

Load files

In [13]:

```
import pandas as pd
import warnings
warnings.filterwarnings('ignore')

covid = pd.read_csv('covid.csv')
covid = pd.DataFrame(covid)
datewise = pd.read_csv('datewise.csv')
datewise = pd.DataFrame(datewise)
```

In [14]:

```
covid[covid['Country/Region']=='China']
```

Out[14]:

Unnamed: 0	Province/State	Country/Region	Last Update	Confirmed	Deaths	Recovered	Observ

In [15]:

```
datewise.head()
```

Out[15]:

	ObservationDate	Confirmed	Recovered	Deaths	Days Since	WeekOfYear	Mortalit Rat
0	2020-01-22	555.0	28.0	17.0	0 days 00:00:00.0000000000	4	3.06306
1	2020-01-23	653.0	30.0	18.0	1 days 00:00:00.0000000000	4	2.75650
2	2020-01-24	941.0	36.0	26.0	2 days 00:00:00.0000000000	4	2.76301
3	2020-01-25	1438.0	39.0	42.0	3 days 00:00:00.0000000000	4	2.92072
4	2020-01-26	2118.0	52.0	56.0	4 days 00:00:00.0000000000	4	2.64400

In [16]:

```
grouped_country = covid.groupby(['Country/Region', "ObservationDate"]).agg(
    {"Confirmed":'sum', "Recovered":'sum', "Deaths":'sum'})
grouped_country["Active Cases"] = grouped_country[
    "Confirmed"]-grouped_country["Recovered"]-grouped_country["Deaths"]

import numpy as np
grouped_country["log_confirmed"] = np.log(grouped_country["Confirmed"])
grouped_country["log_active"] = np.log(grouped_country["Active Cases"])
```

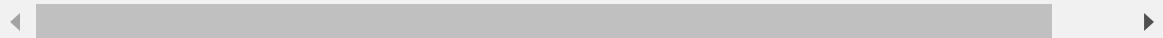
In [17]:

grouped_country

Out[17]:

Country/Region	ObservationDate	Confirmed	Recovered	Deaths	Active Cases	log_confirmed	log_
Azerbaijan	2020-02-28	1.0	0.0	0.0	1.0	0.0	
	2020-02-24	1.0	0.0	0.0	1.0	0.0	
Afghanistan	2020-02-25	1.0	0.0	0.0	1.0	0.0	
	2020-02-26	1.0	0.0	0.0	1.0	0.0	
	2020-02-27	1.0	0.0	0.0	1.0	0.0	
...	
	2020-03-12	0.0	0.0	0.0	0.0	-inf	
occupied Palestinian territory	2020-03-14	0.0	0.0	0.0	0.0	-inf	
	2020-03-15	0.0	0.0	0.0	0.0	-inf	
	2020-03-16	0.0	0.0	0.0	0.0	-inf	
	2020-03-17	0.0	0.0	0.0	0.0	-inf	

22269 rows × 6 columns



Countrywise Analysis

In [18]:

```
#Calculating countrywise Mortality and Recovery Rate
countrywise=covid[covid["ObservationDate"]==covid["ObservationDate"].max()].groupby(["Country/Region"]).agg({"Confirmed":'sum','Recovered':'sum','Deaths':'sum'}).sort_values(["Confirmed"],ascending=False)
countrywise["Mortality"]=(countrywise["Deaths"]/countrywise["Confirmed"])*100
countrywise["Recovery"]=(countrywise["Recovered"]/countrywise["Confirmed"])*100
```

In [19]:

countrywise

Out[19]:

Country/Region		Confirmed	Recovered	Deaths	Mortality	Recovery
US	2590651.0	705203.0	126140.0	4.869046	27.221073	
Brazil	1368195.0	757811.0	58314.0	4.262112	55.387646	
Russia	640246.0	402778.0	9152.0	1.429451	62.909882	
India	566840.0	334822.0	16893.0	2.980206	59.068167	
United Kingdom	313470.0	1368.0	43659.0	13.927649	0.436405	
...
Saint Kitts and Nevis	15.0	15.0	0.0	0.000000	100.000000	
Holy See	12.0	12.0	0.0	0.000000	100.000000	
Papua New Guinea	11.0	8.0	0.0	0.000000	72.727273	
Western Sahara	10.0	8.0	1.0	10.000000	80.000000	
MS Zaandam	9.0	0.0	2.0	22.222222	0.000000	

188 rows × 5 columns

In [20]:

```
country_last_24_confirmed=[]
country_last_24_recovered=[]
country_last_24_deaths=[]
for country in countrywise.index:
    country_last_24_confirmed.append((grouped_country.loc[country].iloc[-1]-grouped_country.loc[country].iloc[-2])["Confirmed"])
    country_last_24_recovered.append((grouped_country.loc[country].iloc[-1]-grouped_country.loc[country].iloc[-2])["Recovered"])
    country_last_24_deaths.append((grouped_country.loc[country].iloc[-1]-grouped_country.loc[country].iloc[-2])['Deaths'])
```

In [21]:

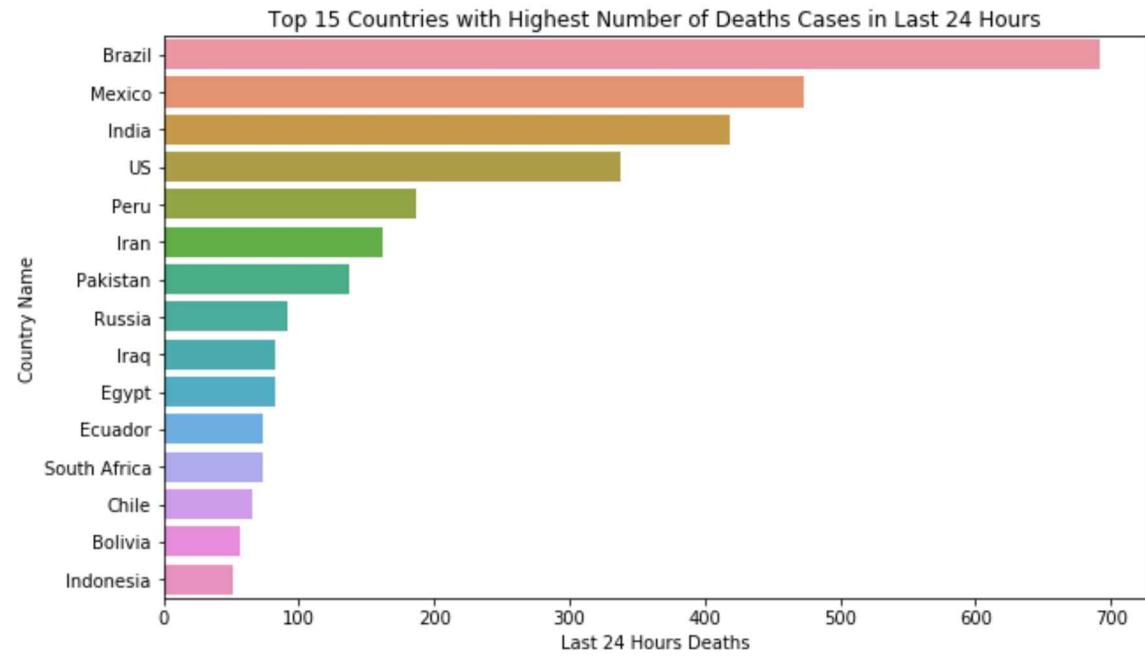
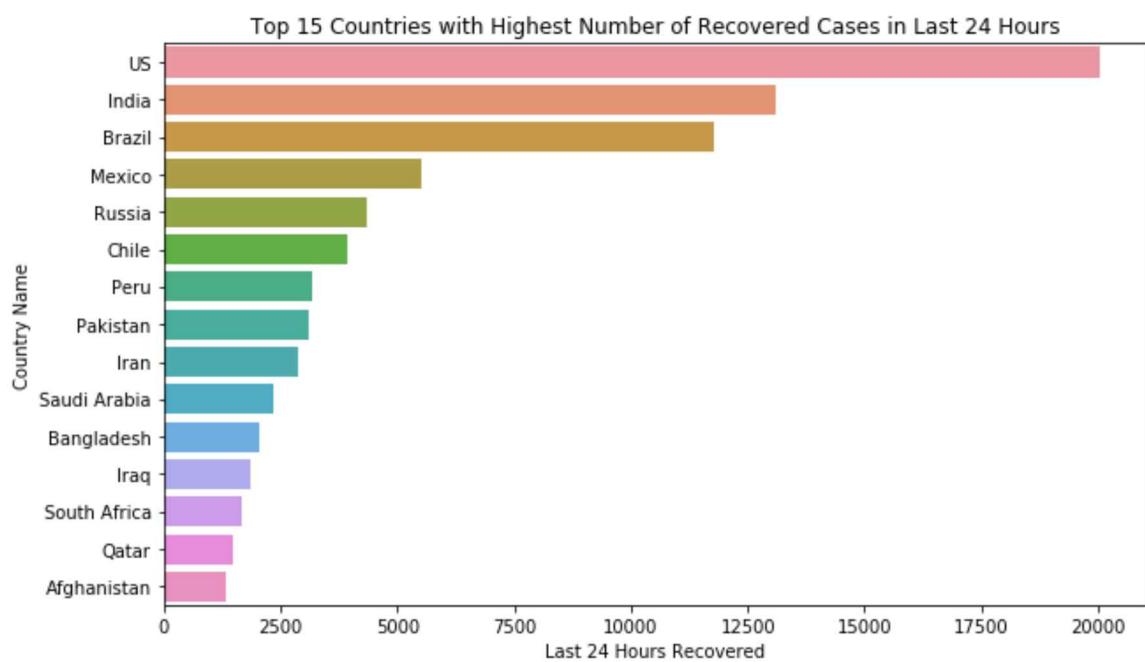
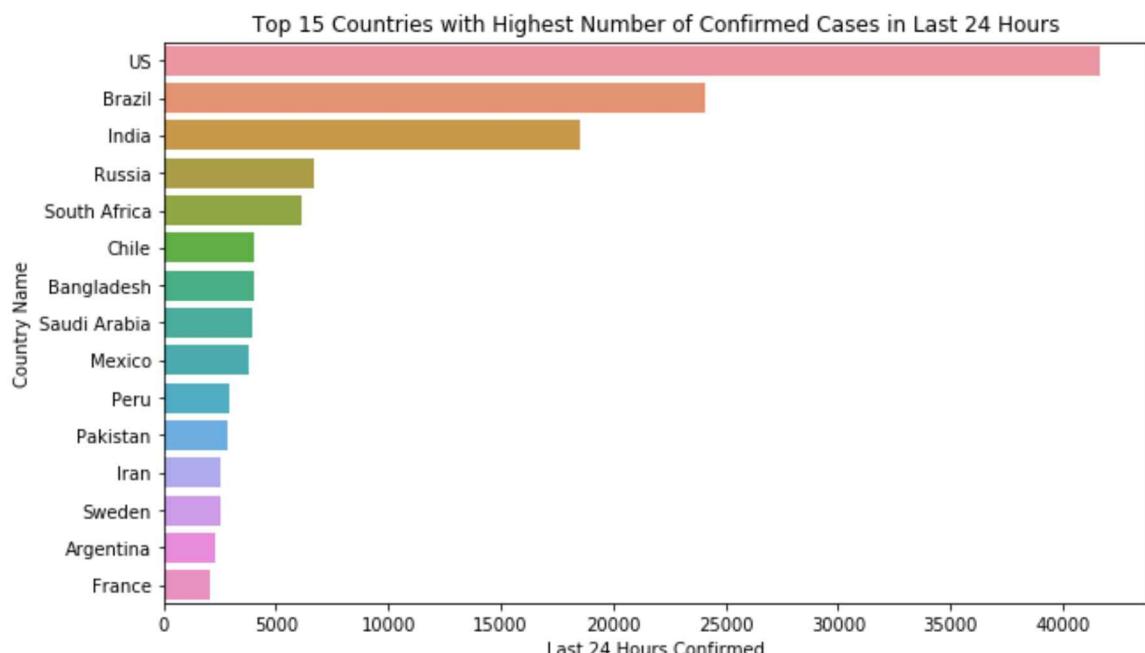
```
Last_24h_country = pd.DataFrame(list(zip(countrywise.index, country_last_24_confirmed,
                                         country_last_24_recovered, country_last_24_deaths)),
                                         columns=['Country Name', 'Last 24 Hours Confirmed', 'Last 24
                                         Hours Recovered', 'Last 24 Hours Deaths'])
```

In [22]:

```
Top15_Confirmed_24h = Last_24h_country.sort_values(['Last 24 Hours Confirmed'], ascending=False).head(15)
Top15_Recovered_24h = Last_24h_country.sort_values(['Last 24 Hours Recovered'], ascending=False).head(15)
Top15_Deaths_24h = Last_24h_country.sort_values(['Last 24 Hours Deaths'], ascending=False).head(15)
```

In [23]:

```
import matplotlib.pyplot as plt  
  
import seaborn as sns  
  
fig, (ax1, ax2, ax3) = plt.subplots(3, 1, figsize=(10, 20))  
sns.barplot(x=Top15_Confirmed_24h['Last 24 Hours Confirmed'], y=Top15_Confirmed_24h['Country Name'], ax=ax1)  
ax1.set_title('Top 15 Countries with Highest Number of Confirmed Cases in Last 24 Hours')  
sns.barplot(x=Top15_Recovered_24h['Last 24 Hours Recovered'], y=Top15_Recovered_24h['Country Name'], ax=ax2)  
ax2.set_title('Top 15 Countries with Highest Number of Recovered Cases in Last 24 Hours')  
sns.barplot(x=Top15_Deaths_24h['Last 24 Hours Deaths'], y=Top15_Deaths_24h['Country Name'], ax=ax3)  
ax3.set_title('Top 15 Countries with Highest Number of Deaths Cases in Last 24 Hours')  
  
fig.show()
```



In [24]:

```
Last_24h_country['Proportion of Confirmed'] = (Last_24h_country['Last 24 Hours Confirmed']/(date  
wise['Confirmed'].iloc[-1]-datewise['Confirmed'].iloc[-2]))*100  
Last_24h_country['Proportion of Recovered']=(Last_24h_country['Last 24 Hours Recovered'])/(datewi  
se['Recovered'].iloc[-1]-datewise['Recovered'].iloc[-2]))*100  
Last_24h_country['Proportion of Deaths']=(Last_24h_country['Last 24 Hours Deaths'])/(datewise['De  
aths'].iloc[-1]-datewise['Deaths'].iloc[-2]))*100
```

In [25]:

```
# View entire dataframe  
pd.set_option('display.max_rows', None)  
pd.set_option('display.max_columns', None)  
pd.set_option('display.width', None)  
pd.set_option('display.max_colwidth', -1)
```

In [26]:

```
Last_24h_country
```

Out [26] :

	Country Name	Last 24 Hours Confirmed	Last 24 Hours Recovered	Last 24 Hours Deaths	Proportion of Confirmed	Proportion of Recovered	Proportion of Deaths
0	US	41655.0	20039.0	337.0	26.640445	21.112797	9.330011
1	Brazil	24052.0	11793.0	692.0	15.382451	12.424932	19.158361
2	Russia	6683.0	4342.0	92.0	4.274111	4.574668	2.547065
3	India	18522.0	13099.0	418.0	11.845741	13.800915	11.572536
4	United Kingdom	830.0	4.0	25.0	0.530826	0.004214	0.692137
5	Peru	2946.0	3161.0	187.0	1.884114	3.330383	5.177187
6	Chile	4017.0	3944.0	66.0	2.569071	4.155341	1.827243
7	Spain	200.0	0.0	3.0	0.127910	0.000000	0.083056
8	Italy	126.0	305.0	6.0	0.080583	0.321344	0.166113
9	Iran	2536.0	2870.0	162.0	1.621898	3.023790	4.485050
10	Mexico	3805.0	5501.0	473.0	2.433487	5.795773	13.095238
11	Pakistan	2825.0	3096.0	137.0	1.806728	3.261900	3.792913
12	France	2046.0	350.0	35.0	1.308519	0.368755	0.968992
13	Turkey	1374.0	1214.0	18.0	0.878741	1.279053	0.498339
14	Germany	349.0	113.0	8.0	0.223203	0.119055	0.221484
15	Saudi Arabia	3943.0	2363.0	48.0	2.521745	2.489622	1.328904
16	South Africa	6130.0	1689.0	73.0	3.920440	1.779506	2.021041
17	Bangladesh	4014.0	2053.0	45.0	2.567153	2.163011	1.245847
18	Canada	637.0	1009.0	46.0	0.407393	1.063068	1.273533
19	Qatar	693.0	1468.0	3.0	0.443208	1.546663	0.083056
20	Colombia	0.0	0.0	0.0	0.000000	0.000000	0.000000
21	Mainland China	23.0	10.0	0.0	0.014710	0.010536	0.000000
22	Sweden	2530.0	0.0	30.0	1.618061	0.000000	0.830565
23	Egypt	1566.0	412.0	83.0	1.001535	0.434077	2.297896
24	Argentina	2335.0	1004.0	48.0	1.493349	1.057800	1.328904
25	Belarus	315.0	186.0	4.0	0.201458	0.195967	0.110742
26	Belgium	66.0	0.0	0.0	0.042210	0.000000	0.000000
27	Ecuador	410.0	372.0	73.0	0.262215	0.391934	2.021041
28	Indonesia	1082.0	864.0	51.0	0.691993	0.910298	1.411960
29	Netherlands	78.0	0.0	2.0	0.049885	0.000000	0.055371
30	United Arab Emirates	449.0	665.0	1.0	0.287158	0.700634	0.027685
31	Iraq	1749.0	1852.0	83.0	1.118573	1.951240	2.297896
32	Kuwait	582.0	819.0	2.0	0.372218	0.862886	0.055371
33	Ukraine	682.0	94.0	19.0	0.436173	0.099037	0.526024

	Country Name	Last 24 Hours Confirmed	Last 24 Hours Recovered	Last 24 Hours Deaths	Proportion of Confirmed	Proportion of Recovered	Proportion of Deaths
34	Singapore	202.0	477.0	0.0	0.129189	0.502560	0.000000
35	Portugal	266.0	139.0	4.0	0.170120	0.146448	0.110742
36	Oman	910.0	1222.0	6.0	0.581990	1.287481	0.166113
37	Philippines	983.0	270.0	11.0	0.628677	0.284468	0.304540
38	Poland	247.0	349.0	6.0	0.157969	0.367701	0.166113
39	Panama	1099.0	125.0	16.0	0.702865	0.131698	0.442968
40	Bolivia	601.0	411.0	57.0	0.384369	0.433024	1.578073
41	Dominican Republic	443.0	138.0	7.0	0.283321	0.145395	0.193798
42	Switzerland	35.0	0.0	0.0	0.022384	0.000000	0.000000
43	Afghanistan	271.0	1330.0	12.0	0.173318	1.401269	0.332226
44	Romania	269.0	98.0	22.0	0.172039	0.103251	0.609081
45	Bahrain	534.0	411.0	1.0	0.341520	0.433024	0.027685
46	Ireland	23.0	0.0	0.0	0.014710	0.000000	0.000000
47	Nigeria	566.0	395.0	8.0	0.361985	0.416166	0.221484
48	Armenia	482.0	181.0	7.0	0.308263	0.190699	0.193798
49	Israel	686.0	144.0	1.0	0.438731	0.151716	0.027685
50	Kazakhstan	492.0	75.0	10.0	0.314658	0.079019	0.276855
51	Honduras	736.0	86.0	6.0	0.470709	0.090608	0.166113
52	Japan	110.0	61.0	0.0	0.070350	0.064269	0.000000
53	Austria	69.0	19.0	1.0	0.044129	0.020018	0.027685
54	Guatemala	479.0	18.0	19.0	0.306344	0.018965	0.526024
55	Ghana	609.0	274.0	0.0	0.389486	0.288682	0.000000
56	Azerbaijan	544.0	343.0	8.0	0.347915	0.361380	0.221484
57	Moldova	107.0	148.0	6.0	0.068432	0.155931	0.166113
58	Serbia	242.0	117.0	4.0	0.154771	0.123269	0.110742
59	Algeria	298.0	303.0	8.0	0.190586	0.319236	0.221484
60	Nepal	476.0	121.0	1.0	0.304426	0.127484	0.027685
61	Denmark	76.0	104.0	1.0	0.048606	0.109573	0.027685
62	Korea, South	43.0	108.0	0.0	0.027501	0.113787	0.000000
63	Cameroon	0.0	0.0	0.0	0.000000	0.000000	0.000000
64	Morocco	238.0	93.0	4.0	0.152213	0.097983	0.110742
65	Czechia	202.0	41.0	0.0	0.129189	0.043197	0.000000
66	Sudan	0.0	0.0	0.0	0.000000	0.000000	0.000000
67	Cote d'Ivoire	113.0	188.0	0.0	0.072269	0.198074	0.000000
68	Norway	7.0	0.0	0.0	0.004477	0.000000	0.000000
69	Malaysia	3.0	16.0	0.0	0.001919	0.016857	0.000000
70	Uzbekistan	274.0	167.0	1.0	0.175237	0.175949	0.027685

	Country Name	Last 24 Hours Confirmed	Last 24 Hours Recovered	Last 24 Hours Deaths	Proportion of Confirmed	Proportion of Recovered	Proportion of Deaths
71	Australia	70.0	30.0	0.0	0.044768	0.031608	0.000000
72	Finland	11.0	0.0	0.0	0.007035	0.000000	0.000000
73	Congo (Kinshasa)	112.0	65.0	10.0	0.071630	0.068483	0.276855
74	Senegal	112.0	50.0	3.0	0.071630	0.052679	0.083056
75	North Macedonia	129.0	112.0	12.0	0.082502	0.118002	0.332226
76	Kenya	120.0	42.0	1.0	0.076746	0.044251	0.027685
77	EI Salvador	239.0	91.0	12.0	0.152852	0.095876	0.332226
78	Haiti	156.0	133.0	5.0	0.099770	0.140127	0.138427
79	Tajikistan	51.0	58.0	0.0	0.032617	0.061108	0.000000
80	Ethiopia	157.0	298.0	5.0	0.100409	0.313968	0.138427
81	Venezuela	233.0	0.0	4.0	0.149015	0.000000	0.110742
82	Gabon	185.0	93.0	2.0	0.118317	0.097983	0.055371
83	Guinea	9.0	14.0	0.0	0.005756	0.014750	0.000000
84	Kyrgyzstan	279.0	76.0	7.0	0.178434	0.080072	0.193798
85	Bulgaria	140.0	74.0	4.0	0.089537	0.077965	0.110742
86	Djibouti	13.0	85.0	1.0	0.008314	0.089555	0.027685
87	Bosnia and Herzegovina	390.0	28.0	6.0	0.249424	0.029500	0.166113
88	Luxembourg	14.0	19.0	0.0	0.008954	0.020018	0.000000
89	Mauritania	88.0	78.0	2.0	0.056280	0.082180	0.055371
90	Hungary	3.0	0.0	4.0	0.001919	0.000000	0.110742
91	Central African Republic	184.0	74.0	2.0	0.117677	0.077965	0.055371
92	Greece	14.0	0.0	0.0	0.008954	0.000000	0.000000
93	Costa Rica	139.0	28.0	0.0	0.088897	0.029500	0.000000
94	Thailand	7.0	0.0	0.0	0.004477	0.000000	0.000000
95	Somalia	10.0	23.0	0.0	0.006395	0.024232	0.000000
96	Croatia	34.0	3.0	0.0	0.021745	0.003161	0.000000
97	Kosovo	508.0	378.0	12.0	0.324891	0.398255	0.332226
98	Albania	64.0	54.0	3.0	0.040931	0.056894	0.083056
99	Cuba	8.0	10.0	0.0	0.005116	0.010536	0.000000
100	Maldives	13.0	16.0	0.0	0.008314	0.016857	0.000000
101	Paraguay	64.0	15.0	1.0	0.040931	0.015804	0.027685
102	West Bank and Gaza	195.0	0.0	1.0	0.124712	0.000000	0.027685
103	Mali	26.0	15.0	1.0	0.016628	0.015804	0.027685
104	Nicaragua	0.0	0.0	0.0	0.000000	0.000000	0.000000
105	Madagascar	60.0	22.0	2.0	0.038373	0.023179	0.055371

