### Stage 1 Member -Ayodeji Iwayemi

January 28, 2024

### 1 Name: Ayodeji Iwayemi

- 1.0.1 Group 1
- 1.0.2 Individual Member submission
- 1.0.3 COVID19 Data Analysis
- 1.0.4 Project Stage I (Data and Project Understanding )
- 1.1 Task 3
- 1.1.1 Read and display the COVID cases, COVID deaths and Population data

```
[2]: #this cell imports the pandas library and package for use in the notebook import pandas as pd import numpy as np import matplotlib.pyplot as plt
```

```
[3]: #Read the COVID19 cases and save in the 'cases' variable cases = pd.read_csv('covid_confirmed_usafacts.csv')
```

```
[4]: #Display the COVID19 cases
print('DISPLAY OF COVID19 CASES')
cases
```

#### DISPLAY OF COVID19 CASES

[4]:		countyFIPS	Cour	nty Name	State	StateFIPS	2020-01-22	\
0	)	0	Statewide Una	llocated	AL	1	0	
1		1001	Autauga	County	AL	1	0	
2	2	1003	Baldwin	County	AL	1	0	
3	3	1005	Barbour	County	AL	1	0	
4		1007	Bibb	County	AL	1	0	
•••		•••				•••		
3	188	56037	Sweetwater	County	WY	56	0	
3	189	56039	Teton	County	WY	56	0	
3	190	56041	Uinta	County	WY	56	0	
3	191	56043	Washakie	County	WY	56	0	
3	192	56045	Weston	County	WY	56	0	

```
2020-01-24 2020-01-25 2020-01-26 2020-01-27
      2020-01-23
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3192
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                                                           2023-07-18
      2023-07-14
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3192
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                                2023-07-22 2023-07-23
      2023-07-20
                   2023-07-21
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            19913
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            70521
                         70521
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3
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4
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3188
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3189
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                                                    12206
3190
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3191
             2640
                          2640
                                       2640
                                                    2640
3192
             1914
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                                       1914
                                                     1914
```

[3193 rows x 1269 columns]

```
[5]: #Read the COVID19 cases and save in the 'cases' variable
deaths = pd.read_csv('covid_deaths_usafacts.csv')
```

```
[6]: print('DISPLAY OF COVID19 DEATHS')
deaths
```

DISPLAY OF COVID19 DEATHS

[6]:		countyFIPS	Co	ounty Name	State	StateFI	PS 2020-01	-22 \	<b>\</b>	
	0	0	Statewide Ur	allocated	AL		1	0		
	1	1001	Autaug	ga County	AL		1	0		
	2	1003	Baldwi	n County	AL		1	0		
	3	1005	Barbou	ır County	AL		1	0		
	4	1007	Bib	b County	AL		1	0		
	 3188	<del></del> 56037	Sweetwate	 er County	 WY		 56	0		
	3189	56039		on County	WY		56	0		
	3190	56041		a County	WY		56	0		
	3191	56043		e County	WY		56	0		
	3192	56045		on County	WY		56	0		
		2020-01-23	2020-01-24	2020-01-25	2020	-01-26	2020-01-27	\		
	0	0	0	0 2020		0	0	\		
	1	0	0	0		0	0	•••		
	2	0	0	0		0	0	•••		
	3			0				•••		
		0	0			0	0	•••		
	4	0	0	0		0	0	•••		
					•••					
	3188	0	0	0		0	0	•••		
	3189	0	0	0		0	0	•••		
	3190	0	0	0		0	0	•••		
	3191	0	0	0		0	0	•••		
	3192	0	0	0		0	0	•••		
		2023-07-14					2023-07-18	2023-	-07-19	\
	0	0	0	0		0	0		0	
	1	235	235	235		235	235		235	
	2	731	731	731		731	731		731	
	3	104	104	104		104	104		104	
	4	111	111	111		111	111		111	
		•••			•••					
	3188	142	142	142		142	142		142	
	3189	16	16	16		16	16		16	
	3190	43	43	43		43	43		43	
	3191	51	51	51		51	51		51	
	3192	24	24	24		24	24		24	
		2023-07-20	2023-07-21			-07-23				
	0	0	0	0		0				
	1	235	235	235		235				
	2	731	731	731		731				
	3	104	104	104		104				
	4	111	111	111		444				
	4	111	111	111		111				

3189	16	16	16	16
3190	43	43	43	43
3191	51	51	51	51
3192	24	24	24	24

[3193 rows x 1269 columns]

```
[7]: #Read the population and save in the 'population' variable population = pd.read_csv('covid_county_population_usafacts.csv')
```

```
[8]: print('DISPLAY OF POPULATION') population
```

#### DISPLAY OF POPULATION

[8]:	countyFIPS	Count	ty Name	State	population
0	0	Statewide Unal	located	AL	0
1	1001	Autauga	County	AL	55869
2	1003	Baldwin	${\tt County}$	AL	223234
3	1005	Barbour	${\tt County}$	AL	24686
4	1007	Bibb	${\tt County}$	AL	22394
•••	•••				
3190	56037	Sweetwater	${\tt County}$	WY	42343
3191	56039	Teton	${\tt County}$	WY	23464
3192	56041	Uinta	${\tt County}$	WY	20226
3193	56043	Washakie	${\tt County}$	WY	7805
3194	56045	Weston	${\tt County}$	WY	6927

[3195 rows x 4 columns]

## 1.1.2 Determining the common columns among the three dataframes: cases, deaths, and population

```
[10]: #Display the intersecting columns intersec_column
```

[10]: {'County Name', 'State', 'countyFIPS'}

#### 1.1.3 Merging the three datasets using the most suitable common column

```
[11]: #Merge the cases and Deaths and name it merged1
      merged1 = pd.merge(cases,deaths, how = "inner", left_on =__
       ⇔("countyFIPS", "State"), right_on = ("countyFIPS", "State"), suffixes = □
       [12]: # Display the merged cases and Deaths dataframe
      merged1
[12]:
                              County Namecases State StateFIPScases \
            countyFIPS
                         Statewide Unallocated
                      0
                                                   AT.
      1
                   1001
                               Autauga County
                                                   AL
                                                                     1
      2
                               Baldwin County
                   1003
                                                   AL
                                                                     1
      3
                   1005
                               Barbour County
                                                   AL
                                                                     1
      4
                   1007
                                  Bibb County
                                                   AL
                                                                     1
      3188
                  56037
                            Sweetwater County
                                                   WY
                                                                    56
                                 Teton County
      3189
                 56039
                                                   WY
                                                                    56
      3190
                 56041
                                 Uinta County
                                                   WY
                                                                    56
                              Washakie County
      3191
                 56043
                                                   WY
                                                                    56
      3192
                 56045
                                Weston County
                                                   WY
                                                                    56
            2020-01-22cases
                              2020-01-23cases 2020-01-24cases 2020-01-25cases
      0
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      3192
                           0
                              2020-01-27cases
                                                   2023-07-14deaths
            2020-01-26cases
      0
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      1
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      3190
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3192
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             2023-07-15deaths
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             2023-07-23deaths
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      3188
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      3189
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      3190
                            43
      3191
                            51
      3192
                            24
      [3193 rows x 2536 columns]
[13]: #Merge the merged1 with population and name it merged
```

# [14]: # Display the merged cases, deaths and population dataframe merged

0	[14]:		countyFIPS		County Nameca	ses	State	StateFIPS	cases	· \		
2 1003 Baldwin County AL 1 3 1005 Barbour County AL 1 4 1007 Bibb County AL 1		0	0	State	ewide Unalloca	ted	AL		1	-		
3		1	1001		Autauga Coun	ty	AL		1	-		
## 1007		2	1003		Baldwin Coun	ty	AL		1	-		
		3	1005		Barbour Coun	ty	AL		1	-		
3188		4	1007		Bibb Coun	ty	AL		1	-		
3189		•••	•••		•••	•••		•••				
3190		3188	56037	Sv		•	WY	•	56	3		
3191   56043   Washakie County   WY   56   56						-						
Signature						-						
2020-01-22cases   2020-01-23cases   2020-01-24cases   2020-01-25cases   0						•						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		3192	56045		Weston Coun	ty	WY	•	56	3		
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			2020-01-22c	ases	2020-01-23cas	es	2020-	01-24cases	2020	)-01-25cases	\	
1       0       0       0       0       0         2       0       0       0       0       0         3       0       0       0       0       0         4       0       0       0       0       0         3188       0       0       0       0       0         3189       0       0       0       0       0         3190       0       0       0       0       0         3191       0       0       0       0       0         3192       0       0       0       0       0         1       0       0       0       0       0         1       0       0       0       0       0         2       0       0       0       0       0       0         4       0       0       0       104       4       111		0										
3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				0		0		0		0		
4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		2		0		0		0		0		
		3		0		0		0		0		
3188		4		0		0		0		0		
3189			•••		***			•••		•••		
3190 0 0 0 0 0 0 0 0 3191 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		3188		0		0		0		0		
3191 0 0 0 0 0 3192 0 0 0 0 0  2020-01-26cases 2020-01-27cases 2023-07-16deaths \ 0 0 0 0 0 1 0 235 2 0 0 0 731 3 0 0 731 3 0 0 104 4 0 0 0 111 3188 0 0 0 111 3189 0 0 0 142 3190 0 0 16 3190 0 0 16 3191 0 0 0 51 3192 0 0 0 51 3192 0 0 0 0 24  2023-07-17deaths 2023-07-18deaths 2023-07-19deaths 2023-07-20deaths \ 0 0 0 0 0 0 0 0 0 0 1 235 235 235 235 2 731 731 731 731		3189		0		0		0		0		
3192 0 0 0 0 0 0  2020-01-26cases 2020-01-27cases 2023-07-16deaths \ 0 0 0 0 0 0 1 0 0 235 2 0 0 0 731 3 0 0 0 104 4 0 0 0 111 3188 0 0 0 111 3189 0 0 0 142 3190 0 0 16 3190 0 0 16 3191 0 0 0 51 3192 0 0 0 51 3192 0 0 0 51 3192 0 0 0 0 24  2023-07-17deaths 2023-07-18deaths 2023-07-19deaths 2023-07-20deaths \ 0 0 0 0 0 0 0 0 0 0 1 235 235 235 235 235 2 731 731 731 731		3190		0		0		0		0		
2020-01-26cases 2020-01-27cases 2023-07-16deaths \ 0		3191		0		0		0		0		
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1 0 0 235 2 0 0 731 3 0 0 104 4 0 0 111 3188 0 0 0 142 3189 0 0 0 16 3190 0 0 43 3191 0 0 0 43 3191 0 0 51 3192 0 0 51 3192 0 0 0 51 3192 0 0 0 51 3192 0 0 0 51 3192 0 0 0 51 3192 0 0 0 0 51 3192 0 0 0 0 0 0 0 0 1 235 235 235 235 2 731 731 731 731		0										
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4 0 0 0 111				0		0	•••					
		3		0		0	•••		104			
3188 0 0 0 142 3189 0 0 16 3190 0 0 43 3191 0 0 0 51 3192 0 0 0 24  2023-07-17deaths 2023-07-18deaths 2023-07-19deaths 2023-07-20deaths \ 0 0 0 0 0 0 0 0 0 1 235 235 235 235 2 731 731 731		4		0		0	•••		111			
3189 0 0 0 16 3190 0 0 43 3191 0 0 51 3192 0 0 24  2023-07-17deaths 2023-07-18deaths 2023-07-19deaths 2023-07-20deaths \ 0 0 0 0 0 0 0 1 235 235 235 235 2 731 731 731		•••	•••		*** ***			•••				
3190 0 0 43 3191 0 0 51 3192 0 0 24  2023-07-17deaths 2023-07-18deaths 2023-07-19deaths 2023-07-20deaths \ 0 0 0 0 0 0 0 0 1 235 235 235 235 2 731 731 731 731		3188		0		0	•••		142			
3191 0 0 51 3192 0 0 24 2023-07-17deaths 2023-07-18deaths 2023-07-19deaths 2023-07-20deaths \ 0 0 0 0 0 0 0 0 0 1 235 235 235 235 2 731 731 731 731		3189		0		0	•••		16			
3192 0 0 24  2023-07-17deaths 2023-07-18deaths 2023-07-19deaths 2023-07-20deaths \ 0 0 0 0 0 0 0 0 0 0 1 235 235 235 235 235 235 235 235 235 235		3190		0		0	•••		43			
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0     0     0     0     0       1     235     235     235     235       2     731     731     731     731		3192		0		0			24			
0     0     0     0     0       1     235     235     235     235       2     731     731     731     731			2023-07-17d	eaths	2023-07-18de	aths	s 202	3-07-19deat	hs 2	2023-07-20dea	ths	\
1 235 235 235 235 2 731 731 731 731		0										•
2 731 731 731 731								2				
				104		104	4				104	

4	111	111	111	111
 3188	 142	 142	 142	 142
3189	16	16	16	16
3190	43	43	43	43
3191	51	51	51	51
3192	24	24	24	24
0102	21	21	21	21
	2023-07-21deaths	2023-07-22deaths	2023-07-23deaths	\
0	0	0	0	
1	235	235	235	
2	731	731	731	
3	104	104	104	
4	111	111	111	
•••	•••	•••	•••	
3188	142	142	142	
3189	16	16	16	
3190	43	43	43	
3191	51	51	51	
3192	24	24	24	
	<b>a</b>	N. 7		
•	County			
0	Statewide Unalloc			
1	Autauga Co	-		
2 3	Baldwin Co	•		
	Barbour Co	•		
4	Bibb Co	unty 22394		
 2100	Crractureten Co			
3188 3189	Sweetwater Co <sup>.</sup> Teton Co <sup>.</sup>	-		
3199	Uinta Co	•		
3190	Washakie Co	•		
3191	Washakie Co Weston Co	•		
3132	weston co	unity 0927		

### 1.2 Extracting and Displaying the New York Dataset

O Statewide Unallocated

Albany County

[3193 rows x 2538 columns]

36001

1860

1861

NY

NY

36

36

0

0

1862	36003	Allega	ny County	NY	36	0	
1863	36005	_	nx County	NY	36	0	
1864	36007	Broo	me County	NY	36	0	
•••	•••			•••	•••		
1918	36115	Washingt	on County	NY	36	0	
1919	36117	•	ne County	NY	36	0	
1920	36119	•	er County	NY	36	0	
1921	36121		ng County	NY	36	0	
1922	36123	· ·	es County	NY	36	0	
			J				
	2020-01-23	2020-01-24	2020-01-25	2020-01-26	2020-01-27	\	
1860	0	0	0	0	0	•••	
1861	0	0	0	0	0	•••	
1862	0	0	0	0	0	•••	
1863	0	0	0	0	0	•••	
1864	0	0	0	0	0	•••	
•••	•••	•••	•••		•••		
1918	0	0	0	0	0	•••	
1919	0	0	0	0	0	•••	
1920	0	0	0	0	0	•••	
1921	0	0	0	0	0	•••	
1922	0	0	0	0	0	•••	
	2023-07-14	2023-07-15	2023-07-16	2023-07-17	2023-07-18	2023-07-19	\
1860	0	0	0	0	0	0	\
1860 1861							\
	0	0	0	0	0	0	\
1861	0 80317	0 80317	0 80317	0 80317	0 80317	0 80346	\
1861 1862	0 80317 11019	0 80317 11019	0 80317 11019	0 80317 11019	0 80317 11019	0 80346 11023	\
1861 1862 1863	0 80317 11019 516506	0 80317 11019 516506	0 80317 11019 516506	0 80317 11019 516506	0 80317 11019 516506	0 80346 11023 516827	\
1861 1862 1863	0 80317 11019 516506	0 80317 11019 516506	0 80317 11019 516506	0 80317 11019 516506	0 80317 11019 516506	0 80346 11023 516827	\
1861 1862 1863 1864 	0 80317 11019 516506 60127 	0 80317 11019 516506 60127	0 80317 11019 516506 60127	0 80317 11019 516506 60127 	0 80317 11019 516506 60127 	0 80346 11023 516827 60149	\
1861 1862 1863 1864  1918	0 80317 11019 516506 60127  16237	0 80317 11019 516506 60127  16237	0 80317 11019 516506 60127 	0 80317 11019 516506 60127  16237	0 80317 11019 516506 60127  16237	0 80346 11023 516827 60149	\
1861 1862 1863 1864  1918 1919	0 80317 11019 516506 60127  16237 22585	0 80317 11019 516506 60127  16237 22585	0 80317 11019 516506 60127  16237 22585	0 80317 11019 516506 60127  16237 22585	0 80317 11019 516506 60127  16237 22585	0 80346 11023 516827 60149 16237 22592	\
1861 1862 1863 1864  1918 1919	0 80317 11019 516506 60127  16237 22585 340492	0 80317 11019 516506 60127  16237 22585 340492	0 80317 11019 516506 60127  16237 22585 340492	0 80317 11019 516506 60127  16237 22585 340492	0 80317 11019 516506 60127  16237 22585 340492	0 80346 11023 516827 60149 16237 22592 340721	\
1861 1862 1863 1864  1918 1919 1920 1921	0 80317 11019 516506 60127  16237 22585 340492 10118 4543	0 80317 11019 516506 60127  16237 22585 340492 10118 4543	0 80317 11019 516506 60127  16237 22585 340492 10118 4543	0 80317 11019 516506 60127  16237 22585 340492 10118 4543	0 80317 11019 516506 60127  16237 22585 340492 10118	0 80346 11023 516827 60149 16237 22592 340721 10120	\
1861 1862 1863 1864  1918 1919 1920 1921 1922	0 80317 11019 516506 60127  16237 22585 340492 10118 4543	0 80317 11019 516506 60127  16237 22585 340492 10118 4543	0 80317 11019 516506 60127  16237 22585 340492 10118 4543	0 80317 11019 516506 60127  16237 22585 340492 10118 4543	0 80317 11019 516506 60127  16237 22585 340492 10118	0 80346 11023 516827 60149 16237 22592 340721 10120	\
1861 1862 1863 1864  1918 1919 1920 1921 1922	0 80317 11019 516506 60127  16237 22585 340492 10118 4543	0 80317 11019 516506 60127  16237 22585 340492 10118 4543	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-22 0	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-23 0	0 80317 11019 516506 60127  16237 22585 340492 10118	0 80346 11023 516827 60149 16237 22592 340721 10120	\
1861 1862 1863 1864  1918 1919 1920 1921 1922	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-20 0 80346	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-21 0 80346	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-22 0 80346	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-23 0 80346	0 80317 11019 516506 60127  16237 22585 340492 10118	0 80346 11023 516827 60149 16237 22592 340721 10120	\
1861 1862 1863 1864  1918 1919 1920 1921 1922 1860 1861 1862	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-20 0 80346 11023	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-21 0 80346 11023	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-22 0 80346 11023	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-23 0 80346 11023	0 80317 11019 516506 60127  16237 22585 340492 10118	0 80346 11023 516827 60149 16237 22592 340721 10120	\
1861 1862 1863 1864  1918 1919 1920 1921 1922 1860 1861 1862 1863	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-20 0 80346 11023 516827	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-21 0 80346 11023 516827	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-22 0 80346 11023 516827	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-23 0 80346 11023 516827	0 80317 11019 516506 60127  16237 22585 340492 10118	0 80346 11023 516827 60149 16237 22592 340721 10120	\
1861 1862 1863 1864  1918 1919 1920 1921 1922 1860 1861 1862	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-20 0 80346 11023	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-21 0 80346 11023	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-22 0 80346 11023	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-23 0 80346 11023	0 80317 11019 516506 60127  16237 22585 340492 10118	0 80346 11023 516827 60149 16237 22592 340721 10120	\
1861 1862 1863 1864  1918 1919 1920 1921 1922 1860 1861 1862 1863 1864 	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-20 0 80346 11023 516827 60149 	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-21 0 80346 11023 516827 60149 	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-22 0 80346 11023 516827 60149 	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-23 0 80346 11023 516827 60149	0 80317 11019 516506 60127  16237 22585 340492 10118	0 80346 11023 516827 60149 16237 22592 340721 10120	
1861 1862 1863 1864  1918 1919 1920 1921 1922 1860 1861 1862 1863 1864 	0 80317 11019 516506 60127 16237 22585 340492 10118 4543  2023-07-20 0 80346 11023 516827 60149 16237	0 80317 11019 516506 60127 16237 22585 340492 10118 4543  2023-07-21 0 80346 11023 516827 60149 16237	0 80317 11019 516506 60127  16237 22585 340492 10118 4543  2023-07-22 0 80346 11023 516827 60149 16237	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-23 0 80346 11023 516827 60149 	0 80317 11019 516506 60127  16237 22585 340492 10118	0 80346 11023 516827 60149 16237 22592 340721 10120	
1861 1862 1863 1864  1918 1919 1920 1921 1922 1860 1861 1862 1863 1864  1918	0 80317 11019 516506 60127 16237 22585 340492 10118 4543  2023-07-20 0 80346 11023 516827 60149 16237 22592	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-21 0 80346 11023 516827 60149  16237 22592	0 80317 11019 516506 60127  16237 22585 340492 10118 4543  2023-07-22 0 80346 11023 516827 60149  16237 22592	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-23 0 80346 11023 516827 60149 	0 80317 11019 516506 60127  16237 22585 340492 10118	0 80346 11023 516827 60149 16237 22592 340721 10120	
1861 1862 1863 1864  1918 1919 1920 1921 1922 1860 1861 1862 1863 1864 	0 80317 11019 516506 60127 16237 22585 340492 10118 4543  2023-07-20 0 80346 11023 516827 60149 16237	0 80317 11019 516506 60127 16237 22585 340492 10118 4543  2023-07-21 0 80346 11023 516827 60149 16237	0 80317 11019 516506 60127  16237 22585 340492 10118 4543  2023-07-22 0 80346 11023 516827 60149 16237	0 80317 11019 516506 60127  16237 22585 340492 10118 4543 2023-07-23 0 80346 11023 516827 60149 	0 80317 11019 516506 60127  16237 22585 340492 10118	0 80346 11023 516827 60149 16237 22592 340721 10120	

