

```
In [1]: import pandas as pd
import matplotlib.pyplot as plt
```

```
In [2]: df_suicide = pd.read_csv("suicide-rates-1985-to-2016-dataset.csv")
```

```
In [3]: df_suicide.head()
```

```
Out[3]:
```

	country	year	sex	age	suicides_no	population	suicides/100k pop	country-year	HDI for year	gdp_for_year (\$)	gdp_per_capita (\$)	generation
0	Albania	1987	male	15-24 years	21	312900	6.71	Albania1987	NaN	2,156,624,900	796	Generation X
1	Albania	1987	male	35-54 years	16	308000	5.19	Albania1987	NaN	2,156,624,900	796	Silent
2	Albania	1987	female	15-24 years	14	289700	4.83	Albania1987	NaN	2,156,624,900	796	Generation X
3	Albania	1987	male	75+ years	1	21800	4.59	Albania1987	NaN	2,156,624,900	796	G.I. Generation
4	Albania	1987	male	25-34 years	9	274300	3.28	Albania1987	NaN	2,156,624,900	796	Boomers

```
In [4]: df_country = pd.read_csv("countryContinent.csv", encoding='ISO-8859-1')
df_country.head()
```

```
Out[4]:
```

	country	code_2	code_3	country_code	iso_3166_2	continent	sub_region	region_code	sub_region_code
0	Afghanistan	AF	AFG	4	ISO 3166-2:AF	Asia	Southern Asia	142.0	34.0
1	Åland Islands	AX	ALA	248	ISO 3166-2:AX	Europe	Northern Europe	150.0	154.0
2	Albania	AL	ALB	8	ISO 3166-2:AL	Europe	Southern Europe	150.0	39.0
3	Algeria	DZ	DZA	12	ISO 3166-2:DZ	Africa	Northern Africa	2.0	15.0
4	American Samoa	AS	ASM	16	ISO 3166-2:AS	Oceania	Polynesia	9.0	61.0

```
In [5]: def find_mismatch (array_1, array_2, only_out=True):
    for i in array_1.unique():
        if i in array_2.unique():
            pass
        else:
            print("Not have :",i)

find_mismatch(df_suicide.country, df_country.country, True)
```

```
Not have : Macau
Not have : Republic of Korea
Not have : Saint Vincent and Grenadines
Not have : United Kingdom
Not have : United States
```

```
In [6]: df_country.loc[df_country.country.str.contains("Maca"), 'country'] = 'Macau'
df_country.loc[118, 'country'] = 'Republic of Korea'
df_country.loc[df_country.country.str.contains("Vincent"), 'country'] = 'Saint Vincent and Grenadines'
df_country.loc[df_country.country.str.contains("King"), 'country'] = 'United Kingdom'
df_country.loc[df_country.country.str.contains("United States of America"), 'country'] = 'United States'

find_mismatch(df_suicide.country, df_country.country, True)
```

```
In [7]: df_suicide_new = df_suicide.merge(df_country[['country', 'continent']])
df_suicide_new.head()
```

```
Out[7]:
```

	country	year	sex	age	suicides_no	population	suicides/100k pop	country-year	HDI for year	gdp_for_year (\$)	gdp_per_capita (\$)	generation	continent
0	Albania	1987	male	15-24 years	21	312900	6.71	Albania1987	NaN	2,156,624,900	796	Generation X	Europe
1	Albania	1987	male	35-54 years	16	308000	5.19	Albania1987	NaN	2,156,624,900	796	Silent	Europe
2	Albania	1987	female	15-24 years	14	289700	4.83	Albania1987	NaN	2,156,624,900	796	Generation X	Europe
3	Albania	1987	male	75+ years	1	21800	4.59	Albania1987	NaN	2,156,624,900	796	G.I. Generation	Europe
4	Albania	1987	male	25-34 years	9	274300	3.28	Albania1987	NaN	2,156,624,900	796	Boomers	Europe

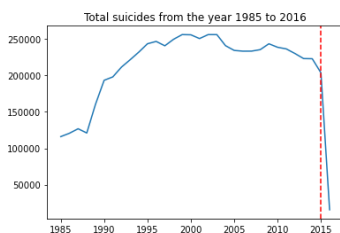
```
In [8]: df_suicide_new.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 27820 entries, 0 to 27819
Data columns (total 13 columns):
#   Column                Non-Null Count  Dtype
---  ---
0   country                27820 non-null  object
1   year                  27820 non-null  int64
2   sex                   27820 non-null  object
3   age                   27820 non-null  object
4   suicides_no           27820 non-null  int64
5   population             27820 non-null  int64
6   suicides/100k pop     27820 non-null  float64
7   country-year           27820 non-null  object
8   HDI for year           8364 non-null   float64
9   gdp_for_year ($)       27820 non-null  object
10  gdp_per_capita ($)     27820 non-null  int64
11  generation             27820 non-null  object
12  continent              27820 non-null  object
dtypes: float64(2), int64(4), object(7)
memory usage: 3.0+ MB
```

```
In [9]: # make plot for total suicide number by year
year = df_suicide['year'].sort_values().unique()
df = df_suicide[['year', 'suicides_no']].groupby(['year']).sum()
df.reset_index(inplace=True) # reset index

plt.plot(df['year'], df['suicides_no'])
plt.title("Total suicides from the year 1985 to 2016")
plt.axvline(x = 2015, color = 'red', ls = '--')
```

```
Out[9]: <matplotlib.lines.Line2D at 0x28e35f19520>
```



```
In [10]: # drop year = 2016
print('before 2016 data drop: ', df_suicide_new.shape)
df_suicide_new.drop(df_suicide_new[df_suicide_new['year'] == 2016].index, inplace = True)
print('after 2016 data drop: ', df_suicide_new.shape)
```

```
before 2016 data drop: (27820, 13)
after 2016 data drop: (27660, 13)
```

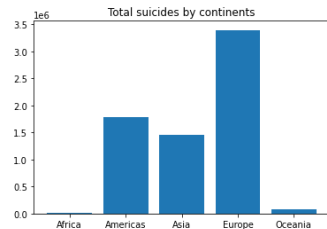
```
In [11]: # make sure all year = 2016 is dropped
len(df_suicide_new[df_suicide_new['year'] == 2016])
```

Out[11]: 0

```
In [12]: continent = df_suicide_new[['continent', 'suicides_no']].groupby(['continent']).sum()
continent.reset_index(inplace=True)

plt.bar(continent['continent'], continent['suicides_no'])
plt.title("Total suicides by continents")
```

Out[12]: Text(0.5, 1.0, 'Total suicides by continents')



```
In [13]: df_suicide_new['country'].unique()
```

Out[13]: array(['Albania', 'Antigua and Barbuda', 'Argentina', 'Armenia', 'Aruba', 'Australia', 'Austria', 'Azerbaijan', 'Bahamas', 'Bahrain', 'Barbados', 'Belarus', 'Belgium', 'Belize', 'Bosnia and Herzegovina', 'Brazil', 'Bulgaria', 'Cabo Verde', 'Canada', 'Chile', 'Colombia', 'Costa Rica', 'Croatia', 'Cuba', 'Cyprus', 'Czech Republic', 'Denmark', 'Dominica', 'Ecuador', 'El Salvador', 'Estonia', 'Fiji', 'Finland', 'France', 'Georgia', 'Germany', 'Greece', 'Grenada', 'Guatemala', 'Guyana', 'Hungary', 'Iceland', 'Ireland', 'Israel', 'Italy', 'Jamaica', 'Japan', 'Kazakhstan', 'Kiribati', 'Kuwait', 'Kyrgyzstan', 'Latvia', 'Lithuania', 'Luxembourg', 'Macau', 'Maldives', 'Malta', 'Mauritius', 'Mexico', 'Montenegro', 'Netherlands', 'New Zealand', 'Nicaragua', 'Norway', 'Oman', 'Panama', 'Paraguay', 'Philippines', 'Poland', 'Portugal', 'Puerto Rico', 'Qatar', 'Republic of Korea', 'Romania', 'Russian Federation', 'Saint Kitts and Nevis', 'Saint Lucia', 'Saint Vincent and the Grenadines', 'San Marino', 'Serbia', 'Seychelles', 'Singapore', 'Slovakia', 'Slovenia', 'South Africa', 'Spain', 'Sri Lanka', 'Suriname', 'Sweden', 'Switzerland', 'Thailand', 'Trinidad and Tobago', 'Turkey', 'Turkmenistan', 'Ukraine', 'United Arab Emirates', 'United Kingdom', 'United States', 'Uruguay', 'Uzbekistan'], dtype=object)

```
In [14]: df_suicide_new['year'].sort_values().unique()
```

Out[14]: array([1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015], dtype=int64)

```
In [15]: # rename column
df_suicide_new = df_suicide_new.rename(columns = {'gdp_for_year ($) ': 'gdp_for_year ($)'}, inplace = False)
df_suicide_new.info() # wrong type for 'gdp_for_year ($)' column
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 27660 entries, 0 to 27819
Data columns (total 13 columns):
#   Column                Non-Null Count  Dtype
---  -
0   country               27660 non-null  object
1   year                  27660 non-null  int64
2   sex                   27660 non-null  object
3   age                   27660 non-null  object
4   suicides_no           27660 non-null  int64
5   population             27660 non-null  int64
6   suicides/100k pop     27660 non-null  float64
7   country-year           27660 non-null  object
8   HDI for year           8364 non-null   float64
9   gdp_for_year ($)       27660 non-null  object
10  gdp_per_capita ($)     27660 non-null  int64
11  generation             27660 non-null  object
12  continent              27660 non-null  object
dtypes: float64(2), int64(4), object(7)
memory usage: 3.0+ MB
```

```
In [16]: # Remove thousand separator for string at column 'gdp_for_year ($)' and change to int data type
for i, row in df_suicide_new.iterrows():
    ifor_val = int("".join(row['gdp_for_year ($)'].split(',')))
    df_suicide_new.at[i, 'gdp_for_year ($)'] = ifor_val

# change data type of dataframe
df_suicide_new['gdp_for_year ($)'] = pd.to_numeric(df_suicide_new['gdp_for_year ($)']) # change data type
df_suicide_new['gdp_for_year ($)']
```

Out[16]: 0 2156624900
1 2156624900
2 2156624900
3 2156624900
4 2156624900
..
27815 63067077179
27816 63067077179
27817 63067077179
27818 63067077179
27819 63067077179
Name: gdp_for_year (\$), Length: 27660, dtype: int64

```
In [17]: # calculate average gdp by grouping country and finding the average
average_gdp = df_suicide_new[['country', 'gdp_for_year ($)']].groupby(['country']).mean()
average_gdp.reset_index(inplace=True)
average_gdp = average_gdp.rename(columns = {'gdp_for_year ($)': 'average_gdp'}, inplace = False)
df_suicide_new = df_suicide_new.merge(average_gdp[['country', 'average_gdp']])

# calculate the average gdp per capita by grouping country and finding the average
average_gdp_per_capita = df_suicide_new[['country', 'gdp_per_capita ($)']].groupby(['country']).mean()
average_gdp_per_capita.reset_index(inplace=True)
average_gdp_per_capita = average_gdp_per_capita.rename(columns = {'gdp_per_capita ($)': 'average_gdp_per_capita'}, inplace = False)
df_suicide_new = df_suicide_new.merge(average_gdp_per_capita[['country', 'average_gdp_per_capita']])

# calculate the average suicide per 100k population by grouping country and finding the average
average_suicides_per_100k_pop = df_suicide_new[['country', 'suicides/100k pop']].groupby(['country']).mean()
average_suicides_per_100k_pop.reset_index(inplace=True)
average_suicides_per_100k_pop = average_suicides_per_100k_pop.rename(columns = {'suicides/100k pop': 'average_suicides_per_100k_pop'}, inplace = False)
df_suicide_new = df_suicide_new.merge(average_suicides_per_100k_pop[['country', 'average_suicides_per_100k_pop']])

# rounding to 2 d.p.
df_suicide_new = df_suicide_new.round({'average_gdp': 2, 'average_gdp_per_capita': 2, 'average_suicides_per_100k_pop': 2})
df_suicide_new.reset_index(inplace = True)
df_suicide_new.info()

# the value found here has also been verified by tableau software
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 27660 entries, 0 to 27659
Data columns (total 17 columns):
#   Column                Non-Null Count  Dtype
---  -
0   index                  27660 non-null  int64
1   country                27660 non-null  object
2   year                   27660 non-null  int64
3   sex                    27660 non-null  object
4   age                    27660 non-null  object
5   suicides_no            27660 non-null  int64
6   population             27660 non-null  int64
7   suicides/100k pop      27660 non-null  float64
8   country-year           27660 non-null  object
9   HDI for year           8364 non-null   float64
10  gdp_for_year ($)        27660 non-null  int64
11  gdp_per_capita ($)      27660 non-null  int64
12  generation              27660 non-null  object
13  continent               27660 non-null  object
14  average_gdp             27660 non-null  float64
15  average_gdp_per_capita  27660 non-null  float64
16  average_suicides_per_100k_pop  27660 non-null  float64
dtypes: float64(5), int64(6), object(6)
memory usage: 3.6+ MB
```

```
In [18]: # example record
df_suicide_new.loc[df_suicide_new['country'] == 'United States'].head(1)
```

Out[18]:

	index	country	year	sex	age	suicides_no	population	suicides/100k pop	country-year	HDI for year	gdp_for_year (\$)	gdp_per_capita (\$)	generation	continent	average_gdp	average_gdp_per_capita	average_suicides_per_100k_pop
26688	26688	United States	1985	male	75+ years	2177	4064000	53.57	United States1985	0.841	4346734000000	19693	G.I. Generation	Americas	1.051071e+13	39269.61	13.82

```
In [19]: # rename column to help with vega-lite
df_suicide_new = df_suicide_new.rename(columns = {'suicides/100k pop': 'suicides_per_100k_pop', \
                                                  'gdp_for_year ($)': 'gdp_for_year', \
                                                  'gdp_per_capita ($)': 'gdp_per_capita', \
                                                  'HDI for year': 'hdi_for_year', \
                                                  'country-year': 'country_year'}, inplace = False)
```

```
In [20]: df_suicide_new.head(1)
```

Out[20]:

	index	country	year	sex	age	suicides_no	population	suicides_per_100k_pop	country_year	hdi_for_year	gdp_for_year	gdp_per_capita	generation	continent	average_gdp	average_gdp_per_capita	average_suicides_per_100k_pop
0	0	Albania	1987	male	15-24 years	21	312900	6.71	Albania1987	NaN	2156624900	796	Generation X	Europe	5.211661e+09	1859.05	3.5

```
In [21]: # export dataset
df_suicide_new.to_csv('suicide-rates-1985-to-2015-dataset-cleaned.csv', index=False)
```