Forward
School

Program Code: J620-002-4:2020

Program Name: FRONT-END SOFTWARE DEVELOPMENT

Title : Covid 19 Project

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Introduction : Doing an exercise on the data collected from the COVID-19 pandemic.

Conclusion : This exercise has helped me with analysing data and plotting graphs with the data.

Covid 19 Python Project (use all your knowledge thus far to solve this)

From Wikipedia,

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease was first identified in 2019 in Wuhan, China, and has since spread globally, resulting in the 2019–20 coronavirus pandemic. Common symptoms include fever, cough and shortness of breath. Muscle pain, sputum production and sore throat are less common. The rate of deaths per number of diagnosed cases is on average 3.4%, ranging from 0.2% in those less than 20 to approximately 15% in those over 80 years old.

Data Source (Date wise) : 2019 Novel Coronavirus COVID-19 (2019-nCoV) Data Repository by Johns Hopkins CSSE

Data Source: https://github.com/CSSEGISandData/COVID-19/tree/master/csse_covid_19_data/csse_covid_19_daily_reports (https://github.com/CSSEGISandData/COVID-19/tree/master/csse_covid_19_data/csse_covid_19_daily_reports)

File naming convention

MM-DD-YYYY.csv in UTC.

Field description

Province/State: China - province name; US/Canada/Australia/ - city name, state/province name; Others - name of the event (e.g., "Diamond Princess" cruise ship); other countries - blank. Country/Region: country/region name conforming to WHO (will be updated). Last Update: MM/DD/YYYY HH:mm (24 hour format, in UTC). Confirmed: the number of confirmed cases. For Hubei Province: from Feb 13 (GMT +8), we report both clinically diagnosed and lab-confirmed cases. For lab-confirmed cases only (Before Feb 17), please refer to who_covid_19_situation_reports. For Italy, diagnosis standard might be changed since Feb 27 to "slow the growth of new case numbers." (Source) Deaths: the number of deaths. Recovered: the number of recovered cases. Update frequency Files after Feb 1 (UTC): once a day around

Q1. Write Python code to display first 5 rows from COVID-19 dataset. Also print the dataset information and check the missing values.

In [2]:

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

covid_data = pd.read_csv('10-10-2020.csv')
covid_data.head()
```

Out[2]:

	FIPS	Admin2	Province_State	Country_Region	Last_Update	Lat	Long_	Confi
0	NaN	NaN	NaN	Afghanistan	2020-10-11 04:23:46	33.93911	67.709953	3
1	NaN	NaN	NaN	Albania	2020-10-11 04:23:46	41.15330	20.168300	1
2	NaN	NaN	NaN	Algeria	2020-10-11 04:23:46	28.03390	1.659600	5
3	NaN	NaN	NaN	Andorra	2020-10-11 04:23:46	42.50630	1.521800	
4	NaN	NaN	NaN	Angola	2020-10-11 04:23:46	-11.20270	17.873900	

In [2]:
```
covid_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3992 entries, 0 to 3991
Data columns (total 14 columns):
 #   Column               Non-Null Count  Dtype  
---  ------               --------------  -----  
 0   FIPS                 3262 non-null   float64
 1   Admin2               3267 non-null   object 
 2   Province_State       3816 non-null   object 
 3   Country_Region       3992 non-null   object 
 4   Last_Update          3992 non-null   object 
 5   Lat                  3907 non-null   float64
 6   Long_                3907 non-null   float64
 7   Confirmed            3992 non-null   int64  
 8   Deaths               3992 non-null   int64  
 9   Recovered            3992 non-null   int64  
 10  Active               3992 non-null   int64  
 11  Combined_Key         3992 non-null   object 
 12  Incidence_Rate       3907 non-null   float64
 13  Case-Fatality_Ratio  3937 non-null   float64
dtypes: float64(5), int64(4), object(5)
```

In [3]:
```
covid_data.isnull().sum()
```

Out[3]:
```
FIPS                   730
Admin2                 725
Province_State         176
Country_Region           0
Last_Update              0
Lat                     85
Long_                   85
Confirmed                0
Deaths                   0
Recovered                0
Active                   0
Combined_Key             0
Incidence_Rate          85
Case-Fatality_Ratio     55
dtype: int64
```

Q2. Write a Python program to get the latest number of confirmed, deaths, recovered and active cases of Novel Coronavirus (COVID-19) Country wise

In [35]:

