The intent of this exercise is to show you the Big Data Pipeline by writing some code that will accomplish

We are going to obtain data from an external web resources, clean the data, visualize the data and then store the data in CSV format which could be pushed out and loaded on cloud or a database.

Our intent is to obtain the information on current GDP of countries and the population statistics of the countries. These details are available from www.worldometers.info (http://www.worldometers.info). But they are available as two different set of information. You will access the data from the two sets, clean them, put them together, create visualizations and then save the new .csv.

Step 1 - Install required packages

In [7]:
```
!pip install requests
!pip install beautifulsoup4
# !pip install JSON
```

```
Requirement already satisfied: requests in d:\snakeconda\lib\site-packages (2.25.1)
Requirement already satisfied: chardet<5,>=3.0.2 in d:\snakeconda\lib\site-packages (from requests) (4.0.0)
Requirement already satisfied: certifi>=2017.4.17 in d:\snakeconda\lib\site-packages (from requests) (2020.
12.5)
Requirement already satisfied: idna<3,>=2.5 in d:\snakeconda\lib\site-packages (from requests) (2.10)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in d:\snakeconda\lib\site-packages (from requests) (1.
26.4)
Requirement already satisfied: beautifulsoup4 in d:\snakeconda\lib\site-packages (4.9.3)
Requirement already satisfied: soupsieve>1.2 in d:\snakeconda\lib\site-packages (from beautifulsoup4) (2.2.
1)
```

Step 2 - Import the packages required for this exercise

In [8]:
```
import pandas as pd
from IPython.core.display import HTML
import requests
from bs4 import BeautifulSoup
import bs4
import json
from datetime import date
```

Step 3 - From the remote URL [https://www.worldometers.info/gdp/gdp-per-capita/ (https://www.worldometers.info/gdp/gdp-per-capita/)](https://www.worldometers.info/gdp/gdp-per-capita/) read the GDP data we require. requests.get(URL) gets the entire content of a remote URL as a string. Visit the URL on your browser to familiarise the data.

In [9]:

```
#Beautiful Soup is a Python library
#that is used for web scraping purposes to pull
#the data out of HTML and XML files.

URL="https://www.worldometers.info/gdp/gdp-per-capita/"
page = requests.get(URL)
soup = BeautifulSoup(page.content, 'html.parser')
stats_tbl = soup.find("table")
```

Step 4 - Parse the string data to only extract the information we require

In [10]:

```
def parse_table(tbl,cols):
    rows = []
    trows = tbl.find_all("tr")
    for tr in trows[1:]:
        row = []
        for td in tr.children:
            if isinstance(td,bs4.element.Tag):
                for data in td.children:
                    if isinstance(data,bs4.element.Tag):
                        for innerHTML in data.children:
                            row.append(innerHTML)
                    else:
                        row.append(data)
        rows.append(row)

    return pd.DataFrame(rows,columns=cols)

df = parse_table(stats_tbl,["Ranking","Country","GDP (PPP) per capita","GDP (nominal) per capita","vs. World
```

Step 5 - Print the head of the dataframe object to see what the data collected looks like

In [11]:
```
df.head()
```

Out[11]:

	Ranking	Country	GDP (PPP) per capita	GDP (nominal) per capita	vs. World PPP GDP per capita
0	1	Qatar	$128,647	$61,264	752%
1	2	Macao	$115,367	$80,890	675%
2	3	Luxembourg	$107,641	$105,280	629%
3	4	Singapore	$94,105	$56,746	550%
4	5	Brunei	$79,003	$28,572	462%

Step 6 - Clean and Process the data to suit our purpose

In [12]:
```
# The data is present with $ sign and ,. This needs to be converted to numeric data

df['GDP (PPP) per capita'] = df['GDP (PPP) per capita'].str.replace("$","")

df['GDP (PPP) per capita'] = df['GDP (PPP) per capita'].str.replace(",","")

df['GDP (PPP) per capita'] = df['GDP (PPP) per capita'].str.replace("N.A.","0")

df['GDP (PPP) per capita'] = df['GDP (PPP) per capita'].astype(int)
```

```
<ipython-input-12-a25f8e7856ef>:3: FutureWarning: The default value of regex will change from True to False
in a future version. In addition, single character regular expressions will*not* be treated as literal stri
ngs when regex=True.
  df['GDP (PPP) per capita'] = df['GDP (PPP) per capita'].str.replace("$","")
<ipython-input-12-a25f8e7856ef>:7: FutureWarning: The default value of regex will change from True to False
in a future version.
  df['GDP (PPP) per capita'] = df['GDP (PPP) per capita'].str.replace("N.A.","0")
```

Step 7 - Clean and Process the data to suit our purpose (continued)

In [13]:

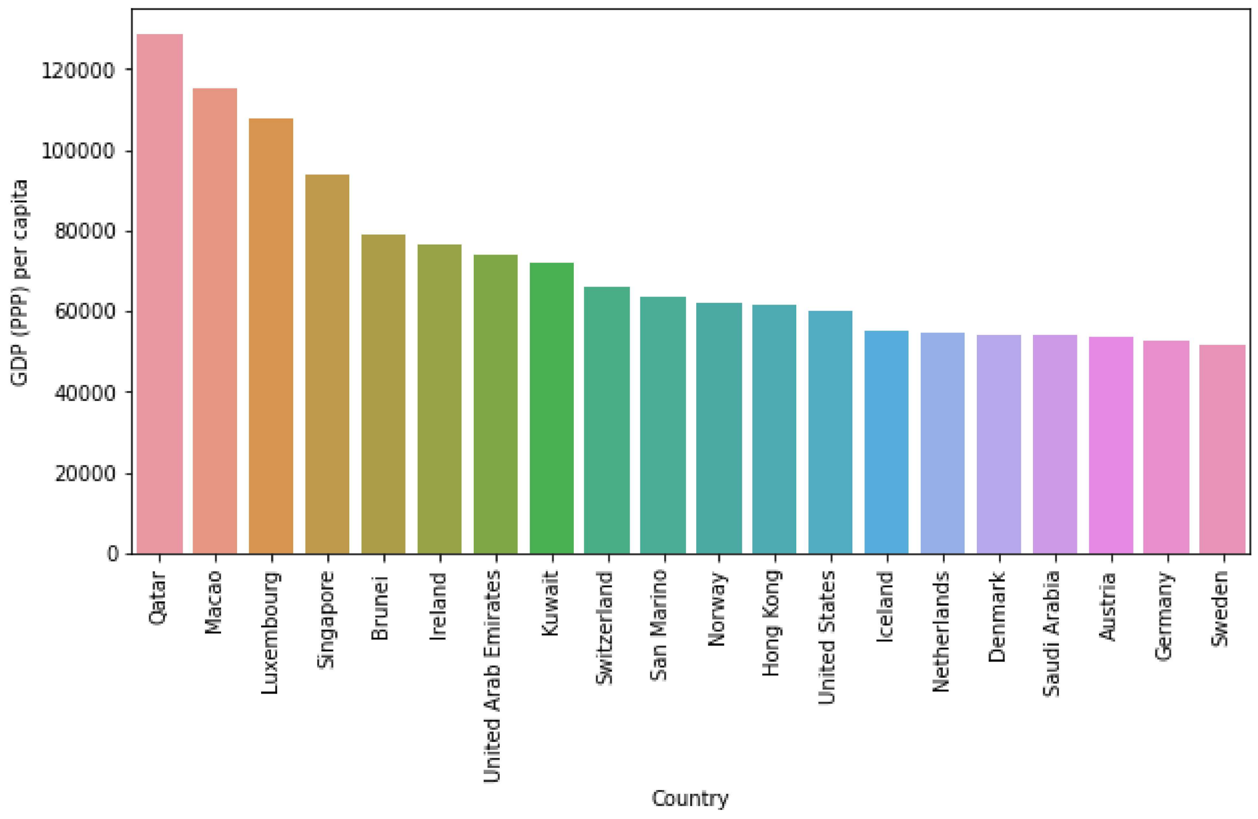
```
df['GDP (nominal) per capita'] = df['GDP (nominal) per capita'].str.replace("$","")
df['GDP (nominal) per capita'] = df['GDP (nominal) per capita'].str.replace(",","")
df['GDP (nominal) per capita'] = df['GDP (nominal) per capita'].str.replace("N.A.","0")
df['GDP (nominal) per capita'] = df['GDP (nominal) per capita'].astype(int)
```

```
<ipython-input-13-d2feb7e4b8c6>:1: FutureWarning: The default value of regex will change from True to False
in a future version. In addition, single character regular expressions will*not* be treated as literal stri
ngs when regex=True.
  df['GDP (nominal) per capita'] = df['GDP (nominal) per capita'].str.replace("$","")
<ipython-input-13-d2feb7e4b8c6>:3: FutureWarning: The default value of regex will change from True to False
in a future version.
  df['GDP (nominal) per capita'] = df['GDP (nominal) per capita'].str.replace("N.A.","0")
```

Step 8 - Import visualization packages and Visualize the data

In [14]:
```
import matplotlib.pyplot as plt
import seaborn as sns

gdps = df['GDP (PPP) per capita'][0:20]
countries = df['Country'][0:20]

plt.figure(figsize=(10,5))
plot = sns.barplot(countries, gdps)

plot.set_xticklabels(countries, rotation=90)

plt.show()
```

```
D:\SnakeConda\lib\site-packages\seaborn\_decorators.py:36: FutureWarning: Pass the following variables as k
eyword args: x, y. From version 0.12, the only valid positional argument will be `data`, and passing other
arguments without an explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```



Step 9 - Obtain the information on population. Just as we did earlier, we obtain the information from [http://worldometers.info/world-population (http://worldometers.info/world-population)](http://worldometers.info/world-population). Feel free to visit the URL and familiarise yourself with the data.

In [15]:

```
URL="http://worldometers.info/world-population"
page = requests.get(URL)
soup = BeautifulSoup(page.content, 'html.parser')
stats_tbl = soup.find(id="popbycountry")
```

Step 10 - Parse the data and generate a dataframe from the data available in the link

In [16]:

```
ıange","Net Change", "People per KMSq","Land Area","Migrants","Fertility Rate","Median Age","Urban Population
```

Step 11 - See the newly created dataframe

In [17]:
```
df2.head(10)
```

Out[17]:

	Pop Rank	Country	Population 2020	Yearly Change	Net Change	People per KMSq	Land Area	Migrants	Fertility Rate	Median Age	Urban Population	World Share
0	1	China	1,439,323,776	0.39 %	5,540,090	153	9,388,211	-348,399	1.69	38	60.8 %	18.5 %
1	2	India	1,380,004,385	0.99 %	13,586,631	464	2,973,190	-532,687	2.2402	28	35 %	17.7 %
2	3	United States	331,002,651	0.59 %	1,937,734	36	9,147,420	954,806	1.7764	38	82.8 %	4.2 %
3	4	Indonesia	273,523,615	1.07 %	2,898,047	151	1,811,570	-98,955	2.3195	30	56.4 %	3.5 %
4	5	Pakistan	220,892,340	2 %	4,327,022	287	770,880	-233,379	3.55	23	35.1 %	2.8 %
5	6	Brazil	212,559,417	0.72 %	1,509,890	25	8,358,140	21,200	1.74	33	87.6 %	2.7 %
6	7	Nigeria	206,139,589	2.58 %	5,175,990	226	910,770	-60,000	5.4168	18	52 %	2.6 %
7	8	Bangladesh	164,689,383	1.01 %	1,643,222	1,265	130,170	-369,501	2.052	28	39.4 %	2.1 %
8	9	Russia	145,934,462	0.04 %	62,206	9	16,376,870	182,456	1.8205	40	73.7 %	1.9 %
9	10	Mexico	128,932,753	1.06 %	1,357,224	66	1,943,950	-60,000	2.14	29	83.8 %	1.7 %

Step 12 - Clean and process the data in desired format

In [18]:
```
df2['Population 2020'] = df2['Population 2020'].str.replace(",","")
df2['Population 2020'] = df2['Population 2020'].astype(int)

df2['Net Change'] = df2['Net Change'].str.replace(",","")
df2['Net Change'] = df2['Net Change'].astype(int)


df2['Land Area'] = df2['Land Area'].str.replace(",","")
df2['Land Area'] = df2['Land Area'].astype(int)

df2['Migrants'] = df2['Migrants'].str.replace(",","")
df2['Migrants'] = df2['Migrants'].replace(" ", "0")
df2['Migrants'] = df2['Migrants'].astype(int)

df2['Median Age'] = df2['Median Age'].replace("N.A.", "0")

df2['Median Age'] = df2['Median Age'].astype(int)

df2['Pop Rank'] = df2['Pop Rank'].astype(int)
```

Step 13 - Merge the two dataframes based on the column which has the same value - "Country"

In [19]:
```
df_new = df.merge(df2,on="Country")
```

Step 14 - Check the data that is present in the newly formed dataframe, which has merged the GDP data and the population data

In [20]:
```
df_new.head(2).transpose()
```

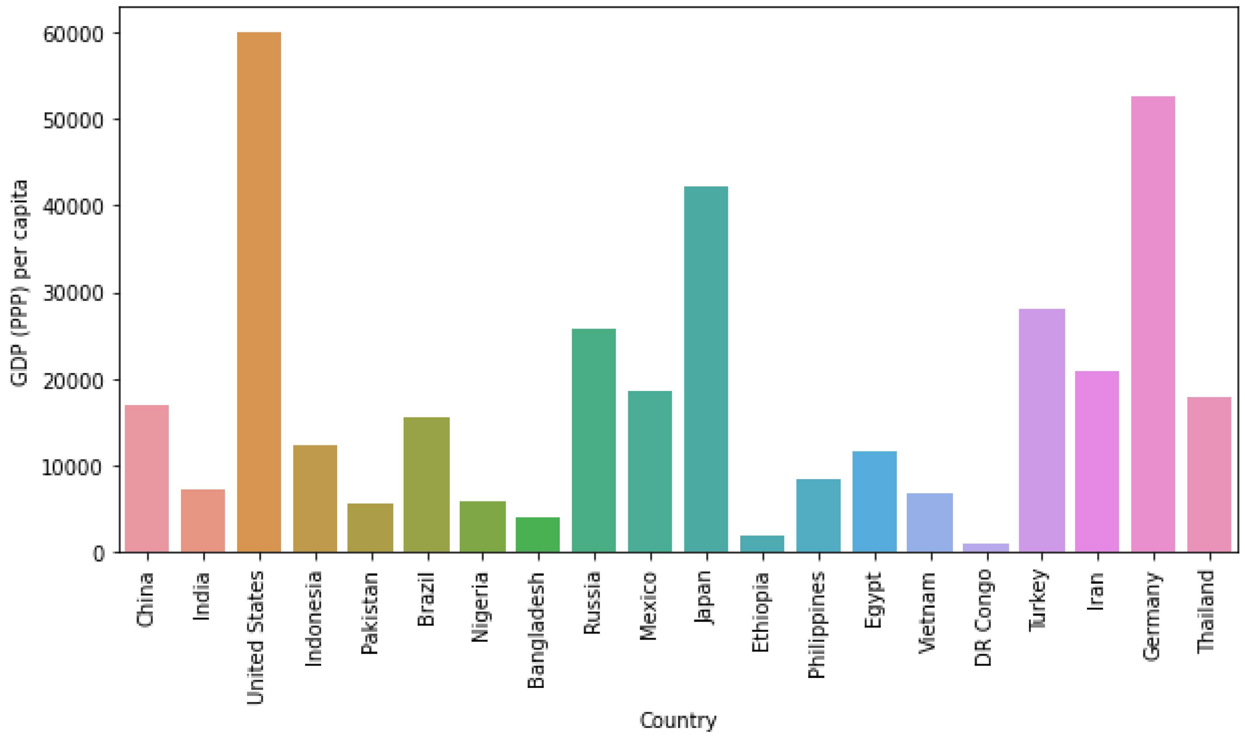
Out[20]:

	0	1
Ranking	1	2
Country	Qatar	Macao
GDP (PPP) per capita	128647	115367
GDP (nominal) per capita	61264	80890
vs. World PPP GDP per capita	752%	675%
Pop Rank	139	167
Population 2020	2881053	649335
Yearly Change	1.73 %	1.39 %
Net Change	48986	8890
People per KMSq	248	21,645
Land Area	11610	30
Migrants	40000	5000
Fertility Rate	1.8805	1.2
Median Age	32	39
Urban Population	96.2 %	N.A.
World Share	0 %	0 %

Step 15 - Visualize the GDP data just as before, but this time in the order of population ranking.

In [21]:
```
df_temp = df_new.sort_values(["Pop Rank"], axis=0,
                 ascending=True)
gdps = df_temp['GDP (PPP) per capita'][0:20]
countries = df_temp['Country'][0:20]
plt.figure(figsize=(10,5))
plot = sns.barplot(countries, gdps)
plot.set_xticklabels(countries, rotation=90)
plt.show()
```

```
D:\SnakeConda\lib\site-packages\seaborn\_decorators.py:36: FutureWarning: Pass the following variables as k
eyword args: x, y. From version 0.12, the only valid positional argument will be `data`, and passing other
arguments without an explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```



Step 16 - Save the data to a CSV file with today's timestamp.

In [22]:

```
timestamp = date.today().strftime("%d_%m_%Y")
df_new.to_csv("Details"+timestamp+".csv")
```