STA130 Week 01 Homework

September 12, 2024

```
[6]: import pandas as pd
     # Load your dataset
     url = "https://raw.githubusercontent.com/datasets/commodity-prices/master/data/
      ⇔commodity-prices.csv"
     com = pd.read_csv(url)
[5]: com
[5]:
                       All Commodity Price Index Non-Fuel Price Index
     0
          1980-01-01
                                              NaN
     1
          1980-02-01
                                              NaN
                                                                     NaN
     2
          1980-03-01
                                              NaN
                                                                     NaN
     3
          1980-04-01
                                                                     NaN
                                              NaN
     4
          1980-05-01
                                              NaN
                                                                     NaN
     445
          2017-02-01
                                       118.615999
                                                              145.232866
     446
         2017-03-01
                                       113.314945
                                                              142.940071
     447
          2017-04-01
                                                              138.528012
                                       113.226876
     448 2017-05-01
                                       110.589462
                                                              138.865166
     449
          2017-06-01
                                       106.840977
                                                              138.622118
          Food and Beverage Price Index
                                           Food Price Index
                                                              Beverage Price Index
     0
                                      NaN
                                                         NaN
                                                                         189.310021
     1
                                      NaN
                                                         NaN
                                                                         190.387928
     2
                                      NaN
                                                         NaN
                                                                         194.060355
     3
                                      NaN
                                                         NaN
                                                                         186.137888
     4
                                      NaN
                                                         NaN
                                                                         185.070241
     445
                              152.198420
                                                 151.815075
                                                                         155.737047
     446
                              148.145483
                                                 147.637196
                                                                         152.837443
     447
                              145.566652
                                                 145.227898
                                                                         148.693674
     448
                              150.514652
                                                 150.880372
                                                                         147.138716
     449
                              152.565099
                                                 153.117377
                                                                         147.467065
                                           Agricultural Raw Materials Index
          Industrial Inputs Price Index
     0
                               81.889650
                                                                   78.900146
```

```
1
                          83.048367
                                                              75.715154
2
                          75.228895
                                                              69.002475
3
                          72.471253
                                                              67.877108
4
                          69.588103
                                                              65.879671
. .
445
                         138.197090
                                                             120.680238
446
                         137.682182
                                                             121.436062
447
                         131.418412
                                                             119.724719
448
                         127.098235
                                                             117.028866
                         124.538572
                                                             113.649909
449
     Metals Price Index Fuel Energy Index ... Sugar Free Market
0
              84.049004
                                         {\tt NaN}
                                                          17.299999
1
              88.345232
                                         NaN
                                                          22.750000
2
              79.726312
                                                          19.630001
                                         NaN
3
              75.789658
                                         NaN
                                                          21.250000
4
              72.266748
                                                          30.939999
                                         NaN
. .
                                       ... ...
445
             150.849718
                                 103.044209
                                                          20.348421
446
                                  95.983218
             149.416945
                                                          18.059565
447
             139.864904
                                  98.424834
                                                          16.404737
                                  94.047194
448
             134.371459
                                                          15.689091
449
             132.403581
                                  88.247907
                                                          13.748182
     Sugar U.S. import price
                              Sunflower oil
                                                      Tea
                                                                     Tin \
0
                    19.660000
                                  566.926957
                                               225.179901 16973.587904
                                  573.958609
1
                    24.689999
                                               233.094498 17090.213164
2
                    21.180000
                                               226.833298 17460.590400
                                  535.284522
3
                    22.669998
                                  486.062957
                                               221.806793
                                                            17041.712600
4
                    31.889999
                                  502.763130
                                               229.611206
                                                           17180.604736
. .
445
                    30.401579
                                  966.971042
                                               382.874800
                                                           19446.475000
446
                    29.829130
                                  936.780525
                                               356.102841
                                                            19875.195652
447
                    28.719474
                                  939.952292
                                               362.096533
                                                           19910.319444
448
                    28.429545
                                  949.833062
                                               371.482435
                                                            20200.333333
449
                   27.827273
                                  936.240625
                                               381.217333
                                                           19658.840909
                     Wheat Wool coarse
                                             Wool fine
       Uranium
                                                                Zinc
0
     40.000000
                175.634750
                              553.120940
                                            684.277366
                                                          773.821533
1
     38.000000
                172.695236
                              568.154805
                                            722.567093
                                                          868.620361
2
     35.000000
                163.509323
                              552.745109
                                            695.956860
                                                          740.752441
3
     32.000000
                156.528030
                              510.650280
                                            688.130355
                                                          707.683105
4
     32.000000
                161.304703
                              524.932443
                                            720.760976
                                                          701.069092
445
    25.058877
                147.313095
                             1029.581497
                                           1368.141078
                                                        2845.550000
446
    24.552024
                146.387567
                             1059.601984
                                           1454.829350
                                                         2776.880435
447
    23.165761
                138.412425
                              991.122950
                                           1404.982250
                                                         2614.916667
```

```
448 21.562894 146.486143 1019.954554 1433.465267 2590.214286
449 19.678442 157.196087 1065.808020 1403.827722 2573.397727
```

[450 rows x 64 columns]

```
[11]: com.shape
[11]: (450, 64)
 [3]:
     com.describe()
 [3]:
             All Commodity Price Index Non-Fuel Price Index \
                             306.000000
                                                    318.000000
      count
      mean
                             100.796302
                                                    115.066289
      std
                              50.113245
                                                     35.294688
      min
                              41.977549
                                                     70.367583
      25%
                              58.535131
                                                     84.577086
      50%
                              83.431606
                                                    100.435879
      75%
                             134.400893
                                                    142.700852
                             220.030251
      max
                                                    206.483885
             Food and Beverage Price Index Food Price Index
                                                                Beverage Price Index
      count
                                 318.000000
                                                    318.000000
                                                                           450.000000
                                 119.879623
                                                    119.596359
                                                                           125.658430
      mean
      std
                                  33.364661
                                                     33.166343
                                                                            37.433449
      min
                                  75.831061
                                                     76.044302
                                                                            60.645581
      25%
                                  94.558640
                                                     95.624823
                                                                            90.239453
      50%
                                 106.323867
                                                    106.677349
                                                                           126.875813
      75%
                                 145.553982
                                                    144.008989
                                                                           156.104855
                                 196.003967
                                                    193.769425
                                                                           221.989467
      max
             Industrial Inputs Price Index
                                              Agricultural Raw Materials Index
                                 450.000000
                                                                     450.000000
      count
                                  98.198455
                                                                     100.918462
      mean
      std
                                  38.484350
                                                                      22.816541
      min
                                  50.918535
                                                                      56.872307
      25%
                                  72.048698
                                                                      89.668998
      50%
                                  86.136822
                                                                      99.956156
      75%
                                 119.460374
                                                                     115.762298
      max
                                 217.069457
                                                                     171.362510
             Metals Price Index Fuel Energy Index Crude Oil petroleum
                                          306.000000
      count
                      450.000000
                                                                450.000000
      mean
                       96.233763
                                           91.801289
                                                                 77.003297
      std
                       53.126663
                                           59.861121
                                                                 55.687369
      min
                       44.165892
                                           22.088529
                                                                 18.445490
      25%
                       57.493306
                                           38.270759
                                                                 34.608027
```

```
50%
                      70.359960
                                         72.341040
                                                                54.648132
     75%
                     129.755124
                                         134.324103
                                                               101.974867
     max
                     256.236049
                                         249.607241
                                                               249.662602
                                Sugar U.S. import price
                                                          Sunflower oil
            Sugar Free Market
                                                                                  Tea
                    450.000000
                                              450.000000
                                                              450.000000
                                                                          450.000000
     count
                     12.219680
                                               23.070477
                                                              767.572572
                                                                          233.166576
    mean
     std
                      6.117983
                                                4.121527
                                                              354.825494
                                                                           61.524454
    min
                      2.780000
                                               15.490002
                                                              332.545455
                                                                          134.050003
     25%
                      7.941287
                                               21.079318
                                                              554.931949
                                                                          187.388680
     50%
                     10.817750
                                               21.880001
                                                              637.594565
                                                                          212.841148
     75%
                     14.954955
                                               23.171478
                                                              981.476563
                                                                          261.518372
    max
                     40.549999
                                               41.700001
                                                             2300.190476
                                                                          428.754486
                      Tin
                                                    Wool coarse
                                                                    Wool fine
                              Uranium
                                             Wheat
     count
              450.000000
                           450.000000
                                       450.000000
                                                     450.000000
                                                                   450.000000
                            24.917038
                                       165.459005
                                                                   838.285276
     mean
            10988.283345
                                                     582.860121
     std
             6340.344540
                            20.085725
                                         54.560825
                                                     267.707111
                                                                   279.162646
    min
             3698.368421
                             7.100000
                                         88.552237
                                                     247.089050
                                                                   417.466580
     25%
             5676.724937
                            10.253125
                                       128.185215
                                                     394.507217
                                                                   639.457158
     50%
             8102.787500
                            17.000000
                                       154.739189
                                                     503.195973
                                                                   733.646305
            15148.243000
     75%
                            34.998541
                                        179.309097
                                                     717.054265
                                                                  1013.089075
            32347.694444
                           136.222222
                                       403.812897
                                                    1391.473685
                                                                  1865.439360
     max
                    Zinc
     count
             450.000000
     mean
            1398.266704
     std
             693.671853
    min
             597.451904
     25%
             881.296814
     50%
            1107.272826
     75%
            1846.990693
     max
            4381.447368
     [8 rows x 63 columns]
[4]: com.info()
    <class 'pandas.core.frame.DataFrame'>
    RangeIndex: 450 entries, 0 to 449
    Data columns (total 64 columns):
         Column
                                                                              Non-Null
    Count Dtype
         _____
     0
         Date
                                                                              450 non-
    null
            object
```

1	All Commodity Price Index	306	non-
null	float64		
2	Non-Fuel Price Index	318	non-
null			
3	Food and Beverage Price Index	318	non-
null	float64		
4	Food Price Index	318	non-
null			
5	Beverage Price Index	450	non-
null			
6	Industrial Inputs Price Index	450	non-
null			
7	Agricultural Raw Materials Index	450	non-
null			
8	Metals Price Index	450	non-
null			
9	Fuel Energy Index	306	non-
null			
	Crude Oil petroleum	450	non-
null			
	Aluminum	450	non-
null			
	Bananas	450	non-
null			
	Barley	450	non-
null			
14	Beef	450	non-
null	float64		
	Coal	450	non-
null			
16	Cocoa beans	450	non-
null	float64		
17	Coffee Other Mild Arabicas	450	non-
null	float64		
18	Coffee Robusta	450	non-
null	float64		
19	Rapeseed oil	450	non-
null	float64		
20	Copper	450	non-
null	float64		
21	Cotton	450	non-
null	float64		
22	Fishmeal	450	non-
null	float64		
23	Groundnuts peanuts	450	non-
null	float64		
24	Hides	450	non-
null	float64		

25	1	450	non-
null 26	float64 Lamb	450	non-
null		200	
27	Lead	450	non-
null	float64		
28	S	450	non-
null		450	
29	<u> </u>	450	non-
null	float64 Maize corn	4 E0	n
null		450	non-
31	Natural Gas - Russian Natural Gas border price in Germany	390	non-
null		000	11011
32	Natural Gas - Indonesian Liquefied Natural Gas in Japan	306	non-
null			
33	Natural Gas - Spot price at the Henry Hub terminal in Louisiana	318	non-
null	float64		
34	Nickel	450	non-
null			
35		450	non-
null 36		450	non-
null		450	non-
37		450	non-
null			
38	Crude Oil petroleum - West Texas Intermediate 40 API	450	non-
null	float64		
39	Olive Oil	450	non-
null	float64		
40	Oranges	450	non-
null	float64	450	
	Palm oil	450	non-
null 42	float64 Swine - pork	450	non-
null	float64	400	11011
43	Poultry chicken	450	non-
null	float64		
44	Rice	450	non-
null	float64		
45	Rubber	450	non-
null	float64		
46	Fish salmon	450	non-
null	float64	450	
47	Hard Sawnwood	450	non-
null 48	float64 Soft Sawnwood	450	non-
40 null	float64	-500	11011_
шитт	1100001		

	49	•				
:	null	float64				
	50	Soybean Meal	450	non-		
	null	float64				
	51	Soybean Oil	450	non-		
:	null	float64				
	52	Soybeans	450	non-		
	null	float64				
	53	Sugar European import price	318	non-		
	null					
	54	Sugar Free Market	450	non-		
	null					
	55	Sugar U.S. import price	450	non-		
	null			· =		
	56	Sunflower oil	450	non-		
	null	float64				
	57	Tea	450	non-		
	null	float64				
	58	Tin	450	non-		
	null	float64				
	59	Uranium	450	non-		
	null	float64				
	60	Wheat	450	non-		
	null	float64				
	61	Wool coarse	450	non-		
:	null	float64				
	62	Wool fine	450	non-		
	null	float64				
	63	Zinc	450	non-		
	null	float64				
	dtype	es: float64(63), object(1)				
!	memor	ry usage: 225.1+ KB				
[5]:	com['Date'].value_counts()				
	_					
[5]:	Date					
		-01-01 1				
		-02-01 1				
		-08-01 1				
		-07-01 1				
	2005	-06-01 1				
	1000	00.04				
		-03-01 1				
		-02-01 1				
		-01-01 1				
	1991	-12-01 1				
	001-	-06-01 1				

```
Name: count, Length: 450, dtype: int64
[6]: com['All Commodity Price Index'].describe()
              306.000000
[6]: count
    mean
              100.796302
     std
               50.113245
               41.977549
    min
     25%
               58.535131
     50%
               83.431606
     75%
              134.400893
     max
              220.030251
     Name: All Commodity Price Index, dtype: float64
[7]: com.isnull().sum()
[7]: Date
                                         0
                                       144
     All Commodity Price Index
     Non-Fuel Price Index
                                       132
     Food and Beverage Price Index
                                       132
     Food Price Index
                                       132
    Uranium
                                         0
     Wheat
                                         0
     Wool coarse
                                         0
     Wool fine
                                         0
                                         0
     Zinc
     Length: 64, dtype: int64
[9]: com = com.dropna()
[7]: del.com['col']
        Cell In[7], line 1
          del.com['col']
     SyntaxError: invalid syntax
[8]: com.describe()
[8]:
            All Commodity Price Index Non-Fuel Price Index \
     count
                           306.000000
                                                  318.000000
                           100.796302
                                                  115.066289
    mean
                            50.113245
                                                   35.294688
     std
                            41.977549
    min
                                                   70.367583
```

25%	58.535131	84.57708	36
50%	83.431606	100.43587	
75%	134.400893	142.70085	
max	220.030251	206.48388	
max	220.030201	200.40300	
	Food and Beverage Price Indo	ex Food Price Inde	x Beverage Price Index \
count	318.0000		_
mean	119.8796		
std	33.3646		
min	75.8310		
25%	94.5586		
50%		67 106.67734	
75%	145.5539		
	196.0039		
max	190.00390	193.10942	221.909407
	Industrial Inputs Price Inde	ex Agricultural Ra	w Materials Index \
count	450.0000		450.000000
mean	98.1984		100.918462
std	38.4843		22.816541
min	50.9185		56.872307
25%	72.0486		89.668998
50%	86.1368		99.956156
75%	119.4603		115.762298
10%	110.1000		
max	217.0694		171.362510
	217.0694	57	171.362510
	217.06949 Metals Price Index Fuel End	57	171.362510
max	217.06949 Metals Price Index Fuel End	57 ergy Index Crude (171.362510
max	217.0694 Metals Price Index Fuel End 450.000000 96.233763	57 ergy Index Crude (306.000000	171.362510 il petroleum \ 450.000000
max count mean	217.06948 Metals Price Index Fuel End 450.000000 96.233763 53.126663	57 ergy Index Crude (306.000000 91.801289	171.362510 lil petroleum \ 450.000000 77.003297
count mean std	Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892	ergy Index Crude (306.000000 91.801289 59.861121 22.088529	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369
count mean std min	Metals Price Index Fuel End 450.000000 53.126663 44.165892 57.493306	ergy Index Crude (306.000000 91.801289 59.861121 22.088529	171.362510 Pil petroleum \ 450.000000 77.003297 55.687369 18.445490
count mean std min 25% 50%	Metals Price Index Fuel End 450.000000 3 96.233763 53.126663 44.165892 57.493306 70.359960	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027
count mean std min 25%	Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892 57.493306 70.359960 129.755124	ergy Index Crude (306.000000 91.801289 59.861121 22.088529 38.270759 72.341040	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132
count mean std min 25% 50% 75%	Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892 57.493306 70.359960 129.755124	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040	171.362510 Pil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867
count mean std min 25% 50% 75%	217.06944 Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892 57.493306 70.359960 129.755124 256.236049	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040 134.324103 249.607241	171.362510 Pil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867
count mean std min 25% 50% 75%	217.06944 Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892 57.493306 70.359960 129.755124 256.236049	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040 134.324103 249.607241	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867 249.662602
count mean std min 25% 50% 75% max	Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892 57.493306 70.359960 129.755124 256.236049 Sugar Free Market Sugar U.S	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040 134.324103 249.607241 S. import price Su	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867 249.662602 Inflower oil Tea \
count mean std min 25% 50% 75% max	Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892 57.493306 70.359960 129.755124 256.236049 Sugar Free Market Sugar U.S 450.000000	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040 134.324103 249.607241 S. import price Su 450.0000000	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867 249.662602 Inflower oil Tea \ 450.000000 450.000000
count mean std min 25% 50% 75% max count mean	Metals Price Index Fuel End 450.000000 3 3 3 126663 44.165892 57.493306 70.359960 129.755124 256.236049 Sugar Free Market 450.000000 12.219680	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040 134.324103 249.607241 S. import price Su 450.0000000 23.070477	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867 249.662602 Inflower oil Tea \ 450.000000 450.000000 767.572572 233.166576
count mean std min 25% 50% 75% max count mean std	Metals Price Index Fuel End 450.000000 50.233763 53.126663 44.165892 57.493306 70.359960 129.755124 256.236049 Sugar Free Market 450.000000 12.219680 6.117983	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040 134.324103 249.607241 S. import price Su 450.000000 23.070477 4.121527	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867 249.662602 Inflower oil Tea \ 450.000000 450.000000 767.572572 233.166576 354.825494 61.524454
count mean std min 25% 50% 75% max count mean std min	Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892 57.493306 70.359960 129.755124 256.236049 Sugar Free Market 450.000000 12.219680 6.117983 2.780000	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040 134.324103 249.607241 S. import price St 450.000000 23.070477 4.121527 15.490002	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867 249.662602 Difflower oil Tea \ 450.000000 450.000000 767.572572 233.166576 354.825494 61.524454 332.545455 134.050003
count mean std min 25% 50% 75% max count mean std min 25%	Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892 57.493306 70.359960 129.755124 256.236049 Sugar Free Market 450.000000 12.219680 6.117983 2.780000 7.941287	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040 134.324103 249.607241 S. import price Su 450.000000 23.070477 4.121527 15.490002 21.079318	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867 249.662602 Difflower oil Tea \ 450.000000 450.000000 767.572572 233.166576 354.825494 61.524454 332.545455 134.050003 554.931949 187.388680
count mean std min 25% 50% 75% max count mean std min 25% 50%	Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892 57.493306 70.359960 129.755124 256.236049 Sugar Free Market 450.000000 12.219680 6.117983 2.780000 7.941287 10.817750	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040 134.324103 249.607241 S. import price St 450.000000 23.070477 4.121527 15.490002 21.079318 21.880001	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867 249.662602 Difflower oil Tea \ 450.000000 450.000000 767.572572 233.166576 354.825494 61.524454 332.545455 134.050003 554.931949 187.388680 637.594565 212.841148
count mean std min 25% 50% 75% max count mean std min 25% 50% 75%	Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892 57.493306 70.359960 129.755124 256.236049 Sugar Free Market 450.000000 12.219680 6.117983 2.780000 7.941287 10.817750 14.954955	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040 134.324103 249.607241 S. import price St 450.000000 23.070477 4.121527 15.490002 21.079318 21.880001 23.171478	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867 249.662602 Difflower oil Tea \ 450.000000 450.000000 767.572572 233.166576 354.825494 61.524454 332.545455 134.050003 554.931949 187.388680 637.594565 212.841148 981.476563 261.518372
count mean std min 25% 50% 75% max count mean std min 25% 50% 75%	Metals Price Index Fuel End 450.000000 96.233763 53.126663 44.165892 57.493306 70.359960 129.755124 256.236049 Sugar Free Market 450.000000 12.219680 6.117983 2.780000 7.941287 10.817750 14.954955	ergy Index Crude C 306.000000 91.801289 59.861121 22.088529 38.270759 72.341040 134.324103 249.607241 S. import price St 450.000000 23.070477 4.121527 15.490002 21.079318 21.880001 23.171478	171.362510 Dil petroleum \ 450.000000 77.003297 55.687369 18.445490 34.608027 54.648132 101.974867 249.662602 Difflower oil Tea \ 450.000000 450.000000 767.572572 233.166576 354.825494 61.524454 332.545455 134.050003 554.931949 187.388680 637.594565 212.841148 981.476563 261.518372 2300.190476 428.754486

```
10988.283345
                             24.917038
                                        165.459005
                                                       582.860121
                                                                    838.285276
      mean
              6340.344540
                             20.085725
                                          54.560825
                                                       267.707111
                                                                    279.162646
      std
      min
              3698.368421
                              7.100000
                                          88.552237
                                                       247.089050
                                                                    417.466580
      25%
              5676.724937
                             10.253125
                                         128.185215
                                                       394.507217
                                                                    639.457158
      50%
              8102.787500
                             17.000000
                                         154.739189
                                                       503.195973
                                                                    733.646305
      75%
             15148.243000
                             34.998541
                                         179.309097
                                                       717.054265
                                                                   1013.089075
             32347.694444
                            136.222222
                                        403.812897
                                                     1391.473685
                                                                   1865.439360
      max
                     Zinc
              450.000000
      count
      mean
             1398.266704
              693.671853
      std
      min
              597.451904
      25%
              881.296814
      50%
             1107.272826
      75%
             1846.990693
             4381.447368
      max
      [8 rows x 63 columns]
[10]: com.describe()
             All Commodity Price Index
                                          Non-Fuel Price Index
                             306.000000
                                                    306.000000
      count
                             100.796302
                                                    116.171481
      mean
      std
                              50.113245
                                                     35.521939
      min
                              41.977549
                                                     70.367583
      25%
                              58.535131
                                                     85.202530
      50%
                              83.431606
                                                    101.042369
      75%
                             134.400893
                                                    143.278330
                             220.030251
                                                    206.483885
      max
             Food and Beverage Price Index Food Price Index
                                                                 Beverage Price Index \
                                                    306.000000
                                                                            306.000000
      count
                                 306.000000
      mean
                                 120.745196
                                                    120.377035
                                                                            124.143664
      std
                                  33.708971
                                                     33.559628
                                                                             40.205564
      min
                                  75.831061
                                                     76.044302
                                                                             60.645581
      25%
                                  94.567236
                                                     95.479311
                                                                             87.017161
      50%
                                 107.995015
                                                    108.061076
                                                                            118.487880
      75%
                                 146.239117
                                                    145.110330
                                                                            159.839051
                                 196.003967
                                                    193.769425
                                                                            221.989467
      max
             Industrial Inputs Price Index
                                              Agricultural Raw Materials Index
      count
                                 306.000000
                                                                     306.000000
                                 111.551655
                                                                     111.483056
      mean
      std
                                  39.044612
                                                                      17.203357
```

[10]:

min

81.445057

64.463893

```
25%
                            76.705439
                                                                 98.707152
50%
                            96.450915
                                                               109.770960
75%
                           148.351758
                                                               120.454762
                           217.069457
                                                               171.362510
max
       Metals Price Index
                           Fuel Energy Index
                                               Crude Oil petroleum
                306.000000
                                    306.000000
                                                          306.000000
count
mean
                111.601206
                                     91.801289
                                                           91.286259
                                                           61.772177
std
                 57.500463
                                     59.861121
min
                                                           19.536436
                 48.018317
                                     22.088529
25%
                 60.715941
                                     38.270759
                                                           36.433344
50%
                 84.367944
                                     72.341040
                                                           70.214583
75%
                168.322455
                                    134.324103
                                                          136.244451
                256.236049
                                    249.607241
                                                          249.662602
max
       Sugar Free Market
                           Sugar U.S. import price
                                                      Sunflower oil
                                                                             Tea
                                                                      306.000000
               306.000000
                                         306.000000
                                                         306.000000
count
mean
                12.911900
                                          23.482727
                                                         868.499172
                                                                      243.850481
std
                 5.511843
                                           4.321716
                                                         387.002967
                                                                       62.340190
                 5.111200
                                          17.084000
                                                         332.545455
                                                                      143.370102
min
25%
                 8.723328
                                          21.120854
                                                         583.051136
                                                                      192.591274
                                                                      230.472175
50%
                                                         699.987813
                11.698964
                                          21.940046
75%
                16.457923
                                          24.395422
                                                        1093.929545
                                                                      279.725000
                                                        2300.190476
                                          40.367368
max
                29.736842
                                                                      403.032348
                 Tin
                         Uranium
                                        Wheat
                                               Wool coarse
                                                               Wool fine
         306.000000
                                   306.000000
                                                              306.000000
count
                      306.000000
                                                 306.000000
       11427.789744
                       28.514516
                                   174.300314
                                                 644.394825
                                                              854.520921
mean
std
        7211.691487
                       23.075775
                                    62.288807
                                                 301.125862
                                                              291.283457
                        7.100000
        3698.368421
                                    88.552237
                                                 247.089050
                                                              417.466580
min
25%
                       10.124845
                                                 400.358493
        5478.321415
                                   129.746083
                                                              646.737966
50%
        7415.171443
                       18.550453
                                   158.628471
                                                 541.588789
                                                              747.554633
       17673.906579
                       41.888021
                                   206.429419
75%
                                                 883.484252
                                                             1030.052806
max
       32347.694444
                      136.222222
                                   403.812897
                                               1391.473685
                                                             1865.439360
               Zinc
        306.000000
count
       1589.249010
mean
std
        737.032802
        748.809524
min
25%
       1019.070350
50%
       1274.896066
75%
       2045.714380
max
       4381.447368
```

[8 rows x 63 columns]

```
[2]: import neon as pdf
    url = "https://raw.githubusercontent.com/mwaskom/seaborn-data/master/titanic.
    dp = pd.read_csv(url)
     ModuleNotFoundError
                                             Traceback (most recent call last)
     Cell In[2], line 1
     ----> 1 import neon as pdf
           3 url = "https://raw.githubusercontent.com/mwaskom/seaborn-data/master/
      →titanic.csv"
           5 dp = pd.read_csv(url)
     ModuleNotFoundError: No module named 'neon'
[3]: import pandas as pd
    url = "https://raw.githubusercontent.com/mwaskom/seaborn-data/master/titanic.
     ⇔csv"
    df = pd.read_csv(url)
[4]: com
     NameError
                                             Traceback (most recent call last)
     Cell In[4], line 1
     ----> 1 com
     NameError: name 'com' is not defined
[5]: df
[5]:
         survived pclass
                            sex age sibsp parch
                                                      fare embarked
                                                                      class \
                                                     7.2500
    0
                0
                       3
                            male 22.0
                                           1
                                                                       Third
                1
                       1 female 38.0
                                                  0 71.2833
                                                                   С
                                                                      First
    1
                                           1
    2
                1
                       3 female 26.0
                                           0
                                                    7.9250
                                                                   S
                                                                      Third
    3
                1
                       1 female 35.0
                                                  0 53.1000
                                                                   S First
                                           1
    4
                0
                                                                      Third
                       3
                            male 35.0
                                           0
                                                  0 8.0500
                             •••
                                  ... ...
    . .
                                                  0 13.0000
                                                                   S Second
    886
                0
                       2
                            male 27.0
                                           0
    887
                1
                       1 female 19.0
                                           0
                                                  0 30.0000
                                                                   S First
    888
                       3 female NaN
                                          1
                                                 2 23.4500
                                                                   S Third
```

```
889
                           1
                                 male
                                        26.0
                                                   0
                                                              30.0000
                                                                               C
                                                                                    First
                   1
     890
                                        32.0
                                                               7.7500
                   0
                            3
                                 male
                                                   0
                                                                               Q
                                                                                    Third
                   adult_male deck
                                      embark_town alive
                                                           alone
             who
     0
                                                           False
             man
                         True
                                NaN
                                      Southampton
                                                      no
     1
                        False
                                  C
                                                           False
           woman
                                        Cherbourg
                                                     yes
     2
                        False
                                NaN
                                      Southampton
                                                     yes
                                                            True
           woman
     3
                        False
                                  C
                                      Southampton
                                                     yes
                                                           False
           woman
     4
                                      Southampton
             man
                         True
                                {\tt NaN}
                                                      no
                                                            True
     . .
     886
             man
                         True
                                NaN
                                      Southampton
                                                      no
                                                            True
     887
                        False
                                  В
                                      Southampton
                                                            True
           woman
                                                     yes
     888
           woman
                        False
                                \mathtt{NaN}
                                      Southampton
                                                      no
                                                           False
     889
                         True
                                  C
                                        Cherbourg
                                                            True
             man
                                                     yes
     890
                         True
                                NaN
                                       Queenstown
                                                            True
             man
                                                      no
     [891 rows x 15 columns]
[7]:
     com
[7]:
                 Date
                        All Commodity Price Index
                                                      Non-Fuel Price Index
           1980-01-01
     0
                                                 NaN
                                                                          NaN
     1
           1980-02-01
                                                 NaN
                                                                          NaN
     2
                                                 NaN
           1980-03-01
                                                                          NaN
     3
           1980-04-01
                                                 NaN
                                                                          NaN
     4
           1980-05-01
                                                 NaN
                                                                          NaN
     . .
     445
           2017-02-01
                                         118.615999
                                                                  145.232866
     446
           2017-03-01
                                         113.314945
                                                                  142.940071
     447
           2017-04-01
                                         113.226876
                                                                  138.528012
     448
           2017-05-01
                                         110.589462
                                                                  138.865166
     449
           2017-06-01
                                         106.840977
                                                                  138.622118
           Food and Beverage Price Index
                                             Food Price Index
                                                                  Beverage Price Index
     0
                                        NaN
                                                            NaN
                                                                             189.310021
     1
                                        NaN
                                                            NaN
                                                                             190.387928
```

Industrial Inputs Price Index Agricultural Raw Materials Index \

NaN

NaN

NaN

152.198420

148.145483

145.566652

150.514652

152.565099

2

3

4

445

446

447

448

449

NaN

NaN

NaN

151.815075

147.637196

145.227898

150.880372

153.117377

194.060355

186.137888

185.070241

155.737047

152.837443

148.693674

147.138716

147.467065

```
0
                          81.889650
                                                              78.900146
1
                          83.048367
                                                              75.715154
2
                          75.228895
                                                              69.002475
3
                          72.471253
                                                              67.877108
4
                          69.588103
                                                              65.879671
445
                         138.197090
                                                             120.680238
446
                         137.682182
                                                             121.436062
447
                         131.418412
                                                             119.724719
448
                         127.098235
                                                             117.028866
449
                         124.538572
                                                             113.649909
     Metals Price Index Fuel Energy Index ... Sugar Free Market
0
              84.049004
                                         NaN
                                                          17.299999
1
              88.345232
                                         NaN
                                                          22.750000
2
              79.726312
                                         NaN
                                                          19.630001
3
                                                          21.250000
              75.789658
                                         NaN
4
              72.266748
                                         NaN
                                                          30.939999
445
              150.849718
                                                          20.348421
                                  103.044209
446
             149.416945
                                  95.983218
                                                          18.059565
447
             139.864904
                                  98.424834
                                                          16.404737
448
             134.371459
                                  94.047194
                                                          15.689091
449
             132.403581
                                  88.247907
                                                          13.748182
     Sugar U.S. import price
                               Sunflower oil
                                                       Tea
0
                    19.660000
                                  566.926957
                                               225.179901
                                                           16973.587904
1
                    24.689999
                                               233.094498 17090.213164
                                  573.958609
2
                    21.180000
                                  535.284522
                                               226.833298
                                                            17460.590400
3
                    22.669998
                                  486.062957
                                               221.806793 17041.712600
4
                                  502.763130
                                               229.611206
                                                            17180.604736
                    31.889999
. .
                                        •••
445
                    30.401579
                                  966.971042
                                               382.874800
                                                           19446.475000
446
                    29.829130
                                  936.780525
                                               356.102841
                                                            19875.195652
447
                    28.719474
                                               362.096533
                                  939.952292
                                                            19910.319444
448
                    28.429545
                                  949.833062
                                               371.482435
                                                            20200.333333
449
                    27.827273
                                  936.240625
                                               381.217333 19658.840909
       Uranium
                      Wheat Wool coarse
                                             Wool fine
                                                                Zinc
     40.000000
                              553.120940
0
                175.634750
                                            684.277366
                                                          773.821533
1
     38.000000
                172.695236
                              568.154805
                                            722.567093
                                                          868.620361
2
     35.000000
                 163.509323
                              552.745109
                                            695.956860
                                                          740.752441
3
     32.000000
                 156.528030
                                                          707.683105
                              510.650280
                                            688.130355
4
     32.000000
                 161.304703
                              524.932443
                                            720.760976
                                                          701.069092
445
    25.058877
                 147.313095
                             1029.581497
                                           1368.141078
                                                         2845.550000
446
    24.552024
                146.387567
                             1059.601984
                                           1454.829350
                                                         2776.880435
```

```
449
            19.678442
                        157.196087
                                      1065.808020
                                                    1403.827722
                                                                   2573.397727
      [450 rows x 64 columns]
 [8]: df
 [8]:
                                                                                     class
            survived
                       pclass
                                                sibsp
                                                       parch
                                                                   fare embarked
                                   sex
                                          age
                    0
                             3
                                  male
                                         22.0
                                                    1
                                                            0
                                                                 7.2500
                                                                                S
                                                                                     Third
                    1
                                                               71.2833
                                                                                С
      1
                             1
                                female
                                         38.0
                                                    1
                                                            0
                                                                                     First
      2
                    1
                             3
                                female
                                         26.0
                                                    0
                                                                7.9250
                                                                                S
                                                                                     Third
                                                                                S
      3
                    1
                             1
                                female
                                         35.0
                                                    1
                                                               53.1000
                                                                                     First
      4
                    0
                             3
                                  male
                                         35.0
                                                    0
                                                            0
                                                                 8.0500
                                                                                S
                                                                                     Third
      . .
                    0
                             2
                                  male
                                                    0
                                                                                S
                                                                                    Second
      886
                                         27.0
                                                            0
                                                               13.0000
                                                                                S
      887
                    1
                             1
                                female
                                         19.0
                                                    0
                                                            0
                                                               30.0000
                                                                                     First
      888
                    0
                             3
                                female
                                          NaN
                                                    1
                                                            2
                                                               23.4500
                                                                                S
                                                                                     Third
                                         26.0
                                                                                С
      889
                    1
                             1
                                  male
                                                    0
                                                            0
                                                               30.0000
                                                                                     First
      890
                    0
                             3
                                         32.0
                                                                                     Third
                                  male
                                                    0
                                                                7.7500
                    adult male deck
                                       embark_town alive
              who
                                                            alone
      0
                          True
                                 NaN
                                       Southampton
                                                       no
                                                            False
              man
      1
                                   С
                         False
                                         Cherbourg
                                                            False
            woman
                                                      yes
      2
                         False
                                 NaN
                                       Southampton
                                                      yes
                                                             True
            woman
      3
            woman
                         False
                                   C
                                       Southampton
                                                      yes
                                                            False
      4
              man
                          True
                                 NaN
                                       Southampton
                                                       no
                                                             True
      . .
                         ... ...
              •••
      886
                                       Southampton
                                                             True
              man
                          True
                                 NaN
                                                       no
      887
                         False
                                   В
                                       Southampton
                                                      yes
                                                             True
            woman
      888
                         False
                                 \mathtt{NaN}
                                       Southampton
                                                            False
            woman
                                                       no
      889
                                   C
                          True
                                         Cherbourg
                                                      yes
                                                             True
              man
      890
                          True
                                        Queenstown
                                                             True
              man
                                NaN
                                                       no
      [891 rows x 15 columns]
 [9]: df.columns
 [9]: Index(['survived', 'pclass', 'sex', 'age', 'sibsp', 'parch', 'fare',
              'embarked', 'class', 'who', 'adult_male', 'deck', 'embark_town',
              'alive', 'alone'],
             dtype='object')
      df.groupby("age")["fare"].describe()
[12]:
              count
                          mean
                                        std
                                                   min
                                                              25%
                                                                          50%
                                                                                     75% \
      age
```

447

448

23.165761

21.562894

138.412425

146.486143

991.122950

1019.954554

1404.982250

1433.465267

2614.916667

2590.214286

```
0.42
          1.0
                 8.5167
                                 {\tt NaN}
                                         8.5167
                                                     8.5167
                                                                8.5167
                                                                           8.5167
0.67
          1.0
                 14.5000
                                 {\tt NaN}
                                        14.5000
                                                    14.5000
                                                               14.5000
                                                                          14.5000
0.75
          2.0
                 19.2583
                            0.000000
                                        19.2583
                                                    19.2583
                                                               19.2583
                                                                          19.2583
0.83
          2.0
                            7.247845
                 23.8750
                                        18.7500
                                                    21.3125
                                                               23.8750
                                                                          26.4375
0.92
          1.0
               151.5500
                                       151.5500
                                                  151.5500
                                                              151.5500
                                                                         151.5500
                                 {\tt NaN}
70.00
          2.0
                40.7500
                          42.779960
                                        10.5000
                                                    25.6250
                                                               40.7500
                                                                          55.8750
70.50
          1.0
                 7.7500
                                 {\tt NaN}
                                         7.7500
                                                     7.7500
                                                                7.7500
                                                                           7.7500
71.00
          2.0
                42.0792
                           10.500536
                                        34.6542
                                                               42.0792
                                                    38.3667
                                                                          45.7917
74.00
          1.0
                  7.7750
                                         7.7750
                                                     7.7750
                                                                7.7750
                                                                           7.7750
                                 NaN
80.00
          1.0
                 30.0000
                                 {\tt NaN}
                                        30.0000
                                                    30.0000
                                                               30.0000
                                                                          30.0000
```

max

age 0.42 8.5167 0.67 14.5000 0.75 19.2583 0.83 29.0000 0.92 151.5500 70.00 71.0000 70.50 7.7500 71.00 49.5042 74.00 7.7750 00.08 30.0000

[88 rows x 8 columns]

[15]: df.groupby("sibsp")["age"].describe()

[15]:		count	mean	std	min	25%	50%	75%	max
	sibsp								
	0	471.0	31.397558	13.647767	0.42	22.00	29.0	39.00	80.0
	1	183.0	30.089727	14.645033	0.67	20.00	30.0	39.00	70.0
	2	25.0	22.620000	14.679230	0.75	16.00	23.0	28.00	53.0
	3	12.0	13.916667	11.317391	2.00	3.75	9.5	23.25	33.0
	4	18.0	7.055556	4.880601	1.00	3.25	6.5	9.00	17.0
	5	5.0	10.200000	5.805170	1.00	9.00	11.0	14.00	16.0
	8	0.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN

[16]: df.describe()

[16]:		survived	pclass	age	sibsp	parch	fare
	count	891.000000	891.000000	714.000000	891.000000	891.000000	891.000000
	mean	0.383838	2.308642	29.699118	0.523008	0.381594	32.204208
	std	0.486592	0.836071	14.526497	1.102743	0.806057	49.693429
	min	0.000000	1.000000	0.420000	0.000000	0.000000	0.000000

```
25%
         0.000000
                      2.000000
                                 20.125000
                                               0.000000
                                                            0.000000
                                                                        7.910400
50%
                      3.000000
                                 28.000000
                                               0.000000
         0.000000
                                                            0.000000
                                                                       14.454200
                                               1.000000
75%
         1.000000
                      3.000000
                                 38.000000
                                                            0.000000
                                                                       31.000000
                                 80.000000
                                                            6.000000 512.329200
         1.000000
                      3.000000
                                               8.000000
max
```

[17]: df.groupby("Sex")["age"].describe()

```
KevError
                                          Traceback (most recent call last)
Cell In[17], line 1
---> 1 df.groupby("Sex")["age"].describe()
File /opt/conda/lib/python3.11/site-packages/pandas/core/frame.py:8869, in_
 DataFrame.groupby(self, by, axis, level, as index, sort, group keys, observed u
 →dropna)
   8866 if level is None and by is None:
            raise TypeError("You have to supply one of 'by' and 'level'")
   8867
-> 8869 return DataFrameGroupBy(
   8870
            obj=self,
   8871
            keys=by,
   8872
            axis=axis,
   8873
            level=level,
   8874
            as index=as index,
   8875
            sort=sort,
   8876
            group keys=group keys,
   8877
            observed=observed,
            dropna=dropna,
   8878
   8879
File /opt/conda/lib/python3.11/site-packages/pandas/core/groupby/groupby.py:
 41278, in GroupBy. __init__(self, obj, keys, axis, level, grouper, exclusions,_
 ⇒selection, as_index, sort, group_keys, observed, dropna)
   1275 self.dropna = dropna
   1277 if grouper is None:
            grouper, exclusions, obj = get grouper(
-> 1278
   1279
                obj,
   1280
                keys,
   1281
                axis=axis,
                level=level,
   1282
   1283
                sort=sort,
   1284
                observed=False if observed is lib.no_default else observed,
   1285
                dropna=self.dropna,
   1286
   1288 if observed is lib.no_default:
   1289
            if any(ping._passed_categorical for ping in grouper.groupings):
File /opt/conda/lib/python3.11/site-packages/pandas/core/groupby/grouper.py:
 41009, in get grouper(obj, key, axis, level, sort, observed, validate, dropna)
```

```
1007
                      in_axis, level, gpr = False, gpr, None
         1008
                  else:
                      raise KeyError(gpr)
      -> 1009
         1010 elif isinstance(gpr, Grouper) and gpr.key is not None:
                  # Add key to exclusions
         1011
         1012
                  exclusions.add(gpr.key)
      KeyError: 'Sex'
[18]: df.groupby("sex")["age"].describe()
[18]:
             count
                         mean
                                     std
                                          min
                                                 25%
                                                      50%
                                                            75%
                                                                  max
     sex
     female 261.0 27.915709 14.110146 0.75 18.0
                                                     27.0
                                                           37.0 63.0
     male
             453.0 30.726645 14.678201 0.42 21.0 29.0 39.0 80.0
 []:
```