

SUMESH R - 20104169

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

import data

```
In [2]: df=pd.read_csv("2015.csv")
df
```

Out[2]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freedom
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.66557
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.62877
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.64938
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.66973
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.63297
...
153	Rwanda	Sub-Saharan Africa	154	3.465	0.03464	0.22208	0.77370	0.42864	0.59201
154	Benin	Sub-Saharan Africa	155	3.340	0.03656	0.28665	0.35386	0.31910	0.48450
155	Syria	Middle East and Northern Africa	156	3.006	0.05015	0.66320	0.47489	0.72193	0.15684
156	Burundi	Sub-Saharan Africa	157	2.905	0.08658	0.01530	0.41587	0.22396	0.11850
157	Togo	Sub-Saharan Africa	158	2.839	0.06727	0.20868	0.13995	0.28443	0.36453

158 rows × 12 columns

sum

In [3]: `df.sum()`

```
Out[3]: 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
```

mean

In [4]: `df.mean()`

```
Out[4]: 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 [5]: `df.median()`

```
Out[5]: 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 [6]:

```
df.mode()
```

Out[6]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freedom (
0	Afghanistan	Sub-Saharan Africa	82.0	5.192	0.03751	0.00000	0.00000	0.92356	0.00000
1	Albania	NaN	NaN	NaN	0.03780	0.01530	0.13995	NaN	0.07699
2	Algeria	NaN	NaN	NaN	0.04394	0.01604	0.30285	NaN	0.09245
3	Angola	NaN	NaN	NaN	0.04934	0.06940	0.35386	NaN	0.10081
4	Argentina	NaN	NaN	NaN	0.05051	0.07120	0.38174	NaN	0.10384
...
153	Venezuela	NaN	NaN	NaN	NaN	1.45900	1.34043	NaN	0.65821
154	Vietnam	NaN	NaN	NaN	NaN	1.52186	1.34951	NaN	0.65980
155	Yemen	NaN	NaN	NaN	NaN	1.55422	1.36058	NaN	0.66246
156	Zambia	NaN	NaN	NaN	NaN	1.56391	1.36948	NaN	0.66557
157	Zimbabwe	NaN	NaN	NaN	NaN	1.69042	1.40223	NaN	0.66973

158 rows × 12 columns



describe

In [7]:

```
df.describe()
```

Out[7]:

	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freedom (True: (Governmer Corruption
count	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	0.14342
std	45.754363	1.145010	0.017146	0.403121	0.272369	0.247078	0.150693	0.12003
min	1.000000	2.839000	0.018480	0.000000	0.000000	0.000000	0.000000	0.000000
25%	40.250000	4.526000	0.037268	0.545808	0.856823	0.439185	0.328330	0.06167
50%	79.500000	5.232500	0.043940	0.910245	1.029510	0.696705	0.435515	0.10722
75%	118.750000	6.243750	0.052300	1.158448	1.214405	0.811013	0.549092	0.18025
max	158.000000	7.587000	0.136930	1.690420	1.402230	1.025250	0.669730	0.55191



cumsum

```
In [8]: df.cumsum()
```

Out[8]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error
0	Switzerland	Western Europe	1	7.587	0.03411
1	SwitzerlandIceland	Western EuropeWestern Europe	3	15.148	0.08295
2	SwitzerlandIcelandDenmark	Western EuropeWestern EuropeWestern Europe	6	22.675	0.11623
3	SwitzerlandIcelandDenmarkNorway	Western EuropeWestern EuropeWestern EuropeWestern Europe	10	30.197	0.15503
4	SwitzerlandIcelandDenmarkNorwayCanada	Western EuropeWestern EuropeWestern EuropeWestern EuropeWestern Europe	15	37.624	0.19056
...
153	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWestern EuropeWestern EuropeWestern Europe	11934	837.276	7.32523
154	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWestern EuropeWestern EuropeWestern Europe	12089	840.616	7.36179
155	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWestern EuropeWestern EuropeWestern Europe	12245	843.622	7.41194
156	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWestern EuropeWestern EuropeWestern Europe	12402	846.527	7.49852
157	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWestern EuropeWestern EuropeWestern Europe	12560	849.366	7.56579

158 rows × 12 columns



count

In [9]: `df.count()`

```
Out[9]: 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 [10]: `df.min()`

```
Out[10]: 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 [11]: `df.max()`

```
Out[11]: 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
```

covariance

```
In [12]: cov(df["Happiness Rank"],df["Happiness Score"])
```

```
Out[12]: array([[ 2.09346174e+03, -5.19756132e+01],  
               [-5.19756132e+01,  1.31104821e+00]])
```

correlation

```
In [13]: spearmanr(df["Happiness Rank"],df["Happiness Score"])
```

```
Out[13]: SpearmanrResult(correlation=-0.9999999999999999, pvalue=0.0)
```

```
In [14]: pearsonr(df["Happiness Rank"],df["Happiness Score"])
```

```
Out[14]: (-0.9921053148284924, 1.4013759581587442e-142)
```