Pandas

July 5, 2023

```
[236]: import pandas as pd
[237]: df=pd.DataFrame(
           {"Name":[
               "Braund, Mr. Owen Harris",
               "Allen, Mr. William Henry",
               "Bonnell, Miss. Elizabeth",
           ],
           "Age": [22,35,58],
           "Sex":["male", "male", "female"],})
[238]: df
[238]:
                               Name
                                             Sex
                                     Age
           Braund, Mr. Owen Harris
                                      22
                                            male
       1 Allen, Mr. William Henry
                                            male
                                      35
       2 Bonnell, Miss. Elizabeth
                                      58
                                          female
[239]: type(df)
[239]: pandas.core.frame.DataFrame
[240]: df["Age"]
[240]: 0
            22
       1
            35
       2
            58
       Name: Age, dtype: int64
[241]: ages=pd.Series([22,35,58], name="Age")
[242]: type(ages)
[242]: pandas.core.series.Series
[243]: df["Age"].max()
[243]: 58
```

```
[244]: df["Age"].min()
[244]: 22
[245]:
       df.describe()
[245]:
                     Age
                3.000000
       count
       mean
               38.333333
       std
               18.230012
       min
               22.000000
       25%
               28.500000
       50%
               35.000000
       75%
               46.500000
               58.000000
       max
[246]: import os
       print(os.getcwd())
      C:\Users\ddaya\Documents\Practice_3
       data1=pd.read_csv("P1-OfficeSupplies.csv")
[248]:
       data1
[248]:
           OrderDate
                         Region
                                      Rep
                                               Item
                                                     Units
                                                             Unit Price
       0
             4-Jul-14
                           East
                                 Richard
                                           Pen Set
                                                        62
                                                                   4.99
       1
           12-Jul-14
                                     Nick
                                            Binder
                                                        29
                                                                   1.99
                           East
       2
           21-Jul-14
                       Central
                                  Morgan
                                           Pen Set
                                                        55
                                                                  12.49
       3
           29-Jul-14
                           East
                                    Susan
                                            Binder
                                                        81
                                                                  19.99
       4
             7-Aug-14
                       Central
                                 Matthew
                                           Pen Set
                                                        42
                                                                  23.95
       5
           15-Aug-14
                           East
                                 Richard
                                            Pencil
                                                        35
                                                                   4.99
           24-Aug-14
       6
                           West
                                    James
                                              Desk
                                                          3
                                                                 275.00
       7
                                                          2
             1-Sep-14
                       Central
                                    Smith
                                               Desk
                                                                 125.00
       8
           10-Sep-14
                       Central
                                     Bill
                                            Pencil
                                                         7
                                                                   1.29
       9
           18-Sep-14
                           East
                                 Richard
                                           Pen Set
                                                         16
                                                                  15.99
                                                                   1.99
           27-Sep-14
                                                        76
       10
                           West
                                    James
                                                Pen
       11
             5-0ct-14
                                                                   8.99
                       Central
                                   Morgan
                                            Binder
                                                        28
       12
           14-Oct-14
                           West
                                   Thomas
                                            Binder
                                                        57
                                                                  19.99
       13
           22-Oct-14
                           East
                                 Richard
                                                Pen
                                                        64
                                                                   8.99
           31-Oct-14
                                  Rachel
                                            Pencil
                                                                   1.29
       14
                       Central
                                                        14
       15
            8-Nov-14
                           East
                                    Susan
                                               Pen
                                                         15
                                                                  19.99
       16
           17-Nov-14
                       Central
                                     Alex
                                            Binder
                                                        11
                                                                   4.99
       17
           25-Nov-14
                       Central
                                 Matthew
                                           Pen Set
                                                        96
                                                                   4.99
       18
             4-Dec-14
                       Central
                                     Alex
                                            Binder
                                                        94
                                                                  19.99
           12-Dec-14
                                                                   1.29
       19
                       Central
                                    Smith
                                            Pencil
                                                        67
       20
           21-Dec-14
                        Central
                                   Rachel
                                            Binder
                                                        28
                                                                   4.99
       21
           29-Dec-14
                           East
                                    Susan
                                           Pen Set
                                                        74
                                                                  15.99
```

```
23
                                                       46
                                                                 8.99
           15-Jan-15
                       Central
                                    Bill
                                           Binder
       24
           23-Jan-15
                       Central
                                Matthew
                                           Binder
                                                       50
                                                                 19.99
       25
            1-Feb-15
                       Central
                                   Smith
                                           Binder
                                                       87
                                                                 15.00
       26
            9-Feb-15
                       Central
                                    Alex
                                           Pencil
                                                       36
                                                                 4.99
       27
           18-Feb-15
                          East
                                Richard
                                           Binder
                                                        4
                                                                 4.99
       28
           26-Feb-15
                      Central
                                   Bill
                                                       27
                                                                 19.99
                                              Pen
       29
            7-Mar-15
                          West
                                   James
                                           Binder
                                                        7
                                                                 19.99
       30
           15-Mar-15
                          West
                                   James
                                           Pencil
                                                                 2.99
                                                       56
       31
           24-Mar-15
                       Central
                                    Alex
                                          Pen Set
                                                       50
                                                                 4.99
       32
            1-Apr-15
                          East
                                Richard
                                           Binder
                                                                 4.99
                                                       60
       33
           10-Apr-15
                       Central
                                 Rachel
                                           Pencil
                                                       66
                                                                 1.99
       34
           18-Apr-15
                       Central
                                 Rachel
                                           Pencil
                                                       75
                                                                 1.99
       35
           27-Apr-15
                          East
                                   Nick
                                              Pen
                                                       96
                                                                 4.99
            5-May-15
                                                                 4.99
       36
                       Central
                                    Alex
                                           Pencil
                                                       90
       37
           14-May-15
                       Central
                                    Bill
                                           Pencil
                                                       53
                                                                 1.29
       38
           22-May-15
                          West
                                  Thomas
                                           Pencil
                                                       32
                                                                 1.99
       39
           31-May-15
                                    Bill
                                           Binder
                                                       80
                                                                 8.99
                       Central
       40
            8-Jun-15
                          East
                                Richard
                                           Binder
                                                       60
                                                                 8.99
       41
           17-Jun-15
                       Central
                                Matthew
                                             Desk
                                                        5
                                                               125.00
       42
           25-Jun-15
                       Central
                                 Morgan
                                           Pencil
                                                       90
                                                                  4.99
[249]: data1.head(8)
[249]:
                                                  Units
                                                          Unit Price
          OrderDate
                       Region
                                    Rep
                                            Item
       0
           4-Jul-14
                         East
                               Richard Pen Set
                                                      62
                                                                 4.99
       1
         12-Jul-14
                         East
                                   Nick
                                          Binder
                                                      29
                                                                1.99
                                Morgan Pen Set
       2 21-Jul-14 Central
                                                      55
                                                               12.49
       3 29-Jul-14
                         East
                                 Susan
                                          Binder
                                                      81
                                                               19.99
       4
          7-Aug-14 Central Matthew Pen Set
                                                      42
                                                               23.95
                                                                 4.99
       5 15-Aug-14
                         East Richard
                                          Pencil
                                                      35
          24-Aug-14
                         West
                                  James
                                            Desk
                                                       3
                                                              275.00
           1-Sep-14 Central
                                                       2
                                                              125.00
                                  Smith
                                            Desk
[250]:
       data1.columns
[250]: Index(['OrderDate', 'Region', 'Rep', 'Item', 'Units', 'Unit Price'],
       dtype='object')
[251]: data1.columns=['OrderDate', 'Region', 'Rep', 'Item', 'Units', 'UnitPrice']
[252]: data1
           OrderDate
[252]:
                        Region
                                     Rep
                                             Item
                                                   Units
                                                           UnitPrice
       0
            4-Jul-14
                                Richard
                                          Pen Set
                                                       62
                                                                 4.99
                          East
       1
           12-Jul-14
                          East
                                    Nick
                                           Binder
                                                       29
                                                                 1.99
       2
                                                               12.49
           21-Jul-14 Central
                                 Morgan
                                          Pen Set
                                                       55
```

22

6-Jan-15

East

Richard

Pencil

95

1.99

```
3
    29-Jul-14
                   East
                           Susan
                                    Binder
                                               81
                                                        19.99
                                               42
                                                        23.95
4
     7-Aug-14 Central
                         Matthew
                                  Pen Set
5
    15-Aug-14
                   East
                         Richard
                                    Pencil
                                               35
                                                         4.99
                                                3
6
    24-Aug-14
                   West
                           James
                                      Desk
                                                       275.00
7
     1-Sep-14 Central
                           Smith
                                      Desk
                                                2
                                                       125.00
                                                7
8
    10-Sep-14
               Central
                            Bill
                                    Pencil
                                                         1.29
9
    18-Sep-14
                                  Pen Set
                                               16
                                                        15.99
                  East Richard
10
    27-Sep-14
                  West
                           James
                                       Pen
                                               76
                                                         1.99
     5-Oct-14 Central
                                               28
                                                         8.99
11
                          Morgan
                                   Binder
12
    14-Oct-14
                  West
                          Thomas
                                   Binder
                                               57
                                                        19.99
13
    22-Oct-14
                  East Richard
                                                         8.99
                                       Pen
                                               64
14
    31-Oct-14 Central
                          Rachel
                                   Pencil
                                               14
                                                         1.29
15
     8-Nov-14
                  East
                           Susan
                                       Pen
                                               15
                                                        19.99
                                                         4.99
16
    17-Nov-14 Central
                            Alex
                                    Binder
                                               11
                                                         4.99
17
    25-Nov-14
               Central
                         Matthew
                                  Pen Set
                                               96
                                                        19.99
18
     4-Dec-14
               Central
                            Alex
                                    Binder
                                               94
19
    12-Dec-14
               Central
                           Smith
                                    Pencil
                                               67
                                                         1.29
20
    21-Dec-14
                                    Binder
                                               28
                                                         4.99
               Central
                          Rachel
                                                        15.99
21
    29-Dec-14
                   East
                           Susan
                                  Pen Set
                                               74
22
     6-Jan-15
                   East
                         Richard
                                    Pencil
                                               95
                                                         1.99
23
                                                         8.99
    15-Jan-15
               Central
                            Bill
                                    Binder
                                               46
24
    23-Jan-15
                                   Binder
                                                        19.99
               Central
                         Matthew
                                               50
25
     1-Feb-15
               Central
                           Smith
                                   Binder
                                               87
                                                        15.00
26
               Central
                                   Pencil
                                                         4.99
     9-Feb-15
                            Alex
                                               36
27
    18-Feb-15
                   East Richard
                                    Binder
                                                         4.99
                                                4
28
    26-Feb-15
               Central
                            Bill
                                       Pen
                                               27
                                                        19.99
                                    Binder
29
     7-Mar-15
                   West
                           James
                                                7
                                                        19.99
30
    15-Mar-15
                           James
                                    Pencil
                                               56
                                                         2.99
                   West
31
    24-Mar-15
               Central
                            Alex
                                  Pen Set
                                               50
                                                         4.99
                                                         4.99
32
     1-Apr-15
                  East
                        Richard
                                    Binder
                                               60
33
    10-Apr-15
                                    Pencil
                                               66
                                                         1.99
               Central
                          Rachel
                                               75
                                                         1.99
34
    18-Apr-15
               Central
                          Rachel
                                    Pencil
35
    27-Apr-15
                                                         4.99
                   East
                            Nick
                                       Pen
                                               96
                                                         4.99
36
     5-May-15
               Central
                            Alex
                                    Pencil
                                               90
37
    14-May-15
               Central
                            Bill
                                    Pencil
                                               53
                                                         1.29
38
    22-May-15
                   West
                          Thomas
                                    Pencil
                                               32
                                                         1.99
39
    31-May-15 Central
                                               80
                                                         8.99
                            Bill
                                   Binder
40
     8-Jun-15
                  East
                         Richard
                                   Binder
                                               60
                                                         8.99
41
    17-Jun-15
               Central
                         Matthew
                                      Desk
                                                5
                                                       125.00
    25-Jun-15
42
               Central
                          Morgan
                                                         4.99
                                   Pencil
                                               90
```

```
[253]: data1["unitprice*2"]=data1.UnitPrice*2
```

[254]: data1

[254]: OrderDate Region Rep Item Units UnitPrice unitprice*2
0 4-Jul-14 East Richard Pen Set 62 4.99 9.98

1	12-Jul-14	East	Nick	Binder	29	1.99	3.98
2	21-Jul-14	Central	Morgan	Pen Set	55	12.49	24.98
3	29-Jul-14	East	Susan	Binder	81	19.99	39.98
4	7-Aug-14	Central	Matthew	Pen Set	42	23.95	47.90
5	15-Aug-14	East	Richard	Pencil	35	4.99	9.98
6	24-Aug-14	West	James	Desk	3	275.00	550.00
7	1-Sep-14	Central	Smith	Desk	2	125.00	250.00
8	10-Sep-14	Central	Bill	Pencil	7	1.29	2.58
9	18-Sep-14	East	Richard	Pen Set	16	15.99	31.98
10	27-Sep-14	West	James	Pen	76	1.99	3.98
11	5-0ct-14	Central	Morgan	Binder	28	8.99	17.98
12	14-Oct-14	West	Thomas	Binder	57	19.99	39.98
13	22-Oct-14	East	Richard	Pen	64	8.99	17.98
14	31-Oct-14	Central	Rachel	Pencil	14	1.29	2.58
15	8-Nov-14	East	Susan	Pen	15	19.99	39.98
16	17-Nov-14	Central	Alex	Binder	11	4.99	9.98
17	25-Nov-14	Central	Matthew	Pen Set	96	4.99	9.98
18	4-Dec-14	Central	Alex	Binder	94	19.99	39.98
19	12-Dec-14	Central	Smith	Pencil	67	1.29	2.58
20	21-Dec-14	Central	Rachel	Binder	28	4.99	9.98
21	29-Dec-14	East	Susan	Pen Set	74	15.99	31.98
22	6-Jan-15	East	Richard	Pencil	95	1.99	3.98
23	15-Jan-15	Central	Bill	Binder	46	8.99	17.98
24	23-Jan-15	Central	Matthew	Binder	50	19.99	39.98
25	1-Feb-15	Central	Smith	Binder	87	15.00	30.00
26	9-Feb-15	Central	Alex	Pencil	36	4.99	9.98
27	18-Feb-15	East	Richard	Binder	4	4.99	9.98
28	26-Feb-15	Central	Bill	Pen	27	19.99	39.98
29	7-Mar-15	West	James	Binder	7	19.99	39.98
30	15-Mar-15	West	James	Pencil	56	2.99	5.98
31	24-Mar-15	Central	Alex	Pen Set	50	4.99	9.98
32	1-Apr-15	East	Richard	Binder	60	4.99	9.98
33	10-Apr-15	Central	Rachel	Pencil	66	1.99	3.98
34	18-Apr-15	Central	Rachel	Pencil	75	1.99	3.98
35	27-Apr-15	East	Nick	Pen	96	4.99	9.98
36	5-May-15	Central	Alex	Pencil	90	4.99	9.98
37	14-May-15	Central	Bill	Pencil	53	1.29	2.58
38	22-May-15	West	Thomas	Pencil	32	1.99	3.98
39	31-May-15	Central	Bill	Binder	80	8.99	17.98
40	8-Jun-15	East	Richard	Binder	60	8.99	17.98
41	17-Jun-15	Central	Matthew	Desk	5	125.00	250.00
42	25-Jun-15	Central	Morgan	Pencil	90	4.99	9.98

[255]: data2=data1.transpose()

[256]: data2

```
[256]:
                           0
                                       1
                                                   2
                                                               3
       OrderDate
                     4-Jul-14 12-Jul-14 21-Jul-14
                                                       29-Jul-14 7-Aug-14
                                                                              15-Aug-14
       Region
                         East
                                     East
                                              Central
                                                            East
                                                                    Central
                                                                                   East
       Rep
                      Richard
                                     Nick
                                              Morgan
                                                           Susan
                                                                    Matthew
                                                                                Richard
                      Pen Set
                                                                    Pen Set
                                                                                 Pencil
       Item
                                   Binder
                                             Pen Set
                                                          Binder
       Units
                           62
                                       29
                                                   55
                                                               81
                                                                         42
                                                                                     35
       UnitPrice
                         4.99
                                                                                   4.99
                                     1.99
                                                12.49
                                                           19.99
                                                                      23.95
                                                                       47.9
       unitprice*2
                         9.98
                                     3.98
                                                24.98
                                                           39.98
                                                                                   9.98
                            6
                                       7
                                                   8
                                                               9
                                                                              33
       OrderDate
                     24-Aug-14
                                 1-Sep-14
                                           10-Sep-14
                                                       18-Sep-14
                                                                      10-Apr-15
       Region
                          West
                                  Central
                                             Central
                                                            East
                                                                        Central
                                    Smith
                                                 Bill
                                                         Richard
       Rep
                         James
                                                                         Rachel
       Item
                          Desk
                                     Desk
                                               Pencil
                                                         Pen Set
                                                                         Pencil
       Units
                                                               16
                                                                              66
       UnitPrice
                         275.0
                                    125.0
                                                 1.29
                                                           15.99
                                                                            1.99
       unitprice*2
                         550.0
                                    250.0
                                                 2.58
                                                           31.98
                                                                            3.98
                            34
                                        35
                                                   36
                                                               37
                                                                           38
                                                                                       39
                                                                                          \
                     18-Apr-15
       OrderDate
                                27-Apr-15
                                            5-May-15
                                                       14-May-15
                                                                   22-May-15
                                                                               31-May-15
                       Central
                                              Central
                                                         Central
                                                                                 Central
       Region
                                      East
                                                                        West
       Rep
                        Rachel
                                      Nick
                                                 Alex
                                                            Bill
                                                                      Thomas
                                                                                    Bill
                        Pencil
                                       Pen
                                               Pencil
                                                          Pencil
                                                                      Pencil
       Item
                                                                                  Binder
       Units
                            75
                                        96
                                                   90
                                                               53
                                                                           32
                                                                                      80
       UnitPrice
                          1.99
                                      4.99
                                                 4.99
                                                             1.29
                                                                        1.99
                                                                                    8.99
       unitprice*2
                          3.98
                                      9.98
                                                 9.98
                                                             2.58
                                                                        3.98
                                                                                   17.98
                           40
                                       41
                                                   42
                     8-Jun-15
                               17-Jun-15
       OrderDate
                                           25-Jun-15
       Region
                         East
                                  Central
                                              Central
       Rep
                      Richard
                                  Matthew
                                               Morgan
       Item
                       Binder
                                     Desk
                                               Pencil
       Units
                           60
                                        5
                                                   90
       UnitPrice
                         8.99
                                    125.0
                                                 4.99
       unitprice*2
                        17.98
                                    250.0
                                                 9.98
```

[7 rows x 43 columns]

```
data2.to_excel("NewData1.xlsx", sheet_name="Testingdata", index=True)
```

[258]: data1.dtypes

```
[258]: OrderDate
                         object
       Region
                         object
       Rep
                         object
       Item
                        object
       Units
                          int64
```

UnitPrice float64 unitprice*2 float64

dtype: object

```
[259]: pd.read_excel("NewData1.xlsx", sheet_name="Testingdata")
```

	$\overline{}$										
[259]:		Unnamed:	0 0)	1	2		3 .	4 \	\	
	0	OrderDate	e 4-Jul-14	l 12-Jul-1	4 21-Jul-	14	29-Jul-1	4 7-Aug-1	4		
	1	Regio	n East	: Eas	t Centr	al	Eas	t Centra	1		
	2	Re	p Richard	l Nic	k Morg	an	Susa	n Matthe	W		
	3	Ite	m Pen Set	Binde	r Pen S	et	Binde	r Pen Se	t		
	4	Unit	s 62	2 2	9	55	8	1 4:	2		
	5	UnitPric	e 4.99	1.9	9 12.	49	19.9	9 23.9	5		
	6	unitprice*	2 9.98	3.9	8 24.	98	39.9	8 47.	Э		
		5	6	7	8		•	33	34	\	
	0	15-Aug-14	24-Aug-14	1-Sep-14	10-Sep-14		10-Apr-	15 18-Apr	-15		
	1	East	West	Central	Central		Centr	al Cent:	ral		
	2	Richard	James	${\tt Smith}$	Bill		Rach	el Rac	hel		
	3	Pencil	Desk	Desk	Pencil	•••	Penc	il Pen	cil		
	4	35	3	2		•••		66	75		
	5	4.99	275	125	1.29				.99		
	6	9.98	550	250	2.58	•••	3.	98 3	.98		
		35	36	37	38		39	40		41	\
	0	27-Apr-15	-	14-May-15	22-May-15		•	8-Jun-15		-Jun-15	
	1	East	Central	Central	West		Central	East		Central	
	2	Nick	Alex	Bill	Thomas		Bill	Richard	M	Matthew	
	3	Pen	Pencil	Pencil	Pencil		Binder	Binder		Desk	
	4	96	90	53	32		80	60		5	
	5	4.99	4.99	1.29	1.99		8.99	8.99		125	
	6	9.98	9.98	2.58	3.98		17.98	17.98		250	
	_	42									
	0	25-Jun-15									
	1	Central									
	2	Morgan									
	3	Pencil 90									
	4	90 4.99									
	5 6	4.99 9.98									
	O	9.98									

[7 rows x 44 columns]

[260]: data1.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 43 entries, 0 to 42

```
Data columns (total 7 columns):
       #
           Column
                         Non-Null Count
                                         Dtype
       0
           OrderDate
                         43 non-null
                                          object
           Region
                         43 non-null
                                          object
       1
       2
           Rep
                         43 non-null
                                          object
       3
           Item
                         43 non-null
                                          object
           Units
                         43 non-null
                                          int64
           UnitPrice
                         43 non-null
                                          float64
           unitprice*2 43 non-null
                                          float64
      dtypes: float64(2), int64(1), object(4)
      memory usage: 2.5+ KB
[261]: titanic=pd.DataFrame(
           {"Name":[
               "Braund, Mr. Owen Harris",
               "Allen, Mr. William Henry",
               "Bonnell, Miss. Elizabeth",
           ],
           "Age": [22,35,58],
           "Sex":["male","male","female"],})
[262]: ages=titanic["Age"]
[263]: ages
[263]: 0
            22
            35
       1
       2
            58
       Name: Age, dtype: int64
[264]: type(titanic["Age"])
[264]: pandas.core.series.Series
[265]: titanic["Age"].shape
[265]: (3,)
[266]: age_sex=titanic[["Age","Sex"]]
[267]: age_sex
[267]:
          Age
                  Sex
       0
           22
                 male
       1
           35
                 male
           58 female
       2
```

```
[268]: age_sex.head(2)
[268]:
                Sex
          Age
       0
           22
               male
       1
           35
               male
[269]: type(titanic[["Age", "Sex"]])
[269]: pandas.core.frame.DataFrame
[270]: titanic[["Age", "Sex"]].shape
[270]: (3, 2)
       above_34=titanic[titanic["Age"]>34]
[272]: above_34.shape
[272]: (2, 3)
[273]: import pandas as pd
       titanic=pd.read_csv("P1-OfficeSupplies.csv")
[274]: titanic
[274]:
           OrderDate
                        Region
                                     Rep
                                             Item
                                                    Units
                                                           Unit Price
       0
            4-Jul-14
                          East
                                Richard
                                          Pen Set
                                                       62
                                                                  4.99
           12-Jul-14
       1
                          East
                                    Nick
                                           Binder
                                                       29
                                                                  1.99
       2
           21-Jul-14
                       Central
                                  Morgan
                                          Pen Set
                                                       55
                                                                 12.49
                                                                 19.99
       3
           29-Jul-14
                          East
                                   Susan
                                           Binder
                                                       81
       4
            7-Aug-14 Central
                                          Pen Set
                                                       42
                                                                 23.95
                                Matthew
           15-Aug-14
       5
                          East
                                Richard
                                           Pencil
                                                       35
                                                                  4.99
       6
           24-Aug-14
                          West
                                   James
                                             Desk
                                                        3
                                                                275.00
       7
            1-Sep-14
                       Central
                                   Smith
                                             Desk
                                                        2
                                                                125.00
                                                        7
       8
           10-Sep-14
                       Central
                                    Bill
                                           Pencil
                                                                  1.29
       9
                                Richard
                                          Pen Set
                                                       16
                                                                 15.99
           18-Sep-14
                          East
       10
           27-Sep-14
                                               Pen
                                                       76
                                                                  1.99
                          West
                                   James
       11
            5-0ct-14
                      Central
                                  Morgan
                                           Binder
                                                       28
                                                                  8.99
       12
                                           Binder
           14-Oct-14
                          West
                                  Thomas
                                                       57
                                                                 19.99
       13
           22-Oct-14
                                 Richard
                                              Pen
                                                       64
                                                                  8.99
                          East
                                                                  1.29
       14
           31-Oct-14
                       Central
                                  Rachel
                                           Pencil
                                                       14
       15
            8-Nov-14
                          East
                                   Susan
                                               Pen
                                                       15
                                                                 19.99
       16
           17-Nov-14
                       Central
                                    Alex
                                           Binder
                                                       11
                                                                  4.99
                                          Pen Set
                                                                  4.99
       17
           25-Nov-14
                       Central
                                Matthew
                                                       96
                                           Binder
                                                                 19.99
       18
            4-Dec-14 Central
                                    Alex
                                                       94
       19
           12-Dec-14
                       Central
                                   Smith
                                           Pencil
                                                       67
                                                                  1.29
       20
                                           Binder
                                                                  4.99
           21-Dec-14
                       Central
                                  Rachel
                                                       28
       21
           29-Dec-14
                          East
                                   Susan Pen Set
                                                       74
                                                                 15.99
```

```
6-Jan-15
                           East
                                 Richard
                                                                   1.99
       23
                                                        46
                                                                   8.99
           15-Jan-15
                       Central
                                     Bill
                                            Binder
       24
           23-Jan-15
                       Central
                                 Matthew
                                            Binder
                                                        50
                                                                  19.99
                                   Smith
                                                                  15.00
       25
             1-Feb-15
                       Central
                                            Binder
                                                        87
       26
            9-Feb-15
                       Central
                                     Alex
                                            Pencil
                                                        36
                                                                   4.99
       27
           18-Feb-15
                           East
                                 Richard
                                            Binder
                                                         4
                                                                   4.99
       28
           26-Feb-15
                       Central
                                    Bill
                                               Pen
                                                        27
                                                                  19.99
       29
                                                                  19.99
            7-Mar-15
                           West
                                    James
                                            Binder
                                                         7
       30
           15-Mar-15
                                    James
                                            Pencil
                                                                   2.99
                           West
                                                        56
       31
           24-Mar-15
                       Central
                                     Alex
                                           Pen Set
                                                        50
                                                                   4.99
       32
             1-Apr-15
                           East
                                 Richard
                                            Binder
                                                                   4.99
                                                        60
       33
           10-Apr-15
                       Central
                                  Rachel
                                            Pencil
                                                        66
                                                                   1.99
       34
           18-Apr-15
                       Central
                                  Rachel
                                            Pencil
                                                        75
                                                                   1.99
       35
           27-Apr-15
                           East
                                    Nick
                                                Pen
                                                        96
                                                                   4.99
            5-May-15
                                                                   4.99
       36
                       Central
                                     Alex
                                            Pencil
                                                        90
       37
           14-May-15
                       Central
                                     Bill
                                            Pencil
                                                        53
                                                                   1.29
           22-May-15
       38
                           West
                                  Thomas
                                            Pencil
                                                        32
                                                                   1.99
       39
           31-May-15
                                     Bill
                                            Binder
                                                        80
                                                                   8.99
                        Central
            8-Jun-15
                                            Binder
       40
                           East
                                 Richard
                                                        60
                                                                   8.99
       41
           17-Jun-15
                       Central
                                 Matthew
                                               Desk
                                                         5
                                                                 125.00
       42
           25-Jun-15
                                                        90
                                                                   4.99
                       Central
                                  Morgan
                                            Pencil
[275]: df1=pd.DataFrame({"Name":[
                                  "Anil Kumar",
                                  "Mandeep Kaur",
                                  "Vivak",
                                  "Kashor"
       ],
                         "Age": [22,23,65,13],
                         "Sex":["Male", "Female", "Male", "Male"],})
[276]: df1
[276]:
                   Name
                                  Sex
                          Age
             Anil Kumar
                           22
                                 Male
       1
          Mandeep Kaur
                           23
                               Female
       2
                  Vivak
                           65
                                 Male
       3
                 Kashor
                           13
                                 Male
[277]: df1["Age"]
[277]: 0
             22
       1
             23
       2
             65
       3
             13
       Name: Age, dtype: int64
```

Pencil

95

22

```
[278]: ages=pd.Series([22,22,23,24])
[279]: ages
[279]: 0
            22
       1
            22
       2
            23
       3
            24
       dtype: int64
[280]: df1["Age"].max()
[280]: 65
[281]:
       ages.max()
[281]: 24
[282]:
       df1.describe()
[282]:
                     Age
       count
                4.000000
               30.750000
       mean
       std
               23.271943
       min
               13.000000
       25%
               19.750000
       50%
               22.500000
       75%
               33.500000
               65.000000
       max
[283]:
      titanic=pd.read_csv("P1-OfficeSupplies.csv")
[284]:
      titanic
[284]:
           OrderDate
                        Region
                                     Rep
                                              Item
                                                    Units
                                                            Unit Price
            4-Jul-14
                          East Richard
                                          Pen Set
                                                        62
                                                                   4.99
       0
       1
           12-Jul-14
                          East
                                    Nick
                                            Binder
                                                        29
                                                                   1.99
       2
           21-Jul-14
                       Central
                                  Morgan
                                           Pen Set
                                                        55
                                                                  12.49
       3
           29-Jul-14
                                   Susan
                                            Binder
                           East
                                                        81
                                                                  19.99
       4
            7-Aug-14
                       Central
                                 Matthew
                                           Pen Set
                                                        42
                                                                  23.95
       5
           15-Aug-14
                                            Pencil
                                                        35
                                                                   4.99
                          East
                                 Richard
                                                         3
       6
           24-Aug-14
                          West
                                   James
                                              Desk
                                                                 275.00
       7
            1-Sep-14
                       Central
                                   Smith
                                              Desk
                                                         2
                                                                 125.00
       8
           10-Sep-14
                                    Bill
                                            Pencil
                                                         7
                       Central
                                                                   1.29
       9
           18-Sep-14
                                           Pen Set
                                                                  15.99
                          East
                                Richard
                                                        16
                                                                   1.99
       10
           27-Sep-14
                          West
                                   James
                                               Pen
                                                        76
            5-0ct-14
       11
                       Central
                                  Morgan
                                            Binder
                                                        28
                                                                   8.99
       12
           14-Oct-14
                          West
                                  Thomas
                                            Binder
                                                        57
                                                                  19.99
```

13	22-Oct-14	East	Richard	Pen	64	8.99
14	31-Oct-14	Central	Rachel	Pencil	14	1.29
15	8-Nov-14	East	Susan	Pen	15	19.99
16	17-Nov-14	Central	Alex	Binder	11	4.99
17	25-Nov-14	Central	Matthew	Pen Set	96	4.99
18	4-Dec-14	Central	Alex	Binder	94	19.99
19	12-Dec-14	Central	Smith	Pencil	67	1.29
20	21-Dec-14	Central	Rachel	Binder	28	4.99
21	29-Dec-14	East	Susan	Pen Set	74	15.99
22	6-Jan-15	East	Richard	Pencil	95	1.99
23	15-Jan-15	Central	Bill	Binder	46	8.99
24	23-Jan-15	Central	Matthew	Binder	50	19.99
25	1-Feb-15	Central	Smith	Binder	87	15.00
26	9-Feb-15	Central	Alex	Pencil	36	4.99
27	18-Feb-15	East	Richard	Binder	4	4.99
28	26-Feb-15	Central	Bill	Pen	27	19.99
29	7-Mar-15	West	James	Binder	7	19.99
30	15-Mar-15	West	James	Pencil	56	2.99
31	24-Mar-15	Central	Alex	Pen Set	50	4.99
32	1-Apr-15	East	Richard	Binder	60	4.99
33	10-Apr-15	Central	Rachel	Pencil	66	1.99
34	18-Apr-15	Central	Rachel	Pencil	75	1.99
35	27-Apr-15	East	Nick	Pen	96	4.99
36	5-May-15	Central	Alex	Pencil	90	4.99
37	14-May-15	Central	Bill	Pencil	53	1.29
38	22-May-15	West	Thomas	Pencil	32	1.99
39	31-May-15	Central	Bill	Binder	80	8.99
40	8-Jun-15	East	Richard	Binder	60	8.99
41	17-Jun-15	Central	Matthew	Desk	5	125.00
42	25-Jun-15	Central	Morgan	Pencil	90	4.99

[285]: titanic.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 43 entries, 0 to 42
Data columns (total 6 columns):

#	Column	Noi	n-Null Coun	t Dtype
0	OrderDate	43	non-null	object
1	Region	43	non-null	object
2	Rep	43	non-null	object
3	Item	43	non-null	object
4	Units	43	non-null	int64
5	Unit Price	43	non-null	float64
dtyp	es: float64(1),	int64(1),	object(4)

memory usage: 2.1+ KB

[286]: titanic.head(8)

```
[286]:
          OrderDate
                       Region
                                            Item
                                                  Units
                                                         Unit Price
                                   Rep
                                                                4.99
       0
           4-Jul-14
                         East
                               Richard
                                       Pen Set
                                                     62
         12-Jul-14
                         East
                                  Nick
                                         Binder
                                                     29
                                                                1.99
       1
       2 21-Jul-14 Central
                                Morgan Pen Set
                                                     55
                                                               12.49
       3 29-Jul-14
                         East
                                 Susan
                                         Binder
                                                     81
                                                               19.99
       4
           7-Aug-14
                     Central
                               Matthew Pen Set
                                                     42
                                                               23.95
       5
         15-Aug-14
                         East
                               Richard
                                         Pencil
                                                     35
                                                                4.99
       6
          24-Aug-14
                         West
                                 James
                                            Desk
                                                      3
                                                              275.00
                                                              125.00
       7
           1-Sep-14 Central
                                 Smith
                                            Desk
                                                      2
[287]:
      titanic.dtypes
[287]: OrderDate
                       object
       Region
                       object
       Rep
                       object
       Item
                       object
       Units
                        int64
       Unit Price
                      float64
       dtype: object
[288]: titanic.to_excel("titanic.xlsx", sheet_name="Passenger")
[289]: titanic.info()
      <class 'pandas.core.frame.DataFrame'>
      RangeIndex: 43 entries, 0 to 42
      Data columns (total 6 columns):
           Column
                        Non-Null Count
                                         Dtype
           OrderDate
                        43 non-null
                                         object
       0
       1
           Region
                        43 non-null
                                         object
       2
                        43 non-null
           Rep
                                         object
       3
           Item
                        43 non-null
                                         object
       4
           Units
                        43 non-null
                                         int64
           Unit Price 43 non-null
                                         float64
      dtypes: float64(1), int64(1), object(4)
      memory usage: 2.1+ KB
[290]: titanic
[290]:
           OrderDate
                        Region
                                    Rep
                                             Item
                                                   Units
                                                          Unit Price
       0
            4-Jul-14
                          East Richard
                                         Pen Set
                                                      62
                                                                 4.99
       1
           12-Jul-14
                          East
                                   Nick
                                          Binder
                                                      29
                                                                 1.99
       2
           21-Jul-14
                                         Pen Set
                                                                12.49
                       Central
                                 Morgan
                                                      55
       3
           29-Jul-14
                          East
                                  Susan
                                          Binder
                                                      81
                                                                19.99
                                         Pen Set
       4
            7-Aug-14
                                Matthew
                                                                23.95
                      Central
                                                      42
       5
           15-Aug-14
                                Richard
                                           Pencil
                                                      35
                                                                 4.99
                          East
       6
           24-Aug-14
                                                       3
                                                               275.00
                          West
                                  James
                                             Desk
```

```
7
     1-Sep-14
                Central
                            Smith
                                       Desk
                                                  2
                                                          125.00
    10-Sep-14
                                                  7
                                                            1.29
8
                Central
                             Bill
                                     Pencil
9
    18-Sep-14
                   East
                          Richard
                                   Pen Set
                                                 16
                                                           15.99
10
    27-Sep-14
                   West
                            James
                                        Pen
                                                 76
                                                            1.99
     5-0ct-14
                                                 28
                                                            8.99
11
                Central
                           Morgan
                                     Binder
12
    14-Oct-14
                   West
                           Thomas
                                     Binder
                                                 57
                                                           19.99
13
    22-Oct-14
                   East
                         Richard
                                                            8.99
                                        Pen
                                                 64
14
    31-Oct-14
                Central
                           Rachel
                                     Pencil
                                                 14
                                                            1.29
                                                           19.99
15
     8-Nov-14
                   East
                            Susan
                                        Pen
                                                 15
16
    17-Nov-14
                Central
                             Alex
                                     Binder
                                                            4.99
                                                 11
17
    25-Nov-14
                Central
                                   Pen Set
                         Matthew
                                                 96
                                                            4.99
18
     4-Dec-14
                Central
                             Alex
                                    Binder
                                                 94
                                                           19.99
19
    12-Dec-14
                Central
                            Smith
                                     Pencil
                                                 67
                                                            1.29
20
    21-Dec-14
                Central
                           Rachel
                                     Binder
                                                 28
                                                            4.99
                                                 74
                                                           15.99
21
    29-Dec-14
                   East
                            Susan
                                   Pen Set
22
     6-Jan-15
                   East
                          Richard
                                     Pencil
                                                 95
                                                            1.99
23
    15-Jan-15
                Central
                                     Binder
                                                 46
                                                            8.99
                             Bill
24
                                                           19.99
    23-Jan-15
                Central
                          Matthew
                                     Binder
                                                 50
25
     1-Feb-15
                Central
                            Smith
                                     Binder
                                                 87
                                                           15.00
26
     9-Feb-15
                Central
                             Alex
                                     Pencil
                                                 36
                                                            4.99
                                                            4.99
27
    18-Feb-15
                   East
                          Richard
                                     Binder
                                                  4
28
    26-Feb-15
                             Bill
                                                 27
                                                           19.99
                Central
                                        Pen
29
     7-Mar-15
                                     Binder
                                                  7
                                                           19.99
                   West
                            James
    15-Mar-15
                                     Pencil
                                                            2.99
30
                   West
                            James
                                                 56
31
    24-Mar-15
                Central
                             Alex
                                   Pen Set
                                                            4.99
                                                 50
32
     1-Apr-15
                   East Richard
                                    Binder
                                                 60
                                                            4.99
                Central
                           Rachel
33
    10-Apr-15
                                     Pencil
                                                 66
                                                            1.99
34
    18-Apr-15
                Central
                                     Pencil
                                                 75
                                                            1.99
                           Rachel
35
    27-Apr-15
                   East
                             Nick
                                        Pen
                                                 96
                                                            4.99
     5-May-15
                                                            4.99
36
                Central
                             Alex
                                     Pencil
                                                 90
37
    14-May-15
                                                            1.29
                Central
                             Bill
                                     Pencil
                                                 53
38
    22-May-15
                   West
                                     Pencil
                                                 32
                                                            1.99
                           Thomas
39
    31-May-15
                                                            8.99
                Central
                             Bill
                                     Binder
                                                 80
40
     8-Jun-15
                   East
                          Richard
                                     Binder
                                                 60
                                                            8.99
41
    17-Jun-15
                          Matthew
                                                  5
                                                          125.00
                Central
                                       Desk
    25-Jun-15
                                                            4.99
                Central
                           Morgan
                                     Pencil
                                                 90
```

[291]: titanic=pd.read_excel("titanic.xlsx", sheet_name="Passenger")

[292]: titanic

[292]: Unnamed: 0 OrderDate Region Rep Item Units Unit Price 0 0 4-Jul-14 East Richard Pen Set 62 4.99 1 1 12-Jul-14 East Nick Binder 29 1.99 Morgan Pen Set 2 2 21-Jul-14 Central 12.49 55 29-Jul-14 3 3 East Susan Binder 81 19.99 4 7-Aug-14 Central Matthew Pen Set 42 23.95

5	5	15-1110-11	East	Dichard	Pencil	35	4.99
6	6	15-Aug-14 24-Aug-14	West	Richard James	Desk	3	275.00
7	7	1-Sep-14	Central	Smith	Desk	2	125.00
8	8	10-Sep-14	Central	Bill	Pencil	7	1.29
9	9	18-Sep-14	East	Richard	Pen Set	16	15.99
10	10	27-Sep-14	West	James	Pen	76	1.99
11	11	5-Oct-14	Central	Morgan	Binder	28	8.99
12	12	14-Oct-14	West	Thomas	Binder	57	19.99
13	13	22-Oct-14	East	Richard	Pen	64	8.99
14	14	31-Oct-14	Central	Rachel	Pencil	14	1.29
15	15	8-Nov-14	East	Susan	Pen	15	19.99
16	16	17-Nov-14	Central	Alex	Binder	11	4.99
17	17	25-Nov-14	Central	Matthew	Pen Set	96	4.99
18	18	4-Dec-14	Central	Alex	Binder	94	19.99
19	19	12-Dec-14	Central	Smith	Pencil	67	1.29
20	20	21-Dec-14	Central	Rachel	Binder	28	4.99
21	21	29-Dec-14	East	Susan	Pen Set	74	15.99
22	22	6-Jan-15	East	Richard	Pencil	95	1.99
23	23	15-Jan-15	Central	Bill	Binder	46	8.99
24	24	23-Jan-15	Central	Matthew	Binder	50	19.99
25	25	1-Feb-15	Central	Smith	Binder	87	15.00
26	26	9-Feb-15	Central	Alex	Pencil	36	4.99
27	27	18-Feb-15	East	Richard	Binder	4	4.99
28	28	26-Feb-15	Central	Bill	Pen	27	19.99
29	29	7-Mar-15	West	James	Binder	7	19.99
30	30	15-Mar-15	West	James	Pencil	56	2.99
31	31	24-Mar-15	Central	Alex	Pen Set	50	4.99
32	32	1-Apr-15	East	Richard	Binder	60	4.99
33	33	10-Apr-15	Central	Rachel	Pencil	66	1.99
34	34	18-Apr-15	Central	Rachel	Pencil	75	1.99
35	35	27-Apr-15	East	Nick	Pen	96	4.99
36	36	5-May-15	Central	Alex	Pencil	90	4.99
37	37	14-May-15	Central	Bill	Pencil	53	1.29
38	38	22-May-15	West	Thomas	Pencil	32	1.99
39	39	31-May-15	Central	Bill	Binder	80	8.99
40	40	8-Jun-15	East	Richard	Binder	60	8.99
41	41	17-Jun-15	Central	Matthew	Desk	5	125.00
42	42	25-Jun-15	Central	Morgan	Pencil	90	4.99
				•			

[293]: titanic.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 43 entries, 0 to 42

Data columns (total 7 columns):

#	Column	Non-Null Count	Dtype
0	Unnamed: 0	43 non-null	int64
1	OrderDate	43 non-null	object

```
3
            Rep
                         43 non-null
                                          object
        4
            Item
                         43 non-null
                                          object
        5
            Units
                         43 non-null
                                          int64
            Unit Price 43 non-null
                                          float64
      dtypes: float64(1), int64(2), object(4)
      memory usage: 2.5+ KB
[294]: region=titanic["Region"]
[295]: region
[295]: 0
                 East
       1
                 East
       2
             Central
       3
                 East
       4
              Central
       5
                 East
       6
                 West
       7
             Central
              Central
       8
       9
                 East
       10
                 West
       11
             Central
       12
                 West
       13
                 East
       14
             Central
       15
                 East
       16
             Central
       17
             Central
       18
             Central
       19
             Central
       20
              Central
                 East
       21
       22
                 East
             Central
       23
       24
             Central
       25
             Central
       26
             Central
       27
                 East
       28
             Central
       29
                 West
       30
                 West
       31
             Central
       32
                 East
             Central
       33
       34
             Central
```

object

Region

2

43 non-null

```
35
                 East
       36
              Central
       37
              Central
       38
                 West
       39
              Central
       40
                 East
              Central
       41
       42
              Central
       Name: Region, dtype: object
[296]: type(titanic["Region"])
[296]: pandas.core.series.Series
[297]: titanic["Region"].shape
[297]: (43,)
[298]: Region=titanic[["Region","Item"]]
[299]: Region
[299]:
            Region
                        Item
       0
              East
                     Pen Set
       1
               East
                      Binder
       2
           Central
                     Pen Set
       3
                      Binder
               East
       4
           Central
                     Pen Set
       5
              East
                      Pencil
       6
                        Desk
              West
       7
           Central
                        Desk
           Central
       8
                      Pencil
       9
              East
                     Pen Set
       10
              West
                         Pen
           Central
                      Binder
       11
       12
              West
                      Binder
       13
              East
                         Pen
       14
           Central
                      Pencil
       15
              East
                         Pen
           Central
       16
                      Binder
       17
           Central
                     Pen Set
           Central
                      Binder
       18
       19
           Central
                      Pencil
       20
           Central
                      Binder
       21
                     Pen Set
              East
       22
               East
                      Pencil
       23
                      Binder
           Central
```

```
24
           Central
                      Binder
       25
           Central
                      Binder
       26
           Central
                      Pencil
       27
               East
                      Binder
       28
           Central
                         Pen
       29
               West
                      Binder
       30
               West
                      Pencil
           Central
                     Pen Set
       31
       32
                      Binder
              East
       33
           Central
                      Pencil
           Central
                      Pencil
       34
       35
               East
                         Pen
       36
           Central
                      Pencil
       37
                      Pencil
           Central
       38
               West
                      Pencil
       39
           Central
                      Binder
       40
               East
                      Binder
       41
           Central
                        Desk
       42
           Central
                      Pencil
[300]: type(titanic[["Region","Item"]])
[300]: pandas.core.frame.DataFrame
[301]: titanic[["Region","Item"]].shape
[301]: (43, 2)
[302]: titanic["Region"]=="East"
[302]: 0
               True
       1
               True
       2
              False
       3
               True
       4
             False
       5
              True
       6
             False
       7
             False
       8
              False
       9
               True
       10
             False
       11
             False
       12
             False
       13
               True
       14
              False
       15
               True
       16
              False
```

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17
              False
       18
              False
       19
              False
       20
              False
       21
               True
       22
               True
       23
              False
              False
       24
       25
              False
       26
              False
       27
               True
       28
              False
       29
              False
       30
              False
              False
       31
       32
               True
       33
              False
       34
              False
       35
               True
       36
              False
       37
              False
       38
              False
       39
              False
       40
               True
       41
              False
       42
              False
       Name: Region, dtype: bool
       East_region=titanic[titanic["Region"]=="East"]
[303]:
[304]:
       East_region
[304]:
            Unnamed: 0
                         OrderDate Region
                                                 Rep
                                                          Item
                                                                 Units
                                                                        Unit Price
       0
                     0
                          4-Jul-14
                                      East
                                             Richard
                                                      Pen Set
                                                                    62
                                                                               4.99
       1
                      1
                         12-Jul-14
                                                        Binder
                                                                    29
                                      East
                                                Nick
                                                                               1.99
       3
                     3
                         29-Jul-14
                                      East
                                               Susan
                                                        Binder
                                                                    81
                                                                              19.99
       5
                     5
                         15-Aug-14
                                      East
                                             Richard
                                                        Pencil
                                                                    35
                                                                               4.99
                         18-Sep-14
                                                      Pen Set
       9
                                                                              15.99
                     9
                                      East
                                             Richard
                                                                    16
       13
                    13
                         22-Oct-14
                                      East
                                             Richard
                                                           Pen
                                                                    64
                                                                               8.99
       15
                          8-Nov-14
                                      East
                                               Susan
                                                           Pen
                                                                    15
                                                                              19.99
                    15
                                                      Pen Set
       21
                    21
                         29-Dec-14
                                      East
                                               Susan
                                                                    74
                                                                              15.99
       22
                    22
                          6-Jan-15
                                      East
                                            Richard
                                                        Pencil
                                                                    95
                                                                               1.99
```

Richard

Richard

East Richard

Nick

Binder

Binder

Binder

Pen

4

60

96

60

East

East

East

4.99

4.99

4.99

8.99

18-Feb-15

27-Apr-15

1-Apr-15

8-Jun-15

27

32

35

40

27

32

35

40

[305]: East_region.shape

[305]: (13, 7)

[306]: titanic

[306]:		Unnamed: 0	OrderDate	Region	Rep	Item	Units	Unit Price	
	0	0	4-Jul-14	East	_	Pen Set	62	4.99	
	1	1	12-Jul-14	East	Nick	Binder	29	1.99	
	2	2	21-Jul-14	Central	Morgan	Pen Set	55	12.49	
	3	3	29-Jul-14	East	Susan	Binder	81	19.99	
	4	4	7-Aug-14	Central	Matthew	Pen Set	42	23.95	
	5	5	15-Aug-14	East	Richard	Pencil	35	4.99	
	6	6	24-Aug-14	West	James	Desk	3	275.00	
	7	7	1-Sep-14	Central	Smith	Desk	2	125.00	
	8	8	10-Sep-14	Central	Bill	Pencil	7	1.29	
	9	9	18-Sep-14	East	Richard	Pen Set	16	15.99	
	10	10	27-Sep-14	West	James	Pen	76	1.99	
	11	11	5-0ct-14	Central	Morgan	Binder	28	8.99	
	12	12	14-Oct-14	West	Thomas	Binder	57	19.99	
	13	13	22-Oct-14	East	Richard	Pen	64	8.99	
	14	14	31-Oct-14	Central	Rachel	Pencil	14	1.29	
	15	15	8-Nov-14	East	Susan	Pen	15	19.99	
	16	16	17-Nov-14	Central	Alex	Binder	11	4.99	
	17	17	25-Nov-14	Central	Matthew	Pen Set	96	4.99	
	18	18	4-Dec-14	Central	Alex	Binder	94	19.99	
	19	19	12-Dec-14	Central	Smith	Pencil	67	1.29	
	20	20	21-Dec-14	Central	Rachel	Binder	28	4.99	
	21	21	29-Dec-14	East	Susan	Pen Set	74	15.99	
	22	22	6-Jan-15	East	Richard	Pencil	95	1.99	
	23	23	15-Jan-15	Central	Bill	Binder	46	8.99	
	24	24	23-Jan-15	Central	Matthew	Binder	50	19.99	
	25	25	1-Feb-15	Central	Smith	Binder	87	15.00	
	26	26	9-Feb-15	Central	Alex	Pencil	36	4.99	
	27	27	18-Feb-15	East	Richard	Binder	4	4.99	
	28	28	26-Feb-15	Central	Bill	Pen	27	19.99	
	29	29	7-Mar-15	West	James	Binder	7	19.99	
	30	30	15-Mar-15	West	James	Pencil	56	2.99	
	31	31	24-Mar-15	Central	Alex	Pen Set	50	4.99	
	32	32	1-Apr-15	East	Richard	Binder	60	4.99	
	33	33	10-Apr-15	Central	Rachel	Pencil	66	1.99	
	34	34	18-Apr-15	Central	Rachel	Pencil	75	1.99	
	35	35	27-Apr-15	East	Nick	Pen	96	4.99	
	36	36	5-May-15	Central	Alex	Pencil	90	4.99	
	37	37	14-May-15	Central	Bill	Pencil	53	1.29	
	38	38	22-May-15	West	Thomas	Pencil	32	1.99	
	39	39	31-May-15	Central	Bill	Binder	80	8.99	

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40
                    40
                          8-Jun-15
                                        East
                                               Richard
                                                          Binder
                                                                      60
                                                                                 8.99
       41
                                                                       5
                    41
                         17-Jun-15
                                     Central
                                               Matthew
                                                            Desk
                                                                               125.00
       42
                    42
                         25-Jun-15
                                     Central
                                                Morgan
                                                          Pencil
                                                                      90
                                                                                 4.99
       class_23=titanic[titanic["Region"].isin(["Central","West"])]
[308]: class_23
           Unnamed: 0
[308]:
                         OrderDate
                                      Region
                                                   Rep
                                                            Item
                                                                   Units
                                                                          Unit Price
                     2
       2
                         21-Jul-14
                                     Central
                                                                      55
                                                                                12.49
                                                Morgan
                                                         Pen Set
       4
                     4
                          7-Aug-14
                                     Central
                                               Matthew
                                                         Pen Set
                                                                      42
                                                                                23.95
       6
                     6
                         24-Aug-14
                                        West
                                                                       3
                                                                               275.00
                                                 James
                                                            Desk
       7
                     7
                          1-Sep-14
                                     Central
                                                 Smith
                                                            Desk
                                                                       2
                                                                               125.00
       8
                     8
                         10-Sep-14
                                     Central
                                                  Bill
                                                          Pencil
                                                                       7
                                                                                 1.29
                         27-Sep-14
       10
                                                                      76
                    10
                                        West
                                                 James
                                                             Pen
                                                                                 1.99
       11
                    11
                          5-0ct-14
                                     Central
                                                Morgan
                                                          Binder
                                                                      28
                                                                                 8.99
       12
                    12
                         14-Oct-14
                                                          Binder
                                                                      57
                                                                                19.99
                                        West
                                                Thomas
       14
                         31-Oct-14
                                                                                 1.29
                    14
                                     Central
                                                Rachel
                                                          Pencil
                                                                      14
                                                                                 4.99
       16
                    16
                         17-Nov-14
                                     Central
                                                  Alex
                                                          Binder
                                                                      11
                                                                                 4.99
       17
                    17
                         25-Nov-14
                                     Central
                                              Matthew
                                                         Pen Set
                                                                      96
       18
                    18
                          4-Dec-14
                                     Central
                                                  Alex
                                                          Binder
                                                                      94
                                                                                19.99
       19
                         12-Dec-14
                                                                                 1.29
                    19
                                     Central
                                                 Smith
                                                          Pencil
                                                                      67
                         21-Dec-14
                                                                                 4.99
       20
                    20
                                     Central
                                                Rachel
                                                          Binder
                                                                      28
       23
                    23
                         15-Jan-15
                                     Central
                                                  Bill
                                                          Binder
                                                                      46
                                                                                 8.99
       24
                         23-Jan-15
                                     Central
                                              Matthew
                                                          Binder
                                                                                19.99
                    24
                                                                      50
       25
                                                                                15.00
                    25
                          1-Feb-15
                                     Central
                                                 Smith
                                                          Binder
                                                                      87
       26
                          9-Feb-15
                                                          Pencil
                                                                                 4.99
                    26
                                     Central
                                                  Alex
                                                                      36
       28
                    28
                         26-Feb-15
                                     Central
                                                  Bill
                                                             Pen
                                                                      27
                                                                                19.99
       29
                    29
                          7-Mar-15
                                        West
                                                 James
                                                          Binder
                                                                       7
                                                                                19.99
       30
                         15-Mar-15
                                                 James
                                                                      56
                                                                                 2.99
                    30
                                        West
                                                          Pencil
       31
                    31
                         24-Mar-15
                                     Central
                                                  Alex Pen Set
                                                                      50
                                                                                 4.99
       33
                    33
                         10-Apr-15
                                     Central
                                                Rachel
                                                          Pencil
                                                                      66
                                                                                 1.99
       34
                         18-Apr-15
                                                                                 1.99
                    34
                                     Central
                                                Rachel
                                                          Pencil
                                                                      75
       36
                    36
                          5-May-15
                                                          Pencil
                                                                      90
                                                                                 4.99
                                     Central
                                                  Alex
                         14-May-15
       37
                                                                                 1.29
                    37
                                     Central
                                                  Bill
                                                          Pencil
                                                                      53
       38
                    38
                         22-May-15
                                        West
                                                Thomas
                                                          Pencil
                                                                      32
                                                                                 1.99
       39
                    39
                         31-May-15
                                     Central
                                                  Bill
                                                          Binder
                                                                      80
                                                                                 8.99
                                                                               125.00
       41
                    41
                         17-Jun-15
                                     Central
                                               Matthew
                                                            Desk
                                                                       5
       42
                    42
                         25-Jun-15
                                     Central
                                                Morgan
                                                          Pencil
                                                                      90
                                                                                 4.99
       class_24=titanic[(titanic["Region"]=="East") | (titanic["Region"]=="Central")]
[309]:
[310]:
      class 24
[310]:
           Unnamed: 0
                         OrderDate
                                      Region
                                                   Rep
                                                            Item
                                                                   Units
                                                                          Unit Price
                          4-Jul-14
                                        East
                                                                                 4.99
       0
                     0
                                              Richard Pen Set
                                                                      62
       1
                         12-Jul-14
                                        East
                                                  Nick
                                                          Binder
                                                                      29
                                                                                 1.99
```

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2
                 21-Jul-14
                              Central
                                         Morgan
                                                  Pen Set
                                                                55
                                                                          12.49
3
              3
                 29-Jul-14
                                                                          19.99
                                 East
                                          Susan
                                                   Binder
                                                                81
4
              4
                  7-Aug-14
                              Central
                                        Matthew
                                                  Pen Set
                                                                42
                                                                          23.95
5
                                                                           4.99
              5
                 15-Aug-14
                                 East
                                        Richard
                                                   Pencil
                                                                35
7
              7
                   1-Sep-14
                              Central
                                          Smith
                                                     Desk
                                                                 2
                                                                         125.00
                                                                7
8
              8
                 10-Sep-14
                              Central
                                           Bill
                                                   Pencil
                                                                           1.29
9
                 18-Sep-14
                                        Richard
                                                  Pen Set
                                                                16
                                                                          15.99
              9
                                 East
11
             11
                   5-0ct-14
                              Central
                                         Morgan
                                                   Binder
                                                                28
                                                                           8.99
                                        Richard
                                                                           8.99
13
             13
                 22-Oct-14
                                 East
                                                      Pen
                                                                64
14
                 31-Oct-14
                              Central
                                         Rachel
                                                   Pencil
                                                                14
                                                                           1.29
             14
15
                  8-Nov-14
                                 East
                                          Susan
                                                      Pen
                                                                15
                                                                          19.99
             15
16
             16
                 17-Nov-14
                              Central
                                           Alex
                                                   Binder
                                                                11
                                                                           4.99
17
             17
                 25-Nov-14
                              Central
                                        Matthew
                                                  Pen Set
                                                                96
                                                                           4.99
18
             18
                   4-Dec-14
                              Central
                                           Alex
                                                   Binder
                                                                94
                                                                          19.99
19
                 12-Dec-14
                                                                           1.29
             19
                              Central
                                          Smith
                                                   Pencil
                                                                67
20
             20
                 21-Dec-14
                              Central
                                         Rachel
                                                   Binder
                                                                28
                                                                           4.99
21
                                                                          15.99
             21
                 29-Dec-14
                                 East
                                          Susan
                                                  Pen Set
                                                                74
22
             22
                   6-Jan-15
                                 East
                                        Richard
                                                   Pencil
                                                                95
                                                                           1.99
                                                                           8.99
23
             23
                 15-Jan-15
                              Central
                                           Bill
                                                   Binder
                                                                46
24
             24
                 23-Jan-15
                              Central
                                        Matthew
                                                   Binder
                                                                50
                                                                          19.99
25
                                                                          15.00
             25
                   1-Feb-15
                              Central
                                          Smith
                                                   Binder
                                                                87
26
             26
                   9-Feb-15
                              Central
                                                   Pencil
                                                                           4.99
                                           Alex
                                                                36
27
             27
                 18-Feb-15
                                        Richard
                                                   Binder
                                                                 4
                                                                           4.99
                                 East
28
                 26-Feb-15
                                                                27
                                                                          19.99
             28
                              Central
                                           Bill
                                                      Pen
31
             31
                 24-Mar-15
                              Central
                                                  Pen Set
                                                                           4.99
                                           Alex
                                                                50
32
             32
                   1-Apr-15
                                 East
                                       Richard
                                                   Binder
                                                                60
                                                                           4.99
33
             33
                 10-Apr-15
                              Central
                                         Rachel
                                                   Pencil
                                                                66
                                                                           1.99
34
                 18-Apr-15
                              Central
                                         Rachel
                                                   Pencil
                                                                75
                                                                           1.99
             34
35
             35
                 27-Apr-15
                                 East
                                           Nick
                                                      Pen
                                                                96
                                                                           4.99
                                                                           4.99
36
             36
                  5-May-15
                              Central
                                                   Pencil
                                                                90
                                           Alex
37
             37
                 14-May-15
                                                   Pencil
                                                                           1.29
                              Central
                                           Bill
                                                                53
39
                                                                           8.99
             39
                 31-May-15
                              Central
                                           Bill
                                                   Binder
                                                                80
40
             40
                  8-Jun-15
                                                   Binder
                                                                           8.99
                                 East
                                        Richard
                                                                60
41
                 17-Jun-15
             41
                              Central
                                        Matthew
                                                      Desk
                                                                 5
                                                                         125.00
42
                 25-Jun-15
                              Central
                                         Morgan
                                                                90
                                                                           4.99
                                                   Pencil
```

[311]: region no na=titanic[titanic["Region"].notna()]

[312]: region_no_na

[312]:	Unnamed: 0	С	OrderDate	Region	Rep	Item	Units	Unit Price
0	C	С	4-Jul-14	East	Richard	Pen Set	62	4.99
1	1	1	12-Jul-14	East	Nick	Binder	29	1.99
2	2	2	21-Jul-14	Central	Morgan	Pen Set	55	12.49
3	3	3	29-Jul-14	East	Susan	Binder	81	19.99
4	4	4	7-Aug-14	Central	Matthew	Pen Set	42	23.95
5	Ę.	5	15-Aug-14	East	Richard	Pencil	35	4.99

```
6
              6
                 24-Aug-14
                                 West
                                           James
                                                      Desk
                                                                 3
                                                                         275.00
7
              7
                   1-Sep-14
                                                                 2
                                                                         125.00
                                          Smith
                                                      Desk
                              Central
                                                                 7
8
              8
                  10-Sep-14
                              Central
                                           Bill
                                                   Pencil
                                                                           1.29
9
                                                                          15.99
              9
                  18-Sep-14
                                 East
                                        Richard
                                                  Pen Set
                                                                16
10
             10
                  27-Sep-14
                                           James
                                                       Pen
                                                                76
                                                                           1.99
                                 West
11
             11
                   5-0ct-14
                              Central
                                         Morgan
                                                   Binder
                                                                28
                                                                           8.99
12
             12
                  14-Oct-14
                                         Thomas
                                                   Binder
                                                                          19.99
                                 West
                                                                57
13
             13
                  22-Oct-14
                                 East
                                        Richard
                                                       Pen
                                                                64
                                                                           8.99
14
                                                                           1.29
             14
                  31-0ct-14
                              Central
                                         Rachel
                                                   Pencil
                                                                14
15
                   8-Nov-14
                                 East
                                          Susan
                                                       Pen
                                                                15
                                                                          19.99
             15
16
                  17-Nov-14
                              Central
                                                                           4.99
             16
                                            Alex
                                                   Binder
                                                                11
17
             17
                  25-Nov-14
                              Central
                                       Matthew
                                                  Pen Set
                                                                96
                                                                           4.99
18
             18
                   4-Dec-14
                              Central
                                           Alex
                                                   Binder
                                                                94
                                                                          19.99
19
             19
                  12-Dec-14
                              Central
                                          Smith
                                                   Pencil
                                                                67
                                                                           1.29
20
                  21-Dec-14
                                                                           4.99
             20
                              Central
                                         Rachel
                                                   Binder
                                                                28
21
             21
                  29-Dec-14
                                 East
                                          Susan
                                                  Pen Set
                                                                74
                                                                          15.99
22
             22
                   6-Jan-15
                                 East
                                        Richard
                                                   Pencil
                                                                95
                                                                           1.99
23
             23
                  15-Jan-15
                              Central
                                                   Binder
                                                                           8.99
                                            Bill
                                                                46
24
             24
                  23-Jan-15
                              Central
                                        Matthew
                                                   Binder
                                                                50
                                                                          19.99
25
             25
                   1-Feb-15
                              Central
                                          Smith
                                                   Binder
                                                                87
                                                                          15.00
26
                                                                           4.99
             26
                   9-Feb-15
                              Central
                                            Alex
                                                   Pencil
                                                                36
                                        Richard
27
             27
                  18-Feb-15
                                                   Binder
                                                                 4
                                                                           4.99
                                 East
28
             28
                  26-Feb-15
                              Central
                                           Bill
                                                       Pen
                                                                27
                                                                          19.99
29
                                 West
                                                                 7
                                                                          19.99
             29
                   7-Mar-15
                                           James
                                                   Binder
30
             30
                  15-Mar-15
                                 West
                                           James
                                                   Pencil
                                                                56
                                                                           2.99
31
             31
                  24-Mar-15
                              Central
                                            Alex
                                                  Pen Set
                                                                50
                                                                           4.99
32
             32
                   1-Apr-15
                                 East
                                        Richard
                                                   Binder
                                                                60
                                                                           4.99
33
             33
                  10-Apr-15
                              Central
                                         Rachel
                                                   Pencil
                                                                           1.99
                                                                66
                              Central
34
             34
                  18-Apr-15
                                         Rachel
                                                   Pencil
                                                                75
                                                                           1.99
                  27-Apr-15
                                                                           4.99
35
             35
                                 East
                                           Nick
                                                       Pen
                                                                96
                   5-May-15
                                                                           4.99
36
             36
                              Central
                                            Alex
                                                   Pencil
                                                                90
37
                                                                           1.29
             37
                  14-May-15
                              Central
                                           Bill
                                                   Pencil
                                                                53
38
                  22-May-15
                                                                           1.99
             38
                                 West
                                         Thomas
                                                   Pencil
                                                                32
39
             39
                  31-May-15
                              Central
                                            Bill
                                                   Binder
                                                                80
                                                                           8.99
40
             40
                   8-Jun-15
                                        Richard
                                                   Binder
                                                                60
                                                                           8.99
                                 East
41
             41
                  17-Jun-15
                              Central
                                        Matthew
                                                      Desk
                                                                 5
                                                                         125.00
42
             42
                 25-Jun-15
                                                                           4.99
                              Central
                                         Morgan
                                                   Pencil
                                                                90
```

[313]: titanic.shape

[313]: (43, 7)

[314]: region_no_na.head()

[314]: Unnamed: 0 OrderDate Region Rep Item Units Unit Price 0 4-Jul-14 East Richard Pen Set 62 4.99 1 1 12-Jul-14 Nick 29 1.99 East Binder

```
2
                       21-Jul-14 Central
                                              Morgan
                                                      Pen Set
       3
                    3 29-Jul-14
                                      East
                                                        Binder
                                                                    81
                                                                             19.99
                                               Susan
       4
                                                                             23.95
                        7-Aug-14
                                   Central
                                             Matthew
                                                      Pen Set
                                                                    42
[315]: adult_name=titanic.loc[titanic["Units"]>=50, "Region"]
[316]: adult_name
[316]: 0
                 East
       2
              Central
       3
                 East
                 West
       10
       12
                 West
                 East
       13
       17
             Central
       18
             Central
       19
              Central
       21
                 East
       22
                 East
       24
             Central
       25
             Central
       30
                 West
       31
              Central
       32
                 East
             Central
       33
       34
              Central
                 East
       35
             Central
       36
             Central
       37
       39
              Central
       40
                 East
       42
              Central
       Name: Region, dtype: object
[317]: titanic
[317]:
           Unnamed: 0
                        OrderDate
                                     Region
                                                           Item
                                                                 Units
                                                                         Unit Price
                                                  Rep
                         4-Jul-14
       0
                     0
                                       East
                                              Richard Pen Set
                                                                     62
                                                                                4.99
       1
                     1
                        12-Jul-14
                                                                     29
                                                                                1.99
                                       East
                                                 Nick
                                                         Binder
       2
                        21-Jul-14
                                    Central
                                               Morgan
                                                        Pen Set
                                                                     55
                                                                              12.49
       3
                     3
                        29-Jul-14
                                       East
                                                Susan
                                                         Binder
                                                                              19.99
                                                                     81
       4
                                    Central
                         7-Aug-14
                                              Matthew
                                                        Pen Set
                                                                     42
                                                                              23.95
       5
                        15-Aug-14
                                              Richard
                                                         Pencil
                                                                               4.99
                     5
                                       East
                                                                     35
       6
                     6
                        24-Aug-14
                                       West
                                                James
                                                           Desk
                                                                      3
                                                                             275.00
       7
                     7
                         1-Sep-14
                                    Central
                                                Smith
                                                           Desk
                                                                      2
                                                                             125.00
       8
                     8
                        10-Sep-14
                                    Central
                                                 Bill
                                                         Pencil
                                                                      7
                                                                                1.29
       9
                        18-Sep-14
                                              Richard Pen Set
                                                                              15.99
                                       East
                                                                     16
```

12.49

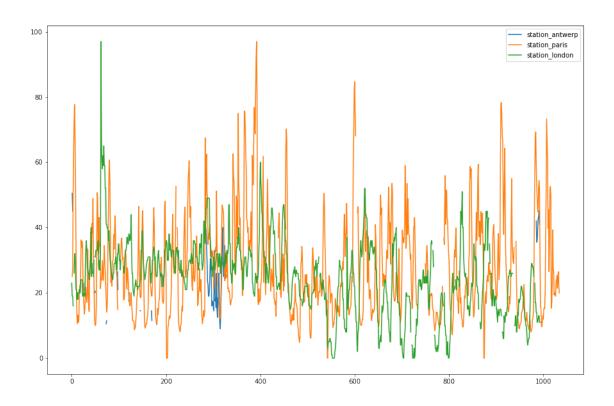
55

10	10	27-Sep-14	West	James	Pen	76	1.99
11	11	5-Oct-14	Central	Morgan	Binder	28	8.99
12	12	14-Oct-14	West	Thomas	Binder	57	19.99
13	13	22-Oct-14	East	Richard	Pen	64	8.99
14	14	31-Oct-14	Central	Rachel	Pencil	14	1.29
15	15	8-Nov-14	East	Susan	Pen	15	19.99
16	16	17-Nov-14	Central	Alex	Binder	11	4.99
17	17	25-Nov-14	Central	Matthew	Pen Set	96	4.99
18	18	4-Dec-14	Central	Alex	Binder	94	19.99
19	19	12-Dec-14	Central	Smith	Pencil	67	1.29
20	20	21-Dec-14	Central	Rachel	Binder	28	4.99
21	21	29-Dec-14	East	Susan	Pen Set	74	15.99
22	22	6-Jan-15	East	Richard	Pencil	95	1.99
23	23	15-Jan-15	Central	Bill	Binder	46	8.99
24	24	23-Jan-15	Central	Matthew	Binder	50	19.99
25	25	1-Feb-15	Central	Smith	Binder	87	15.00
26	26	9-Feb-15	Central	Alex	Pencil	36	4.99
27	27	18-Feb-15	East	Richard	Binder	4	4.99
28	28	26-Feb-15	Central	Bill	Pen	27	19.99
29	29	7-Mar-15	West	James	Binder	7	19.99
30	30	15-Mar-15	West	James	Pencil	56	2.99
31	31	24-Mar-15	Central	Alex	Pen Set	50	4.99
32	32	1-Apr-15	East	Richard	Binder	60	4.99
33	33	10-Apr-15	Central	Rachel	Pencil	66	1.99
34	34	18-Apr-15	Central	Rachel	Pencil	75	1.99
35	35	27-Apr-15	East	Nick	Pen	96	4.99
36	36	5-May-15	Central	Alex	Pencil	90	4.99
37	37	14-May-15	Central	Bill	Pencil	53	1.29
38	38	22-May-15	West	Thomas	Pencil	32	1.99
39	39	31-May-15	Central	Bill	Binder	80	8.99
40	40	8-Jun-15	East	Richard	Binder	60	8.99
41	41	17-Jun-15	Central	Matthew	Desk	5	125.00
42	42	25-Jun-15	Central	Morgan	Pencil	90	4.99

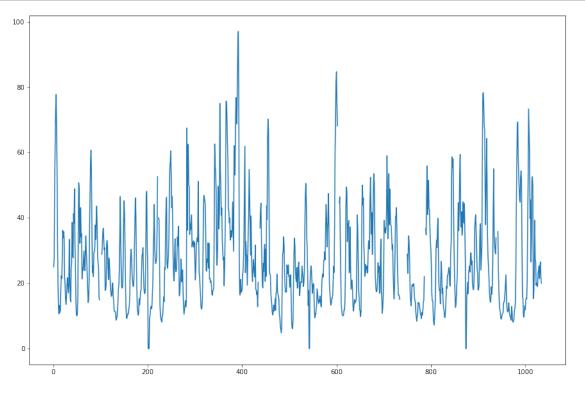
[318]: titanic.iloc[9:25,2:5]

[318]:		Region	Rep	Item
	9	East	Richard	Pen Set
	10	West	James	Pen
	11	Central	Morgan	Binder
	12	West	Thomas	Binder
	13	East	Richard	Pen
	14	Central	Rachel	Pencil
	15	East	Susan	Pen
	16	Central	Alex	Binder
	17	Central	Matthew	Pen Set
	18	Central	Alex	Binder

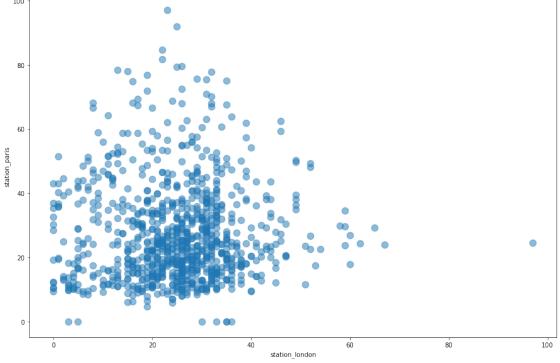
```
19
           Central
                       Smith
                               Pencil
       20
           Central
                      Rachel
                               Binder
                       Susan Pen Set
       21
              East
       22
              East
                    Richard
                               Pencil
       23
           Central
                        Bill
                               Binder
       24
           Central Matthew
                               Binder
[319]: titanic.iloc[0:3,3]="anonymous"
[320]: titanic.loc[11,"Item"]
[320]: 'Binder'
[321]: import pandas as pd
       import matplotlib.pylab as plt
[322]: air_quality=pd.read_csv("air_quality_no2.csv")
[323]: air_quality
[323]:
                    datetime
                               station_antwerp
                                                 station_paris
                                                                 station_london
       0
               5/7/2019 2:00
                                                                            23.0
                                            {\tt NaN}
                                                            {\tt NaN}
               5/7/2019 3:00
                                           50.5
                                                           25.0
                                                                            19.0
       1
       2
                                           45.0
                                                           27.7
               5/7/2019 4:00
                                                                            19.0
       3
                                                                            16.0
               5/7/2019 5:00
                                            NaN
                                                           50.4
               5/7/2019 6:00
                                            NaN
                                                           61.9
                                                                            NaN
       1030 6/20/2019 22:00
                                            NaN
                                                           21.4
                                                                             NaN
       1031 6/20/2019 23:00
                                                           24.9
                                            NaN
                                                                             NaN
       1032
              6/21/2019 0:00
                                            NaN
                                                           26.5
                                                                             NaN
       1033
              6/21/2019 1:00
                                            NaN
                                                           21.8
                                                                             NaN
       1034
              6/21/2019 2:00
                                            NaN
                                                           20.0
                                                                             NaN
       [1035 rows x 4 columns]
[324]: plt.rcParams["figure.figsize"]=15,10
       air_quality.plot()
       plt.show()
```



[325]: air_quality["station_paris"].plot() plt.show()



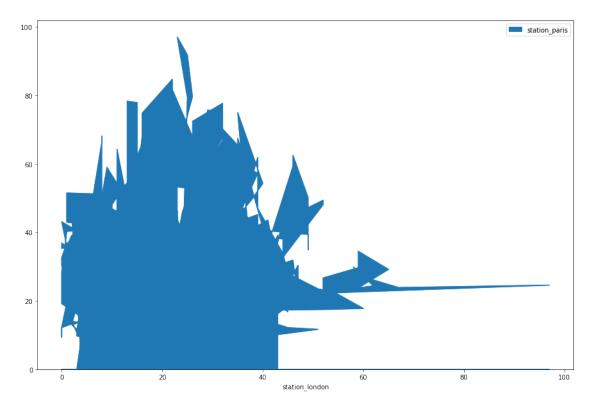
```
[326]: df2=air_quality.iloc[25:30]
[327]:
      df2
                datetime station_antwerp station_paris station_london
[327]:
           5/8/2019 3:00
                                     23.0
                                                    19.6
                                                                     20.0
       25
                                     20.5
                                                    15.3
                                                                     20.0
       26 5/8/2019 4:00
           5/8/2019 5:00
                                      NaN
                                                    13.5
                                                                     19.0
       28 5/8/2019 6:00
                                                    15.5
                                                                     19.0
                                      NaN
       29 5/8/2019 7:00
                                                    19.3
                                                                     29.0
                                      NaN
[328]: air_quality.plot.scatter(x="station_london",y="station_paris",alpha=0.5,s=110)
[328]: <AxesSubplot:xlabel='station_london', ylabel='station_paris'>
```



```
[329]: 
    method_name
    for method_name in dir(air_quality.plot)
    if not method_name.startswith("_")
]
```

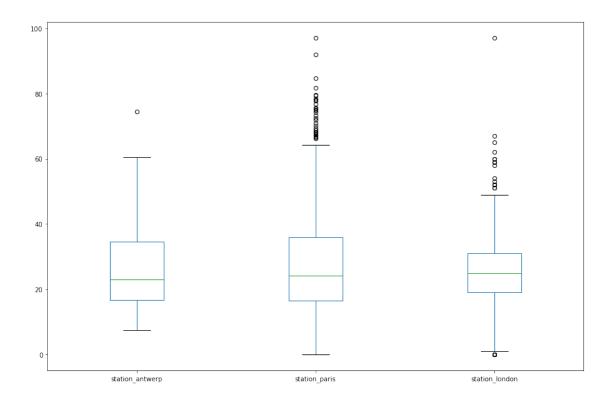
[330]: air_quality.plot.area(x="station_london",y="station_paris")

[330]: <AxesSubplot:xlabel='station_london'>



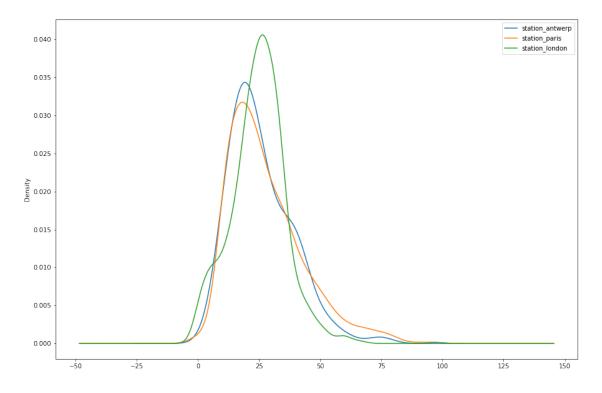
```
[331]: #air_quality.plot.bar(x="datetime", y="station_antwerp")
[332]: #air_quality.plot.barh(x="station_london", y="station_paris")
[333]: air_quality.plot.box()
```

[333]: <AxesSubplot:>



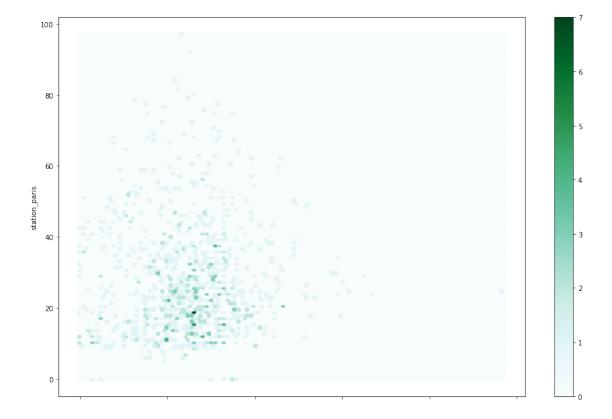
[334]: air_quality.plot.density()

[334]: <AxesSubplot:ylabel='Density'>



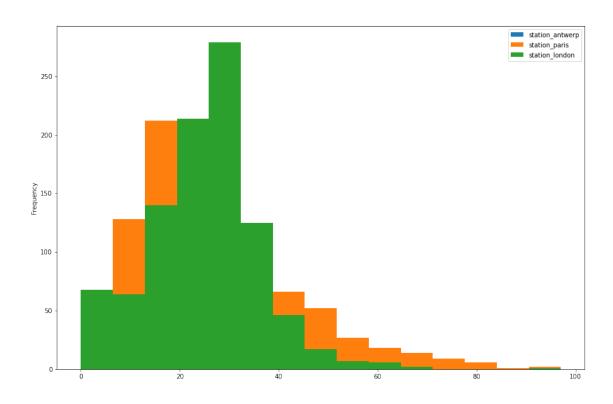
```
[335]: air_quality.plot.hexbin(x="station_london",y="station_paris")
```

[335]: <AxesSubplot:xlabel='station_london', ylabel='station_paris'>

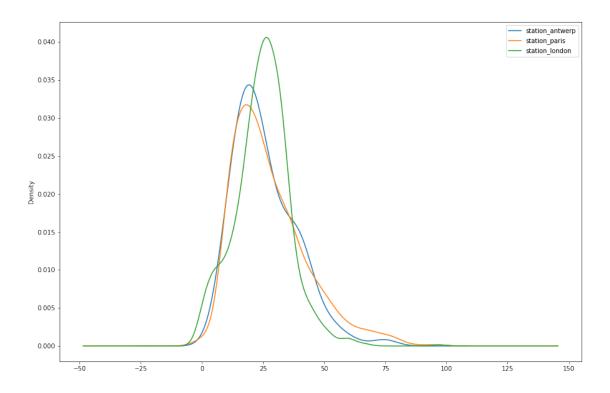


```
[336]: air_quality.plot.hist(bins=15)
```

[336]: <AxesSubplot:ylabel='Frequency'>

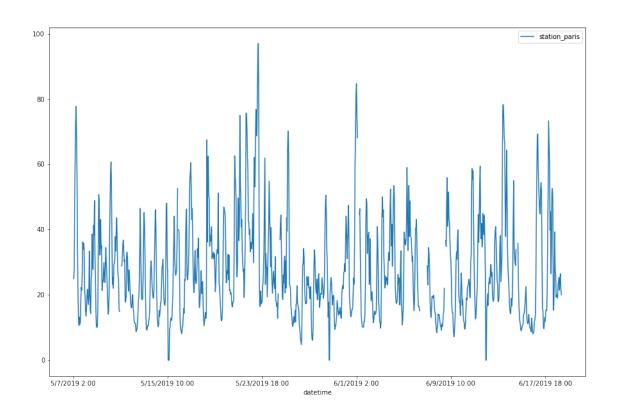


```
[337]: [
           method_name
           for method_name in dir(air_quality.plot)
           if not method_name.startswith("_")
       ]
[337]: ['area',
        'bar',
        'barh',
        'box',
        'density',
        'hexbin',
        'hist',
        'kde',
        'line',
        'pie',
        'scatter']
[338]: air_quality.plot.kde()
[338]: <AxesSubplot:ylabel='Density'>
```

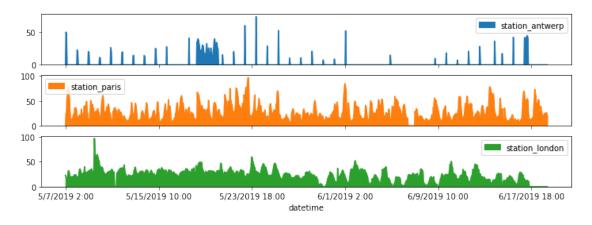


```
[339]: air_quality.plot.line(x="datetime",y="station_paris")
```

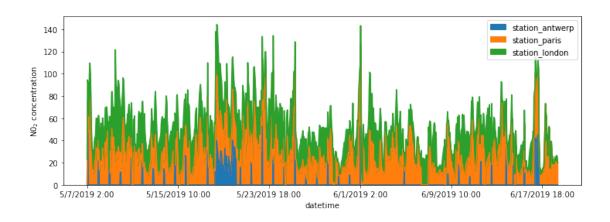
[339]: <AxesSubplot:xlabel='datetime'>







```
[341]: fig, axs=plt.subplots(figsize=(12,4))
air_quality.plot.area(x="datetime",ax=axs)
axs.set_ylabel("N0$_2$ concentration")
fig.savefig("no2_concentrations.png")
```



[]: