

```
In [2]: import pandas as pd
import numpy as np
import matplotlib as mpl
import matplotlib.pyplot as plt
mpl.rcParams['figure.figsize'] = (20, 10)
mpl.rcParams['axes.grid'] = False
%matplotlib inline
```

```
In [3]: covid_confirm=pd.read_csv("D:\\DSWF\\carono\\covid_confirmed.csv")
covid_confirm
```

Out[3]:

	Province/State	Country/Region	Lat	Long	1/22/20	1/23/20	1/24/20	1/25/20	1/26/20
0	NaN	Thailand	15.0000	101.0000	2	3	5	7	8
1	NaN	Japan	36.0000	138.0000	2	1	2	2	4
2	NaN	Singapore	1.2833	103.8333	0	1	3	3	4
3	NaN	Nepal	28.1667	84.2500	0	0	0	1	1
4	NaN	Malaysia	2.5000	112.5000	0	0	0	3	4
...
482	NaN	Dominica	15.4150	-61.3710	0	0	0	0	0
483	NaN	Grenada	12.1165	-61.6790	0	0	0	0	0
484	NaN	Mozambique	-18.6657	35.5296	0	0	0	0	0
485	NaN	Syria	34.8021	38.9968	0	0	0	0	0
486	NaN	Timor-Leste	-8.8742	125.7275	0	0	0	0	0

487 rows × 65 columns



In [4]: covid_deaths=pd.read_csv("D:\\DSWF\\carono\\covid_death.csv")
covid_deaths

Out[4]:

	Province/State	Country/Region	Lat	Long	1/22/20	1/23/20	1/24/20	1/25/20	1/26/20
0	NaN	Thailand	15.0000	101.0000	0	0	0	0	0
1	NaN	Japan	36.0000	138.0000	0	0	0	0	0
2	NaN	Singapore	1.2833	103.8333	0	0	0	0	0
3	NaN	Nepal	28.1667	84.2500	0	0	0	0	0
4	NaN	Malaysia	2.5000	112.5000	0	0	0	0	0
...
482	NaN	Dominica	15.4150	-61.3710	0	0	0	0	0
483	NaN	Grenada	12.1165	-61.6790	0	0	0	0	0
484	NaN	Mozambique	-18.6657	35.5296	0	0	0	0	0
485	NaN	Syria	34.8021	38.9968	0	0	0	0	0
486	NaN	Timor-Leste	-8.8742	125.7275	0	0	0	0	0

487 rows × 65 columns

In [5]: covid_recovered=pd.read_csv("D:\\DSWF\\carono\\covid_recovered.csv")
covid_recovered

Out[5]:

	Province/State	Country/Region	Lat	Long	1/22/20	1/23/20	1/24/20	1/25/20	1/26/20
0	NaN	Thailand	15.0000	101.0000	0	0	0	0	2
1	NaN	Japan	36.0000	138.0000	0	0	0	0	1
2	NaN	Singapore	1.2833	103.8333	0	0	0	0	0
3	NaN	Nepal	28.1667	84.2500	0	0	0	0	0
4	NaN	Malaysia	2.5000	112.5000	0	0	0	0	0
...
482	NaN	Dominica	15.4150	-61.3710	0	0	0	0	0
483	NaN	Grenada	12.1165	-61.6790	0	0	0	0	0
484	NaN	Mozambique	-18.6657	35.5296	0	0	0	0	0
485	NaN	Syria	34.8021	38.9968	0	0	0	0	0
486	NaN	Timor-Leste	-8.8742	125.7275	0	0	0	0	0

487 rows × 65 columns

In [6]: covid_confirm.head(5)

	Province/State	Country/Region	Lat	Long	1/22/20	1/23/20	1/24/20	1/25/20	1/26/20	1/27/20
0	NaN	Thailand	15.0000	101.0000	2	3	5	7	8	10
1	NaN	Japan	36.0000	138.0000	2	1	2	2	4	6
2	NaN	Singapore	1.2833	103.8333	0	1	3	3	4	5
3	NaN	Nepal	28.1667	84.2500	0	0	0	1	1	2
4	NaN	Malaysia	2.5000	112.5000	0	0	0	3	4	5

5 rows × 65 columns

In [7]: covid_deaths.head(4)

	Province/State	Country/Region	Lat	Long	1/22/20	1/23/20	1/24/20	1/25/20	1/26/20	1/27/20
0	NaN	Thailand	15.0000	101.0000	0	0	0	0	0	0
1	NaN	Japan	36.0000	138.0000	0	0	0	0	0	0
2	NaN	Singapore	1.2833	103.8333	0	0	0	0	0	0
3	NaN	Nepal	28.1667	84.2500	0	0	0	0	0	0

4 rows × 65 columns

In [8]: covid_recovered.head()

	Province/State	Country/Region	Lat	Long	1/22/20	1/23/20	1/24/20	1/25/20	1/26/20	1/27/20
0	NaN	Thailand	15.0000	101.0000	0	0	0	0	0	2
1	NaN	Japan	36.0000	138.0000	0	0	0	0	0	1
2	NaN	Singapore	1.2833	103.8333	0	0	0	0	0	0
3	NaN	Nepal	28.1667	84.2500	0	0	0	0	0	0
4	NaN	Malaysia	2.5000	112.5000	0	0	0	0	0	0

5 rows × 65 columns

```
In [9]: covid_confirm=covid_confirm.melt(id_vars=['Province/State','Country/Region','Lat',  
covid_confirm
```

Out[9]:

	Province/State	Country/Region	Lat	Long	variable	value
0	NaN	Thailand	15.0000	101.0000	1/22/20	2
1	NaN	Japan	36.0000	138.0000	1/22/20	2
2	NaN	Singapore	1.2833	103.8333	1/22/20	0
3	NaN	Nepal	28.1667	84.2500	1/22/20	0
4	NaN	Malaysia	2.5000	112.5000	1/22/20	0
...
29702	NaN	Dominica	15.4150	-61.3710	3/22/20	1
29703	NaN	Grenada	12.1165	-61.6790	3/22/20	1
29704	NaN	Mozambique	-18.6657	35.5296	3/22/20	1
29705	NaN	Syria	34.8021	38.9968	3/22/20	1
29706	NaN	Timor-Leste	-8.8742	125.7275	3/22/20	1

29707 rows × 6 columns

```
In [10]: covid_confirm=covid_confirm.rename({'variable':'Date','value': 'Confirm'}, axis=  
covid_confirm.head()
```

Out[10]:

	Province/State	Country/Region	Lat	Long	Date	Confirm
0	NaN	Thailand	15.0000	101.0000	1/22/20	2
1	NaN	Japan	36.0000	138.0000	1/22/20	2
2	NaN	Singapore	1.2833	103.8333	1/22/20	0
3	NaN	Nepal	28.1667	84.2500	1/22/20	0
4	NaN	Malaysia	2.5000	112.5000	1/22/20	0

```
In [11]: covid_deaths=covid_deaths.melt(id_vars=['Province/State','Country/Region','Lat',  
covid_deaths.head())
```

Out[11]:

	Province/State	Country/Region	Lat	Long	variable	value
0	NaN	Thailand	15.0000	101.0000	1/22/20	0
1	NaN	Japan	36.0000	138.0000	1/22/20	0
2	NaN	Singapore	1.2833	103.8333	1/22/20	0
3	NaN	Nepal	28.1667	84.2500	1/22/20	0
4	NaN	Malaysia	2.5000	112.5000	1/22/20	0

In [12]: `covid_deaths=covid_deaths.rename({'variable':'Date','value': 'Death'}, axis='columns')
covid_deaths.head()`

Out[12]:

	Province/State	Country/Region	Lat	Long	Date	Death
0	NaN	Thailand	15.0000	101.0000	1/22/20	0
1	NaN	Japan	36.0000	138.0000	1/22/20	0
2	NaN	Singapore	1.2833	103.8333	1/22/20	0
3	NaN	Nepal	28.1667	84.2500	1/22/20	0
4	NaN	Malaysia	2.5000	112.5000	1/22/20	0

In [13]: `covid_recovered=covid_recovered.melt(id_vars=['Province/State','Country/Region'], value_vars='Recovered')
covid_recovered.head()`

Out[13]:

	Province/State	Country/Region	Lat	Long	variable	value
0	NaN	Thailand	15.0000	101.0000	1/22/20	0
1	NaN	Japan	36.0000	138.0000	1/22/20	0
2	NaN	Singapore	1.2833	103.8333	1/22/20	0
3	NaN	Nepal	28.1667	84.2500	1/22/20	0
4	NaN	Malaysia	2.5000	112.5000	1/22/20	0

In [14]: `covid_recovered=covid_recovered.rename({'variable':'Date','value': 'Recovered'}, axis='columns')
covid_recovered.head()`

Out[14]:

	Province/State	Country/Region	Lat	Long	Date	Recovered
0	NaN	Thailand	15.0000	101.0000	1/22/20	0
1	NaN	Japan	36.0000	138.0000	1/22/20	0
2	NaN	Singapore	1.2833	103.8333	1/22/20	0
3	NaN	Nepal	28.1667	84.2500	1/22/20	0
4	NaN	Malaysia	2.5000	112.5000	1/22/20	0

```
In [15]: combined_covid = [covid_confirm, covid_deaths, covid_recovered]
combined_covid
```

```
Out[15]: [      Province/State Country/Region      Lat      Long     Date  Confirm
0                NaN        Thailand  15.0000  101.0000  1/22/20      2
1                NaN         Japan   36.0000  138.0000  1/22/20      2
2                NaN    Singapore  1.2833  103.8333  1/22/20      0
3                NaN        Nepal  28.1667  84.2500  1/22/20      0
4                NaN      Malaysia  2.5000  112.5000  1/22/20      0
...
29702               ...       Dominica  15.4150 -61.3710  3/22/20      1
29703               ...       Grenada  12.1165 -61.6790  3/22/20      1
29704               ...    Mozambique -18.6657  35.5296  3/22/20      1
29705               ...        Syria  34.8021  38.9968  3/22/20      1
29706               ...  Timor-Leste -8.8742  125.7275  3/22/20      1
```

```
[29707 rows x 6 columns],
      Province/State Country/Region      Lat      Long     Date  Death
0                NaN        Thailand  15.0000  101.0000  1/22/20      0
1                NaN         Japan   36.0000  138.0000  1/22/20      0
2                NaN    Singapore  1.2833  103.8333  1/22/20      0
3                NaN        Nepal  28.1667  84.2500  1/22/20      0
4                NaN      Malaysia  2.5000  112.5000  1/22/20      0
...
29702               ...       Dominica  15.4150 -61.3710  3/22/20      0
29703               ...       Grenada  12.1165 -61.6790  3/22/20      0
29704               ...    Mozambique -18.6657  35.5296  3/22/20      0
29705               ...        Syria  34.8021  38.9968  3/22/20      0
29706               ...  Timor-Leste -8.8742  125.7275  3/22/20      0
```

```
[29707 rows x 6 columns],
      Province/State Country/Region      Lat      Long     Date  Recover
0                NaN        Thailand  15.0000  101.0000  1/22/20      0
1                NaN         Japan   36.0000  138.0000  1/22/20      0
2                NaN    Singapore  1.2833  103.8333  1/22/20      0
3                NaN        Nepal  28.1667  84.2500  1/22/20      0
4                NaN      Malaysia  2.5000  112.5000  1/22/20      0
...
29702               ...       Dominica  15.4150 -61.3710  3/22/20      0
29703               ...       Grenada  12.1165 -61.6790  3/22/20      0
29704               ...    Mozambique -18.6657  35.5296  3/22/20      0
29705               ...        Syria  34.8021  38.9968  3/22/20      0
29706               ...  Timor-Leste -8.8742  125.7275  3/22/20      0
```

```
[29707 rows x 6 columns]]
```

```
In [16]: combined_covid=[covid_confirm, covid_deaths, covid_recovered]
combined_covid=df.set_index(['Province/State','Country/Region','Lat','Long','Date'])
combined_covid=combined_covid[0].join(combined_covid[1:])
combined_covid.head()
```

Out[16]:

Province/State	Country/Region	Lat	Long	Date	Confirm	Death	Recover
	Thailand	15.0000	101.0000	1/22/20	2	0	0
	Japan	36.0000	138.0000	1/22/20	2	0	0
Nan	Singapore	1.2833	103.8333	1/22/20	0	0	0
	Nepal	28.1667	84.2500	1/22/20	0	0	0
	Malaysia	2.5000	112.5000	1/22/20	0	0	0

```
In [17]: combined_covid.tail(6)
```

Out[17]:

Province/State	Country/Region	Lat	Long	Date	Confirm	Death	Recover
	Uganda	1.0000	32.0000	3/22/20	1	0	0
	Dominica	15.4150	-61.3710	3/22/20	1	0	0
Nan	Grenada	12.1165	-61.6790	3/22/20	1	0	0
	Mozambique	-18.6657	35.5296	3/22/20	1	0	0
	Syria	34.8021	38.9968	3/22/20	1	0	0
	Timor-Leste	-8.8742	125.7275	3/22/20	1	0	0

```
In [18]: combined_covid=combined_covid.reset_index()
combined_covid.head()
```

Out[18]:

	Province/State	Country/Region	Lat	Long	Date	Confirm	Death	Recover
0	Nan	Thailand	15.0000	101.0000	1/22/20	2	0	0
1	Nan	Japan	36.0000	138.0000	1/22/20	2	0	0
2	Nan	Singapore	1.2833	103.8333	1/22/20	0	0	0
3	Nan	Nepal	28.1667	84.2500	1/22/20	0	0	0
4	Nan	Malaysia	2.5000	112.5000	1/22/20	0	0	0

```
In [19]: combined_covid[['Lat','Long','Confirm','Death','Recover']] = combined_covid[['Lat','Long','Date']].drop_duplicates(keep='first')
```

In [20]: `combined_covid.head()`

	Province/State	Country/Region	Lat	Long	Date	Confirm	Death	Recover
0	NaN	Thailand	15.0000	101.0000	1/22/20	2	0	0
1	NaN	Japan	36.0000	138.0000	1/22/20	2	0	0
2	NaN	Singapore	1.2833	103.8333	1/22/20	0	0	0
3	NaN	Nepal	28.1667	84.2500	1/22/20	0	0	0
4	NaN	Malaysia	2.5000	112.5000	1/22/20	0	0	0

In [21]: `combined_covid[['Date']] = combined_covid[['Date']].apply(pd.to_datetime)
combined_covid.head()`

	Province/State	Country/Region	Lat	Long	Date	Confirm	Death	Recover
0	NaN	Thailand	15.0000	101.0000	2020-01-22	2	0	0
1	NaN	Japan	36.0000	138.0000	2020-01-22	2	0	0
2	NaN	Singapore	1.2833	103.8333	2020-01-22	0	0	0
3	NaN	Nepal	28.1667	84.2500	2020-01-22	0	0	0
4	NaN	Malaysia	2.5000	112.5000	2020-01-22	0	0	0

In [22]: `combined_covid=combined_covid.rename({'Province/State':'State','Country/Region':
combined_covid.head(6)}`

	State	Country	Lat	Long	Date	Confirm	Death	Recover
0	NaN	Thailand	15.0000	101.0000	2020-01-22	2	0	0
1	NaN	Japan	36.0000	138.0000	2020-01-22	2	0	0
2	NaN	Singapore	1.2833	103.8333	2020-01-22	0	0	0
3	NaN	Nepal	28.1667	84.2500	2020-01-22	0	0	0
4	NaN	Malaysia	2.5000	112.5000	2020-01-22	0	0	0
5	British Columbia	Canada	49.2827	-123.1207	2020-01-22	0	0	0

In [23]: `combined_covid.query("Country=='US' & State=='Washington'")`

Out[23]:

	State	Country	Lat	Long	Date	Confirm	Death	Recover
98	Washington	US	47.4009	-121.4905	2020-01-22	0	0	0
585	Washington	US	47.4009	-121.4905	2020-01-23	0	0	0
1072	Washington	US	47.4009	-121.4905	2020-01-24	0	0	0
1559	Washington	US	47.4009	-121.4905	2020-01-25	0	0	0
2046	Washington	US	47.4009	-121.4905	2020-01-26	0	0	0
...
27370	Washington	US	47.4009	-121.4905	2020-03-18	1014	55	0
27857	Washington	US	47.4009	-121.4905	2020-03-19	1376	74	0
28344	Washington	US	47.4009	-121.4905	2020-03-20	1524	83	0
28831	Washington	US	47.4009	-121.4905	2020-03-21	1793	94	0
29318	Washington	US	47.4009	-121.4905	2020-03-22	1996	95	0

61 rows × 8 columns

In [24]: `combined_covid.query("Country=='China' & State=='Hubei'")`

Out[24]:

	State	Country	Lat	Long	Date	Confirm	Death	Recover
154	Hubei	China	30.9756	112.2707	2020-01-22	444	17	28
641	Hubei	China	30.9756	112.2707	2020-01-23	444	17	28
1128	Hubei	China	30.9756	112.2707	2020-01-24	549	24	31
1615	Hubei	China	30.9756	112.2707	2020-01-25	761	40	32
2102	Hubei	China	30.9756	112.2707	2020-01-26	1058	52	42
...
27426	Hubei	China	30.9756	112.2707	2020-03-18	67800	3122	56927
27913	Hubei	China	30.9756	112.2707	2020-03-19	67800	3130	57682
28400	Hubei	China	30.9756	112.2707	2020-03-20	67800	3133	58382
28887	Hubei	China	30.9756	112.2707	2020-03-21	67800	3139	58946
29374	Hubei	China	30.9756	112.2707	2020-03-22	67800	3144	59433

61 rows × 8 columns

In [25]: `combined_covid['Active']=combined_covid['Confirm'] - combined_covid['Death'] - combined_covid['Recovered']
combined_covid.head()`

Out[25]:

	State	Country	Lat	Long	Date	Confirm	Death	Recovered	Active
0	NaN	Thailand	15.0000	101.0000	2020-01-22	2	0	0	2
1	NaN	Japan	36.0000	138.0000	2020-01-22	2	0	0	2
2	NaN	Singapore	1.2833	103.8333	2020-01-22	0	0	0	0
3	NaN	Nepal	28.1667	84.2500	2020-01-22	0	0	0	0
4	NaN	Malaysia	2.5000	112.5000	2020-01-22	0	0	0	0

In [26]: `max_dt=combined_covid[combined_covid.Date==combined_covid['Date'].max()]
max_dt`

Out[26]:

	State	Country	Lat	Long	Date	Confirm	Death	Recovered	Active
29220	NaN	Thailand	15.0000	101.0000	2020-03-22	599	1	44	554
29221	NaN	Japan	36.0000	138.0000	2020-03-22	1086	40	235	811
29222	NaN	Singapore	1.2833	103.8333	2020-03-22	455	2	144	309
29223	NaN	Nepal	28.1667	84.2500	2020-03-22	2	0	1	1
29224	NaN	Malaysia	2.5000	112.5000	2020-03-22	1306	10	139	1157
...
29702	NaN	Dominica	15.4150	-61.3710	2020-03-22	1	0	0	1
29703	NaN	Grenada	12.1165	-61.6790	2020-03-22	1	0	0	1
29704	NaN	Mozambique	-18.6657	35.5296	2020-03-22	1	0	0	1
29705	NaN	Syria	34.8021	38.9968	2020-03-22	1	0	0	1
29706	NaN	Timor-Leste	-8.8742	125.7275	2020-03-22	1	0	0	1

487 rows × 9 columns

```
In [27]: max_dt[['Country','Active']].sort_values('Active',ascending=False).head(10)
```

Out[27]:

	Country	Active
29236	Italy	46638
29231	Germany	24513
29238	Spain	24421
29319	US	15676
29377	France	13144
29375	Iran	12022
29251	Switzerland	7016
29376	Korea, South	5884
29623	United Kingdom	5337
29374	China	5223

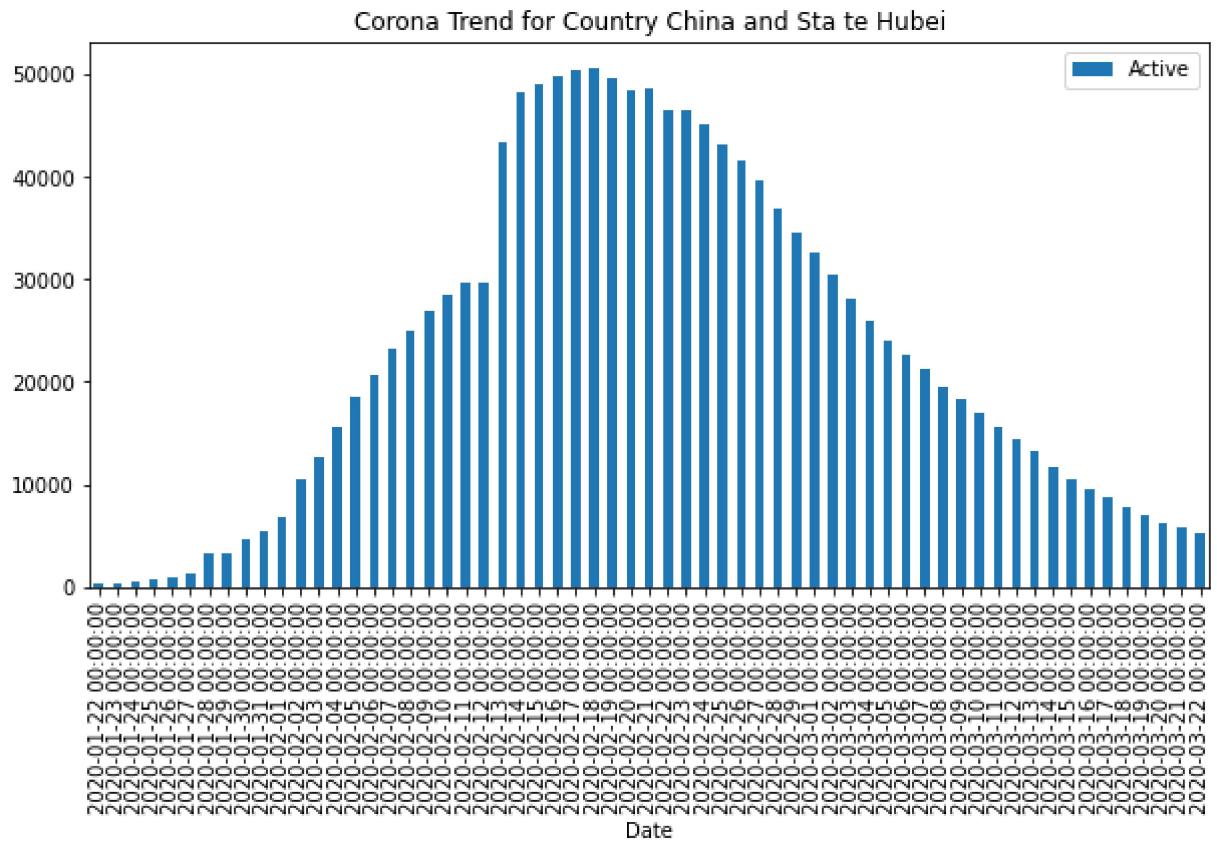
```
In [28]: max_dt[['Country','Confirm']].groupby(['Country']).sum().sort_values('Confirm',a:
```

Out[28]:

	Confirm
Eritrea	1
Mozambique	1
Cape Verde	1
Dominica	1
Timor-Leste	1
Somalia	1
Djibouti	1
Chad	1
Syria	1
Papua New Guinea	1

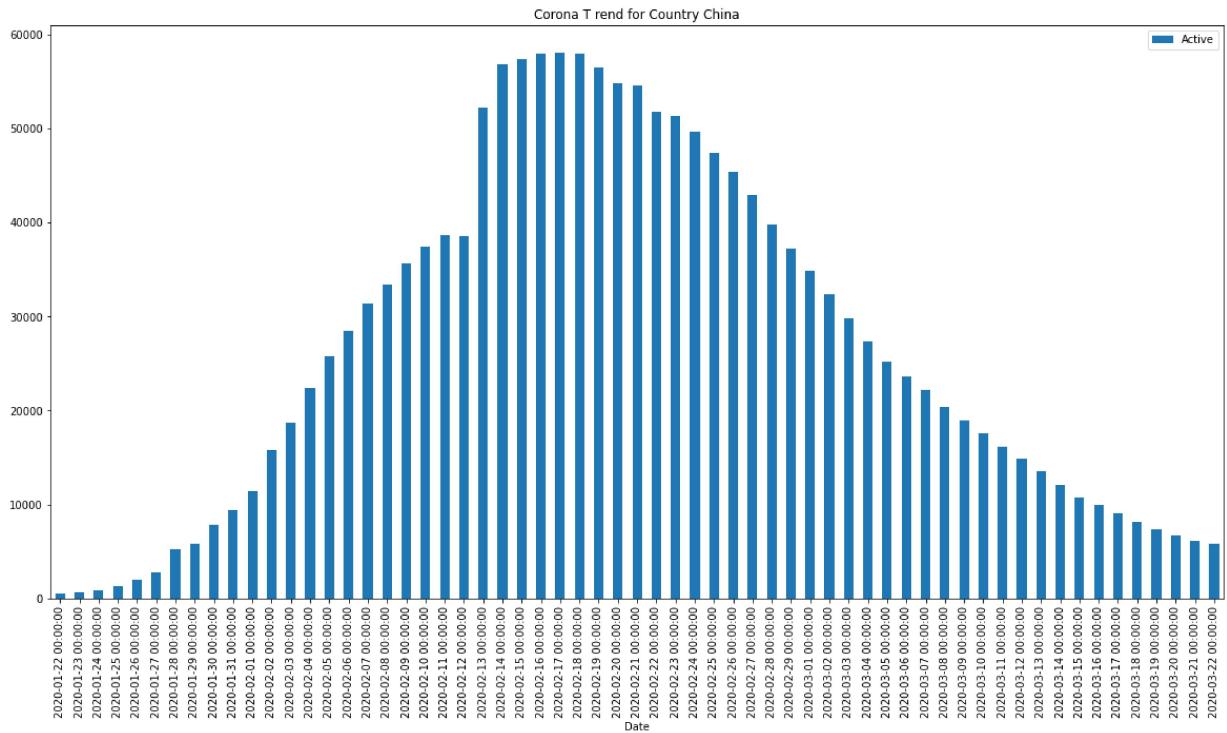
```
In [29]: %matplotlib inline  
mpl.rcParams['figure.figsize'] = (10, 5)  
mpl.rcParams['axes.grid'] = False  
combined_covid[['Date','Country','State','Active']].query("Country=='China' & State=='Hubei'").tail(100)
```

```
Out[29]: <matplotlib.axes._subplots.AxesSubplot at 0x2d3bcb4faf0>
```



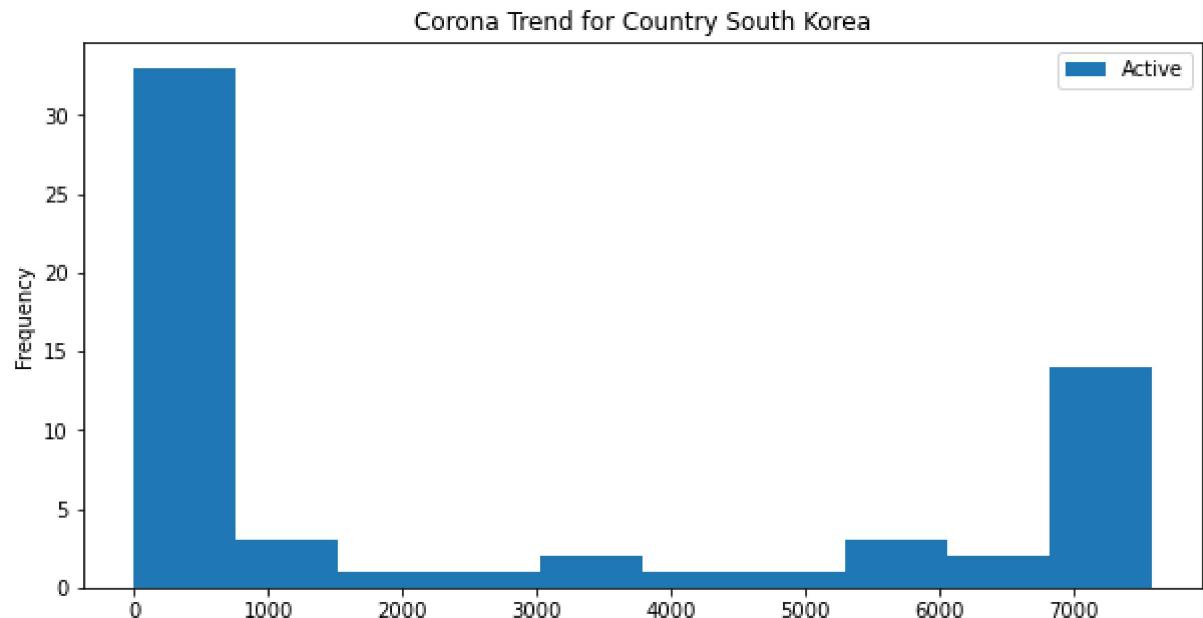
```
In [30]: %matplotlib inline  
mpl.rcParams['figure.figsize'] = (20, 10)  
mpl.rcParams['axes.grid'] = False  
combined_covid[['Date','Country','State','Active']].groupby(['Date','Country']).  
head(10)
```

```
Out[30]: <matplotlib.axes._subplots.AxesSubplot at 0x2d3bc9d31c0>
```



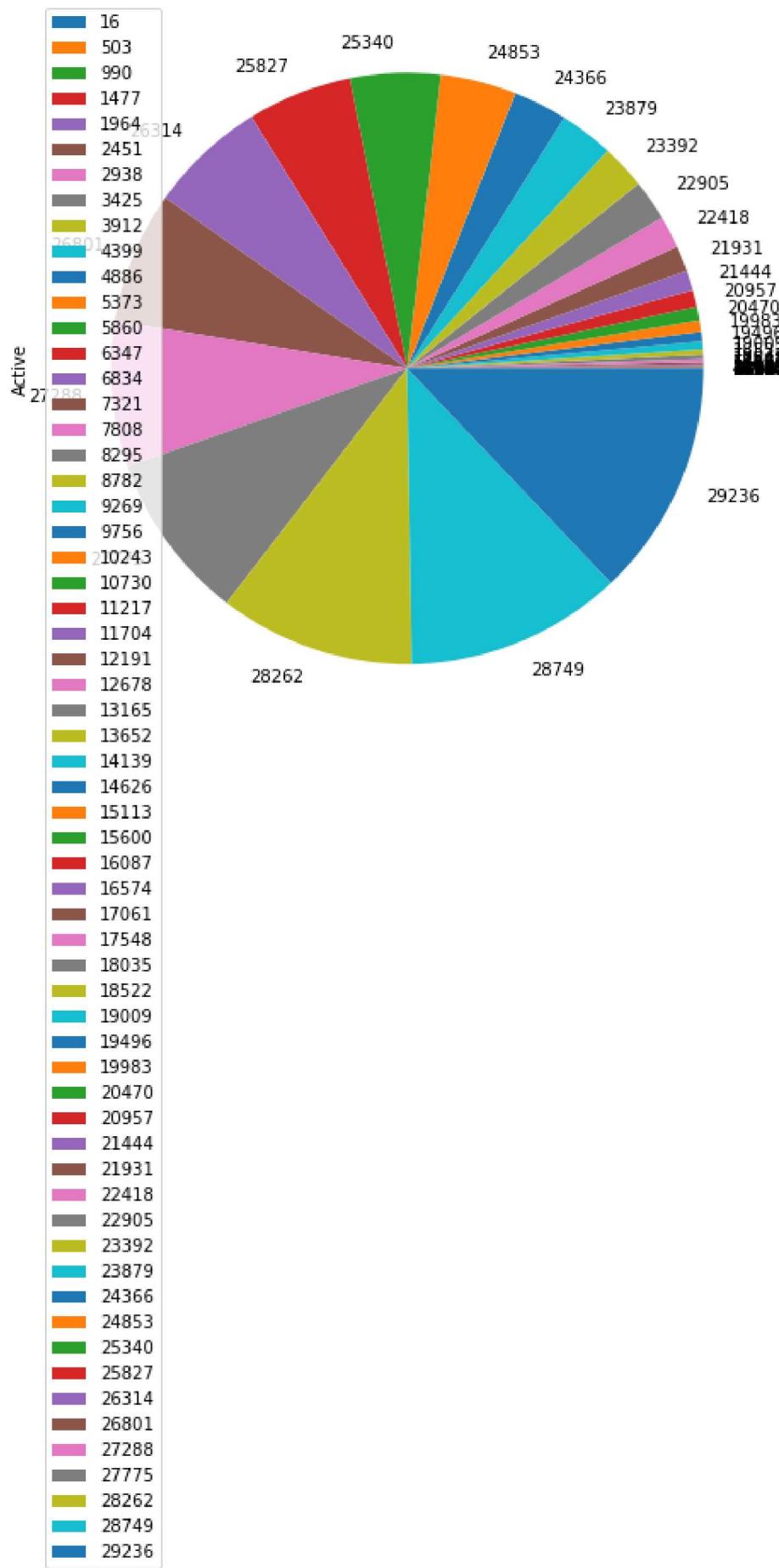
```
In [31]: %matplotlib inline  
mpl.rcParams['figure.figsize'] = (10, 5)  
mpl.rcParams['axes.grid'] = False  
combined_covid[['Date', 'Country', 'State', 'Active']].query("Country=='Korea, South")
```

```
Out[31]: <matplotlib.axes._subplots.AxesSubplot at 0x2d3bc052af0>
```



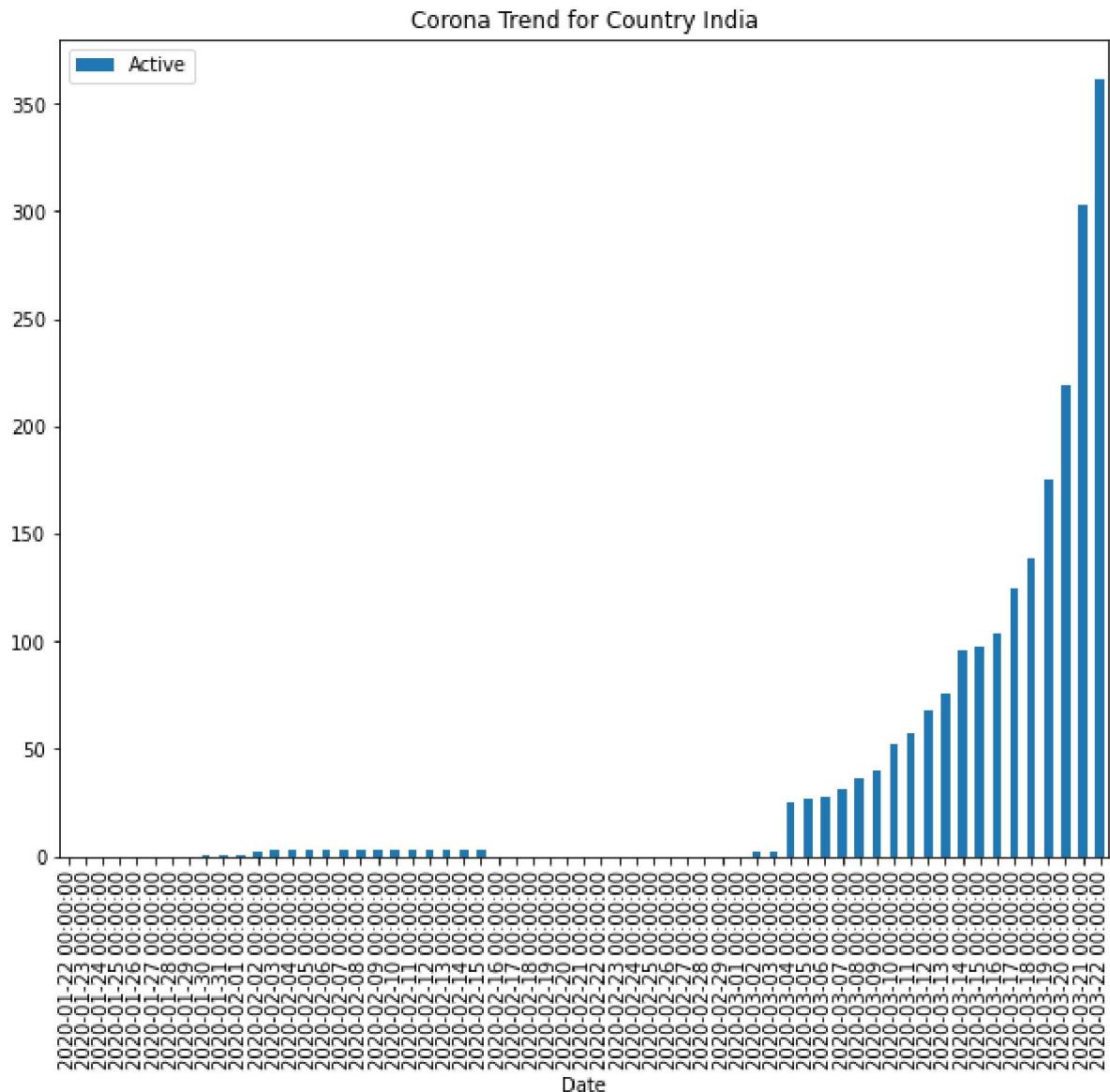
```
In [32]: %matplotlib inline  
mpl.rcParams['figure.figsize'] = (10, 8)  
mpl.rcParams['axes.grid'] = False  
combined_covid[['Date', 'Country', 'State', 'Active']].query("Country=='Italy'").plot()  
  
Out[32]: <matplotlib.axes._subplots.AxesSubplot at 0x2d3bc120e20>
```

Corona Trend for Country Italy



```
In [33]: %matplotlib inline  
mpl.rcParams['figure.figsize'] = (10, 8)  
mpl.rcParams['axes.grid'] = False  
combined_covid[['Date', 'Country', 'State', 'Active']].query("Country=='India'").plot
```

```
Out[33]: <matplotlib.axes._subplots.AxesSubplot at 0x2d3bc570a90>
```



```
In [34]: %matplotlib inline
mpl.rcParams['figure.figsize'] = (12, 8)
mpl.rcParams['axes.grid'] = False
combined_covid[['Date','Country','State','Active']].query("Country=='Iran'").plot()
plt.savefig
```

```
AttributeError Traceback (most recent call last)
<ipython-input-34-249575540412> in <module>
      3     mpl.rcParams['axes.grid'] = False
      4     combined_covid[['Date','Country','State','Active']].query("Country=
=> 'Iran'").plot(x='Date' ,y='Active' ,kind='scatter', title="Corona Trend for
 Country Iran")
      5 plt.savefig
```

AttributeError: module 'matplotlib.pyplot' has no attribute 'save'



```
In [ ]: covid_confirmed_global=pd.read_csv('D:\\DSWF\\carono\\covid_confirmed_global.csv')
covid_confirmed_global
```

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

```
In [ ]: covid_confirmed_global=covid_confirmed_global.rename({'variable':'Date','value':
covid_confirmed_global.head()
```

```
In [ ]: covid_confirmed_global=covid_confirmed_global.rename({'variable':'Date','value':
covid_confirmed_global
```

```
In [ ]: covid_deaths_global=pd.read_csv('D:\\DSWF\\carono\\covid_deaths_global.csv')
covid_deaths_global
```

```
In [ ]: combined_covid = [covid_confirm, covid_deaths, covid_recovered]
combined_covid
```

```
In [ ]:
```

```
In [ ]:
```

