25-07-2023

In [2]:
```
import numpy as np
import pandas as pd
```

In [38]:
```
a=pd.read_csv(r"C:\Users\user\Downloads\6_Salesworkload1.csv")
a
```

Out[38]:

	MonthYear	Time index	Country	StoreID	City	Dept_ID	Dept. Name	HoursOwn	HoursLease	Sales units	Turnover	Custome
0	10.2016	1.0	United Kingdom	88253.0	London (I)	1.0	Dry	3184.764	0.0	398560.0	1226244.0	NaN
1	10.2016	1.0	United Kingdom	88253.0	London (I)	2.0	Frozen	1582.941	0.0	82725.0	387810.0	NaN
2	10.2016	1.0	United Kingdom	88253.0	London (I)	3.0	other	47.205	0.0	438400.0	654657.0	NaN
3	10.2016	1.0	United Kingdom	88253.0	London (I)	4.0	Fish	1623.852	0.0	309425.0	499434.0	NaN
4	10.2016	1.0	United Kingdom	88253.0	London (I)	5.0	Fruits & Vegetables	1759.173	0.0	165515.0	329397.0	NaN
...	...	...	...	...	...	...	...	...	...	...	...	..
7653	06.2017	9.0	Sweden	29650.0	Gothenburg	12.0	Checkout	6322.323	0.0	3886530.0	14538825.0	NaN

In [60]:
```
a=a.head(50)
a
```

29	10.2016	1.0	United Kingdom	38976.0	Manchester	12.0	Checkout	11719.428	0.0	7476680.0	25719732.0	NaN
30	10.2016	1.0	United Kingdom	38976.0	Manchester	16.0	Customer Services	5491.515	0.0	5.0	0.0	NaN
31	10.2016	1.0	United Kingdom	38976.0	Manchester	11.0	Delivery	0	0.0	120.0	243.0	NaN
32	10.2016	1.0	United Kingdom	38976.0	Manchester	17.0	others	2300.457	0.0	5.0	0.0	NaN
33	10.2016	1.0	United Kingdom	38976.0	Manchester	18.0	all	74401.374	0.0	7476680.0	25719732.0	NaN
34	10.2016	1.0	United Kingdom	17647.0	Liverpool	1.0	Dry	2341.368	0.0	532855.0	1853250.0	NaN
35	10.2016	1.0	United Kingdom	17647.0	Liverpool	2.0	Frozen	3077.766	184.0	167015.0	859218.0	NaN
36	10.2016	1.0	United Kingdom	17647.0	Liverpool	3.0	other	47.205	0.0	896495.0	140016.0	NaN

In [63]:
```
a.sum()
```

Out[63]:
```
MonthYear        10.201610.201610.201610.201610.201610.201610.2...
Time index                                                  50.0
Country          United KingdomUnited KingdomUnited KingdomUnit...
StoreID                                                2445245.0
City             London (I)London (I)London (I)London (I)London...
Dept_ID                                                    465.0
Dept. Name       DryFrozenotherFishFruits & VegetablesMeatFoodC...
HoursOwn         3184.7641582.94147.2051623.8521759.1738270.316...
HoursLease                                                3048.0
Sales units                                             61592195.0
Turnover                                               203349924.0
Customer                                                      0.0
Area (m2)        953.04720.48966.721053.361053.3611735.1619865....
Opening hours    Type AType AType AType AType AType AType AType...
dtype: object
```

In [64]:
```
a.mean()
```

Out[64]:
```
Time index           1.00
StoreID          48904.90
Dept_ID              9.30
HoursLease          60.96
Sales units    1231843.90
Turnover       4066998.48
Customer              NaN
dtype: float64
```

In [65]:
```
a.count()
```

Out[65]:
```
MonthYear        50
Time index       50
Country          50
StoreID          50
City             50
Dept_ID          50
Dept. Name       50
HoursOwn         50
HoursLease       50
Sales units      50
Turnover         50
Customer          0
Area (m2)        50
Opening hours    50
dtype: int64
```

In [66]:
```
a.describe()
```

Out[66]:

	Time index	StoreID	Dept_ID	HoursLease	Sales units	Turnover	Customer
count	50.0	50.000000	50.000000	50.000000	5.000000e+01	5.000000e+01	0.0
mean	1.0	48904.900000	9.300000	60.960000	1.231844e+06	4.066998e+06	NaN
std	0.0	29839.520941	5.304022	213.640644	2.088301e+06	6.868434e+06	NaN
min	1.0	17647.000000	1.000000	0.000000	0.000000e+00	0.000000e+00	NaN
25%	1.0	17647.000000	5.000000	0.000000	5.504125e+04	1.477058e+05	NaN
50%	1.0	38976.000000	9.000000	0.000000	3.093425e+05	7.400520e+05	NaN
75%	1.0	88253.000000	14.000000	0.000000	9.128262e+05	3.521022e+06	NaN
max	1.0	88253.000000	18.000000	1152.000000	7.476680e+06	2.571973e+07	NaN

In [67]:
```
a.mode()
```

Out[67]:

	MonthYear	Time index	Country	StoreID	City	Dept_ID	Dept. Name	HoursOwn	HoursLease	Sales units	Turnover	Customer	Area (m2)	Ol
0	10.2016	1.0	United Kingdom	38976.0	London (I)	1.0	Admin	0	0.0	0.0	0.0	NaN	0	
1	NaN	NaN	NaN	88253.0	Manchester	2.0	Checkout	47.205	NaN	NaN	NaN	NaN	NaN	
2	NaN	NaN	NaN	NaN	NaN	3.0	Clothing	NaN	NaN	NaN	NaN	NaN	NaN	
3	NaN	NaN	NaN	NaN	NaN	4.0	Customer Services	NaN	NaN	NaN	NaN	NaN	NaN	
4	NaN	NaN	NaN	NaN	NaN	5.0	Delivery	NaN	NaN	NaN	NaN	NaN	NaN	
5	NaN	NaN	NaN	NaN	NaN	6.0	Dry	NaN	NaN	NaN	NaN	NaN	NaN	
6	NaN	NaN	NaN	NaN	NaN	7.0	Fish	NaN	NaN	NaN	NaN	NaN	NaN	
7	NaN	NaN	NaN	NaN	NaN	8.0	Food	NaN	NaN	NaN	NaN	NaN	NaN	
8	NaN	NaN	NaN	NaN	NaN	9.0	Frozen	NaN	NaN	NaN	NaN	NaN	NaN	
9	NaN	NaN	NaN	NaN	NaN	11.0	Fruits & Vegetables	NaN	NaN	NaN	NaN	NaN	NaN	
10	NaN	NaN	NaN	NaN	NaN	12.0	Hardware	NaN	NaN	NaN	NaN	NaN	NaN	
11	NaN	NaN	NaN	NaN	NaN	13.0	Household	NaN	NaN	NaN	NaN	NaN	NaN	
12	NaN	NaN	NaN	NaN	NaN	14.0	Meat	NaN	NaN	NaN	NaN	NaN	NaN	
13	NaN	NaN	NaN	NaN	NaN	15.0	Non Food	NaN	NaN	NaN	NaN	NaN	NaN	
14	NaN	NaN	NaN	NaN	NaN	16.0	other	NaN	NaN	NaN	NaN	NaN	NaN	
15	NaN	NaN	NaN	NaN	NaN	17.0	others	NaN	NaN	NaN	NaN	NaN	NaN	

In [68]:
```
a.cumsum()
```

Out[68]:

	MonthYear	Time index	Country	StoreID	City	Dept_ID	Dept. Name
0	10.2016	1.0	United Kingdom	88253.0	London (I)	1.0	Dry
1	10.201610.2016	2.0	United KingdomUnited Kingdom	176506.0	London (I)London (I)	3.0	DryFrozen
2	10.201610.201610.2016	3.0	United KingdomUnited KingdomUnited Kingdom	264759.0	London (I)London (I)London (I)	6.0	DryFrozenother
3	10.201610.201610.201610.2016	4.0	United KingdomUnited KingdomUnited KingdomUnit...	353012.0	London (I)London (I)London (I)London (I)	10.0	DryFrozenotherFish
					London		

In [69]:
```
a.min()
```

Out[69]:
```
MonthYear              10.2016
Time index                 1.0
Country          United Kingdom
StoreID                17647.0
City                 Liverpool
Dept_ID                    1.0
Dept. Name               Admin
HoursOwn                     0
HoursLease                 0.0
Sales units                0.0
Turnover                   0.0
Customer                   NaN
Area (m2)                    0
Opening hours         Type A
dtype: object
```

In [70]:
```
a.max()
```

Out[70]:
```
MonthYear               10.2016
Time index                  1.0
Country          United Kingdom
StoreID                 88253.0
City                  Manchester
Dept_ID                   18.0
Dept. Name              others
HoursOwn              8965.803
HoursLease              1152.0
Sales units           7476680.0
Turnover             25719732.0
Customer                    NaN
Area (m2)                987.24
Opening hours            Type A
dtype: object
```

In [71]:
```
from numpy import cov
```

In [72]:
```
cov(a['Sales units'],a['Turnover'])
```

Out[72]:
```
array([[4.36099946e+12, 1.41713829e+13],
       [1.41713829e+13, 4.71753840e+13]])
```

In [74]:
```
from scipy.stats import pearsonr
pearsonr(a['Sales units'],a['Turnover'])
```

Out[74]:
```
(0.988010347706751, 1.3106593171852339e-40)
```

In [75]:
```
from scipy.stats import spearmanr
spearmanr(a['StoreID'],a['Turnover'])
```

Out[75]:
```
SpearmanrResult(correlation=-0.043899316897637874, pvalue=0.7621110891029952)
```

In [ ]:
```

```