

```
import numpy as np
import pandas as pd
df = pd.read_excel('FAO DATASET.xlsx')
```

```
df
```

	Area Code	Area	Item Code	Item	Element Code \
0	4	Algeria	2501	Population	511
1	4	Algeria	2501	Population	5301
2	4	Algeria	2901	Grand Total	664
3	4	Algeria	2901	Grand Total	674
4	4	Algeria	2901	Grand Total	684
...
60938	181	Zimbabwe	2899	Miscellaneous	5142
60939	181	Zimbabwe	2899	Miscellaneous	645
60940	181	Zimbabwe	2899	Miscellaneous	664
60941	181	Zimbabwe	2899	Miscellaneous	674
60942	181	Zimbabwe	2899	Miscellaneous	684

	Element	Unit
Y2014 \		
0	Total Population - Both sexes	1000 persons
38924.00		
1	Domestic supply quantity	1000 tonnes
0.00		
2	Food supply (kcal/capita/day)	kcal/capita/day
3377.00		
3	Protein supply quantity (g/capita/day)	g/capita/day
94.90		
4	Fat supply quantity (g/capita/day)	g/capita/day
80.06		
...
...		
60938	Food	1000 tonnes
42.00		
60939	Food supply quantity (kg/capita/yr)	kg
3.06		
60940	Food supply (kcal/capita/day)	kcal/capita/day
3.00		
60941	Protein supply quantity (g/capita/day)	g/capita/day
0.10		
60942	Fat supply quantity (g/capita/day)	g/capita/day
0.04		

	Y2015	Y2016	Y2017	Y2018
0	39728.00	40551.00	41389.00	42228.00
1	0.00	0.00	0.00	0.00
2	3379.00	3372.00	3341.00	3322.00
3	94.35	94.72	92.82	91.83

4	79.36	77.40	80.19	77.28
...
60938	46.00	33.00	19.00	16.00
60939	3.33	2.35	1.33	1.08
60940	4.00	3.00	1.00	1.00
60941	0.11	0.08	0.04	0.04
60942	0.05	0.03	0.02	0.01

[60943 rows x 12 columns]

```
df.groupby('Item').sum().loc['Animal fats']
```

```
Area Code      85279.00
Item Code      1882494.00
Element Code    2567303.00
Y2014          209460.54
Y2015          200675.72
Y2016          183314.22
Y2017          269617.53
Y2018          269648.27
Name: Animal fats, dtype: float64
```

```
df.describe()
```

	Area Code	Item Code	Element Code	Y2014
Y2015 \				
count	60943.000000	60943.000000	60943.000000	59354.000000
mean	134.265576	2687.176706	3814.856456	134.196282
std	72.605709	146.055739	2212.007033	1567.663696
min	4.000000	2501.000000	511.000000	-1796.000000
25%	74.000000	2562.000000	684.000000	0.000000
50%	136.000000	2630.000000	5142.000000	0.090000
75%	195.000000	2775.000000	5511.000000	8.340000
max	276.000000	2961.000000	5911.000000	176405.000000

	Y2016	Y2017	Y2018
count	59408.000000	59437.000000	59507.000000
mean	136.555222	140.917765	143.758381
std	1640.007194	1671.862359	1710.782658
min	-3225.000000	-1582.000000	-3396.000000
25%	0.000000	0.000000	0.000000
50%	0.080000	0.100000	0.070000

```

75%          8.430000          9.000000          9.000000
max    185960.000000    190873.000000    195875.000000

```

```
df.isnull().sum() * 100 / len(df)
```

```

Area Code      0.000000
Area           0.000000
Item Code      0.000000
Item           0.000000
Element Code   0.000000
Element        0.000000
Unit          0.000000
Y2014         2.607354
Y2015         2.540078
Y2016         2.518747
Y2017         2.471162
Y2018         2.356300

```

```
dtype: float64
```

```
df.corr()
```

	Area Code	Item Code	Element Code	Y2014	
Y2015 \					
Area Code	1.000000	-0.005159	-0.000209	0.006164	0.005472
Item Code	-0.005159	1.000000	-0.024683	0.021722	0.020857
Element Code	-0.000209	-0.024683	1.000000	0.024457	0.023889
Y2014	0.006164	0.021722	0.024457	1.000000	0.994647
Y2015	0.005472	0.020857	0.023889	0.994647	1.000000
Y2016	0.005247	0.020109	0.023444	0.996081	0.995739
Y2017	0.005006	0.021494	0.024254	0.995230	0.988048
Y2018	0.005665	0.021314	0.024279	0.994872	0.988208

	Y2016	Y2017	Y2018
Area Code	0.005247	0.005006	0.005665
Item Code	0.020109	0.021494	0.021314
Element Code	0.023444	0.024254	0.024279
Y2014	0.996081	0.995230	0.994872
Y2015	0.995739	0.988048	0.988208
Y2016	1.000000	0.992785	0.992757
Y2017	0.992785	1.000000	0.998103
Y2018	0.992757	0.998103	1.000000

```
df.isnull().sum() * 100 / len(df)
```

Code \ Element	Area Code	Item Code	Element
Domestic supply quantity 28068795	708993	14197445	
Export Quantity 26026133	599910	11840553	
Fat supply quantity (g/capita/day) 3435732	675050	13535000	
Feed 7282199	176272	3538507	
Food 25406622	663295	13285035	
Food supply (kcal/capita/day) 3329296	674057	13511060	
Food supply quantity (kg/capita/yr) 3163725	658446	13185401	
Import Quantity 28834929	688174	13795966	
Losses 10292107	274353	5424803	
Other uses (non-food) 8926728	235554	4729749	
Processing 10313310	271940	5350416	
Production 21388191	526751	10450053	
Protein supply quantity (g/capita/day) 3385502	675050	13535000	
Residuals 24066350	623271	12421089	
Seed 4211574	103537	2035933	
Stock Variation 21464704	571566	11329527	
Total Population - Both sexes 22995	6020	112545	
Tourist consumption 2869905	50308	1486528	

	Y2014	Y2015
Y2016 \		
Element		
Domestic supply quantity 2044842.70	1996716.35	2021493.55
Export Quantity	150020.64	157614.47

151920.46		
Fat supply quantity (g/capita/day)	10225.56	10235.74
10102.77		
Feed	216927.89	225050.22
228958.65		
Food	1212332.49	1232361.10
1247022.17		
Food supply (kcal/capita/day)	454257.00	453383.00
451810.00		
Food supply quantity (kg/capita/yr)	49650.63	49345.13
48985.28		
Import Quantity	274144.48	267018.46
286582.78		
Losses	153223.00	155439.00
157787.00		
Other uses (non-food)	78718.13	66254.41
69563.68		
Processing	282923.00	287929.00
280631.00		
Production	1931287.75	1947019.39
1943537.15		
Protein supply quantity (g/capita/day)	11836.46	11833.95
11779.69		
Residuals	30149.00	30045.00
37224.00		
Seed	21922.92	23976.82
23389.20		
Stock Variation	58749.83	34910.99
33140.12		
Total Population - Both sexes	1031585.00	1058081.00
1085107.00		
Tourist consumption	416.00	349.00
89.00		

	Y2017	Y2018
Element		
Domestic supply quantity	2088198.10	2161192.10
Export Quantity	182338.80	181594.80
Fat supply quantity (g/capita/day)	10253.84	10258.69
Feed	223705.68	233489.68
Food	1258888.28	1303841.28
Food supply (kcal/capita/day)	454681.00	455261.00
Food supply quantity (kg/capita/yr)	48690.04	49056.85
Import Quantity	294559.09	287997.09
Losses	160614.00	163902.00
Other uses (non-food)	91645.97	91300.97
Processing	292836.00	308429.00
Production	2030056.89	2075072.89
Protein supply quantity (g/capita/day)	11842.45	11833.56
Residuals	35500.00	34864.00

Seed	24870.14	25263.14
Stock Variation	54316.91	20577.91
Total Population - Both sexes	1112641.00	1140605.00
Tourist consumption	91.00	90.00

df.groupby('Area').sum()

Y2014 \ Area	Area Code	Item Code	Element Code
Algeria	5252	3532053	5017927
313375.33			
Angola	9968	3819908	5515088
208584.42			
Benin	68105	3453692	4852820
118050.79			
Botswana	27560	3704902	5259784
22339.92			
Burkina Faso	328297	3778795	5431243
105051.33			
Cabo Verde	44100	3396746	4787751
14576.94			
Cameroon	46720	3916078	5663196
217630.28			
Central African Republic	49728	3607546	5069094
28739.02			
Chad	52377	3606529	5108355
65940.17			
Comoros	2025	124514	241681
32.00			
Congo	64998	3792029	5445560
38699.26			
Côte d'Ivoire	156969	3934818	5691192
195982.84			
Djibouti	78840	2956078	3980378
21332.28			
Egypt	87792	3996567	5893126
849192.30			
Eswatini	268356	3456174	4870226
53285.75			
Ethiopia	344386	3878162	5598223
415935.50			
Ethiopia PDR	2418	107853	209609
0.00			
Gabon	92130	3354410	4590308
28126.31			
Gambia	87600	3145402	4272295
19607.87			
Ghana	109674	3639339	5135536

308328.59			
Guinea	126900	3782145	5431286
91213.40			
Guinea-Bissau	197400	3035574	4011694
17708.67			
Kenya	177840	4185637	6211860
255211.01			
Lesotho	140300	3099348	4204994
19125.89			
Liberia	148338	3249929	4309057
27898.35			
Madagascar	185631	3864258	5619900
128985.32			
Malawi	188110	3879389	5600952
173454.86			
Mali	171969	3469876	4878889
123038.75			
Mauritania	162520	3222107	4297253
109557.63			
Mauritius	188786	3711587	5317897
50898.12			
Morocco	199199	3743082	5414999
375977.76			
Mozambique	205488	3830309	5566682
160757.87			
Namibia	188601	3452725	4813630
32026.42			
Niger	221674	3763737	5384208
108236.65			
Nigeria	234366	3954357	5726937
1399542.19			
Rwanda	262384	3824085	5477860
70001.38			
Sao Tome and Principe	227161	3168050	4260866
12458.64			
Senegal	285090	3922180	5643618
78533.93			
Seychelles	13328	188266	367816
305.20			
Sierra Leone	244674	3343306	4603040
62570.89			
South Africa	282598	3759379	5450983
497289.52			
Sudan	363216	3534661	4866583
247577.56			
Sudan (former)	10918	146631	286940
0.00			
Togo	280798	3478828	4868747
47618.05			
Tunisia	297036	3602818	5131662

117029.33			
Uganda	329508	3909109	5660301
218142.33			
United Republic of Tanzania	305085	3809549	5461092
337430.64			
Zambia	364201	3892801	5638889
99318.53			
Zimbabwe	252133	3739292	5346770
78366.34			

	Y2015	Y2016	Y2017
Y2018			
Area			

Algeria	324058.40	326007.41	325644.27
341729.98			
Angola	209565.67	214725.32	229159.57
235206.68			
Benin	108181.13	117963.59	124771.22
124960.70			
Botswana	23024.85	22970.65	22101.30
23129.08			
Burkina Faso	102701.22	107702.27	101855.07
112970.72			
Cabo Verde	14538.93	14569.40	14650.74
14622.60			
Cameroon	225220.72	231714.36	232030.43
233022.93			
Central African Republic	28885.34	29454.54	29937.00
30101.57			
Chad	65835.88	72673.76	71594.68
72282.24			
Comoros	41.34	54.91	59.84
59.84			
Congo	40255.51	40592.66	41181.68
42005.53			
Côte d'Ivoire	211591.29	211439.20	224599.01
227018.00			
Djibouti	23690.16	21783.91	22729.91
23718.96			
Egypt	868218.73	858568.63	866379.92
852652.92			
Eswatini	54072.07	54025.21	54343.33
55045.07			
Ethiopia	429139.33	444567.57	448683.76
450788.86			
Ethiopia PDR	0.00	0.00	0.00
0.00			
Gabon	28367.30	28129.95	27979.64
28339.38			

Gambia	19665.39	21758.15	23154.18
23513.80			
Ghana	311092.13	314320.45	337599.06
358915.64			
Guinea	92803.39	95450.24	98138.87
103262.08			
Guinea-Bissau	17990.06	18524.83	19102.77
18997.92			
Kenya	265506.19	260257.56	264660.66
270916.80			
Lesotho	17965.84	17258.96	21267.96
19109.23			
Liberia	28698.10	29746.68	29342.20
29629.83			
Madagascar	126674.90	129010.25	131197.73
134576.44			
Malawi	167989.09	164970.42	181098.71
187366.09			
Mali	132456.58	147324.78	149928.33
159026.42			
Mauritania	61909.99	79872.42	156665.46
157479.95			
Mauritius	53372.42	49272.41	51114.83
47150.91			
Morocco	412473.80	367884.18	388495.36
399271.27			
Mozambique	158231.17	159924.41	161407.98
164934.05			
Namibia	30687.90	30389.07	29874.89
29350.04			
Niger	117834.65	123601.88	126707.58
133982.86			
Nigeria	1414362.83	1482945.71	1483268.23
1499774.24			
Rwanda	70138.83	70921.76	73663.69
74839.08			
Sao Tome and Principe	12386.93	12647.56	12662.63
12806.49			
Senegal	91939.14	89017.72	95681.15
95493.82			
Seychelles	358.20	416.32	442.34
442.34			
Sierra Leone	62523.14	52767.72	55311.33
55981.73			
South Africa	468352.18	462224.16	517590.54
509787.97			
Sudan	230652.54	253197.29	239931.92
268054.39			
Sudan (former)	0.00	0.00	0.00
0.00			

Togo	47834.59	47930.75	49841.88
54872.00			
Tunisia	128211.41	123778.86	124167.20
127343.17			
Uganda	220615.72	202981.34	213950.38
222147.25			
United Republic of Tanzania	341969.46	333765.86	322616.85
349763.41			
Zambia	96214.00	97728.69	103223.77
101604.27			
Zimbabwe	74041.79	75638.88	75919.34
76581.41			