

Covid Prediction

In [1]:

```
import pandas as pd
import matplotlib as mpl
import matplotlib.pyplot as plt

mpl.rcParams['figure.figsize'] = (20, 10)
mpl.rcParams['axes.grid'] = False
%matplotlib inline
```

In []:

```
corona_confirmed_df = pd.read_csv('https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_19-covid-Confirmed.csv')
```

In [4]:

```
corona_confirmed_df.head()
```

Out[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 | ... | 3/13/20 | 3/14/20 | 3/15/20 | 3/16/20 |
|---|----------------|----------------|---------|----------|---------|---------|---------|---------|---------|---------|-----|---------|---------|---------|---------|
| 0 | NaN | Thailand | 15.0000 | 101.0000 | 2 | 3 | 5 | 7 | 8 | 8 | ... | 75 | 82 | 114 | 114 |
| 1 | NaN | Japan | 36.0000 | 138.0000 | 2 | 1 | 2 | 2 | 4 | 4 | ... | 701 | 773 | 839 | 839 |
| 2 | NaN | Singapore | 1.2833 | 103.8333 | 0 | 1 | 3 | 3 | 4 | 5 | ... | 200 | 212 | 226 | 226 |
| 3 | NaN | Nepal | 28.1667 | 84.2500 | 0 | 0 | 0 | 1 | 1 | 1 | ... | 1 | 1 | 1 | 1 |
| 4 | NaN | Malaysia | 2.5000 | 112.5000 | 0 | 0 | 0 | 3 | 4 | 4 | ... | 197 | 238 | 428 | 428 |

5 rows × 65 columns



In [5]:

```
corona_death_df = pd.read_csv('https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_19-covid-Deaths.csv')
```

In [6]:

```
corona_death_df.head()
```

Out[6]:

| | Province/State | Country/Region | Lat | Long | 1/22/20 | 1/23/20 | 1/24/20 | 1/25/20 | 1/26/20 | 1/27/20 | ... | 3/13/20 | 3/14/20 | 3/15/20 | 3/16/20 |
|---|----------------|----------------|---------|----------|---------|---------|---------|---------|---------|---------|-----|---------|---------|---------|---------|
| 0 | NaN | Thailand | 15.0000 | 101.0000 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 1 | 1 | 1 | 1 |
| 1 | NaN | Japan | 36.0000 | 138.0000 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 19 | 22 | 22 | 22 |
| 2 | NaN | Singapore | 1.2833 | 103.8333 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 |
| 3 | NaN | Nepal | 28.1667 | 84.2500 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 |
| 4 | NaN | Malaysia | 2.5000 | 112.5000 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 |

5 rows × 65 columns



In [7]:

```
corona_recovered_df = pd.read_csv('https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_19-covid-Recovered.csv')
```

In [8]:



```
corona_recovered_df.head()
```

Out[8]:

| | Province/State | Country/Region | Lat | Long | 1/22/20 | 1/23/20 | 1/24/20 | 1/25/20 | 1/26/20 | 1/27/20 | ... | 3/13/20 | 3/14/20 | 3/15/20 | 3/16/20 |
|---|----------------|----------------|---------|----------|---------|---------|---------|---------|---------|---------|-----|---------|---------|---------|---------|
| 0 | NaN | Thailand | 15.0000 | 101.0000 | 0 | 0 | 0 | 0 | 2 | 2 | ... | 35 | 35 | 35 | 35 |
| 1 | NaN | Japan | 36.0000 | 138.0000 | 0 | 0 | 0 | 0 | 1 | 1 | ... | 118 | 118 | 118 | 118 |
| 2 | NaN | Singapore | 1.2833 | 103.8333 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 97 | 105 | 105 | 105 |
| 3 | NaN | Nepal | 28.1667 | 84.2500 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 1 | 1 | 1 | 1 |
| 4 | NaN | Malaysia | 2.5000 | 112.5000 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 26 | 35 | 42 | 42 |

5 rows × 65 columns

In [9]:

```
corona_confirmed_df=corona_confirmed_df.melt(id_vars=['Province/State','Country/Region','Lat','Long'])
corona_confirmed_df.head()
```

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 |

In [10]:

```
corona_confirmed_df=corona_confirmed_df.rename({'variable':'Date','value': 'Confirmed'},
axis='columns')
```

In [11]:

```
corona_confirmed_df.head()
```

Out[11]:

| | Province/State | Country/Region | Lat | Long | Date | Confirmed |
|---|----------------|----------------|---------|----------|---------|-----------|
| 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 [12]:

```
corona_death_df=corona_death_df.melt(id_vars=['Province/State','Country/Region','Lat','Long'])
```

In [13]:

```
corona_death_df.head()
```

Out[13]:

| | Province/State | Country/Region | Lat | Long | variable | value |
|---|----------------|----------------|---------|----------|----------|-------|
| 0 | NaN | Thailand | 15.0000 | 101.0000 | 1/22/20 | 0 |

| 1 | Province/State | Country/Region | Lat | Long | Date | value |
|---|----------------|----------------|---------|----------|---------|-------|
| 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]:

```
corona_death_df=corona_death_df.rename({'variable':'Date','value': 'Death'}, axis='columns')
corona_death_df.head()
```

Out[14]:

| | 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 [15]:

```
corona_recovered_df=corona_recovered_df.melt(id_vars=['Province/State','Country/Region','Lat','Long'])
corona_recovered_df.rename({'variable':'Date','value': 'recovered'}, axis='columns')
```

In [16]:

```
corona_recovered_df.head()
```

Out[16]:

| | 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 [17]:

```
combined_df=[corona_confirmed_df,corona_recovered_df,corona_death_df]
combined_df
```

Out[17]:

| | Province/State | Country/Region | Lat | Long | \ |
|----|------------------|----------------------|----------|-----------|---|
| 0 | NaN | Thailand | 15.0000 | 101.0000 | |
| 1 | NaN | Japan | 36.0000 | 138.0000 | |
| 2 | NaN | Singapore | 1.2833 | 103.8333 | |
| 3 | NaN | Nepal | 28.1667 | 84.2500 | |
| 4 | NaN | Malaysia | 2.5000 | 112.5000 | |
| 5 | British Columbia | Canada | 49.2827 | -123.1207 | |
| 6 | New South Wales | Australia | -33.8688 | 151.2093 | |
| 7 | Victoria | Australia | -37.8136 | 144.9631 | |
| 8 | Queensland | Australia | -28.0167 | 153.4000 | |
| 9 | NaN | Cambodia | 11.5500 | 104.9167 | |
| 10 | NaN | Sri Lanka | 7.0000 | 81.0000 | |
| 11 | NaN | Germany | 51.0000 | 9.0000 | |
| 12 | NaN | Finland | 64.0000 | 26.0000 | |
| 13 | NaN | United Arab Emirates | 24.0000 | 54.0000 | |
| 14 | NaN | Philippines | 13.0000 | 122.0000 | |
| 15 | NaN | India | 21.0000 | 78.0000 | |
| 16 | NaN | Italy | 43.0000 | 12.0000 | |
| 17 | NaN | Sweden | 63.0000 | 16.0000 | |

| | | | | | |
|-------|-----------------------|-----|------------------|----------|-----------|
| 17 | | NaN | Sweden | 85.0000 | 10.0000 |
| 18 | | NaN | Spain | 40.0000 | -4.0000 |
| 19 | South Australia | | Australia | -34.9285 | 138.6007 |
| 20 | | NaN | Belgium | 50.8333 | 4.0000 |
| 21 | | NaN | Egypt | 26.0000 | 30.0000 |
| 22 | From Diamond Princess | | Australia | 35.4437 | 139.6380 |
| 23 | | NaN | Lebanon | 33.8547 | 35.8623 |
| 24 | | NaN | Iraq | 33.0000 | 44.0000 |
| 25 | | NaN | Oman | 21.0000 | 57.0000 |
| 26 | | NaN | Afghanistan | 33.0000 | 65.0000 |
| 27 | | NaN | Bahrain | 26.0275 | 50.5500 |
| 28 | | NaN | Kuwait | 29.5000 | 47.7500 |
| 29 | | NaN | Algeria | 28.0339 | 1.6596 |
| ... | | ... | ... | ... | ... |
| 29677 | | NaN | Djibouti | 11.8251 | 42.5903 |
| 29678 | | NaN | Gambia, The | 13.4432 | -15.3101 |
| 29679 | Montserrat | | United Kingdom | 16.7425 | -62.1874 |
| 29680 | | NaN | Bahamas, The | 25.0343 | -77.3963 |
| 29681 | Greenland | | Denmark | 71.7069 | -42.6043 |
| 29682 | New Caledonia | | France | -20.9043 | 165.6180 |
| 29683 | Bermuda | | United Kingdom | 32.3078 | -64.7505 |
| 29684 | | NaN | Chad | 15.4542 | 18.7322 |
| 29685 | | NaN | El Salvador | 13.7942 | -88.8965 |
| 29686 | | NaN | Fiji | -17.7134 | 178.0650 |
| 29687 | | NaN | Nicaragua | 12.8654 | -85.2072 |
| 29688 | | NaN | Madagascar | -18.7669 | 46.8691 |
| 29689 | | NaN | Haiti | 18.9712 | -72.2852 |
| 29690 | | NaN | Angola | -11.2027 | 17.8739 |
| 29691 | | NaN | Cabo Verde | 16.5388 | -23.0418 |
| 29692 | Sint Maarten | | Netherlands | 18.0425 | -63.0548 |
| 29693 | | NaN | Niger | 17.6078 | 8.0817 |
| 29694 | | NaN | Papua New Guinea | -6.3150 | 143.9555 |
| 29695 | Isle of Man | | United Kingdom | 54.2361 | -4.5481 |
| 29696 | | NaN | Zimbabwe | -20.0000 | 30.0000 |
| 29697 | Northwest Territories | | Canada | 64.8255 | -124.8457 |
| 29698 | | NaN | Cape Verde | 15.1111 | -23.6167 |
| 29699 | | NaN | East Timor | -8.5500 | 125.5600 |
| 29700 | | NaN | Eritrea | 15.1794 | 39.7823 |
| 29701 | | NaN | Uganda | 1.0000 | 32.0000 |
| 29702 | | NaN | Dominica | 15.4150 | -61.3710 |
| 29703 | | NaN | Grenada | 12.1165 | -61.6790 |
| 29704 | | NaN | Mozambique | -18.6657 | 35.5296 |
| 29705 | | NaN | Syria | 34.8021 | 38.9968 |
| 29706 | | NaN | Timor-Leste | -8.8742 | 125.7275 |

| | Date | Confirmed |
|-------|---------|-----------|
| 0 | 1/22/20 | 2 |
| 1 | 1/22/20 | 2 |
| 2 | 1/22/20 | 0 |
| 3 | 1/22/20 | 0 |
| 4 | 1/22/20 | 0 |
| 5 | 1/22/20 | 0 |
| 6 | 1/22/20 | 0 |
| 7 | 1/22/20 | 0 |
| 8 | 1/22/20 | 0 |
| 9 | 1/22/20 | 0 |
| 10 | 1/22/20 | 0 |
| 11 | 1/22/20 | 0 |
| 12 | 1/22/20 | 0 |
| 13 | 1/22/20 | 0 |
| 14 | 1/22/20 | 0 |
| 15 | 1/22/20 | 0 |
| 16 | 1/22/20 | 0 |
| 17 | 1/22/20 | 0 |
| 18 | 1/22/20 | 0 |
| 19 | 1/22/20 | 0 |
| 20 | 1/22/20 | 0 |
| 21 | 1/22/20 | 0 |
| 22 | 1/22/20 | 0 |
| 23 | 1/22/20 | 0 |
| 24 | 1/22/20 | 0 |
| 25 | 1/22/20 | 0 |
| 26 | 1/22/20 | 0 |
| 27 | 1/22/20 | 0 |
| 28 | 1/22/20 | 0 |
| 29 | 1/22/20 | 0 |
| ... | ... | ... |
| 29677 | 3/22/20 | 1 |

```

29677 3/22/20 1
29678 3/22/20 1
29679 3/22/20 1
29680 3/22/20 4
29681 3/22/20 4
29682 3/22/20 4
29683 3/22/20 2
29684 3/22/20 1
29685 3/22/20 3
29686 3/22/20 2
29687 3/22/20 2
29688 3/22/20 3
29689 3/22/20 2
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29693 3/22/20 2
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29696 3/22/20 3
29697 3/22/20 1
29698 3/22/20 1
29699 3/22/20 1
29700 3/22/20 1
29701 3/22/20 1
29702 3/22/20 1
29703 3/22/20 1
29704 3/22/20 1
29705 3/22/20 1
29706 3/22/20 1

```

[29707 rows x 6 columns],

| | Province/State | Country/Region | Lat | Long | \ |
|-------|-----------------------|----------------------|----------|-----------|-----|
| 0 | NaN | Thailand | 15.0000 | 101.0000 | |
| 1 | NaN | Japan | 36.0000 | 138.0000 | |
| 2 | NaN | Singapore | 1.2833 | 103.8333 | |
| 3 | NaN | Nepal | 28.1667 | 84.2500 | |
| 4 | NaN | Malaysia | 2.5000 | 112.5000 | |
| 5 | British Columbia | Canada | 49.2827 | -123.1207 | |
| 6 | New South Wales | Australia | -33.8688 | 151.2093 | |
| 7 | Victoria | Australia | -37.8136 | 144.9631 | |
| 8 | Queensland | Australia | -28.0167 | 153.4000 | |
| 9 | NaN | Cambodia | 11.5500 | 104.9167 | |
| 10 | NaN | Sri Lanka | 7.0000 | 81.0000 | |
| 11 | NaN | Germany | 51.0000 | 9.0000 | |
| 12 | NaN | Finland | 64.0000 | 26.0000 | |
| 13 | NaN | United Arab Emirates | 24.0000 | 54.0000 | |
| 14 | NaN | Philippines | 13.0000 | 122.0000 | |
| 15 | NaN | India | 21.0000 | 78.0000 | |
| 16 | NaN | Italy | 43.0000 | 12.0000 | |
| 17 | NaN | Sweden | 63.0000 | 16.0000 | |
| 18 | NaN | Spain | 40.0000 | -4.0000 | |
| 19 | South Australia | Australia | -34.9285 | 138.6007 | |
| 20 | NaN | Belgium | 50.8333 | 4.0000 | |
| 21 | NaN | Egypt | 26.0000 | 30.0000 | |
| 22 | From Diamond Princess | Australia | 35.4437 | 139.6380 | |
| 23 | NaN | Lebanon | 33.8547 | 35.8623 | |
| 24 | NaN | Iraq | 33.0000 | 44.0000 | |
| 25 | NaN | Oman | 21.0000 | 57.0000 | |
| 26 | NaN | Afghanistan | 33.0000 | 65.0000 | |
| 27 | NaN | Bahrain | 26.0275 | 50.5500 | |
| 28 | NaN | Kuwait | 29.5000 | 47.7500 | |
| 29 | NaN | Algeria | 28.0339 | 1.6596 | |
| ... | ... | ... | ... | ... | ... |
| 29677 | NaN | Djibouti | 11.8251 | 42.5903 | |
| 29678 | NaN | Gambia, The | 13.4432 | -15.3101 | |
| 29679 | Montserrat | United Kingdom | 16.7425 | -62.1874 | |
| 29680 | NaN | Bahamas, The | 25.0343 | -77.3963 | |
| 29681 | Greenland | Denmark | 71.7069 | -42.6043 | |
| 29682 | New Caledonia | France | -20.9043 | 165.6180 | |
| 29683 | Bermuda | United Kingdom | 32.3078 | -64.7505 | |
| 29684 | NaN | Chad | 15.4542 | 18.7322 | |
| 29685 | NaN | El Salvador | 13.7942 | -88.8965 | |
| 29686 | NaN | Fiji | -17.7134 | 178.0650 | |
| 29687 | NaN | Nicaragua | 12.8654 | -85.2072 | |
| 29688 | NaN | Madagascar | -18.7669 | 46.8691 | |
| 29689 | NaN | Haiti | 18.9712 | -72.2852 | |
| 29690 | NaN | Angola | 11.2027 | 17.8728 | |

| | | | | |
|-------|-----------------------|------------------|----------|-----------|
| 29690 | NaN | Angola | -11.2021 | 17.8759 |
| 29691 | NaN | Cabo Verde | 16.5388 | -23.0418 |
| 29692 | Sint Maarten | Netherlands | 18.0425 | -63.0548 |
| 29693 | NaN | Niger | 17.6078 | 8.0817 |
| 29694 | NaN | Papua New Guinea | -6.3150 | 143.9555 |
| 29695 | Isle of Man | United Kingdom | 54.2361 | -4.5481 |
| 29696 | NaN | Zimbabwe | -20.0000 | 30.0000 |
| 29697 | Northwest Territories | Canada | 64.8255 | -124.8457 |
| 29698 | NaN | Cape Verde | 15.1111 | -23.6167 |
| 29699 | NaN | East Timor | -8.5500 | 125.5600 |
| 29700 | NaN | Eritrea | 15.1794 | 39.7823 |
| 29701 | NaN | Uganda | 1.0000 | 32.0000 |
| 29702 | NaN | Dominica | 15.4150 | -61.3710 |
| 29703 | NaN | Grenada | 12.1165 | -61.6790 |
| 29704 | NaN | Mozambique | -18.6657 | 35.5296 |
| 29705 | NaN | Syria | 34.8021 | 38.9968 |
| 29706 | NaN | Timor-Leste | -8.8742 | 125.7275 |

| | Date | recovered |
|-------|---------|-----------|
| 0 | 1/22/20 | 0 |
| 1 | 1/22/20 | 0 |
| 2 | 1/22/20 | 0 |
| 3 | 1/22/20 | 0 |
| 4 | 1/22/20 | 0 |
| 5 | 1/22/20 | 0 |
| 6 | 1/22/20 | 0 |
| 7 | 1/22/20 | 0 |
| 8 | 1/22/20 | 0 |
| 9 | 1/22/20 | 0 |
| 10 | 1/22/20 | 0 |
| 11 | 1/22/20 | 0 |
| 12 | 1/22/20 | 0 |
| 13 | 1/22/20 | 0 |
| 14 | 1/22/20 | 0 |
| 15 | 1/22/20 | 0 |
| 16 | 1/22/20 | 0 |
| 17 | 1/22/20 | 0 |
| 18 | 1/22/20 | 0 |
| 19 | 1/22/20 | 0 |
| 20 | 1/22/20 | 0 |
| 21 | 1/22/20 | 0 |
| 22 | 1/22/20 | 0 |
| 23 | 1/22/20 | 0 |
| 24 | 1/22/20 | 0 |
| 25 | 1/22/20 | 0 |
| 26 | 1/22/20 | 0 |
| 27 | 1/22/20 | 0 |
| 28 | 1/22/20 | 0 |
| 29 | 1/22/20 | 0 |
| ... | ... | ... |
| 29677 | 3/22/20 | 0 |
| 29678 | 3/22/20 | 0 |
| 29679 | 3/22/20 | 0 |
| 29680 | 3/22/20 | 0 |
| 29681 | 3/22/20 | 0 |
| 29682 | 3/22/20 | 0 |
| 29683 | 3/22/20 | 0 |
| 29684 | 3/22/20 | 0 |
| 29685 | 3/22/20 | 0 |
| 29686 | 3/22/20 | 0 |
| 29687 | 3/22/20 | 0 |
| 29688 | 3/22/20 | 0 |
| 29689 | 3/22/20 | 0 |
| 29690 | 3/22/20 | 0 |
| 29691 | 3/22/20 | 0 |
| 29692 | 3/22/20 | 0 |
| 29693 | 3/22/20 | 0 |
| 29694 | 3/22/20 | 0 |
| 29695 | 3/22/20 | 0 |
| 29696 | 3/22/20 | 0 |
| 29697 | 3/22/20 | 0 |
| 29698 | 3/22/20 | 0 |
| 29699 | 3/22/20 | 0 |
| 29700 | 3/22/20 | 0 |
| 29701 | 3/22/20 | 0 |
| 29702 | 3/22/20 | 0 |
| 29703 | 3/22/20 | 0 |
| 29704 | 3/22/20 | 0 |

29704 3/22/20 0
 29705 3/22/20 0
 29706 3/22/20 0

[29707 rows x 6 columns],

| | Province/State | Country/Region | Lat | Long | \ |
|-------|-----------------------|----------------------|----------|-----------|-----|
| 0 | NaN | Thailand | 15.0000 | 101.0000 | |
| 1 | NaN | Japan | 36.0000 | 138.0000 | |
| 2 | NaN | Singapore | 1.2833 | 103.8333 | |
| 3 | NaN | Nepal | 28.1667 | 84.2500 | |
| 4 | NaN | Malaysia | 2.5000 | 112.5000 | |
| 5 | British Columbia | Canada | 49.2827 | -123.1207 | |
| 6 | New South Wales | Australia | -33.8688 | 151.2093 | |
| 7 | Victoria | Australia | -37.8136 | 144.9631 | |
| 8 | Queensland | Australia | -28.0167 | 153.4000 | |
| 9 | NaN | Cambodia | 11.5500 | 104.9167 | |
| 10 | NaN | Sri Lanka | 7.0000 | 81.0000 | |
| 11 | NaN | Germany | 51.0000 | 9.0000 | |
| 12 | NaN | Finland | 64.0000 | 26.0000 | |
| 13 | NaN | United Arab Emirates | 24.0000 | 54.0000 | |
| 14 | NaN | Philippines | 13.0000 | 122.0000 | |
| 15 | NaN | India | 21.0000 | 78.0000 | |
| 16 | NaN | Italy | 43.0000 | 12.0000 | |
| 17 | NaN | Sweden | 63.0000 | 16.0000 | |
| 18 | NaN | Spain | 40.0000 | -4.0000 | |
| 19 | South Australia | Australia | -34.9285 | 138.6007 | |
| 20 | NaN | Belgium | 50.8333 | 4.0000 | |
| 21 | NaN | Egypt | 26.0000 | 30.0000 | |
| 22 | From Diamond Princess | Australia | 35.4437 | 139.6380 | |
| 23 | NaN | Lebanon | 33.8547 | 35.8623 | |
| 24 | NaN | Iraq | 33.0000 | 44.0000 | |
| 25 | NaN | Oman | 21.0000 | 57.0000 | |
| 26 | NaN | Afghanistan | 33.0000 | 65.0000 | |
| 27 | NaN | Bahrain | 26.0275 | 50.5500 | |
| 28 | NaN | Kuwait | 29.5000 | 47.7500 | |
| 29 | NaN | Algeria | 28.0339 | 1.6596 | |
| ... | ... | ... | ... | ... | ... |
| 29677 | NaN | Djibouti | 11.8251 | 42.5903 | |
| 29678 | NaN | Gambia, The | 13.4432 | -15.3101 | |
| 29679 | Montserrat | United Kingdom | 16.7425 | -62.1874 | |
| 29680 | NaN | Bahamas, The | 25.0343 | -77.3963 | |
| 29681 | Greenland | Denmark | 71.7069 | -42.6043 | |
| 29682 | New Caledonia | France | -20.9043 | 165.6180 | |
| 29683 | Bermuda | United Kingdom | 32.3078 | -64.7505 | |
| 29684 | NaN | Chad | 15.4542 | 18.7322 | |
| 29685 | NaN | El Salvador | 13.7942 | -88.8965 | |
| 29686 | NaN | Fiji | -17.7134 | 178.0650 | |
| 29687 | NaN | Nicaragua | 12.8654 | -85.2072 | |
| 29688 | NaN | Madagascar | -18.7669 | 46.8691 | |
| 29689 | NaN | Haiti | 18.9712 | -72.2852 | |
| 29690 | NaN | Angola | -11.2027 | 17.8739 | |
| 29691 | NaN | Cabo Verde | 16.5388 | -23.0418 | |
| 29692 | Sint Maarten | Netherlands | 18.0425 | -63.0548 | |
| 29693 | NaN | Niger | 17.6078 | 8.0817 | |
| 29694 | NaN | Papua New Guinea | -6.3150 | 143.9555 | |
| 29695 | Isle of Man | United Kingdom | 54.2361 | -4.5481 | |
| 29696 | NaN | Zimbabwe | -20.0000 | 30.0000 | |
| 29697 | Northwest Territories | Canada | 64.8255 | -124.8457 | |
| 29698 | NaN | Cape Verde | 15.1111 | -23.6167 | |
| 29699 | NaN | East Timor | -8.5500 | 125.5600 | |
| 29700 | NaN | Eritrea | 15.1794 | 39.7823 | |
| 29701 | NaN | Uganda | 1.0000 | 32.0000 | |
| 29702 | NaN | Dominica | 15.4150 | -61.3710 | |
| 29703 | NaN | Grenada | 12.1165 | -61.6790 | |
| 29704 | NaN | Mozambique | -18.6657 | 35.5296 | |
| 29705 | NaN | Syria | 34.8021 | 38.9968 | |
| 29706 | NaN | Timor-Leste | -8.8742 | 125.7275 | |

| | Date | Death |
|---|---------|-------|
| 0 | 1/22/20 | 0 |
| 1 | 1/22/20 | 0 |
| 2 | 1/22/20 | 0 |
| 3 | 1/22/20 | 0 |
| 4 | 1/22/20 | 0 |
| 5 | 1/22/20 | 0 |
| 6 | 1/22/20 | 0 |
| 7 | 1/22/20 | 0 |
| 8 | 1/22/20 | 0 |

```

8      1/22/20      0
9      1/22/20      0
10     1/22/20      0
11     1/22/20      0
12     1/22/20      0
13     1/22/20      0
14     1/22/20      0
15     1/22/20      0
16     1/22/20      0
17     1/22/20      0
18     1/22/20      0
19     1/22/20      0
20     1/22/20      0
21     1/22/20      0
22     1/22/20      0
23     1/22/20      0
24     1/22/20      0
25     1/22/20      0
26     1/22/20      0
27     1/22/20      0
28     1/22/20      0
29     1/22/20      0
...     ...     ...
29677  3/22/20      0
29678  3/22/20      0
29679  3/22/20      0
29680  3/22/20      0
29681  3/22/20      0
29682  3/22/20      0
29683  3/22/20      0
29684  3/22/20      0
29685  3/22/20      0
29686  3/22/20      0
29687  3/22/20      0
29688  3/22/20      0
29689  3/22/20      0
29690  3/22/20      0
29691  3/22/20      0
29692  3/22/20      0
29693  3/22/20      0
29694  3/22/20      0
29695  3/22/20      0
29696  3/22/20      0
29697  3/22/20      0
29698  3/22/20      0
29699  3/22/20      0
29700  3/22/20      0
29701  3/22/20      0
29702  3/22/20      0
29703  3/22/20      0
29704  3/22/20      0
29705  3/22/20      0
29706  3/22/20      0

```

[29707 rows x 6 columns]]

In [18]:

```

combined_df = [corona_confirmed_df, corona_death_df, corona_recovered_df]
combined_df = [df.set_index(['Province/State', 'Country/Region', 'Lat', 'Long', 'Date']) for df in combined_df]
combined_df=combined_df[0].join(combined_df[1:])

```

In [19]:

```
combined_df.head()
```

Out[19]:

| | | | | | Confirmed | Death | recovered |
|----------------|----------------|---------|----------|---------|-----------|-------|-----------|
| Province/State | Country/Region | Lat | Long | Date | | | |
| NaN | Thailand | 15.0000 | 101.0000 | 1/22/20 | 2 | 0 | 0 |
| | Japan | 35.6800 | 139.7600 | 1/22/20 | 2 | 0 | 0 |

| | | Japan | 36.0000 | 138.0000 | 1/22/20 | Confirmed | Death | recovered |
|----------------|----------------|-----------|---------|----------|---------|-----------|-------|-----------|
| Province/State | Country/Region | 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 [20]:

```
combined_df=combined_df.reset_index()
```

In [21]:

```
combined_df.head()
```

Out [21]:

| | Province/State | Country/Region | Lat | Long | Date | Confirmed | Death | recovered |
|---|----------------|----------------|---------|----------|---------|-----------|-------|-----------|
| 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 [22]:

```
combined_df[['Lat', 'Long', 'Confirmed', 'Death', 'recovered']] = combined_df[['Lat', 'Long', 'Confirmed', 'Death', 'recovered']].apply(pd.to_numeric)
```

In [23]:

```
combined_df.head()
```

Out [23]:

| | Province/State | Country/Region | Lat | Long | Date | Confirmed | Death | recovered |
|---|----------------|----------------|---------|----------|---------|-----------|-------|-----------|
| 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 [24]:

```
combined_df[['Date']] = combined_df[['Date']].apply(pd.to_datetime)
```

In [25]:

```
combined_df.head()
```

Out [25]:

| | Province/State | Country/Region | Lat | Long | Date | Confirmed | Death | recovered |
|---|----------------|----------------|---------|----------|------------|-----------|-------|-----------|
| 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 [26]:

```
combined_df.dtypes
```

Out[26]:

```
Province/State      object
Country/Region      object
Lat                 float64
Long                float64
Date                datetime64[ns]
Confirmed            int64
Death               int64
recovered           int64
dtype: object
```

In [27]:

```
combined_df=combined_df.rename({'Province/State':'State', 'Country/Region':'Country'},axis='columns')

```

In [28]:

```
combined_df.head()
```

Out[28]:

| | State | Country | Lat | Long | Date | Confirmed | Death | recovered |
|---|-------|-----------|---------|----------|------------|-----------|-------|-----------|
| 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 [29]:

```
combined_df.query("Country=='US' & State=='Washington'")
```

Out[29]:

| | State | Country | Lat | Long | Date | Confirmed | Death | recovered |
|------|------------|---------|---------|-----------|------------|-----------|-------|-----------|
| 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 |
| 2533 | Washington | US | 47.4009 | -121.4905 | 2020-01-27 | 0 | 0 | 0 |
| 3020 | Washington | US | 47.4009 | -121.4905 | 2020-01-28 | 0 | 0 | 0 |
| 3507 | Washington | US | 47.4009 | -121.4905 | 2020-01-29 | 0 | 0 | 0 |
| 3994 | Washington | US | 47.4009 | -121.4905 | 2020-01-30 | 0 | 0 | 0 |
| 4481 | Washington | US | 47.4009 | -121.4905 | 2020-01-31 | 0 | 0 | 0 |
| 4968 | Washington | US | 47.4009 | -121.4905 | 2020-02-01 | 0 | 0 | 0 |
| 5455 | Washington | US | 47.4009 | -121.4905 | 2020-02-02 | 0 | 0 | 0 |
| 5942 | Washington | US | 47.4009 | -121.4905 | 2020-02-03 | 0 | 0 | 0 |
| 6429 | Washington | US | 47.4009 | -121.4905 | 2020-02-04 | 0 | 0 | 0 |
| 6916 | Washington | US | 47.4009 | -121.4905 | 2020-02-05 | 0 | 0 | 0 |
| 7403 | Washington | US | 47.4009 | -121.4905 | 2020-02-06 | 0 | 0 | 0 |
| 7890 | Washington | US | 47.4009 | -121.4905 | 2020-02-07 | 0 | 0 | 0 |

| 8377 | Washington | US | 47.4009 | -121.4905 | 2020-02-08 | Confirmed | Death | recovered |
|-------|------------|-----|---------|-----------|------------|-----------|-------|-----------|
| State | Country | Lat | Long | Date | | | | |
| 8864 | Washington | US | 47.4009 | -121.4905 | 2020-02-09 | 0 | 0 | 0 |
| 9351 | Washington | US | 47.4009 | -121.4905 | 2020-02-10 | 0 | 0 | 0 |
| 9838 | Washington | US | 47.4009 | -121.4905 | 2020-02-11 | 0 | 0 | 0 |
| 10325 | Washington | US | 47.4009 | -121.4905 | 2020-02-12 | 0 | 0 | 0 |
| 10812 | Washington | US | 47.4009 | -121.4905 | 2020-02-13 | 0 | 0 | 0 |
| 11299 | Washington | US | 47.4009 | -121.4905 | 2020-02-14 | 0 | 0 | 0 |
| 11786 | Washington | US | 47.4009 | -121.4905 | 2020-02-15 | 0 | 0 | 0 |
| 12273 | Washington | US | 47.4009 | -121.4905 | 2020-02-16 | 0 | 0 | 0 |
| 12760 | Washington | US | 47.4009 | -121.4905 | 2020-02-17 | 0 | 0 | 0 |
| 13247 | Washington | US | 47.4009 | -121.4905 | 2020-02-18 | 0 | 0 | 0 |
| 13734 | Washington | US | 47.4009 | -121.4905 | 2020-02-19 | 0 | 0 | 0 |
| 14221 | Washington | US | 47.4009 | -121.4905 | 2020-02-20 | 0 | 0 | 0 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15195 | Washington | US | 47.4009 | -121.4905 | 2020-02-22 | 0 | 0 | 0 |
| 15682 | Washington | US | 47.4009 | -121.4905 | 2020-02-23 | 0 | 0 | 0 |
| 16169 | Washington | US | 47.4009 | -121.4905 | 2020-02-24 | 0 | 0 | 0 |
| 16656 | Washington | US | 47.4009 | -121.4905 | 2020-02-25 | 0 | 0 | 0 |
| 17143 | Washington | US | 47.4009 | -121.4905 | 2020-02-26 | 0 | 0 | 0 |
| 17630 | Washington | US | 47.4009 | -121.4905 | 2020-02-27 | 0 | 0 | 0 |
| 18117 | Washington | US | 47.4009 | -121.4905 | 2020-02-28 | 0 | 0 | 0 |
| 18604 | Washington | US | 47.4009 | -121.4905 | 2020-02-29 | 0 | 0 | 0 |
| 19091 | Washington | US | 47.4009 | -121.4905 | 2020-03-01 | 0 | 0 | 0 |
| 19578 | Washington | US | 47.4009 | -121.4905 | 2020-03-02 | 0 | 0 | 0 |
| 20065 | Washington | US | 47.4009 | -121.4905 | 2020-03-03 | 0 | 0 | 0 |
| 20552 | Washington | US | 47.4009 | -121.4905 | 2020-03-04 | 0 | 0 | 0 |
| 21039 | Washington | US | 47.4009 | -121.4905 | 2020-03-05 | 0 | 0 | 0 |
| 21526 | Washington | US | 47.4009 | -121.4905 | 2020-03-06 | 0 | 0 | 0 |
| 22013 | Washington | US | 47.4009 | -121.4905 | 2020-03-07 | 0 | 0 | 0 |
| 22500 | Washington | US | 47.4009 | -121.4905 | 2020-03-08 | 0 | 0 | 0 |
| 22987 | Washington | US | 47.4009 | -121.4905 | 2020-03-09 | 0 | 0 | 0 |
| 23474 | Washington | US | 47.4009 | -121.4905 | 2020-03-10 | 267 | 23 | 1 |
| 23961 | Washington | US | 47.4009 | -121.4905 | 2020-03-11 | 366 | 29 | 1 |
| 24448 | Washington | US | 47.4009 | -121.4905 | 2020-03-12 | 442 | 31 | 1 |
| 24935 | Washington | US | 47.4009 | -121.4905 | 2020-03-13 | 568 | 37 | 1 |
| 25422 | Washington | US | 47.4009 | -121.4905 | 2020-03-14 | 572 | 37 | 1 |
| 25909 | Washington | US | 47.4009 | -121.4905 | 2020-03-15 | 643 | 40 | 1 |
| 26396 | Washington | US | 47.4009 | -121.4905 | 2020-03-16 | 904 | 48 | 1 |
| 26883 | Washington | US | 47.4009 | -121.4905 | 2020-03-17 | 1076 | 55 | 1 |
| 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 [30]:

```
combined_df.query("Country=='China' & State=='Hubei'")

#combined_df.query("Country=='China' & State=='Hubei'")
```

Out[30]:

| | State | Country | Lat | Long | Date | Confirmed | Death | recovered |
|-------|-------|---------|---------|----------|------------|-----------|-------|-----------|
| 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 |
| 2589 | Hubei | China | 30.9756 | 112.2707 | 2020-01-27 | 1423 | 76 | 45 |
| 3076 | Hubei | China | 30.9756 | 112.2707 | 2020-01-28 | 3554 | 125 | 80 |
| 3563 | Hubei | China | 30.9756 | 112.2707 | 2020-01-29 | 3554 | 125 | 88 |
| 4050 | Hubei | China | 30.9756 | 112.2707 | 2020-01-30 | 4903 | 162 | 90 |
| 4537 | Hubei | China | 30.9756 | 112.2707 | 2020-01-31 | 5806 | 204 | 141 |
| 5024 | Hubei | China | 30.9756 | 112.2707 | 2020-02-01 | 7153 | 249 | 168 |
| 5511 | Hubei | China | 30.9756 | 112.2707 | 2020-02-02 | 11177 | 350 | 295 |
| 5998 | Hubei | China | 30.9756 | 112.2707 | 2020-02-03 | 13522 | 414 | 386 |
| 6485 | Hubei | China | 30.9756 | 112.2707 | 2020-02-04 | 16678 | 479 | 522 |
| 6972 | Hubei | China | 30.9756 | 112.2707 | 2020-02-05 | 19665 | 549 | 633 |
| 7459 | Hubei | China | 30.9756 | 112.2707 | 2020-02-06 | 22112 | 618 | 817 |
| 7946 | Hubei | China | 30.9756 | 112.2707 | 2020-02-07 | 24953 | 699 | 1115 |
| 8433 | Hubei | China | 30.9756 | 112.2707 | 2020-02-08 | 27100 | 780 | 1439 |
| 8920 | Hubei | China | 30.9756 | 112.2707 | 2020-02-09 | 29631 | 871 | 1795 |
| 9407 | Hubei | China | 30.9756 | 112.2707 | 2020-02-10 | 31728 | 974 | 2222 |
| 9894 | Hubei | China | 30.9756 | 112.2707 | 2020-02-11 | 33366 | 1068 | 2639 |
| 10381 | Hubei | China | 30.9756 | 112.2707 | 2020-02-12 | 33366 | 1068 | 2686 |
| 10868 | Hubei | China | 30.9756 | 112.2707 | 2020-02-13 | 48206 | 1310 | 3459 |
| 11355 | Hubei | China | 30.9756 | 112.2707 | 2020-02-14 | 54406 | 1457 | 4774 |
| 11842 | Hubei | China | 30.9756 | 112.2707 | 2020-02-15 | 56249 | 1596 | 5623 |
| 12329 | Hubei | China | 30.9756 | 112.2707 | 2020-02-16 | 58182 | 1696 | 6639 |
| 12816 | Hubei | China | 30.9756 | 112.2707 | 2020-02-17 | 59989 | 1789 | 7862 |
| 13303 | Hubei | China | 30.9756 | 112.2707 | 2020-02-18 | 61682 | 1921 | 9128 |
| 13790 | Hubei | China | 30.9756 | 112.2707 | 2020-02-19 | 62031 | 2029 | 10337 |
| 14277 | Hubei | China | 30.9756 | 112.2707 | 2020-02-20 | 62442 | 2144 | 11788 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15251 | Hubei | China | 30.9756 | 112.2707 | 2020-02-22 | 64084 | 2346 | 15299 |
| 15738 | Hubei | China | 30.9756 | 112.2707 | 2020-02-23 | 64084 | 2346 | 15343 |
| 16225 | Hubei | China | 30.9756 | 112.2707 | 2020-02-24 | 64287 | 2495 | 16748 |
| 16712 | Hubei | China | 30.9756 | 112.2707 | 2020-02-25 | 64786 | 2563 | 18971 |
| 17199 | Hubei | China | 30.9756 | 112.2707 | 2020-02-26 | 65187 | 2615 | 20969 |
| 17686 | Hubei | China | 30.9756 | 112.2707 | 2020-02-27 | 65596 | 2641 | 23383 |
| 18173 | Hubei | China | 30.9756 | 112.2707 | 2020-02-28 | 65914 | 2682 | 26403 |
| 18660 | Hubei | China | 30.9756 | 112.2707 | 2020-02-29 | 66337 | 2727 | 28993 |
| 19147 | Hubei | China | 30.9756 | 112.2707 | 2020-03-01 | 66907 | 2761 | 31536 |
| 19634 | Hubei | China | 30.9756 | 112.2707 | 2020-03-02 | 67103 | 2803 | 33934 |
| 20121 | Hubei | China | 30.9756 | 112.2707 | 2020-03-03 | 67217 | 2835 | 36208 |
| 20608 | Hubei | China | 30.9756 | 112.2707 | 2020-03-04 | 67332 | 2871 | 38557 |
| 21095 | Hubei | China | 30.9756 | 112.2707 | 2020-03-05 | 67466 | 2902 | 40592 |
| 21582 | Hubei | China | 30.9756 | 112.2707 | 2020-03-06 | 67592 | 2931 | 42033 |
| 22069 | Hubei | China | 30.9756 | 112.2707 | 2020-03-07 | 67666 | 2959 | 43500 |
| 22556 | Hubei | China | 30.9756 | 112.2707 | 2020-03-08 | 67707 | 2986 | 45235 |

| 23043 | State | Country | Lat | Long | Date | Confirmed | Death | recovered |
|-------|-------|---------|---------|----------|------------|-----------|-------|-----------|
| 23530 | Hubei | China | 30.9756 | 112.2707 | 2020-03-10 | 67760 | 3024 | 47743 |
| 24017 | Hubei | China | 30.9756 | 112.2707 | 2020-03-11 | 67773 | 3046 | 49134 |
| 24504 | Hubei | China | 30.9756 | 112.2707 | 2020-03-12 | 67781 | 3056 | 50318 |
| 24991 | Hubei | China | 30.9756 | 112.2707 | 2020-03-13 | 67786 | 3062 | 51553 |
| 25478 | Hubei | China | 30.9756 | 112.2707 | 2020-03-14 | 67790 | 3075 | 52960 |
| 25965 | Hubei | China | 30.9756 | 112.2707 | 2020-03-15 | 67794 | 3085 | 54288 |
| 26452 | Hubei | China | 30.9756 | 112.2707 | 2020-03-16 | 67798 | 3099 | 55142 |
| 26939 | Hubei | China | 30.9756 | 112.2707 | 2020-03-17 | 67799 | 3111 | 56003 |
| 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 [31]:

```
combined_df['Active']=combined_df['Confirmed'] - combined_df['Death'] - combined_df['recovered']
```

In [32]:

```
combined_df.query("Country=='China' & State=='Hubei'")
```

Out[32]:

| | State | Country | Lat | Long | Date | Confirmed | Death | recovered | Active |
|-------|-------|---------|---------|----------|------------|-----------|-------|-----------|--------|
| 154 | Hubei | China | 30.9756 | 112.2707 | 2020-01-22 | 444 | 17 | 28 | 399 |
| 641 | Hubei | China | 30.9756 | 112.2707 | 2020-01-23 | 444 | 17 | 28 | 399 |
| 1128 | Hubei | China | 30.9756 | 112.2707 | 2020-01-24 | 549 | 24 | 31 | 494 |
| 1615 | Hubei | China | 30.9756 | 112.2707 | 2020-01-25 | 761 | 40 | 32 | 689 |
| 2102 | Hubei | China | 30.9756 | 112.2707 | 2020-01-26 | 1058 | 52 | 42 | 964 |
| 2589 | Hubei | China | 30.9756 | 112.2707 | 2020-01-27 | 1423 | 76 | 45 | 1302 |
| 3076 | Hubei | China | 30.9756 | 112.2707 | 2020-01-28 | 3554 | 125 | 80 | 3349 |
| 3563 | Hubei | China | 30.9756 | 112.2707 | 2020-01-29 | 3554 | 125 | 88 | 3341 |
| 4050 | Hubei | China | 30.9756 | 112.2707 | 2020-01-30 | 4903 | 162 | 90 | 4651 |
| 4537 | Hubei | China | 30.9756 | 112.2707 | 2020-01-31 | 5806 | 204 | 141 | 5461 |
| 5024 | Hubei | China | 30.9756 | 112.2707 | 2020-02-01 | 7153 | 249 | 168 | 6736 |
| 5511 | Hubei | China | 30.9756 | 112.2707 | 2020-02-02 | 11177 | 350 | 295 | 10532 |
| 5998 | Hubei | China | 30.9756 | 112.2707 | 2020-02-03 | 13522 | 414 | 386 | 12722 |
| 6485 | Hubei | China | 30.9756 | 112.2707 | 2020-02-04 | 16678 | 479 | 522 | 15677 |
| 6972 | Hubei | China | 30.9756 | 112.2707 | 2020-02-05 | 19665 | 549 | 633 | 18483 |
| 7459 | Hubei | China | 30.9756 | 112.2707 | 2020-02-06 | 22112 | 618 | 817 | 20677 |
| 7946 | Hubei | China | 30.9756 | 112.2707 | 2020-02-07 | 24953 | 699 | 1115 | 23139 |
| 8433 | Hubei | China | 30.9756 | 112.2707 | 2020-02-08 | 27100 | 780 | 1439 | 24881 |
| 8920 | Hubei | China | 30.9756 | 112.2707 | 2020-02-09 | 29631 | 871 | 1795 | 26965 |
| 9407 | Hubei | China | 30.9756 | 112.2707 | 2020-02-10 | 31728 | 974 | 2222 | 28532 |
| 9894 | Hubei | China | 30.9756 | 112.2707 | 2020-02-11 | 33366 | 1068 | 2639 | 29659 |
| 10381 | Hubei | China | 30.9756 | 112.2707 | 2020-02-12 | 33366 | 1068 | 2686 | 29612 |
| 10868 | Hubei | China | 30.9756 | 112.2707 | 2020-02-13 | 48206 | 1310 | 3459 | 43437 |
| 11355 | Hubei | China | 30.9756 | 112.2707 | 2020-02-14 | 54406 | 1457 | 4774 | 48175 |
| 11842 | Hubei | China | 30.9756 | 112.2707 | 2020-02-15 | 56249 | 1596 | 5623 | 49030 |

| 12329 | State | Country | Lat | Long | Date | Confirmed | Death | recovered | Active |
|-------|-------|---------|---------|----------|------------|-----------|-------|-----------|--------|
| 12816 | Hubei | China | 30.9756 | 112.2707 | 2020-02-17 | 59989 | 1789 | 7862 | 50338 |
| 13303 | Hubei | China | 30.9756 | 112.2707 | 2020-02-18 | 61682 | 1921 | 9128 | 50633 |
| 13790 | Hubei | China | 30.9756 | 112.2707 | 2020-02-19 | 62031 | 2029 | 10337 | 49665 |
| 14277 | Hubei | China | 30.9756 | 112.2707 | 2020-02-20 | 62442 | 2144 | 11788 | 48510 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15251 | Hubei | China | 30.9756 | 112.2707 | 2020-02-22 | 64084 | 2346 | 15299 | 46439 |
| 15738 | Hubei | China | 30.9756 | 112.2707 | 2020-02-23 | 64084 | 2346 | 15343 | 46395 |
| 16225 | Hubei | China | 30.9756 | 112.2707 | 2020-02-24 | 64287 | 2495 | 16748 | 45044 |
| 16712 | Hubei | China | 30.9756 | 112.2707 | 2020-02-25 | 64786 | 2563 | 18971 | 43252 |
| 17199 | Hubei | China | 30.9756 | 112.2707 | 2020-02-26 | 65187 | 2615 | 20969 | 41603 |
| 17686 | Hubei | China | 30.9756 | 112.2707 | 2020-02-27 | 65596 | 2641 | 23383 | 39572 |
| 18173 | Hubei | China | 30.9756 | 112.2707 | 2020-02-28 | 65914 | 2682 | 26403 | 36829 |
| 18660 | Hubei | China | 30.9756 | 112.2707 | 2020-02-29 | 66337 | 2727 | 28993 | 34617 |
| 19147 | Hubei | China | 30.9756 | 112.2707 | 2020-03-01 | 66907 | 2761 | 31536 | 32610 |
| 19634 | Hubei | China | 30.9756 | 112.2707 | 2020-03-02 | 67103 | 2803 | 33934 | 30366 |
| 20121 | Hubei | China | 30.9756 | 112.2707 | 2020-03-03 | 67217 | 2835 | 36208 | 28174 |
| 20608 | Hubei | China | 30.9756 | 112.2707 | 2020-03-04 | 67332 | 2871 | 38557 | 25904 |
| 21095 | Hubei | China | 30.9756 | 112.2707 | 2020-03-05 | 67466 | 2902 | 40592 | 23972 |
| 21582 | Hubei | China | 30.9756 | 112.2707 | 2020-03-06 | 67592 | 2931 | 42033 | 22628 |
| 22069 | Hubei | China | 30.9756 | 112.2707 | 2020-03-07 | 67666 | 2959 | 43500 | 21207 |
| 22556 | Hubei | China | 30.9756 | 112.2707 | 2020-03-08 | 67707 | 2986 | 45235 | 19486 |
| 23043 | Hubei | China | 30.9756 | 112.2707 | 2020-03-09 | 67743 | 3008 | 46488 | 18247 |
| 23530 | Hubei | China | 30.9756 | 112.2707 | 2020-03-10 | 67760 | 3024 | 47743 | 16993 |
| 24017 | Hubei | China | 30.9756 | 112.2707 | 2020-03-11 | 67773 | 3046 | 49134 | 15593 |
| 24504 | Hubei | China | 30.9756 | 112.2707 | 2020-03-12 | 67781 | 3056 | 50318 | 14407 |
| 24991 | Hubei | China | 30.9756 | 112.2707 | 2020-03-13 | 67786 | 3062 | 51553 | 13171 |
| 25478 | Hubei | China | 30.9756 | 112.2707 | 2020-03-14 | 67790 | 3075 | 52960 | 11755 |
| 25965 | Hubei | China | 30.9756 | 112.2707 | 2020-03-15 | 67794 | 3085 | 54288 | 10421 |
| 26452 | Hubei | China | 30.9756 | 112.2707 | 2020-03-16 | 67798 | 3099 | 55142 | 9557 |
| 26939 | Hubei | China | 30.9756 | 112.2707 | 2020-03-17 | 67799 | 3111 | 56003 | 8685 |
| 27426 | Hubei | China | 30.9756 | 112.2707 | 2020-03-18 | 67800 | 3122 | 56927 | 7751 |
| 27913 | Hubei | China | 30.9756 | 112.2707 | 2020-03-19 | 67800 | 3130 | 57682 | 6988 |
| 28400 | Hubei | China | 30.9756 | 112.2707 | 2020-03-20 | 67800 | 3133 | 58382 | 6285 |
| 28887 | Hubei | China | 30.9756 | 112.2707 | 2020-03-21 | 67800 | 3139 | 58946 | 5715 |
| 29374 | Hubei | China | 30.9756 | 112.2707 | 2020-03-22 | 67800 | 3144 | 59433 | 5223 |

61 rows × 9 columns

In [33]:

```
max_df=combined_df[combined_df.Date==combined_df['Date'].max()]
```

In [34]:

```
max_df[['Country','Active']].sort_values('Active',ascending=False).head(8)
```

Out[34]:

| | Country | Active |
|-------|---------|--------|
| 29236 | Italy | 46638 |
| 29231 | Germany | 24513 |
| 29238 | Spain | 24421 |

| 29319 | Country | Active |
|-------|--------------|--------|
| | US | 15876 |
| 29377 | France | 13144 |
| 29375 | Iran | 12022 |
| 29251 | Switzerland | 7016 |
| 29376 | Korea, South | 5884 |

In [35]:

```
max_df[['Country', 'Confirmed']].groupby(['Country']).sum().sort_values('Confirmed', ascending=False).head(10)
```

Out [35]:

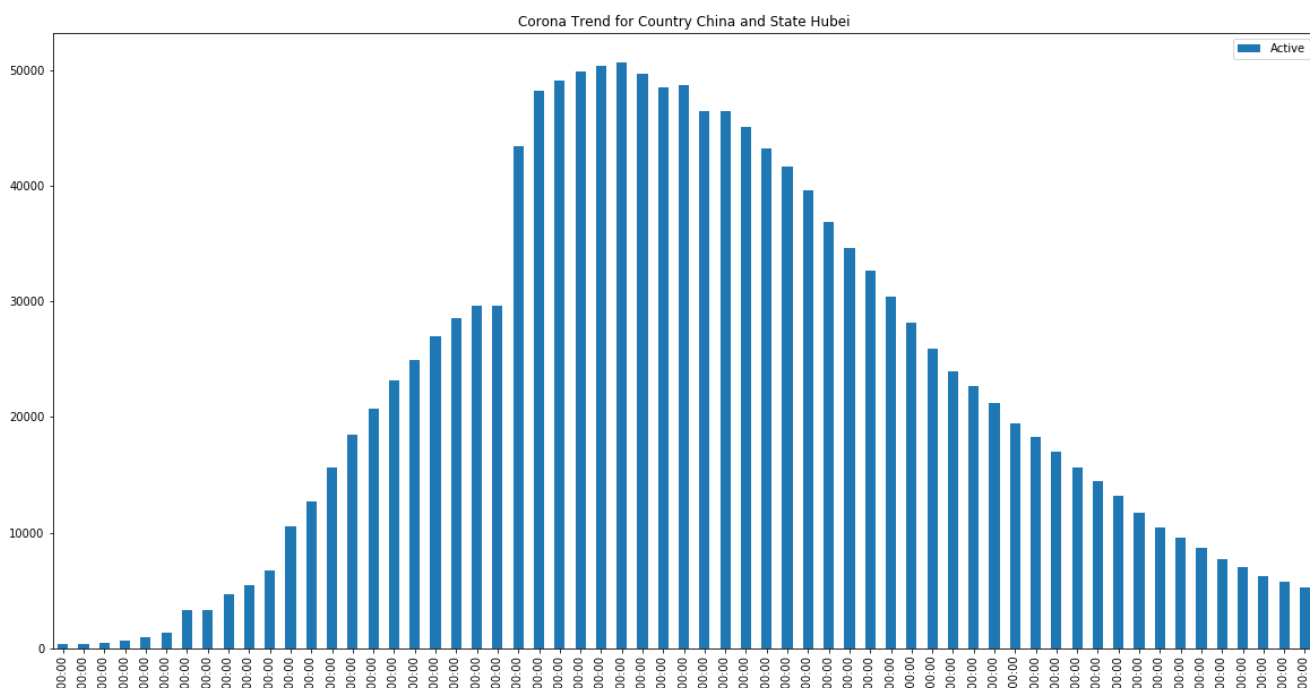
| | Confirmed |
|----------------|-----------|
| Country | |
| China | 81397 |
| Italy | 59138 |
| US | 33272 |
| Spain | 28768 |
| Germany | 24873 |
| Iran | 21638 |
| France | 16176 |
| Korea, South | 8897 |
| Switzerland | 7245 |
| United Kingdom | 5741 |

In [36]:

```
%matplotlib inline
mpl.rcParams['figure.figsize'] = (20, 10)
mpl.rcParams['axes.grid'] = False
combined_df[['Date', 'Country', 'State', 'Active']].query("Country=='China' & State=='Hubei']").plot(x='Date', y='Active', kind='bar', title="Corona Trend for Country China and State Hubei")
```

Out [36]:

<matplotlib.axes._subplots.AxesSubplot at 0x1c76552e240>



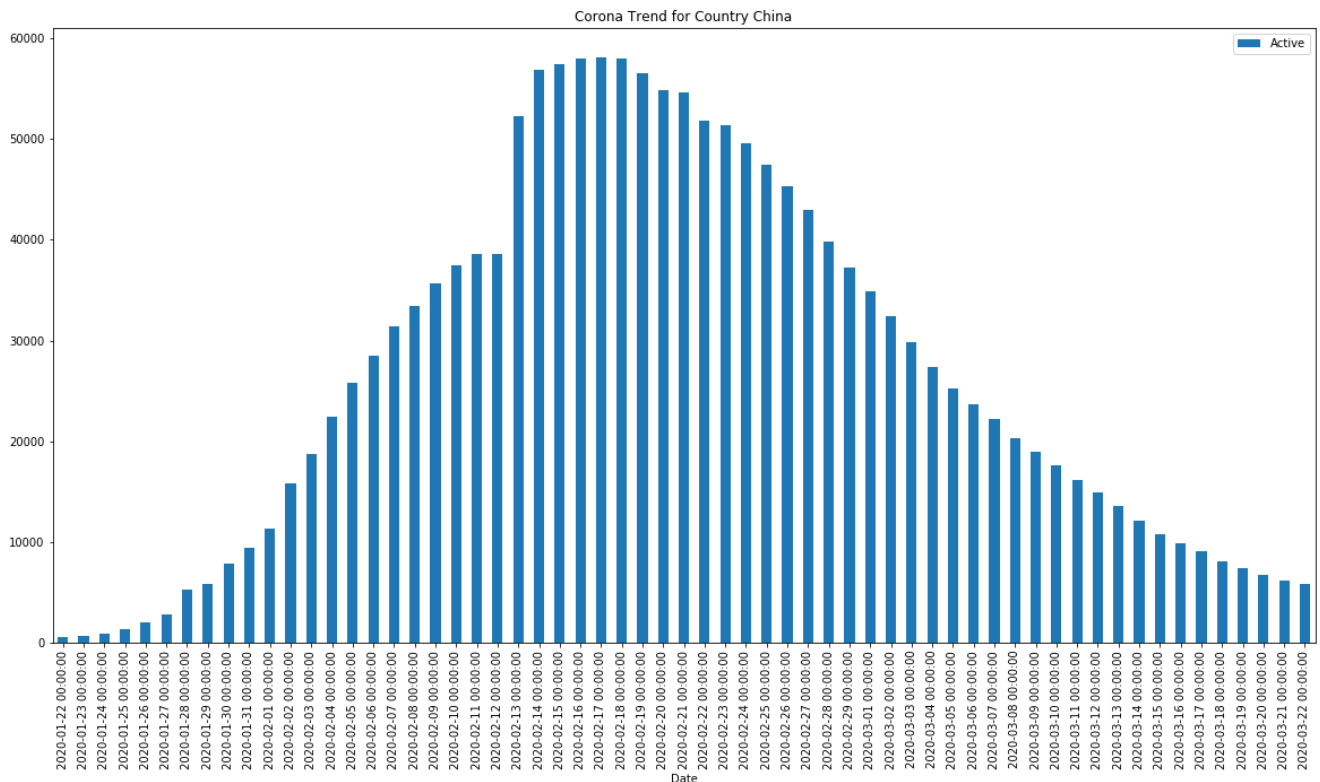
```
2020-01-22 00:00:00
2020-01-23 00:00:00
2020-01-24 00:00:00
2020-01-25 00:00:00
2020-01-26 00:00:00
2020-01-27 00:00:00
2020-01-28 00:00:00
2020-01-29 00:00:00
2020-01-30 00:00:00
2020-01-31 00:00:00
2020-02-01 00:00:00
2020-02-02 00:00:00
2020-02-03 00:00:00
2020-02-04 00:00:00
2020-02-05 00:00:00
2020-02-06 00:00:00
2020-02-07 00:00:00
2020-02-08 00:00:00
2020-02-09 00:00:00
2020-02-10 00:00:00
2020-02-11 00:00:00
2020-02-12 00:00:00
2020-02-13 00:00:00
2020-02-14 00:00:00
2020-02-15 00:00:00
2020-02-16 00:00:00
2020-02-17 00:00:00
2020-02-18 00:00:00
2020-02-19 00:00:00
2020-02-20 00:00:00
2020-02-21 00:00:00
2020-02-22 00:00:00
2020-02-23 00:00:00
2020-02-24 00:00:00
2020-02-25 00:00:00
2020-02-26 00:00:00
2020-02-27 00:00:00
2020-02-28 00:00:00
2020-02-29 00:00:00
2020-03-01 00:00:00
2020-03-02 00:00:00
2020-03-03 00:00:00
2020-03-04 00:00:00
2020-03-05 00:00:00
2020-03-06 00:00:00
2020-03-07 00:00:00
2020-03-08 00:00:00
2020-03-09 00:00:00
2020-03-10 00:00:00
2020-03-11 00:00:00
2020-03-12 00:00:00
2020-03-13 00:00:00
2020-03-14 00:00:00
2020-03-15 00:00:00
2020-03-16 00:00:00
2020-03-17 00:00:00
2020-03-18 00:00:00
2020-03-19 00:00:00
2020-03-20 00:00:00
2020-03-21 00:00:00
2020-03-22 00:00:00
Date
```

In [37]:

```
%matplotlib inline
mpl.rcParams['figure.figsize'] = (20, 10)
mpl.rcParams['axes.grid'] = False
combined_df[['Date', 'Country', 'State', 'Active']].groupby(['Date', 'Country']).sum().query("Country=='China'").reset_index().plot(x='Date', y='Active', kind='bar', title="Corona Trend for Country China")
```

Out[37]:

<matplotlib.axes._subplots.AxesSubplot at 0x1c7653317b8>

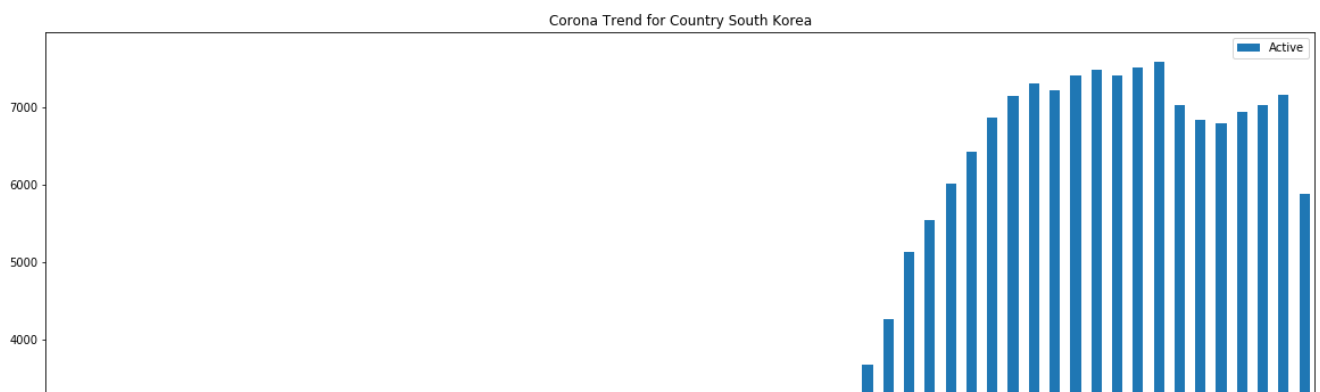


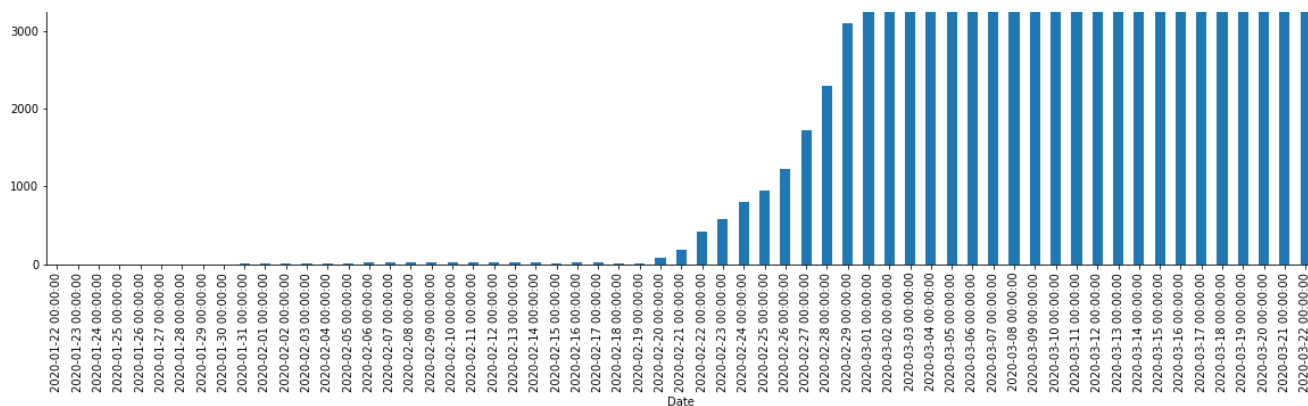
In [38]:

```
%matplotlib inline
mpl.rcParams['figure.figsize'] = (20, 10)
mpl.rcParams['axes.grid'] = False
combined_df[['Date', 'Country', 'State', 'Active']].query("Country=='Korea, South'").plot(x='Date', y='Active', kind='bar', title="Corona Trend for Country South Korea")
```

Out[38]:

<matplotlib.axes._subplots.AxesSubplot at 0x1c76559d5c0>



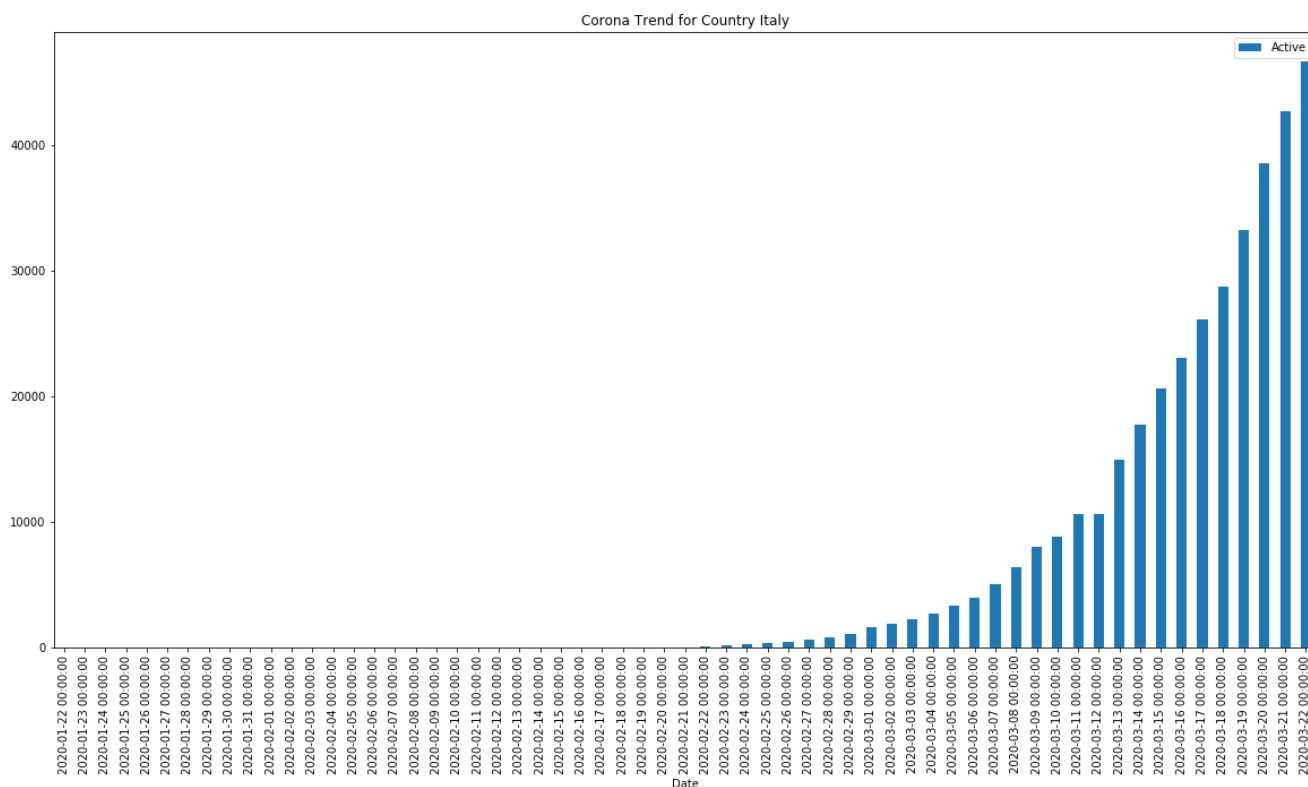


In [39]:

```
%matplotlib inline
mpl.rcParams['figure.figsize'] = (20, 10)
mpl.rcParams['axes.grid'] = False
combined_df[['Date', 'Country', 'State', 'Active']].query("Country=='Italy']").plot(x='Date', y='Active',
kind='bar', title="Corona Trend for Country Italy")
```

Out[39]:

<matplotlib.axes._subplots.AxesSubplot at 0x1c765c6b4e0>



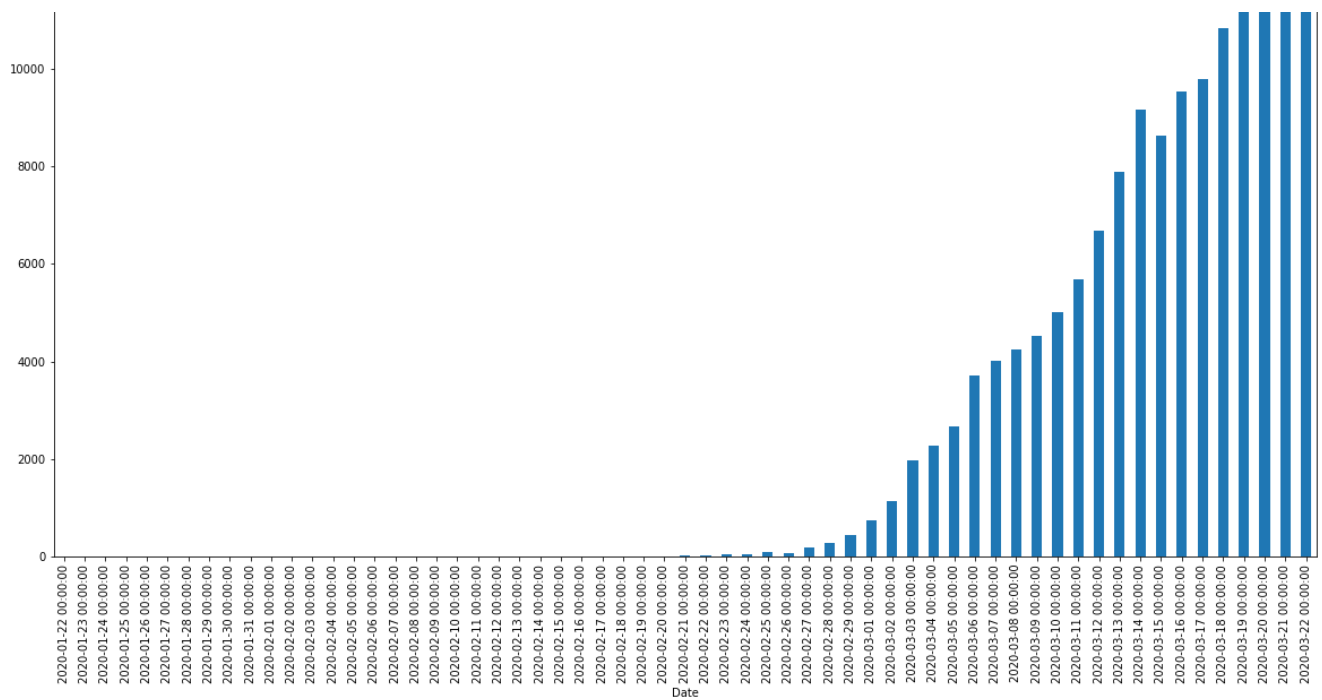
In [40]:

```
%matplotlib inline
mpl.rcParams['figure.figsize'] = (20, 10)
mpl.rcParams['axes.grid'] = False
combined_df[['Date', 'Country', 'State', 'Active']].query("Country=='Iran']").plot(x='Date', y='Active',
kind='bar', title="Corona Trend for Country Iran")
```

Out[40]:

<matplotlib.axes._subplots.AxesSubplot at 0x1c766141780>



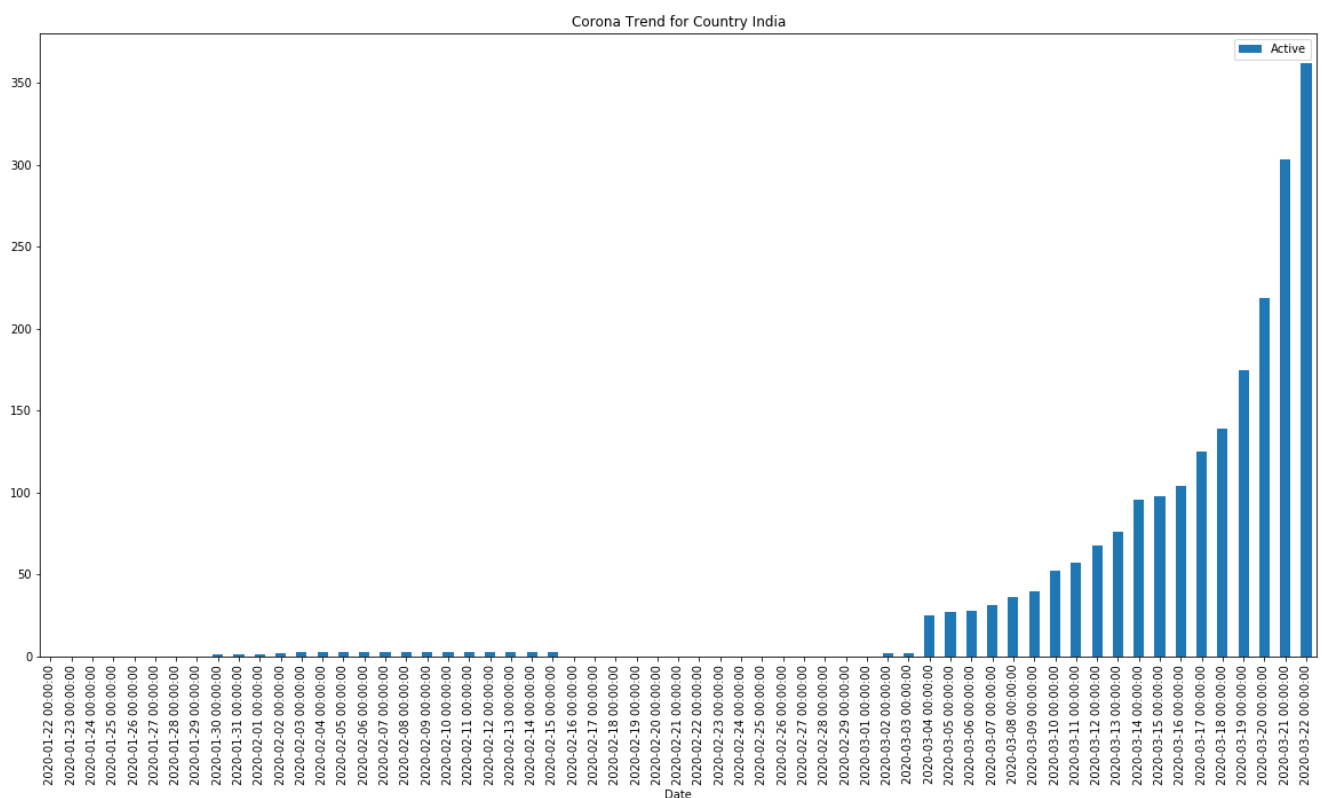


In [41]:

```
%matplotlib inline
mpl.rcParams['figure.figsize'] = (20, 10)
mpl.rcParams['axes.grid'] = False
combined_df[['Date', 'Country', 'State', 'Active']].query("Country=='India'").plot(x='Date', y='Active', kind='bar', title="Corona Trend for Country India")
```

Out[41]:

<matplotlib.axes._subplots.AxesSubplot at 0x1c7662b3c88>



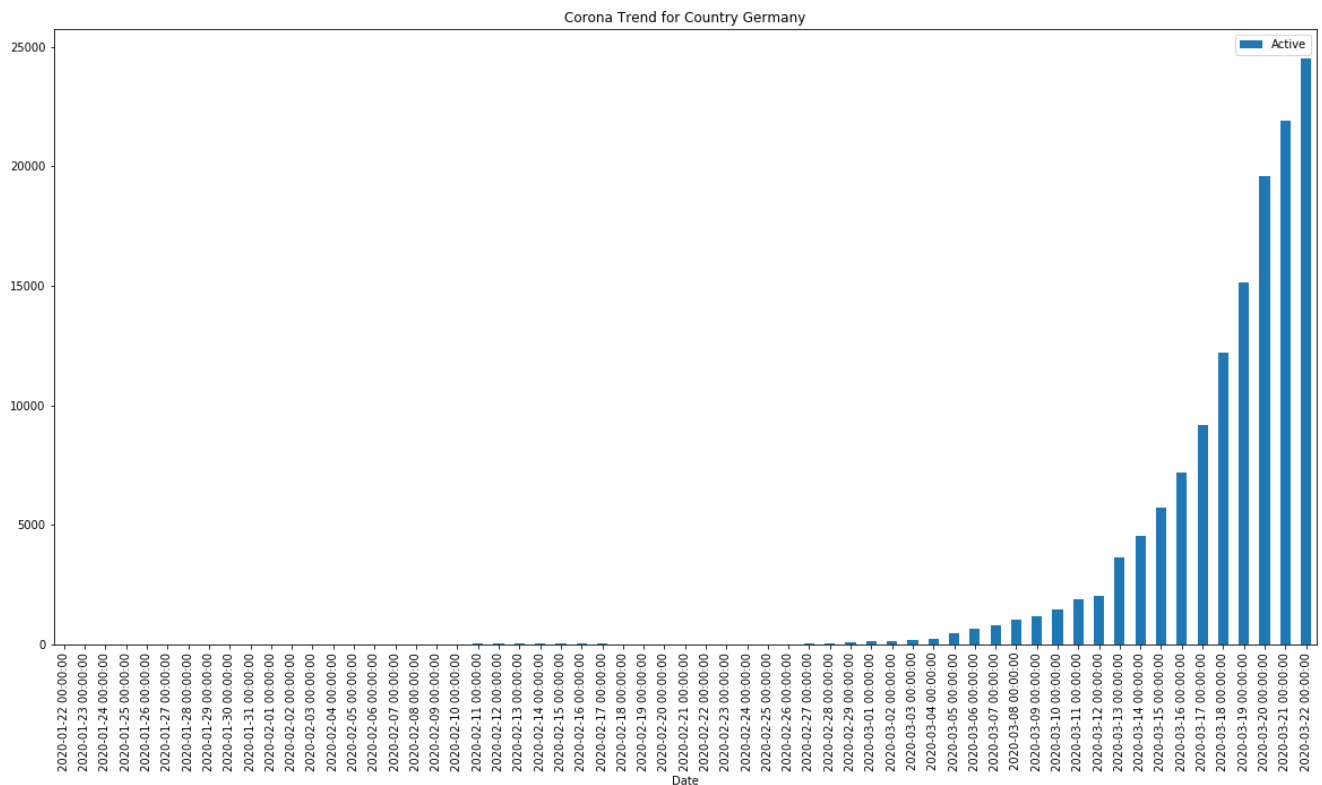
In [42]:

```
%matplotlib inline
mpl.rcParams['figure.figsize'] = (20, 10)
mpl.rcParams['axes.grid'] = False
```

```
combined_df[['Date', 'Country', 'State', 'Active']].query("Country=='Germany'").plot(x='Date', y='Active', kind='bar', title="Corona Trend for Country Germany")
```

Out[42]:

<matplotlib.axes._subplots.AxesSubplot at 0x1c76676a978>

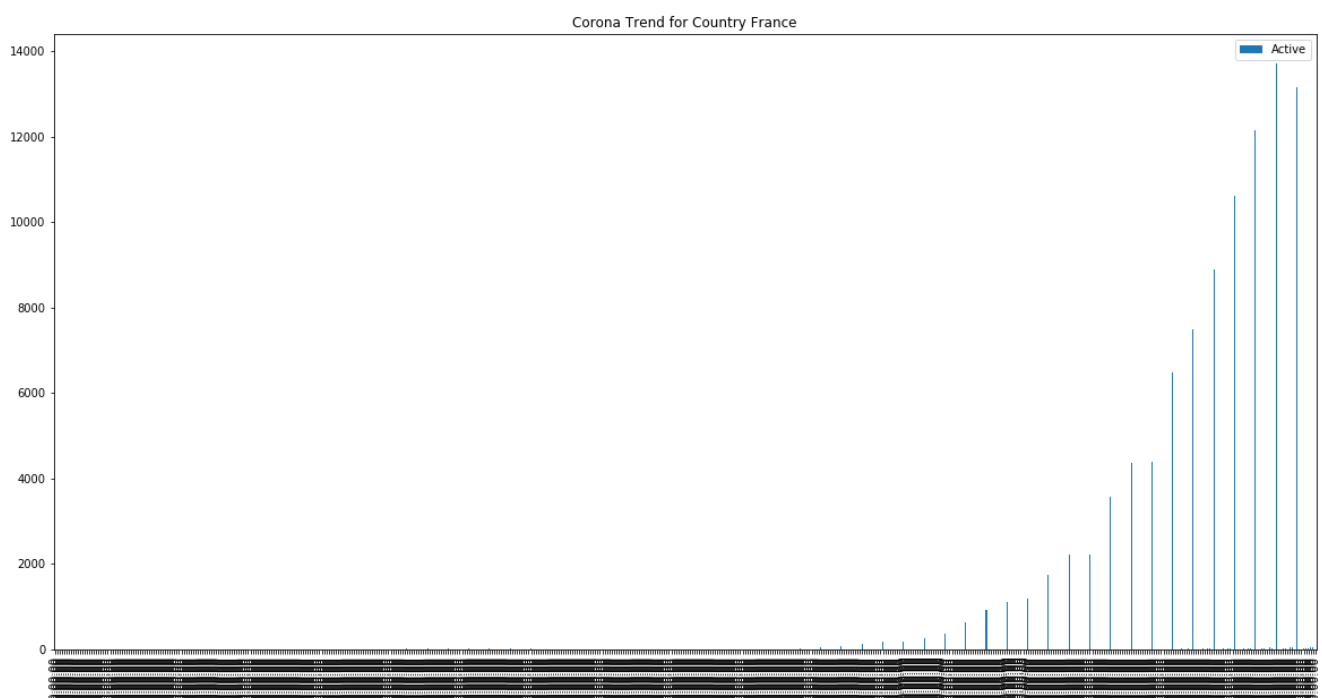


In [43]:

```
%matplotlib inline
mpl.rcParams['figure.figsize'] = (20, 10)
mpl.rcParams['axes.grid'] = False
combined_df[['Date', 'Country', 'State', 'Active']].query("Country=='France'").plot(x='Date', y='Active', kind='bar', title="Corona Trend for Country France")
```

Out[43]:

<matplotlib.axes._subplots.AxesSubplot at 0x1c766b08438>



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

Date

In []: