ANALYSIS OF COVID19 OUTBREAK

In [37]:
```
import pandas as pd
import seaborn as sns
import numpy as np
import matplotlib.pyplot as plt
```

In [79]:
```
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')
deaths_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')
recoveries_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 [98]:
```
confirmed_df.head()
```

Out[98]:

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

5 rows × 57 columns

In [100]:
```
recoveries_df.head()
```

Out[100]:

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

5 rows × 55 columns

In [101]:
```
deaths_df.head()
```

Out[101]:

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

5 rows × 55 columns

Since the data is updated regularly and the most recent date is the last column of the dataset, the code below would help extract the most recent date

In [88]:
```
most_recent=confirmed_df.columns[-1]
```

The code below creates pivot tables for the different datasets

In [83]:
```
conf1 = pd.pivot_table(confirmed_df, values=most_recent, index=['Country/Region'], aggfunc=np.sum)
recov1=pd.pivot_table(recoveries_df, values=most_recent, index=['Country/Region'], aggfunc=np.sum)
dead1=pd.pivot_table(deaths_df, values=most_recent, index=['Country/Region'], aggfunc=np.sum)
```

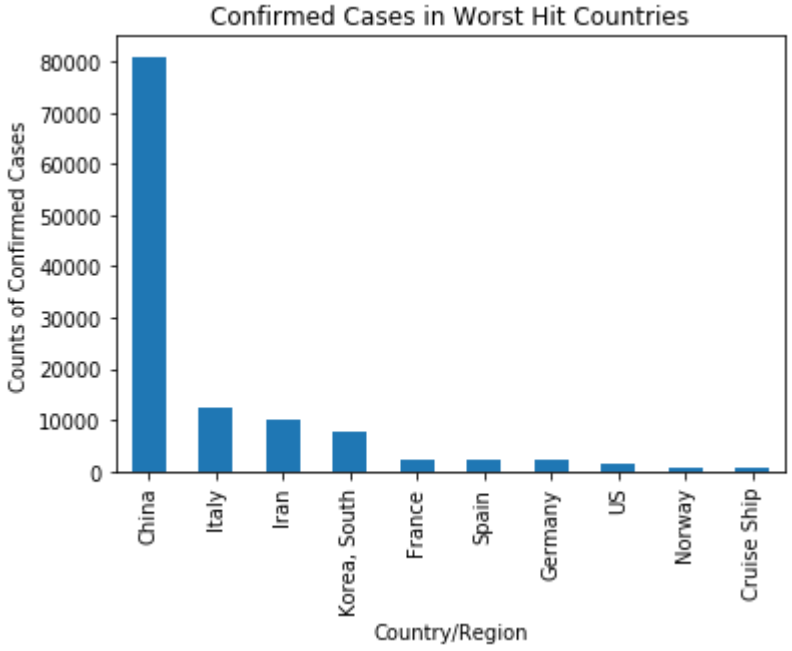
The 3 Pivot tables were merged on the left with their corresponding indices (Country/Region) to form a single table.

In [85]:
```
mergedDf = conf1.merge(recov1[most_recent], left_index=True, right_index=True)

mergedDf = mergedDf.merge(dead1[most_recent], left_index=True, right_index=True)
```

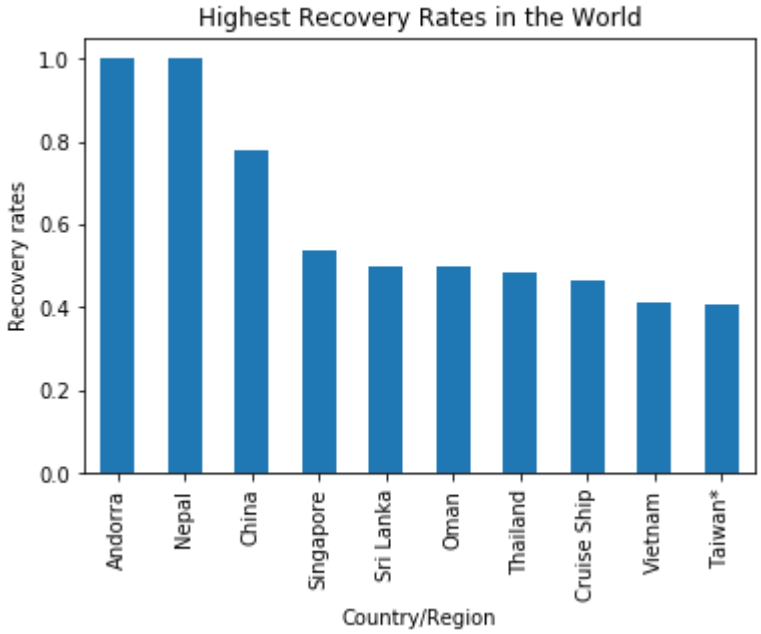
In [87]:
```
cases=mergedDf.iloc[:,0]
recovered=mergedDf.iloc[:,1]
dead=mergedDf.iloc[:,2]
mergedDf['recovery_rate']=recovered/cases
mergedDf['death_rate']=dead/cases
mergedDf['cases']=cases
```

In [92]:
```
tab=mergedDf['cases'].sort_values(ascending=False).head(10)
tab.plot(kind='bar')
plt.ylabel("Counts of Confirmed Cases")
plt.title("Confirmed Cases in Worst Hit Countries")
ind=tab.index
```



In [94]:
```
tab2=mergedDf['recovery_rate'].sort_values(ascending=False).head(10)
tab2.plot(kind='bar')
plt.ylabel("Recovery rates")
plt.title("Highest Recovery Rates in the World")
```

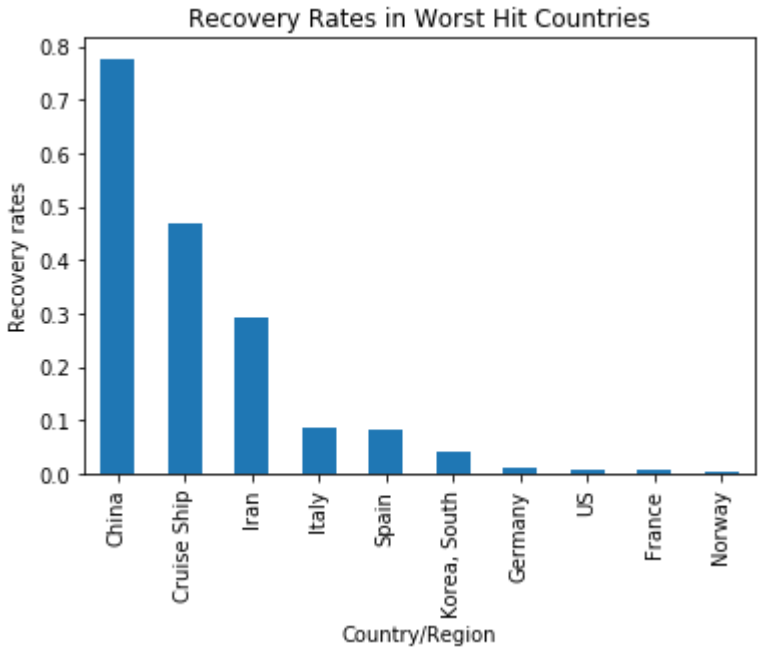
Out[94]: Text(0.5, 1.0, 'Highest Recovery Rates in the World')



In [ ]:
```
```

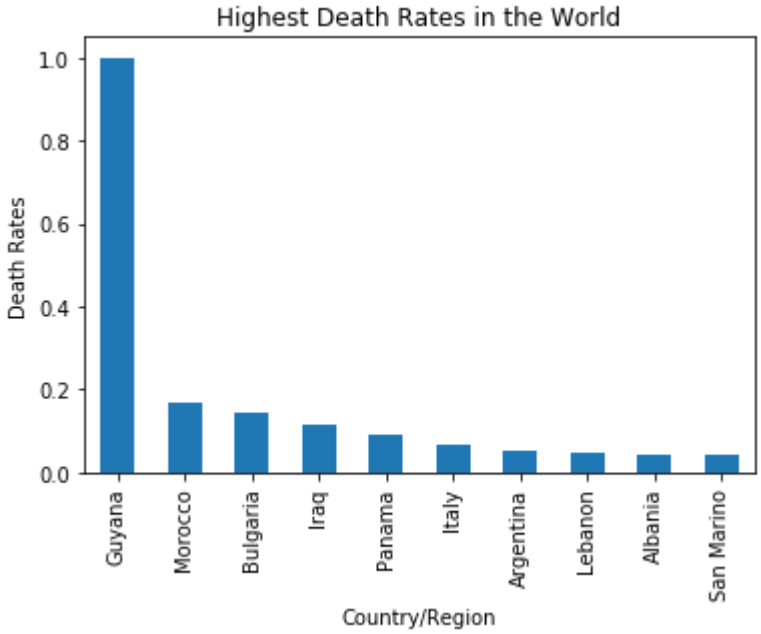
In [95]:
```
tab22=mergedDf['recovery_rate'].loc[ind].sort_values(ascending=False)
tab22.plot(kind='bar')
plt.ylabel("Recovery rates")
plt.title("Recovery Rates in Worst Hit Countries")
```

Out[95]: Text(0.5, 1.0, 'Recovery Rates in Worst Hit Countries')



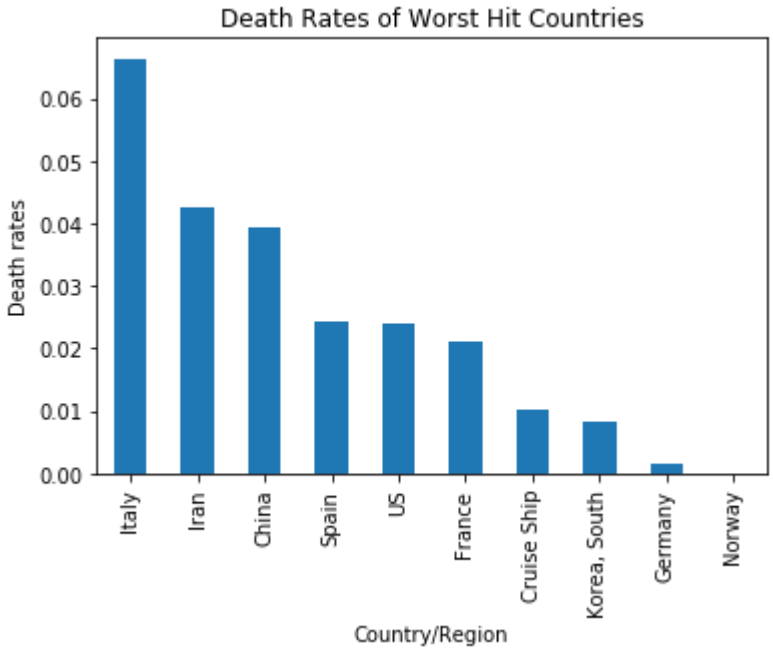
In [96]:
```
tab3=mergedDf['death_rate'].sort_values(ascending=False).head(10)
tab3.plot(kind='bar')
plt.ylabel("Death Rates")
plt.title("Highest Death Rates in the World")
```

Out[96]: Text(0.5, 1.0, 'Highest Death Rates in the World')



In [97]:
```
tab33=mergedDf['death_rate'].loc[ind].sort_values(ascending=False)
tab33.plot(kind='bar')
plt.ylabel("Death rates")
plt.title("Death Rates of Worst Hit Countries")
```

Out[97]: Text(0.5, 1.0, 'Death Rates of Worst Hit Countries')



In [104]:
```
recov1=pd.pivot_table(recoveries_df, index=['Country/Region'], aggfunc=np.sum)
```

In [107]:
```
d=recov1.loc[['Italy'],'1/22/20':most_recent].transpose()
dd=pd.pivot_table(d,index=['Italy'], aggfunc=np.sum)
```

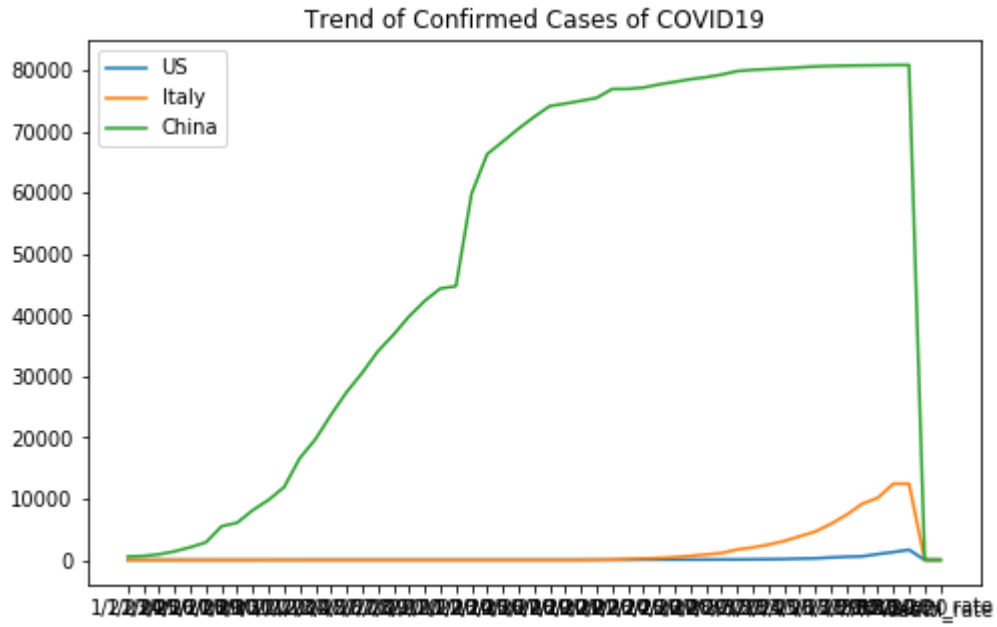
In [146]:
```
CC=confirmed_df.drop(['Lat','Long','Province/State'],axis=1).groupby('Country/Region').sum()
RR=recoveries_df.drop(['Lat','Long','Province/State'],axis=1).groupby('Country/Region').sum()
DD=deaths_df.drop(['Lat','Long','Province/State'],axis=1).groupby('Country/Region').sum()
```

In [120]:
```
ax1.plot(CC.loc['US'])
```

Out[120]:
```
[<matplotlib.lines.Line2D at 0x1b8e74f5e88>]
```

In [139]:
```
#plt.figure(figsize=(20,20))
fig = plt.figure(figsize=(8,5))
ax = fig.add_subplot(1, 1, 1)
#ax2 = fig.add_subplot(1, 1, 1)
#ax3 = fig.add_subplot(1, 1, 1)
#ax1.plot(dd)
#ax2.plot(CC.loc['Italy'])
ax.plot(CC.loc['US'],label='US')
ax.plot(CC.loc['Italy'],label='Italy')
ax.plot(CC.loc['China'],label='China')
plt.title('Trend of Confirmed Cases of COVID19')
ax.legend()
```

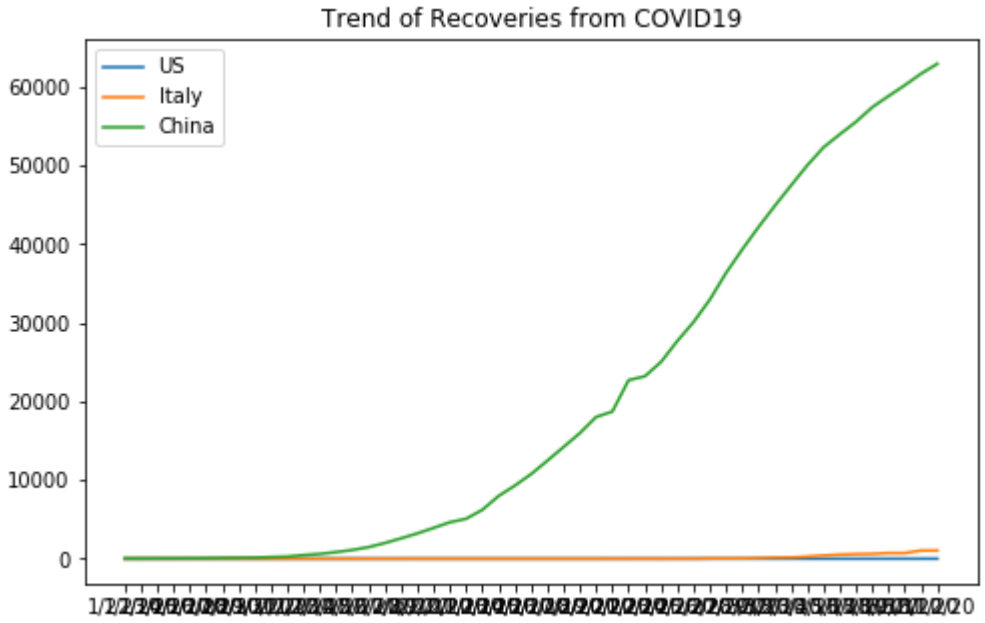
Out[139]:
```
<matplotlib.legend.Legend at 0x1b8e98a6408>
```



In [150]:
```
#plt.figure(figsize=(20,20))
fig = plt.figure(figsize=(8,5))
ax = fig.add_subplot(1, 1, 1)

ax.plot(RR.loc['US'],label='US')
ax.plot(RR.loc['Italy'],label='Italy')
ax.plot(RR.loc['China'],label='China')
plt.title('Trend of Recoveries from COVID19')
ax.legend()
```

Out[150]: <matplotlib.legend.Legend at 0x1b8eaf46b88>



In [148]:
```
#plt.figure(figsize=(20,20))
fig = plt.figure(figsize=(8,5))
ax = fig.add_subplot(1, 1, 1)
ax.plot(DD.loc['US'],label='US')
ax.plot(DD.loc['Italy'],label='Italy')
ax.plot(DD.loc['China'],label='China')
plt.title('Trend of Deaths from COVID19')
ax.legend()
```

Out[148]: <matplotlib.legend.Legend at 0x1b8e9d99908>