	9
3616	9
2437	9
2952	9
3955	9
2894	9
4072	9
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2377	9
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4612	9
3069	9
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4660	9
3378	9

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4078	9
5318	9
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3679	9
3710	9
2962	9
4304	9
3938	9
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3014	9
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4491	9
4008	9
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4880	9
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2699	9
3805	9
2985	9
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3270	9
4007	9
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4186	9
4474	9
3283	9
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3708	9
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4614	9
5521	9
3140	9
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2145	9
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3166	9
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In [59]: train['male_age_median'].unique()
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75. , 67. , 62.66667, 54.91667, 18.08333, 61.16667,
72.66667, 62.41667, 18.16667, 77.75 , 60.91667, 19.16667,
68.91667, 19.08333, 65.75 , 77.25 , 75.16667, 74.83333,
18.66667, 56.5 , 58.91667, 69.25 , 17.41667, 13.5 ,
67.66667, 68.41667, 57.16667, 58.33333, 58.41667, 72.58333,
78.25 , 67.5 , 19. , 14.75 , 61.08333, 55.5 ,
71.08333, 64.91667, 58.58333, 70. , 68.33333, 16.75 ,
61. , 14.91667, 72.91667, 17.33333, 69.91667, 59.75 ,
69.58333, 69.16667, 66.16667, 63. , 13.16667, 67.33333,
71. , 65.08333, 63.75 , 69.33333, 68. , 75.66667,
77.66667, 65.91667, 74.5 , 60.83333, 73.33333, 60. ,
63.41667, 73.25 , 64.25 , 75.5 , 76.91667, 71.75 ,
70.75 , 73.58333, 16. , 9.75 , 74. , 63.66667,
16.33333, 68.16667, 65.25 , 18.25 , 71.66667, 61.58333,
17.5 , 17.25])

The IntelliSense Age Group defaults are:

Kid(0 to 9)

Youth (10 to 17)

Young Adult (18 to 35)

Adult (36 to 55)

Senior (56 and up)

```
In [60]: bins = [0,12,18,35,55,100]
          labels = ['Kids', 'Youth', 'Young Adult', 'Adult', 'Senior']
```

```
In [61]: train['state'].unique()
```

```
Out[61]: array(['New York', 'Indiana', 'Puerto Rico', 'Kansas', 'Alabama', 'Texas',
   ,
   'South Carolina', 'California', 'Arkansas', 'Maryland', 'Illinois',
   ,
   'Iowa', 'Tennessee', 'Nevada', 'Louisiana', 'Colorado',
   'Rhode Island', 'Mississippi', 'New Jersey', 'Oregon', 'Arizona',
   'Florida', 'Wisconsin', 'Pennsylvania', 'North Carolina',
   'Virginia', 'Michigan', 'Ohio', 'Oklahoma', 'Georgia', 'Idaho',
   'South Dakota', 'Minnesota', 'Missouri', 'Washington', 'Wyoming',
   'Connecticut', 'West Virginia', 'Kentucky', 'Massachusetts',
   'District of Columbia', 'Hawaii', 'Montana', 'Alaska',
   'New Hampshire', 'Utah', 'Vermont', 'Nebraska', 'North Dakota',
   'New Mexico', 'Maine', 'Delaware'], dtype=object)
```

```
In [62]: train['state'].nunique()
```

```
Out[62]: 52
```

```
In [63]: pd.set_option('display.max_columns',None)
```

a) Analyze the married, separated, and divorced population for these population brackets

```
In [64]: train['male_population'] = pd.cut(train['male_age_median'],bins,labels=labels)
          train['female_population'] = pd.cut(train['female_age_median'],bins,labels=labels)
          test['male_population'] = pd.cut(test['male_age_median'],bins,labels=labels)
          test['female_population'] = pd.cut(test['female_age_median'],bins,labels=labels)
```

In [65]: `train.head()`

Out[65]:

UID	COUNTYID	STATEID	state	state_ab	city	place	type	primary	zip_
267822	53	36	New York	NY	Hamilton	Hamilton	City	tract	
246444	141	18	Indiana	IN	South Bend	Roseland	City	tract	
245683	63	18	Indiana	IN	Danville	Danville	City	tract	
279653	127	72	Puerto Rico	PR	San Juan	Guaynabo	Urban	tract	
247218	161	20	Kansas	KS	Manhattan	Manhattan City	City	tract	

b) Visualize using appropriate chart type

To ease the visualization we are splitting states into 4 parts which means there are 52 unique states and we are dividing 52 states by 4. So, one part of the splitting will contain 13 states.

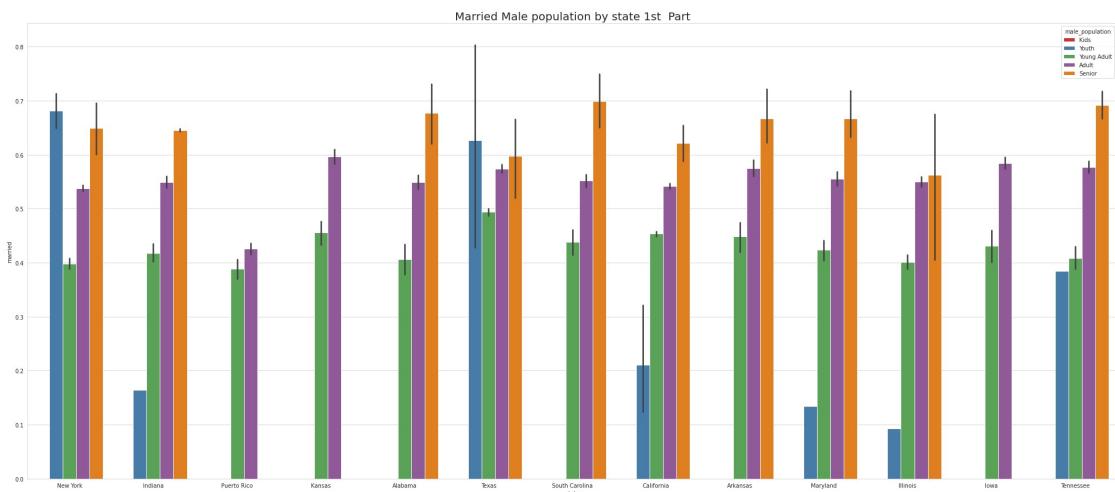
In [66]:

```

sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='married',hue='male_population',data=train,palette="Set1",order=['New York', 'Indiana', 'Puerto Rico', 'Kansas', 'Alabama', 'Texas', 'South Carolina', 'California', 'Arkansas', 'Maryland', 'Illinois', 'Iowa', 'Tennessee'],).set_title('Married Male population by state 1st Part', fontsize = 20)

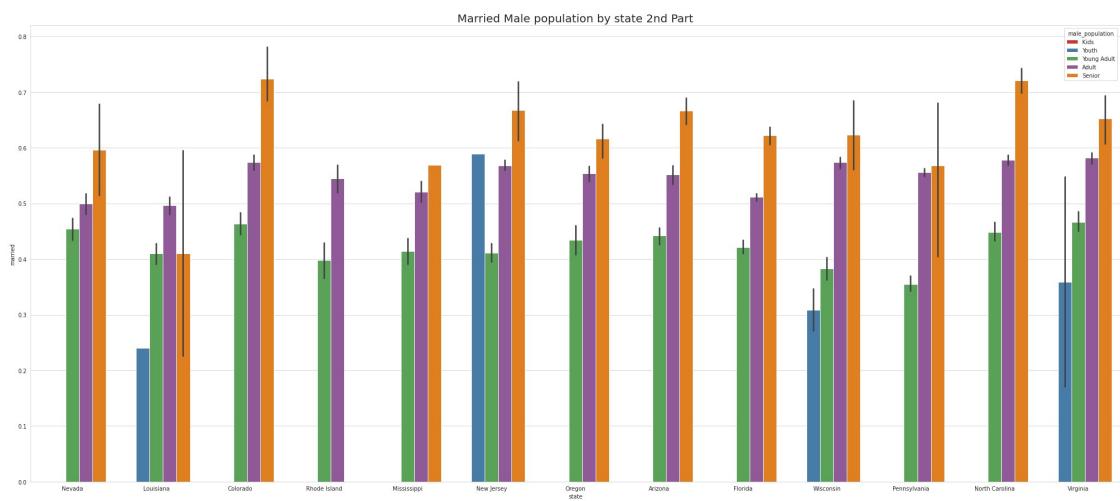
plt.show()

```



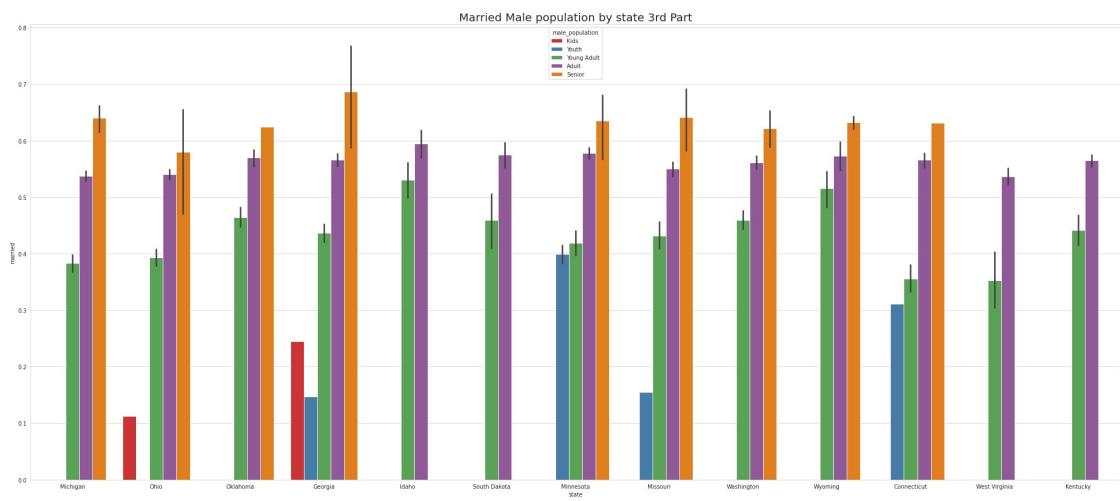
```
In [67]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='married',hue='male_population',data=train,palette="Set1",order=['Nevada', 'Louisiana', 'Colorado','Rhode Island', 'Mississippi', 'New Jersey',
'Oregon', 'Arizona','Florida', 'Wisconsin', 'Pennsylvania', 'North Carolina','Virginia']).set_title('Married Male population by state 2nd Part', fontsize = 20)

plt.show()
```



```
In [68]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='married',hue='male_population',data=train,palette="Set1",order=['Michigan', 'Ohio', 'Oklahoma', 'Georgia', 'Idaho', 'South Dakota', 'Minnesota', 'Missouri', 'Washington', 'Wyoming', 'Connecticut', 'West Virginia', 'Kentucky']).set_title('Married Male population by state 3rd Part', fontsize = 20)

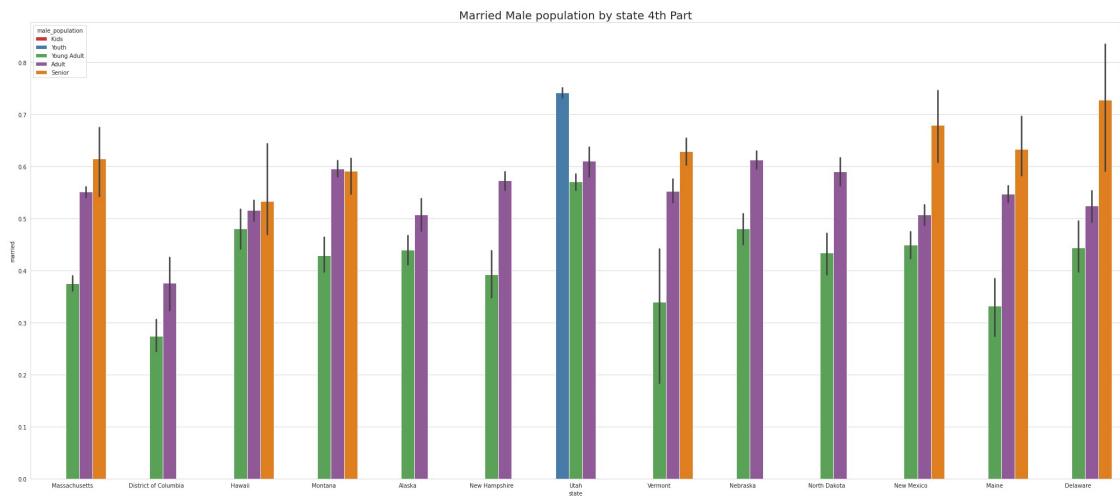
plt.show()
```



Ohio & Georgia have Married Male KIDS

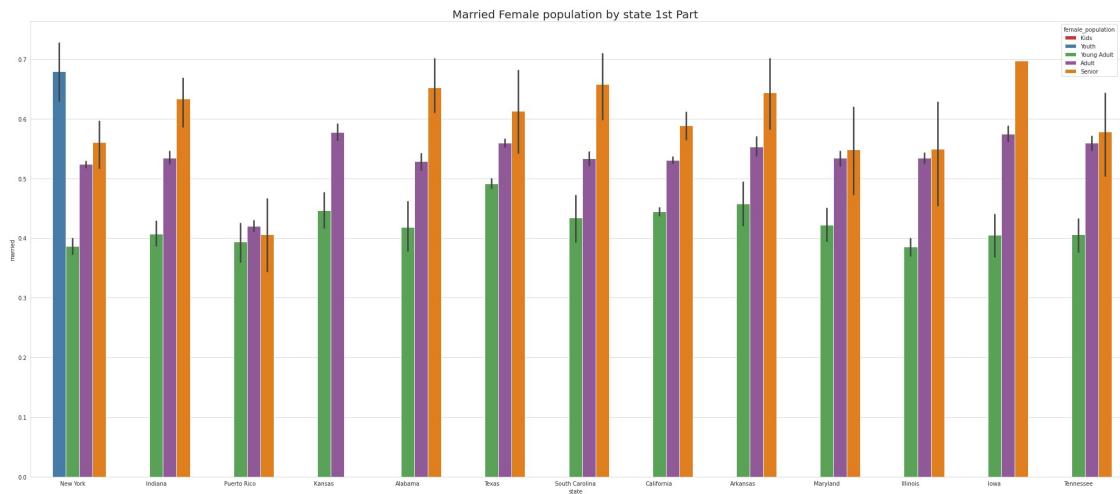
```
In [69]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='married',hue='male_population',data=train,palette="Set1",order=['Massachusetts', 'District of Columbia', 'Hawaii', 'Montana', 'Alaska',
       'New Hampshire', 'Utah', 'Vermont', 'Nebraska', 'North Dakota',
       'New Mexico', 'Maine', 'Delaware']).set_title('Married Male population by state 4th Part', fontsize = 20)

plt.show()
```



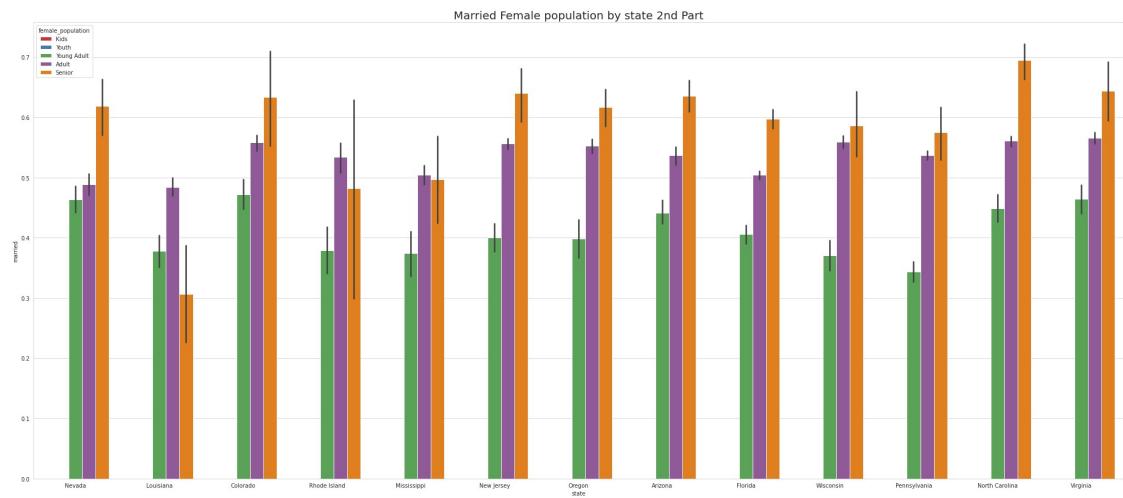
```
In [70]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='married',hue='female_population',data=train,palette="Set1",order=['New York', 'Indiana', 'Puerto Rico', 'Kansas', 'Alabama',
       'Texas', 'South Carolina',
       'California', 'Arkansas', 'Maryland', 'Illinois', 'Iowa', 'Tennessee'],
       ).set_title('Married Female population by state 1st Part', fontsize = 20)

plt.show()
```



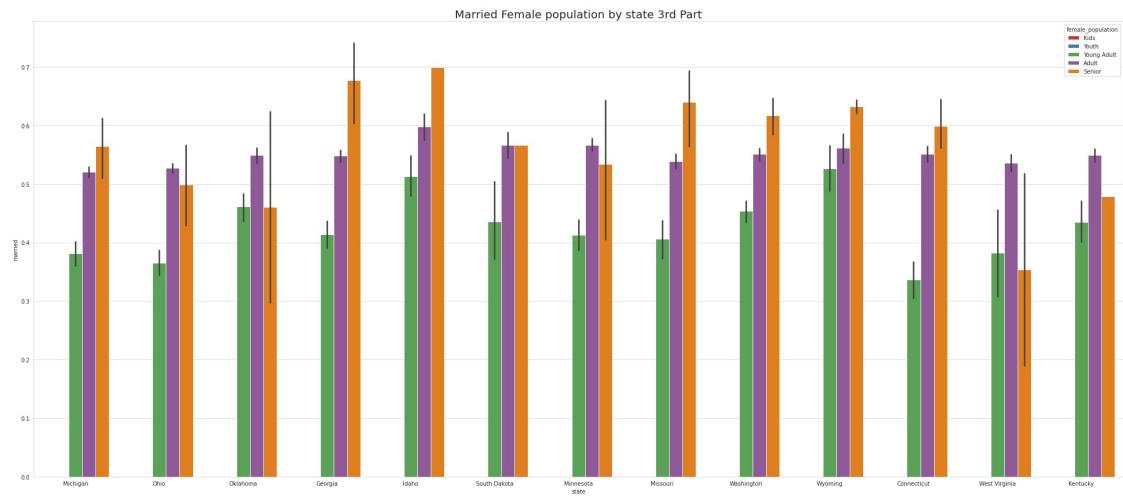
```
In [71]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='married',hue='female_population',data=train,pal
ette="Set1",order=['Nevada', 'Louisiana', 'Colorado', 'Rhode Island', 'Mississippi', 'New Jersey',
'Oregon', 'Arizona', 'Florida', 'Wisconsin', 'Pennsylvania', 'North Carolina', 'Virginia']).set_title('Married Female population by state 2nd Part', fontsize = 20)

plt.show()
```



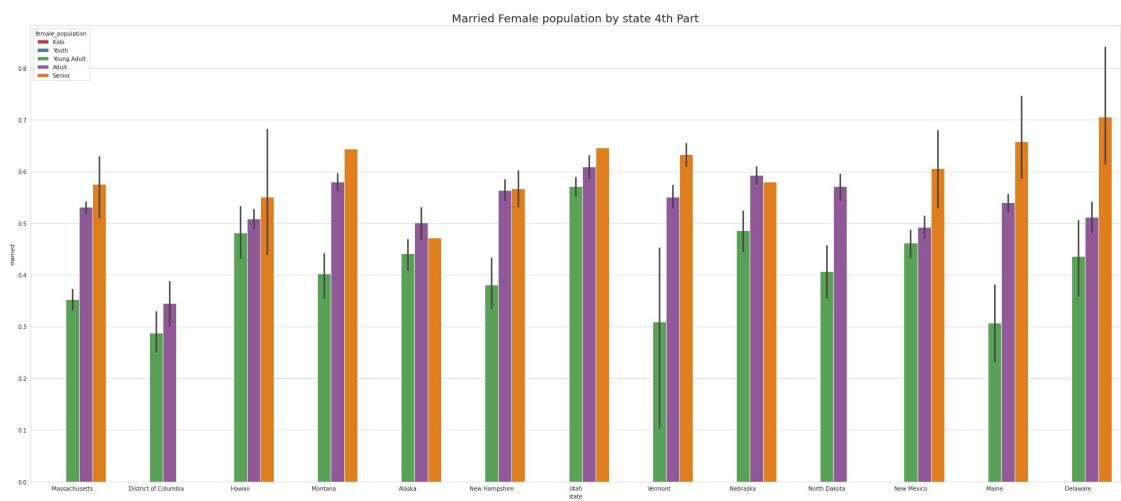
```
In [72]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='married',hue='female_population',data=train,pal
ette="Set1",order=['Michigan', 'Ohio', 'Oklahoma', 'Georgia', 'Idaho', 'So
uth Dakota', 'Minnesota', 'Missouri', 'Washington', 'Wyoming', 'Connectic
ut', 'West Virginia', 'Kentucky']).set_title('Married Female population by state 3rd Par
t', fontsize = 20)

plt.show()
```



```
In [73]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='married',hue='female_population',data=train,pal
ette="Set1",order=['Massachusetts', 'District of Columbia', 'Hawaii', 'Montana', 'Alaska',
'New Hampshire', 'Utah', 'Vermont', 'Nebraska', 'North Dakota', 'New Mexico', 'Maine', 'Delaware']).set_title('Married Female population by state 4th Part', fontsize = 20)

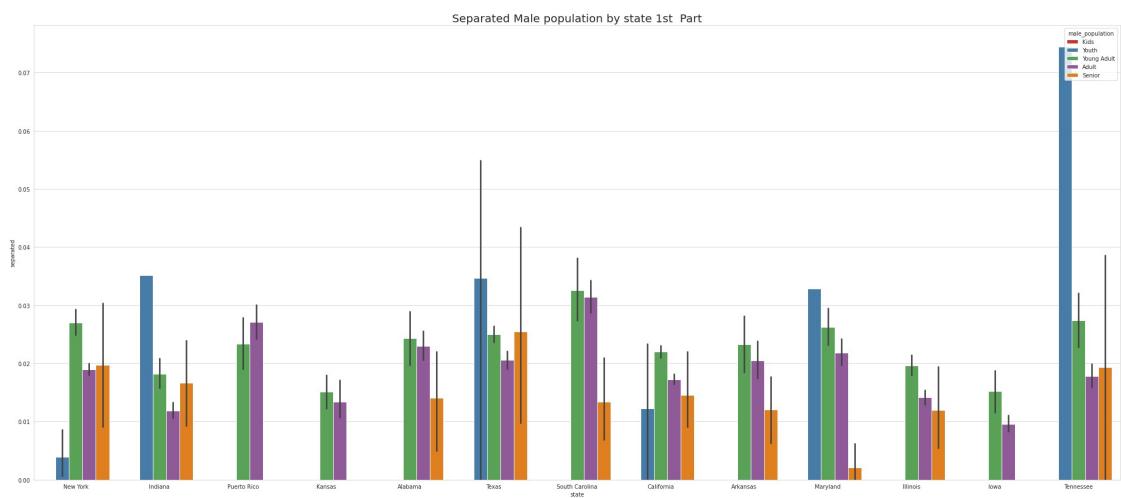
plt.show()
```



Except NewYork no other states has youth

```
In [74]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='separated',hue='male_population',data=train,pal
ette="Set1",order=['New York', 'Indiana', 'Puerto Rico', 'Kansas', 'Alabama', 'Texas', 'South Carolina',
'California', 'Arkansas', 'Maryland', 'Illinois', 'Iowa', 'Tennessee'],].set_title('Separated Male population by state 1st Part', fontsize = 20)

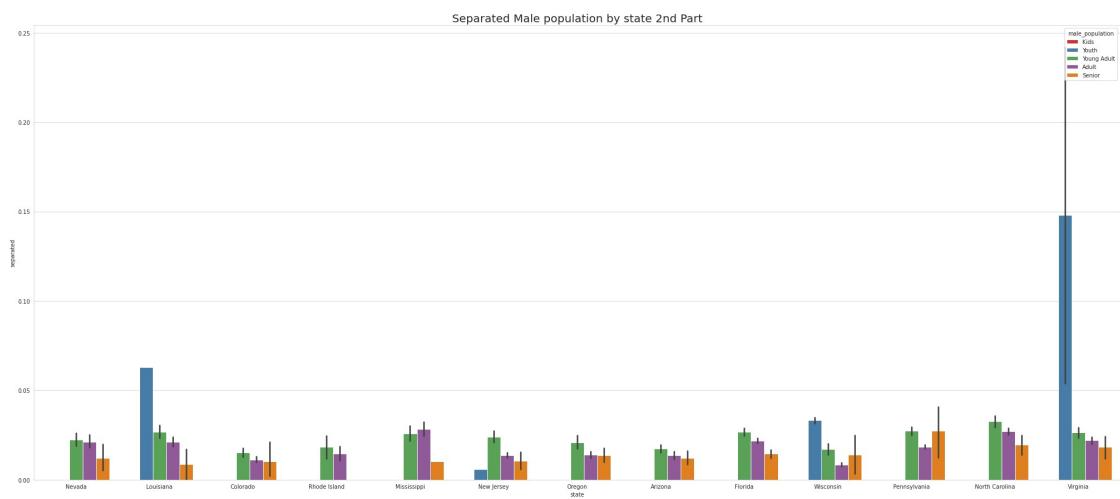
plt.show()
```



Tennessee has Highest youth separated in 1st part

```
In [75]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='separated',hue='male_population',data=train,pal
ette="Set1",order=['Nevada', 'Louisiana', 'Colorado', 'Rhode Island', 'Mississippi', 'New Jersey',
'Oregon', 'Arizona', 'Florida', 'Wisconsin', 'Pennsylvania', 'North Carolina', 'Virginia']).set_title('Separated Male population by state 2nd Part', fontsize = 20)

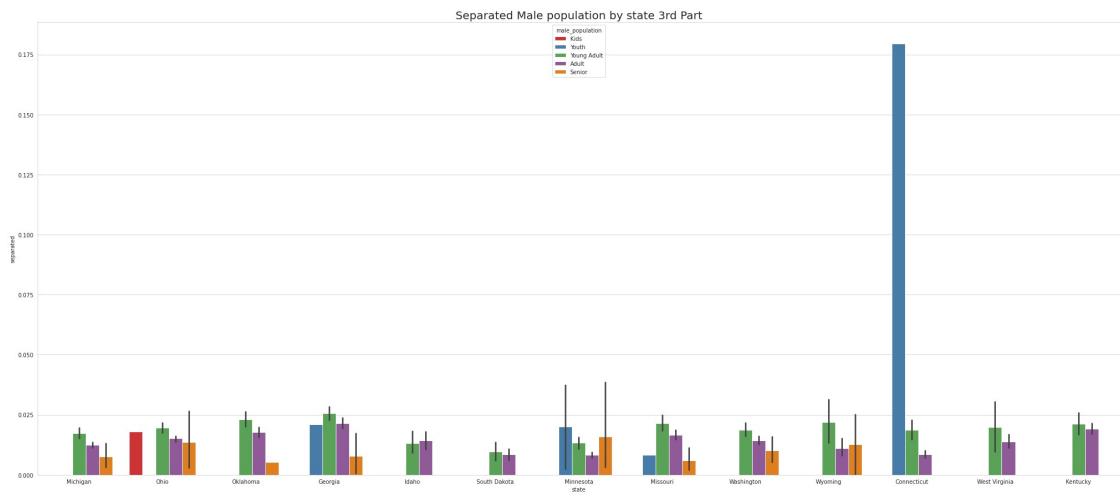
plt.show()
```



Virginia Has highest youth seperated in 2nd part

```
In [76]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='separated',hue='male_population',data=train,pal
ette="Set1",order=['Michigan', 'Ohio', 'Oklahoma', 'Georgia', 'Idaho', 'So
uth Dakota', 'Minnesota', 'Missouri', 'Washington', 'Wyoming', 'Connectic
ut', 'West Virginia', 'Kentucky']).set_title('Separated Male population by state 3rd Part', fontsize = 20)

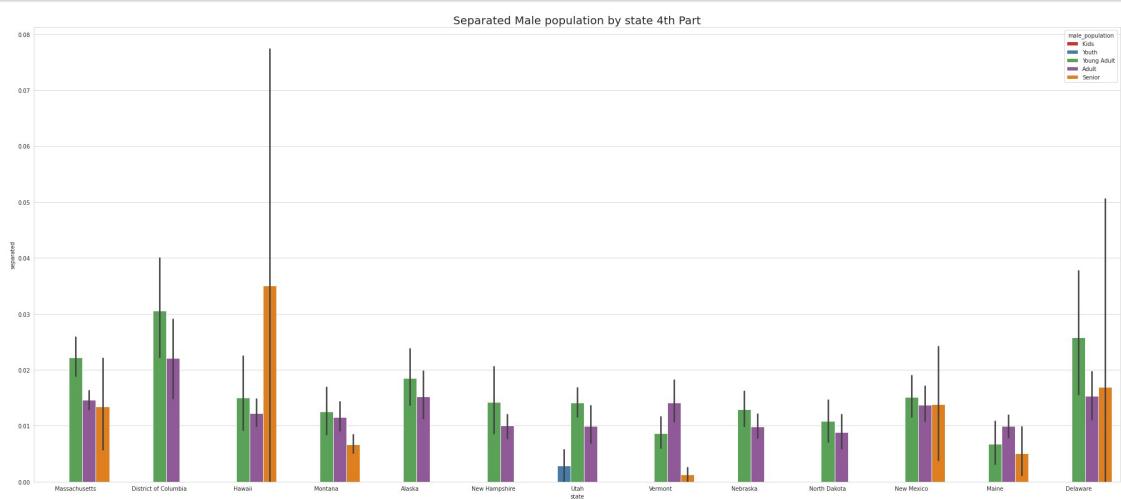
plt.show()
```



Connecticut has highest youth seperated in 3rd Part

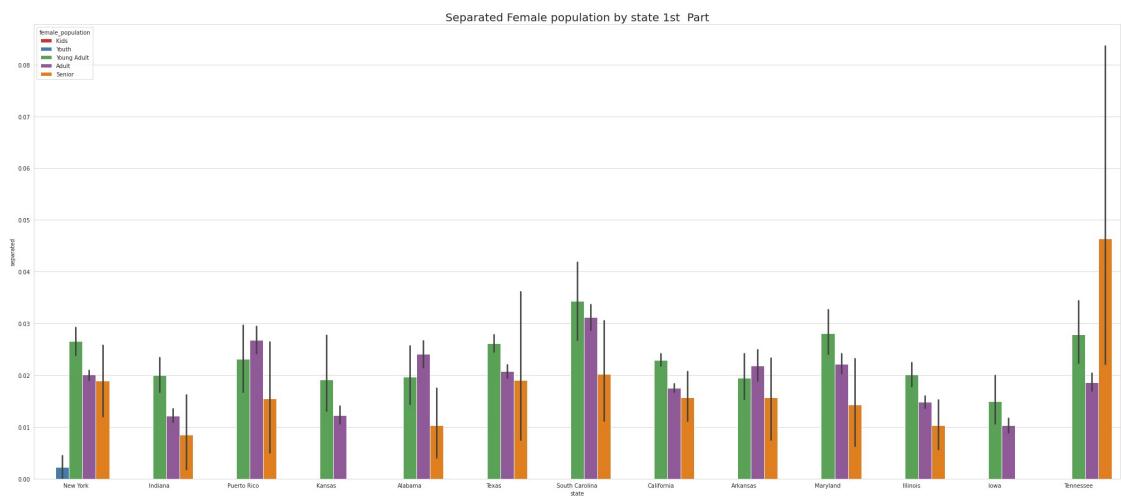
```
In [77]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='separated',hue='male_population',data=train,pal
ette="Set1",order=['Massachusetts', 'District of Columbia', 'Hawaii', 'Mon
tana', 'Alaska',
    'New Hampshire', 'Utah', 'Vermont', 'Nebraska', 'North Dakota
', 'New Mexico', 'Maine', 'Delaware']).set_title('Separated Male populati
on by state 4th Part', fontsize = 20)

plt.show()
```



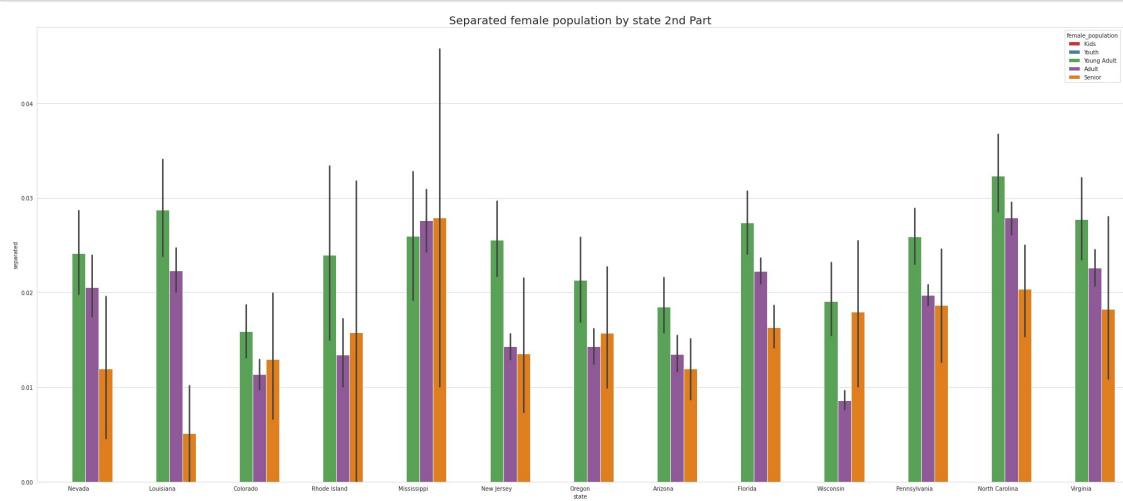
```
In [78]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='separated',hue='female_population',data=train,pa
lette="Set1",order=['New York', 'Indiana', 'Puerto Rico', 'Kansas', 'Alab
ama', 'Texas', 'South Carolina',
    'California', 'Arkansas', 'Maryland', 'Illinois', 'Iowa', 'Tennesse
e',]).set_title('Separated Female population by state 1st Part', fontsz
e = 20)

plt.show()
```



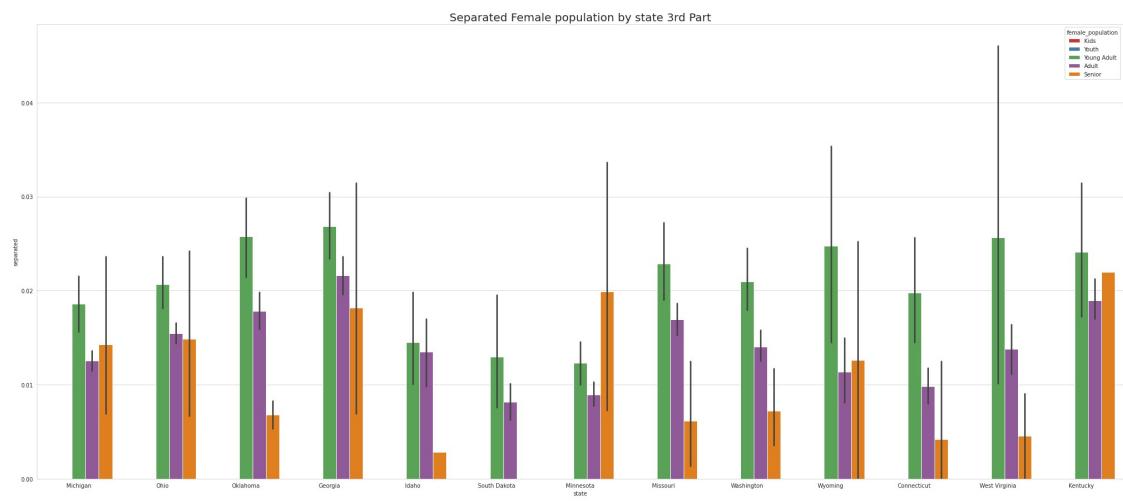
```
In [79]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='separated',hue='female_population',data=train,pallete="Set1",order=['Nevada', 'Louisiana', 'Colorado', 'Rhode Island', 'Mississippi', 'New Jersey',
'Oregon', 'Arizona', 'Florida', 'Wisconsin', 'Pennsylvania', 'North Carolina','Virginia']).set_title('Separated female population by state 2nd Part', fontsize = 20)

plt.show()
```



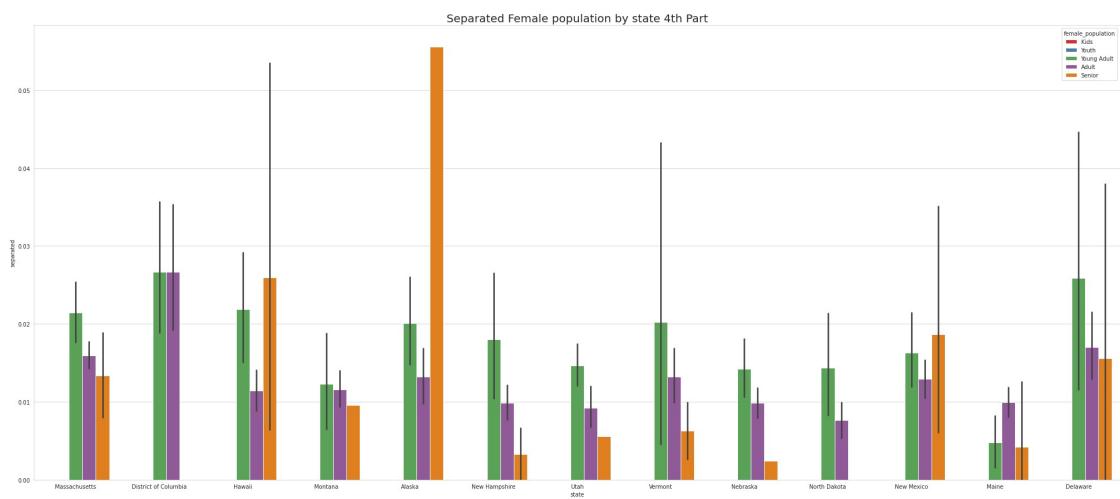
```
In [80]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='separated',hue='female_population',data=train,pallete="Set1",order=['Michigan', 'Ohio', 'Oklahoma', 'Georgia', 'Idaho', 'South Dakota', 'Minnesota', 'Missouri', 'Washington', 'Wyoming', 'Connecticut', 'West Virginia', 'Kentucky']).set_title('Separated Female population by state 3rd Part', fontsize = 20)

plt.show()
```



```
In [81]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='separated',hue='female_population',data=train,palette="Set1",order=['Massachusetts', 'District of Columbia', 'Hawaii', 'Montana', 'Alaska', 'New Hampshire', 'Utah', 'Vermont', 'Nebraska', 'North Dakota', 'New Mexico', 'Maine', 'Delaware']).set_title('Separated Female population by state 4th Part', fontsize = 20)

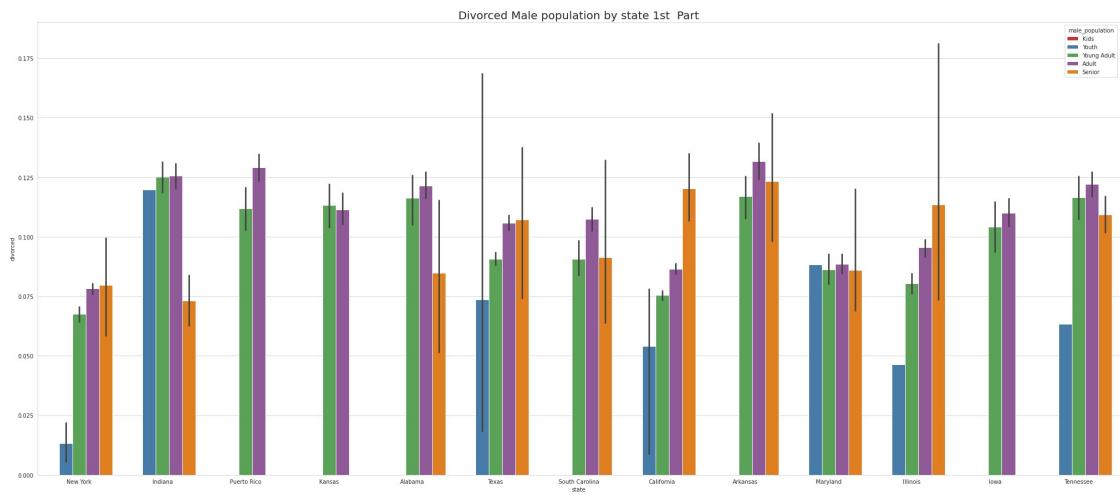
plt.show()
```



Except for Newyork, No other state has Separated Female Youth population Tennessee has the Highest Separated Female Senior population

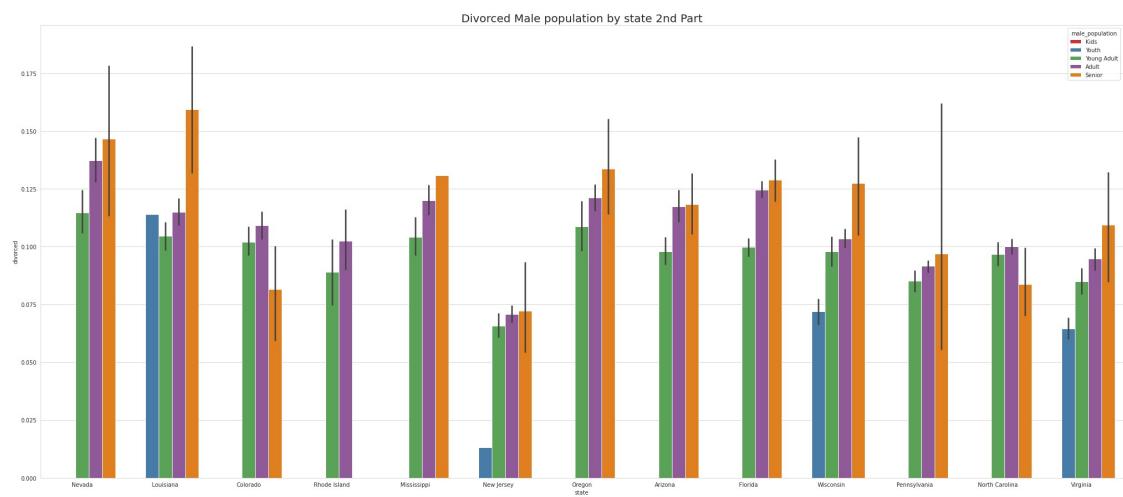
```
In [82]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='divorced',hue='male_population',data=train,palette="Set1",order=['New York', 'Indiana', 'Puerto Rico', 'Kansas', 'Alabama', 'Texas', 'South Carolina', 'California', 'Arkansas', 'Maryland', 'Illinois', 'Iowa', 'Tennessee'],).set_title('Divorced Male population by state 1st Part', fontsize = 20)

plt.show()
```



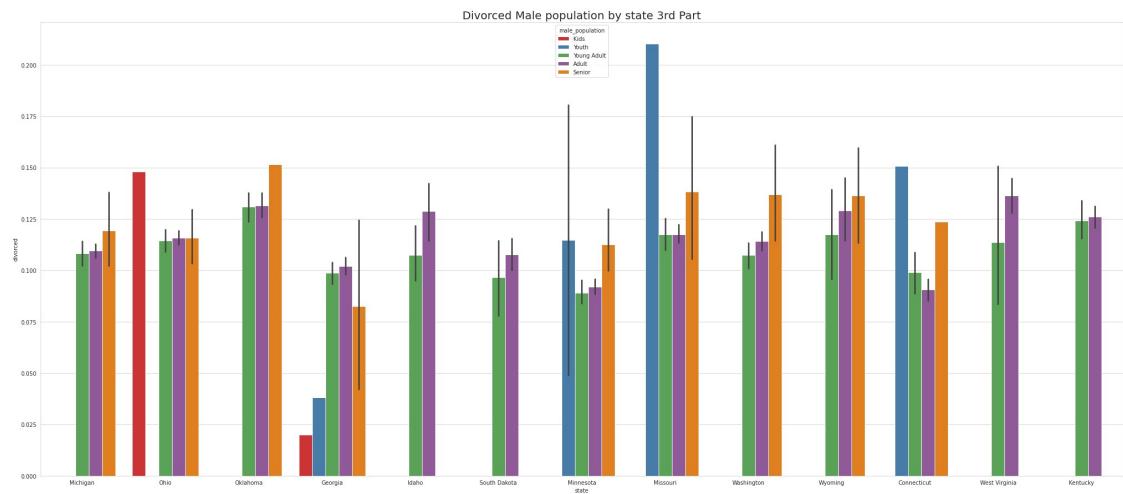
```
In [83]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='divorced',hue='male_population',data=train,pallete="Set1",order=['Nevada', 'Louisiana', 'Colorado','Rhode Island', 'Mississippi', 'New Jersey',
'Oregon', 'Arizona','Florida', 'Wisconsin', 'Pennsylvania', 'North Carolina','Virginia']).set_title('Divorced Male population by state 2nd Part', fontsize = 20)

plt.show()
```



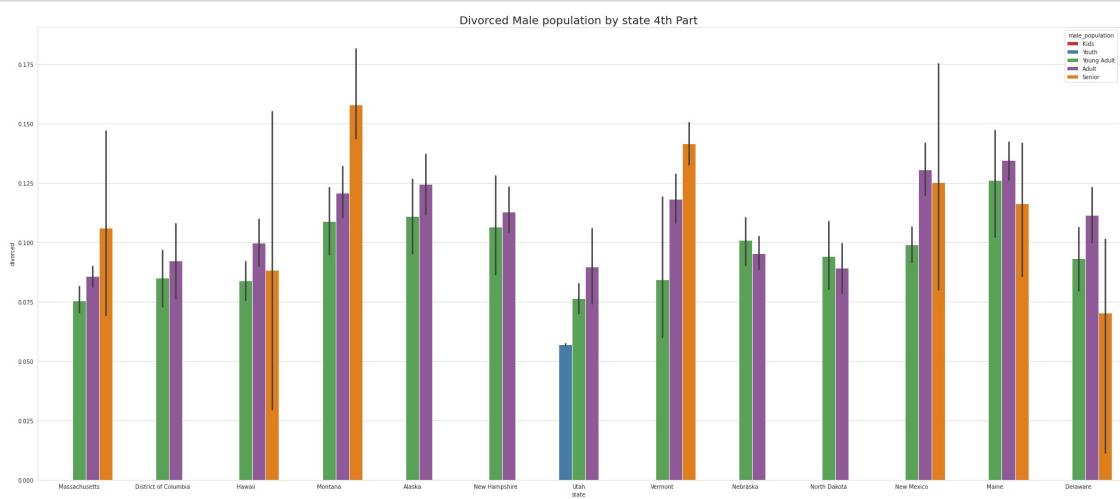
```
In [84]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='divorced',hue='male_population',data=train,pallete="Set1",order=['Michigan', 'Ohio', 'Oklahoma', 'Georgia', 'Idaho', 'South Dakota', 'Minnesota',
'Missouri', 'Washington', 'Wyoming', 'Connecticut', 'West Virginia', 'Kentucky']).set_title('Divorced Male population by state 3rd Part', fontsize = 20)

plt.show()
```



```
In [85]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='divorced',hue='male_population',data=train,pallete="Set1",order=[ 'Massachusetts', 'District of Columbia', 'Hawaii', 'Montana', 'Alaska',
'New Hampshire', 'Utah', 'Vermont', 'Nebraska', 'North Dakota',
'New Mexico', 'Maine', 'Delaware']).set_title('Divorced Male population by state 4th Part', fontsize = 20)

plt.show()
```



"Ohio", has Largest number of Divorced Male KIDS.

"Missouri"&"Connecticut", has Largest number of Divorced Male YOUTH.

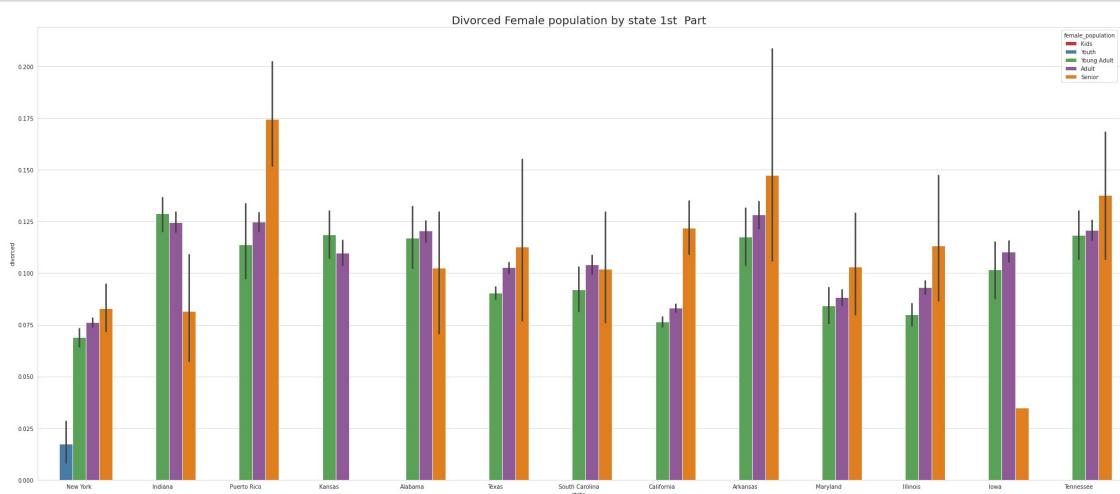
"Maine, Indiana & Oklahoma", has Largest number of Divorced Male YOUNG ADULTS

"Arkansas, Maine, Neveda ,Indiana & Oklahoma", has Largest number of Divorced Male ADULTS

"Louisiana", "OKlahoma" & "Montana", has Largest number of Divorced Male SENIORS.

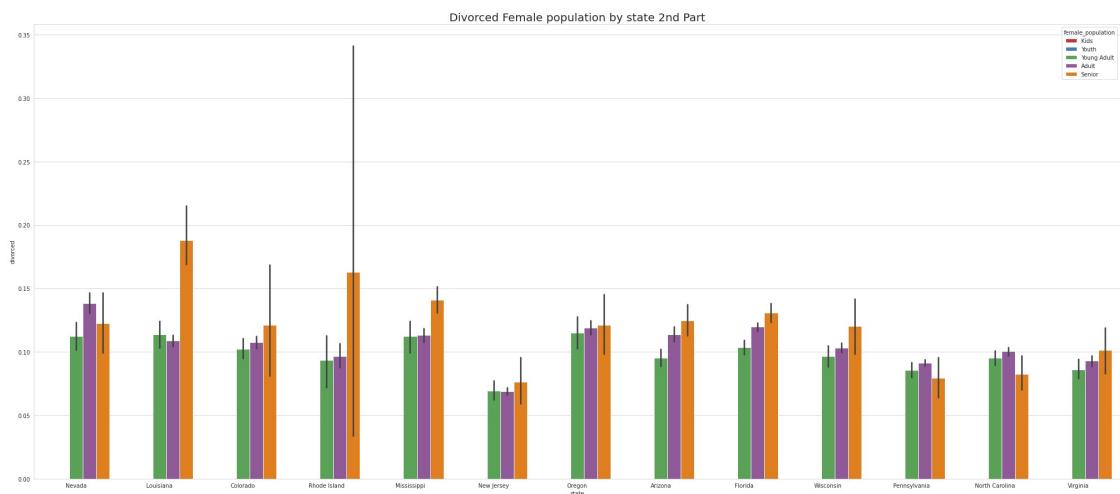
```
In [86]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='divorced',hue='female_population',data=train,pal
ette="Set1",order=['New York', 'Indiana', 'Puerto Rico', 'Kansas', 'Alaba
ma', 'Texas','South Carolina',
'California', 'Arkansas', 'Maryland', 'Illinois','Iowa', 'Tennesse
e',]).set_title('Divorced Female population by state 1st Part', fontsize
= 20)

plt.show()
```



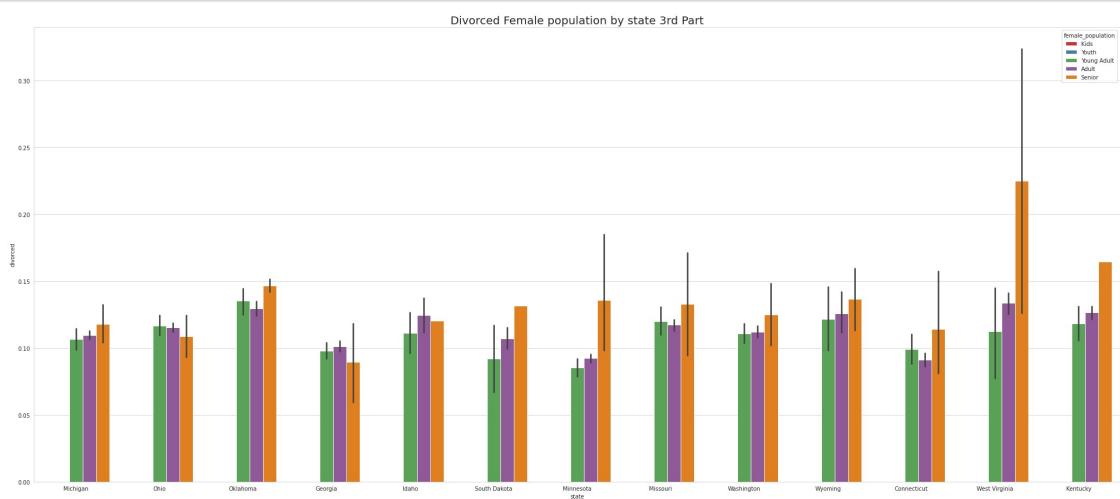
```
In [87]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='divorced',hue='female_population',data=train,pal
ette="Set1",order=['Nevada', 'Louisiana', 'Colorado','Rhode Island', 'Mis
sissippi', 'New Jersey',
' Oregon', 'Arizona','Florida', 'Wisconsin', 'Pennsylvania', 'North
Carolina','Virginia']).set_title('Divorced Female population by state 2nd
Part', fontsize = 20)

plt.show()
```



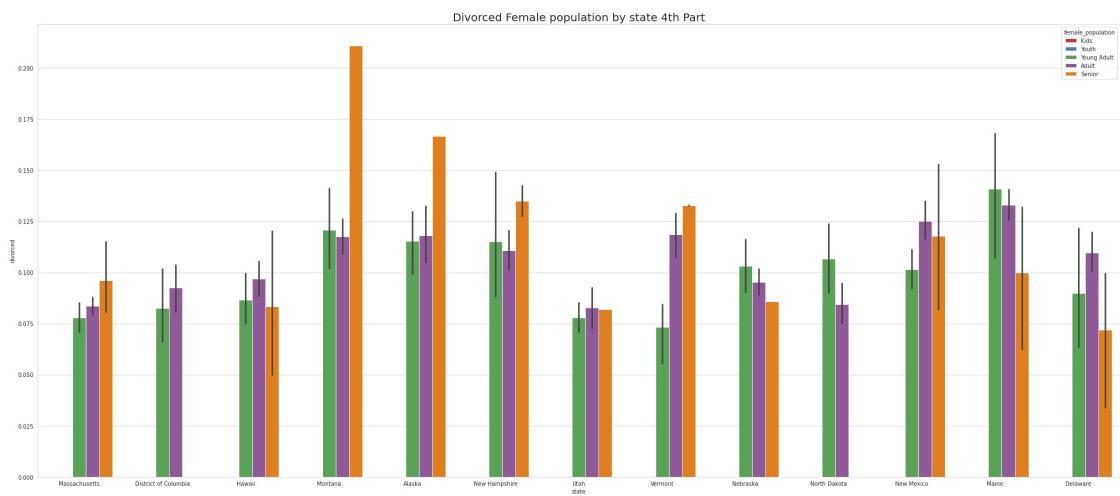
```
In [88]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='divorced',hue='female_population',data=train,pal
ette="Set1",order=['Michigan', 'Ohio', 'Oklahoma', 'Georgia', 'Idaho', 'S
outh Dakota', 'Minnesota',
'Missouri', 'Washington', 'Wyoming', 'Connecticut', 'West Virg
inia', 'Kentucky']).set_title('Divorced Female population by state 3rd Pa
rt', fontsize = 20)

plt.show()
```



```
In [89]: sns.set_style('whitegrid')
plt.figure(figsize=(35,15))
sns.barplot(x='state',y='divorced',hue='female_population',data=train,pal
ette="Set1",order=['Massachusetts', 'District of Columbia', 'Hawaii', 'Mo
ntana', 'Alaska',
'New Hampshire', 'Utah', 'Vermont', 'Nebraska', 'North Dakota
', 'New Mexico', 'Maine', 'Delaware']).set_title('Divorced Female populat
ion by state 4th Part', fontsize = 20)

plt.show()
```



"Newyork", is the only state that has Divorced Female YOUTH.

"Maine", has Largest number of Divorced Female YOUNG ADULTS

"Maine", has Largest number of Divorced Female ADULTS

"Montana", has Largest number of Divorced Female SENIORS.

Please detail your observations for rent as a percentage of income at an overall level, and for different states.

```
In [90]: rent_income = train.groupby(by='state')['rent_mean'].agg(['mean'])
rent_income.head()
```

Out[90]:

state	mean
Alabama	768.810406
Alaska	1173.830410
Arizona	1101.133798
Arkansas	715.367386
California	1479.363998

```
In [91]: family_income = train.groupby(by='state')['family_mean'].agg(['mean'])
family_income.head()
```

Out[91]:

state	mean
Alabama	66814.665178
Alaska	92504.826703
Arizona	73546.551858
Arkansas	64046.416919
California	88438.468548

```
In [92]: rent_perc_of_income=round(rent_income['mean']/family_income['mean'],2)
rent_perc_of_income.head(10)
```

```
Out[92]: state
Alabama          0.01
Alaska           0.01
Arizona          0.01
Arkansas          0.01
California        0.02
Colorado          0.01
Connecticut        0.01
Delaware          0.01
District of Columbia  0.01
Florida           0.02
Name: mean, dtype: float64
```

```
In [93]: #overall Level rent as a percentage of income
round(sum(train['rent_mean'])/sum(train['family_mean'])*100,2)
```

```
Out[93]: 1.33
```

Perform correlation analysis for all the relevant variables by creating a heatmap. Describe your findings.

```
In [94]: train.columns
```

```
Out[94]: Index(['COUNTYID', 'STATEID', 'state', 'state_ab', 'city', 'place', 'type',
       'primary', 'zip_code', 'area_code', 'lat', 'lng', 'ALand', 'AWater',
       'pop', 'male_pop', 'female_pop', 'rent_mean', 'rent_median',
       'rent_stdev', 'rent_sample_weight', 'rent_samples', 'rent_gt_10',
       'rent_gt_15', 'rent_gt_20', 'rent_gt_25', 'rent_gt_30', 'rent_gt_35',
       'rent_gt_40', 'rent_gt_50', 'universe_samples', 'used_samples',
       'hi_mean', 'hi_median', 'hi_stdev', 'hi_sample_weight', 'hi_samples',
       'family_mean', 'family_median', 'family_stdev', 'family_sample_weight',
       'family_samples', 'hc_mortgage_mean', 'hc_mortgage_median',
       'hc_mortgage_stdev', 'hc_mortgage_sample_weight', 'hc_mortgage_samples',
       'hc_mean', 'hc_median', 'hc_stdev', 'hc_samples', 'hc_sample_weight',
       'home_equity_second_mortgage', 'second_mortgage', 'home_equity',
       'debt',
       'second_mortgage_cdf', 'home_equity_cdf', 'debt_cdf', 'hs_degree',
       'hs_degree_male', 'hs_degree_female', 'male_age_mean',
       'male_age_median', 'male_age_stdev', 'male_age_sample_weight',
       'male_age_samples', 'female_age_mean', 'female_age_median',
       'female_age_stdev', 'female_age_sample_weight', 'female_age_samples',
       'pct_own', 'married', 'married_snp', 'separated', 'divorced',
       'bad_debt', 'bins', 'remaining_income', 'pop_density', 'median_age',
       'male_population', 'female_population'],
      dtype='object')
```

```
In [95]: train.corr()
```

Out[95]:

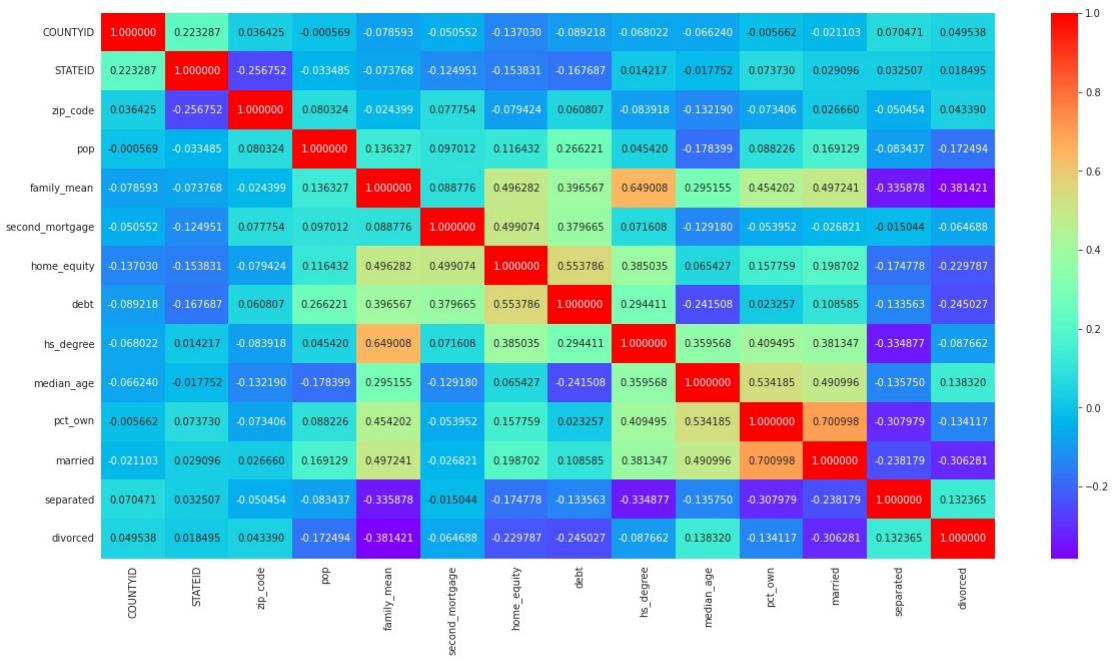
	COUNTYID	STATEID	zip_code	area_code	lat	lon
COUNTYID	1.000000	0.223287	0.036425	0.067072	-0.151533	0.0
STATEID	0.223287	1.000000	-0.256752	0.041526	0.113640	0.3
zip_code	0.036425	-0.256752	1.000000	-0.005795	-0.066621	-0.9
area_code	0.067072	0.041526	-0.005795	1.000000	-0.125661	-0.0
lat	-0.151533	0.113640	-0.066621	-0.125661	1.000000	0.0
long	0.070043	0.315076	-0.927256	-0.012333	0.018561	1.0
ALand	0.016090	-0.016735	0.073090	0.016342	0.101773	-0.1
AWater	0.017031	-0.026702	0.032090	0.022635	0.069589	-0.0
pop	-0.000569	-0.033485	0.080324	0.032716	-0.090787	-0.0
male_pop	-0.000045	-0.035321	0.097659	0.035495	-0.084619	-0.1
female_pop	-0.001064	-0.030731	0.061090	0.029063	-0.094200	-0.0
rent_mean	-0.101025	-0.218888	0.072191	0.043070	-0.002630	-0.1
rent_median	-0.098807	-0.213287	0.065121	0.043159	-0.004809	-0.1
rent_stdev	-0.093382	-0.161816	0.038962	0.007007	0.051760	-0.1
rent_sample_weight	0.048407	0.055482	0.036003	-0.046464	0.002103	-0.0
rent_samples	-0.004591	-0.055277	0.071796	-0.026024	-0.012512	-0.0
rent_gt_10	-0.012977	-0.049668	-0.007010	0.028616	-0.054234	-0.0
rent_gt_15	-0.028583	-0.093912	0.001015	0.028971	-0.080601	-0.0
rent_gt_20	-0.027498	-0.097669	-0.008332	0.023347	-0.106557	-0.0
rent_gt_25	-0.019562	-0.097030	-0.012694	0.016971	-0.110886	-0.0
rent_gt_30	-0.013346	-0.093942	-0.013553	0.021730	-0.120369	-0.0
rent_gt_35	-0.011231	-0.088322	-0.019356	0.012082	-0.117711	-0.0
rent_gt_40	-0.012661	-0.082602	-0.026066	0.008261	-0.107468	0.0
rent_gt_50	-0.017261	-0.069986	-0.035668	-0.003806	-0.082918	0.0
universe_samples	-0.002112	-0.043719	0.066434	-0.024660	-0.032738	-0.0
used_samples	-0.005648	-0.055833	0.074013	-0.025234	-0.008351	-0.0
hi_mean	-0.081554	-0.088322	0.001854	0.017577	0.131394	-0.0
hi_median	-0.079876	-0.077650	0.002074	0.021174	0.138221	-0.0
hi_stdev	-0.078903	-0.106192	-0.007979	0.001709	0.106668	-0.0
hi_sample_weight	0.033864	0.033457	0.018502	-0.011039	-0.108856	0.0
hi_samples	-0.003445	-0.000826	0.021548	-0.003494	-0.026977	-0.0
family_mean	-0.078593	-0.073768	-0.024399	0.001511	0.154028	-0.0
family_median	-0.076669	-0.063696	-0.027873	0.001361	0.153961	-0.0
family_stdev	-0.065202	-0.098698	-0.011084	-0.004660	0.110878	-0.0
family_sample_weight	0.038421	0.023716	0.060018	0.034203	-0.178752	-0.0
family_samples	-0.000958	-0.001674	0.044422	0.034822	-0.060142	-0.0
hc_mortgage_mean	-0.140820	-0.168790	-0.017347	0.043388	0.100382	-0.0

	COUNTYID	STATEID	zip_code	area_code	lat	lon
hc_mortgage_median	-0.138465	-0.164789	-0.014659	0.041269	0.101724	-0.0
hc_mortgage_stdev	-0.123860	-0.164438	-0.017293	0.038626	0.062509	-0.0
hc_mortgage_sample_weight	0.039519	0.052420	-0.015256	-0.018005	-0.018108	0.0
hc_mortgage_samples	-0.025001	-0.020214	0.003119	0.016052	0.052816	-0.0
hc_mean	-0.093181	-0.015292	-0.219464	0.033448	0.221092	0.1
hc_median	-0.092821	-0.007497	-0.222153	0.033897	0.220345	0.1
hc_stdev	-0.056453	-0.060218	-0.093055	0.026035	0.086797	0.0
hc_samples	0.039904	0.113807	-0.061711	0.004379	-0.118708	0.1
hc_sample_weight	0.055392	0.111858	-0.017305	-0.000298	-0.184986	0.0
home_equity_second_mortgage	-0.041053	-0.112604	0.083010	0.005227	0.076686	-0.1
second_mortgage	-0.050552	-0.124951	0.077754	0.003852	0.081656	-0.1
home_equity	-0.137030	-0.153831	-0.079424	-0.002090	0.225917	0.0
debt	-0.089218	-0.167687	0.060807	0.014255	0.188251	-0.1
second_mortgage_cdf	0.060584	0.121704	-0.061424	0.002720	-0.136345	0.0
home_equity_cdf	0.150341	0.162447	0.087225	0.010127	-0.258570	-0.0
debt_cdf	0.084777	0.164158	-0.071669	-0.022758	-0.159389	0.1
hs_degree	-0.068022	0.014217	-0.083918	-0.028772	0.245615	0.0
hs_degree_male	-0.064961	0.004236	-0.066084	-0.022153	0.233781	0.0
hs_degree_female	-0.066098	0.023879	-0.095826	-0.032577	0.241539	0.0
male_age_mean	-0.068323	-0.024696	-0.108997	-0.024674	-0.007237	0.0
male_age_median	-0.069007	-0.020339	-0.110069	-0.016547	0.015950	0.0
male_age_stdev	-0.010542	0.063380	-0.063268	-0.009461	0.010659	0.0
male_age_sample_weight	0.003152	-0.033347	0.092835	0.037512	-0.081217	-0.1
male_age_samples	-0.000045	-0.035321	0.097659	0.035495	-0.084619	-0.1
female_age_mean	-0.060044	-0.019499	-0.143931	-0.022033	-0.018374	0.1
female_age_median	-0.058462	-0.014456	-0.139463	-0.014146	-0.003129	0.1
female_age_stdev	-0.001736	0.070417	-0.059782	-0.017580	0.041367	0.0
female_age_sample_weight	0.002970	-0.028977	0.059036	0.027582	-0.089739	-0.0
female_age_samples	-0.001064	-0.030731	0.061090	0.029063	-0.094200	-0.0
pct_own	-0.005662	0.073730	-0.073406	0.016004	0.057068	0.0
married	-0.021103	0.029096	0.026660	0.059046	0.038939	-0.0
married_snp	0.044997	-0.030348	0.021005	0.030469	-0.165985	-0.0
separated	0.070471	0.032507	-0.050454	0.023231	-0.146233	0.0
divorced	0.049538	0.018495	0.043390	-0.045801	-0.059212	-0.0
bad_debt	-0.138812	-0.159455	-0.075752	-0.002423	0.224401	-0.0
remaining_income	-0.001094	0.042556	-0.100912	-0.059233	0.107401	0.1
-----	-----	-----	-----	-----	-----	-----

```
In [96]: correlation=train[['COUNTYID','STATEID','zip_code','pop', 'family_mean',
   'second_mortgage', 'home_equity', 'debt','hs_degree',
   'median_age','pct_own', 'married','separated', 'divorced']].corr()
```

```
In [97]: plt.figure(figsize=(20,10))
sns.heatmap(correlation,annot=True, fmt='f', cmap=plt.cm.rainbow)
```

Out[97]: <matplotlib.axes._subplots.AxesSubplot at 0x7efe2bccb610>



High positive correlation is noticed between pop, male_pop and female_pop

High positive correlation is noticed between rent_mean,hi_mean, family_mean, hc_mean

Project Task: Week 3

Data Pre-processing:

The economic multivariate data has a significant number of measured variables. The goal is to find where the measured variables depend on a number of smaller unobserved common factors or latent variables. 2. Each variable is assumed to be dependent upon a linear combination of the common factors, and the coefficients are known as loadings. Each measured variable also includes a component due to independent random variability, known as “specific variance” because it is specific to one variable. Obtain the common factors and then plot the loadings. Use factor analysis to find latent variables in our dataset and gain insight into the linear relationships in the data. Following are the list of latent variables:

- Highschool graduation rates
- Median population age
- Second mortgage statistics
- Percent own
- Bad debt expense

```
In [98]: from factor_analyzer import FactorAnalyzer
```

```
In [99]: def numerical_variable(data):
    numerical_variable = list(data.select_dtypes(include = ['int', 'float'
        ]).columns)
    return numerical_variable
```

```
In [100]: numerical_variable(train)
```

```
Out[100]: ['COUNTYID',
 'STATEID',
 'zip_code',
 'area_code',
 'lat',
 'lng',
 'ALand',
 'AWater',
 'pop',
 'male_pop',
 'female_pop',
 'rent_mean',
 'rent_median',
 'rent_stdev',
 'rent_sample_weight',
 'rent_samples',
 'rent_gt_10',
 'rent_gt_15',
 'rent_gt_20',
 'rent_gt_25',
 'rent_gt_30',
 'rent_gt_35',
 'rent_gt_40',
 'rent_gt_50',
 'universe_samples',
 'used_samples',
 'hi_mean',
 'hi_median',
 'hi_stdev',
 'hi_sample_weight',
 'hi_samples',
 'family_mean',
 'family_median',
 'family_stdev',
 'family_sample_weight',
 'family_samples',
 'hc_mortgage_mean',
 'hc_mortgage_median',
 'hc_mortgage_stdev',
 'hc_mortgage_sample_weight',
 'hc_mortgage_samples',
 'hc_mean',
 'hc_median',
 'hc_stdev',
 'hc_samples',
 'hc_sample_weight',
 'home_equity_second_mortgage',
 'second_mortgage',
 'home_equity',
 'debt',
 'second_mortgage_cdf',
 'home_equity_cdf',
 'debt_cdf',
 'hs_degree',
 'hs_degree_male',
 'hs_degree_female',
 'male_age_mean',
 'male_age_median',
 'male_age_stdev',
 'male_age_sample_weight',
```

```
'male_age_samples',
'female_age_mean',
'female_age_median',
'female_age_stdev',
'female_age_sample_weight',
'female_age_samples',
'pct_own',
'married',
'married_snp',
'separated',
'divorced',
'bad_debt',
'remaining_income',
'pop_density',
'median_age']
```

In [101]: n_train = train[numerical_variable(train)]

In [102]: n_train.isnull().any().sum()

Out[102]: 0

In [103]: n_train.head()

Out[103]:

	COUNTYID	STATEID	zip_code	area_code	lat	long	ALand	A
UID								
267822	53	36	13346	315	42.840812	-75.501524	202183361.0	16
246444	141	18	46616	574	41.701441	-86.266614	1560828.0	1
245683	63	18	46122	317	39.792202	-86.515246	69561595.0	2
279653	127	72	927	787	18.396103	-66.104169	1105793.0	
247218	161	20	66502	785	39.195573	-96.569366	2554403.0	

```
In [104]: n_train.columns
```

```
Out[104]: Index(['COUNTYID', 'STATEID', 'zip_code', 'area_code', 'lat', 'lng', 'ALand',  
       'AWater', 'pop', 'male_pop', 'female_pop', 'rent_mean', 'rent_median',  
       'rent_stdev', 'rent_sample_weight', 'rent_samples', 'rent_gt_10',  
       'rent_gt_15', 'rent_gt_20', 'rent_gt_25', 'rent_gt_30', 'rent_gt_35',  
       'rent_gt_40', 'rent_gt_50', 'universe_samples', 'used_samples',  
       'hi_mean', 'hi_median', 'hi_stdev', 'hi_sample_weight', 'hi_samples',  
       'family_mean', 'family_median', 'family_stdev', 'family_sample_weight',  
       'family_samples', 'hc_mortgage_mean', 'hc_mortgage_median',  
       'hc_mortgage_stdev', 'hc_mortgage_sample_weight', 'hc_mortgage_samples',  
       'hc_mean', 'hc_median', 'hc_stdev', 'hc_samples', 'hc_sample_weight',  
       'home_equity_second_mortgage', 'second_mortgage', 'home_equity',  
       'debt', 'second_mortgage_cdf', 'home_equity_cdf', 'debt_cdf', 'hs_degree',  
       'hs_degree_male', 'hs_degree_female', 'male_age_mean',  
       'male_age_median', 'male_age_stdev', 'male_age_sample_weight',  
       'male_age_samples', 'female_age_mean', 'female_age_median',  
       'female_age_stdev', 'female_age_sample_weight', 'female_age_samples',  
       'pct_own', 'married', 'married_snp', 'separated', 'divorced',  
       'bad_debt', 'remaining_income', 'pop_density', 'median_age'],  
       dtype='object')
```

```
In [105]: #exclude columns
```

```
n_train.drop(columns=['COUNTYID', 'STATEID', 'zip_code', 'area_code', 'lat', 'lng', 'remaining_income', 'pop_density', 'median_age'], inplace=True)
```

```
In [106]: n_train.head()
```

```
Out[106]:
```

UID	ALand	AWater	pop	male_pop	female_pop	rent_mean	rent_median	rent	
267822	202183361.0	1699120	5230	2612	2618	769.38638	784.0	232	
246444	1560828.0	100363	2633	1349	1284	804.87924	848.0	253	
245683	69561595.0	284193	6881	3643	3238	742.77365	703.0	323	
279653	1105793.0		0	2700	1141	803.42018	782.0	297	
247218	2554403.0		0	5637	2586	3051	938.56493	881.0	392

```
In [107]: from factor_analyzer.factor_analyzer import calculate_bartlett_sphericity  
chi_square_value,p_value=calculate_bartlett_sphericity(n_train)  
chi_square_value, p_value
```

```
Out[107]: (9045268.678767936, 0.0)
```

```
In [108]: from factor_analyzer.factor_analyzer import calculate_kmo  
kmo_all,kmo_model=calculate_kmo(n_train)
```

```
In [109]: kmo_model
```

```
Out[109]: 0.21258179885097275
```

```
In [110]: # Create factor analysis object and perform factor analysis  
fa = FactorAnalyzer(n_factors=5,rotation=None)  
fa.fit(n_train)  
# Check Eigenvalues  
ev, v = fa.get_eigenvalues()  
ev
```

```
Out[110]: array([ 1.57678238e+01,  1.22155718e+01,  8.26250989e+00,  4.58172663e+0  
0,  
            3.97519378e+00,  3.01600413e+00,  2.06024698e+00,  1.46559774e+0  
0,  
            1.34374021e+00,  1.25431970e+00,  1.12745750e+00,  9.61855242e-0  
1,  
            9.26584195e-01,  8.09338082e-01,  7.46960817e-01,  6.50289807e-0  
1,  
            5.85096676e-01,  5.67000356e-01,  5.19034761e-01,  4.59746569e-0  
1,  
            4.24790777e-01,  3.83072967e-01,  3.54797876e-01,  3.13372295e-0  
1,  
            3.04908411e-01,  2.55646006e-01,  2.44373229e-01,  2.37250283e-0  
1,  
            2.06382996e-01,  2.01625607e-01,  1.86066850e-01,  1.72524346e-0  
1,  
            1.52798366e-01,  1.41654101e-01,  1.32787334e-01,  1.16981644e-0  
1,  
            1.08400630e-01,  9.83265800e-02,  9.44036830e-02,  9.13910484e-0  
2,  
            8.98417270e-02,  5.82959043e-02,  5.07010306e-02,  4.11974098e-0  
2,  
            3.36265157e-02,  3.24731122e-02,  2.72260565e-02,  2.23657590e-0  
2,  
            2.11101652e-02,  1.91414406e-02,  1.60759720e-02,  1.54707466e-0  
2,  
            1.43342261e-02,  1.18052258e-02,  8.05927119e-03,  6.60756027e-0  
3,  
            5.48495296e-03,  3.75413968e-03,  3.11038391e-03,  9.58311144e-0  
4,  
            7.06313700e-04,  2.79804975e-16, -2.19609660e-16, -5.71746555e-1  
6,  
           -6.22053464e-16, -1.03574432e-15])
```

```
In [111]: load = fa.loadings_
load
```

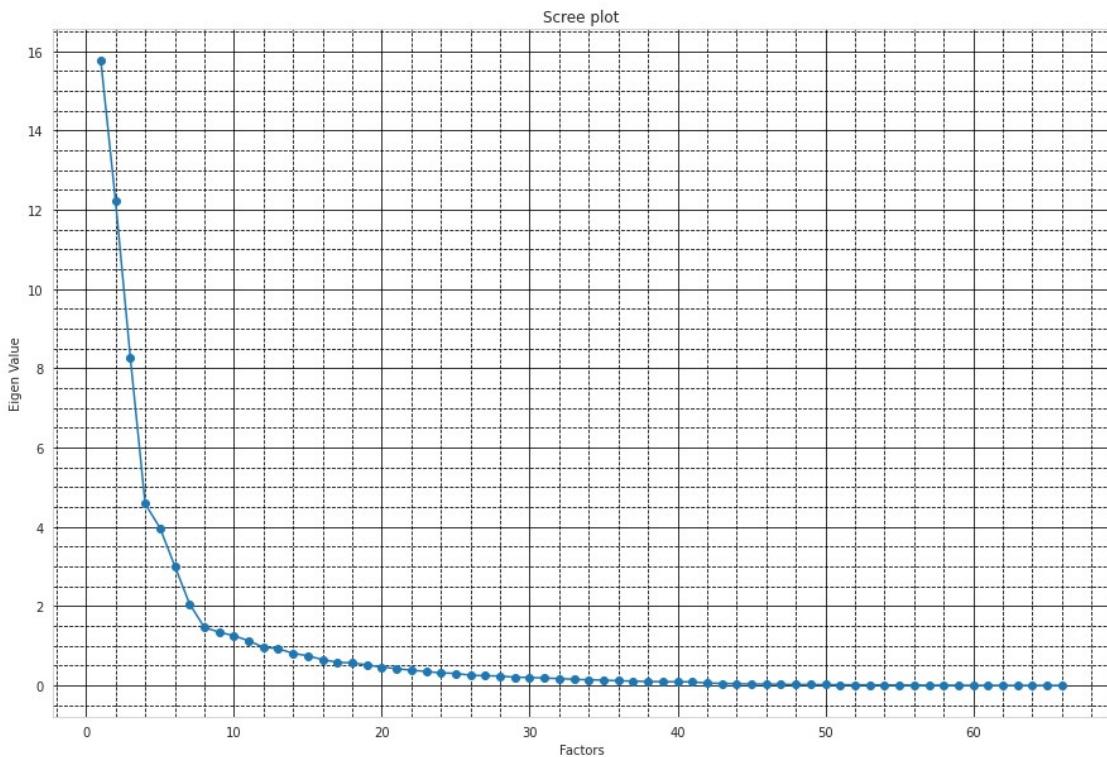
```
Out[111]: array([[-4.27717069e-02, -4.54305642e-02, -1.13940778e-01,
   -3.91728198e-02,  4.37363770e-02],
  [-9.34046725e-03, -2.22582167e-02, -3.13959770e-02,
   -2.40646603e-02,  2.64331867e-02],
 [ 3.26432741e-01,  9.28257809e-01, -6.46486643e-02,
  3.89795024e-02,  1.67045960e-02],
 [ 3.18069896e-01,  9.03287405e-01, -6.31368222e-02,
  1.99749779e-02,  1.38052827e-02],
 [ 3.23886932e-01,  9.21117943e-01, -6.37530960e-02,
  5.60007999e-02,  1.87912064e-02],
 [ 7.41500880e-01, -8.54214488e-02,  3.33649249e-01,
  1.48215432e-01,  7.70206888e-02],
 [ 6.99629295e-01, -7.87175578e-02,  3.24351275e-01,
  1.33998942e-01,  5.77966129e-02],
 [ 5.66798428e-01, -7.29982955e-02,  2.58285206e-01,
  1.55797194e-01,  2.06444816e-01],
 [-4.00621047e-01,  4.90599583e-01,  2.44292832e-01,
  -1.99468978e-01,  2.83430997e-01],
 [-1.14653161e-01,  5.65887877e-01,  4.64443135e-01,
  -1.99537028e-01,  4.07302727e-01],
 [-6.08088714e-02,  1.16117581e-01,  2.72184908e-01,
  2.72761812e-01, -1.59694845e-01],
 [-1.16407792e-01,  1.32922792e-01,  4.04049900e-01,
  4.46350323e-01, -1.63852127e-01],
 [-2.16002689e-01,  1.19149037e-01,  4.60945483e-01,
  5.84767113e-01, -1.36477214e-01],
 [-2.78871609e-01,  1.08861381e-01,  4.78739126e-01,
  6.71978390e-01, -1.16300989e-01],
 [-3.05016070e-01,  9.78260034e-02,  4.67441265e-01,
  7.12178962e-01, -1.05383863e-01],
 [-3.00503980e-01,  8.14321533e-02,  4.51711004e-01,
  7.10425590e-01, -8.33570240e-02],
 [-2.95100163e-01,  6.98051500e-02,  4.32940633e-01,
  6.76272268e-01, -7.03685567e-02],
 [-2.72794618e-01,  4.58255931e-02,  3.97802189e-01,
  5.89636974e-01, -4.22063506e-02],
 [-1.33085520e-01,  5.84549162e-01,  4.36291615e-01,
  -1.90858604e-01,  4.16676015e-01],
 [-1.06588964e-01,  5.67096204e-01,  4.60266772e-01,
  -2.00789058e-01,  4.04561965e-01],
 [ 9.47841279e-01, -1.59917219e-01,  8.02180657e-03,
  -2.42208616e-03,  5.91615353e-02],
 [ 9.17102893e-01, -1.44632572e-01, -6.17229682e-03,
  -2.83869113e-02,  1.78107026e-03],
 [ 8.77201678e-01, -1.76299300e-01,  4.45030682e-02,
  7.35810754e-02,  2.12327446e-01],
 [-1.80726172e-01,  8.71851903e-01, -1.42631529e-01,
  5.45521362e-02,  1.40694625e-01],
 [ 3.33823395e-01,  8.78480258e-01, -1.57974608e-01,
  3.79964518e-02,  1.35535542e-01],
 [ 9.38850676e-01, -1.85770592e-01,  5.09189569e-04,
  6.52991721e-03,  1.29756572e-01],
 [ 9.12774943e-01, -1.82798055e-01, -3.47789483e-03,
  -1.31408282e-03,  1.09032523e-01],
 [ 8.02677419e-01, -1.57215342e-01,  6.00139930e-02,
  6.11630293e-02,  2.27780311e-01],
 [-1.39608586e-01,  8.82046719e-01, -2.22358589e-01,
  1.00467706e-01, -4.48114293e-02],
 [ 4.10608767e-01,  8.34383932e-01, -2.58037126e-01,
  9.49314268e-02, -5.59793029e-02],
```

```
[ 7.93996715e-01, -1.47716993e-01,  3.80943424e-01,
 1.08289225e-01,  2.73206629e-01],
[ 7.74751775e-01, -1.45421820e-01,  3.89586818e-01,
 1.01709347e-01,  2.65252953e-01],
[ 6.85812082e-01, -1.50947437e-01,  1.70174296e-01,
 1.38192251e-01,  2.53434843e-01],
[ 1.28200345e-01,  6.48192079e-01, -5.09237932e-01,
 4.28241971e-02, -3.22942348e-01],
[ 6.03190228e-01,  6.02051101e-01, -2.85365248e-01,
 8.42391625e-02, -2.62054078e-01],
[ 6.98106162e-01, -1.74559329e-01,  2.87190311e-01,
 1.01808738e-01,  3.27191507e-01],
[ 6.67482954e-01, -1.64370467e-01,  2.87299176e-01,
 9.20667223e-02,  3.11242327e-01],
[ 5.39019540e-01, -1.38556493e-01,  1.36797242e-01,
 1.40167700e-01,  3.61665129e-01],
[ 1.10317347e-01,  4.11055589e-01, -7.29491545e-01,
 3.04575773e-01,  1.03984648e-01],
[ -9.98084380e-02,  4.10976445e-01, -7.45178883e-01,
 2.51438799e-01,  3.63350898e-02],
[ 1.94109538e-01,  9.56042040e-02,  3.01781640e-01,
 -1.46853994e-01, -5.39792699e-01],
[ 2.14663391e-01,  8.74717311e-02,  3.22817469e-01,
 -1.35174792e-01, -5.39888504e-01],
[ 6.13747914e-01, -3.09779402e-02,  2.91737717e-01,
 -5.86381802e-02, -4.19799747e-01],
[ 5.12652618e-01,  1.66534839e-01,  4.47368768e-01,
 -1.97636716e-01, -3.75181331e-01],
[ -3.27700628e-01, -9.40060428e-02, -1.47038220e-01,
 8.40421064e-02,  5.62570198e-01],
[ -6.38704323e-01,  2.14758546e-02, -2.54634222e-01,
 4.62083545e-02,  4.37733436e-01],
[ -5.03664516e-01, -1.63803678e-01, -4.70662225e-01,
 2.02077918e-01,  3.72547925e-01],
[ 6.56702845e-01, -1.32248862e-01, -2.03449068e-01,
 -5.85644022e-02, -4.54163819e-02],
[ 6.49292229e-01, -1.21210694e-01, -1.71450030e-01,
 -5.89308620e-02, -3.08048713e-02],
[ 6.21381620e-01, -1.34733516e-01, -2.24237447e-01,
 -5.55845606e-02, -5.55265727e-02],
[ 2.31356363e-01, -3.19538993e-01, -5.42131647e-01,
 3.56713104e-01,  1.50884446e-01],
[ 3.04483717e-01, -3.12753040e-01, -5.55963681e-01,
 3.43078803e-01,  9.02644164e-02],
[ 4.62636855e-02, -1.27064731e-01, -4.85036535e-01,
 2.71330986e-01, -5.76910525e-02],
[ 2.65851006e-01,  8.73754229e-01, -8.19058057e-03,
 1.03179733e-02,  2.09903110e-02],
[ 3.18069896e-01,  9.03287406e-01, -6.31368223e-02,
 1.99749779e-02,  1.38052827e-02],
[ 1.69225868e-01, -2.99820960e-01, -5.15535548e-01,
 3.78623517e-01,  1.40861575e-01],
[ 2.43086980e-01, -3.02677205e-01, -5.60756945e-01,
 3.83852956e-01,  7.09595160e-02],
[ -5.80520770e-02, -9.13413537e-02, -4.03911677e-01,
 2.07169682e-01, -2.39216264e-02],
[ 2.65619570e-01,  8.88410503e-01,  3.21718615e-03,
 3.47370074e-02,  3.23087171e-02],
[ 3.23886933e-01,  9.21117945e-01, -6.37530962e-02,
 5.60008002e-02,  1.87912066e-02],
```

```
[ 4.71244264e-01, -1.46683236e-01, -6.50928513e-01,
  2.23256190e-01, -3.31825963e-01],
[ 5.36844587e-01, -5.25497024e-02, -4.92878942e-01,
  1.25174036e-01, -1.28465015e-01],
[-3.43764143e-01,  6.26721477e-02,  2.72647680e-01,
  1.36795536e-02,  1.40522351e-01],
[-3.54927741e-01,  3.45839953e-02,  1.58201988e-01,
  1.72765246e-02,  7.27318735e-02],
[-3.95390758e-01, -2.64754497e-02, -1.78128610e-01,
  6.92417342e-04, -1.84786176e-02],
[ 6.13009586e-01, -2.96715897e-02,  3.05997608e-01,
 -5.78711726e-02, -4.31950016e-01]])
```

```
In [112]: xv= range(1, n_train.shape[1]+1)
```

```
In [113]: plt.figure(figsize = (15,10))
plt.scatter(xv, ev)
plt.plot(xv, ev)
plt.title('Scree plot')
plt.xlabel('Factors')
plt.ylabel('Eigen Value')
plt.grid(color = 'black', )
plt.grid(b=True, which='minor', color='black', linestyle='--')
plt.minorticks_on()
plt.show()
```



```
In [114]: Fa = pd.DataFrame.from_records(load)

Fa = Fa.add_prefix('Factor_Analysis')

Fa.index = n_train.columns
Fa
```

Out[114]:

	Factor_Analysis0	Factor_Analysis1	Factor_Analysis2	Factor_Analysis3
ALand	-0.042772	-0.045431	-0.113941	0.000000
AWater	-0.009340	-0.022258	-0.031396	0.000000
pop	0.326433	0.928258	-0.064649	0.000000
male_pop	0.318070	0.903287	-0.063137	0.000000
female_pop	0.323887	0.921118	-0.063753	0.000000
rent_mean	0.741501	-0.085421	0.333649	0.000000
rent_median	0.699629	-0.078718	0.324351	0.000000
rent_stdev	0.566798	-0.072998	0.258285	0.000000
rent_sample_weight	-0.400621	0.490600	0.244293	0.000000
rent_samples	-0.114653	0.565888	0.464443	0.000000
rent_gt_10	-0.060809	0.116118	0.272185	0.000000
rent_gt_15	-0.116408	0.132923	0.404050	0.000000
rent_gt_20	-0.216003	0.119149	0.460945	0.000000
rent_gt_25	-0.278872	0.108861	0.478739	0.000000
rent_gt_30	-0.305016	0.097826	0.467441	0.000000
rent_gt_35	-0.300504	0.081432	0.451711	0.000000
rent_gt_40	-0.295100	0.069805	0.432941	0.000000
rent_gt_50	-0.272795	0.045826	0.397802	0.000000
universe_samples	-0.133086	0.584549	0.436292	0.000000
used_samples	-0.106589	0.567096	0.460267	0.000000
hi_mean	0.947841	-0.159917	0.008022	0.000000
hi_median	0.917103	-0.144633	-0.006172	0.000000
hi_stdev	0.877202	-0.176299	0.044503	0.000000
hi_sample_weight	-0.180726	0.871852	-0.142632	0.000000
hi_samples	0.333823	0.878480	-0.157975	0.000000
family_mean	0.938851	-0.185771	0.000509	0.000000
family_median	0.912775	-0.182798	-0.003478	0.000000
family_stdev	0.802677	-0.157215	0.060014	0.000000
family_sample_weight	-0.139609	0.882047	-0.222359	0.000000
family_samples	0.410609	0.834384	-0.258037	0.000000
hc_mortgage_mean	0.793997	-0.147717	0.380943	0.000000
hc_mortgage_median	0.774752	-0.145422	0.389587	0.000000
hc_mortgage_stdev	0.685812	-0.150947	0.170174	0.000000
hc_mortgage_sample_weight	0.128200	0.648192	-0.509238	0.000000
hc_mortgage_samples	0.603190	0.602051	-0.285365	0.000000
hc_mean	0.698106	-0.174559	0.287190	0.000000
hc_median	0.667483	-0.164370	0.287299	0.000000

	Factor_Analysis0	Factor_Analysis1	Factor_Analysis2	Factor_Analysis3
hc_stdev	0.539020	-0.138556	0.136797	-0.000100
hc_samples	0.110317	0.411056	-0.729492	0.000100
hc_sample_weight	-0.099808	0.410976	-0.745179	0.000100
home_equity_second_mortgage	0.194110	0.095604	0.301782	0.000100
second_mortgage	0.214663	0.087472	0.322817	0.000100
home_equity	0.613748	-0.030978	0.291738	0.000100
debt	0.512653	0.166535	0.447369	0.000100
second_mortgage_cdf	-0.327701	-0.094006	-0.147038	0.000100
home_equity_cdf	-0.638704	0.021476	-0.254634	0.000100
debt_cdf	-0.503665	-0.163804	-0.470662	0.000100
hs_degree	0.656703	-0.132249	-0.203449	0.000100
hs_degree_male	0.649292	-0.121211	-0.171450	0.000100
hs_degree_female	0.621382	-0.134734	-0.224237	0.000100
male_age_mean	0.231356	-0.319539	-0.542132	0.000100
male_age_median	0.304484	-0.312753	-0.555964	0.000100
male_age_stdev	0.046264	-0.127065	-0.485037	0.000100
male_age_sample_weight	0.265851	0.873754	-0.008191	0.000100
male_age_samples	0.318070	0.903287	-0.063137	0.000100
female_age_mean	0.169226	-0.299821	-0.515536	0.000100
female_age_median	0.243087	-0.302677	-0.560757	0.000100
female_age_stdev	-0.058052	-0.091341	-0.403912	0.000100
female_age_sample_weight	0.265620	0.888411	0.003217	0.000100
female_age_samples	0.323887	0.921118	-0.063753	0.000100
pct_own	0.471244	-0.146683	-0.650929	0.000100
married	0.536845	-0.052550	-0.492879	0.000100
married_snp	-0.343764	0.062672	0.272648	0.000100
separated	-0.354928	0.034584	0.158202	0.000100
-----	-----	-----	-----	-----

• Highschool graduation rates

- Median population age
- Second mortgage statistics
- Percent own
- Bad debt expense

```
In [115]: Fa_train = round(Fa.loc[['hs_degree', 'hs_degree_male', 'hs_degree_female', "male_age_median", "female_age_median", "home_equity_second_mortgage", 'second_mortgage', 'second_mortgage_cdf', 'pct_own', 'bad_debt'], :], 2)
```

```
In [116]: def col_elements(value):
    #Colors elements in a dataframe green if positive and red if negative

    if value < -0.5:
        color = 'red'
    elif value > 0.5:
        color = 'green'
    else:
        color = 'black'

    return 'color: %s' % color
```

```
In [117]: Fa_train.style.applymap(col_elements)
```

Out[117]:

	Factor_Analysis0	Factor_Analysis1	Factor_Analysis2	Factor_Analysis3
hs_degree	0.660000	-0.130000	-0.200000	
hs_degree_male	0.650000	-0.120000	-0.170000	
hs_degree_female	0.620000	-0.130000	-0.220000	
male_age_median	0.300000	-0.310000	-0.560000	
female_age_median	0.240000	-0.300000	-0.560000	
home_equity_second_mortgage	0.190000	0.100000	0.300000	
second_mortgage	0.210000	0.090000	0.320000	
second_mortgage_cdf	-0.330000	-0.090000	-0.150000	
pct_own	0.470000	-0.150000	-0.650000	
bad_debt	0.610000	-0.030000	0.310000	

Project Task: Week 4

Data Modeling :

Build a linear Regression model to predict the total monthly expenditure for home mortgages loan. Please refer 'deplotment_RE.xlsx'. Column hc_mortgage_mean is predicted variable. This is the mean monthly mortgage and owner costs of specified geographical location. Note: Exclude loans from prediction model which have NaN (Not a Number) values for hc_mortgage_mean.

```
In [118]: from sklearn.linear_model import LinearRegression
from sklearn.metrics import r2_score,mean_absolute_error,mean_squared_error
```

```
In [119]: n_test = test[numerical_variable(test)]
```

```
In [120]: #exculde columns
n_test.drop(columns=['COUNTYID', 'STATEID', 'zip_code', 'area_code', 'lat
', 'lng', 'pop_density', 'median_age'], inplace=True)

In [121]: print(n_train.shape)
print(n_test.shape)

(26585, 66)
(11355, 66)

In [122]: n_train.columns

Out[122]: Index(['ALand', 'AWater', 'pop', 'male_pop', 'female_pop', 'rent_mean',
       'rent_median', 'rent_stdev', 'rent_sample_weight', 'rent_samples',
       'rent_gt_10', 'rent_gt_15', 'rent_gt_20', 'rent_gt_25', 'rent_gt_
30',
       'rent_gt_35', 'rent_gt_40', 'rent_gt_50', 'universe_samples',
       'used_samples', 'hi_mean', 'hi_median', 'hi_stdev', 'hi_sample_we
ight',
       'hi_samples', 'family_mean', 'family_median', 'family_stdev',
       'family_sample_weight', 'family_samples', 'hc_mortgage_mean',
       'hc_mortgage_median', 'hc_mortgage_stdev', 'hc_mortgage_sample_we
ight',
       'hc_mortgage_samples', 'hc_mean', 'hc_median', 'hc_stdev', 'hc_sa
mples',
       'hc_sample_weight', 'home_equity_second_mortgage', 'second_mortga
ge',
       'home_equity', 'debt', 'second_mortgage_cdf', 'home_equity_cdf',
       'debt_cdf', 'hs_degree', 'hs_degree_male', 'hs_degree_female',
       'male_age_mean', 'male_age_median', 'male_age_stdev',
       'male_age_sample_weight', 'male_age_samples', 'female_age_mean',
       'female_age_median', 'female_age_stdev', 'female_age_sample_weigh
t',
       'female_age_samples', 'pct_own', 'married', 'married_snp', 'separ
ated',
       'divorced', 'bad_debt'],
      dtype='object')
```

```
In [123]: n_test.columns
```

```
Out[123]: Index(['ALand', 'AWater', 'pop', 'male_pop', 'female_pop', 'rent_mean',
       'rent_median', 'rent_stdev', 'rent_sample_weight', 'rent_samples',
       'rent_gt_10', 'rent_gt_15', 'rent_gt_20', 'rent_gt_25', 'rent_gt_30',
       'rent_gt_35', 'rent_gt_40', 'rent_gt_50', 'universe_samples',
       'used_samples', 'hi_mean', 'hi_median', 'hi_stdev', 'hi_sample_weight',
       'hi_samples', 'family_mean', 'family_median', 'family_stdev',
       'family_sample_weight', 'family_samples', 'hc_mortgage_mean',
       'hc_mortgage_median', 'hc_mortgage_stdev', 'hc_mortgage_sample_weight',
       'hc_mortgage_samples', 'hc_mean', 'hc_median', 'hc_stdev', 'hc_samples',
       'hc_sample_weight', 'home_equity_second_mortgage', 'second_mortgage',
       'home_equity', 'debt', 'second_mortgage_cdf', 'home_equity_cdf',
       'debt_cdf', 'hs_degree', 'hs_degree_male', 'hs_degree_female',
       'male_age_mean', 'male_age_median', 'male_age_stdev',
       'male_age_sample_weight', 'male_age_samples', 'female_age_mean',
       'female_age_median', 'female_age_stdev', 'female_age_sample_weight',
       'female_age_samples', 'pct_own', 'married', 'married_snp', 'separated',
       'divorced', 'bad_debt'],
      dtype='object')
```

a) Run a model at a Nation level. If the accuracy levels and R square are not satisfactory proceed to below step.

```
In [124]: train_x = n_train.drop(columns=['hc_mortgage_mean'])
train_y = n_train['hc_mortgage_mean']
```

```
In [125]: test_x = n_test.drop(columns=['hc_mortgage_mean'])
test_y = n_test['hc_mortgage_mean']
```

```
In [126]: print(train_x.shape)
print(test_x.shape)
```

```
(26585, 65)
(11355, 65)
```

```
In [127]: Lr = LinearRegression()
```

```
In [128]: Lr.fit(train_x,train_y)
```

```
Out[128]: LinearRegression()
```

```
In [129]: predict= Lr.predict(test_x)
predict
```

```
Out[129]: array([1141.74980398, 1511.1676771 , 1222.02059301, ..., 1854.09448016,
       1157.18297104, 1387.37036565])
```

```
In [130]: mae = mean_absolute_error(test_y,predict)
mse = mean_squared_error(test_y,predict)
rmse = math.sqrt(mean_squared_error(test_y,predict))
r2 = r2_score(test_y,predict)
print(f"Mean Absolute Error:{round(mae,2)}")
print(f"Mean Squared Error:{round(mse,2)}")
print(f"Root Mean Squared Error:{round(rmse,2)}")
print(f"R2 Score:{round(r2,2)}")
```

```
Mean Absolute Error:43.67
Mean Squared Error:4673.49
Root Mean Squared Error:68.36
R2 Score:0.99
```

Regression Model with all dependent numeric variables at Nation level is giving R SQUARED metric of 99%. So skipping state level Regression Model

b) Run another model at State level. There are 52 states in USA

```
In [133]: s_train = train[numerical_variable(train)]
s_test = test[numerical_variable(test)]
```

```
In [134]: s_train.drop(columns=['zip_code', 'area_code', 'lat','lng','remaining_inc
ome', 'pop_density', 'median_age'],inplace=True)
s_test.drop(columns=['zip_code', 'area_code', 'lat','lng','pop_density',
'median_age'],inplace=True)
```

```
In [137]: print(s_train.shape)
print(s_test.shape)
```

```
(26585, 68)
(11355, 68)
```

```
In [145]: state = s_train['STATEID'].unique()
```

```
In [149]: s_train['STATEID'].value_counts()
```

```
Out[149]: 6      2826
48     1876
36     1683
12     1569
42     1203
17     1096
39     1074
26     1016
37      809
13      757
34      684
51      667
18      565
25      538
53      536
55      531
4       523
24      513
47      508
27      496
29      488
8       463
22      420
1       407
45      389
21      387
40      365
9       321
41      321
72      300
20      295
19      287
5       264
28      242
32      239
49      224
35      195
31      185
54      168
23      130
30      117
15      113
33      111
16      101
46       89
44       89
38       79
2        74
10      71
11       63
50       62
56       56
Name: STATEID, dtype: int64
```

```
In [146]: print(sorted(state))
```

```
[1, 2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 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, 42, 44, 45, 46, 47, 48, 49, 50, 51, 53, 54, 55, 56, 72]
```

```
In [136]: s_train.columns
```

```
Out[136]: Index(['COUNTYID', 'STATEID', 'ALand', 'AWater', 'pop', 'male_pop',  
       'female_pop', 'rent_mean', 'rent_median', 'rent_stdev',  
       'rent_sample_weight', 'rent_samples', 'rent_gt_10', 'rent_gt_15',  
       'rent_gt_20', 'rent_gt_25', 'rent_gt_30', 'rent_gt_35', 'rent_gt_40',  
       'rent_gt_50', 'universe_samples', 'used_samples', 'hi_mean',  
       'hi_median', 'hi_stdev', 'hi_sample_weight', 'hi_samples',  
       'family_mean', 'family_median', 'family_stdev', 'family_sample_weight',  
       'family_samples', 'hc_mortgage_mean', 'hc_mortgage_median',  
       'hc_mortgage_stdev', 'hc_mortgage_sample_weight', 'hc_mortgage_samples',  
       'hc_mean', 'hc_median', 'hc_stdev', 'hc_samples', 'hc_sample_weight',  
       'home_equity_second_mortgage', 'second_mortgage', 'home_equity',  
       'debt', 'second_mortgage_cdf', 'home_equity_cdf', 'debt_cdf', 'hs_degree',  
       'hs_degree_male', 'hs_degree_female', 'male_age_mean',  
       'male_age_median', 'male_age_stdev', 'male_age_sample_weight',  
       'male_age_samples', 'female_age_mean', 'female_age_median',  
       'female_age_stdev', 'female_age_sample_weight', 'female_age_samples',  
       'pct_own', 'married', 'married_snp', 'separated', 'divorced',  
       'bad_debt'],  
      dtype='object')
```

```
In [138]: feature_columns=['COUNTYID', 'STATEID', 'ALand', 'AWater', 'pop', 'male_p  
op',  
    'female_pop', 'rent_mean', 'rent_median', 'rent_stdev',  
    'rent_sample_weight', 'rent_samples', 'rent_gt_10', 'rent_gt_15',  
    'rent_gt_20', 'rent_gt_25', 'rent_gt_30', 'rent_gt_35', 'rent_gt_4  
0',  
    'rent_gt_50', 'universe_samples', 'used_samples', 'hi_mean',  
    'hi_median', 'hi_stdev', 'hi_sample_weight', 'hi_samples',  
    'family_mean', 'family_median', 'family_stdev', 'family_sample_wei  
ght',  
    'family_samples', 'hc_mortgage_median', 'hc_mortgage_stdev', 'hc_mo  
rtgage_sample_weight',  
    'hc_mortgage_samples', 'hc_mean', 'hc_median', 'hc_stdev', 'hc_samp  
les', 'hc_sample_weight',  
    'home_equity_second_mortgage', 'second_mortgage', 'home_equity', '  
debt',  
    'second_mortgage_cdf', 'home_equity_cdf', 'debt_cdf', 'hs_degree',  
    'hs_degree_male', 'hs_degree_female', 'male_age_mean',  
    'male_age_median', 'male_age_stdev', 'male_age_sample_weight',  
    'male_age_samples', 'female_age_mean', 'female_age_median',  
    'female_age_stdev', 'female_age_sample_weight', 'female_age_sample  
s',  
    'pct_own', 'married', 'married.snp', 'separated', 'divorced',  
    'bad_debt']
```

```
In [139]: from sklearn.preprocessing import StandardScaler
```

```
In [147]: SC = StandardScaler()
```

```
In [152]: for i in [1,20,45]:
    print("STATEID - ",i)
    s_train_x=s_train[s_train['COUNTYID']==i][feature_columns]
    s_train_y=s_train[s_train['COUNTYID']==i]['hc_mortgage_mean']

    s_test_x=s_test[s_test['COUNTYID']==i][feature_columns]
    s_test_y=s_test[s_test['COUNTYID']==i]['hc_mortgage_mean']

    s_train_scaled=SC.fit_transform(s_train_x)
    s_test_scaled=SC.fit_transform(s_test_x)

    Lr.fit(s_train_scaled,s_train_y)
    s_pred = Lr.predict(s_test_scaled)

    s_mae = mean_absolute_error(s_test_y,s_pred)
    s_mse = mean_squared_error(s_test_y,s_pred)
    s_rmse = math.sqrt(mean_squared_error(s_test_y,s_pred))
    s_r2 = r2_score(s_test_y,s_pred)

    print(f"Mean Absolute Error:{round(s_mae,2)}")
    print(f"Mean Squared Error:{round(s_mse,2)}")
    print(f"Root Mean Squared Error:{round(s_rmse,2)}")
    print(f"R2 Score:{round(s_r2,2)}")

STATEID - 1
Mean Absolute Error:11389503548.48
Mean Squared Error:2.0908859553935737e+20
Root Mean Squared Error:14459896110.95
R2 Score:-410429821366382.56
STATEID - 20
Mean Absolute Error:246.6
Mean Squared Error:84714.13
Root Mean Squared Error:291.06
R2 Score:0.63
STATEID - 45
Mean Absolute Error:8822908571370.76
Mean Squared Error:1.553802280528196e+26
Root Mean Squared Error:12465160570679.37
R2 Score:-6.443994385547235e+20
```

- Ensure Multi-collinearity does not exist in dependent variables

```
In [160]: corr_features = set()
corr_mat = n_train.drop('hc_mortgage_mean', axis=1).corr()

for i in range(len(corr_mat.columns)):
    for j in range(i):
        if abs(corr_mat.iloc[i, j]) > 0.8:
            col_name = corr_mat.columns[i]
            corr_features.add(col_name)
```

```
In [161]: corr_features
```

```
Out[161]: {'bad_debt',
'debt_cdf',
'family_mean',
'family_median',
'family_sample_weight',
'family_samples',
'family_stdev',
'female_age_mean',
'female_age_median',
'female_age_sample_weight',
'female_age_samples',
'female_pop',
'hc_median',
'hc_mortgage_samples',
'hc_sample_weight',
'hi_median',
'hi_samples',
'hi_stdev',
'home_equity_cdf',
'hs_degree_female',
'hs_degree_male',
'male_age_median',
'male_age_sample_weight',
'male_age_samples',
'male_pop',
'rent_gt_25',
'rent_gt_30',
'rent_gt_35',
'rent_gt_40',
'rent_gt_50',
'rent_median',
'rent_samples',
'second_mortgage',
'universe_samples',
'used_samples'}
```

```
In [163]: corr_list = ['bad_debt', 'debt_cdf', 'family_mean', 'family_median', 'family_
sample_weight', 'family_samples', 'family_stdev', 'female_age_mean', 'female_
age_median', 'female_age_sample_weight',
'female_age_samples', 'female_pop', 'hc_median', 'hc_mortgage_samples', 'hc_
sample_weight', 'hi_median', 'hi_samples', 'hi_stdev', 'home_equity_cdf', 'hs_
degree_female', 'hs_degree_male',
'male_age_median', 'male_age_sample_weight', 'male_age_samples', 'male_pop'
', 'rent_gt_25', 'rent_gt_30', 'rent_gt_35', 'rent_gt_40', 'rent_gt_50', 'rent_
median', 'rent_samples',
'second_mortgage', 'universe_samples', 'used_samples']
```

```
In [164]: n_train.drop(corr_list, axis=1, inplace=True)
```

```
In [165]: n_test.drop(corr_list, axis=1, inplace=True)
```

```
In [166]: print(n_train.shape, n_test.shape)
```

```
(26585, 31) (11355, 31)
```

Dropped MultiCollinear variables and ran the Regression Model

In [167]: `n_train.head()`

Out[167]:

	ALand	AWater	pop	rent_mean	rent_stdev	rent_sample_weight	rent_gt_1
UID							
267822	202183361.0	1699120	5230	769.38638	232.63967	272.34441	0.8676
246444	1560828.0	100363	2633	804.87924	253.46747	312.58622	0.9741
245683	69561595.0	284193	6881	742.77365	323.39011	291.85520	0.9523
279653	1105793.0		0	2700	803.42018	297.39258	259.30316
247218	2554403.0		0	5637	938.56493	392.44096	1005.42886

In [168]: `train_X = n_train.drop(columns=['hc_mortgage_mean'])`
`train_Y = n_train['hc_mortgage_mean']`

`test_X = n_test.drop(columns=['hc_mortgage_mean'])`
`test_Y = n_test['hc_mortgage_mean']`

In [169]: `Lr.fit(train_X,train_Y)`

Out[169]: `LinearRegression()`

In [170]: `y_pred = Lr.predict(test_X)`
`y_pred`

Out[170]: `array([1146.05812417, 1511.21532648, 1224.05002978, ..., 1846.89314756,`
`1166.22357821, 1388.02844867])`

In [171]: `n_mae = mean_absolute_error(test_Y,y_pred)`
`n_mse = mean_squared_error(test_Y,y_pred)`
`n_rmse = math.sqrt(mean_squared_error(test_Y,y_pred))`
`n_r2 = r2_score(test_Y,y_pred)`
`print(f"Mean Absolute Error:{round(n_mae,2)}")`
`print(f"Mean Squared Error:{round(n_mse,2)}")`
`print(f"Root Mean Squared Error:{round(n_rmse,2)}")`
`print(f"R2 Score:{round(n_r2,2)}")`

Mean Absolute Error:44.0
Mean Squared Error:4787.23
Root Mean Squared Error:69.19
R2 Score:0.99

We have achieved an R Squared value of 99% which is pretty close to 1

- Test if predicted variable is normally distributed

```
In [172]: residual = test_Y - y_pred  
residual
```

Out[172]: UID

255504	-6.812644
252676	22.044554
276314	30.494590
248614	-78.423430
286865	8.275276
238666	4.135431
240174	11.796707
266241	-44.265031
224873	-49.241696
290904	38.112548
243894	39.372085
249869	-15.990594
252569	-11.469165
289758	6.883624
265375	-2.377305
282536	21.882346
291282	31.373245
228479	76.953234
234207	9.420985
221773	-9.871131
250775	-35.231303
221579	49.945929
282302	13.824565
224946	-15.516089
293442	12.370279
240520	62.051402
265215	40.940737
281686	-66.082313
285948	-36.556975
258792	-25.763980
220502	-45.105171
258985	-48.357005
273508	-49.776142
276405	33.678663
284366	-4.822987
224534	-98.769147
246101	-82.400449
240403	-33.719314
259449	19.412706
243106	-26.743362
275231	-91.634767
262923	42.691556
242365	-62.567103
263028	45.741530
266907	-83.067416
271383	6.772818
265183	46.578746
244091	-18.541317
268845	-26.255923
286696	-41.229761
285372	6.923895
251908	52.759745
251142	-45.985787
261472	-0.797916
249010	-9.055891
277442	18.490864
258904	49.806972
287677	24.839936
272171	-58.991153

221625	293.344799
267766	127.916684
274915	10.897324
283644	34.026163
225539	-243.360541
281801	96.222460
258586	21.009520
234183	28.660528
271503	5.546638
287093	-75.955062
280950	-41.281336
244967	-25.055367
265820	25.553286
242338	-0.002177
288357	-5.142481
222751	-49.466378
279884	16.032620
226660	125.086223
264513	-74.275075
279833	-9.422211
264980	-8.918294
274171	-4.630017
237894	9.295089
260815	-36.629026
277258	-2.850989
267561	60.554435
276680	33.812423
239079	42.081993
277038	106.387609
258265	22.025661
272889	-23.535633
292038	-29.806670
257919	-22.046829
275036	23.702358
263121	-5.455320
240028	-20.305019
256774	-9.617187
262816	-3.403754
262417	-69.589327
243976	68.989227
250737	24.363277
250763	37.841557
282088	-10.492738
229748	-87.885984
283296	-22.992920
229452	-1.891832
226688	88.851271
247855	-12.542262
221117	39.977292
258523	46.195680
287799	-36.652542
285844	22.969827
286800	-44.575785
254832	-7.302943
276597	-204.476403
237476	68.428798
225836	-18.736119
267794	1.505182
283803	-31.762760
265485	49.439910

267932	-34.099713
288528	84.931654
275247	-19.234894
249326	65.261460
269954	63.168674
228931	225.163132
235047	-4.179733
275987	-17.086475
286509	79.587207
293063	4.479706
265334	-65.242440
288919	-48.178316
290494	2.122856
273690	43.373243
256849	-24.710613
242161	55.713564
242977	-281.902954
251163	8.735772
251015	-18.096134
286270	53.865360
275775	41.035700
242603	-6.304967
289082	1.404081
291818	-63.869020
221704	12.681044
243398	-44.047233
226048	106.845041
280750	95.526926
229172	46.587207
293711	28.093010
235877	61.571106
275250	90.892236
275940	-25.734987
286433	-34.192496
274118	3.262421
284140	-111.464260
272354	46.301908
267863	48.970078
287455	-14.317578
263938	129.092330
237667	-56.889767
232048	45.061809
225409	-6.527994
253379	22.823637
245843	-20.812704
230653	36.775081
242551	126.545038
251204	51.790060
257847	-24.085699
257349	-20.679835
238189	-58.152984
229671	-75.189010
269868	-60.822492
275211	16.726057
260901	-37.835710
244656	-20.018480
234891	9.215430
260156	-51.855415
235922	-76.578297
258665	-14.253111

280230	-6.721518
266149	238.189409
230812	119.286038
265237	8.045505
244343	1.975399
282579	-51.010084
275109	-22.140319
245112	-27.158015
250241	-37.501863
254640	-37.926439
249908	-22.806988
246081	-73.424562
282352	80.879608
268164	-172.206595
262930	49.488956
272825	42.057747
228622	-35.709426
262131	-14.748702
263577	-87.424915
241308	-30.953727
261408	8.240967
235911	5.332723
280953	130.041594
284088	-13.962682
283280	78.512177
233515	7.374759
288371	-90.324917
229736	-19.576363
239900	-25.601161
233500	10.621063
263463	-40.619038
239273	94.553552
234577	-19.097360
234327	-12.319635
289529	-27.659618
223186	18.636744
227195	21.515066
248955	33.698009
223792	-108.676329
291357	-7.122951
277614	-18.389865
272867	0.823399
270445	0.864223
287435	26.797277
248177	54.280959
230247	220.078445
231440	-43.346020
290114	4.060619
229725	12.852163
274036	23.983944
283123	5.983559
241301	-11.706958
287739	-7.619665
227422	0.474146
279307	1.056318
262832	105.506471
263999	-362.275803
226598	80.929540
227552	-24.369728
286506	-23.401593

284275	30.870566
254506	29.226997
247230	-28.367924
269101	87.840411
228342	-43.163612
224617	-9.824342
246699	9.605339
279511	17.646443
239773	14.191578
223835	-18.774089
246480	-7.492302
270981	-76.124306
231674	-41.170595
221197	64.320231
238573	-23.540906
258111	0.621249
259578	17.376936
232024	-43.869904
247818	-7.672490
265856	50.940091
255313	320.544047
236204	-99.103475
227522	-55.789404
275669	17.139381
252399	-27.017170
239904	-9.606947
230789	-19.690447
243210	14.279140
230762	-45.657688
265103	-87.635594
267591	70.185305
275509	10.455901
285317	-68.792247
230091	24.035744
290481	35.818407
270679	-74.715695
231888	-37.322433
223759	53.934975
274173	-3.337323
263185	0.032432
244527	-89.488940
262205	-7.375389
251858	-25.732398
275857	17.308264
258151	3.442559
250072	-74.403140
284836	-32.444552
247871	-59.586581
274236	-33.872708
248721	3.401718
293953	-27.117147
282967	27.897742
268423	-50.174224
245411	8.987619
280708	48.799188
232638	7.821154
224966	-9.804468
259642	-4.047993
291924	-14.910433
274616	42.249331

223606	10.881866
292389	21.197102
272862	-16.339917
265021	89.851657
288595	-23.378819
261257	-37.183556
241804	9.150501
229317	-59.148846
261238	-6.785832
282672	-28.789873
224240	-104.674855
269397	19.179580
225100	122.754567
262045	14.522962
279986	-82.314484
272797	6.704837
286420	-19.524801
245450	4.792377
235982	-12.948187
241141	31.861864
274374	29.259649
289644	-206.851997
271131	76.838936
281078	50.549118
237720	-25.267452
238465	-80.653847
288906	-25.211423
268861	36.618995
251208	-57.202115
227230	-34.627636
247945	-76.427102
233450	-48.035643
259428	28.416493
272732	22.437724
262918	72.561620
293203	-19.892532
233271	-206.773315
266564	11.997536
259352	31.943580
275674	6.483753
248983	19.381361
231714	-25.628882
246710	-13.017018
251499	-44.524248
275675	-66.474607
229773	41.686635
236026	-44.818765
227741	26.830001
282242	36.701656
260498	31.635880
289870	-12.177596
257253	-59.555141
251931	-18.962659
285662	-32.087402
276887	-23.780249
222237	21.474666
264595	-61.250187
277985	60.739591
235560	-67.566389
241380	29.771411

242657	-83.098447
250546	153.724967
293819	-6.307817
252122	74.991716
270053	32.910463
289617	-84.766915
224862	-106.517871
269890	-16.854923
224157	7.782420
222649	15.546344
277681	-47.060404
278221	-23.978382
266143	193.163576
291361	33.335719
224204	68.639414
272543	59.785188
265632	26.147947
270701	92.717796
246978	13.931334
252413	-48.185884
229020	27.367544
246669	9.310608
229561	-102.470370
276486	-25.958734
220568	-28.187287
271930	11.098718
291266	-30.448831
280179	-72.075173
287797	-43.828302
263430	-169.394090
271608	-43.603900
272532	13.183078
282560	-10.757474
270148	-61.826397
280896	38.596126
266365	-1.757261
257936	-13.659581
235393	37.191600
227778	23.525922
238218	49.811795
267837	16.086121
246137	25.460675
220961	-85.023653
255653	-118.755579
291801	-10.190312
272749	-12.011120
221240	23.985852
281640	41.487191
291590	29.537521
279644	-17.062155
228503	-34.673972
237000	1.524278
224186	162.407812
220578	-48.641682
235254	5.741121
224336	36.558405
266883	-15.866240
264556	-35.214977
227329	138.309837
270883	28.278098

279732	-115.081844
221358	54.909648
242578	28.983826
276318	-2.158893
227979	255.544180
258189	7.818020
273441	-15.973058
273956	-26.088265
283131	2.614364
292030	44.430705
285074	9.549953
223626	20.983318
255467	-12.943448
236102	-9.107796
261253	16.559874
269447	25.780784
222559	-22.323759
262409	-24.160758
284776	47.082852
288439	-120.123024
250060	55.451891
293243	10.151348
270006	-15.244475
270018	-37.579232
283979	511.058337
276913	35.841206
290745	-9.498631
263099	-114.349054
289246	-153.093723
230841	79.595551
271174	9.594795
229598	14.843614
246179	1.084679
249913	30.784770
255215	-37.667667
275758	80.135494
236064	14.639222
272098	64.613412
293477	31.009928
247618	1.201112
257329	23.272791
271134	-15.823772
272101	-0.021139
225470	-164.507476
284939	99.170418
265421	-28.010144
270712	-137.179057
271476	28.307985
268031	-1.874728
282199	-15.946810
290785	-52.807925
223447	-98.571204
276871	8.541977
248323	20.562120
265549	-134.536199
243583	4.341929
294044	56.688301
256081	-33.849986
237454	-20.003350
269941	39.534069

234076	21.787187
285084	-28.659398
287899	115.108763
268999	-13.956770
221325	-33.225005
220431	2.795090
226238	68.169981
258712	75.740882
243287	12.102522
252755	8.439009
229714	-7.192490
260257	-29.671867
274212	7.647091
220650	-3.117701
270213	-20.749808
252490	-25.807186
231003	-50.631334
293058	-14.467305
224418	-54.487389
268898	-39.584247
239208	-54.963313
244156	-6.085527
220605	-8.126836
277483	42.241059
283022	36.365699
292473	187.471159
249289	81.465706
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288144	-25.890287
286546	111.886088
285320	60.426434
252876	20.669070
245477	-65.760360
245665	-19.367536
245846	11.436836
234635	-1.167077
291835	20.275838
260821	-2.572978
272376	-18.830780
276955	17.889801
268951	-194.734278
291464	35.214164
222661	-35.498965
282858	-77.138015
263555	55.768167
277749	162.160721
253227	-38.389739
231224	10.857652
287001	12.730141

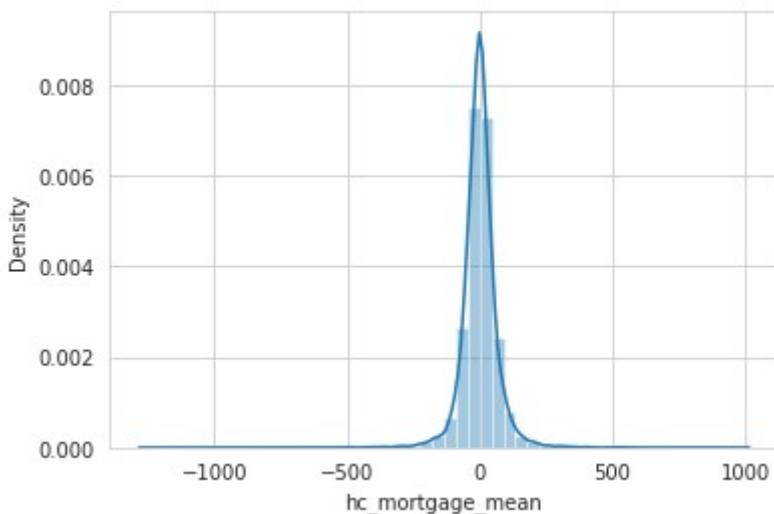
290257	50.457919
251277	97.840163
233983	-72.317041
224814	29.329232
246344	20.442744
288056	-5.872041
285495	51.099667
291670	1.081799
229500	-149.972852
260584	13.281159
274130	3.237505
272727	-3.240733
262984	-83.253135
225656	-297.415579
291196	108.390447
283693	16.212485
275170	101.869794
265319	-157.571274
232999	11.235777
254028	1.692746
227718	56.442689
243955	22.288142
233111	74.121813
245413	18.913220
245091	30.864332
280924	-12.286381
264783	-29.301051
250607	7.528279
248279	0.845657
263193	-3.692141
279470	35.642444
240743	170.071810
262234	102.534005
250552	-7.568743
272381	-1.986239
227075	-217.692668
264372	137.809900
252530	122.953976
224094	15.308493
256539	1.476375
267112	97.764312
253249	-14.020034
222136	-9.409063
228798	49.906898
245926	-37.171853
242718	-10.924889
239778	-51.842671
288606	41.243390
222938	-44.013814
263298	85.784900
249947	41.039455
259555	-12.590283
238595	-35.367973
235074	19.314422
248236	-6.878030
227149	35.154337
244560	10.862193
234900	-61.890531
289839	-39.574254
273140	44.480933

274658	81.763721
265612	44.460025
294313	-0.450881
277248	-24.750720
221965	-16.138136
280441	71.044904
267177	162.336719
250375	10.860502
254765	2.873378
226038	111.983999
285011	5.869906
246102	19.308641
269132	122.578143
267609	212.841813
249282	-11.749843
263601	22.431479
262651	-42.053037
221638	-46.743260
255873	-119.773737
288653	-26.676322
222623	-26.666164
275966	-117.733712
249087	27.089200
283456	-46.478349
255317	63.049016
248004	8.381971
277358	54.984143
256347	-52.316020
243132	-10.022880
288475	-53.057477
266635	72.529148
275455	-48.809814
228519	-108.092969
282798	20.616567
247643	40.574039
236145	-40.296964
280884	-25.768760
242503	17.292641
222772	61.979446
227632	-78.693638
253291	-2.349747
269396	2.436884
231314	69.877278
234594	-18.653567
280958	63.613106
255560	54.327267
293084	-19.017213
230828	67.143515
230184	-80.319233
242805	28.497633
262005	20.150526
277121	-34.033650
292450	-0.342513
238658	-38.258960
263710	-107.183671
277072	31.866689
275992	-58.616044
233127	-48.821771
260115	-31.764204
254093	-58.870604

```
223028      0.296036
253297     -34.516984
275021      22.800859
241714      10.073050
```

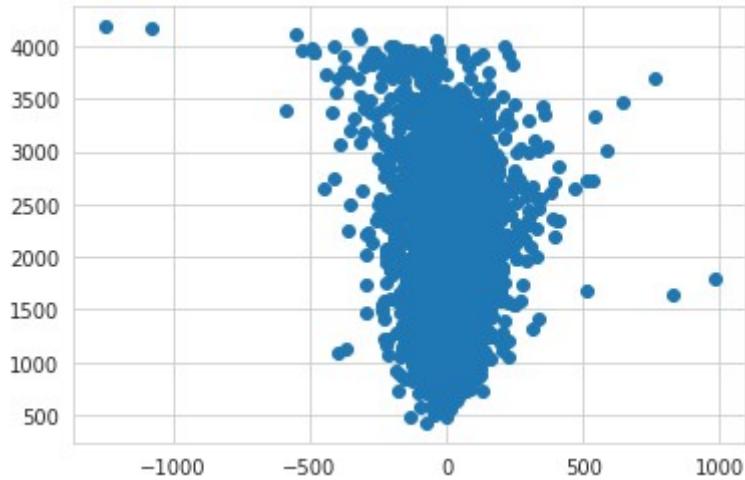
```
In [173]: sns.distplot(residual)
```

```
Out[173]: <matplotlib.axes._subplots.AxesSubplot at 0x7efe2a25bb90>
```



```
In [174]: # Same variance and residuals does not have correlation with predictor and Independance of residuals
plt.scatter(residual,y_pred)
```

```
Out[174]: <matplotlib.collections.PathCollection at 0x7efe2a164e90>
```



```
In [ ]:
```