```
In [1]: import numpy as np
        import pandas as pd
```

```
In [2]: x=pd.read_csv(r"C:\Users\user\Downloads\2015 - 2015.csv")
        x
```

Out[2]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Fre
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.6
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.6
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.6
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.6
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.6
...	...	...	...	...	...	...	...	...	
153	Rwanda	Sub-Saharan Africa	154	3.465	0.03464	0.22208	0.77370	0.42864	0.5
154	Benin	Sub-Saharan Africa	155	3.340	0.03656	0.28665	0.35386	0.31910	0.4
155	Syria	Middle East and Northern Africa	156	3.006	0.05015	0.66320	0.47489	0.72193	0.1
156	Burundi	Sub-Saharan Africa	157	2.905	0.08658	0.01530	0.41587	0.22396	0.1
157	Togo	Sub-Saharan Africa	158	2.839	0.06727	0.20868	0.13995	0.28443	0.3

158 rows × 12 columns

In [3]: `x.dtypes`

Out[3]:
```
Country                          object
Region                           object
Happiness Rank                    int64
Happiness Score                 float64
Standard Error                  float64
Economy (GDP per Capita)        float64
Family                          float64
Health (Life Expectancy)        float64
Freedom                         float64
Trust (Government Corruption)   float64
Generosity                      float64
Dystopia Residual               float64
dtype: object
```

In [4]: `x.head()`

Out[4]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freedc
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.665
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.628
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.649
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.669
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.632

In [5]: `x.tail()`

Out[5]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freedc
153	Rwanda	Sub-Saharan Africa	154	3.465	0.03464	0.22208	0.77370	0.42864	0.592
154	Benin	Sub-Saharan Africa	155	3.340	0.03656	0.28665	0.35386	0.31910	0.484
155	Syria	Middle East and Northern Africa	156	3.006	0.05015	0.66320	0.47489	0.72193	0.156
156	Burundi	Sub-Saharan Africa	157	2.905	0.08658	0.01530	0.41587	0.22396	0.118
157	Togo	Sub-Saharan Africa	158	2.839	0.06727	0.20868	0.13995	0.28443	0.364

In [6]: `x.columns`

Out[6]: Index(['Country', 'Region', 'Happiness Rank', 'Happiness Score',
            'Standard Error', 'Economy (GDP per Capita)', 'Family',
            'Health (Life Expectancy)', 'Freedom', 'Trust (Government Corruptio
       n)',
            'Generosity', 'Dystopia Residual'],
           dtype='object')

In [7]: `x.index`

Out[7]: RangeIndex(start=0, stop=158, step=1)

In [8]: `x.describe()`

Out[8]:

	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freedom	(Go C
count	158.000000	158.000000	158.000000	158.000000	158.000000	158.000000	158.000000	1:
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	

In [10]: `x["Family"]`

Out[10]:
```
0      1.34951
1      1.40223
2      1.36058
3      1.33095
4      1.32261
        ...
153    0.77370
154    0.35386
155    0.47489
156    0.41587
157    0.13995
Name: Family, Length: 158, dtype: float64
```

In [11]: `x[0:2]`

Out[11]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freedo
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.665
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.628

In [12]: `x.loc[0:2]`

Out[12]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freedo
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.665
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.628
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.649

In [13]: `x.iloc[0:2]`

Out[13]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freedo
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.665
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.628

In [16]: `x.loc["Family":"Freedom"]`

Out[16]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freedom	(

In [17]: `x[x["Freedom"]<=2]`

Out[17]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Free
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.6
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.6
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.6
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.6
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.6
...	...	...	...	...	...	...	...	...	
153	Rwanda	Sub-Saharan Africa	154	3.465	0.03464	0.22208	0.77370	0.42864	0.5
154	Benin	Sub-Saharan Africa	155	3.340	0.03656	0.28665	0.35386	0.31910	0.4
155	Syria	Middle East and Northern Africa	156	3.006	0.05015	0.66320	0.47489	0.72193	0.1
156	Burundi	Sub-Saharan Africa	157	2.905	0.08658	0.01530	0.41587	0.22396	0.1
157	Togo	Sub-Saharan Africa	158	2.839	0.06727	0.20868	0.13995	0.28443	0.3

158 rows × 12 columns

In [18]:
```python
x.fillna(value=5)
```

Out[18]:

|	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Fre
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.6
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.6
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.6
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.6
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.6
...	...	...	...	...	...	...	...	...	
153	Rwanda	Sub-Saharan Africa	154	3.465	0.03464	0.22208	0.77370	0.42864	0.5
154	Benin	Sub-Saharan Africa	155	3.340	0.03656	0.28665	0.35386	0.31910	0.4
155	Syria	Middle East and Northern Africa	156	3.006	0.05015	0.66320	0.47489	0.72193	0.1
156	Burundi	Sub-Saharan Africa	157	2.905	0.08658	0.01530	0.41587	0.22396	0.1
157	Togo	Sub-Saharan Africa	158	2.839	0.06727	0.20868	0.13995	0.28443	0.3

158 rows × 12 columns

In [19]: `x.dropna()`

Out[19]:

|	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Fre
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.6
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.6
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.6
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.6
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.6
...	...	...	...	...	...	...	...	...	
153	Rwanda	Sub-Saharan Africa	154	3.465	0.03464	0.22208	0.77370	0.42864	0.5
154	Benin	Sub-Saharan Africa	155	3.340	0.03656	0.28665	0.35386	0.31910	0.4
155	Syria	Middle East and Northern Africa	156	3.006	0.05015	0.66320	0.47489	0.72193	0.1
156	Burundi	Sub-Saharan Africa	157	2.905	0.08658	0.01530	0.41587	0.22396	0.1
157	Togo	Sub-Saharan Africa	158	2.839	0.06727	0.20868	0.13995	0.28443	0.3

158 rows × 12 columns

In [20]: `x.plot.line()`

Out[20]: `<AxesSubplot:>`
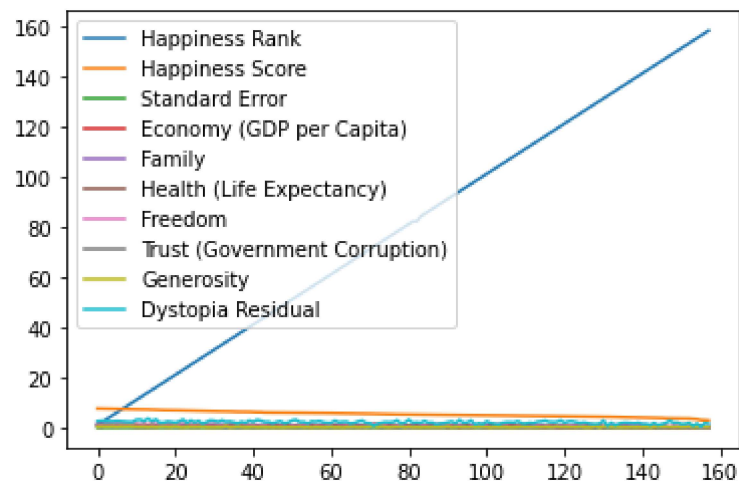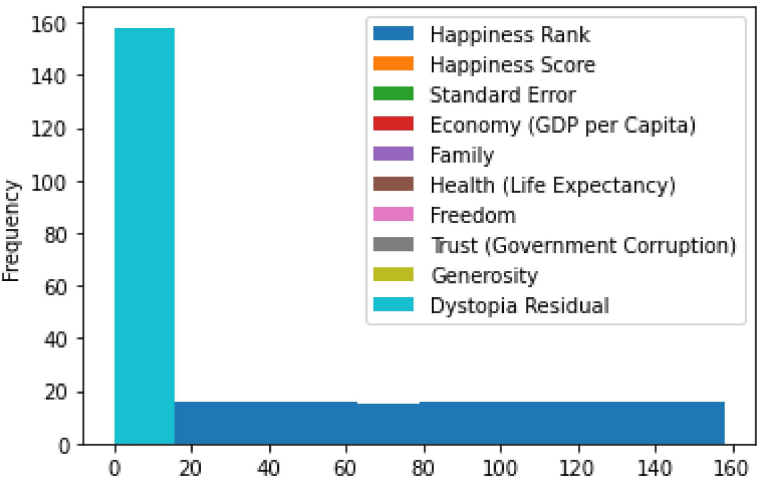

In [21]: `x.plot.bar()`

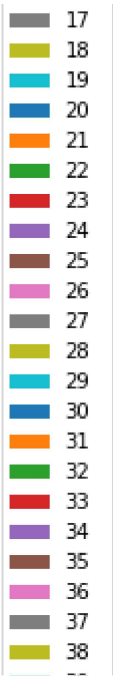Out[21]: `<AxesSubplot:>`
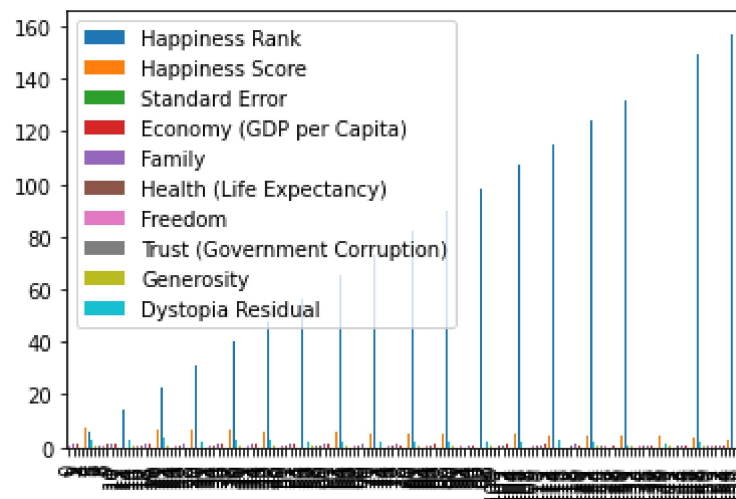
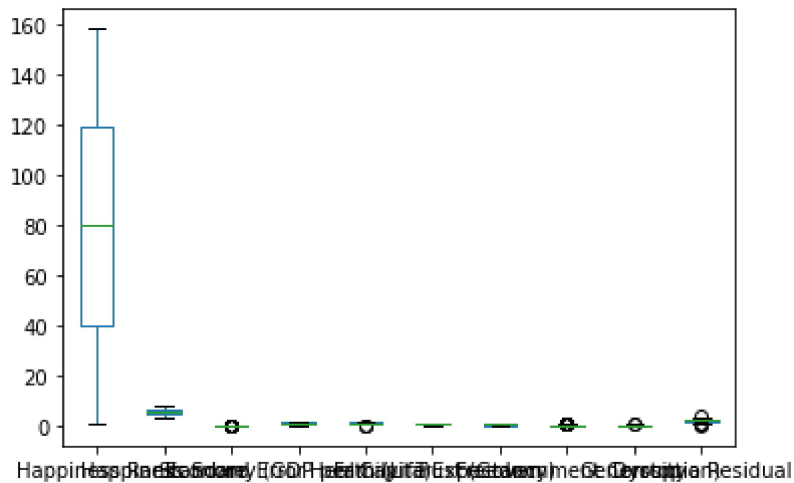In [22]: `x.plot.hist()`

Out[22]: `<AxesSubplot:ylabel='Frequency'>`

In [24]: `x.plot.pie(y='Freedom')`

In [25]: `x.plot.box()`

Out[25]: `<AxesSubplot:>`

In [26]: `x.plot.scatter(x='Family',y='Freedom')`

Out[26]: `<AxesSubplot:xlabel='Family', ylabel='Freedom'>`
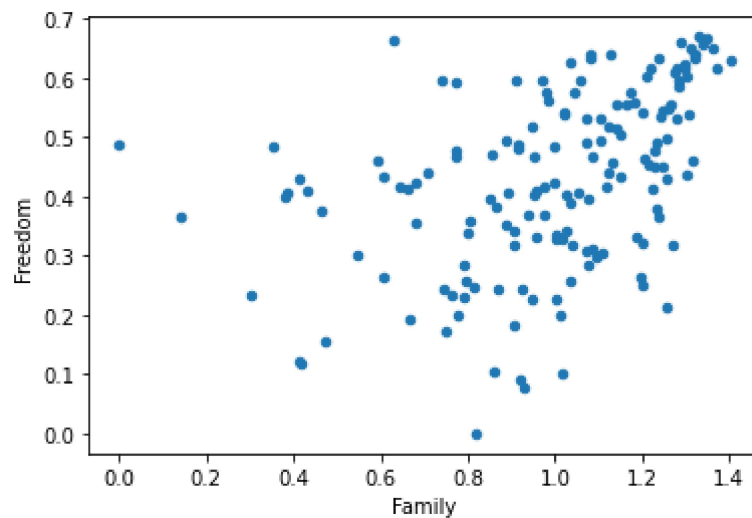
In [27]: `x.mean()`

Out[27]:
```
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
```

In [28]: `x.median()`

Out[28]:
```
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
```

In [29]: `x.mode()`

Out[29]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Fre
0	Afghanistan	Sub-Saharan Africa	82.0	5.192	0.03751	0.00000	0.00000	0.92356	0.0
1	Albania	NaN	NaN	NaN	0.03780	0.01530	0.13995	NaN	0.0
2	Algeria	NaN	NaN	NaN	0.04394	0.01604	0.30285	NaN	0.0
3	Angola	NaN	NaN	NaN	0.04934	0.06940	0.35386	NaN	0.1
4	Argentina	NaN	NaN	NaN	0.05051	0.07120	0.38174	NaN	0.1
...	...	...	...	...	...	...	...	...	
153	Venezuela	NaN	NaN	NaN	NaN	1.45900	1.34043	NaN	0.6
154	Vietnam	NaN	NaN	NaN	NaN	1.52186	1.34951	NaN	0.6
155	Yemen	NaN	NaN	NaN	NaN	1.55422	1.36058	NaN	0.6
156	Zambia	NaN	NaN	NaN	NaN	1.56391	1.36948	NaN	0.6
157	Zimbabwe	NaN	NaN	NaN	NaN	1.69042	1.40223	NaN	0.6

158 rows × 12 columns

In [30]: `x.describe()`

Out[30]:

	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freedom	(Go C₁
count	158.000000	158.000000	158.000000	158.000000	158.000000	158.000000	158.000000	1:
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	

In [31]: `x.sum()`

Out[31]:
```
Country                         SwitzerlandIcelandDenmarkNorwayCanadaFinland
Ne...
Region                          Western EuropeWestern EuropeWestern EuropeWe
st...
Happiness Rank
12560
Happiness Score                                                           84
9.366
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
```

In [32]: `x.cumsum()`

Out[32]:

	Country	Region	Happiness Rank	Happiness Score	Sta
0	Switzerland	Western Europe	1	7.587	0
1	SwitzerlandIceland	Western EuropeWestern Europe	3	15.148	0.
2	SwitzerlandIcelandDenmark	Western EuropeWestern EuropeWestern Europe	6	22.675	0
3	SwitzerlandIcelandDenmarkNorway	Western EuropeWestern EuropeWestern EuropeWest...	10	30.197	0.
4	SwitzerlandIcelandDenmarkNorwayCanada	Western EuropeWestern EuropeWestern EuropeWest...	15	37.624	0.
...	...	...	...	...	
153	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWest...	11934	837.276	7.
154	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWest...	12089	840.616	7.
155	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWest...	12245	843.622	7
156	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWest...	12402	846.527	7.
157	SwitzerlandIcelandDenmarkNorwayCanadaFinlandNe...	Western EuropeWestern EuropeWestern EuropeWest...	12560	849.366	7.

158 rows × 12 columns

```
In [33]: x.count()
```

```
Out[33]: 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
```

```
In [34]: x.min()
```

```
Out[34]: 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
```

```
In [35]: x.max()
```

```
Out[35]: 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
```

```python
from numpy import cov
d1=x['Family']
d2=x['Freedom']
d1
d2
```

Out[37]:
```
0      0.66557
1      0.62877
2      0.64938
3      0.66973
4      0.63297
        ...
153    0.59201
154    0.48450
155    0.15684
156    0.11850
157    0.36453
Name: Freedom, Length: 158, dtype: float64
```

In [38]:
```python
cov(d1,d2)
```

Out[38]:
```
array([[0.07418492, 0.0181217 ],
       [0.0181217 , 0.02270832]])
```

In [39]:
```python
from scipy.stats import pearsonr
print(pearsonr(d1,d2))
```

```
(0.44151821062286056, 6.363670360267173e-09)
```

In [40]:
```python
from scipy.stats import spearmanr
print(spearmanr(d1,d2))
```

```
SpearmanrResult(correlation=0.5281391142435108, pvalue=9.937786974199143e-13)
```

In [ ]: