## untitled4

## March 10, 2024

```
import pandas as pd
[2]: pd.__version__
[2]: '2.1.4'
    tips_data=pd.Series(["total_bill" ,"tip" ,"sex","smoker","day","time","size"])
[4]: tips_data
[4]: 0
          total_bill
                 tip
     2
                  sex
     3
              smoker
     4
                 day
     5
                time
                size
     dtype: object
[7]: tips_data=pd.read_csv("tips.csv")
[8]: tips_data
[8]:
          total_bill
                        tip
                                sex smoker
                                              day
                                                     time
                                                           size
     0
               16.99 1.01
                            Female
                                         No
                                              Sun
                                                   Dinner
                                                               2
     1
               10.34
                      1.66
                               Male
                                                   Dinner
                                                               3
                                         No
                                              Sun
     2
               21.01
                      3.50
                                                               3
                               Male
                                                   Dinner
                                         No
                                              Sun
     3
               23.68 3.31
                                                               2
                               Male
                                                   Dinner
                                         No
                                              Sun
     4
               24.59 3.61
                             Female
                                         No
                                              Sun
                                                   Dinner
                                                               4
     239
               29.03 5.92
                               Male
                                              Sat
                                                   Dinner
                                                               3
                                         No
     240
               27.18 2.00
                                                   Dinner
                                                               2
                             Female
                                        Yes
                                              Sat
     241
               22.67 2.00
                               Male
                                                   Dinner
                                                               2
                                        Yes
                                              Sat
     242
               17.82 1.75
                               Male
                                         No
                                                   Dinner
                                                               2
                                              Sat
     243
               18.78 3.00 Female
                                                   Dinner
                                                               2
                                         No
                                             Thur
     [244 rows x 7 columns]
```

```
[9]: tips_data.to_csv("export_tips.csv",index=False)
[10]: export_tips=pd.read_csv("export_tips.csv")
[11]:
      export_tips
[11]:
           total_bill
                         tip
                                 sex smoker
                                               day
                                                      time
                                                            size
      0
                16.99
                       1.01
                              Female
                                          No
                                               Sun
                                                    Dinner
                                                                2
      1
                10.34
                       1.66
                                Male
                                                    Dinner
                                                                3
                                          No
                                               Sun
      2
                21.01
                       3.50
                                Male
                                          No
                                               Sun
                                                    Dinner
                                                                3
                                                                2
      3
                23.68 3.31
                                                    Dinner
                                Male
                                          No
                                               Sun
      4
                24.59 3.61
                             Female
                                          No
                                               Sun
                                                    Dinner
                                                                4
      . .
      239
                29.03 5.92
                                Male
                                         No
                                               Sat
                                                    Dinner
                                                                3
      240
                27.18 2.00
                              Female
                                         Yes
                                               Sat
                                                    Dinner
                                                                2
                                               Sat
      241
                22.67
                       2.00
                                Male
                                         Yes
                                                    Dinner
                                                                2
      242
                                                                2
                17.82 1.75
                                Male
                                         No
                                               Sat
                                                    Dinner
                                                                2
      243
                18.78 3.00 Female
                                         No
                                              Thur
                                                    Dinner
      [244 rows x 7 columns]
[12]:
      export_tips.describe()
[12]:
             total_bill
                                             size
                                 tip
             244.000000 244.000000
                                      244.000000
      count
      mean
              19.785943
                            2.998279
                                         2.569672
      std
               8.902412
                            1.383638
                                         0.951100
      min
               3.070000
                            1.000000
                                         1.000000
      25%
                            2.000000
                                         2.000000
              13.347500
      50%
              17.795000
                            2.900000
                                         2.000000
      75%
              24.127500
                            3.562500
                                         3.000000
      max
              50.810000
                           10.000000
                                         6.000000
[13]:
      export_tips.dtypes
[13]: total_bill
                     float64
      tip
                     float64
      sex
                      object
      smoker
                      object
      day
                      object
                      object
      time
                       int64
      size
      dtype: object
[14]: export_tips.dtypes
```

```
[14]: total_bill
                    float64
                    float64
      tip
      sex
                     object
                     object
      smoker
      day
                     object
      time
                     object
      size
                      int64
      dtype: object
[15]: export_tips.info()
     <class 'pandas.core.frame.DataFrame'>
     RangeIndex: 244 entries, 0 to 243
     Data columns (total 7 columns):
          Column
                      Non-Null Count Dtype
          _____
          total_bill 244 non-null
                                       float64
      0
                      244 non-null
                                       float64
      1
          tip
                      244 non-null
      2
          sex
                                       object
      3
          smoker
                      244 non-null
                                       object
      4
                      244 non-null
          day
                                       object
      5
          time
                      244 non-null
                                       object
          size
                      244 non-null
                                       int64
     dtypes: float64(2), int64(1), object(4)
     memory usage: 13.5+ KB
[16]: export_tips.columns
[16]: Index(['total_bill', 'tip', 'sex', 'smoker', 'day', 'time', 'size'],
      dtype='object')
[17]: tips_columns=export_tips.columns
[18]: tips_columns
[18]: Index(['total bill', 'tip', 'sex', 'smoker', 'day', 'time', 'size'],
      dtype='object')
[19]: tips_columns
[19]: Index(['total_bill', 'tip', 'sex', 'smoker', 'day', 'time', 'size'],
      dtype='object')
[21]: tips_columns
[21]: Index(['total_bill', 'tip', 'sex', 'smoker', 'day', 'time', 'size'],
      dtype='object')
```

```
[22]: export_tips.index
[22]: RangeIndex(start=0, stop=244, step=1)
      export_tips
[23]:
[23]:
           total bill
                        tip
                                 sex smoker
                                               day
                                                      time
                                                            size
      0
                16.99
                       1.01
                             Female
                                         No
                                               Sun
                                                    Dinner
                                                               2
      1
                10.34 1.66
                                Male
                                               Sun
                                                   Dinner
                                                               3
                                         No
      2
                21.01 3.50
                                Male
                                                    Dinner
                                                               3
                                         No
                                               Sun
                23.68 3.31
      3
                                Male
                                         No
                                               Sun
                                                    Dinner
                                                               2
      4
                24.59 3.61 Female
                                         No
                                               Sun
                                                    Dinner
                                                               4
                29.03 5.92
                                                               3
      239
                                Male
                                                    Dinner
                                         No
                                               Sat
      240
                27.18 2.00
                                                               2
                              Female
                                        Yes
                                               Sat
                                                    Dinner
                                                               2
      241
                22.67 2.00
                                Male
                                        Yes
                                               Sat
                                                    Dinner
      242
                17.82 1.75
                                Male
                                         No
                                               Sat
                                                    Dinner
                                                               2
                18.78 3.00 Female
                                                               2
      243
                                         No
                                             Thur
                                                    Dinner
      [244 rows x 7 columns]
[24]:
      export_tips.describe
[24]: <bound method NDFrame.describe of
                                               total_bill
                                                            tip
                                                                     sex smoker
                                                                                  day
      time
            size
      0
                16.99 1.01 Female
                                                    Dinner
                                                               2
                                         No
                                               Sun
      1
                10.34 1.66
                                Male
                                         No
                                               Sun
                                                    Dinner
                                                               3
      2
                21.01 3.50
                                Male
                                                    Dinner
                                                               3
                                         No
                                               Sun
                                                               2
      3
                23.68 3.31
                                Male
                                                    Dinner
                                         No
                                               Sun
      4
                24.59 3.61 Female
                                         No
                                               Sun
                                                    Dinner
                                                               4
                29.03 5.92
      239
                                Male
                                         No
                                               Sat
                                                    Dinner
                                                               3
      240
                27.18 2.00
                             Female
                                        Yes
                                               Sat
                                                    Dinner
                                                               2
      241
                22.67 2.00
                                                    Dinner
                                                               2
                                Male
                                        Yes
                                               Sat
      242
                17.82 1.75
                                Male
                                         No
                                               Sat
                                                    Dinner
                                                               2
      243
                18.78 3.00 Female
                                             Thur
                                                    Dinner
                                                               2
                                         No
      [244 rows x 7 columns]>
[25]: tips_data.describe
[25]: <bound method NDFrame.describe of
                                               total_bill
                                                            tip
                                                                    sex smoker
                                                                                  day
      time size
      0
                16.99 1.01 Female
                                         No
                                               Sun Dinner
                                                               2
      1
                10.34 1.66
                                Male
                                         No
                                               Sun
                                                    Dinner
                                                               3
      2
                       3.50
                                                               3
                21.01
                                Male
                                               Sun
                                                    Dinner
                                         No
      3
                23.68 3.31
                                                               2
                                Male
                                         No
                                               Sun
                                                    Dinner
```

```
4
              24.59 3.61 Female
                                              Dinner
                                                        4
                                     No
                                         Sun
     239
              29.03 5.92
                            Male
                                     No
                                         Sat
                                              Dinner
                                                        3
              27.18 2.00
                                                        2
     240
                          Female
                                    Yes
                                         Sat
                                              Dinner
     241
              22.67 2.00
                            Male
                                              Dinner
                                                        2
                                    Yes
                                         Sat
     242
                                                        2
              17.82 1.75
                            Male
                                    No
                                         Sat
                                              Dinner
     243
              18.78 3.00 Female
                                                        2
                                     No
                                        Thur
                                              Dinner
     [244 rows x 7 columns]>
[26]:
    tips_data.info
[26]: <bound method DataFrame.info of
                                       total_bill
                                                   tip
                                                           sex smoker
                                                                       day
     time
          size
     0
              16.99 1.01 Female
                                         Sun Dinner
                                                        2
                                     No
     1
              10.34 1.66
                            Male
                                         Sun
                                              Dinner
                                                        3
                                     No
     2
              21.01
                    3.50
                            Male
                                         Sun
                                              Dinner
                                                        3
                                     No
                                                        2
     3
              23.68 3.31
                            Male
                                    No
                                         Sun
                                              Dinner
     4
              24.59 3.61
                                              Dinner
                         Female
                                     No
                                         Sun
                                                        4
     239
              29.03 5.92
                            Male
                                    No
                                         Sat
                                              Dinner
                                                        3
     240
              27.18 2.00
                          Female
                                         Sat
                                              Dinner
                                                        2
                                    Yes
     241
              22.67 2.00
                            Male
                                    Yes
                                         Sat
                                              Dinner
                                                        2
     242
              17.82 1.75
                                                        2
                            Male
                                    No
                                              Dinner
                                         Sat
     243
              18.78 3.00 Female
                                        Thur
                                              Dinner
                                                        2
                                     No
     [244 rows x 7 columns]>
[27]: tips_data[["total_bill","tip"]].mean()
                  19.785943
[27]: total_bill
                   2.998279
     tip
     dtype: float64
[28]: tips_data.sum()
[28]: total_bill
                                                         4827.77
     tip
                                                          731.58
                  sex
                  smoker
                  day
                  DinnerDinnerDinnerDinnerDinnerDinnerDinnerDinnerDinn...
     time
     size
                                                             627
     dtype: object
[29]: tips_data["total_bill"].sum()
```

[29]: 4827.77

[30]: tips\_data["tip"].sum()

[30]: 731.579999999999

[31]: tips\_data["smoker"].sum()

[32]: len(tips\_data)

[32]: 244

[33]: tips\_data.head(50)

[33]: total\_bill tip sex smoker day time size 2 16.99 1.01 Female No Sun Dinner 0 1 10.34 1.66 Male No Sun Dinner 3 2 21.01 3 3.50 Male No Sun Dinner 3 23.68 3.31 Male No Sun Dinner 2 4 24.59 3.61 Female No Sun Dinner 4 5 25.29 4.71 Male Sun Dinner 4 No 6 8.77 2.00 2 Male Sun Dinner No 7 4 26.88 3.12 Male No Sun Dinner 15.04 1.96 2 8 Male No Sun Dinner 9 14.78 3.23 2 Male No Sun Dinner 2 10 10.27 1.71 Male No Sun Dinner 11 35.26 5.00 Female No Sun Dinner 4 12 15.42 1.57 Male No Sun Dinner 2 13 18.43 3.00 Sun Dinner 4 Male No 14 14.83 3.02 Female No Sun Dinner 2 2 15 21.58 3.92 Male No Sun Dinner 16 10.33 1.67 Female No Sun Dinner 3 17 16.29 3.71 Male No Sun Dinner 3 18 16.97 3.50 Female No Sun Dinner 3 19 20.65 3.35 Male Dinner 3 No Sat 20 17.92 4.08 Male No Sat Dinner 2 2 21 20.29 2.75 Female No Sat Dinner 22 15.77 2.23 Female 2 No Sat Dinner

23	39.42	7.58	Male	No	Sat	Dinner	4
24	19.82	3.18	Male	No	Sat	Dinner	2
25	17.81	2.34	Male	No	Sat	Dinner	4
26	13.37	2.00	Male	No	Sat	Dinner	2
27	12.69	2.00	Male	No	Sat	Dinner	2
28	21.70	4.30	Male	No	Sat	Dinner	2
29	19.65	3.00	Female	No	Sat	Dinner	2
30	9.55	1.45	Male	No	Sat	Dinner	2
31	18.35	2.50	Male	No	Sat	Dinner	4
32	15.06	3.00	Female	No	Sat	Dinner	2
33	20.69	2.45	Female	No	Sat	Dinner	4
34	17.78	3.27	Male	No	Sat	Dinner	2
35	24.06	3.60	Male	No	Sat	Dinner	3
36	16.31	2.00	Male	No	Sat	Dinner	3
37	16.93	3.07	Female	No	Sat	Dinner	3
38	18.69	2.31	Male	No	Sat	Dinner	3
39	31.27	5.00	Male	No	Sat	Dinner	3
40	16.04	2.24	Male	No	Sat	Dinner	3
41	17.46	2.54	Male	No	Sun	Dinner	2
42	13.94	3.06	Male	No	Sun	Dinner	2
43	9.68	1.32	Male	No	Sun	Dinner	2
44	30.40	5.60	Male	No	Sun	Dinner	4
45	18.29	3.00	Male	No	Sun	Dinner	2
46	22.23	5.00	Male	No	Sun	Dinner	2
47	32.40	6.00	Male	No	Sun	Dinner	4
48	28.55	2.05	Male	No	Sun	Dinner	3
49	18.04	3.00	Male	No	Sun	Dinner	2

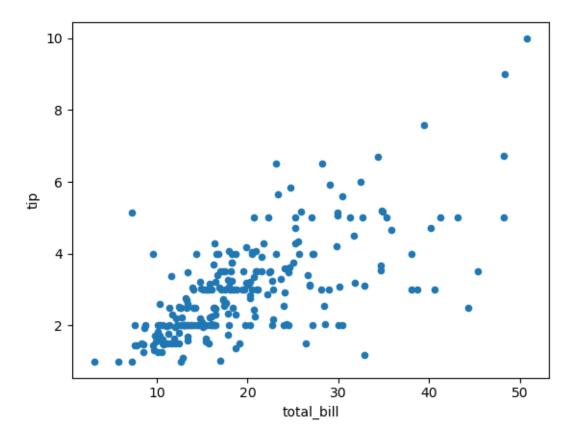
## [34]: tips\_data.head(15)

size	time	day	smoker	sex	tip	total_bill	[34]:
2	Dinner	Sun	No	Female	1.01	16.99	0
3	Dinner	Sun	No	Male	1.66	10.34	1
3	Dinner	Sun	No	Male	3.50	21.01	2
2	Dinner	Sun	No	Male	3.31	23.68	3
4	Dinner	Sun	No	Female	3.61	24.59	4
4	Dinner	Sun	No	Male	4.71	25.29	5
2	Dinner	Sun	No	Male	2.00	8.77	6
4	Dinner	Sun	No	Male	3.12	26.88	7
2	Dinner	Sun	No	Male	1.96	15.04	8
2	Dinner	Sun	No	Male	3.23	14.78	9
2	Dinner	Sun	No	Male	1.71	10.27	10
4	Dinner	Sun	No	Female	5.00	35.26	11
2	Dinner	Sun	No	Male	1.57	15.42	12
4	Dinner	Sun	No	Male	3.00	18.43	13
2	Dinner	Sun	No	Female	3.02	14.83	14

```
[35]: tips_data.tail(15)
[35]:
           total_bill
                                                    time size
                        tip
                                sex smoker
                                             day
      229
                22.12 2.88
                            Female
                                                  Dinner
                                                              2
                                       Yes
                                             Sat
      230
                24.01 2.00
                               Male
                                       Yes
                                              Sat
                                                  Dinner
                                                              4
      231
                15.69 3.00
                               Male
                                                  Dinner
                                                              3
                                       Yes
                                             Sat
      232
                11.61 3.39
                               Male
                                        No
                                             Sat
                                                  Dinner
                                                              2
      233
                10.77 1.47
                               Male
                                        No
                                             Sat
                                                  Dinner
                                                              2
      234
                15.53 3.00
                               Male
                                                  Dinner
                                                              2
                                       Yes
                                             Sat
      235
                                                              2
                10.07 1.25
                               Male
                                        No
                                             Sat
                                                  Dinner
      236
                12.60 1.00
                                                              2
                               Male
                                             Sat
                                                  Dinner
                                       Yes
      237
                32.83 1.17
                                             Sat Dinner
                                                              2
                               Male
                                       Yes
      238
                                                              3
                35.83 4.67 Female
                                        No
                                             Sat Dinner
      239
                29.03 5.92
                                             Sat Dinner
                                                              3
                               Male
                                        No
                27.18 2.00 Female
                                                              2
      240
                                       Yes
                                             Sat Dinner
      241
                22.67 2.00
                               Male
                                       Yes
                                             Sat Dinner
                                                              2
      242
                17.82 1.75
                               Male
                                        No
                                             Sat Dinner
                                                              2
                18.78 3.00 Female
      243
                                        No
                                            Thur Dinner
                                                              2
[36]: tips_data.tail(5)
[36]:
           total_bill
                        tip
                                sex smoker
                                                     time
                                              day
                                                           size
                29.03 5.92
      239
                               Male
                                        No
                                             Sat Dinner
                                                              3
      240
                27.18 2.00 Female
                                                  Dinner
                                       Yes
                                             Sat
                                                              2
      241
                22.67 2.00
                               Male
                                       Yes
                                             Sat Dinner
                                                              2
      242
                17.82 1.75
                                                              2
                               Male
                                        No
                                             Sat
                                                  Dinner
      243
                18.78 3.00 Female
                                            Thur Dinner
                                                              2
                                        No
[37]: tips_data.loc[9]
[37]: total_bill
                     14.78
                      3.23
      tip
      sex
                      Male
      smoker
                        No
      day
                       Sun
      time
                    Dinner
      size
      Name: 9, dtype: object
[38]: tips_data.iloc[5]
[38]: total_bill
                     25.29
                      4.71
      tip
      sex
                      Male
      smoker
                        No
      day
                       Sun
      time
                    Dinner
```

```
size
      Name: 5, dtype: object
[39]: tips_data.iloc[3]
[39]: total_bill
                     23.68
      tip
                      3.31
      sex
                      Male
                        No
      smoker
      day
                       Sun
      time
                    Dinner
      size
      Name: 3, dtype: object
[45]: import matplotlib
      import matplotlib as plt
      tips_data
[45]:
           total_bill
                        tip
                                sex smoker
                                              day
                                                     time
                                                           size
      0
                16.99 1.01 Female
                                         No
                                              Sun
                                                   Dinner
                                                              2
                                                              3
      1
                10.34 1.66
                               Male
                                         No
                                              Sun
                                                   Dinner
      2
                21.01 3.50
                                                   Dinner
                                                              3
                               Male
                                         No
                                              Sun
      3
                23.68 3.31
                               Male
                                         No
                                              Sun
                                                   Dinner
                                                              2
                24.59 3.61 Female
                                                              4
      4
                                         No
                                              Sun
                                                   Dinner
                29.03 5.92
                                                              3
      239
                               Male
                                                   Dinner
                                         No
                                              Sat
                                                              2
      240
                27.18 2.00 Female
                                              Sat
                                                   Dinner
                                        Yes
                22.67 2.00
                                                              2
      241
                               Male
                                        Yes
                                              Sat
                                                   Dinner
      242
                17.82 1.75
                               Male
                                                   Dinner
                                                              2
                                         No
                                              Sat
      243
                18.78 3.00 Female
                                         No
                                             Thur
                                                  Dinner
                                                              2
      [244 rows x 7 columns]
[46]: tips_data.plot(kind="scatter",x="total_bill",y="tip")
```

[46]: <Axes: xlabel='total\_bill', ylabel='tip'>



[47]: <Axes: xlabel='tip', ylabel='sex'>