1922 4544 4544 4544 4544

[63 rows x 1269 columns]

```
[17]: #New York Deaths
deathsNY = deaths[deaths["State"] == "NY"]
```

[18]: # Display the New York deaths deathsNY

1860	[18]:		countyFIPS	C	County Name	State	StateF	IPS 2020-01	-22 \		
1862   36003		1860	0	Statewide U	Jnallocated	NY		36	0		
1863       36005       Browner       County       NY       36       0         1864       36007       Browner       County       NY       36       0                 1918       36115       Washington County       NY       36       0         1919       36117       Wayne County       NY       36       0         1920       36119       Westchester County       NY       36       0         1921       36121       Wyoming County       NY       36       0         1922       36123       Yates County       NY       36       0         1922       36123       Yates County       NY       36       0         1860       0       0       0       0          1861       0       0       0       0          1862       0       0       0       0          1863       0       0       0       0          1918       0       0       0       0          1919       0       0       0       0		1861	36001	Alba	any County	NY		36	0		
1864		1862	36003	Allega	any County	NY		36	0		
		1863	36005	Bro	onx County	NY		36	0		
1918   36115		1864	36007	Broo	ome County	NY		36	0		
1919   36117											
1920 36119 Westchester County NY 36 0 1921 36121 Wyoming County NY 36 0 1922 36123 Yates County NY 36 0  2020-01-23 2020-01-24 2020-01-25 2020-01-26 2020-01-27 \ 1860 0 0 0 0 0 0 0 1861 0 0 0 0 0 0 0 1862 0 0 0 0 0 0 0 1863 0 0 0 0 0 0 0 1864 0 0 0 0 0 0 0 1864 0 0 0 0 0 0 0 1898 0 0 0 0 0 0 1918 0 0 0 0 0 0 1919 0 0 0 0 0 0 1920 0 0 0 0 0 0 1921 0 0 0 0 0 0 1922 0 0 0 0 0 0 0 0 0 1926 0 0 0 0 0 0 0 0 1927 0 0 0 0 0 0 0 0 0 1928 0 0 0 0 0 0 0 0 0 0 1929 0 0 0 0 0 0 0 0 0 0 1920 0 0 0 0 0 0 0 0 0 1921 0 0 0 0 0 0 0 0 1922 0 0 0 0 0 0 0 0 0 0 0 1924 0 0 0 0 0 0 0 0 0 0 1925 0 0 0 0 0 0 0 0 0 0 0 0 1926 0 0 0 0 0 0 0 0 0 0 0 1927 0 0 0 0 0 0 0 0 0 0 0 0 1928 0 0 0 0 0 0 0 0 0 0 0 0 0 1938 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1948 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		1918	36115	Washingt	on County	NY		36	0		
1921 36121 Wyoming County NY 36 0  2020-01-23 2020-01-24 2020-01-25 2020-01-26 2020-01-27 \ 1860 0 0 0 0 0 0 0 \ 1861 0 0 0 0 0 0 0 \ 1862 0 0 0 0 0 0 0 \ 1863 0 0 0 0 0 0 0 \ 1864 0 0 0 0 0 0 0 \ 1864 0 0 0 0 0 0 0 \ 1898 0 0 0 0 0 0 0 \ 1918 0 0 0 0 0 0 0 \ 1919 0 0 0 0 0 0 \ 1922 0 0 0 0 0 0 0 0 \ 1922 0 0 0 0 0 0 0 0 \ 1922 0 0 0 0 0 0 0 0 0 \ 1924 0 0 0 0 0 0 0 0 0 \ 1925 0 0 0 0 0 0 0 0 0 \ 1926 0 0 0 0 0 0 0 0 0 \ 1927 0 0 0 0 0 0 0 0 0 \ 1928 1 0 0 0 0 0 0 0 0 0 \ 1929 1 0 0 0 0 0 0 0 0 0 \ 1920 1 0 0 0 0 0 0 0 0 0 \ 1920 1 0 0 0 0 0 0 0 0 0 0 \ 1920 1 0 0 0 0 0 0 0 0 0 0 \ 1920 1 0 0 0 0 0 0 0 0 0 0 0 \ 1920 1 0 0 0 0 0 0 0 0 0 0 0 0 \ 1920 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 \ 1920 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 \ 1920 1 1860 578 578 578 578 578 578 578 578 \ 1861 638 638 638 638 638 638 638 638 \ 1862 166 166 166 166 166 166 166 166 \ 1863 8526 8526 8526 8526 8526 8526 8526 \ 1864 617 617 617 617 617 617 617 617 \ \ 1918 140 140 140 140 140 140 140 140 \ 1919 218 218 218 218 218 218 218 218 \ 1920 3031 3031 3031 3031 3031 3031		1919	36117	Way	ne County	NY		36	0		
1922 36123 Yates County NY 36 0  2020-01-23 2020-01-24 2020-01-25 2020-01-26 2020-01-27 \ 1860		1920	36119	Westchest	er County	NY		36	0		
2020-01-23		1921	36121	Wyomi	ing County	NY		36	0		
1860       0       0       0       0          1861       0       0       0       0          1862       0       0       0       0          1863       0       0       0       0          1864       0       0       0       0          1918       0       0       0       0          1919       0       0       0       0          1920       0       0       0       0          1921       0       0       0       0          1922       0       0       0       0          1922       0       0       0       0          1860       578       578       578       578       578         1861       638       638       638       638       638       638         1862       166       166       166       166       166       166       166       166         1863       8526       8526       8526       8526       8526       8526		1922	36123	Yat	es County	NY		36	0		
1861       0       0       0       0       0          1862       0       0       0       0       0          1863       0       0       0       0           1864       0       0       0       0                   1918       0       0       0       0           1919       0       0       0       0			2020-01-23	2020-01-24	2020-01-2	5 2020	-01-26	2020-01-27	\		
1862       0       0       0       0       0          1863       0       0       0       0       0          1864       0       0       0       0                    1918       0       0       0       0            1919       0       0       0       0		1860	0	0	(	)	0	0	•••		
1863       0       0       0       0       0          1864       0       0       0       0       0                  1918       0       0       0       0           1919       0       0       0       0            1920       0       0       0       0              1921       0       0       0       0       0		1861	0	0	(	)	0	0	•••		
1864       0       0       0       0       0                  1918       0       0       0       0       0          1919       0       0       0       0       0          1920       0       0       0       0           1921       0       0       0       0            1922       0       0       0       0       0            1860       578       578       578       578       578       578       578       578       58       58       186       186       166       166       166       166       166       166       166       166       166       166       166       166       166       166       166       167       617		1862	0	0	(	)	0	0	•••		
1918		1863	0	0	(	)	0	0	•••		
1918       0       0       0       0          1919       0       0       0       0          1920       0       0       0       0          1921       0       0       0       0          1922       0       0       0       0          1860       578       578       578       578       578         1861       638       638       638       638       638       638         1862       166       166       166       166       166       166       166       166         1863       8526       8526       8526       8526       8526       8526       8526         1864       617       617       617       617       617       617       617       617                    1918       140       140       140       140       140       140       140       140         1919       218       218       218       218       218       218       218       218		1864	0	0	(	)	0	0	•••		
1919       0       0       0       0       0          1920       0       0       0       0       0          1921       0       0       0       0       0          1922       0       0       0       0       0          1860       578       578       578       578       578       578         1861       638       638       638       638       638       638       638         1862       166		•••	•••	•••	•••	•••	•••	•••			
1920       0       0       0       0       0          1921       0       0       0       0       0          1922       0       0       0       0       0          1860       578       578       578       578       578       578         1861       638       638       638       638       638       638       638         1862       166       160       160       160       160       160 <td></td> <td>1918</td> <td>0</td> <td>0</td> <td>(</td> <td>)</td> <td>0</td> <td>0</td> <td>•••</td> <td></td> <td></td>		1918	0	0	(	)	0	0	•••		
1921       0       0       0       0       0          1922       0       0       0       0       0          2023-07-14       2023-07-15       2023-07-16       2023-07-17       2023-07-18       2023-07-19       \         1860       578       578       578       578       578       578         1861       638       638       638       638       638       638         1862       166       166       166       166       166       166       166         1863       8526 <td< td=""><td></td><td>1919</td><td>0</td><td>0</td><td>(</td><td>)</td><td>0</td><td>0</td><td>•••</td><td></td><td></td></td<>		1919	0	0	(	)	0	0	•••		
1922         0         0         0         0         0            2023-07-14         2023-07-15         2023-07-16         2023-07-17         2023-07-18         2023-07-19         \           1860         578         578         578         578         578         578           1861         638         638         638         638         638         638           1862         166         166         166         166         166         166           1863         8526         8526         8526         8526         8526         8526           1864         617         617         617         617         617         617                    1918         140         140         140         140         140         140           1919         218         218         218         218         218         218           1920         3031         3031         3031         3031         3031         3031		1920	0	0	(	)	0	0	•••		
2023-07-14         2023-07-15         2023-07-16         2023-07-17         2023-07-18         2023-07-19         \           1860         578         578         578         578         578         578           1861         638         638         638         638         638         638           1862         166         166         166         166         166         166         166           1863         8526         8526         8526         8526         8526         8526         8526           1864         617         617         617         617         617         617         617		1921	0	0	(	)	0	0	•••		
1860     578     578     578     578     578       1861     638     638     638     638     638     638       1862     166     166     166     166     166     166       1863     8526     8526     8526     8526     8526     8526       1864     617     617     617     617     617     617               1918     140     140     140     140     140     140       1919     218     218     218     218     218     218       1920     3031     3031     3031     3031     3031     3031     3031		1922	0	0	(	)	0	0	•••		
1860     578     578     578     578     578       1861     638     638     638     638     638     638       1862     166     166     166     166     166     166       1863     8526     8526     8526     8526     8526     8526       1864     617     617     617     617     617     617               1918     140     140     140     140     140     140       1919     218     218     218     218     218     218       1920     3031     3031     3031     3031     3031     3031     3031			2023-07-14	2023-07-15	2023-07-16	3 2023	8-07-17	2023-07-18	2023-	07-19	\
1861       638       638       638       638       638       638         1862       166       166       166       166       166       166       166         1863       8526       8526       8526       8526       8526       8526       8526       8526         1864       617       617       617       617       617       617       617                   1918       140       140       140       140       140       140       140         1919       218       218       218       218       218       218       218         1920       3031       3031       3031       3031       3031       3031       3031		1860							2020		`
1862       166       167       617       617       617       617											
1863     8526     8526     8526     8526     8526     8526       1864     617     617     617     617     617               1918     140     140     140     140     140       1919     218     218     218     218     218       1920     3031     3031     3031     3031     3031     3031											
1864     617     617     617     617     617               1918     140     140     140     140     140       1919     218     218     218     218     218       1920     3031     3031     3031     3031     3031     3031											
1919     218     218     218     218     218     218       1920     3031     3031     3031     3031     3031     3031			•••	•••	•••	•••		•••			
1919     218     218     218     218     218     218       1920     3031     3031     3031     3031     3031     3031			140	140	140	)				140	
1920 3031 3031 3031 3031 3031 3031											
1921 98 98 98 98 98		1921	98	98			98	98		98	

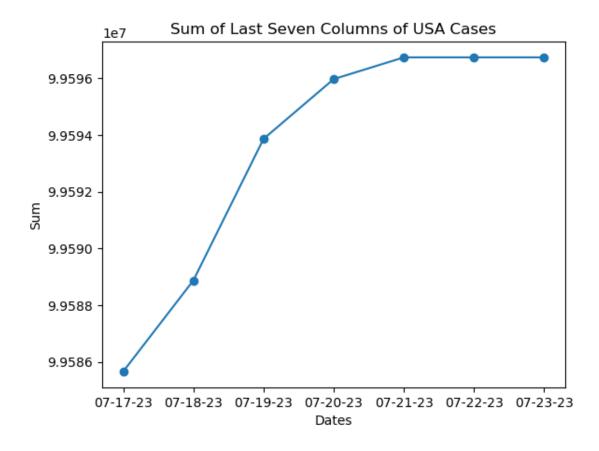
1922	45	45	45	45	45	45
	2023-07-20	2023-07-21	2023-07-22	2023-07-23		
1860	579	579	579	579		
1861	638	638	638	638		
1862	166	166	166	166		
1863	8526	8526	8526	8526		
1864	617	617	617	617		
•••	•••	•••	•••	•••		
1918	140	140	140	140		
1919	218	218	218	218		
1920	3032	3032	3032	3032		
1921	98	98	98	98		
1922	45	45	45	45		

[63 rows x 1269 columns]

### 1.3 Analysing the Last seven days in the USA

		v		V				
[19]:	#Last	t seven days	of cases					
	last_	seven_days =	cases.iloc[	[:, -7:]				
[20]:		splay the las	st seven days	of cases				
	last_	seven_days						
[20]:		2023-07-17	2023-07-18	2023-07-19	2023-07-20	2023-07-21	2023-07-22	\
	0	0	0	0	0	0	0	
	1	19913	19913	19913	19913	19913	19913	
	2	70521	70521	70521	70521	70521	70521	
	3	7582	7582	7582	7582	7582	7582	
	4	8149	8149	8149	8149	8149	8149	
	•••		•••					
	3188	12645	12645	12645	12645	12645	12645	
	3189	12206	12206	12206	12206	12206	12206	
	3190	6468	6468	6468	6468	6468	6468	
	3191	2640	2640	2640	2640	2640	2640	
	3192	1914	1914	1914	1914	1914	1914	
		2023-07-23						
	0	0						
	1	19913						
	2	70521						
	3	7582						
	4	8149						
	•••	•••						
	3188	12645						
	3189	12206						

```
3190
                  6468
      3191
                  2640
      3192
                  1914
      [3193 rows x 7 columns]
[21]: column_sums = last_seven_days.sum()
[22]: column_sums
[22]: 2023-07-17
                    99585659
      2023-07-18
                    99588872
      2023-07-19
                    99593865
      2023-07-20
                    99595974
      2023-07-21
                    99596741
      2023-07-22
                    99596741
      2023-07-23
                    99596741
      dtype: int64
[23]: import pandas as pd
      import matplotlib.pyplot as plt
      x_cases = []
      y_cases = []
      # Using enumerate to iterate over both index and values
      for i, curcol in enumerate(column_sums):
          date = column_sums.index[i]
          x_cases.append(f''{date[-5:]}-23'') # Extract the last 5, 6th, 9th, and 10th
       \hookrightarrow characters
          \#x_cases.append(column_sums.index[i][-5,6,9,10:]) \# Extract the last 5_\sqcup
       ⇔characters from the index
          y_cases.append(curcol)
      plt.plot(x_cases, y_cases, marker='o')
      plt.xlabel('Dates')
      plt.ylabel('Sum')
      plt.title('Sum of Last Seven Columns of USA Cases') # Corrected title
      plt.show()
```



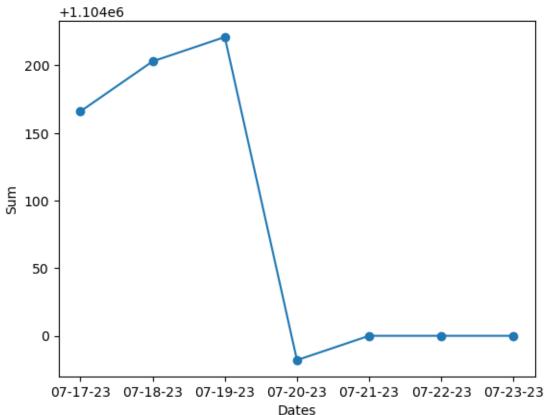
#### 1.3.1 Summary of the Last Seven Days' Infected Cases in the USA (One week Cases)

The COVID 19 cases increased and also remained steady in the last seven days of the dataset under consideration which is that of the USA. Considering the graph and looking at the numbers, the COVID-19 cases are generally increasing over the first few days (that is Monday, July 17, 2023 to Friday, July 21, 2023) but then remain constant from Saturday, July 22, 2023 to Sunday, July 23, 2023. Therefore, during the initial part of the week, the cases increased, but by the end of the week, they remained steady. It can be infered that the cases increased during the working days of the week due to the increasing work activities but remained constant in the weekend due to the low activities during weekends. #### Generally this pattern can be caused by: - Workplace and School-Related Transmission - Increased transmission in workplaces or schools during weekdays due to close interactions, commuting, and gatherings. - Reduced workplace and school-related transmission during weekends when people are less likely to be in these settings. - Variations in healthcare system capacity and response during weekdays and weekends. - Strain on healthcare resources during weekdays may result in increased testing and reporting, while weekends may see a more stable capacity. - Changes in people's behavior during weekdays and weekends, affecting exposure and transmission rates. - Compliance with public health measures might vary during the week, influencing the number of new cases.

```
[24]: #Last seven days of Deaths
last_seven_days_deaths = deaths.iloc[:, -7:]
```

```
[25]: last_seven_days_deaths
[25]:
            2023-07-17
                         2023-07-18
                                      2023-07-19 2023-07-20
                                                               2023-07-21 2023-07-22
      0
                      0
                                   0
                                               0
                                                            0
                                                                         0
                                                                                      0
      1
                    235
                                 235
                                              235
                                                          235
                                                                       235
                                                                                    235
      2
                    731
                                 731
                                             731
                                                          731
                                                                       731
                                                                                    731
      3
                    104
                                 104
                                              104
                                                          104
                                                                       104
                                                                                    104
      4
                    111
                                 111
                                              111
                                                                       111
                                                                                    111
                                                          111
                                 142
                                                                                    142
      3188
                    142
                                              142
                                                          142
                                                                       142
      3189
                     16
                                  16
                                              16
                                                           16
                                                                        16
                                                                                     16
      3190
                     43
                                  43
                                              43
                                                           43
                                                                        43
                                                                                     43
      3191
                     51
                                  51
                                              51
                                                           51
                                                                        51
                                                                                     51
      3192
                     24
                                  24
                                              24
                                                           24
                                                                        24
                                                                                     24
            2023-07-23
      0
      1
                    235
      2
                    731
      3
                    104
      4
                    111
                    142
      3188
      3189
                     16
      3190
                     43
      3191
                     51
      3192
                     24
      [3193 rows x 7 columns]
[26]: column_deaths_sums = last_seven_days_deaths.sum()
[27]: column_deaths_sums
[27]: 2023-07-17
                     1104166
      2023-07-18
                     1104203
      2023-07-19
                     1104221
      2023-07-20
                     1103982
      2023-07-21
                     1104000
      2023-07-22
                     1104000
      2023-07-23
                     1104000
      dtype: int64
[28]: import pandas as pd
      import matplotlib.pyplot as plt
      x_{deaths} = []
```





#### 1.3.2 Summary of the Last Seven Days' Deaths (One week Deaths) in the USA

The COVID 19 deaths increased the first two days of the last seven days. However, the number of deaths reduced sharply in the next day. It remained steady in the last three days of the last seven days. It should be noted that this is with respect to the last seven days of the dataset under consideration in New York state of the USA as shown in the slope of the graph. Looking at the numbers, the COVID-related deaths fluctuate during the week. There is a slight increase from July 17 to July 19, followed by a decrease on July 20, and then the numbers remain steady from July 21 to July 23.

In summary, the data suggests a mixed pattern with some fluctuations during the week, but a general stability in the number of COVID-related deaths towards the end of the provided one-week time frame. It should also be noted that the death cases were steady and constant throughout the weekend starting from Friday, July 21, 2023 to Sunday July 23, 2023. #### Analysis -Deaths on Mon-Thur: 1104166 (Mon) + 1104203 (Tue) + 1104221 (Wed) + 1103982 (Thu) =4,416,572 - Deaths on Fri-Sun: 1104000 (Fri) + 1104000 (Sat) + 1104000 (Sun) = 3,312,000 -Difference = (Sum of Deaths on Mon-Thur) - (Sum of Deaths on Fri-Sun) - Difference = 4,416,572 -3.312,000 ### Difference = 1,104,572 (Reduced Death cases when compared to the weekdays) - Therefore, the difference between the deaths on Monday through Thursday and the deaths on Friday through Sunday is 1,104,572. #### Generally this pattern can be caused by: - Healthcare resources, including staff and facilities, may be more strained during weekdays, potentially affecting patient outcomes. - Weekends may see reduced strain on healthcare resources, resulting in better patient care and lower mortality rates. - Fatigue among healthcare professionals during weekdays could impact patient care and outcomes. - Weekends may provide an opportunity for staff to rest, potentially improving patient care and reducing mortality rates. - Reporting Delays - Increased Workplace and School-Related activities during week days and their decrease during weekend

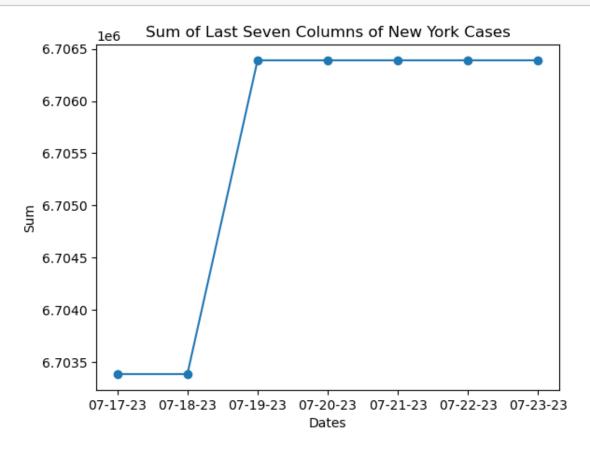
Further analysis, including a detailed examination of local policies, healthcare practices, and reporting mechanisms, would be needed to provide a more definitive understanding of the observed trend.

#### 1.4 Analysing the Last seven days in the NY State of the USA

```
[29]: #Last seven days of cases
      last seven daysNY = casesNY.iloc[:, -7:]
[30]:
      # Display the last seven days of cases
      last_seven_daysNY
[30]:
             2023-07-17
                          2023-07-18
                                       2023-07-19
                                                    2023-07-20
                                                                  2023-07-21
                                                                               2023-07-22
      1860
                       0
                                    0
                                                 0
                                                              0
                                                                            0
                                                                                         0
      1861
                  80317
                               80317
                                             80346
                                                          80346
                                                                       80346
                                                                                    80346
      1862
                  11019
                                11019
                                             11023
                                                          11023
                                                                       11023
                                                                                    11023
      1863
                 516506
                              516506
                                            516827
                                                         516827
                                                                      516827
                                                                                   516827
      1864
                  60127
                                60127
                                             60149
                                                          60149
                                                                       60149
                                                                                    60149
      1918
                                                          16237
                                                                       16237
                                                                                    16237
                  16237
                               16237
                                             16237
      1919
                  22585
                               22585
                                             22592
                                                          22592
                                                                       22592
                                                                                    22592
      1920
                              340492
                                            340721
                                                                                   340721
                 340492
                                                         340721
                                                                      340721
```

```
1921
                 10118
                             10118
                                          10120
                                                       10120
                                                                   10120
                                                                               10120
      1922
                  4543
                              4543
                                           4544
                                                       4544
                                                                    4544
                                                                                4544
            2023-07-23
      1860
                     0
      1861
                 80346
      1862
                 11023
      1863
                516827
      1864
                 60149
      1918
                 16237
      1919
                 22592
      1920
                340721
      1921
                 10120
      1922
                  4544
      [63 rows x 7 columns]
[31]: column_sumsCasesNY = last_seven_daysNY.sum()
      column sumsCasesNY
[31]: 2023-07-17
                    6703386
      2023-07-18
                    6703386
      2023-07-19
                    6706390
      2023-07-20
                    6706390
      2023-07-21
                    6706390
      2023-07-22
                    6706390
      2023-07-23
                    6706390
      dtype: int64
[32]: # Plotting the graph of Last seven days against cases in NY
      x_casesNY = []
      y_casesNY = []
      # Using enumerate to iterate over both index and values
      for i, curcol in enumerate(column sumsCasesNY):
          date = column_sumsCasesNY.index[i]
          x_casesNY.append(f"{date[-5:]}-23") # Extract the last 5, 6th, 9th, and
       →10th characters
          #x cases.append(column sums.index[i][-5,6,9,10:]) # Extract the last 5_{\sqcup}
       ⇔characters from the index
          y_casesNY.append(curcol)
      plt.plot(x_casesNY, y_casesNY, marker='o')
      plt.xlabel('Dates')
      plt.ylabel('Sum')
      plt.title('Sum of Last Seven Columns of New York Cases') # Corrected title
```

plt.show()



## 1.5 Summary of the trend of the Last Seven Days' Cases (One week Cases) in New York

Looking at the graph, it can be inferred that the COVID-19 cases remained constant from July 17 to July 18, and then increase on July 19. However, from July 19 to July 23, the number of cases appears to be steady, as it remainsed the same at 6706390.

In summary, for this specific one-week period, the COVID-19 cases increased on July 19 but remained steady from July 19 to July 23. - It should, however, be noted that the cases were constant throughout the weekend without increase or decrease. - It should also be nothed that the observation in the entire USA trend of cases is also displayed in the NY State.

```
[33]: #Last seven days of death

last_seven_daysDNY = deathsNY.iloc[:, -7:]

# Display the last seven days of cases

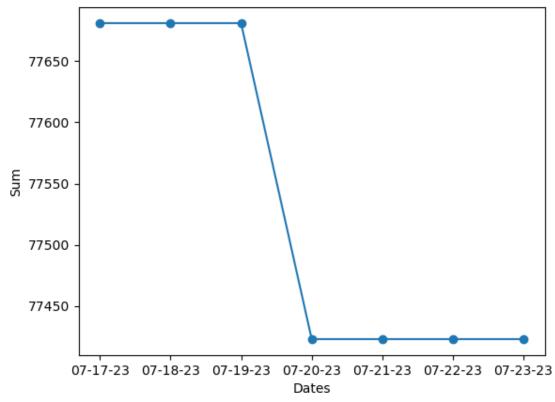
last_seven_daysDNY
```

```
1861
                   638
                                638
                                             638
                                                          638
                                                                      638
                                                                                   638
      1862
                    166
                                166
                                             166
                                                                      166
                                                                                   166
                                                          166
      1863
                   8526
                               8526
                                            8526
                                                         8526
                                                                     8526
                                                                                  8526
      1864
                    617
                                617
                                             617
                                                          617
                                                                      617
                                                                                   617
      1918
                                                                                   140
                    140
                                140
                                             140
                                                          140
                                                                      140
      1919
                   218
                                218
                                             218
                                                          218
                                                                      218
                                                                                   218
                               3031
                                            3031
                                                                     3032
                                                                                  3032
      1920
                  3031
                                                         3032
                                                                                    98
      1921
                     98
                                 98
                                              98
                                                           98
                                                                       98
      1922
                     45
                                 45
                                              45
                                                           45
                                                                       45
                                                                                    45
            2023-07-23
      1860
                   579
      1861
                   638
      1862
                    166
                   8526
      1863
      1864
                   617
      1918
                    140
      1919
                    218
      1920
                   3032
      1921
                     98
      1922
                     45
      [63 rows x 7 columns]
[34]: column_sumsDeathsNY = last_seven_daysDNY.sum()
      column_sumsDeathsNY
[34]: 2023-07-17
                     77681
                     77681
      2023-07-18
      2023-07-19
                     77681
      2023-07-20
                     77423
      2023-07-21
                     77423
      2023-07-22
                     77423
      2023-07-23
                     77423
      dtype: int64
[35]: # Plotting the graph of Last seven days against deaths in NY
      x_deathsNY = []
      y_deathsNY = []
      # Using enumerate to iterate over both index and values
      for i, curcol in enumerate(column_sumsDeathsNY):
          date = column_sumsDeathsNY.index[i]
          x_deathsNY.append(f''{date[-5:]}-23") # Extract the last 5, 6th, 9th, and
       →10th characters
```

```
#x_cases.append(column_sums.index[i][-5,6,9,10:]) # Extract the last 5
characters from the index
    y_deathsNY.append(curcol)

plt.plot(x_deathsNY, y_deathsNY, marker='o')
plt.xlabel('Dates')
plt.ylabel('Sum')
plt.title('Sum of Last Seven Columns of New York Deaths') # Corrected title
plt.show()
```





## 1.5.1 Summary of the trend of the Last Seven Days' Deaths (One week Deaths) from Covid19 in New York State

- can be observed that the number of deaths remains constant at 77681 from July 17 to July 19. However, there is a decrease in the number of deaths from July 19 to July 20, and then the number remains constant at 77423 from July 20 to July 23.
- In summary, for this specific one-week period, the COVID-19-related deaths in New York remained constant for the first three days, decreased on the fourth day, and then stayed steady for the remaining days of the week.
- It should also be noted that the observation in the entire USA trend of deaths is also displayed

#### 1.6 Enrichment Dataset - Presidential Election Results Data

#### 1.6.1 Merge enrichment data with super covid19 dataframe

```
[36]: #Display the presidential election results dataframe
      presidential = pd.read_csv('president_county_candidate.csv')
      presidential
[36]:
                                                candidate party total votes
                state
                                   county
                                                                                 won
                                                                        44552
      0
             Delaware
                              Kent County
                                                Joe Biden
                                                            DEM
                                                                                True
                                                                               False
      1
             Delaware
                              Kent County
                                            Donald Trump
                                                            REP
                                                                        41009
      2
             Delaware
                              Kent County
                                             Jo Jorgensen
                                                            LIB
                                                                         1044
                                                                               False
      3
                              Kent County Howie Hawkins
                                                                               False
             Delaware
                                                            GRN
                                                                          420
             Delaware New Castle County
                                                Joe Biden
                                                            DEM
                                                                       195034
                                                                                True
      32172
              Arizona
                          Maricopa County
                                                Write-ins
                                                            WRI
                                                                               False
                                                                         1331
                            Mohave County
                                                                        78535
                                                                                True
      32173
              Arizona
                                             Donald Trump
                                                            REP
                                                Joe Biden
      32174
              Arizona
                            Mohave County
                                                                        24831
                                                                               False
                                                            DEM
      32175
                            Mohave County
                                                                               False
              Arizona
                                             Jo Jorgensen
                                                            LIB
                                                                         1302
      32176
              Arizona
                            Mohave County
                                                Write-ins
                                                            WR.T
                                                                           37
                                                                               False
      [32177 rows x 6 columns]
[37]: #Display the merged covid19 cases, covid19 deaths, and population dataframe and
       ⇔store in variable 'covid_df'
      covid df = merged
      covid df
[37]:
            countyFIPS
                              County Namecases State
                                                       StateFIPScases
      0
                         Statewide Unallocated
                                                   AL
                                                                     1
      1
                  1001
                               Autauga County
                                                   ΑL
                                                                     1
      2
                  1003
                               Baldwin County
                                                   ΑL
                                                                     1
      3
                  1005
                               Barbour County
                                                   ΑL
                                                                     1
      4
                                                                     1
                  1007
                                  Bibb County
                                                   ΑL
      3188
                 56037
                            Sweetwater County
                                                   WY
                                                                    56
      3189
                                 Teton County
                                                                    56
                 56039
                                                   WY
                                 Uinta County
      3190
                 56041
                                                   WY
                                                                    56
      3191
                 56043
                              Washakie County
                                                   WY
                                                                    56
      3192
                 56045
                                Weston County
                                                                    56
                                                   WY
            2020-01-22cases 2020-01-23cases 2020-01-24cases 2020-01-25cases
      0
                                                              0
      1
                           0
                                             0
                                                              0
                                                                                0
      2
                           0
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                                                                                0
      3
                           0
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                                                                                0
```

```
4
                      0
                                         0
                                                                               0
                                                            0
                                                                               0
3188
                      0
3189
                                                                               0
3190
3191
                      0
                                         0
                                                            0
                                                                               0
3192
                      0
                                         0
                                                                               0
                                                            0
      2020-01-26cases
                         2020-01-27cases
                                            ... 2023-07-16deaths \
0
                      0
                                                                0
1
                      0
                                                               235
                                         0
2
                      0
                                         0
                                                               731
3
                                                               104
                      0
                                         0 ...
4
                      0
                                         0
                                                               111
                      0
                                                               142
3188
                                         0
3189
                      0
                                                               16
3190
                      0
                                                                43
3191
                                                                51
3192
                                                                24
      2023-07-17 deaths \quad 2023-07-18 deaths \quad 2023-07-19 deaths \quad 2023-07-20 deaths \quad \backslash
0
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                                                               0
                                                                                    0
1
                     235
                                         235
                                                             235
                                                                                  235
2
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                                         731
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                                                             731
3
                     104
                                                                                  104
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                                                             104
                     111
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                                                             111
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3188
3189
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                                                                                   43
3191
                                          51
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                                                                                   51
                      51
3192
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                                          24
                                                              24
                                                                                   24
      2023-07-21 deaths 2023-07-22 deaths 2023-07-23 deaths \
0
                      0
                                           0
                                                               0
1
                     235
                                         235
                                                             235
2
                     731
                                         731
                                                             731
3
                     104
                                         104
                                                             104
4
                     111
                                         111
                                                             111
                                         142
                                                             142
3188
                     142
3189
                      16
                                          16
                                                              16
3190
                      43
                                          43
                                                              43
3191
                      51
                                          51
                                                              51
3192
                      24
                                          24
                                                               24
```

```
County Name population
      Statewide Unallocated
0
1
             Autauga County
                                  55869
2
             Baldwin County
                                 223234
3
             Barbour County
                                  24686
                Bibb County
                                  22394
3188
          Sweetwater County
                                  42343
3189
               Teton County
                                  23464
3190
               Uinta County
                                  20226
            Washakie County
3191
                                   7805
3192
              Weston County
                                   6927
```

[3193 rows x 2538 columns]

Observation and Understanding of the covid(cases, deaths, with population) dataframe and the enrichment dataframe for preparation for merging

```
[38]: # Identify the unique data in 'County Namecases' column of the merged Covid19_\( \) \( \to DataFrame \)

uniqueCountyNamesCovid = covid_df['County Namecases'].unique()

# Identify the unique data in 'county' column of the presidential DataFrame

uniqueCountyNamesPre = presidential['county'].unique()

print("The Unique data in the 'County Namecases' column of the COVID19_\( \to \)

\( \to dataframe \) are:\n", uniqueCountyNamesCovid)

print()

print("The Unique data in the 'county' column of the Presidential dataframe are:

\( \to \)\n", uniqueCountyNamesPre)
```

The Unique data in the 'County Namecases' column of the COVID19 dataframe are: ['Statewide Unallocated' 'Autauga County ' 'Baldwin County ' ...
'Uinta County ' 'Washakie County ' 'Weston County ']

The Unique data in the 'county' column of the Presidential dataframe are: ['Kent County' 'New Castle County' 'Sussex County' ... 'La Paz County' 'Maricopa County' 'Mohave County']

[39]: # Display of the covid(cases, deaths, with population) dataframe for →observation and understanding of its columns covid\_df

[39]:	${\tt countyFIPS}$	County Namecases	State	StateFIPScases	\
0	0	Statewide Unallocated	AL	1	
1	1001	Autauga County	AL	1	
2	1003	Baldwin County	AL	1	
3	1005	Barbour County	AL	1	
4	1007	Bibb County	AL	1	
•••	•••	***		•••	

```
3188
            56037
                       Sweetwater County
                                                                  56
                                                WY
3189
            56039
                             Teton County
                                                WY
                                                                  56
3190
                             Uinta County
            56041
                                                WY
                                                                  56
3191
            56043
                         Washakie County
                                                WY
                                                                  56
3192
            56045
                            Weston County
                                                WY
                                                                  56
      2020-01-22cases
                         2020-01-23cases
                                             2020-01-24cases
                                                                2020-01-25cases
0
                      0
                                                            0
1
                      0
                                         0
                                                            0
                                                                               0
2
                      0
                                         0
                                                            0
                                                                               0
3
                      0
                                         0
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4
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3188
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3189
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3190
                      0
                                         0
                                                            0
                                                                               0
                                                                               0
3191
                      0
                                         0
                                                             0
3192
                      0
                                                                               0
      2020-01-26cases
                         2020-01-27cases
                                                2023-07-16deaths
0
                      0
1
                      0
                                                               235
                                         0
2
                      0
                                         0
                                                               731
3
                                                               104
                      0
                                         0
4
                      0
                                                               111
                                                               142
3188
                      0
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3189
                      0
                                         0
                                                                16
3190
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                                                                43
                                         0
3191
                      0
                                         0
                                                                51
3192
                      0
                                                                24
      2023-07-17deaths
                           2023-07-18deaths
                                               2023-07-19deaths
                                                                   2023-07-20deaths \
                                           0
0
                       0
                                                                0
                                                                                    0
                     235
                                         235
                                                             235
                                                                                  235
1
2
                     731
                                         731
                                                             731
                                                                                  731
3
                     104
                                                                                  104
                                         104
                                                             104
4
                     111
                                         111
                                                             111
                                                                                  111
3188
                     142
                                         142
                                                              142
                                                                                  142
3189
                      16
                                          16
                                                               16
                                                                                   16
3190
                      43
                                          43
                                                                                   43
                                                               43
3191
                      51
                                          51
                                                               51
                                                                                   51
3192
                      24
                                          24
                                                               24
                                                                                   24
      2023-07-21deaths
                          2023-07-22deaths
                                               2023-07-23deaths
0
```

1	235	235	235
2	731	731	731
3	104	104	104
4	111	111	111
•••	•••	•••	•••
3188	142	142	142
3189	16	16	16
3190	43	43	43
3191	51	51	51
3192	24	24	24
	County Name	population	
0	Statewide Unallocated	0	
0 1	Statewide Unallocated Autauga County	-	
		55869	
1	Autauga County	55869 223234	
1 2	Autauga County Baldwin County	55869 223234	
1 2 3	Autauga County Baldwin County Barbour County	55869 223234 24686	
1 2 3 4	Autauga County Baldwin County Barbour County	55869 223234 24686	
1 2 3 4 	Autauga County Baldwin County Barbour County Bibb County	55869 223234 24686 22394  42343	
1 2 3 4  3188	Autauga County Baldwin County Barbour County Bibb County Sweetwater County	55869 223234 24686 22394  42343	
1 2 3 4  3188 3189	Autauga County Baldwin County Barbour County Bibb County Sweetwater County Teton County	55869 223234 24686 22394  42343 23464 20226	
1 2 3 4  3188 3189 3190	Autauga County Baldwin County Barbour County Bibb County Sweetwater County Teton County Uinta County	55869 223234 24686 22394  42343 23464 20226	

[3193 rows x 2538 columns]

Clean the 'County Namecases' entries of the COVID19 dataframe and renaming the name of the column for uniformity with its equivalent in presidential dataframe

```
[40]: # Clean the 'County Namecases' entries of the COVID19 dataframe by removing whitespaces at the end of the entries

covid_df['County Namecases'] = covid_df['County Namecases'].str.strip()

# Renaming the 'County Namecases' column as 'county' in the covid dataframe to be the same as that of the presidential dataframe

covid_df = covid_df.rename(columns={'County Namecases': 'county'})

covid_df
```

\	StateFIPScases	State	county	countyFIPS	[40]:
	1	AL	Statewide Unallocated	0	0
	1	AL	Autauga County	1001	1
	1	AL	Baldwin County	1003	2
	1	AL	Barbour County	1005	3
	1	AL	Bibb County	1007	4
	•••		<b></b>	•••	•••
	56	WY	Sweetwater County	56037	3188
	56	WY	Teton County	56039	3189
	56	WY	Uinta County	56041	3190
	56	WY	Washakie County	56043	3191

3192	56045	Weston County	WY	56
	2020-01-22cases	2020-01-23cases	2020-01-24cases 2	020-01-25cases \
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
3188	0	0	0	0
3189	0	0	0	0
3190	0	0	0	0
3191	0	0	0	0
3192	0	0	0	0
	2020-01-26cases		2023-07-16death	
0	0			0
1	0		23	
2	0		73	
3	0		10	
4	0	0	11	1
 3188	 0	<b></b>	14	2
3189	0	0		
3190	0	0	4	
3191	0	0	5	
3192	0	0	2	
	2023-07-17deaths	2023-07-18deaths	2023-07-19deaths	2023-07-20deaths \
0	0			
1	235			
2	731			
3	104			
4	111			
- 				
3188	142			
3189	16			
3190	43			
3191	51			
3192	24			
	2023-07-21deaths	2023-07-22deaths	2023-07-23deaths	\
0	2025-07-21deaths			
1	235			
2	731			
3	104			
4	111			
Ŧ	111	111	111	

•••	•••	•••	•••
3188	142	142	142
3189	16	16	16
3190	43	43	43
3191	51	51	51
3192	24	24	24
	County Name	population	
0	Statewide Unallocated	0	
1	Autauga County	55869	
2	Baldwin County	223234	
3	Barbour County	24686	
4	Bibb County	22394	
•••		•••	
3188	Sweetwater County	42343	
3189	Teton County	23464	
3190	Uinta County	20226	
3191	Washakie County	7805	
3192	Weston County	6927	
_	_		

[3193 rows x 2538 columns]

## Replacement of the State Names in the Presidential Dataframe with their two-letter postal abbreviations equivalence in the covid dataframe

```
[41]: # Replacement of the State Names in the Presidential Dataframe with their
       →two-letter postal abbreviations
      states = {
          'Alaska': 'AK',
          'Alabama': 'AL',
          'Arkansas': 'AR',
          'Arizona': 'AZ',
          'California': 'CA',
          'Colorado': 'CO',
          'Connecticut': 'CT',
          'District of Columbia': 'DC',
          'Delaware': 'DE',
          'Florida': 'FL',
          'Georgia': 'GA',
          'Hawaii': 'HI',
          'Iowa': 'IA',
          'Idaho': 'ID',
          'Illinois': 'IL',
          'Indiana': 'IN',
          'Kansas': 'KS',
          'Kentucky': 'KY',
          'Louisiana': 'LA',
          'Massachusetts': 'MA',
```

```
'Maryland': 'MD',
    'Maine': 'ME',
    'Michigan': 'MI',
    'Minnesota': 'MN',
    'Missouri': 'MO',
    'Mississippi': 'MS',
    'Montana': 'MT',
    'North Carolina': 'NC',
    'North Dakota': 'ND',
    'Nebraska': 'NE',
    'New Hampshire': 'NH',
    'New Jersey': 'NJ',
    'New Mexico': 'NM',
    'Nevada': 'NV',
    'New York': 'NY',
    'Ohio': 'OH',
    'Oklahoma': 'OK',
    'Oregon': 'OR',
    'Pennsylvania': 'PA',
    'Rhode Island': 'RI',
    'South Carolina': 'SC',
    'South Dakota': 'SD',
    'Tennessee': 'TN',
    'Texas': 'TX',
    'Utah': 'UT',
    'Virginia': 'VA',
    'Vermont': 'VT',
    'Washington': 'WA',
    'Wisconsin': 'WI',
    'West Virginia': 'WV',
    'Wyoming': 'WY'
}
presidential['state'] = presidential['state'].replace(states)
presidential
```

[41]:		state	С	ounty	candidate	party	total_votes	won
	0	DE	Kent C	County	Joe Biden	DEM	44552	True
	1	DE	Kent C	County	Donald Trump	REP	41009	False
	2	DE	Kent C	County	Jo Jorgensen	LIB	1044	False
	3	DE	Kent C	County	Howie Hawkins	GRN	420	False
	4	DE	New Castle C	County	Joe Biden	DEM	195034	True
		•••	•••		•••		•••	
	32172	AZ	Maricopa C	County	Write-ins	WRI	1331	False
	32173	AZ	Mohave C	County	Donald Trump	REP	78535	True
	32174	AZ	Mohave C	County	Joe Biden	DEM	24831	False
	32175	AZ	Mohave C	County	Jo Jorgensen	LIB	1302	False
	32176	AZ	Mohave C	ountv	Write-ins	WRI	37	False

#### [32177 rows x 6 columns]

```
[42]: # Display state to confirm the entries have been abbreviated appropriately in
      → the presidential dataframe
      uniqueStatesPre = presidential['state'].unique()
      uniqueStatesPre
[42]: array(['DE', 'DC', 'FL', 'GA', 'HI', 'ID', 'IL', 'IN', 'IA', 'KS', 'KY',
             'LA', 'ME', 'MD', 'MA', 'MI', 'MN', 'MS', 'MO', 'MT', 'NE', 'NV',
             'NH', 'NJ', 'NM', 'NY', 'NC', 'ND', 'OH', 'OK', 'OR', 'PA', 'RI',
             'SC', 'SD', 'TN', 'TX', 'UT', 'VT', 'VA', 'WA', 'WV', 'WI', 'WY',
             'AL', 'AK', 'AR', 'CA', 'CO', 'CT', 'AZ'], dtype=object)
        • Merge the covid df with the presidential election results dataframe
[43]: | # the 'state' column in the presidential DataFrame is renamed 'State' for
       sameness with its equivalent in the covid dataframe
      presidential = presidential.rename(columns={'state': 'State'})
      presidential
[43]:
            State
                              county
                                           candidate party
                                                            total votes
                                                                            won
                         Kent County
      0
               DF.
                                           Joe Biden
                                                       DEM
                                                                   44552
                                                                           True
      1
               DE
                         Kent County
                                        Donald Trump
                                                       REP
                                                                  41009 False
      2
               DF.
                         Kent County
                                        Jo Jorgensen
                                                       LIB
                                                                   1044 False
      3
               DE
                         Kent County
                                      Howie Hawkins
                                                       GRN
                                                                     420 False
      4
               DE
                   New Castle County
                                           Joe Biden
                                                       DEM
                                                                 195034
                                                                          True
                     Maricopa County
      32172
               AZ
                                           Write-ins
                                                       WRI
                                                                   1331 False
                       Mohave County
                                                                   78535
      32173
               AZ
                                        Donald Trump
                                                       REP
                                                                          True
      32174
               AZ
                       Mohave County
                                           Joe Biden
                                                       DEM
                                                                  24831
                                                                         False
      32175
               AZ
                       Mohave County
                                        Jo Jorgensen
                                                       LIB
                                                                   1302 False
                                           Write-ins
      32176
               AZ
                       Mohave County
                                                       WR.I
                                                                      37 False
      [32177 rows x 6 columns]
     Generate the super covid dataframe: Merging the covid_df with the presidential
     dataframe
[44]: # Generate the super covid dataframe
      superCovid = pd.merge(covid_df, presidential, left_on=("county", "State"),__
       →right_on = ("county", "State"), how = "inner")
      superCovid
[44]:
             countyFIPS
                                 county State StateFIPScases 2020-01-22cases \
      0
                   1001
                         Autauga County
                                            AL
                                                             1
                         Autauga County
                   1001
                                                                               0
      1
                                            AL
                                                             1
      2
                         Autauga County
                                                                               0
                   1001
                                            ΑL
                                                             1
```

3 4		ga County in County	AL AL	1 1		0 0	
	***			•••	•••		
19339	56045 West	on County	WY	56		0	
19340	56045 West	on County	WY	56		0	
19341	56045 West	on County	WY	56		0	
19342	56045 West	on County	WY	56		0	
19343		on County	WY	56		0	
		·					
	2020-01-23cases	2020-01-24ca	ses 20	)20-01-25cases	2020-01-26cas	es	\
0	0		0	0		0	
1	0		0	0		0	
2	0		0	0		0	
3	0		0	0		0	
4	0		0	0		0	
	•••	•••		•••	***		
19339	0		0	0		0	
19340	0		0	0		0	
19341	0		0	0		0	
19342	0		0	0		0	
19343	0		0	0		0	
	2020-01-27cases	2023-07-2	Odeaths	s 2023-07-21dea	aths \		
0	0	•••	235	5	235		
		•••	200	,	200		
1	0	···	235		235		
	0			5			
1	0	•••	235 235	5	235 235		
1 2	0 0 0	•••	235 235 235	5	235 235 235		
1 2 3	0 0 0	 	235 235	5	235 235		
1 2 3 4 	0 0 0 0	 	235 235 235 731 	5 5 5 L 	235 235 235 731		
1 2 3 4  19339	0 0 0 0 	 	235 235 235 731 	5 5 1 	235 235 235 731		
1 2 3 4  19339 19340	0 0 0 0  0	 	235 235 235 731 	5 5 1  1 4	235 235 235 731 24 24		
1 2 3 4  19339 19340 19341	0 0 0 0  0 0		235 235 235 731  24 24	5 5 1  1 1 1	235 235 235 731 24 24 24 24		
1 2 3 4  19339 19340 19341 19342	0 0 0 0  0 0 0	 	235 235 235 731  24 24 24	5 5 1  1 1 1	235 235 235 731 24 24 24 24 24		
1 2 3 4  19339 19340 19341	0 0 0 0  0 0		235 235 235 731  24 24	5 5 1  1 1 1	235 235 235 731 24 24 24 24		
1 2 3 4  19339 19340 19341 19342	0 0 0 0  0 0 0		235 235 731  24 24 24 24	5 5 1  1 1 1	235 235 235 731 24 24 24 24 24 24	\	
1 2 3 4  19339 19340 19341 19342	0 0 0 0  0 0 0		235 235 731  24 24 24 24	5 5 5 1  1 1 1 1 1	235 235 235 731 24 24 24 24 24 24	\	
1 2 3 4  19339 19340 19341 19342 19343	0 0 0 0  0 0 0 0 0 0		235 235 731 24 24 24 24	County Name Autauga County	235 235 235 731 24 24 24 24 24 24 population 55869	\	
1 2 3 4  19339 19340 19341 19342 19343	$\begin{array}{ccc} & & 0 \\ & 0 \\ & 0 \\ & & 0 \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & \\ & & & \\ & & \\ & & & \\ & \\ & & \\ & & \\ & \\ & & \\ & & \\ & \\ & & \\ & & \\ & \\ & & \\ & & \\ &$		235 235 731  24 24 24 24 24 25 eaths 235 235	County Name Autauga County Autauga County	235 235 235 731 24 24 24 24 24 24 24 population 55869 55869	\	
1 2 3 4  19339 19340 19341 19342 19343	$\begin{array}{c} & & 0 \\ & 0 \\ & 0 \\ & & 0 \\ \\ & & 0 \\ \\ & & 0 \\ & 0 \\ & 0 \\ & 0 \\ \\ & 2023-07-22 \\ \\ & & 235 \\ \\ & & 235 \\ \\ & & & 235 \\ \\ & & & & \\ \\ & & & & \\ \end{array}$		235 235 731 24 24 24 24 24 25 235 235 235	County Name Autauga County Autauga County Autauga County	235 235 235 731 24 24 24 24 24 24 29 55869 55869 55869	\	
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1 2 3 4  19339 19340 19341 19342 19343	$\begin{array}{ccc} & & & 0 \\ & & 0 \\ & & 0 \\ & & & 0 \\ & & & &$	      2023-07-23d	235 235 731 24 24 24 24 24 25 235 235 235	County Name Autauga County Autauga County Autauga County	235 235 235 731 24 24 24 24 24 24 29 55869 55869 55869	\	
1 2 3 4  19339 19340 19341 19342 19343 0 1 2 3 4 	0 0 0 0  0 0 0 0 0 0 0 2023-07-22deaths 235 235 235 235 235		235 235 731 24 24 24 24 25 235 235 235 731	County Name Autauga County  Autauga County  Autauga County  Autauga County  Autauga County  Autauga County  Autauga County  Baldwin County	235 235 235 731 24 24 24 24 24 24 24 population 55869 55869 55869 55869 223234	\	
1 2 3 4  19339 19340 19341 19342 19343 0 1 2 3 4  19339	$\begin{array}{cccc} & & & 0 \\ & & 0 \\ & & 0 \\ & & & 0 \\ & & & &$	      2023-07-23d	235 235 731 24 24 24 25 235 235 235 235 731	County Name County Name Autauga County Autauga County Autauga County Autauga County Autauga County Mutauga County Mutauga County Mutauga County Mutauga County County Meston County	235 235 235 731 24 24 24 24 24 24 29 24 29 20 20 20 20 20 20 20 20 20 20 20 20 20	\	
1 2 3 4  19339 19340 19341 19342 19343 0 1 1 2 3 4  19339 19340	0 0 0 0  0 0 0 0 0 0 0 0 2023-07-22deaths 235 235 235 235 235 235 731 	      2023-07-23d	235 235 731 24 24 24 235 235 235 235 235 235 235 235 235 234 24	County Name County Name Autauga County Autauga County Autauga County Autauga County Autauga County Mutauga County Weston County Weston County	235 235 235 731 24 24 24 24 24 24 24 29 population 55869 55869 55869 223234  6927 6927	`	
1 2 3 4  19339 19340 19341 0 1 1 2 3 4  19339 19340 19341	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	      2023-07-23d	235 235 731 24 24 24 235 235 235 235 235 235 235 24 24 24 24	County Name County Name Autauga County Autauga County Autauga County Autauga County Baldwin County Weston County Weston County	235 235 235 731 24 24 24 24 24 24 24 29 population 55869 55869 55869 223234  6927 6927 6927	`	
1 2 3 4  19339 19340 19341 19342 19343 0 1 1 2 3 4  19339 19340	0 0 0 0  0 0 0 0 0 0 0 0 2023-07-22deaths 235 235 235 235 235 235 731 	      2023-07-23d	235 235 731 24 24 24 235 235 235 235 235 235 235 235 235 234 24	County Name County Name Autauga County Autauga County Autauga County Autauga County Autauga County Mutauga County Weston County Weston County	235 235 235 731 24 24 24 24 24 24 24 29 24 24 24 24 24 24 24 24 24 24 24 24 27 85869 85969 8596		

	candidate	party	total_votes	won
0	Donald Trump	REP	19838	True
1	Joe Biden	DEM	7503	False
2	Jo Jorgensen	LIB	350	False
3	Write-ins	WRI	79	False
4	Donald Trump	REP	83544	True
•••	••• •••		•••	
19339	Donald Trump	REP	3107	True
19340	Joe Biden	DEM	360	False
19341	Jo Jorgensen	LIB	46	False
19342	Brock Pierce	IND	20	False
19343	Write-ins	WRI	9	False

[19344 rows x 2542 columns]

 $\bullet\,$  Save the supercovid data frame to a file

[45]: superCovid.to\_csv('supercovid.csv')