```
covid_data.groupby(['Country_Region'])[['Confirmed', 'Deaths', 'Recovered',
```

Out[35]:

	Confirmed	Deaths	Recovered	Active
Country_Region				
Afghanistan	39789	1477	33064	5248
Albania	15231	416	9406	5409
Algeria	52940	1795	37170	13975
Andorra	2696	55	1814	827
Angola	6246	218	2716	3312
...	...	...	...	...
West Bank and Gaza	43945	378	37240	6327
Winter Olympics 2022	0	0	0	0
Yemen	2051	595	1329	127
Zambia	15415	337	14541	537
Zimbabwe	8010	230	6492	1288

197 rows × 4 columns

Q3. Write a Python program to get the Chinese province wise cases of confirmed, deaths and recovered cases of Novel Coronavirus (COVID-19)

In [5]:

```
china_provinces = covid_data[covid_data['Country_Region'] == 'China']
china_provinces[['Province_State', 'Confirmed', 'Deaths', 'Recovered']].res
```

Out[5]:

	Province_State	Confirmed	Deaths	Recovered
0	Anhui	991	6	985
1	Beijing	936	9	927
2	Chongqing	585	6	578
3	Fujian	415	1	400
4	Gansu	170	2	168
5	Guangdong	1858	8	1823
6	Guangxi	260	2	256
7	Guizhou	147	2	145
8	Hainan	171	6	165
9	Hebei	365	6	358
10	Heilongjiang	948	13	935
11	Henan	1281	22	1255
12	Hong Kong	5175	105	4914
13	Hubei	68139	4512	63627
14	Hunan	1019	4	1015
15	Inner Mongolia	268	1	261
16	Jiangsu	667	0	664
17	Jiangxi	935	1	934
18	Jilin	157	2	155
19	Liaoning	276	2	269
20	Macau	46	0	46
21	Ningxia	75	0	75
22	Qinghai	18	0	18
23	Shaanxi	428	3	397
24	Shandong	832	7	824
25	Shanghai	1048	7	980
26	Shanxi	206	0	203
27	Sichuan	721	3	673
28	Tianjin	244	3	236
29	Tibet	1	0	1
30	Xinjiang	902	3	899
31	Yunnan	211	2	200
32	Zhejiang	1283	1	1272
33	Unknown	5201	0	0

Q4. Write a Python program to get the latest country wise deaths cases of Novel Coronavirus (COVID-19)

```
In [33]:  covid_data.groupby(['Country_Region'])[['Deaths']].sum().reset_index()
```

```
Out[33]:
            Country_Region  Deaths
      0        Afghanistan    1477
      1            Albania     416
      2            Algeria    1795
      3            Andorra      55
      4             Angola     218
    ...                ...     ...
    192  West Bank and Gaza     378
    193  Winter Olympics 2022      0
    194              Yemen     595
    195             Zambia     337
    196           Zimbabwe     230

    197 rows × 2 columns
```

Q5. Write a Python program to list countries with no cases of Novel Coronavirus (COVID-19) recovered

In [68]:

```
# no_cases = covid_data[covid_data['Recovered'] == 0]
# no_cases.groupby(['Country_Region'])[['Confirmed', 'Deaths', 'Recovered',

no_cases = covid_data[covid_data['Recovered'] == 0]
no_cases = no_cases.groupby(['Country_Region'])[['Recovered']].sum()
no_cases[no_cases == 0].reset_index()

# Before filtering out countries with zero cases of recoveries
# no_recovered = covid_data.groupby('Country_Region')['Recovered'].sum()
# no_recovered[no_recovered == 0].reset_index()
```

Out[68]:

	Country_Region	Recovered
0	Antarctica	0
1	Australia	0
2	Canada	0
3	China	0
4	Colombia	0
5	Germany	0
6	India	0
7	Kiribati	0
8	Korea, North	0
9	MS Zaandam	0
10	Malaysia	0
11	Nauru	0
12	Netherlands	0
13	New Zealand	0
14	Palau	0
15	Peru	0
16	Samoa	0
17	Serbia	0
18	Spain	0
19	Summer Olympics 2020	0
20	Sweden	0
21	Tonga	0
22	Tuvalu	0
23	US	0
24	Ukraine	0
25	United Kingdom	0
26	Winter Olympics 2022	0

Q6. Write a Python program to get the latest number of confirmed deaths and recovered people of Novel Coronavirus (COVID-19) cases Country/Region - Province/State wise.

In [31]:

```
covid_data.groupby(['Country_Region', 'Province_State'])[['Deaths', 'Recove
```

Out[31]:

		Deaths	Recovered
Country_Region	**Province_State**		
Australia	**Australian Capital Territory**	3	110
	New South Wales	53	0
	Northern Territory	0	33
	Queensland	6	1152
	South Australia	4	466
...	**...**	...	...
United Kingdom	**Saint Helena, Ascension and Tristan da Cunha**	0	2
	Scotland	4339	0
	Turks and Caicos Islands	6	672
	Unknown	74	0
	Wales	2700	0

601 rows × 2 columns

Q7. Write a Python program to list countries with all cases of Novel Coronavirus (COVID-19) died

In [70]:

```
all_deaths = covid_data[(covid_data['Confirmed'] > 0) & (covid_data['Recove
all_deaths = all_deaths.groupby(['Country_Region'])[['Confirmed', 'Deaths']
# all_deaths.index.tolist()
print(all_deaths)
```

```
Empty DataFrame
Columns: [Confirmed, Deaths]
Index: []
```

Q8.Write a Python program to list countries with all cases of Novel Coronavirus (COVID-19) recovered.

In [71]:

```
all_recovered = covid_data[(covid_data['Confirmed'] > 0) & (covid_data['Dea
all_recovered = all_recovered.groupby(['Country_Region'])[['Confirmed', 'Re
print(all_recovered)
```

```
                                  Confirmed  Recovered
Country_Region
Australia                                33         33
Canada                                   33         33
China                                   140        140
France                                   27         27
Grenada                                  24         24
Holy See                                 12         12
Japan                                   148        148
Saint Vincent and the Grenadines         64         64
Timor-Leste                              28         28
United Kingdom                           18         18
```

Q9. Write a Python program to get the top 10 countries data (Last Update, Country/Region, Confirmed, Deaths, Recovered) of Novel Coronavirus (COVID-19).

In [7]:

```
all_countries = covid_data.groupby(['Country_Region', 'Last_Update'])[['Con
all_countries.sort_values(['Confirmed', 'Deaths', 'Recovered'], ascending=F
```

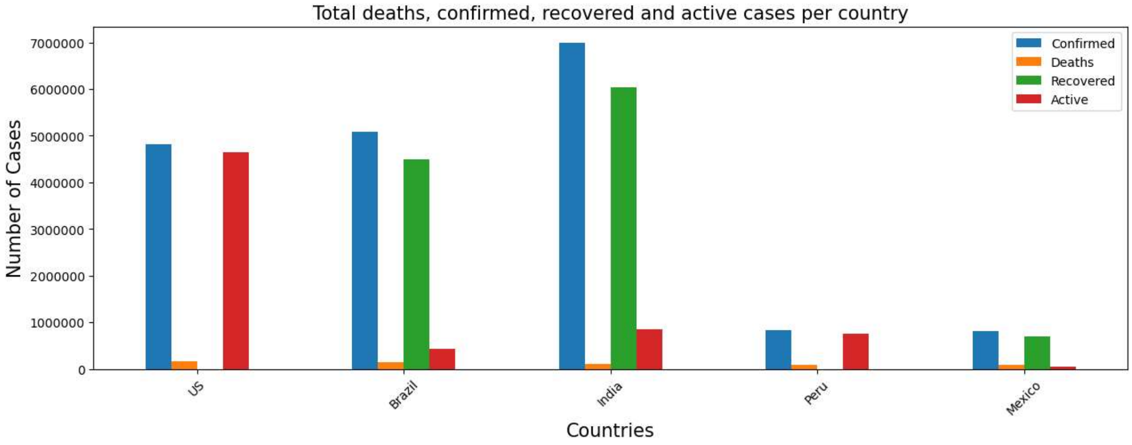
Out[7]:

	Country_Region	Last_Update	Confirmed	Deaths	Recovered
0	US	2020-10-11 04:23:46	7752922	213320	3062983
1	India	2020-10-11 04:23:46	7053806	108334	6077976
2	Brazil	2020-10-11 04:23:46	5084513	150302	4502854
3	Russia	2020-10-11 04:23:46	1278245	22331	1011911
4	Colombia	2020-10-11 04:23:46	902747	27660	783131
5	Argentina	2020-10-11 04:23:46	883882	23581	709464
6	Spain	2020-10-11 04:23:46	861112	32929	150376
7	Peru	2020-10-11 04:23:46	846088	83825	733000
8	Mexico	2020-10-11 04:23:46	814328	83642	689377
9	France	2020-10-11 04:23:46	761384	32684	103232

Q10. Write a Python program to create a plot (lines) of total deaths, confirmed, recovered and active cases Country wise where deaths greater than 150.

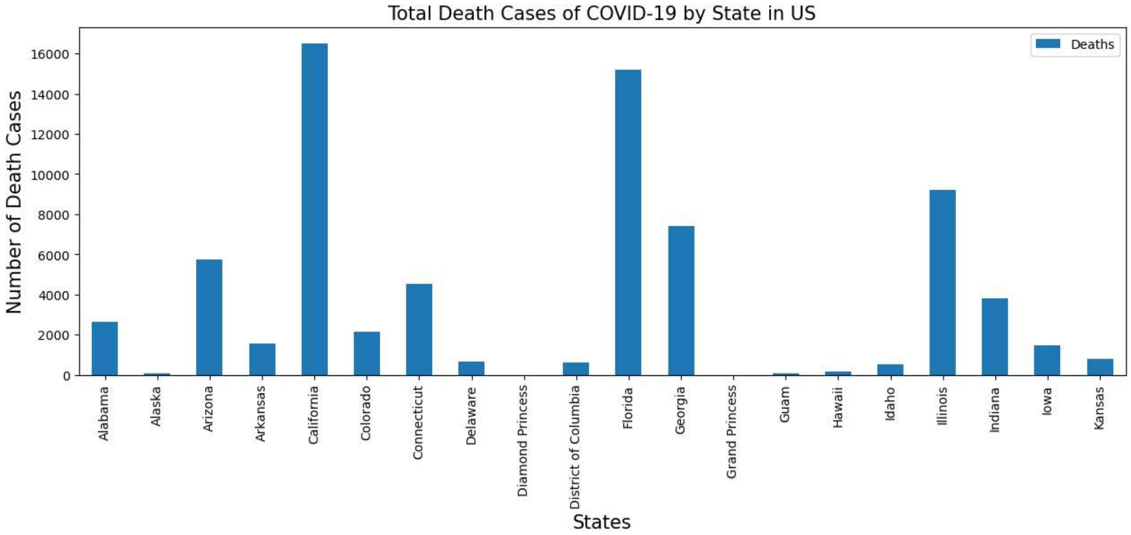
In [23]:

```
total_cases = covid_data[covid_data['Deaths'] > 150]
total_cases = total_cases.groupby(['Country_Region'])[['Confirmed', 'Deaths
total_cases = total_cases.sort_values(['Deaths', 'Confirmed'], ascending=Fa

ax = total_cases.plot(x = 'Country_Region', kind = 'bar', figsize = (15,5))
plt.ticklabel_format(useOffset = False, style = 'plain', axis = 'y')
plt.title('Total deaths, confirmed, recovered and active cases per country'
plt.xlabel('Countries', fontsize = 15)
plt.ylabel('Number of Cases', fontsize = 15)
plt.xticks(rotation=45)
plt.show()
```



Q.11 Write a Python program to visualize the state/province wise death cases of Novel Coronavirus (COVID-19) in USA

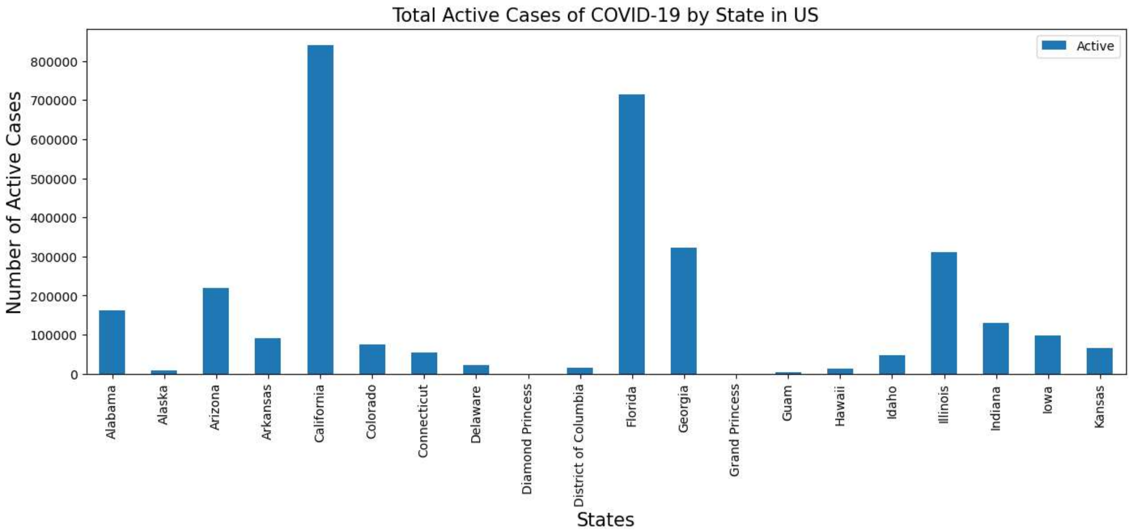
```
In [4]:
us_cases = covid_data[(covid_data['Country_Region'] == 'US')]
us_cases = us_cases.groupby(['Province_State'])[['Confirmed', 'Deaths', 'Re

ax2 = us_cases.head(20).plot(x = 'Province_State', y = ['Deaths'], kind =
plt.ticklabel_format(useOffset = False, style = 'plain', axis = 'y')
plt.title('Total Death Cases of COVID-19 by State in US', fontsize = 15)
plt.xlabel('States', fontsize = 15)
plt.ylabel('Number of Death Cases', fontsize = 15)
# plt.xticks(rotation=45)
plt.show()
```



Q.12 Write a Python program to visualize the state/province wise Active cases of Novel Coronavirus (COVID-19) in USA

In [5]:

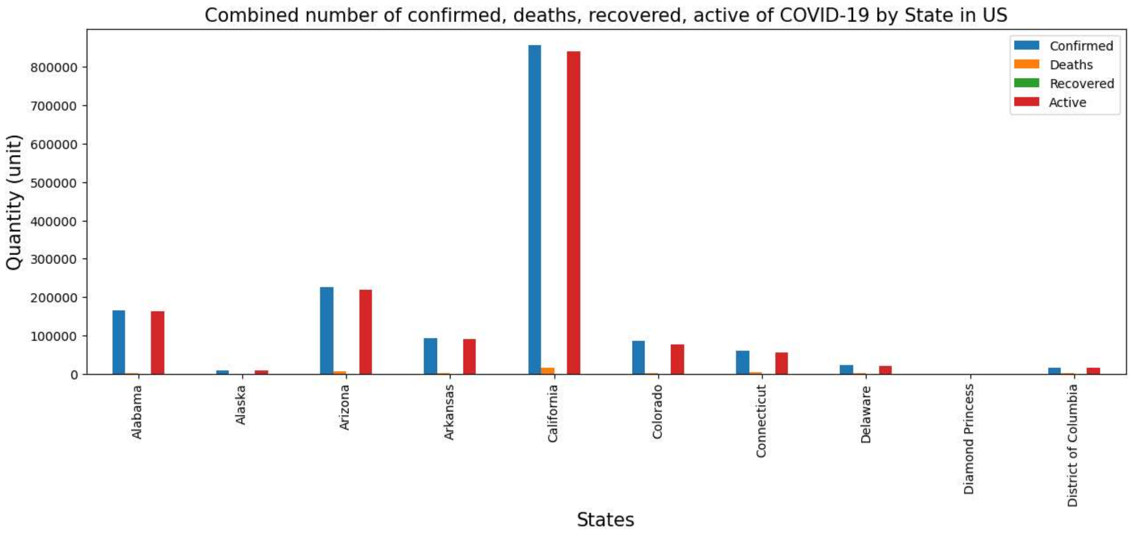
```
us_cases = covid_data[(covid_data['Country_Region'] == 'US')]
us_cases = us_cases.groupby(['Province_State'])[['Confirmed', 'Deaths', 'Re

ax3 = us_cases.head(20).plot(x = 'Province_State', y = ['Active'], kind =
plt.ticklabel_format(useOffset = False, style = 'plain', axis = 'y')
plt.title('Total Active Cases of COVID-19 by State in US', fontsize = 15)
plt.xlabel('States', fontsize = 15)
plt.ylabel('Number of Active Cases', fontsize = 15)
# plt.xticks(rotation=45)
plt.show()
```



Q.13 Write a Python program to visualize the state/province wise combine number of confirmed, deaths, recovered, active Novel Coronavirus (COVID-19) cases in USA.

In [14]:

```
us_cases = covid_data[(covid_data['Country_Region'] == 'US')]
us_cases = us_cases.groupby(['Province_State'])[['Confirmed', 'Deaths', 'Re

ax4 = us_cases.head(10).plot(x = 'Province_State', kind = 'bar', figsize =
plt.ticklabel_format(useOffset = False, style = 'plain', axis = 'y')
plt.title('Combined number of confirmed, deaths, recovered, active of COVID
plt.xlabel('States', fontsize = 15)
plt.ylabel('Quantity (unit)', fontsize = 15)
# plt.xticks(rotation=45)
plt.show()
```



Q.14 Write a Python program to visualize Worldwide Confirmed Novel Coronavirus (COVID-19) cases over time

In [ ]:

In [ ]: