In [14]:
```
import numpy as np
import pandas as pd
```

Dataset-1

In [26]:
```
df=pd.read_csv(r"C:\Users\user\Downloads\1_fiat500_VehicleSelection_Dataset.csv
df.fillna(0, inplace=True)
df
```

Out[26]:

	ID	model	engine_power	age_in_days	km	previous_owners	lat	lo
0	1.0	lounge	51.0	882.0	25000.0	1.0	44.907242	8.61155986
1	2.0	pop	51.0	1186.0	32500.0	1.0	45.666359	12.2418899
2	3.0	sport	74.0	4658.0	142228.0	1.0	45.503300	11.4178
3	4.0	lounge	51.0	2739.0	160000.0	1.0	40.633171	17.6346092
4	5.0	pop	73.0	3074.0	106880.0	1.0	41.903221	12.4956502
...	...	...	...	...	...	...	...	...
1544	0.0	0	0.0	0.0	0.0	0.0	0.000000	lengtl
1545	0.0	0	0.0	0.0	0.0	0.0	0.000000	conca
1546	0.0	0	0.0	0.0	0.0	0.0	0.000000	Null value
1547	0.0	0	0.0	0.0	0.0	0.0	0.000000	fin
1548	0.0	0	0.0	0.0	0.0	0.0	0.000000	searcl

1549 rows × 11 columns

In [27]:
```
data1=df["km"].values
data2=df["age_in_days"].values
```

In [28]:
```
mean = np.mean(data1)
median = np.median(data1)
mode = pd.Series(data1).mode().values
```

In [29]:
```
data_sum = np.sum(data1)
cumulative_sum = np.cumsum(data1)
data_count = len(data1)
data_min = np.min(data1)
data_max = np.max(data1)
```

In [30]:
```
covariance = np.cov(data1, data2)[0, 1]
spearman_corr = pd.Series(data1).corr(pd.Series(data2), method='spearman')
pearson_corr = pd.Series(data1).corr(pd.Series(data2), method='pearson')
```

In [31]:
```
print("a) Mean:", mean)
print("   Median:", median)
print("   Mode:", mode)
print("b) Sum:", data_sum)
print("   Cumulative Sum:", cumulative_sum)
print("   Count:", data_count)
print("   Min:", data_min)
print("   Max:", data_max)
print("c) Covariance:", covariance)
print("   Spearman Correlation:", spearman_corr)
print("   Pearson Correlation:", pearson_corr)
```

```
a) Mean: 53016.8276307295
   Median: 38800.0
   Mode: [17000.]
b) Sum: 82123066.0
   Cumulative Sum: [2.5000000e+04 5.7500000e+04 1.9972800e+05 ... 8.2123066e+
07 8.2123066e+07
 8.2123066e+07]
   Count: 1549
   Min: 0.0
   Max: 235000.0
c) Covariance: 43379104.33490349
   Spearman Correlation: 0.837737856976292
   Pearson Correlation: 0.8358723005598141
```

Dataset-2

In [32]:
```
df=pd.read_csv(r"C:\Users\user\Downloads\2_2015.csv")
df.fillna(0, inplace=True)
df
```

Out[32]:

	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 [34]:
```
data1=df["Happiness Score"].values
data2=df["Family"].values
```

In [35]:
```
mean = np.mean(data1)
median = np.median(data1)
mode = pd.Series(data1).mode().values
```

In [36]:
```
data_sum = np.sum(data1)
cumulative_sum = np.cumsum(data1)
data_count = len(data1)
data_min = np.min(data1)
data_max = np.max(data1)
```

In [37]:
```
covariance = np.cov(data1, data2)[0, 1]
spearman_corr = pd.Series(data1).corr(pd.Series(data2), method='spearman')
pearson_corr = pd.Series(data1).corr(pd.Series(data2), method='pearson')
```

In [38]:
```
print("a) Mean:", mean)
print("   Median:", median)
print("   Mode:", mode)
print("b) Sum:", data_sum)
print("   Cumulative Sum:", cumulative_sum)
print("   Count:", data_count)
print("   Min:", data_min)
print("   Max:", data_max)
print("c) Covariance:", covariance)
print("   Spearman Correlation:", spearman_corr)
print("   Pearson Correlation:", pearson_corr)
```

```
a) Mean: 5.375734177215189
   Median: 5.2325
   Mode: [5.192]
b) Sum: 849.3659999999999
   Cumulative Sum: [  7.587  15.148  22.675  30.197  37.624  45.03   52.408
59.772  67.058
  74.342  81.62   88.846  96.046 103.233 110.352 117.335 124.281 131.221
 138.158 145.059 151.926 158.779 165.589 172.387 179.173 185.923 192.593
 199.204 205.779 212.353 218.858 225.343 231.82  238.275 244.686 251.015
 257.317 263.615 269.91  276.179 282.347 288.477 294.6   300.603 306.598
 312.585 318.569 324.544 330.504 336.452 342.342 348.231 354.109 359.964
 365.812 371.645 377.473 383.297 389.11  394.901 400.671 406.43  412.184
 417.9   423.609 429.304 434.993 440.598 446.187 451.735 457.212 462.686
 468.115 473.514 478.874 484.206 489.492 494.76  500.013 505.225 510.419
 515.611 520.803 525.943 531.072 536.196 541.319 546.421 551.519 556.592
 561.649 566.662 571.669 576.64  581.599 586.548 591.446 596.331 601.207
 606.081 610.948 615.805 620.644 625.444 630.232 635.018 639.757 644.472
 649.166 653.852 658.533 663.21  667.852 672.485 677.095 681.666 686.231
 690.781 695.299 699.816 704.33  708.842 713.349 717.785 722.204 726.573
 730.923 735.255 739.562 743.859 748.151 752.422 756.674 760.892 765.086
 769.163 773.196 777.191 781.18  785.136 789.067 792.971 796.867 800.712
 804.531 808.312 811.993 815.671 819.338 822.994 826.649 830.236 833.811
 837.276 840.616 843.622 846.527 849.366]
   Count: 158
   Min: 2.839
   Max: 7.587
c) Covariance: 0.23096910936225107
   Spearman Correlation: 0.7700379625427317
   Pearson Correlation: 0.7406051972367848
```

Dataset-3

In [42]:
```
df=pd.read_csv(r"C:\Users\user\Downloads\6_Salesworkload1.csv")
df.fillna(0, inplace=True)
df
```

Out[42]:

	MonthYear	Time index	Country	StoreID	City	Dept_ID	Dept. Name	HoursOwn	HoursLea
0	10.2016	1.0	United Kingdom	88253.0	London (I)	1.0	Dry	3184.764	
1	10.2016	1.0	United Kingdom	88253.0	London (I)	2.0	Frozen	1582.941	
2	10.2016	1.0	United Kingdom	88253.0	London (I)	3.0	other	47.205	
3	10.2016	1.0	United Kingdom	88253.0	London (I)	4.0	Fish	1623.852	
4	10.2016	1.0	United Kingdom	88253.0	London (I)	5.0	Fruits & Vegetables	1759.173	
...	...	...	...	...	...	...	...	...	
7653	06.2017	9.0	Sweden	29650.0	Gothenburg	12.0	Checkout	6322.323	
7654	06.2017	9.0	Sweden	29650.0	Gothenburg	16.0	Customer Services	4270.479	
7655	06.2017	9.0	Sweden	29650.0	Gothenburg	11.0	Delivery	0	
7656	06.2017	9.0	Sweden	29650.0	Gothenburg	17.0	others	2224.929	
7657	06.2017	9.0	Sweden	29650.0	Gothenburg	18.0	all	39652.2	

7658 rows × 14 columns

In [47]:
```
data1=df["Sales units"].values
data2=df["Turnover"].values
mean = np.mean(data1)
median = np.median(data1)
mode = pd.Series(data1).mode().values
data_sum = np.sum(data1)
cumulative_sum = np.cumsum(data1)
data_count = len(data1)
data_min = np.min(data1)
data_max = np.max(data1)
covariance = np.cov(data1, data2)[0, 1]
spearman_corr = pd.Series(data1).corr(pd.Series(data2), method='spearman')
pearson_corr = pd.Series(data1).corr(pd.Series(data2), method='pearson')
```

In [48]:
```
print("a) Mean:", mean)
print("   Median:", median)
print("   Mode:", mode)
print("b) Sum:", data_sum)
print("   Cumulative Sum:", cumulative_sum)
print("   Count:", data_count)
print("   Min:", data_min)
print("   Max:", data_max)
print("c) Covariance:", covariance)
print("   Spearman Correlation:", spearman_corr)
print("   Pearson Correlation:", pearson_corr)
```

```
a) Mean: 1075346.1693653695
   Median: 292762.5
   Mode: [0.]
b) Sum: 8235000965.0
   Cumulative Sum: [3.98560000e+05 4.81285000e+05 9.19685000e+05 ... 8.231114
19e+09
 8.23111444e+09 8.23500096e+09]
   Count: 7658
   Min: 0.0
   Max: 11242955.0
c) Covariance: 9822465673187.139
   Spearman Correlation: 0.915789587710917
   Pearson Correlation: 0.9473954215727692
```

Dataset-4

In [49]:
```
df=pd.read_csv(r"C:\Users\user\Downloads\4_drug200.csv")
df.fillna(0, inplace=True)
df
```

Out[49]:

	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 [50]:
```
data1=df["Na_to_K"].values
data2=df["Age"].values
mean = np.mean(data1)
median = np.median(data1)
mode = pd.Series(data1).mode().values
data_sum = np.sum(data1)
cumulative_sum = np.cumsum(data1)
data_count = len(data1)
data_min = np.min(data1)
data_max = np.max(data1)
covariance = np.cov(data1, data2)[0, 1]
spearman_corr = pd.Series(data1).corr(pd.Series(data2), method='spearman')
pearson_corr = pd.Series(data1).corr(pd.Series(data2), method='pearson')
```

In [51]:
```
print("a) Mean:", mean)
print("   Median:", median)
print("   Mode:", mode)
print("b) Sum:", data_sum)
print("   Cumulative Sum:", cumulative_sum)
print("   Count:", data_count)
print("   Min:", data_min)
print("   Max:", data_max)
print("c) Covariance:", covariance)
print("   Spearman Correlation:", spearman_corr)
print("   Pearson Correlation:", pearson_corr)
```

```
a) Mean: 16.084485
   Median: 13.9365
   Mode: [12.006 18.295]
b) Sum: 3216.897
   Cumulative Sum: [  25.355   38.448   48.562   56.36    74.403   83.01    9
9.285  110.322
  125.493  144.861  156.628  175.827  191.203  212.145  224.848  240.364
  251.819  265.791  273.089  299.063  318.191  344.108  374.676  389.712
  423.198  442.007  472.373  481.754  504.451  522.402  531.152  540.719
  551.733  583.609  597.742  605.027  614.472  628.41   638.119  647.203
  666.424  680.663  696.453  708.713  721.008  729.115  742.206  752.497
  784.183  803.979  823.395  834.293  861.476  879.933  890.122  904.282
  915.622  943.448  953.539  972.242 1002.117 1011.592 1032.285 1040.655
 1053.958 1081.008 1093.864 1104.696 1129.354 1153.63  1167.597 1187.272
 1197.877 1220.782 1237.851 1258.76  1269.958 1289.119 1302.432 1313.272
 1327.206 1334.967 1344.679 1356.005 1366.072 1380.007 1393.604 1409.082
 1432.173 1449.384 1465.978 1481.134 1510.584 1539.855 1554.87  1566.294
 1604.541 1629.936 1665.575 1682.3   1694.171 1707.025 1720.152 1729.118
 1757.412 1766.38  1778.333 1798.346 1808.023 1824.873 1832.363 1839.046
 1848.216 1861.985 1871.266 1889.561 1899.075 1909.178 1919.47  1944.945
 1972.009 1989.215 2011.671 2028.424 2040.919 2066.888 2083.235 2091.08
 2124.622 2132.099 2152.588 2185.51  2199.108 2224.894 2245.93  2257.869
 2268.846 2281.74  2293.083 2303.148 2309.417 2335.158 2343.779 2359.215
 2368.879 2378.322 2390.328 2402.635 2409.975 2418.126 2426.826 2437.835
 2445.096 2459.738 2476.462 2486.999 2498.226 2521.189 2531.633 2544.556
 2554.999 2564.944 2577.803 2606.435 2625.442 2643.737 2670.382 2684.598
 2707.601 2718.863 2731.742 2741.759 2758.984 2777.723 2790.489 2808.837
 2819.283 2838.294 2854.263 2870.154 2892.972 2906.856 2918.542 2934.032
 2971.22  2997.113 3006.962 3017.365 3052.362 3073.294 3092.285 3100.296
 3116.606 3123.375 3158.061 3169.628 3181.634 3191.528 3205.548 3216.897]
   Count: 200
   Min: 6.269
   Max: 38.247
c) Covariance: -7.543751532663317
   Spearman Correlation: -0.047273882688479915
   Pearson Correlation: -0.06311949726772588
```

Dataset-5

In [52]:
```
df=pd.read_csv(r"C:\Users\user\Downloads\5_Instagram data.csv")
df.fillna(0, inplace=True)
df
```

Out[52]:

	Impressions	From Home	From Hashtags	From Explore	From Other	Saves	Comments	Shares	Likes	Profile Visits	F
0	3920	2586	1028	619	56	98	9	5	162	35	
1	5394	2727	1838	1174	78	194	7	14	224	48	
2	4021	2085	1188	0	533	41	11	1	131	62	
3	4528	2700	621	932	73	172	10	7	213	23	
4	2518	1704	255	279	37	96	5	4	123	8	
...	...	...	...	...	...	...	...	...	...	...	
114	13700	5185	3041	5352	77	573	2	38	373	73	
115	5731	1923	1368	2266	65	135	4	1	148	20	
116	4139	1133	1538	1367	33	36	0	1	92	34	
117	32695	11815	3147	17414	170	1095	2	75	549	148	

	Impressions	From Home	From Hashtags	From Explore	From Other	Saves	Comments	Shares	Likes	Profile Visits	F
118	36919	13473	4176	16444	2547	653	5	26	443	611	

119 rows × 13 columns

In [53]:
```
data1=df["Impressions"].values
data2=df["Profile Visits"].values
mean = np.mean(data1)
median = np.median(data1)
mode = pd.Series(data1).mode().values
data_sum = np.sum(data1)
cumulative_sum = np.cumsum(data1)
data_count = len(data1)
data_min = np.min(data1)
data_max = np.max(data1)
covariance = np.cov(data1, data2)[0, 1]
spearman_corr = pd.Series(data1).corr(pd.Series(data2), method='spearman')
pearson_corr = pd.Series(data1).corr(pd.Series(data2), method='pearson')
```

In [54]:
```
print("a) Mean:", mean)
print("   Median:", median)
print("   Mode:", mode)
print("b) Sum:", data_sum)
print("   Cumulative Sum:", cumulative_sum)
print("   Count:", data_count)
print("   Min:", data_min)
print("   Max:", data_max)
print("c) Covariance:", covariance)
print("   Spearman Correlation:", spearman_corr)
print("   Pearson Correlation:", pearson_corr)
```

```
a) Mean: 5703.991596638655
   Median: 4289.0
   Mode: [5394]
b) Sum: 678775
   Cumulative Sum: [  3920   9314  13335  17863  20381  24265  26886  30427
34176  38291
  40509  43743  48087  51303  60756  65811  69813  72982  79150  81557
  83621  87594  94875  97927 102555 106637 112031 114797 118721 121736
 128402 132256 136611 140954 147062 149585 151912 155902 158093 160034
 176096 181094 185383 189263 193049 197347 200977 203803 211210 221596
 224594 231612 234553 240985 251652 255640 260618 264006 268473 271719
 276791 283130 287369 290823 298394 301727 305545 316478 321536 325137
 328617 332142 335748 341290 347849 351472 361965 366411 369368 374906
 379587 384860 389915 393917 397086 403254 405661 409291 412117 419524
 429910 432908 435960 440588 444670 450064 452830 456754 459769 465178
 470501 478502 482652 487261 493609 504677 511908 529304 536118 553831
 559394 564236 575385 585591 599291 605022 609161 641856 678775]
   Count: 119
   Min: 1941
   Max: 36919
c) Covariance: 321009.96289702324
   Spearman Correlation: 0.6539126442811372
   Pearson Correlation: 0.7609809286546656
```

In [ ]:
```
```