```
import numpy as np
import pandas as pd
from numpy import mean,std
import matplotlib.pyplot as pp
from numpy import cov
from scipy.stats import pearsonr
from scipy.stats import spearmanr
```

```
a=pd.read_csv(r"C:\Users\user\Downloads\2015 - 2015.csv")
a
```

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

158 rows × 12 columns

a) Find mean, median, mode and describe

```
a.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
```

```
a.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
```

```
a.mode()
```

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

158 rows × 12 columns

```
a.describe()
```

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

b) Find sum(), cumsum(), count, min and max values

```
In [28]:
```

```
a.sum()
```

Out[28]:

```
Country                           SwitzerlandIcelandDenmarkNorwayCanadaFinl
andNe...
Region                            Western EuropeWestern EuropeWestern Europ
eWest...
Happiness Rank
12560
Happiness Score
849.366
Standard Error
7.56579
Economy (GDP per Capita)                                                 1
33.68968
Family                                                                   1
56.58526
Health (Life Expectancy)
99.58098
Freedom
67.72116
Trust (Government Corruption)
22.66065
Generosity
37.49269
Dystopia Residual                                                        3
31.63833
dtype: object
```

```
a.cumsum()
```

	Country	Region	Happiness Rank	Happiness Score
0	Switzerland	Western Europe	1	7.587
1	SwitzerlandIceland	Western EuropeWestern Europe	3	15.148
2	SwitzerlandIcelandDenmark	Western EuropeWestern EuropeWestern Europe	6	22.675
3	SwitzerlandIcelandDenmarkNorway	Western EuropeWestern EuropeWestern EuropeWest...	10	30.197
4	SwitzerlandIcelandDenmarkNorwayCanada	Western EuropeWestern EuropeWestern EuropeWest...	15	37.624
...	...	...	...	...
153	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWest...	11934	837.276
154	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWest...	12089	840.616
155	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWest...	12245	843.622
156	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWest...	12402	846.527
157	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWest...	12560	849.366

158 rows × 12 columns

```
a.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
```

```
a.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
```

```
a.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
```

c) Find covariance and correlation (spearman and pearsons)

In [33]:

```
d1=a["Happiness Score"]
d2=a["Standard Error"]
cov(d1,d2)
```

Out[33]:

```
array([[ 1.31104821e+00, -3.47994395e-03],
       [-3.47994395e-03,  2.93991439e-04]])
```

In [34]:

```
pearsonr(d1,d2)
```

Out[34]:

```
(-0.17725380900494764, 0.02587868479253323)
```

In [35]:

```
spearmanr(d1,d2)
```

Out[35]:

```
SpearmanrResult(correlation=-0.21519846171732626, pvalue=0.006619286429972
024)
```

In [ ]: