# Importing libraries

In [1]:
```
import pandas as pd
import numpy as np
from numpy import cov
from scipy.stats import spearmanr
from scipy.stats import pearsonr
```

In [2]:
```
df=pd.read_csv(r"C:\Users\user\Desktop\Ash\Datasets\2015.csv")
df
```

Out[2]:

| | Country | Region | Happiness Rank | Happiness Score | Standard Error | Economy (GDP per Capita) | Family | Health (Life Expectancy) | Freedom | Trust (Government Corruption) | Generosity | Dystop Residu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | Switzerland | Western Europe | 1 | 7.587 | 0.03411 | 1.39651 | 1.34951 | 0.94143 | 0.66557 | 0.41978 | 0.29678 | 2.517 |
| **1** | Iceland | Western Europe | 2 | 7.561 | 0.04884 | 1.30232 | 1.40223 | 0.94784 | 0.62877 | 0.14145 | 0.43630 | 2.702 |
| **2** | Denmark | Western Europe | 3 | 7.527 | 0.03328 | 1.32548 | 1.36058 | 0.87464 | 0.64938 | 0.48357 | 0.34139 | 2.492 |
| **3** | Norway | Western Europe | 4 | 7.522 | 0.03880 | 1.45900 | 1.33095 | 0.88521 | 0.66973 | 0.36503 | 0.34699 | 2.465 |
| **4** | Canada | North America | 5 | 7.427 | 0.03553 | 1.32629 | 1.32261 | 0.90563 | 0.63297 | 0.32957 | 0.45811 | 2.451 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| **153** | Rwanda | Sub-Saharan Africa | 154 | 3.465 | 0.03464 | 0.22208 | 0.77370 | 0.42864 | 0.59201 | 0.55191 | 0.22628 | 0.670 |
| **154** | Benin | Sub-Saharan Africa | 155 | 3.340 | 0.03656 | 0.28665 | 0.35386 | 0.31910 | 0.48450 | 0.08010 | 0.18260 | 1.633 |
| **155** | Syria | Middle East and Northern Africa | 156 | 3.006 | 0.05015 | 0.66320 | 0.47489 | 0.72193 | 0.15684 | 0.18906 | 0.47179 | 0.328 |
| **156** | Burundi | Sub-Saharan Africa | 157 | 2.905 | 0.08658 | 0.01530 | 0.41587 | 0.22396 | 0.11850 | 0.10062 | 0.19727 | 1.833 |
| **157** | Togo | Sub-Saharan Africa | 158 | 2.839 | 0.06727 | 0.20868 | 0.13995 | 0.28443 | 0.36453 | 0.10731 | 0.16681 | 1.567 |

158 rows × 12 columns

# Mean

In [3]:
```
print(df.mean())
```

```
Happiness Rank                  79.493671
Happiness Score                  5.375734
Standard Error                   0.047885
Economy (GDP per Capita)         0.846137
Family                           0.991046
Health (Life Expectancy)         0.630259
Freedom                          0.428615
Trust (Government Corruption)    0.143422
Generosity                       0.237296
Dystopia Residual                2.098977
dtype: float64
```

# Median

In [4]:
```
print(df.median())
```

```
Happiness Rank                  79.500000
Happiness Score                  5.232500
Standard Error                   0.043940
Economy (GDP per Capita)         0.910245
Family                           1.029510
Health (Life Expectancy)         0.696705
Freedom                          0.435515
Trust (Government Corruption)    0.107220
Generosity                       0.216130
Dystopia Residual                2.095415
dtype: float64
```

# Mode

In [5]:
```
print(df.mode())
```

```
         Country              Region  Happiness Rank  Happiness Score  \
0    Afghanistan  Sub-Saharan Africa            82.0            5.192
1        Albania                 NaN             NaN              NaN
2        Algeria                 NaN             NaN              NaN
3         Angola                 NaN             NaN              NaN
4      Argentina                 NaN             NaN              NaN
..           ...                 ...             ...              ...
153    Venezuela                 NaN             NaN              NaN
154      Vietnam                 NaN             NaN              NaN
155        Yemen                 NaN             NaN              NaN
156       Zambia                 NaN             NaN              NaN
157     Zimbabwe                 NaN             NaN              NaN

     Standard Error  Economy (GDP per Capita)   Family  \
0           0.03751                   0.00000  0.00000
1           0.03780                   0.01530  0.13995
2           0.04394                   0.01604  0.30285
3           0.04934                   0.06940  0.35386
4           0.05051                   0.07120  0.38174
..              ...                       ...      ...
153             NaN                   1.45900  1.34043
154             NaN                   1.52186  1.34951
155             NaN                   1.55422  1.36058
156             NaN                   1.56391  1.36948
157             NaN                   1.69042  1.40223

     Health (Life Expectancy)  Freedom  Trust (Government Corruption)  \
0                     0.92356  0.00000                         0.32524
1                         NaN  0.07699                             NaN
2                         NaN  0.09245                             NaN
3                         NaN  0.10081                             NaN
4                         NaN  0.10384                             NaN
..                        ...      ...                             ...
153                       NaN  0.65821                             NaN
154                       NaN  0.65980                             NaN
155                       NaN  0.66246                             NaN
156                       NaN  0.66557                             NaN
157                       NaN  0.66973                             NaN

     Generosity  Dystopia Residual
0       0.00000            0.32858
1       0.00199            0.65429
2       0.02641            0.67042
```

```
3       0.05444            0.67108
4       0.05547            0.89991
..          ...                ...
153     0.51535            3.10712
154     0.51752            3.17728
155     0.51912            3.19131
156     0.57630            3.26001
157     0.79588            3.60214

[158 rows x 12 columns]
```

# Statistical data

In [6]:
```
df.describe()
```

Out[6]:

| | Happiness Rank | Happiness Score | Standard Error | Economy (GDP per Capita) | Family | Health (Life Expectancy) | Freedom | Trust (Government Corruption) | Generosity | Dystopia Residual |
|---|---|---|---|---|---|---|---|---|---|---|
| **count** | 158.000000 | 158.000000 | 158.000000 | 158.000000 | 158.000000 | 158.000000 | 158.000000 | 158.000000 | 158.000000 | 158.000000 |
| **mean** | 79.493671 | 5.375734 | 0.047885 | 0.846137 | 0.991046 | 0.630259 | 0.428615 | 0.143422 | 0.237296 | 2.098977 |
| **std** | 45.754363 | 1.145010 | 0.017146 | 0.403121 | 0.272369 | 0.247078 | 0.150693 | 0.120034 | 0.126685 | 0.553550 |
| **min** | 1.000000 | 2.839000 | 0.018480 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.328580 |
| **25%** | 40.250000 | 4.526000 | 0.037268 | 0.545808 | 0.856823 | 0.439185 | 0.328330 | 0.061675 | 0.150553 | 1.759410 |
| **50%** | 79.500000 | 5.232500 | 0.043940 | 0.910245 | 1.029510 | 0.696705 | 0.435515 | 0.107220 | 0.216130 | 2.095415 |
| **75%** | 118.750000 | 6.243750 | 0.052300 | 1.158448 | 1.214405 | 0.811013 | 0.549092 | 0.180255 | 0.309883 | 2.462415 |
| **max** | 158.000000 | 7.587000 | 0.136930 | 1.690420 | 1.402230 | 1.025250 | 0.669730 | 0.551910 | 0.795880 | 3.602140 |

# Sum

In [7]:
```
print(df.sum())
```

```
Country                          SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...
Region                           Western EuropeWestern EuropeWestern EuropeWest...
Happiness Rank                                                           12560
Happiness Score                                                        849.366
Standard Error                                                         7.56579
Economy (GDP per Capita)                                             133.68968
Family                                                               156.58526
Health (Life Expectancy)                                              99.58098
Freedom                                                               67.72116
Trust (Government Corruption)                                         22.66065
Generosity                                                            37.49269
Dystopia Residual                                                    331.63833
dtype: object
```

# Cumsum

In [16]:
```
print(df.cumsum())
```

```
                                          Country  \
0                                     Switzerland
1                                 SwitzerlandIceland
2                             SwitzerlandIcelandDenmark
3                         SwitzerlandIcelandDenmarkNorway
4                    SwitzerlandIcelandDenmarkNorwayCanada
..                                                 ...
153  SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...
154  SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...
155  SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...
156  SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...
157  SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...

                                           Region  Happiness Rank  \
0                                  Western Europe               1
1                      Western EuropeWestern Europe               3
2           Western EuropeWestern EuropeWestern Europe               6
3    Western EuropeWestern EuropeWestern EuropeWest...              10
4    Western EuropeWestern EuropeWestern EuropeWest...              15
..                                                 ...             ...
153  Western EuropeWestern EuropeWestern EuropeWest...           11934
154  Western EuropeWestern EuropeWestern EuropeWest...           12089
155  Western EuropeWestern EuropeWestern EuropeWest...           12245
156  Western EuropeWestern EuropeWestern EuropeWest...           12402
157  Western EuropeWestern EuropeWestern EuropeWest...           12560

     Happiness Score  Standard Error  Economy (GDP per Capita)     Family  \
0              7.587         0.03411                   1.39651    1.34951
1             15.148         0.08295                   2.69883    2.75174
2             22.675         0.11623                   4.02431    4.11232
3             30.197         0.15503                   5.48331    5.44327
4             37.624         0.19056                   6.80960    6.76588
..               ...             ...                       ...        ...
153          837.276         7.32523                132.51585  155.20069
154          840.616         7.36179                132.80250  155.55455
155          843.622         7.41194                133.46570  156.02944
156          846.527         7.49852                133.48100  156.44531
157          849.366         7.56579                133.68968  156.58526

     Health (Life Expectancy)   Freedom  Trust (Government Corruption)  \
0                     0.94143   0.66557                        0.41978
1                     1.88927   1.29434                        0.56123
2                     2.76391   1.94372                        1.04480
```

```
3                    3.64912   2.61345                     1.40983
4                    4.55475   3.24642                     1.73940
..                       ...       ...                         ...
153                 98.03156  66.59679                    22.18356
154                 98.35066  67.08129                    22.26366
155                 99.07259  67.23813                    22.45272
156                 99.29655  67.35663                    22.55334
157                 99.58098  67.72116                    22.66065

     Generosity  Dystopia Residual
0       0.29678            2.51738
1       0.73308            5.21939
2       1.07447            7.71143
3       1.42146           10.17674
4       1.87957           12.62850
..          ...                ...
153    36.47422          326.27619
154    36.65682          327.90947
155    37.12861          328.23805
156    37.32588          330.07107
157    37.49269          331.63833

[158 rows x 12 columns]
```

# Count

In [8]:
```
print(df.count())
```

```
Country                          158
Region                           158
Happiness Rank                   158
Happiness Score                  158
Standard Error                   158
Economy (GDP per Capita)         158
Family                           158
Health (Life Expectancy)         158
Freedom                          158
Trust (Government Corruption)    158
Generosity                       158
Dystopia Residual                158
dtype: int64
```

# Min

In [9]:
```
print(df.min())
```

```
Country                                    Afghanistan
Region                         Australia and New Zealand
Happiness Rank                                       1
Happiness Score                                  2.839
Standard Error                                 0.01848
Economy (GDP per Capita)                           0.0
Family                                             0.0
Health (Life Expectancy)                           0.0
Freedom                                            0.0
Trust (Government Corruption)                      0.0
Generosity                                         0.0
Dystopia Residual                              0.32858
dtype: object
```

# Max

In [10]:
```
print(df.max())
```

```
Country                             Zimbabwe
Region                        Western Europe
Happiness Rank                           158
Happiness Score                        7.587
Standard Error                       0.13693
Economy (GDP per Capita)             1.69042
Family                               1.40223
Health (Life Expectancy)             1.02525
Freedom                              0.66973
Trust (Government Corruption)        0.55191
Generosity                           0.79588
Dystopia Residual                    3.60214
dtype: object
```

# Covarience

In [13]:
```
cov(df["Family"],df["Freedom"])
```

Out[13]:
```
array([[0.07418492, 0.0181217 ],
       [0.0181217 , 0.02270832]])
```

# Correaltion

In [14]:
```
pearsonr(df['Family'],df['Freedom'])
```

Out[14]:
```
(0.44151821062286056, 6.363670360267173e-09)
```

In [15]:
```
spearmanr(df['Family'],df['Freedom'])
```

Out[15]:
```
SpearmanrResult(correlation=0.5281391142435108, pvalue=9.937786974199143e-13)
```

In [ ]:
```

```