	Country Name	Last 24 Hours Confirmed	Last 24 Hours Recovered	Last 24 Hours Deaths	Proportion of Confirmed	Proportion of Recovered	Proportion of Deaths
106	Sri Lanka	2.0	17.0	0.0	0.001279	0.017911	0.000000
107	Equatorial Guinea	0.0	0.0	0.0	0.000000	0.000000	0.000000
108	South Sudan	0.0	0.0	0.0	0.000000	0.000000	0.000000
109	Estonia	0.0	0.0	0.0	0.000000	0.000000	0.000000
110	Iceland	2.0	2.0	0.0	0.001279	0.002107	0.000000
111	Lithuania	1.0	9.0	0.0	0.000640	0.009482	0.000000
112	Lebanon	5.0	17.0	0.0	0.003198	0.017911	0.000000
113	Slovakia	1.0	3.0	0.0	0.000640	0.003161	0.000000
114	Guinea-Bissau	40.0	0.0	2.0	0.025582	0.000000	0.055371
115	Slovenia	4.0	0.0	0.0	0.002558	0.000000	0.000000
116	Zambia	11.0	0.0	0.0	0.007035	0.000000	0.000000
117	New Zealand	0.0	0.0	0.0	0.000000	0.000000	0.000000
118	Sierra Leone	23.0	18.0	0.0	0.014710	0.018965	0.000000
119	Benin	38.0	17.0	3.0	0.024303	0.017911	0.083056
120	Tunisia	3.0	0.0	0.0	0.001919	0.000000	0.000000
121	Cabo Verde	10.0	38.0	0.0	0.006395	0.040036	0.000000
122	Malawi	6.0	0.0	0.0	0.003837	0.000000	0.000000
123	Jordan	7.0	7.0	0.0	0.004477	0.007375	0.000000
124	Yemen	10.0	2.0	2.0	0.006395	0.002107	0.055371
125	Latvia	1.0	0.0	0.0	0.000640	0.000000	0.000000
126	Congo (Brazzaville)	0.0	0.0	0.0	0.000000	0.000000	0.000000
127	Niger	1.0	0.0	0.0	0.000640	0.000000	0.000000
128	Rwanda	101.0	0.0	0.0	0.064595	0.000000	0.000000
129	Cyprus	2.0	0.0	0.0	0.001279	0.000000	0.000000
130	Burkina Faso	0.0	0.0	0.0	0.000000	0.000000	0.000000
131	Uruguay	3.0	4.0	0.0	0.001919	0.004214	0.000000
132	Georgia	2.0	6.0	0.0	0.001279	0.006322	0.000000
133	Mozambique	24.0	1.0	1.0	0.015349	0.001054	0.027685
134	Uganda	11.0	14.0	0.0	0.007035	0.014750	0.000000
135	Chad	0.0	1.0	0.0	0.000000	0.001054	0.000000
136	Andorra	0.0	0.0	0.0	0.000000	0.000000	0.000000
137	Libya	40.0	10.0	2.0	0.025582	0.010536	0.055371
138	Eswatini	14.0	8.0	0.0	0.008954	0.008429	0.000000
139	Liberia	2.0	14.0	2.0	0.001279	0.014750	0.055371
140	Sao Tome and Principe	0.0	16.0	0.0	0.000000	0.016857	0.000000

	Country Name	Last 24 Hours Confirmed	Last 24 Hours Recovered	Last 24 Hours Deaths	Proportion of Confirmed	Proportion of Recovered	Proportion of Deaths
141	Diamond Princess	0.0	0.0	0.0	0.000000	0.000000	0.000000
142	San Marino	0.0	0.0	0.0	0.000000	0.000000	0.000000
143	Jamaica	2.0	1.0	0.0	0.001279	0.001054	0.000000
144	Malta	0.0	3.0	0.0	0.000000	0.003161	0.000000
145	Togo	1.0	0.0	0.0	0.000640	0.000000	0.000000
146	Zimbabwe	7.0	10.0	1.0	0.004477	0.010536	0.027685
147	Tanzania	0.0	0.0	0.0	0.000000	0.000000	0.000000
148	Suriname	11.0	18.0	2.0	0.007035	0.018965	0.055371
149	Montenegro	20.0	0.0	0.0	0.012791	0.000000	0.000000
150	Taiwan*	0.0	0.0	0.0	0.000000	0.000000	0.000000
151	Vietnam	0.0	5.0	0.0	0.000000	0.005268	0.000000
152	Mauritius	0.0	0.0	0.0	0.000000	0.000000	0.000000
153	Burma	0.0	3.0	0.0	0.000000	0.003161	0.000000
154	Angola	9.0	12.0	0.0	0.005756	0.012643	0.000000
155	Comoros	0.0	0.0	0.0	0.000000	0.000000	0.000000
156	Syria	13.0	0.0	0.0	0.008314	0.000000	0.000000
157	Guyana	5.0	5.0	0.0	0.003198	0.005268	0.000000
158	Mongolia	0.0	0.0	0.0	0.000000	0.000000	0.000000
159	Namibia	13.0	0.0	0.0	0.008314	0.000000	0.000000
160	Eritrea	0.0	0.0	0.0	0.000000	0.000000	0.000000
161	Botswana	83.0	0.0	0.0	0.053083	0.000000	0.000000
162	Burundi	0.0	0.0	0.0	0.000000	0.000000	0.000000
163	Brunei	0.0	0.0	0.0	0.000000	0.000000	0.000000
164	Cambodia	0.0	0.0	0.0	0.000000	0.000000	0.000000
165	Trinidad and Tobago	0.0	0.0	0.0	0.000000	0.000000	0.000000
166	Bahamas	0.0	0.0	0.0	0.000000	0.000000	0.000000
167	Monaco	0.0	0.0	0.0	0.000000	0.000000	0.000000
168	Barbados	0.0	0.0	0.0	0.000000	0.000000	0.000000
169	Liechtenstein	0.0	0.0	0.0	0.000000	0.000000	0.000000
170	Seychelles	7.0	0.0	0.0	0.004477	0.000000	0.000000
171	Bhutan	1.0	6.0	0.0	0.000640	0.006322	0.000000
172	Antigua and Barbuda	0.0	0.0	0.0	0.000000	0.000000	0.000000
173	Gambia	2.0	0.0	0.0	0.001279	0.000000	0.000000
174	Saint Vincent and the Grenadines	0.0	0.0	0.0	0.000000	0.000000	0.000000
175	Lesotho	0.0	0.0	0.0	0.000000	0.000000	0.000000

	Country Name	Last 24 Hours Confirmed	Last 24 Hours Recovered	Last 24 Hours Deaths	Proportion of Confirmed	Proportion of Recovered	Proportion of Deaths
176	Timor-Leste	0.0	0.0	0.0	0.000000	0.000000	0.000000
177	Belize	0.0	0.0	0.0	0.000000	0.000000	0.000000
178	Grenada	0.0	0.0	0.0	0.000000	0.000000	0.000000
179	Saint Lucia	0.0	0.0	0.0	0.000000	0.000000	0.000000
180	Laos	0.0	0.0	0.0	0.000000	0.000000	0.000000
181	Dominica	0.0	0.0	0.0	0.000000	0.000000	0.000000
182	Fiji	0.0	0.0	0.0	0.000000	0.000000	0.000000
183	Saint Kitts and Nevis	0.0	0.0	0.0	0.000000	0.000000	0.000000
184	Holy See	0.0	0.0	0.0	0.000000	0.000000	0.000000
185	Papua New Guinea	0.0	0.0	0.0	0.000000	0.000000	0.000000
186	Western Sahara	0.0	0.0	0.0	0.000000	0.000000	0.000000
187	MS Zaandam	0.0	0.0	0.0	0.000000	0.000000	0.000000

Proportion of Countries in Confirmed, Recovered and Death Cases

In [27]:

```
Last_24h_country[['Country Name','Proportion of Confirmed','Proportion of Recovered','Proportion of Deaths']].sort_values(['Proportion of Confirmed'], ascending=False).style.background_gradient(cmap='Reds')
```

Out [27] :

	Country Name	Proportion of Confirmed	Proportion of Recovered	Proportion of Deaths
0	US	26.6404	21.1128	9.33001
1	Brazil	15.3825	12.4249	19.1584
3	India	11.8457	13.8009	11.5725
2	Russia	4.27411	4.57467	2.54707
16	South Africa	3.92044	1.77951	2.02104
6	Chile	2.56907	4.15534	1.82724
17	Bangladesh	2.56715	2.16301	1.24585
15	Saudi Arabia	2.52174	2.48962	1.3289
10	Mexico	2.43349	5.79577	13.0952
5	Peru	1.88411	3.33038	5.17719
11	Pakistan	1.80673	3.2619	3.79291
9	Iran	1.6219	3.02379	4.48505
22	Sweden	1.61806	0	0.830565
24	Argentina	1.49335	1.0578	1.3289
12	France	1.30852	0.368755	0.968992
31	Iraq	1.11857	1.95124	2.2979
23	Egypt	1.00153	0.434077	2.2979
13	Turkey	0.878741	1.27905	0.498339
39	Panama	0.702865	0.131698	0.442968
28	Indonesia	0.691993	0.910298	1.41196
37	Philippines	0.628677	0.284468	0.30454
36	Oman	0.58199	1.28748	0.166113
4	United Kingdom	0.530826	0.00421434	0.692137
51	Honduras	0.470709	0.0906083	0.166113
19	Qatar	0.443208	1.54666	0.0830565
49	Israel	0.438731	0.151716	0.0276855
33	Ukraine	0.436173	0.099037	0.526024
18	Canada	0.407393	1.06307	1.27353
55	Ghana	0.389486	0.288682	0
40	Bolivia	0.384369	0.433024	1.57807
32	Kuwait	0.372218	0.862886	0.055371
47	Nigeria	0.361985	0.416166	0.221484
56	Azerbaijan	0.347915	0.36138	0.221484
45	Bahrain	0.34152	0.433024	0.0276855
97	Kosovo	0.324891	0.398255	0.332226
50	Kazakhstan	0.314658	0.0790189	0.276855

	Country Name	Proportion of Confirmed	Proportion of Recovered	Proportion of Deaths
48	Armenia	0.308263	0.190699	0.193798
54	Guatemala	0.306344	0.0189645	0.526024
60	Nepal	0.304426	0.127484	0.0276855
30	United Arab Emirates	0.287158	0.700634	0.0276855
41	Dominican Republic	0.283321	0.145395	0.193798
27	Ecuador	0.262215	0.391934	2.02104
87	Bosnia and Herzegovina	0.249424	0.0295004	0.166113
14	Germany	0.223203	0.119055	0.221484
25	Belarus	0.201458	0.195967	0.110742
59	Algeria	0.190586	0.319236	0.221484
84	Kyrgyzstan	0.178434	0.0800725	0.193798
70	Uzbekistan	0.175237	0.175949	0.0276855
43	Afghanistan	0.173318	1.40127	0.332226
44	Romania	0.172039	0.103251	0.609081
35	Portugal	0.17012	0.146448	0.110742
38	Poland	0.157969	0.367701	0.166113
58	Serbia	0.154771	0.123269	0.110742
77	El Salvador	0.152852	0.0958763	0.332226
64	Morocco	0.152213	0.0979834	0.110742
81	Venezuela	0.149015	0	0.110742
34	Singapore	0.129189	0.50256	0
65	Czechia	0.129189	0.043197	0
7	Spain	0.12791	0	0.0830565
102	West Bank and Gaza	0.124712	0	0.0276855
82	Gabon	0.118317	0.0979834	0.055371
91	Central African Republic	0.117677	0.0779653	0.055371
80	Ethiopia	0.100409	0.313968	0.138427
78	Haiti	0.0997698	0.140127	0.138427
85	Bulgaria	0.089537	0.0779653	0.110742
93	Costa Rica	0.0888974	0.0295004	0
75	North Macedonia	0.0825019	0.118002	0.332226
8	Italy	0.0805833	0.321344	0.166113
76	Kenya	0.076746	0.0442506	0.0276855
67	Cote d'Ivoire	0.0722691	0.198074	0
73	Congo (Kinshasa)	0.0716296	0.068483	0.276855
74	Senegal	0.0716296	0.0526793	0.0830565
52	Japan	0.0703505	0.0642687	0
57	Moldova	0.0684318	0.155931	0.166113

	Country Name	Proportion of Confirmed	Proportion of Recovered	Proportion of Deaths
128	Rwanda	0.0645945	0	0
89	Mauritania	0.0562804	0.0821797	0.055371
161	Botswana	0.0530826	0	0
29	Netherlands	0.0498849	0	0.055371
61	Denmark	0.0486058	0.109573	0.0276855
71	Australia	0.0447685	0.0316076	0
53	Austria	0.0441289	0.0200181	0.0276855
26	Belgium	0.0422103	0	0
98	Albania	0.0409312	0.0568936	0.0830565
101	Paraguay	0.0409312	0.0158038	0.0276855
105	Madagascar	0.038373	0.0231789	0.055371
79	Tajikistan	0.032617	0.061108	0
62	Korea, South	0.0275006	0.113787	0
137	Libya	0.025582	0.0105359	0.055371
114	Guinea-Bissau	0.025582	0	0.055371
119	Benin	0.0243029	0.017911	0.0830565
42	Switzerland	0.0223842	0	0
96	Croatia	0.0217447	0.00316076	0
103	Mali	0.0166283	0.0158038	0.0276855
133	Mozambique	0.0153492	0.00105359	0.0276855
46	Ireland	0.0147096	0	0
118	Sierra Leone	0.0147096	0.0189645	0
21	Mainland China	0.0147096	0.0105359	0
149	Montenegro	0.012791	0	0
92	Greece	0.0089537	0	0
88	Luxembourg	0.0089537	0.0200181	0
138	Eswatini	0.0089537	0.00842868	0
100	Maldives	0.00831415	0.0168574	0
156	Syria	0.00831415	0	0
159	Namibia	0.00831415	0	0
86	Djibouti	0.00831415	0.0895548	0.0276855
72	Finland	0.00703505	0	0
134	Uganda	0.00703505	0.0147502	0
116	Zambia	0.00703505	0	0
148	Suriname	0.00703505	0.0189645	0.055371
124	Yemen	0.0063955	0.00210717	0.055371
121	Cabo Verde	0.0063955	0.0400362	0
95	Somalia	0.0063955	0.0242325	0

	Country Name	Proportion of Confirmed	Proportion of Recovered	Proportion of Deaths
83	Guinea	0.00575595	0.0147502	0
154	Angola	0.00575595	0.012643	0
99	Cuba	0.0051164	0.0105359	0
146	Zimbabwe	0.00447685	0.0105359	0.0276855
170	Seychelles	0.00447685	0	0
123	Jordan	0.00447685	0.0073751	0
94	Thailand	0.00447685	0	0
68	Norway	0.00447685	0	0
122	Malawi	0.0038373	0	0
112	Lebanon	0.00319775	0.017911	0
157	Guyana	0.00319775	0.00526793	0
115	Slovenia	0.0025582	0	0
90	Hungary	0.00191865	0	0.110742
120	Tunisia	0.00191865	0	0
69	Malaysia	0.00191865	0.0168574	0
131	Uruguay	0.00191865	0.00421434	0
110	Iceland	0.0012791	0.00210717	0
106	Sri Lanka	0.0012791	0.017911	0
143	Jamaica	0.0012791	0.00105359	0
139	Liberia	0.0012791	0.0147502	0.055371
173	Gambia	0.0012791	0	0
132	Georgia	0.0012791	0.00632151	0
129	Cyprus	0.0012791	0	0
111	Lithuania	0.00063955	0.00948227	0
127	Niger	0.00063955	0	0
171	Bhutan	0.00063955	0.00632151	0
125	Latvia	0.00063955	0	0
145	Togo	0.00063955	0	0
113	Slovakia	0.00063955	0.00316076	0
168	Barbados	0	0	0
169	Liechtenstein	0	0	0
167	Monaco	0	0	0
20	Colombia	0	0	0
166	Bahamas	0	0	0
172	Antigua and Barbuda	0	0	0
117	New Zealand	0	0	0
178	Grenada	0	0	0
174	Saint Vincent and the Grenadines	0	0	0

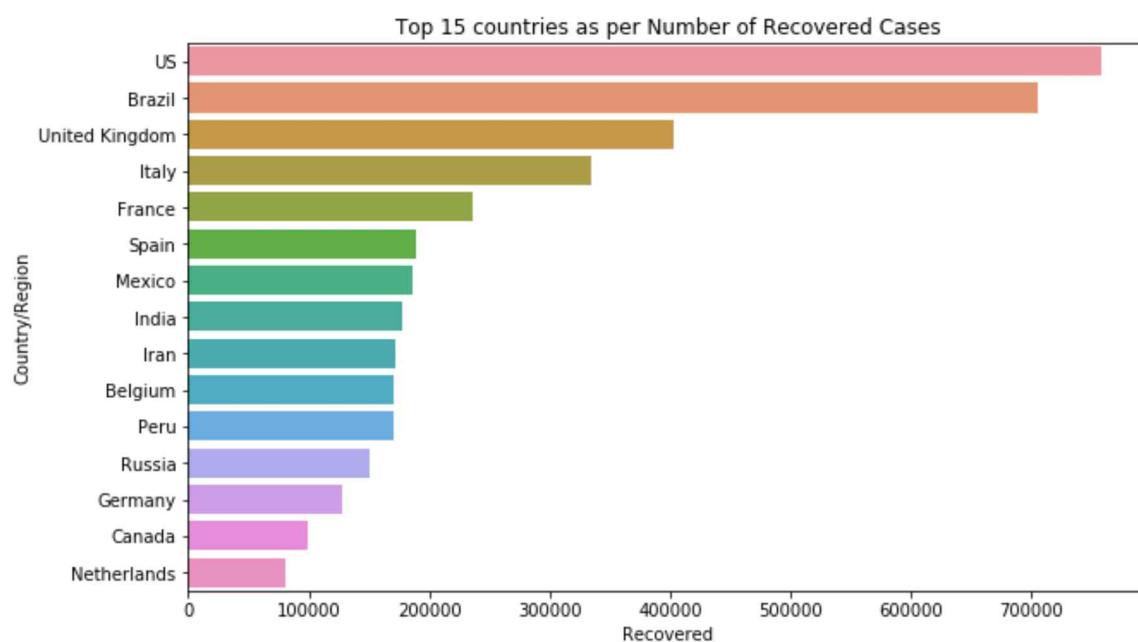
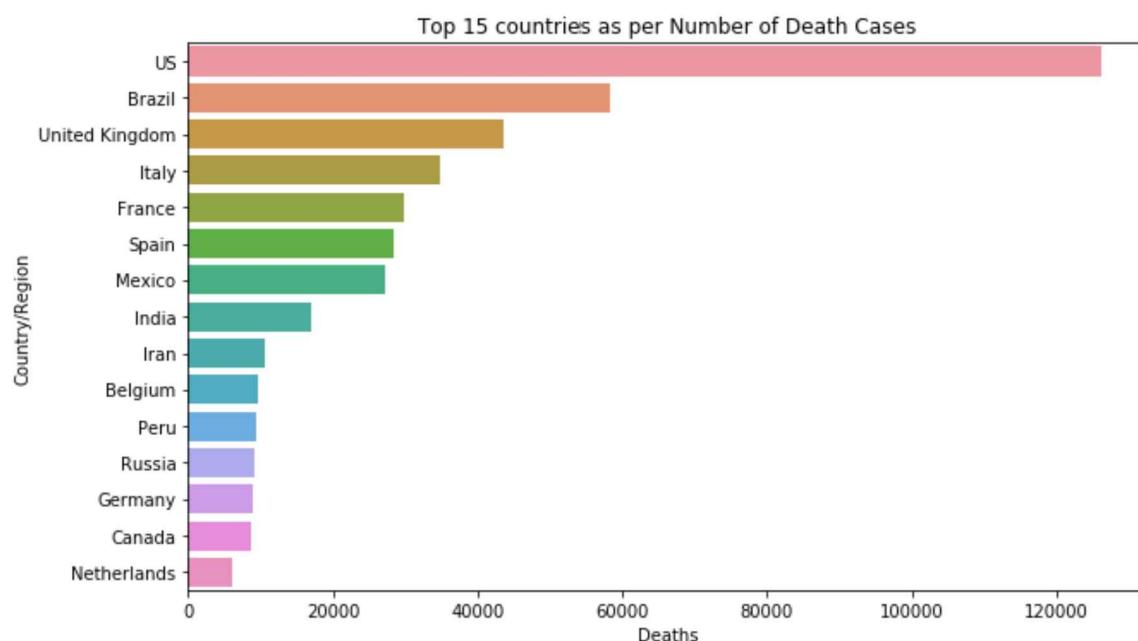
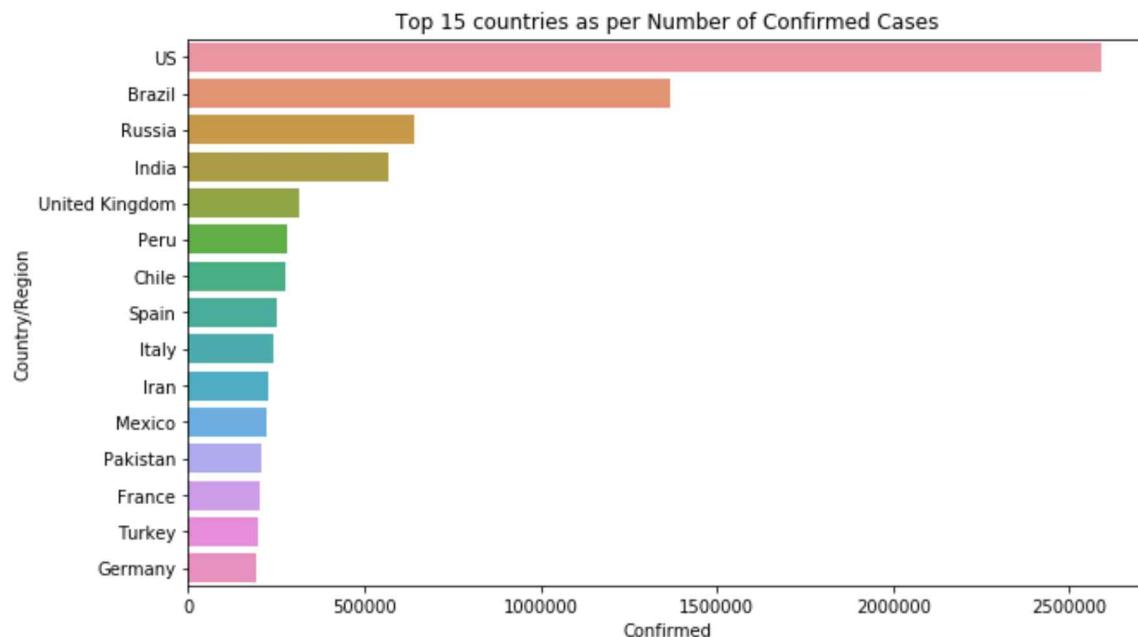
	Country Name	Proportion of Confirmed	Proportion of Recovered	Proportion of Deaths
175	Lesotho	0	0	0
176	Timor-Leste	0	0	0
177	Belize	0	0	0
164	Cambodia	0	0	0
179	Saint Lucia	0	0	0
180	Laos	0	0	0
181	Dominica	0	0	0
182	Fiji	0	0	0
183	Saint Kitts and Nevis	0	0	0
184	Holy See	0	0	0
185	Papua New Guinea	0	0	0
186	Western Sahara	0	0	0
165	Trinidad and Tobago	0	0	0
153	Burma	0	0.00316076	0
163	Brunei	0	0	0
162	Burundi	0	0	0
126	Congo (Brazzaville)	0	0	0
130	Burkina Faso	0	0	0
109	Estonia	0	0	0
135	Chad	0	0.00105359	0
136	Andorra	0	0	0
108	South Sudan	0	0	0
107	Equatorial Guinea	0	0	0
140	Sao Tome and Principe	0	0.0168574	0
141	Diamond Princess	0	0	0
142	San Marino	0	0	0
144	Malta	0	0.00316076	0
147	Tanzania	0	0	0
104	Nicaragua	0	0	0
150	Taiwan*	0	0	0
151	Vietnam	0	0.00526793	0
152	Mauritius	0	0	0
155	Comoros	0	0	0
158	Mongolia	0	0	0
66	Sudan	0	0	0
160	Eritrea	0	0	0
63	Cameroon	0	0	0
187	MS Zaandam	0	0	0

In [28]:

```
fig, (ax1, ax2, ax3) = plt.subplots(3, 1, figsize=(10,20))
top15_confirmed=countrywise.sort_values(["Confirmed"], ascending=False).head(15)
top15_recovered = countrywise.sort_values(['Recovered'], ascending=False).head(15)
top15_deaths=countrywise.sort_values(["Deaths"], ascending=False).head(15)
sns.barplot(x=top15_confirmed["Confirmed"],y=top15_confirmed.index,ax=ax1)
ax1.set_title("Top 15 countries as per Number of Confirmed Cases")
sns.barplot(x=top15_deaths["Deaths"],y=top15_deaths.index,ax=ax2)
ax2.set_title("Top 15 countries as per Number of Death Cases")
sns.barplot(x=top15_recovered['Recovered'],y=top15_deaths.index, ax=ax3)
ax3.set_title('Top 15 countries as per Number of Recovered Cases')
```

Out [28]:

Text(0.5, 1.0, 'Top 15 countries as per Number of Recovered Cases')



Tourist Data: <https://worldpopulationreview.com/countries/most-visited-countries/> (<https://worldpopulationreview.com/countries/most-visited-countries/>)

International Students Data: <https://www.easyuni.com/advice/top-countries-with-most-international-students-1184/> (<https://www.easyuni.com/advice/top-countries-with-most-international-students-1184/>)

If we check the list of countries in accordance to number tourists from link mentioned above, top countries are mainly USA, UK, France, Spain, China, Italy, Mexico, Turkey, Germany, Thailand, etc. Another thing to take into account most of the countries mentioned above also have highest number of international Students. All of them are the most affected countries cuz of COVID-19.

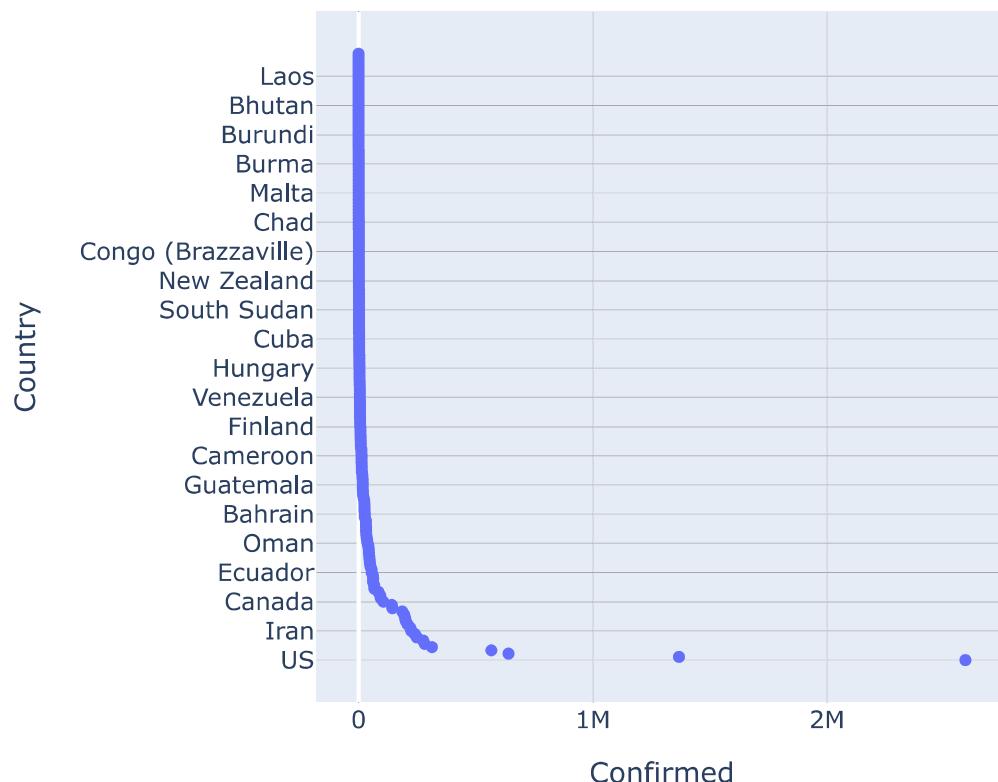
Another interesting thing to see is the median age of worst affected countries. We can check that here Countrywise Median Age: <https://ourworldindata.org/age-structure> (<https://ourworldindata.org/age-structure>)

Top 25 Countries as per Mortality rate and Recovery rate with more than 500 Confirmed Cases.

In [29]:

```
import plotly.graph_objects as go
fig=go.Figure()
fig.add_trace(go.Scatter(y=countrywise.index, x=countrywise['Confirmed'],
                         mode='markers'))
fig.update_layout(title='The number of Confirmed per Countries',
                  xaxis_title='Confirmed', yaxis_title='Country')
```

The number of Confirmed per Countries



In [30]:

```
fig, (ax1, ax2) = plt.subplots(2, 1, figsize=(10, 15))

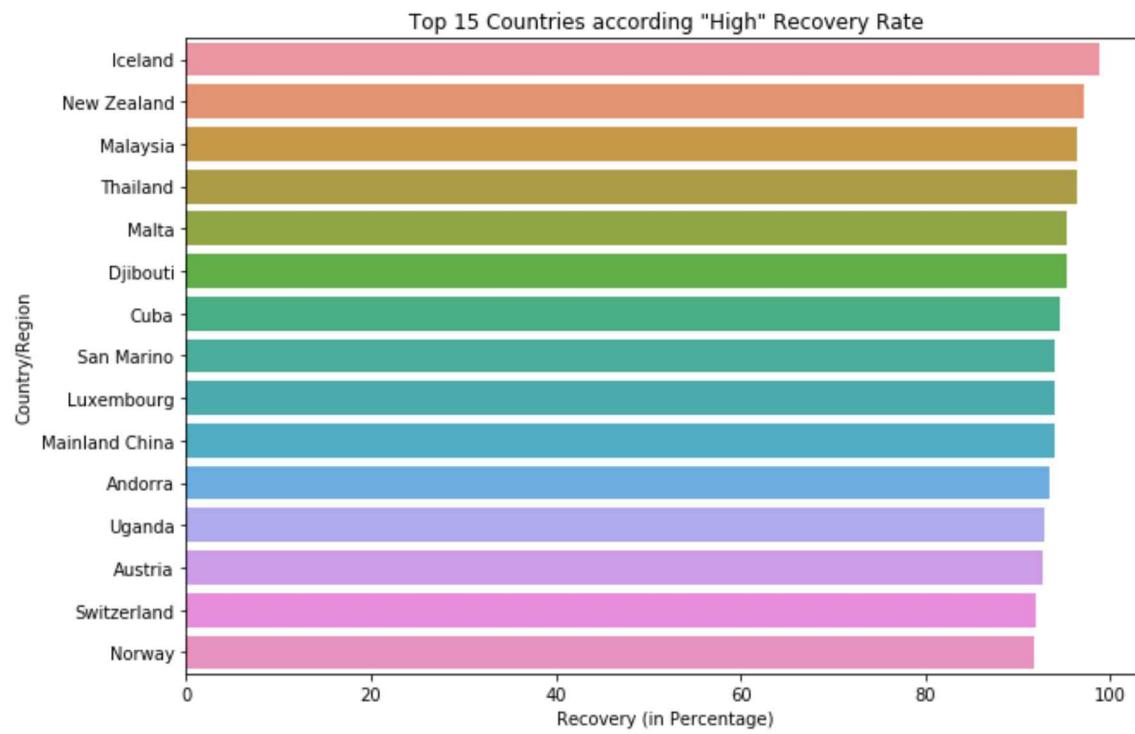
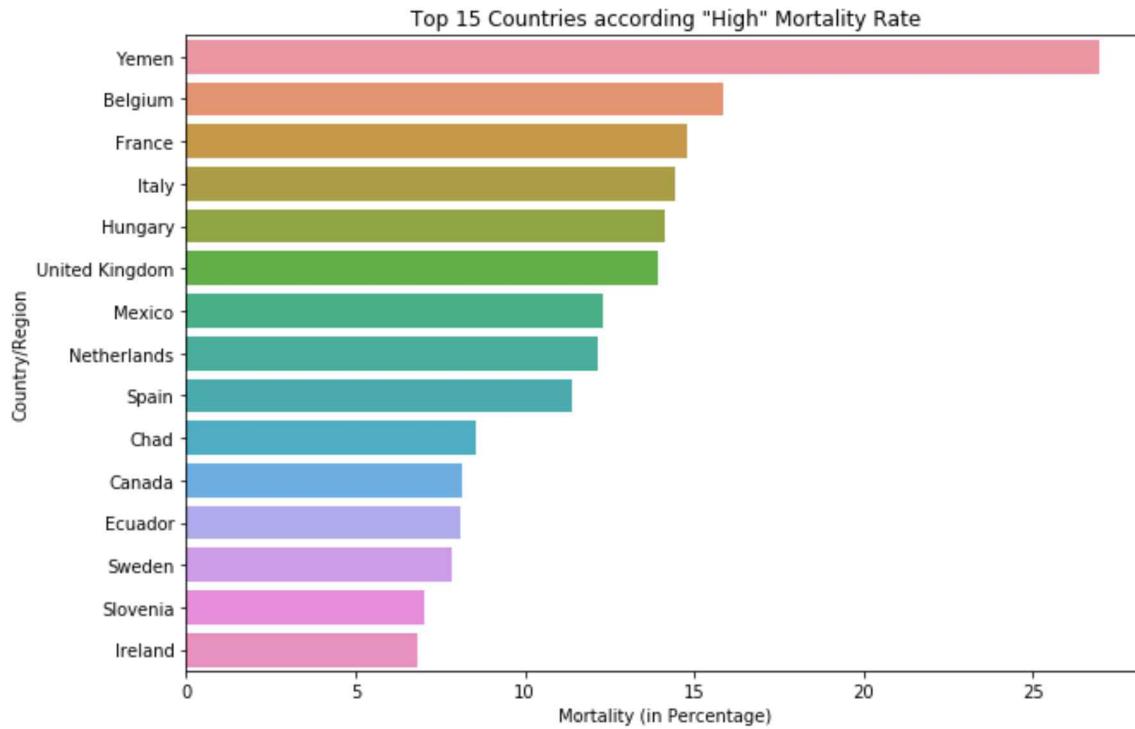
# 알맞은 비율의 값을 얻어내기 위하여 500이상의 확인된 환자들이 있는 나라에 한하여 봄.

countrywise_mortal = countrywise[countrywise['Confirmed']>500].sort_values(['Mortality'], ascending=False).head(15)
sns.barplot(x=countrywise_mortal['Mortality'], y=countrywise_mortal.index, ax=ax1)
ax1.set_title('Top 15 Countries according "High" Mortality Rate')
ax1.set_xlabel('Mortality (in Percentage)')

countrywise_recover = countrywise[countrywise['Confirmed']>500].sort_values(['Recovery'], ascending=False).head(15)
sns.barplot(x=countrywise_recover['Recovery'], y=countrywise_recover.index, ax=ax2)
ax2.set_title('Top 15 Countries according "High" Recovery Rate')
ax2.set_xlabel('Recovery (in Percentage)')
```

Out[30]:

Text(0.5, 0, 'Recovery (in Percentage)')



In [31]:

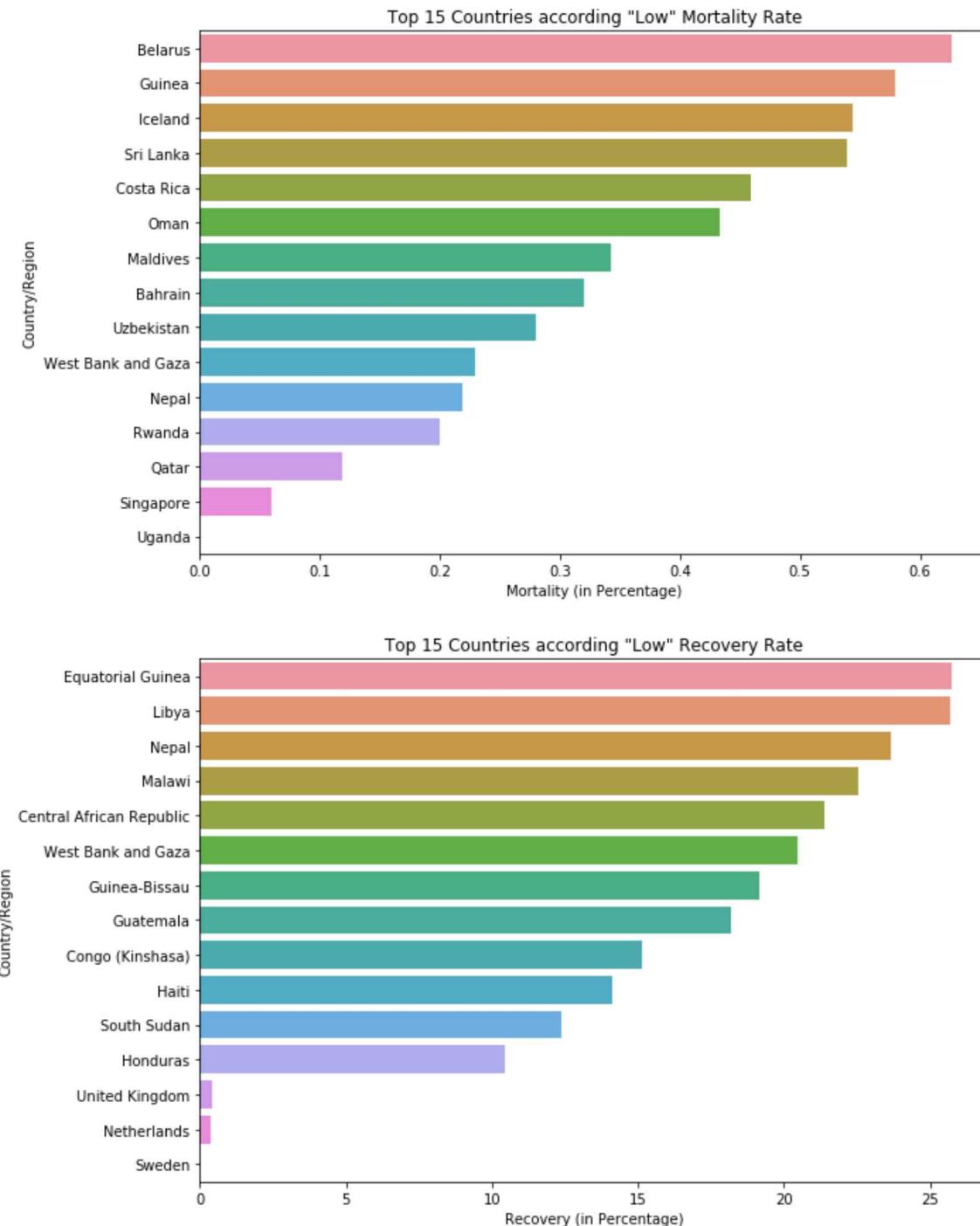
```
fig, (ax1, ax2) = plt.subplots(2, 1, figsize=(10, 15))

countrywise_mortal = countrywise[countrywise['Confirmed']>500].sort_values(['Mortality'], ascending=False).tail(15)
sns.barplot(x=countrywise_mortal['Mortality'], y=countrywise_mortal.index, ax=ax1)
ax1.set_title('Top 15 Countries according "Low" Mortality Rate')
ax1.set_xlabel('Mortality (in Percentage)')

countrywise_recover = countrywise[countrywise['Confirmed']>500].sort_values(['Recovery'], ascending=False).tail(15)
sns.barplot(x=countrywise_recover['Recovery'], y=countrywise_recover.index, ax=ax2)
ax2.set_title('Top 15 Countries according "Low" Recovery Rate')
ax2.set_xlabel('Recovery (in Percentage)')
```

Out[31]:

Text(0.5, 0, 'Recovery (in Percentage)')

**No Recovered Patients with considerable Mortality Rate**

In [32]:

```
no_recovered_countries = countrywise[(countrywise['Recovered']==0)][['Confirmed', 'Deaths']]
no_recovered_countries['Mortality Rate'] = (no_recovered_countries['Deaths']/no_recovered_countries['Confirmed'])*100
no_recovered_countries = no_recovered_countries[no_recovered_countries['Mortality Rate']>0].sort_values(['Mortality Rate'], ascending=False)
no_recovered_countries.style.background_gradient(cmap='Reds')
```

Out [32]:

Country/Region	Confirmed	Deaths	Mortality Rate
MS Zaandam	9	2	22.2222
Sweden	67667	5310	7.84725

Serbia was a country which had more than 50 Confirmed Cases with no Recovered patient for a very long time. Right now above countries have No Recovered Patients, but comparatively low number of Confirmed Cases.

notice: The number of Confirmed of MS Zaandam is less than 500, so it doesn't appear on the graph above.

Countries with more than 100 Confirmed Cases and No Deaths with considerably high Recovery Rate

In [33]:

```
no_deaths = countrywise[(countrywise['Confirmed']>100)&(countrywise['Deaths']==0)]
no_deaths = no_deaths[no_deaths['Recovery']>0].sort_values(['Recovery'], ascending=False)
no_deaths.style.background_gradient(cmap='Blues')
```

Out [33]:

Country/Region	Confirmed	Recovered	Deaths	Mortality	Recovery
Vietnam	355	335	0	0	94.3662
Uganda	870	808	0	0	92.8736
Cambodia	141	130	0	0	92.1986
Mongolia	220	175	0	0	79.5455
Eritrea	191	53	0	0	27.7487
Namibia	196	24	0	0	12.2449

Vietnam has been able to contain COVID_19 pretty well with no Deaths recorded so far with pretty healthy Recovery Rate. Just for information Vietnam was the first country to inform World Health Organization about Human to Human Transmission of COVID-19.

Vietnam and Cambodia will soon be free from COVID-19.

All the above countries are showing amazing recovery rate as well and will be fully completely get over COVID-19 very soon.

And the following is a new fact that I get to know personally.

Gravitas: Wuhan Coronavirus: Taiwan's big claim against WHO:https://www.youtube.com/watch?v=USTJUqe_fdk (https://www.youtube.com/watch?v=USTJUqe_fdk)

Here, the fact that Taiwan wasn't part of the WHO...! And Taiwan is also one of a country having a good recovery record.

WHO releases statement after senior staff's awkward interview https://www.youtube.com/watch?v=wFRHB-wP9SU&feature=youtu.be&fbclid=IwAR1_wXFXq_qG17VZhA4nivmlm8ZWjHD1W0ozYS70YjgBsmfXwRGE_I2 (https://www.youtube.com/watch?v=wFRHB-wP9SU&feature=youtu.be&fbclid=IwAR1_wXFXq_qG17VZhA4nivmlm8ZWjHD1W0ozYS70YjgBsmfXwRGE_I2)

In [34]:

```
countrywise.loc[countrywise.index=='Taiwan*']
```

Out [34]:

	Confirmed	Recovered	Deaths	Mortality	Recovery
--	-----------	-----------	--------	-----------	----------

Country/Region

Taiwan*	447.0	435.0	7.0	1.565996	97.315436
---------	-------	-------	-----	----------	-----------

Let's go back to the main point.

In [35]:

```
fig, (ax1, ax2) = plt.subplots(2, 1, figsize=(10, 15))
countrywise['Active Cases'] = (countrywise['Confirmed']-countrywise['Recovered']-countrywise['Deaths'])
countrywise['Closed Cases'] = (countrywise['Recovered']+countrywise['Deaths'])

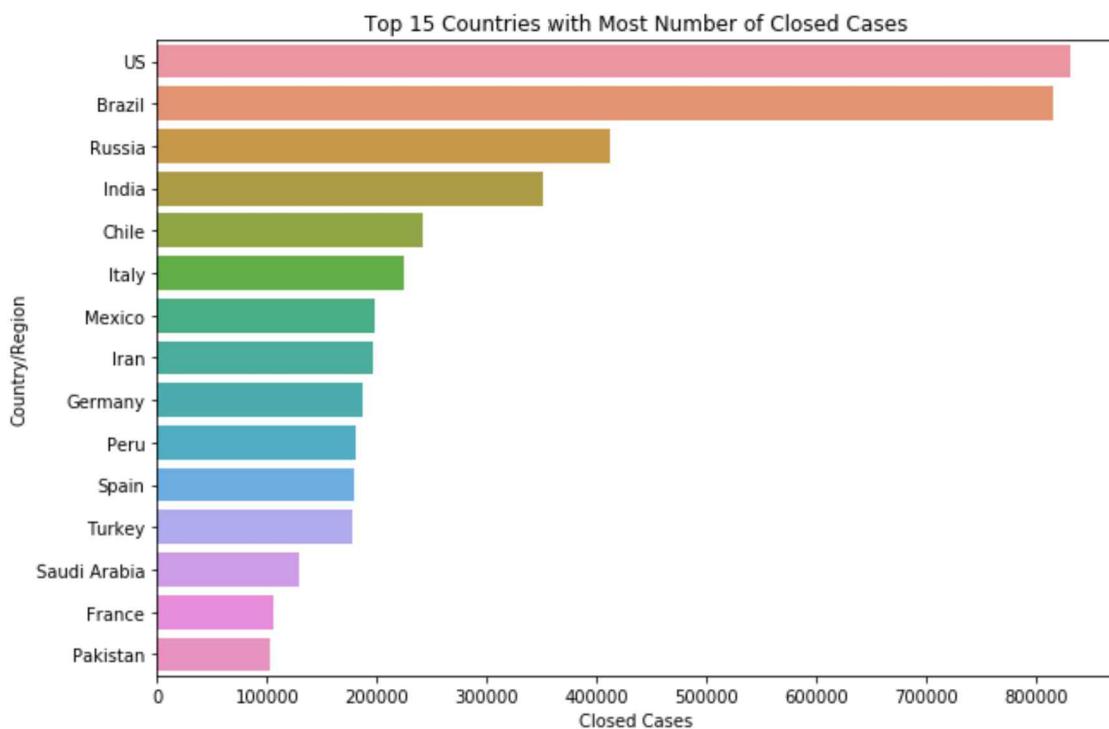
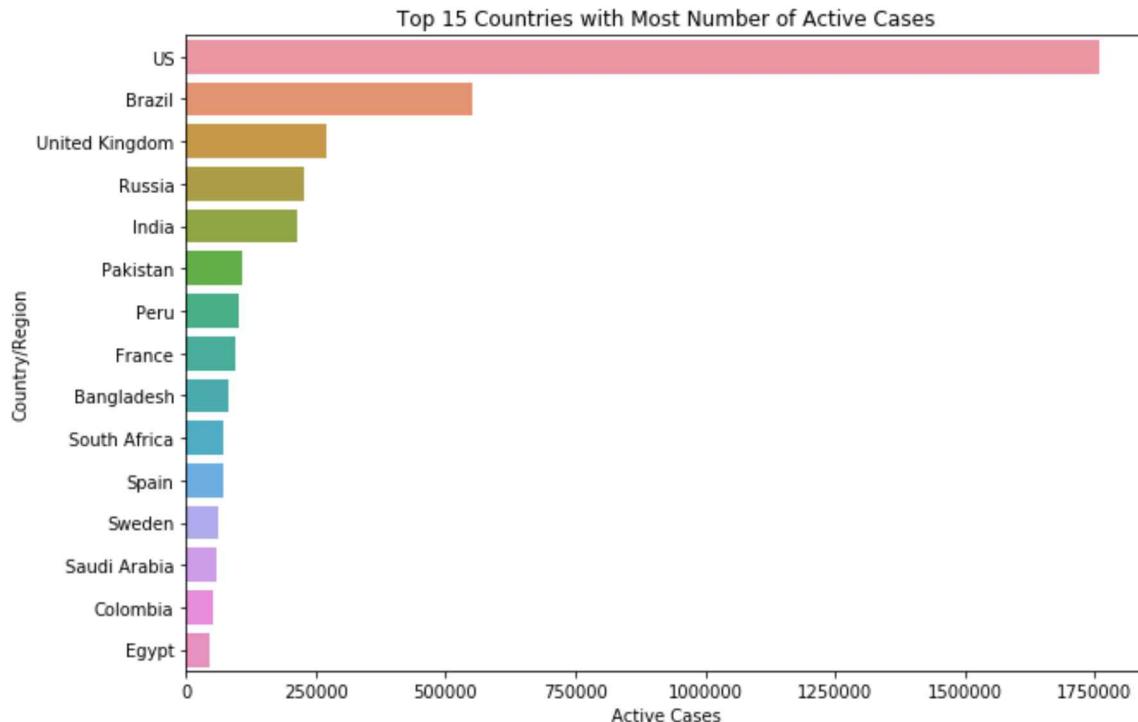
top15_active = countrywise.sort_values(['Active Cases'], ascending=False).head(15)
top15_closed = countrywise.sort_values(['Closed Cases'], ascending=False).head(15)

sns.barplot(x=top15_active['Active Cases'], y=top15_active.index, ax=ax1)
sns.barplot(x=top15_closed['Closed Cases'], y=top15_closed.index, ax=ax2)

ax1.set_title('Top 15 Countries with Most Number of Active Cases')
ax2.set_title('Top 15 Countries with Most Number of Closed Cases')
```

Out [35]:

Text(0.5, 1.0, 'Top 15 Countries with Most Number of Closed Cases')



In [36]:

```
country_date = covid.groupby(['Country/Region', 'ObservationDate']).agg({
    "Confirmed":'sum', "Recovered":'sum', "Deaths":'sum'})
confirm_rate = []
for country in countrywise.index:
    days=country_date.ix[country].shape[0] # shape[0]: 행의 개수
    confirm_rate.append((countrywise.ix[country]['Confirmed'])/days)
countrywise['Confirm Cases/Day'] = confirm_rate
```

In [37]:

```
country_date.ix[country].shape
```

Out[37]:

```
(94, 3)
```

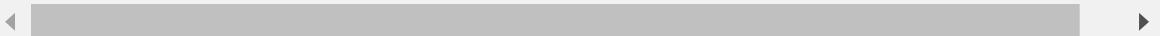
In [38]:

```
countrywise[countrywise.index=='China']
```

Out[38]:

	Confirmed	Recovered	Deaths	Mortality	Recovery	Active Cases	Closed Cases	Conf Cases/I
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Country/Region



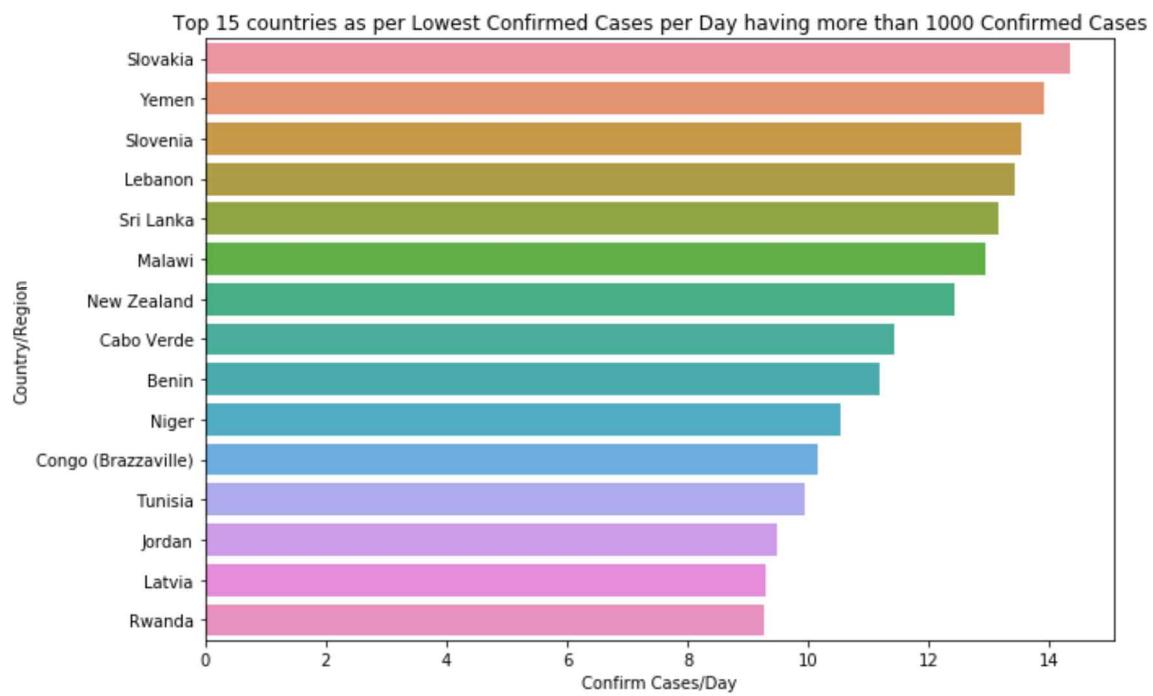
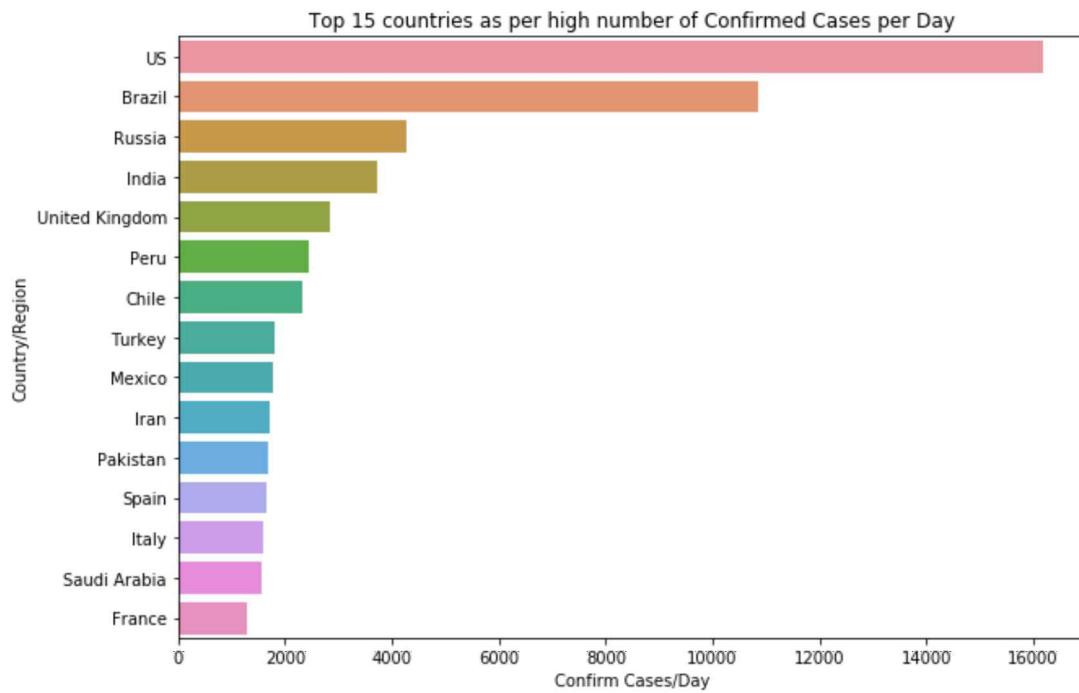
In [39]:

```
fig, (ax1, ax2) = plt.subplots(2, 1, figsize=(10, 15))
top15_ccpd = countrywise.sort_values(['Confirm Cases/Day'], ascending=False).head(15)
sns.barplot(y=top15_ccpd.index, x=top15_ccpd['Confirm Cases/Day'], ax=ax1)
ax1.set_title('Top 15 countries as per high number of Confirmed Cases per Day')

bottom15_ccpd = countrywise[countrywise['Confirmed']>1000].sort_values(['Confirm Cases/Day'], as
cending=False).tail(15)
sns.barplot(y=bottom15_ccpd.index, x=bottom15_ccpd['Confirm Cases/Day'], ax=ax2)
ax2.set_title('Top 15 countries as per Lowest Confirmed Cases per Day having more than 1000 Conf
irmed Cases')
```

Out [39]:

Text(0.5, 1.0, 'Top 15 countries as per Lowest Confirmed Cases per Day having more than 1000 Confirmed Cases')



Mainland China has recorded highest cases as their Recovery Rate is staggering recording 85%+

Confirmed Cases/Day is clear indication of why US has highest number of Active Cases currently. The rate is 11000+ cases per day. Showing increase in that value every day.

In [40]:

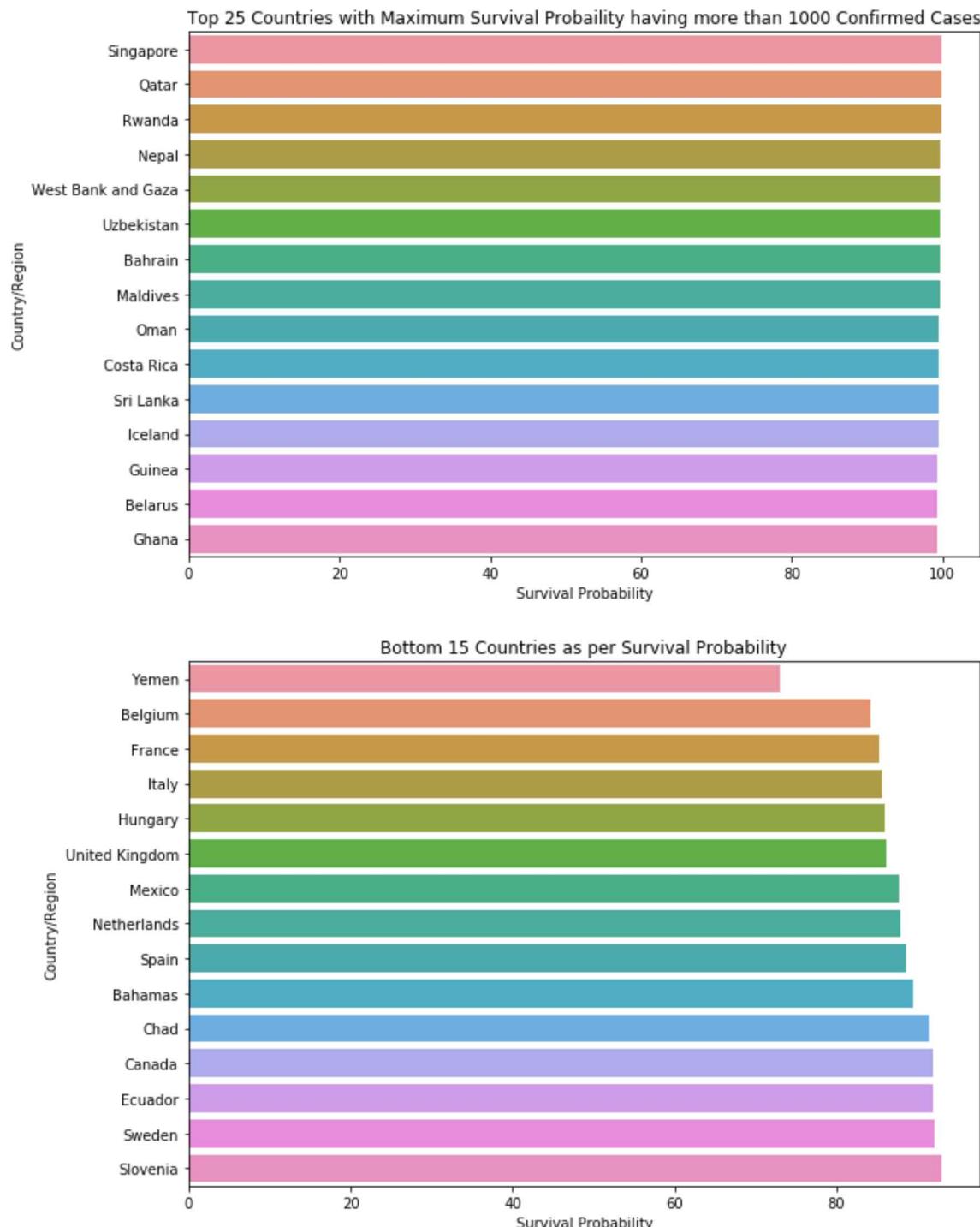
```
fig, (ax1, ax2) = plt.subplots(2, 1, figsize=(10, 15))

countrywise['Survival Probability']=(1- (countrywise['Deaths']/countrywise['Confirmed']))*100
top25_survival = countrywise[countrywise['Confirmed']>1000].sort_values(['Survival Probability'],
], ascending=False).head(15)
sns.barplot(x=top25_survival['Survival Probability'], y=top25_survival.index, ax=ax1)
ax1.set_title('Top 25 Countries with Maximum Survival Probaility having more than 1000 Confirmed Cases')

bottom15_survive = countrywise[countrywise['Confirmed']>100].sort_values(['Survival Probability'],
], ascending=True).head(15)
sns.barplot(x=bottom15_survive['Survival Probability'], y=bottom15_survive.index, ax=ax2)
plt.title('Bottom 15 Countries as per Survival Probability')

print('Mean Survival Probability across all countries', countrywise['Survival Probability'].mean())
print('Median survival Probability across all countries', countrywise['Survival Probability'].median())
print('Mean Death Probability across all countries', 100-countrywise['Survival Probability'].mean())
print('Median Death Probability across all countries', 100-countrywise['Survival Probability'].median())
```

Mean Survival Probability across all countries 96.68207885154457
Median survival Probability across all countries 97.80063310878243
Mean Death Probability across all countries 3.317921148455426
Median Death Probability across all countries 2.199366891217565



Survival Probability is the only graph that looks the most promising! Having average survival probability of 95%+ across all countries. The difference between Mean and Median Death Probability is an clear indication that there few countries with really high mortality rate e.g. Italy, Algeria, UK etc.

Journey of different Countries in COVID-19

When we see daily news reports on COVID-19 it's really hard to interpret what's actually happening, since the numbers are changing so rapidly but that's something expected from Exponential growth. Since almost all the pandemics tend to grow exponentially it's relly hard to understand for someone from a non-mathematical or non-statistical background.

We are more concerned about how we are doing and where we are heading in this pandemic rather than just looking at those exponentially growing numbers. The growth won't be exponentially forever, ar some point of time the curve will become flat because probably all the people on the planet are infected or we human have been able to control the disease.

When we are in the middle of the exponential growth it's almost impossible to twll where are we heading.

Here, I am trying to show how we can interpret the exponential growth which is the common trend among all the countries.

참고 유튜브 영상 : How To Tell If We're Beating COVID-19: [\(https://www.youtube.com/watch?v=54XLXg4fYsc\)](https://www.youtube.com/watch?v=54XLXg4fYsc)

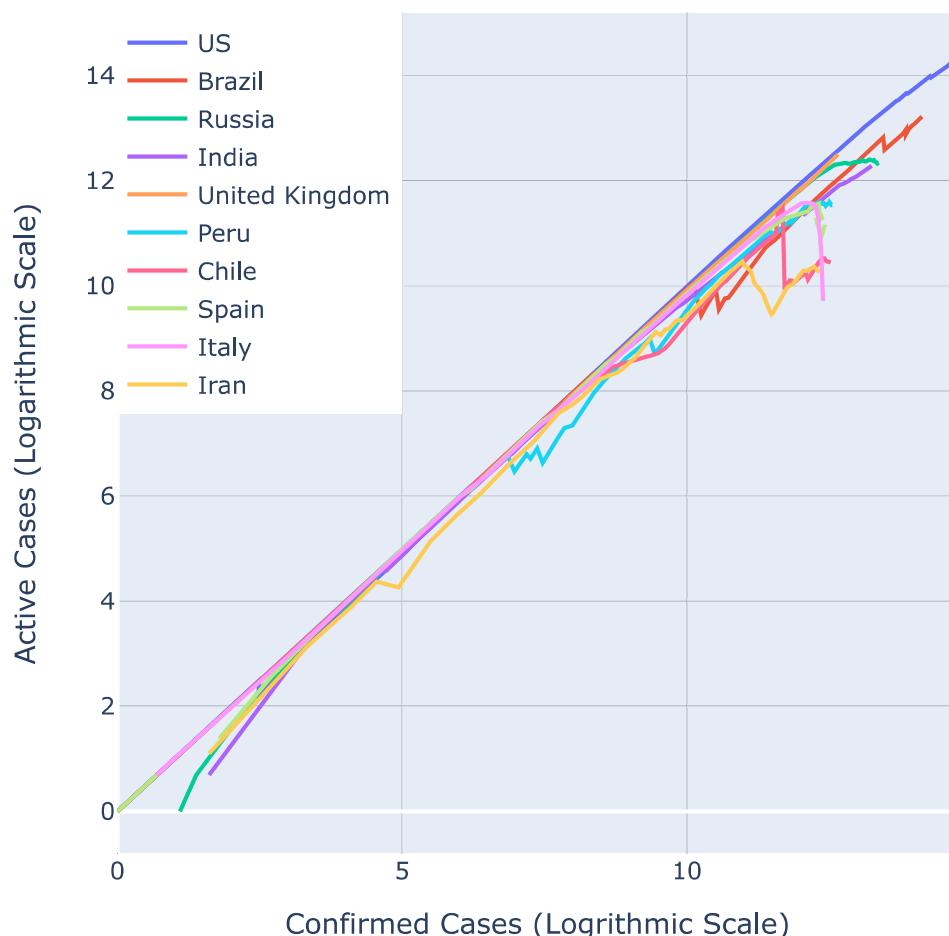
Exponential growth and epidemics: [\(https://www.youtube.com/watch?v=Kas0tIxDvrg\)](https://www.youtube.com/watch?v=Kas0tIxDvrg)

In [41]:

```
fig = go.Figure()
for country in countrywise.head(10).index:
    fig.add_trace(go.Scatter(x=grouped_country.ix[country]["log_confirmed"],
                             y=grouped_country.ix[country]['log_active'],
                             mode='lines', name=country))

fig.update_layout(height=600, title='COVID-19 Journey of Top 10 Worst Affected Countries',
                  xaxis_title='Confirmed Cases (Logarithmic Scale)', yaxis_title='Active Cases (Logarithmic Scale)',
                  legend=dict(x=0, y=1, traceorder='normal'))
fig.show()
```

COVID-19 Journey of Top 10 Worst Affected Countries



It's pretty evident that the disease is spreading in same manner everywhere, but if particular country is following pandemic controlling practices rigously the results are evident in the graph.

Most of the countries will follow the same trajectory as that USA, which is "Uncontrolled Exponential Growth"

There are few countries where the pandemic controlling practices seems to be working accurately, few classic examples are China, Germany, Italy, Spain, Turkey has started showing that dip indicating there are somehow got control over COVID-19

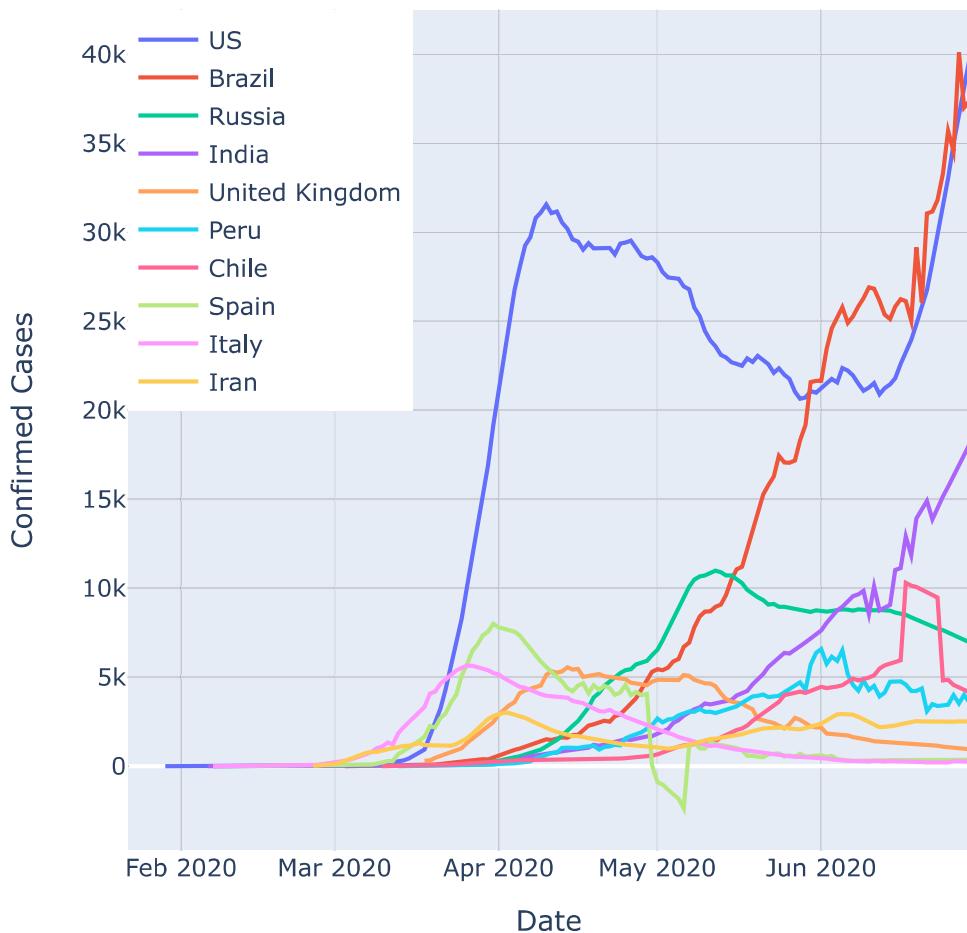
Countries like United Kingdom, Russia are following similar lines as that of United States, indicating the growth is still exponential among those countries.

Iran is showing some occasional drops.

In [42]:

```
fig = go.Figure()
for country in countrywise.head(10).index:
    fig.add_trace(go.Scatter(x=grouped_country.ix[country].index,
                             y=grouped_country.ix[country][ "Confirmed"].rolling(window=7).mean().
                             diff(),
                             mode='lines', name=country))
fig.update_layout(height=600, title='7 Days Rolling Average of Daily increase of Confirmed Case
s',
                  xaxis_title='Date', yaxis_title='Confirmed Cases',
                  legend=dict(x=0, y=1, traceorder='normal'))
fig.show()
```

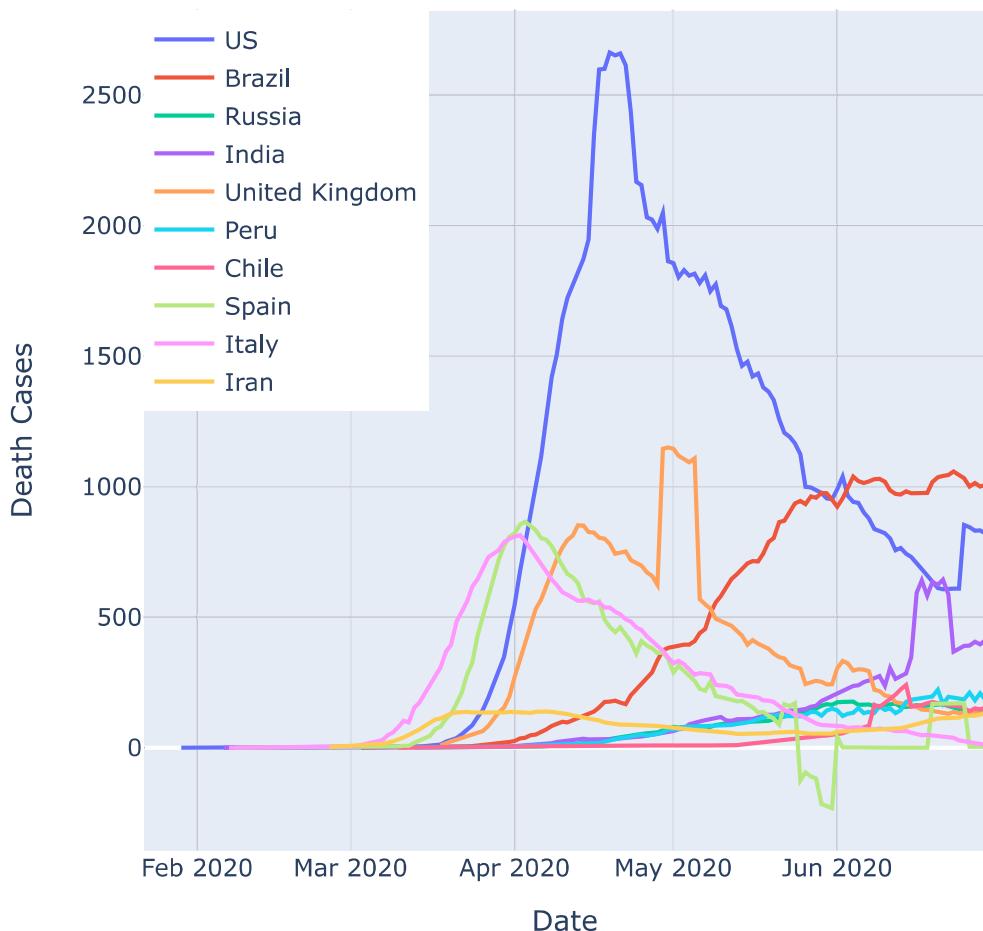
7 Days Rolling Average of Daily increase of Confirmed Cases



In [43]:

```
fig = go.Figure()
for country in countrywise.head(10).index:
    fig.add_trace(go.Scatter(x=grouped_country.ix[country].index,
                             y=grouped_country.ix[country][ "Deaths" ].rolling(window=7).mean().diff(),
                             mode='lines', name=country))
fig.update_layout(height=600, title='7 Days Rolling Average of Daily increase of Death Cases',
                  xaxis_title="Date", yaxis_title='Death Cases',
                  legend=dict(x=0, y=1, traceorder='normal'))
fig.show()
```

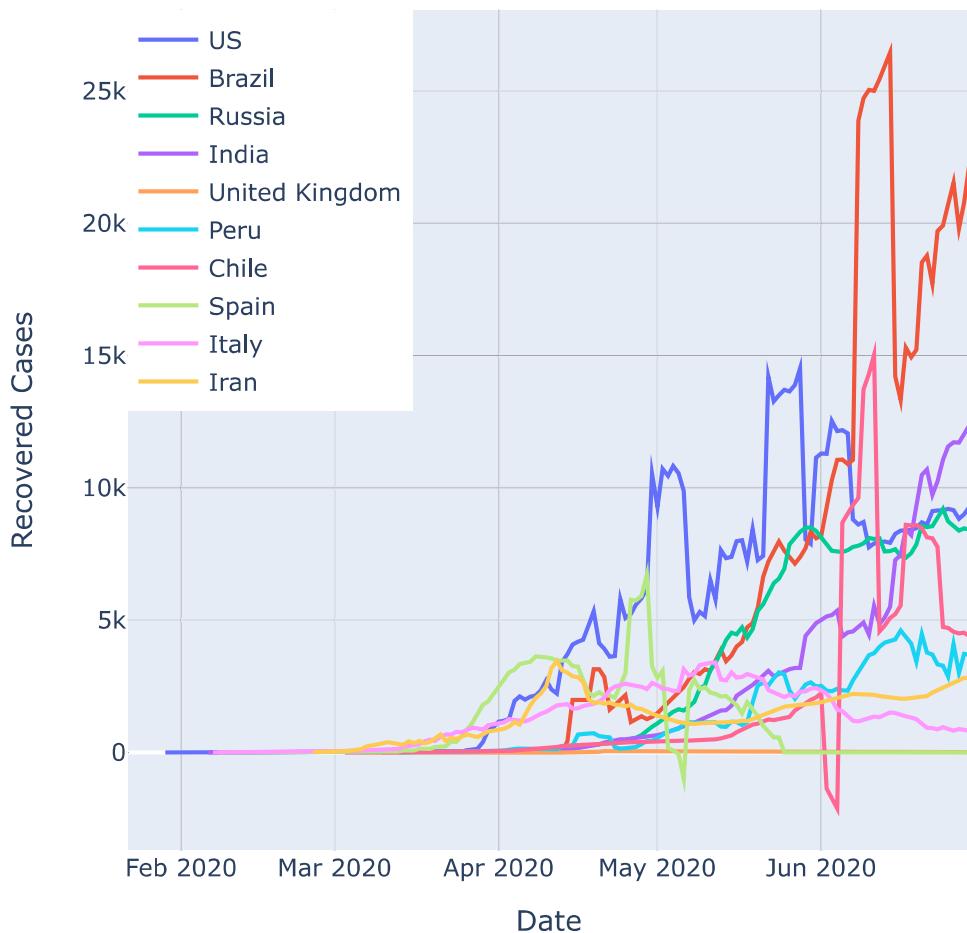
7 Days Rolling Average of Daily increase of Death Cases



In [44]:

```
fig = go.Figure()
for country in countrywise.head(10).index:
    fig.add_trace(go.Scatter(x=grouped_country.ix[country].index,
                             y=grouped_country.ix[country][["Recovered"]].rolling(window=7).mean().diff(),
                             mode='lines', name=country))
fig.update_layout(height=600, title='7 Days Rolling Average of Daily increase of Recovered Case s',
                  xaxis_title='Date', yaxis_title='Recovered Cases',
                  legend=dict(x=0, y=1, traceorder='normal'))
fig.show()
```

7 Days Rolling Average of Daily increase of Recovered Cases



In []:

Export File

In [45]:

countrywise.head()

Out [45]:

Country/Region		Confirmed	Recovered	Deaths	Mortality	Recovery	Active Cases	Closed Cases
US		2590651.0	705203.0	126140.0	4.869046	27.221073	1759308.0	831343.0
Brazil		1368195.0	757811.0	58314.0	4.262112	55.387646	552070.0	816125.0
Russia		640246.0	402778.0	9152.0	1.429451	62.909882	228316.0	411930.0
India		566840.0	334822.0	16893.0	2.980206	59.068167	215125.0	351715.0
United Kingdom		313470.0	1368.0	43659.0	13.927649	0.436405	268443.0	45027.0

In [46]:

countrywise.to_csv('countrywise.csv', sep=',', na_rep='NaN')

In []: