

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

```
In [11]:  
a=pd.read_csv(r"C:\Users\user\Downloads\5_Instagram data - 5_Instagram data.csv")  
a
```

| Out[11]: | Impressions | From Home | From Hashtags | From Explore | From Other | Saves | Comments | Shares | Likes | Profile Visits | Follows |
|----------|-------------|-----------|---------------|--------------|------------|-------|----------|--------|-------|----------------|---------|
| 0        | 3920        | 2586      | 1028          | 619          | 56         | 98    | 9        | 5      | 162   | 35             | 2       |
| 1        | 5394        | 2727      | 1838          | 1174         | 78         | 194   | 7        | 14     | 224   | 48             | 10      |
| 2        | 4021        | 2085      | 1188          | 0            | 533        | 41    | 11       | 1      | 131   | 62             | 12      |
| 3        | 4528        | 2700      | 621           | 932          | 73         | 172   | 10       | 7      | 213   | 23             | 8       |
| 4        | 2518        | 1704      | 255           | 279          | 37         | 96    | 5        | 4      | 123   | 8              | 0       |
| ...      | ...         | ...       | ...           | ...          | ...        | ...   | ...      | ...    | ...   | ...            | ...     |
| 114      | 13700       | 5185      | 3041          | 5352         | 77         | 573   | 2        | 38     | 373   | 73             | 80      |
| 115      | 5731        | 1923      | 1368          | 2266         | 65         | 135   | 4        | 1      | 148   | 20             | 18      |
| 116      | 4139        | 1133      | 1538          | 1367         | 33         | 36    | 0        | 1      | 92    | 34             | 10      |

|     | Impressions | From Home | From Hashtags | From Explore | From Other | Saves | Comments | Shares | Likes | Profile Visits | Follows |
|-----|-------------|-----------|---------------|--------------|------------|-------|----------|--------|-------|----------------|---------|
| 117 | 32695       | 11815     | 3147          | 17414        | 170        | 1095  | 2        | 75     | 549   | 148            | 214     |
| 118 | 36919       | 13473     | 4176          | 16444        | 2547       | 653   | 5        | 26     | 443   | 611            | 228     |

119 rows × 13 columns

In [12]:

```
b=pd.read_csv(r"C:\Users\user\Downloads\4_drug200 - 4_drug200.csv")
b
```

Out[12]:

|     | Age | Sex | BP     | Cholesterol | Na_to_K | Drug  |
|-----|-----|-----|--------|-------------|---------|-------|
| 0   | 23  | F   | HIGH   | HIGH        | 25.355  | drugY |
| 1   | 47  | M   | LOW    | HIGH        | 13.093  | drugC |
| 2   | 47  | M   | LOW    | HIGH        | 10.114  | drugC |
| 3   | 28  | F   | NORMAL | HIGH        | 7.798   | drugX |
| 4   | 61  | F   | LOW    | HIGH        | 18.043  | drugY |
| ... | ... | ... | ...    | ...         | ...     | ...   |
| 195 | 56  | F   | LOW    | HIGH        | 11.567  | drugC |
| 196 | 16  | M   | LOW    | HIGH        | 12.006  | drugC |
| 197 | 52  | M   | NORMAL | HIGH        | 9.894   | drugX |
| 198 | 23  | M   | NORMAL | NORMAL      | 14.020  | drugX |
| 199 | 40  | F   | LOW    | NORMAL      | 11.349  | drugX |

200 rows × 6 columns

In [13]:

```
c=pd.read_csv(r"C:\Users\user\Downloads\6_Salesworkload1 - 6_Salesworkload1.csv")
c
```

Out[13]:

|   | MonthYear | Time index | Country | StoreID | City       | Dept_ID | Dept. Name | HoursOwn | HoursLease |
|---|-----------|------------|---------|---------|------------|---------|------------|----------|------------|
| 0 | 10.2016   | 1.0        | United  | 88253.0 | London (I) | 1.0     | Dry        | 3184.764 | 0.0        |

|         | MonthYear | Time index | Country        | StoreID | City       | Dept_ID | Dept. Name          | HoursOwn | HoursLease |
|---------|-----------|------------|----------------|---------|------------|---------|---------------------|----------|------------|
| Kingdom |           |            |                |         |            |         |                     |          |            |
| 1       | 10.2016   | 1.0        | United Kingdom | 88253.0 | London (I) | 2.0     | Frozen              | 1582.941 | 0.0        |
| 2       | 10.2016   | 1.0        | United Kingdom | 88253.0 | London (I) | 3.0     | other               | 47.205   | 0.0        |
| 3       | 10.2016   | 1.0        | United Kingdom | 88253.0 | London (I) | 4.0     | Fish                | 1623.852 | 0.0        |
| 4       | 10.2016   | 1.0        | United Kingdom | 88253.0 | London (I) | 5.0     | Fruits & Vegetables | 1759.173 | 0.0        |
| ...     | ...       | ...        | ...            | ...     | ...        | ...     | ...                 | ...      | ...        |
| 7653    | 6.2017    | 9.0        | Sweden         | 29650.0 | Gothenburg | 12.0    | Checkout            | 6322.323 | 0.0 3      |
| 7654    | 6.2017    | 9.0        | Sweden         | 29650.0 | Gothenburg | 16.0    | Customer Services   | 4270.479 | 0.0        |
| 7655    | 6.2017    | 9.0        | Sweden         | 29650.0 | Gothenburg | 11.0    | Delivery            | 0        | 0.0        |
| 7656    | 6.2017    | 9.0        | Sweden         | 29650.0 | Gothenburg | 17.0    | others              | 2224.929 | 0.0        |
| 7657    | 6.2017    | 9.0        | Sweden         | 29650.0 | Gothenburg | 18.0    | all                 | 39652.2  | 0.0 3      |

7658 rows × 14 columns

In [14]:

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

Out[14]:

|     | 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        | 155            | 3.340           | 0.03656        | 0.28665                  | 0.35386 | 0.31910                  | 0.48450 |

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

In [119]:

```
e=pd.read_csv(r"C:\Users\user\Downloads\USA_Housing.csv")
e
```

Out[119]:

|      | Avg. Area_Income | Avg. Area_House_Age | Avg. Area_Number_of_Rooms | Avg. Area_Number_of_Bedrooms | Area_Population | Price        | Address   |
|------|------------------|---------------------|---------------------------|------------------------------|-----------------|--------------|---|
| 0    | 79545.45857      | 5.682861            | 7.009188                  | 4.09                         | 23086.80050     | 1.059034e+06 | 208 Michael Ferry Apt.<br>674\nLaurabury, NE<br>3701... |
| 1    | 79248.64245      | 6.002900            | 6.730821                  | 3.09                         | 40173.07217     | 1.505891e+06 | 188 Johnson Views<br>Suite 079\nLake<br>Kathleen, CA... |
| 2    | 61287.06718      | 5.865890            | 8.512727                  | 5.13                         | 36882.15940     | 1.058988e+06 | 9127 Elizabeth<br>Stravenue\nDanieltown,<br>WI 06482... |
| 3    | 63345.24005      | 7.188236            | 5.586729                  | 3.26                         | 34310.24283     | 1.260617e+06 | USS Barnett\nFPO AP<br>44820                            |
| 4    | 59982.19723      | 5.040555            | 7.839388                  | 4.23                         | 26354.10947     | 6.309435e+05 | USNS Raymond\nFPO<br>AE 09386                           |
| ...  | ...              | ...                 | ...                       | ...                          | ...             | ...          | ...   |
| 4995 | 60567.94414      | 7.830362            | 6.137356                  | 3.46                         | 22837.36103     | 1.060194e+06 | USNS Williams\nFPO<br>AP 30153-7653                     |
| 4996 | 78491.27543      | 6.999135            | 6.576763                  | 4.02                         | 25616.11549     | 1.482618e+06 | PSC 9258, Box<br>8489\nAPO AA 42991-<br>3352            |
| 4997 | 63390.68689      | 7.250591            | 4.805081                  | 2.13                         | 33266.14549     | 1.030730e+06 | 4215 Tracy Garden<br>Suite 076\nJoshualand,<br>VA 01... |

|      | Avg.<br>Area_Income | Avg.<br>Area<br>House<br>Age | Avg.<br>Area<br>Number<br>of<br>Rooms | Avg. Area<br>Number<br>of<br>Bedrooms | Area<br>Population | Price        | Address   |
|------|---------------------|------------------------------|---------------------------------------|---------------------------------------|--------------------|--------------|---|
| 4998 | 68001.33124         | 5.534388                     | 7.130144                              | 5.44                                  | 42625.62016        | 1.198657e+06 | USS Wallace\nFPO AE<br>73316                            |
| 4999 | 65510.58180         | 5.992305                     | 6.792336                              | 4.07                                  | 46501.28380        | 1.298950e+06 | 37778 George Ridges<br>Apt. 509\nEast Holly,<br>NV 2... |

5000 rows × 7 columns

## a)find mean ,median,mode and describe

### mean

In [16]:

```
print(a.mean())
```

|                |                |
|----------------|----------------|
| Impressions    | 5703.991597    |
| From Home      | 2475.789916    |
| From Hashtags  | 1887.512605    |
| From Explore   | 1078.100840    |
| From Other     | 171.092437     |
| Saves          | 153.310924     |
| Comments       | 6.663866       |
| Shares         | 9.361345       |
| Likes          | 173.781513     |
| Profile Visits | 50.621849      |
| Follows        | 20.756303      |
|                | dtype: float64 |

In [19]:

```
print(b.mean())
```

|         |                |
|---------|----------------|
| Age     | 44.315000      |
| Na_to_K | 16.084485      |
|         | dtype: float64 |

In [20]:

```
print(c.mean())
```

|             |                |
|-------------|----------------|
| Time index  | 5.000000e+00   |
| StoreID     | 6.199522e+04   |
| Dept_ID     | 9.470588e+00   |
| HoursLease  | 2.203608e+01   |
| Sales units | 1.076471e+06   |
| Turnover    | 3.721393e+06   |
| Customer    | NaN            |
|             | dtype: float64 |

In [21]:

```
print(d.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
```

```
In [22]: print(e.mean())
```

```
Avg. Area Income            6.858311e+04
Avg. Area House Age          5.977222e+00
Avg. Area Number of Rooms    6.987792e+00
Avg. Area Number of Bedrooms 3.981330e+00
Area Population                3.616352e+04
Price                          1.232073e+06
dtype: float64
```

## median

```
In [23]: print(a.median())
```

```
Impressions        4289.0
From Home          2207.0
From Hashtags      1278.0
From Explore        326.0
From Other          74.0
Saves               109.0
Comments              6.0
Shares               6.0
Likes                 151.0
Profile Visits      23.0
Follows                  8.0
dtype: float64
```

```
In [24]: print(b.median())
```

```
Age           45.0000
Na_to_K       13.9365
dtype: float64
```

```
In [25]: print(c.median())
```

```
Time index        5.0
StoreID          75400.5
Dept_ID           9.0
HoursLease         0.0
Sales units      293230.0
Turnover          931957.5
Customer            NaN
dtype: float64
```

```
In [26]: print(d.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
```

In [27]:

```
print(e.median())
```

```
Avg. Area Income           6.880429e+04
Avg. Area House Age        5.970429e+00
Avg. Area Number of Rooms  7.002902e+00
Avg. Area Number of Bedrooms 4.050000e+00
Area Population             3.619941e+04
Price                       1.232669e+06
dtype: float64
```

## mode

In [28]:

```
print(a.mode())
```

|    | Impressions | From Home | From Hashtags | From Explore | From Other | Saves | \ |
|----|-------------|-----------|---------------|--------------|------------|-------|---|
| 0  | 5394.0      | 1975.0    | 116           | 45.0         | 34.0       | 40.0  |   |
| 1  | NaN         | NaN       | 201           | 84.0         | NaN        | 135.0 |   |
| 2  | NaN         | NaN       | 278           | NaN          | NaN        | 144.0 |   |
| 3  | NaN         | NaN       | 362           | NaN          | NaN        | NaN   |   |
| 4  | NaN         | NaN       | 411           | NaN          | NaN        | NaN   |   |
| 5  | NaN         | NaN       | 583           | NaN          | NaN        | NaN   |   |
| 6  | NaN         | NaN       | 655           | NaN          | NaN        | NaN   |   |
| 7  | NaN         | NaN       | 707           | NaN          | NaN        | NaN   |   |
| 8  | NaN         | NaN       | 771           | NaN          | NaN        | NaN   |   |
| 9  | NaN         | NaN       | 794           | NaN          | NaN        | NaN   |   |
| 10 | NaN         | NaN       | 1248          | NaN          | NaN        | NaN   |   |
| 11 | NaN         | NaN       | 1260          | NaN          | NaN        | NaN   |   |
| 12 | NaN         | NaN       | 1278          | NaN          | NaN        | NaN   |   |
| 13 | NaN         | NaN       | 1693          | NaN          | NaN        | NaN   |   |
| 14 | NaN         | NaN       | 1938          | NaN          | NaN        | NaN   |   |
| 15 | NaN         | NaN       | 2351          | NaN          | NaN        | NaN   |   |
| 16 | NaN         | NaN       | 2975          | NaN          | NaN        | NaN   |   |
| 17 | NaN         | NaN       | 3450          | NaN          | NaN        | NaN   |   |
| 18 | NaN         | NaN       | 3551          | NaN          | NaN        | NaN   |   |

  

|    | Comments | Shares | Likes | Profile Visits | Follows | \ |
|----|----------|--------|-------|----------------|---------|---|
| 0  | 6.0      | 3.0    | 114.0 | 19.0           | 2.0     |   |
| 1  | NaN      | NaN    | 151.0 | 21.0           | NaN     |   |
| 2  | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 3  | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 4  | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 5  | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 6  | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 7  | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 8  | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 9  | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 10 | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 11 | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 12 | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 13 | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 14 | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 15 | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 16 | NaN      | NaN    | NaN   | NaN            | NaN     |   |
| 17 | NaN      | NaN    | NaN   | NaN            | NaN     |   |

```
18      NaN      NaN      NaN      NaN      NaN  
                                         Caption \  
0  Here are some of the best data science project...  
1  Here are some of the best websites that you ca...  
2          NaN  
3          NaN  
4          NaN  
5          NaN  
6          NaN  
7          NaN  
8          NaN  
9          NaN  
10         NaN  
11         NaN  
12         NaN  
13         NaN  
14         NaN  
15         NaN  
16         NaN  
17         NaN  
18         NaN
```

```
Hashtags  
0  #data #datascience #dataanalysis #dataanalytic...  
1          NaN  
2          NaN  
3          NaN  
4          NaN  
5          NaN  
6          NaN  
7          NaN  
8          NaN  
9          NaN  
10         NaN  
11         NaN  
12         NaN  
13         NaN  
14         NaN  
15         NaN  
16         NaN  
17         NaN  
18         NaN
```

```
In [29]: print(b.mode())
```

|   | Age  | Sex | BP   | Cholesterol | Na_to_K | Drug  |
|---|------|-----|------|-------------|---------|-------|
| 0 | 47.0 | M   | HIGH | HIGH        | 12.006  | drugY |
| 1 | NaN  | NaN | NaN  | NaN         | 18.295  | NaN   |

```
In [30]: print(c.mode())
```

|   | MonthYear | Time | index | Country        | StoreID | City           | Dept_ID | \ |
|---|-----------|------|-------|----------------|---------|----------------|---------|---|
| 0 | 1.2017    |      | 1.0   | France         | 12227.0 | Aalborg (I)    | 1.0     |   |
| 1 | 10.2016   |      | 2.0   | Germany        | 15552.0 | Aalborg (II)   | 2.0     |   |
| 2 | 11.2016   |      | 3.0   | United Kingdom | 16927.0 | Amsterdam      | 3.0     |   |
| 3 | 12.2016   |      | 4.0   |                | 17647.0 | Antwerp        | 4.0     |   |
| 4 | 2.2017    |      | 5.0   |                | 18808.0 | Barcelona (I)  | 5.0     |   |
| 5 | 3.2017    |      | 6.0   |                | 19000.0 | Barcelona (II) | 6.0     |   |
| 6 | 4.2017    |      | 7.0   |                | 19340.0 | Berlin (I)     | 7.0     |   |
| 7 | 5.2017    |      | 8.0   |                | 19769.0 | Berlin (II)    | 8.0     |   |
| 8 | 6.2017    |      | 9.0   |                | 20166.0 | Bilbao         | 9.0     |   |
| 9 |           |      | NaN   |                | 20891.0 | Birmingham     | 11.0    |   |

|    |     |     |     |         |                 |      |
|----|-----|-----|-----|---------|-----------------|------|
| 10 | NaN | NaN | NaN | 22117.0 | Bologna         | 12.0 |
| 11 | NaN | NaN | NaN | 23623.0 | Bordeaux        | 13.0 |
| 12 | NaN | NaN | NaN | 29650.0 | Brno            | 14.0 |
| 13 | NaN | NaN | NaN | 32949.0 | Brussels (I)    | 15.0 |
| 14 | NaN | NaN | NaN | 34378.0 | Brussels (II)   | 16.0 |
| 15 | NaN | NaN | NaN | 38560.0 | Cologne         | 17.0 |
| 16 | NaN | NaN | NaN | 38976.0 | Copenhagen (I)  | 18.0 |
| 17 | NaN | NaN | NaN | 42367.0 | Copenhagen (II) | NaN  |
| 18 | NaN | NaN | NaN | 45583.0 | Den Haag        | NaN  |
| 19 | NaN | NaN | NaN | 63354.0 | Frankfurt       | NaN  |
| 20 | NaN | NaN | NaN | 64983.0 | Gothenburg      | NaN  |
| 21 | NaN | NaN | NaN | 71991.0 | Groningen       | NaN  |
| 22 | NaN | NaN | NaN | 73422.0 | Hamburg         | NaN  |
| 23 | NaN | NaN | NaN | 73762.0 | Krakow          | NaN  |
| 24 | NaN | NaN | NaN | 73949.0 | Leicester       | NaN  |
| 25 | NaN | NaN | NaN | 76852.0 | Liverpool       | NaN  |
| 26 | NaN | NaN | NaN | 77348.0 | London (I)      | NaN  |
| 27 | NaN | NaN | NaN | 78325.0 | London (II)     | NaN  |
| 28 | NaN | NaN | NaN | 78450.0 | Lyon            | NaN  |
| 29 | NaN | NaN | NaN | 79785.0 | Madrid (I)      | NaN  |
| 30 | NaN | NaN | NaN | 81473.0 | Madrid (II)     | NaN  |
| 31 | NaN | NaN | NaN | 83160.0 | Malmö           | NaN  |
| 32 | NaN | NaN | NaN | 85124.0 | Manchester      | NaN  |
| 33 | NaN | NaN | NaN | 85321.0 | Marseille       | NaN  |
| 34 | NaN | NaN | NaN | 85696.0 | Milano          | NaN  |
| 35 | NaN | NaN | NaN | 86089.0 | Munich          | NaN  |
| 36 | NaN | NaN | NaN | 86208.0 | Nantes          | NaN  |
| 37 | NaN | NaN | NaN | 87703.0 | Napoli          | NaN  |
| 38 | NaN | NaN | NaN | 88253.0 | Ostrava         | NaN  |
| 39 | NaN | NaN | NaN | 88750.0 | Paris (I)       | NaN  |
| 40 | NaN | NaN | NaN | 88994.0 | Paris (II)      | NaN  |
| 41 | NaN | NaN | NaN | 90992.0 | Poznan          | NaN  |
| 42 | NaN | NaN | NaN | 91973.0 | Prague (I)      | NaN  |
| 43 | NaN | NaN | NaN | 93033.0 | Prague (II)     | NaN  |
| 44 | NaN | NaN | NaN | 94153.0 | Rome (I)        | NaN  |
| 45 | NaN | NaN | NaN | 94882.0 | Rome (II)       | NaN  |
| 46 | NaN | NaN | NaN | 95434.0 | Rotterdam       | NaN  |
| 47 | NaN | NaN | NaN | 96493.0 | Stockholm       | NaN  |
| 48 | NaN | NaN | NaN | 96857.0 | Warsaw (I)      | NaN  |
| 49 | NaN | NaN | NaN | 98422.0 | Warsaw (II)     | NaN  |

|    | Dept.               | Name      | HoursOwn | HoursLease | Sales | units | Turnover | Customer | \ |
|----|---------------------|-----------|----------|------------|-------|-------|----------|----------|---|
| 0  |                     | Admin     | 47.205   | 0.0        | 0.0   | 0.0   | 0.0      | NaN      |   |
| 1  |                     | Checkout  | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 2  |                     | Clothing  | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 3  | Customer            | Services  | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 4  |                     | Delivery  | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 5  |                     | Dry       | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 6  |                     | Fish      | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 7  |                     | Food      | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 8  |                     | Frozen    | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 9  | Fruits & Vegetables |           | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 10 |                     | Hardware  | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 11 |                     | Household | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 12 |                     | Meat      | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 13 |                     | Non Food  | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 14 |                     | all       | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 15 |                     | other     | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 16 |                     | others    | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 17 |                     |           | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 18 |                     |           | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 19 |                     |           | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 20 |                     |           | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 21 |                     |           | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |
| 22 |                     |           | NaN      | NaN        | NaN   | NaN   | NaN      | NaN      |   |

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 23 | NaN | NaN | NaN | NaN | NaN | NaN |
| 24 | NaN | NaN | NaN | NaN | NaN | NaN |
| 25 | NaN | NaN | NaN | NaN | NaN | NaN |
| 26 | NaN | NaN | NaN | NaN | NaN | NaN |
| 27 | NaN | NaN | NaN | NaN | NaN | NaN |
| 28 | NaN | NaN | NaN | NaN | NaN | NaN |
| 29 | NaN | NaN | NaN | NaN | NaN | NaN |
| 30 | NaN | NaN | NaN | NaN | NaN | NaN |
| 31 | NaN | NaN | NaN | NaN | NaN | NaN |
| 32 | NaN | NaN | NaN | NaN | NaN | NaN |
| 33 | NaN | NaN | NaN | NaN | NaN | NaN |
| 34 | NaN | NaN | NaN | NaN | NaN | NaN |
| 35 | NaN | NaN | NaN | NaN | NaN | NaN |
| 36 | NaN | NaN | NaN | NaN | NaN | NaN |
| 37 | NaN | NaN | NaN | NaN | NaN | NaN |
| 38 | NaN | NaN | NaN | NaN | NaN | NaN |
| 39 | NaN | NaN | NaN | NaN | NaN | NaN |
| 40 | NaN | NaN | NaN | NaN | NaN | NaN |
| 41 | NaN | NaN | NaN | NaN | NaN | NaN |
| 42 | NaN | NaN | NaN | NaN | NaN | NaN |
| 43 | NaN | NaN | NaN | NaN | NaN | NaN |
| 44 | NaN | NaN | NaN | NaN | NaN | NaN |
| 45 | NaN | NaN | NaN | NaN | NaN | NaN |
| 46 | NaN | NaN | NaN | NaN | NaN | NaN |
| 47 | NaN | NaN | NaN | NaN | NaN | NaN |
| 48 | NaN | NaN | NaN | NaN | NaN | NaN |
| 49 | NaN | NaN | NaN | NaN | NaN | NaN |

|    | Area (m2) | Opening hours | Type   | A |
|----|-----------|---------------|--------|---|
| 0  | 0         |               | Type A |   |
| 1  | NaN       |               | NaN    |   |
| 2  | NaN       |               | NaN    |   |
| 3  | NaN       |               | NaN    |   |
| 4  | NaN       |               | NaN    |   |
| 5  | NaN       |               | NaN    |   |
| 6  | NaN       |               | NaN    |   |
| 7  | NaN       |               | NaN    |   |
| 8  | NaN       |               | NaN    |   |
| 9  | NaN       |               | NaN    |   |
| 10 | NaN       |               | NaN    |   |
| 11 | NaN       |               | NaN    |   |
| 12 | NaN       |               | NaN    |   |
| 13 | NaN       |               | NaN    |   |
| 14 | NaN       |               | NaN    |   |
| 15 | NaN       |               | NaN    |   |
| 16 | NaN       |               | NaN    |   |
| 17 | NaN       |               | NaN    |   |
| 18 | NaN       |               | NaN    |   |
| 19 | NaN       |               | NaN    |   |
| 20 | NaN       |               | NaN    |   |
| 21 | NaN       |               | NaN    |   |
| 22 | NaN       |               | NaN    |   |
| 23 | NaN       |               | NaN    |   |
| 24 | NaN       |               | NaN    |   |
| 25 | NaN       |               | NaN    |   |
| 26 | NaN       |               | NaN    |   |
| 27 | NaN       |               | NaN    |   |
| 28 | NaN       |               | NaN    |   |
| 29 | NaN       |               | NaN    |   |
| 30 | NaN       |               | NaN    |   |
| 31 | NaN       |               | NaN    |   |
| 32 | NaN       |               | NaN    |   |
| 33 | NaN       |               | NaN    |   |
| 34 | NaN       |               | NaN    |   |
| 35 | NaN       |               | NaN    |   |

```
36      NaN      NaN  
37      NaN      NaN  
38      NaN      NaN  
39      NaN      NaN  
40      NaN      NaN  
41      NaN      NaN  
42      NaN      NaN  
43      NaN      NaN  
44      NaN      NaN  
45      NaN      NaN  
46      NaN      NaN  
47      NaN      NaN  
48      NaN      NaN  
49      NaN      NaN
```

In [31]:

```
print(d.mode())
```

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

In [32]:

```
print(e.mode())
```

|      | Avg. Area Income                                 | Avg. Area House Age | Avg. Area Number of Rooms | \ |
|------|--|---------------------|---------------------------|---|
| 0    | 17796.631190                                     | 2.644304            | 3.236194                  |   |
| 1    | 35454.714659                                     | 2.683043            | 3.950225                  |   |
| 2    | 35608.986237                                     | 2.797215            | 3.950973                  |   |
| 3    | 35797.323122                                     | 2.797619            | 3.969632                  |   |
| 4    | 35963.330809                                     | 2.922736            | 4.027931                  |   |
| ...  | ...  | ...                 | ...                       |   |
| 4995 | 101599.670580                                    | 8.973441            | 10.024375                 |   |
| 4996 | 101928.858060                                    | 8.991399            | 10.144988                 |   |
| 4997 | 102881.120902                                    | 9.008900            | 10.219902                 |   |
| 4998 | 104702.724257                                    | 9.125283            | 10.280022                 |   |
| 4999 | 107701.748378                                    | 9.519088            | 10.759588                 |   |
|      |  |                     |                           |   |
|      | Avg. Area Number of Bedrooms                     | Area Population     | Price                     | \ |
| 0    | 4.38   | 172.610686          | 1.593866e+04              |   |
| 1    | NaN  | 3285.450538         | 3.114052e+04              |   |
| 2    | NaN  | 3883.448164         | 8.859177e+04              |   |
| 3    | NaN  | 4114.489353         | 1.430274e+05              |   |
| 4    | NaN  | 5727.485885         | 1.515271e+05              |   |
| ...  | ...  | ...                 | ...                       |   |
| 4995 | NaN  | 68311.695822        | 2.318286e+06              |   |
| 4996 | NaN  | 69553.988327        | 2.330290e+06              |   |
| 4997 | NaN  | 69575.449464        | 2.332111e+06              |   |
| 4998 | NaN  | 69592.040236        | 2.370231e+06              |   |
| 4999 | NaN  | 69621.713378        | 2.469066e+06              |   |
|      |  |                     |                           |   |
|      | Address  |                     |                           |   |
| 0    | 000 Adkins Crescent\nSouth Teresa, AS 49642-1348 |                     |                           |   |
| 1    | 000 Todd Pines\nAshleyberg, KY 90207-1179        |                     |                           |   |
| 2    | 001 Steve Plaza\nJessicastad, UT 25190           |                     |                           |   |
| 3    | 0010 Gregory Loaf\nSouth Ericfort, VA 34651-0718 |                     |                           |   |
| 4    | 00149 Raymond Knolls\nNew Jason, UT 75026        |                     |                           |   |
| ...  | ...  |                     |                           |   |
| 4995 | Unit 9774 Box 4511\nDPO AE 44963                 |                     |                           |   |
| 4996 | Unit 9778 Box 2114\nDPO AP 59374                 |                     |                           |   |
| 4997 | Unit 9785 Box 0790\nDPO AP 60371-0797            |                     |                           |   |
| 4998 | Unit 9831 Box 7128\nDPO AA 54705                 |                     |                           |   |
| 4999 | Unit 9871 Box 9037\nDPO AP 37275-9289            |                     |                           |   |

[5000 rows x 7 columns]

## describe

In [33]:

```
print(a.describe())
```

|       | Impressions | From Home   | From Hashtags | From Explore | From Other | \ |
|-------|-------------|-------------|---------------|--------------|------------|---|
| count | 119.000000  | 119.000000  | 119.000000    | 119.000000   | 119.000000 |   |
| mean  | 5703.991597 | 2475.789916 | 1887.512605   | 1078.100840  | 171.092437 |   |
| std   | 4843.780105 | 1489.386348 | 1884.361443   | 2613.026132  | 289.431031 |   |
| min   | 1941.000000 | 1133.000000 | 116.000000    | 0.000000     | 9.000000   |   |
| 25%   | 3467.000000 | 1945.000000 | 726.000000    | 157.500000   | 38.000000  |   |
| 50%   | 4289.000000 | 2207.000000 | 1278.000000   | 326.000000   | 74.000000  |   |
| 75%   | 6138.000000 | 2602.500000 | 2363.500000   | 689.500000   | 196.000000 |   |

```

max    36919.000000  13473.000000  11817.000000  17414.000000  2547.000000
       Saves   Comments   Shares   Likes Profile Visits \
count  119.000000  119.000000  119.000000  119.000000  119.000000
mean   153.310924  6.663866   9.361345  173.781513  50.621849
std    156.317731  3.544576  10.089205  82.378947  87.088402
min    22.000000  0.000000  0.000000  72.000000  4.000000
25%   65.000000  4.000000  3.000000  121.500000  15.000000
50%   109.000000  6.000000  6.000000  151.000000  23.000000
75%   169.000000  8.000000  13.500000  204.000000  42.000000
max   1095.000000 19.000000  75.000000  549.000000  611.000000

      Follows
count  119.000000
mean   20.756303
std    40.921580
min    0.000000
25%   4.000000
50%   8.000000
75%   18.000000
max   260.000000

```

In [34]: `print(b.describe())`

```

          Age   Na_to_K
count  200.000000  200.000000
mean   44.315000  16.084485
std    16.544315  7.223956
min    15.000000  6.269000
25%   31.000000  10.445500
50%   45.000000  13.936500
75%   58.000000  19.380000
max   74.000000  38.247000

```

In [35]: `print(c.describe())`

```

          Time index   StoreID   Dept_ID HoursLease Sales units \
count  7650.000000  7650.000000  7650.000000  7650.000000  7.650000e+03
mean   5.000000    61995.220000   9.470588   22.036078  1.076471e+06
std    2.582158    29924.581631   5.337429  133.299513  1.728113e+06
min    1.000000    12227.000000   1.000000   0.000000  0.000000e+00
25%   3.000000    29650.000000   5.000000   0.000000  5.457125e+04
50%   5.000000    75400.500000   9.000000   0.000000  2.932300e+05
75%   7.000000    87703.000000  14.000000   0.000000  9.175075e+05
max   9.000000    98422.000000  18.000000  3984.000000  1.124296e+07

```

```

          Turnover Customer
count  7.650000e+03    0.0
mean   3.721393e+06   NaN
std    6.003380e+06   NaN
min    0.000000e+00   NaN
25%   2.726798e+05   NaN
50%   9.319575e+05   NaN
75%   3.264432e+06   NaN
max   4.271739e+07   NaN

```

In [36]: `print(d.describe())`

```

          Happiness Rank   Happiness Score Standard Error \
count  158.000000     158.000000    158.000000
mean   79.493671     5.375734     0.047885
std    45.754363     1.145010     0.017146

```

```

min           1.000000    2.839000    0.018480
25%          40.250000   4.526000    0.037268
50%          79.500000   5.232500    0.043940
75%         118.750000   6.243750    0.052300
max          158.000000   7.587000    0.136930

Economy (GDP per Capita)      Family      Health (Life Expectancy) \
count          158.000000  158.000000  158.000000
mean           0.846137   0.991046   0.630259
std            0.403121   0.272369   0.247078
min           0.000000   0.000000   0.000000
25%          0.545808   0.856823   0.439185
50%          0.910245   1.029510   0.696705
75%          1.158448   1.214405   0.811013
max          1.690420   1.402230   1.025250

Freedom Trust (Government Corruption) Generosity \
count          158.000000  158.000000  158.000000
mean           0.428615   0.143422   0.237296
std            0.150693   0.120034   0.126685
min           0.000000   0.000000   0.000000
25%          0.328330   0.061675   0.150553
50%          0.435515   0.107220   0.216130
75%          0.549092   0.180255   0.309883
max          0.669730   0.551910   0.795880

Dystopia Residual
count          158.000000
mean           2.098977
std            0.553550
min           0.328580
25%          1.759410
50%          2.095415
75%          2.462415
max          3.602140

```

In [37]: `print(e.describe())`

|       | Avg. Area Income | Avg. Area House Age | Avg. Area Number of Rooms | Price |
|-------|------------------|---------------------|---------------------------|-------|
| count | 5000.000000      | 5000.000000         | 5000.000000               |       |
| mean  | 68583.108984     | 5.977222            | 6.987792                  |       |
| std   | 10657.991214     | 0.991456            | 1.005833                  |       |
| min   | 17796.631190     | 2.644304            | 3.236194                  |       |
| 25%   | 61480.562388     | 5.322283            | 6.299250                  |       |
| 50%   | 68804.286404     | 5.970429            | 7.002902                  |       |
| 75%   | 75783.338666     | 6.650808            | 7.665871                  |       |
| max   | 107701.748378    | 9.519088            | 10.759588                 |       |

## b)find sum(),cumsum(),count(),min,max

### sum()

```
In [38]: print(a.sum())
```

|                |   |
|----------------|---|
| Impressions    | 678775  |
| From Home      | 294619  |
| From Hashtags  | 224614  |
| From Explore   | 128294  |
| From Other     | 20360   |
| Saves          | 18244   |
| Comments       | 793   |
| Shares         | 1114  |
| Likes          | 20680   |
| Profile Visits | 6024  |
| Follows        | 2470  |
| Caption        | Here are some of the most important data visua... |
| Hashtags       | #finance #money #business #investing #investme... |
| dtype: object  |   |

```
In [39]: print(b.sum())
```

|               |   |
|---------------|---|
| Age           | 8863  |
| Sex           | FMMFFFFMFMFFMFFFMMMFMMFFFMMFMMFMMMFMMFF...            |
| BP            | HIGHLOWLOWNORMALMALLOWNORMALNORMALMALLOWLOW...        |
| Cholesterol   | HIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHNORMALHIGH... |
| Na_to_K       | 3216.897  |
| Drug          | drugYdrugCdrugXdrugYdrugXdrugYdrugCdrugYd...          |
| dtype: object |   |

```
In [40]: print(c.sum())
```

|               |  |
|---------------|--|
| MonthYear     | 10.201610.201610.201610.201610.201610.2... |
| Time index    | 38250.0                                    |
| StoreID       | 474263433.0                                |
| Dept_ID       | 72450.0                                    |
| HoursLease    | 168576.0                                   |
| Sales units   | 8235000965.0                               |
| Turnover      | 28468656015.0                              |
| Customer      | 0.0  |
| dtype: object |  |

```
In [41]: print(d.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                 |   |

```
In [42]: print(e.sum())
```

|                     |                  |
|---------------------|------------------|
| Avg. Area Income    | 342915544.919799 |
| Avg. Area House Age | 29886.110176     |

```
Avg. Area Number of Rooms          34938.959255
Avg. Area Number of Bedrooms       19906.65
Area Population                   180817580.192873
Price                            6160363270.711784
Address                           208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
dtype: object
```

## cumsum()

In [43]:

```
print(a.cumsum())
```

```
Impressions  From Home  From Hashtags  From Explore  From Other  Saves \
0            3920    2586           1028        619         56      98
1            9314    5313           2866        1793        134     292
2           13335    7398           4054        1793        667     333
3           17863   10098           4675        2725        740     505
4           20381   11802           4930        3004        777     601
..           ...
114          599291  266275          214385        90803      17545    16325
115          605022  268198          215753        93069      17610    16460
116          609161  269331          217291        94436      17643    16496
117          641856  281146          220438        111850      17813    17591
118          678775  294619          224614        128294      20360    18244

Comments  Shares  Likes  Profile Visits  Follows \
0          9      5    162           35         2
1          16     19    386           83        12
2          27     20    517           145       24
3          37     27    730           168       32
4          42     31    853           176       32
..           ...
114         782    1011   19448          5211      2000
115         786    1012   19596          5231      2018
116         786    1013   19688          5265      2028
117         788    1088   20237          5413      2242
118         793    1114   20680          6024      2470

Caption \
0  Here are some of the most important data visua...
1  Here are some of the most important data visua...
2  Here are some of the most important data visua...
3  Here are some of the most important data visua...
4  Here are some of the most important data visua...
..           ...
114  Here are some of the most important data visua...
115  Here are some of the most important data visua...
116  Here are some of the most important data visua...
117  Here are some of the most important data visua...
118  Here are some of the most important data visua...

Hashtags
0  #finance #money #business #investme...
1  #finance #money #business #investme...
2  #finance #money #business #investme...
3  #finance #money #business #investme...
4  #finance #money #business #investme...
..           ...
114  #finance #money #business #investme...
115  #finance #money #business #investme...
116  #finance #money #business #investme...
117  #finance #money #business #investme...
118  #finance #money #business #investme...
```

[119 rows x 13 columns]

In [44]:

```
print(b.cumsum())
```

|     | Age   | Sex   |   |
|-----|---|---|---|
| 0   | 23  | F   |   |
| 1   | 70  | FM  |   |
| 2   | 117   | FMM   |   |
| 3   | 145   | FMMF  |   |
| 4   | 206   | FMMFF   |   |
| ..  | ...   | ...   |   |
| 195 | 8732  | FMMFFFFM...FMMFFM...FMMFFM...FMMFFM...FMMFFM...FMMFF... |   |
| 196 | 8748  | FMMFFFFM...FMMFFM...FMMFFM...FMMFFM...FMMFFM...FMMFF... |   |
| 197 | 8800  | FMMFFFFM...FMMFFM...FMMFFM...FMMFFM...FMMFFM...FMMFF... |   |
| 198 | 8823  | FMMFFFFM...FMMFFM...FMMFFM...FMMFFM...FMMFFM...FMMFF... |   |
| 199 | 8863  | FMMFFFFM...FMMFFM...FMMFFM...FMMFFM...FMMFFM...FMMFF... |   |
|     | BP  | \   |   |
| 0   |   | HIGH  |   |
| 1   |   | HIGHLOW   |   |
| 2   |   | HIGHLOWLOW  |   |
| 3   |   | HIGHLOWLOWNORMAL  |   |
| 4   |   | HIGHLOWLOWNORMALLOW                                     |   |
| ..  |   | ...   |   |
| 195 | HIGHLOWLOWNORMALLOWNORMALNORMALNORMALLOWLOW...      | ...   |   |
| 196 | HIGHLOWLOWNORMALLOWNORMALNORMALNORMALLOWLOW...      | ...   |   |
| 197 | HIGHLOWLOWNORMALLOWNORMALNORMALLOWNORMALLOWLOW...   | ...   |   |
| 198 | HIGHLOWLOWNORMALLOWNORMALNORMALLOWNORMALLOWLOW...   | ...   |   |
| 199 | HIGHLOWLOWNORMALLOWNORMALNORMALLOWNORMALLOWLOW...   | ...   |   |
|     | Cholesterol   | Na_to_K   | \ |
| 0   | HIGH  | 25.355  |   |
| 1   | HIGHHIGH  | 38.448  |   |
| 2   | HIGHHIGHHIGH  | 48.562  |   |
| 3   | HIGHHIGHHIGHHIGH                                    | 56.360  |   |
| 4   | HIGHHIGHHIGHHIGHHIGH                                | 74.403  |   |
| ..  | ...   | ...   |   |
| 195 | HIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGH... | 3169.628  |   |
| 196 | HIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGH... | 3181.634  |   |
| 197 | HIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGH... | 3191.528  |   |
| 198 | HIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGH... | 3205.548  |   |
| 199 | HIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGHHIGH... | 3216.897  |   |
|     | Drug  |   |   |
| 0   | drugY   |   |   |
| 1   | drugYdrugC  |   |   |
| 2   | drugYdrugCdrugC                                     |   |   |
| 3   | drugYdrugCdrugCdrugX                                |   |   |
| 4   | drugYdrugCdrugCdrugXdrugY                           |   |   |
| ..  | ...   |   |   |
| 195 | drugYdrugCdrugCdrugXdrugYdrugXdrugYdrugCdrugYd...   |   |   |
| 196 | drugYdrugCdrugCdrugXdrugYdrugXdrugYdrugCdrugYd...   |   |   |
| 197 | drugYdrugCdrugCdrugXdrugYdrugXdrugYdrugCdrugYd...   |   |   |
| 198 | drugYdrugCdrugCdrugXdrugYdrugXdrugYdrugCdrugYd...   |   |   |
| 199 | drugYdrugCdrugCdrugXdrugYdrugXdrugYdrugCdrugYd...   |   |   |

[200 rows x 6 columns]

In [143...]

```
c1=c["StoreID"].values  
print(np.cumsum(c1))
```

[ 88253. 176506. 264759. ... nan nan nan]

In [50]:

```
print(d.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]

In [47]:

```
print(e.cumsum())
```

```
          Avg. Area Income  Avg. Area House Age  Avg. Area Number of Rooms \
0        7.954546e+04           5.682861           7.009188
1       1.587941e+05          11.685761          13.740009
2       2.200812e+05          17.551651          22.252737
3       2.834264e+05          24.739887          27.839465
4       3.434086e+05          29.780442          35.678853
...
4995   3.426402e+08          29860.333757         34913.654931
4996   3.427186e+08          29867.332892         34920.231694
4997   3.427820e+08          29874.583483         34925.036775
4998   3.428500e+08          29880.117871         34932.166918
4999   3.429155e+08          29886.110176         34938.959255

          Avg. Area Number of Bedrooms  Area Population      Price \
0             4.09     2.308680e+04  1.059034e+06
1             7.18     6.325987e+04  2.564924e+06
2            12.31     1.001420e+05  3.623912e+06
3            15.57     1.344523e+05  4.884529e+06
4            19.80     1.608064e+05  5.515473e+06
...
4995          19890.99     1.806696e+08  6.155352e+09
4996          19895.01     1.806952e+08  6.156835e+09
4997          19897.14     1.807285e+08  6.157866e+09
4998          19902.58     1.807711e+08  6.159064e+09
4999          19906.65     1.808176e+08  6.160363e+09

                           Address
0  208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
1  208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
2  208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
3  208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
4  208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
...
4995 208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
4996 208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
4997 208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
4998 208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
4999 208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
```

[5000 rows x 7 columns]

## count

In [61]:

```
print(a.count())
```

```
Impressions      119
From Home       119
From Hashtags   119
From Explore    119
From Other      119
Saves           119
Comments         119
Shares           119
Likes            119
```

```
Profile Visits      119  
Follows            119  
Caption           119  
Hashtags          119  
dtype: int64
```

```
In [62]: print(b.count())
```

```
Age              200  
Sex              200  
BP               200  
Cholesterol     200  
Na_to_K          200  
Drug             200  
dtype: int64
```

```
In [63]: print(c.count())
```

```
MonthYear        7658  
Time index       7650  
Country          7650  
StoreID          7650  
City              7650  
Dept_ID          7650  
Dept. Name        7650  
HoursOwn         7650  
HoursLease        7650  
Sales units       7650  
Turnover          7650  
Customer          0  
Area (m2)         7650  
Opening hours     7650  
dtype: int64
```

```
In [64]: print(d.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
```

```
In [65]: print(e.count())
```

```
Avg. Area Income    5000  
Avg. Area House Age 5000  
Avg. Area Number of Rooms 5000  
Avg. Area Number of Bedrooms 5000  
Area Population     5000  
Price               5000  
Address             5000  
dtype: int64
```

## min

```
In [66]: print(a.min())
```

```
Impressions          1941
From Home           1133
From Hashtags       116
From Explore        0
From Other          9
Saves               22
Comments             0
Shares               0
Likes                72
Profile Visits      4
Follows              0
Caption             170 Python Projects with Source Code solved an...
Hashtags            #career #job #jobs #jobsearch #education #busi...
dtype: object
```

```
In [67]: print(b.min())
```

```
Age                 15
Sex                 F
BP                  HIGH
Cholesterol        HIGH
Na_to_K            6.269
Drug                drugA
dtype: object
```

```
In [68]: print(c.min())
```

```
MonthYear         - - - -
Time index        1.0
StoreID          12227.0
Dept_ID          1.0
HoursLease        0.0
Sales units       0.0
Turnover          0.0
Customer          NaN
dtype: object
```

```
In [69]: print(d.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
```

```
In [70]: print(e.min())
```

```
Avg. Area Income           17796.63119
Avg. Area House Age        2.644304
Avg. Area Number of Rooms   3.236194
Avg. Area Number of Bedrooms  2.0
Area Population             172.610686
Price                       15938.657923
Address                      000 Adkins Crescent\nSouth Teresa, AS 49642-1348
dtype: object
```

## max

```
In [71]: print(a.max())
```

```
Impressions            36919
From Home              13473
From Hashtags           11817
From Explore             17414
From Other                2547
Saves                     1095
Comments                   19
Shares                      75
Likes                      549
Profile Visits            611
Follows                     260
Caption      You must have seen the news divided into categ...
Hashtags      #timeseries #time #statistics #datascience #bi...
dtype: object
```

```
In [72]: print(b.max())
```

```
Age                  74
Sex                  M
BP                  NORMAL
Cholesterol          NORMAL
Na_to_K              38.247
Drug                 drugY
dtype: object
```

```
In [73]: print(c.max())
```

```
MonthYear          6.2017
Time index           9.0
StoreID            98422.0
Dept_ID              18.0
HoursLease          3984.0
Sales units       11242955.0
Turnover            42717390.0
Customer             NaN
dtype: object
```

```
In [74]: print(d.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
```

```
In [75]: print(e.max())
```

```
Avg. Area Income           107701.748378
Avg. Area House Age        9.519088
Avg. Area Number of Rooms 10.759588
Avg. Area Number of Bedrooms 6.5
Area Population             69621.713378
Price                        2469065.594175
Address                      Unit 9871 Box 9037\nDPO AP 37275-9289
dtype: object
```

## c)covariance and corelation

### covariance

```
In [134... from numpy import cov
```

```
In [135... a1=a["Comments"].values
a2=a["Saves"].values
print(np.cov(a1,a2))
```

```
[[ 1.25640222e+01 -1.49115511e+01]
 [-1.49115511e+01  2.44352330e+04]]
```

```
In [136... b1=b["Age"].values
b2=b["Na_to_K"].values
print(np.cov(b1,b2))
```

```
[[273.71434673 -7.54375153]
 [-7.54375153  52.18553348]]
```

```
In [137... c1=c["StoreID"].values
c2=c["Turnover"].values
print(np.cov(c1,c2))
```

```
[[nan nan]
 [nan nan]]
```

```
In [138... d1=d["Family"].values
d2=d["Freedom"].values
print(np.cov(d1,d2))
```

```
[[0.07418492 0.0181217 ]
 [0.0181217  0.02270832]]
```

```
In [139... e1=e["Area Population"].values
e2=e["Price"].values
print(np.cov(e1,e2))
```

```
[[9.85185302e+07 1.43195649e+09]
 [1.43195649e+09 1.24692058e+11]]
```

## correlation

In [108...]

```
from scipy.stats import pearsonr
from scipy.stats import spearmanr
```

In [128...]

```
a1=a["Comments"].values
a2=a["Saves"].values
spearman =pd.Series(a1).corr(pd.Series(a2),method='spearman')
pearson =pd.Series(a1).corr(pd.Series(a2),method='pearson')
print(spearman)
print(pearson)
```

```
0.18289066665208123
-0.026912263707561033
```

In [129...]

```
b1=b["Age"].values
b2=b["Na_to_K"].values
spearman =pd.Series(b1).corr(pd.Series(b2),method='spearman')
pearson =pd.Series(b1).corr(pd.Series(b2),method='pearson')
print(spearman)
print(pearson)
```

```
-0.047273882688479915
-0.06311949726772588
```

In [130...]

```
c1=c["StoreID"].values
c2=c["Turnover"].values
spearman =pd.Series(c1).corr(pd.Series(c2),method='spearman')
pearson =pd.Series(c1).corr(pd.Series(c2),method='pearson')
print(spearman)
print(pearson)
```

```
0.023487567052755485
0.009206092867868828
```

In [131...]

```
d1=d["Family"].values
d2=d["Freedom"].values
spearman =pd.Series(d1).corr(pd.Series(d2),method='spearman')
pearson =pd.Series(d1).corr(pd.Series(d2),method='pearson')
print(spearman)
print(pearson)
```

```
0.5281391142435108
0.4415182106228604
```

In [132...]

```
e1=e["Area Population"].values
e2=e["Price"].values
spearman =pd.Series(e1).corr(pd.Series(e2),method='spearman')
pearson =pd.Series(e1).corr(pd.Series(e2),method='pearson')
```

```
print(spearman)
print(pearson)
```

```
0.3946491364259654
0.4085558793209317
```