Class04

September 10, 2024

1 Working with Pandas

```python
[3]: # import the necessary libraries

import numpy as np, pandas as pd

cars_per_cap = [809, 731, 588, 18, 200, 70, 45]
country = ['United States', 'Australia', 'Japan', 'India', 'Russia', 'Morocco',
 ↪'Egypt']
drives_right = [True, False, False, False, True, True, True]
```

```python
[4]: data = {"cars_per_cap":cars_per_cap, "country":country, "drives_right":
 ↪drives_right}
data
```

```
[4]: {'cars_per_cap': [809, 731, 588, 18, 200, 70, 45],
 'country': ['United States',
  'Australia',
  'Japan',
  'India',
  'Russia',
  'Morocco',
  'Egypt'],
 'drives_right': [True, False, False, False, True, True, True]}
```

```python
[5]: cars = pd.DataFrame(data)
cars
```

```
[5]:    cars_per_cap        country  drives_right
   0           809  United States          True
   1           731      Australia         False
   2           588          Japan         False
   3            18          India         False
   4           200         Russia          True
   5            70        Morocco          True
   6            45          Egypt          True
```

```
[6]: type(cars)
```

```
[6]: pandas.core.frame.DataFrame
```

```
[7]: cars_df = pd.read_csv("cars.csv")
     cars_df
```

```
[7]:      USCA   US United States   809  FALSE
     0   ASPAC  AUS     Australia  731.0   True
     1   ASPAC  JAP         Japan  588.0   True
     2   ASPAC   IN         India   18.0   True
     3   ASPAC   RU        Russia  200.0  False
     4   LATAM  MOR       Morocco   70.0  False
     5     AFR   EG         Egypt   45.0  False
     6     EUR  ENG       England    NaN   True
```

```
[8]: cars_df = pd.read_csv("cars.csv",header=None)
     cars_df
```

```
[8]:        0    1               2      3      4
     0   USCA   US   United States  809.0  False
     1  ASPAC  AUS       Australia  731.0   True
     2  ASPAC  JAP           Japan  588.0   True
     3  ASPAC   IN           India   18.0   True
     4  ASPAC   RU          Russia  200.0  False
     5  LATAM  MOR         Morocco   70.0  False
     6    AFR   EG           Egypt   45.0  False
     7    EUR  ENG         England    NaN   True
```

```
[9]: cars_df.columns
```

```
[9]: Int64Index([0, 1, 2, 3, 4], dtype='int64')
```

```
[10]: cars_df = pd.read_csv("cars.csv",header=None, index_col = 0)
      cars_df.columns = ['Region', 'Country','cars_per_cap', 'drives_right']
      cars_df
```

```
[10]:        Region         Country  cars_per_cap  drives_right
      0
      USCA       US   United States         809.0         False
      ASPAC     AUS       Australia         731.0          True
      ASPAC     JAP           Japan         588.0          True
      ASPAC      IN           India          18.0          True
      ASPAC      RU          Russia         200.0         False
      LATAM     MOR         Morocco          70.0         False
      AFR        EG           Egypt          45.0         False
      EUR       ENG         England           NaN          True
```

```
[11]: cars_df.index
```

```
[11]: Index(['USCA', 'ASPAC', 'ASPAC', 'ASPAC', 'ASPAC', 'LATAM', 'AFR', 'EUR'],
      dtype='object', name=0)
```

```
[12]: cars_df.index.name = "Country_Code"
      cars_df
```

[12]:

Country_Code	Region	Country	cars_per_cap	drives_right
USCA	US	United States	809.0	False
ASPAC	AUS	Australia	731.0	True
ASPAC	JAP	Japan	588.0	True
ASPAC	IN	India	18.0	True
ASPAC	RU	Russia	200.0	False
LATAM	MOR	Morocco	70.0	False
AFR	EG	Egypt	45.0	False
EUR	ENG	England	NaN	True

```
[13]: cars_df.index.name = None
      cars_df
```

[13]:

	Region	Country	cars_per_cap	drives_right
USCA	US	United States	809.0	False
ASPAC	AUS	Australia	731.0	True
ASPAC	JAP	Japan	588.0	True
ASPAC	IN	India	18.0	True
ASPAC	RU	Russia	200.0	False
LATAM	MOR	Morocco	70.0	False
AFR	EG	Egypt	45.0	False
EUR	ENG	England	NaN	True

```
[14]: cars_df.to_csv("cars_to_csv.csv")
```

```
[15]: # working with the sales.xlsx file

      sales = pd.read_excel("sales.xlsx")
      sales
```

[15]:

	Market	Region	No_of_Orders	Profit	Sales
0	Africa	Western Africa	251	-12901.51	78476.06
1	Africa	Southern Africa	85	11768.58	51319.50
2	Africa	North Africa	182	21643.08	86698.89
3	Africa	Eastern Africa	110	8013.04	44182.60
4	Africa	Central Africa	103	15606.30	61689.99
5	Asia Pacific	Western Asia	382	-16766.90	124312.24
6	Asia Pacific	Southern Asia	469	67998.76	351806.60

```
7     Asia Pacific   Southeastern Asia        533   20948.84   329751.38
8     Asia Pacific             Oceania        646   54734.02   408002.98
9     Asia Pacific        Eastern Asia        414   72805.10   315390.77
10    Asia Pacific        Central Asia         37   -2649.76     8190.74
11          Europe      Western Europe        964   82091.27   656637.14
12          Europe     Southern Europe        338   18911.49   215703.93
13          Europe     Northern Europe        367   43237.44   252969.09
14          Europe      Eastern Europe        241   25050.69   108258.93
15           LATAM       South America        496   12377.59   210710.49
16           LATAM     Central America        930   74679.54   461670.28
17           LATAM           Caribbean        288   13529.59   116333.05
18            USCA          Western US        490   44303.65   251991.83
19            USCA         Southern US        255   19991.83   148771.91
20            USCA          Eastern US        443   47462.04   264973.98
21            USCA          Central US        356   33697.43   170416.31
22            USCA              Canada         49    7246.62    26298.81
```

[16]:
```python
sales = pd.read_excel("sales.xlsx",index_col=[0,1])
sales
```

[16]:
```
                               No_of_Orders    Profit       Sales
Market        Region
Africa        Western Africa            251  -12901.51    78476.06
              Southern Africa            85   11768.58    51319.50
              North Africa              182   21643.08    86698.89
              Eastern Africa            110    8013.04    44182.60
              Central Africa            103   15606.30    61689.99
Asia Pacific  Western Asia              382  -16766.90   124312.24
              Southern Asia             469   67998.76   351806.60
              Southeastern Asia         533   20948.84   329751.38
              Oceania                   646   54734.02   408002.98
              Eastern Asia              414   72805.10   315390.77
              Central Asia               37   -2649.76     8190.74
Europe        Western Europe            964   82091.27   656637.14
              Southern Europe           338   18911.49   215703.93
              Northern Europe           367   43237.44   252969.09
              Eastern Europe            241   25050.69   108258.93
LATAM         South America             496   12377.59   210710.49
              Central America           930   74679.54   461670.28
              Caribbean                 288   13529.59   116333.05
USCA          Western US                490   44303.65   251991.83
              Southern US               255   19991.83   148771.91
              Eastern US                443   47462.04   264973.98
              Central US                356   33697.43   170416.31
              Canada                     49    7246.62    26298.81
```

[17]:
```python
sales.head()
```

```
[17]:                        No_of_Orders      Profit      Sales
      Market Region
      Africa Western Africa           251  -12901.51   78476.06
             Southern Africa           85   11768.58   51319.50
             North Africa             182   21643.08   86698.89
             Eastern Africa           110    8013.04   44182.60
             Central Africa           103   15606.30   61689.99
```

```
[18]: sales.head(3)
```

```
[18]:                        No_of_Orders      Profit      Sales
      Market Region
      Africa Western Africa           251  -12901.51   78476.06
             Southern Africa           85    11768.58   51319.50
             North Africa             182   21643.08   86698.89
```

```
[19]: sales.tail()
```

```
[19]:                      No_of_Orders      Profit       Sales
      Market Region
      USCA   Western US            490   44303.65   251991.83
             Southern US           255   19991.83   148771.91
             Eastern US            443   47462.04   264973.98
             Central US            356   33697.43   170416.31
             Canada                 49    7246.62    26298.81
```

```
[20]: sales.tail(2)
```

```
[20]:                      No_of_Orders      Profit       Sales
      Market Region
      USCA   Central US            356   33697.43   170416.31
             Canada                 49    7246.62    26298.81
```

```
[21]: sales.info()
```

```
<class 'pandas.core.frame.DataFrame'>
MultiIndex: 23 entries, ('Africa', 'Western Africa') to ('USCA', 'Canada')
Data columns (total 3 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   No_of_Orders  23 non-null     int64
 1   Profit        23 non-null     float64
 2   Sales         23 non-null     float64
dtypes: float64(2), int64(1)
memory usage: 1.6+ KB
```

```
[22]: sales.describe() # Statistical information
```

```
[22]:          No_of_Orders          Profit           Sales
       count      23.000000       23.000000       23.000000
       mean      366.478261    28859.944783   206285.108696
       std       246.590361    27701.193773   160589.886606
       min        37.000000   -16766.900000     8190.740000
       25%       211.500000    12073.085000    82587.475000
       50%       356.000000    20948.840000   170416.310000
       75%       479.500000    45882.845000   290182.375000
       max       964.000000    82091.270000   656637.140000
```

```
[23]: sales.shape
```

```
[23]: (23, 3)
```

```
[24]: sales['Profit']
```

```
[24]: Market         Region
      Africa         Western Africa      -12901.51
                     Southern Africa      11768.58
                     North Africa         21643.08
                     Eastern Africa        8013.04
                     Central Africa       15606.30
      Asia Pacific   Western Asia        -16766.90
                     Southern Asia        67998.76
                     Southeastern Asia    20948.84
                     Oceania              54734.02
                     Eastern Asia         72805.10
                     Central Asia         -2649.76
      Europe         Western Europe       82091.27
                     Southern Europe      18911.49
                     Northern Europe      43237.44
                     Eastern Europe       25050.69
      LATAM          South America        12377.59
                     Central America      74679.54
                     Caribbean            13529.59
      USCA           Western US           44303.65
                     Southern US          19991.83
                     Eastern US           47462.04
                     Central US           33697.43
                     Canada                7246.62
      Name: Profit, dtype: float64
```

```
[25]: sales['Sales']
```

```
[25]: Market         Region
      Africa         Western Africa       78476.06
                     Southern Africa      51319.50
```

```
                   North Africa            86698.89
                   Eastern Africa          44182.60
                   Central Africa          61689.99
    Asia Pacific   Western Asia           124312.24
                   Southern Asia          351806.60
                   Southeastern Asia      329751.38
                   Oceania                408002.98
                   Eastern Asia           315390.77
                   Central Asia             8190.74
    Europe         Western Europe         656637.14
                   Southern Europe        215703.93
                   Northern Europe        252969.09
                   Eastern Europe         108258.93
    LATAM          South America          210710.49
                   Central America        461670.28
                   Caribbean              116333.05
    USCA           Western US             251991.83
                   Southern US            148771.91
                   Eastern US             264973.98
                   Central US             170416.31
                   Canada                  26298.81
    Name: Sales, dtype: float64
```

[26]: `sales.Sales`

```
[26]: Market         Region
      Africa         Western Africa          78476.06
                     Southern Africa         51319.50
                     North Africa            86698.89
                     Eastern Africa          44182.60
                     Central Africa          61689.99
      Asia Pacific   Western Asia           124312.24
                     Southern Asia          351806.60
                     Southeastern Asia      329751.38
                     Oceania                408002.98
                     Eastern Asia           315390.77
                     Central Asia             8190.74
      Europe         Western Europe         656637.14
                     Southern Europe        215703.93
                     Northern Europe        252969.09
                     Eastern Europe         108258.93
      LATAM          South America          210710.49
                     Central America        461670.28
                     Caribbean              116333.05
      USCA           Western US             251991.83
                     Southern US            148771.91
                     Eastern US             264973.98
```

```
                 Central US              170416.31
                 Canada                   26298.81
      Name: Sales, dtype: float64
```

[27]: `sales[['Sales','Profit']]`

[27]:
```
                                    Sales      Profit
      Market        Region
      Africa        Western Africa    78476.06 -12901.51
                    Southern Africa   51319.50  11768.58
                    North Africa      86698.89  21643.08
                    Eastern Africa    44182.60   8013.04
                    Central Africa    61689.99  15606.30
      Asia Pacific  Western Asia     124312.24 -16766.90
                    Southern Asia    351806.60  67998.76
                    Southeastern Asia 329751.38  20948.84
                    Oceania          408002.98  54734.02
                    Eastern Asia     315390.77  72805.10
                    Central Asia       8190.74  -2649.76
      Europe        Western Europe   656637.14  82091.27
                    Southern Europe  215703.93  18911.49
                    Northern Europe  252969.09  43237.44
                    Eastern Europe   108258.93  25050.69
      LATAM         South America    210710.49  12377.59
                    Central America  461670.28  74679.54
                    Caribbean        116333.05  13529.59
      USCA          Western US       251991.83  44303.65
                    Southern US      148771.91  19991.83
                    Eastern US       264973.98  47462.04
                    Central US       170416.31  33697.43
                    Canada            26298.81   7246.62
```

[28]: `sales.loc[["Europe"]]`

[28]:
```
                            No_of_Orders    Profit      Sales
      Market Region
      Europe Western Europe         964   82091.27  656637.14
             Southern Europe        338   18911.49  215703.93
             Northern Europe        367   43237.44  252969.09
             Eastern Europe         241   25050.69  108258.93
```

[29]: `sales.loc["Europe","Sales"]`

[29]:
```
      Region
      Western Europe      656637.14
      Southern Europe     215703.93
      Northern Europe     252969.09
```

```
      Eastern Europe      108258.93
Name: Sales, dtype: float64
```

[30]: `sales.iloc[6]`

[30]:
```
No_of_Orders        469.00
Profit            67998.76
Sales            351806.60
Name: (Asia Pacific, Southern Asia), dtype: float64
```

[31]: `sales.iloc[6,2]`

[31]: `351806.6`

[32]: `sales.loc[:,["Sales", "Profit"]]`

[32]:

Market	Region	Sales	Profit
Africa	Western Africa	78476.06	-12901.51
	Southern Africa	51319.50	11768.58
	North Africa	86698.89	21643.08
	Eastern Africa	44182.60	8013.04
	Central Africa	61689.99	15606.30
Asia Pacific	Western Asia	124312.24	-16766.90
	Southern Asia	351806.60	67998.76
	Southeastern Asia	329751.38	20948.84
	Oceania	408002.98	54734.02
	Eastern Asia	315390.77	72805.10
	Central Asia	8190.74	-2649.76
Europe	Western Europe	656637.14	82091.27
	Southern Europe	215703.93	18911.49
	Northern Europe	252969.09	43237.44
	Eastern Europe	108258.93	25050.69
LATAM	South America	210710.49	12377.59
	Central America	461670.28	74679.54
	Caribbean	116333.05	13529.59
USCA	Western US	251991.83	44303.65
	Southern US	148771.91	19991.83
	Eastern US	264973.98	47462.04
	Central US	170416.31	33697.43
	Canada	26298.81	7246.62

[33]: `sales.loc[:,["Sales", "Profit"]].head()`

[33]:

Market	Region	Sales	Profit
Africa	Western Africa	78476.06	-12901.51

```
       Southern Africa  51319.50  11768.58
       North Africa     86698.89  21643.08
       Eastern Africa   44182.60   8013.04
       Central Africa   61689.99  15606.30
```

[34]: `sales.iloc[:,[1,2]].head()`

[34]:
```
                          Profit      Sales
      Market Region
      Africa Western Africa  -12901.51  78476.06
             Southern Africa  11768.58  51319.50
             North Africa     21643.08  86698.89
             Eastern Africa    8013.04  44182.60
             Central Africa   15606.30  61689.99
```

[35]: `sales.loc[["Europe"],:]`

[35]:
```
                          No_of_Orders    Profit      Sales
      Market Region
      Europe Western Europe          964  82091.27  656637.14
             Southern Europe         338  18911.49  215703.93
             Northern Europe         367  43237.44  252969.09
             Eastern Europe          241  25050.69  108258.93
```

[36]: `sales.iloc[0:3]`

[36]:
```
                          No_of_Orders     Profit      Sales
      Market Region
      Africa Western Africa         251 -12901.51  78476.06
             Southern Africa         85  11768.58  51319.50
             North Africa           182  21643.08  86698.89
```

[37]: `sales.iloc[0:4, 2:4]`

[37]:
```
                             Sales
      Market Region
      Africa Western Africa  78476.06
             Southern Africa  51319.50
             North Africa     86698.89
             Eastern Africa   44182.60
```

[38]: `# filtering`

`sales["Sales"] < 30000`

[38]:
```
      Market          Region
      Africa          Western Africa          False
```

```
                 Southern Africa      False
                 North Africa         False
                 Eastern Africa       False
                 Central Africa       False
Asia Pacific     Western Asia         False
                 Southern Asia        False
                 Southeastern Asia    False
                 Oceania              False
                 Eastern Asia         False
                 Central Asia          True
Europe           Western Europe       False
                 Southern Europe      False
                 Northern Europe      False
                 Eastern Europe       False
LATAM            South America        False
                 Central America      False
                 Caribbean            False
USCA             Western US           False
                 Southern US          False
                 Eastern US           False
                 Central US           False
                 Canada                True
Name: Sales, dtype: bool
```

[39]: `sales[sales["Sales"] < 30000]`

[39]:

Market	Region	No_of_Orders	Profit	Sales
Asia Pacific	Central Asia	37	-2649.76	8190.74
USCA	Canada	49	7246.62	26298.81

[40]: `sales[sales["Sales"] >= 30000]`

[40]:

Market	Region	No_of_Orders	Profit	Sales
Africa	Western Africa	251	-12901.51	78476.06
	Southern Africa	85	11768.58	51319.50
	North Africa	182	21643.08	86698.89
	Eastern Africa	110	8013.04	44182.60
	Central Africa	103	15606.30	61689.99
Asia Pacific	Western Asia	382	-16766.90	124312.24
	Southern Asia	469	67998.76	351806.60
	Southeastern Asia	533	20948.84	329751.38
	Oceania	646	54734.02	408002.98
	Eastern Asia	414	72805.10	315390.77
Europe	Western Europe	964	82091.27	656637.14
	Southern Europe	338	18911.49	215703.93

```
                Northern Europe         367   43237.44   252969.09
                Eastern Europe          241   25050.69   108258.93
LATAM           South America           496   12377.59   210710.49
                Central America         930   74679.54   461670.28
                Caribbean               288   13529.59   116333.05
USCA            Western US              490   44303.65   251991.83
                Southern US             255   19991.83   148771.91
                Eastern US              443   47462.04   264973.98
                Central US              356   33697.43   170416.31
```

[41]:
```python
sales = pd.read_excel("sales.xlsx")
sales
```

[41]:

	Market	Region	No_of_Orders	Profit	Sales
0	Africa	Western Africa	251	-12901.51	78476.06
1	Africa	Southern Africa	85	11768.58	51319.50
2	Africa	North Africa	182	21643.08	86698.89
3	Africa	Eastern Africa	110	8013.04	44182.60
4	Africa	Central Africa	103	15606.30	61689.99
5	Asia Pacific	Western Asia	382	-16766.90	124312.24
6	Asia Pacific	Southern Asia	469	67998.76	351806.60
7	Asia Pacific	Southeastern Asia	533	20948.84	329751.38
8	Asia Pacific	Oceania	646	54734.02	408002.98
9	Asia Pacific	Eastern Asia	414	72805.10	315390.77
10	Asia Pacific	Central Asia	37	-2649.76	8190.74
11	Europe	Western Europe	964	82091.27	656637.14
12	Europe	Southern Europe	338	18911.49	215703.93
13	Europe	Northern Europe	367	43237.44	252969.09
14	Europe	Eastern Europe	241	25050.69	108258.93
15	LATAM	South America	496	12377.59	210710.49
16	LATAM	Central America	930	74679.54	461670.28
17	LATAM	Caribbean	288	13529.59	116333.05
18	USCA	Western US	490	44303.65	251991.83
19	USCA	Southern US	255	19991.83	148771.91
20	USCA	Eastern US	443	47462.04	264973.98
21	USCA	Central US	356	33697.43	170416.31
22	USCA	Canada	49	7246.62	26298.81

[42]:
```python
sales[(sales["Market"].isin(["LATAM","Europe"])) & (sales["Sales"] >= 25000)]
```

[42]:

	Market	Region	No_of_Orders	Profit	Sales
11	Europe	Western Europe	964	82091.27	656637.14
12	Europe	Southern Europe	338	18911.49	215703.93
13	Europe	Northern Europe	367	43237.44	252969.09
14	Europe	Eastern Europe	241	25050.69	108258.93
15	LATAM	South America	496	12377.59	210710.49
16	LATAM	Central America	930	74679.54	461670.28

```
17      LATAM        Caribbean              288   13529.59   116333.05
```

[43]:
```
# or operator
sales[(sales["Market"].isin(["LATAM","Europe"])) | (sales["Sales"] >= 25000)]
```

[43]:

	Market	Region	No_of_Orders	Profit	Sales
0	Africa	Western Africa	251	-12901.51	78476.06
1	Africa	Southern Africa	85	11768.58	51319.50
2	Africa	North Africa	182	21643.08	86698.89
3	Africa	Eastern Africa	110	8013.04	44182.60
4	Africa	Central Africa	103	15606.30	61689.99
5	Asia Pacific	Western Asia	382	-16766.90	124312.24
6	Asia Pacific	Southern Asia	469	67998.76	351806.60
7	Asia Pacific	Southeastern Asia	533	20948.84	329751.38
8	Asia Pacific	Oceania	646	54734.02	408002.98
9	Asia Pacific	Eastern Asia	414	72805.10	315390.77
11	Europe	Western Europe	964	82091.27	656637.14
12	Europe	Southern Europe	338	18911.49	215703.93
13	Europe	Northern Europe	367	43237.44	252969.09
14	Europe	Eastern Europe	241	25050.69	108258.93
15	LATAM	South America	496	12377.59	210710.49
16	LATAM	Central America	930	74679.54	461670.28
17	LATAM	Caribbean	288	13529.59	116333.05
18	USCA	Western US	490	44303.65	251991.83
19	USCA	Southern US	255	19991.83	148771.91
20	USCA	Eastern US	443	47462.04	264973.98
21	USCA	Central US	356	33697.43	170416.31
22	USCA	Canada	49	7246.62	26298.81

[44]:
```
# replace the sales values column in the form of thousands
sales.Sales = sales.Sales.floordiv(1000)
sales.head()
```

[44]:

	Market	Region	No_of_Orders	Profit	Sales
0	Africa	Western Africa	251	-12901.51	78.0
1	Africa	Southern Africa	85	11768.58	51.0
2	Africa	North Africa	182	21643.08	86.0
3	Africa	Eastern Africa	110	8013.04	44.0
4	Africa	Central Africa	103	15606.30	61.0

[45]:
```
sales.rename(columns={'Sales':"Sales in thousand"}, inplace = True)
sales.head()
```

[45]:

	Market	Region	No_of_Orders	Profit	Sales in thousand
0	Africa	Western Africa	251	-12901.51	78.0
1	Africa	Southern Africa	85	11768.58	51.0
2	Africa	North Africa	182	21643.08	86.0

```
3   Africa    Eastern Africa              110    8013.04              44.0
4   Africa    Central Africa              103   15606.30              61.0
```

```
[46]: total_sum = sales.Profit.sum()
      total_sum
```

```
[46]: 663778.7300000001
```

```
[47]: sales["Profit %"] = sales.Profit.apply(lambda x:x/total_sum*100)
      sales.head()
```

```
[47]:    Market           Region  No_of_Orders     Profit  Sales in thousand  \
      0  Africa   Western Africa           251  -12901.51               78.0
      1  Africa  Southern Africa            85   11768.58               51.0
      2  Africa     North Africa           182   21643.08               86.0
      3  Africa   Eastern Africa           110    8013.04               44.0
      4  Africa   Central Africa           103   15606.30               61.0

         Profit %
      0 -1.943646
      1  1.772967
      2  3.260587
      3  1.207185
      4  2.351130
```

```
[48]: # Replace negative profits as NaN(zeroes)

      sales.loc[sales["Profit"] < 0 , "Profit"] = np.nan
      sales.head()
```

```
[48]:    Market           Region  No_of_Orders     Profit  Sales in thousand  \
      0  Africa   Western Africa           251        NaN               78.0
      1  Africa  Southern Africa            85   11768.58               51.0
      2  Africa     North Africa           182   21643.08               86.0
      3  Africa   Eastern Africa           110    8013.04               44.0
      4  Africa   Central Africa           103   15606.30               61.0

         Profit %
      0 -1.943646
      1  1.772967
      2  3.260587
      3  1.207185
      4  2.351130
```

```
[49]: sales.loc[sales["Profit %"] < 0 , "Profit %"] = np.nan
      sales.head()
```

```
[49]:      Market           Region  No_of_Orders    Profit  Sales in thousand  \
      0  Africa    Western Africa           251       NaN               78.0
      1  Africa   Southern Africa            85  11768.58               51.0
      2  Africa      North Africa           182  21643.08               86.0
      3  Africa    Eastern Africa           110   8013.04               44.0
      4  Africa    Central Africa           103  15606.30               61.0

         Profit %
      0       NaN
      1  1.772967
      2  3.260587
      3  1.207185
      4  2.351130
```

[ ]: