01_Pandas_tips___tricks_till_Part_4

July 27, 2022

1 Pandas Tips and Tricks

1.1 01- How to find the version

[ ]:
```
import pandas as pd
pd.__version__
```

[ ]:
```
'1.3.4'
```

[ ]:
```
# Another way
pd.show_versions()
```

```
INSTALLED VERSIONS
------------------
commit           : 945c9ed766a61c7d2c0a7cbb251b6edebf9cb7d5
python           : 3.9.7.final.0
python-bits      : 64
OS               : Windows
OS-release       : 10
Version          : 10.0.19044
machine          : AMD64
processor        : Intel64 Family 6 Model 69 Stepping 1, GenuineIntel
byteorder        : little
LC_ALL           : None
LANG             : None
LOCALE           : English_Pakistan.1252

pandas           : 1.3.4
numpy            : 1.20.3
pytz             : 2021.3
dateutil         : 2.8.2
pip              : 21.2.4
setuptools       : 58.0.4
Cython           : 0.29.24
pytest           : 6.2.4
hypothesis       : None
sphinx           : 4.2.0
blosc            : None
```

```
feather          : None
xlsxwriter       : 3.0.1
lxml.etree       : 4.6.3
html5lib         : 1.1
pymysql          : None
psycopg2         : None
jinja2           : 2.11.3
IPython          : 7.29.0
pandas_datareader: None
bs4              : 4.10.0
bottleneck       : 1.3.2
fsspec           : 2021.10.1
fastparquet      : None
gcsfs            : None
matplotlib       : 3.4.3
numexpr          : 2.7.3
odfpy            : None
openpyxl         : 3.0.9
pandas_gbq       : None
pyarrow          : 7.0.0
pyxlsb           : None
s3fs             : None
scipy            : 1.7.1
sqlalchemy       : 1.4.22
tables           : 3.6.1
tabulate         : 0.8.9
xarray           : 2022.3.0
xlrd             : 2.0.1
xlwt             : 1.3.0
numba            : 0.54.1
```

1.2 02- Make a DataFrame

[ ]:
```
# Method 1
df = pd.DataFrame({
    'A Col': [1,2,3,7,8],
    'B Col': [4,5,6,34,65]
})
df.head()
```

[ ]:

	A Col	B Col
0	1	4
1	2	5
2	3	6
3	7	34
4	8	65

[ ]:
```
# Method 2
import numpy as np
arr = np.array([[1,2,3], [4,5,6], [7,8,9]])
pd.DataFrame(arr)
```

[ ]:

	0	1	2
0	1	2	3
1	4	5	6
2	7	8	9

[ ]:
```
# Method 3
pd.DataFrame(np.random.rand(4,8))
```

[ ]:

	0	1	2	3	4	5	6	7
0	0.262443	0.483676	0.789906	0.445719	0.136252	0.559958	0.147009	0.347417
1	0.280001	0.000549	0.216594	0.165982	0.183394	0.103213	0.676123	0.242696
2	0.705467	0.022715	0.404600	0.030551	0.709595	0.100663	0.719191	0.236025
3	0.662837	0.305511	0.740651	0.160672	0.236295	0.574736	0.637684	0.367113

[ ]:
```
# Method 4
pd.DataFrame(np.random.rand(4,9), columns=list('ABCDEFGHI'))
```

[ ]:

	A	B	C	D	E	F	G	H	I
0	0.779652	0.993084	0.992091	0.889988	0.328866	0.844554	0.005716	0.157522	0.914300
1	0.783581	0.827090	0.435010	0.726450	0.913124	0.208181	0.420027	0.807988	0.960341
2	0.231493	0.262570	0.850607	0.717956	0.899159	0.392331	0.380058	0.382277	0.989851
3	0.071663	0.869387	0.852132	0.176404	0.263959	0.983783	0.481264	0.287063	0.819558

1.3 03- How to Rename Columns

[ ]:
```
df = pd.DataFrame({
    'A Col': [1,2,3,7,8],
    'B Col': [4,5,6,34,65]
})
df.head()
```

[ ]:

	A Col	B Col
0	1	4
1	2	5
2	3	6
3	7	34
4	8	65

[ ]:
```
# Method 1
df.rename(columns={'A Col': 'Col_A', 'B Col': 'Col_B'}, inplace=True)
df.head()
```

[ ]:

	Col_A	Col_B
0	1	4
1	2	5
2	3	6
3	7	34
4	8	65

[ ]:
```
# Method 2
df.columns = ['col_aa', 'col_bb']
df.head()
```

[ ]:

	col_aa	col_bb
0	1	4
1	2	5
2	3	6
3	7	34
4	8	65

[ ]:
```
# Rename any Specific character
df.columns = df.columns.str.replace('_', '*')
df.head()
```

[ ]:

	col*aa	col*bb
0	1	4
1	2	5
2	3	6
3	7	34
4	8	65

[ ]:
```
# Adding prefix to columns
df = df.add_prefix('baba_')
df.head()
```

[ ]:

	baba_col*aa	baba_col*bb
0	1	4
1	2	5
2	3	6

```
3            7           34
4            8           65
```

[ ]:
```
# Adding suffix to columns
df = df.add_suffix('haha')
df.head()
```

[ ]:
```
   baba_col*aahaha  baba_col*bbhaha
0                1                4
1                2                5
2                3                6
3                7               34
4                8               65
```

[ ]:
```
df.columns = ['col_a', 'col_b']
df.head()
```

[ ]:
```
   col_a  col_b
0      1      4
1      2      5
2      3      6
3      7     34
4      8     65
```

1.4 04- Using Template Data

[ ]:
```
# import libraries
import pandas as pd
import numpy as np
import seaborn as sns

# import dataset
df = sns.load_dataset('tips')
df.head()
```

[ ]:
```
   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       21.01  3.50    Male     No  Sun  Dinner     3
3       23.68  3.31    Male     No  Sun  Dinner     2
4       24.59  3.61  Female     No  Sun  Dinner     4
```

[ ]:
```
# Summary of Data
df.describe()
```

[ ]:
```
       total_bill         tip        size
count  244.000000  244.000000  244.000000
```

```
mean    19.785943    2.998279    2.569672
std      8.902412    1.383638    0.951100
min      3.070000    1.000000    1.000000
25%     13.347500    2.000000    2.000000
50%     17.795000    2.900000    2.000000
75%     24.127500    3.562500    3.000000
max     50.810000   10.000000    6.000000
```

[ ]:
```
# Saving Dataset
df.to_csv('tips.csv')
df.to_excel('tips.xlsx')
```

1.5 05- Using Your own Data

[ ]:
```
# import dataset from local drive
df = pd.read_csv('tips.csv')
df.head()
```

[ ]:

	Unnamed: 0	total_bill	tip	sex	smoker	day	time	size
0	0	16.99	1.01	Female	No	Sun	Dinner	2
1	1	10.34	1.66	Male	No	Sun	Dinner	3
2	2	21.01	3.50	Male	No	Sun	Dinner	3
3	3	23.68	3.31	Male	No	Sun	Dinner	2
4	4	24.59	3.61	Female	No	Sun	Dinner	4

1.6 06- Reverse Row Order

[ ]:
```
import pandas as pd
import seaborn as sns

df = sns.load_dataset('titanic')
df.head()
```

[ ]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	\
0	0	3	male	22.0	1	0	7.2500	S	Third	
1	1	1	female	38.0	1	0	71.2833	C	First	
2	1	3	female	26.0	0	0	7.9250	S	Third	
3	1	1	female	35.0	1	0	53.1000	S	First	
4	0	3	male	35.0	0	0	8.0500	S	Third	

	who	adult_male	deck	embark_town	alive	alone
0	man	True	NaN	Southampton	no	False
1	woman	False	C	Cherbourg	yes	False
2	woman	False	NaN	Southampton	yes	True
3	woman	False	C	Southampton	yes	False
4	man	True	NaN	Southampton	no	True

[ ]:
```
# Reversing Row wise
df.loc[::-1].head()
```

[ ]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	\
890	0	3	male	32.0	0	0	7.75	Q	Third	
889	1	1	male	26.0	0	0	30.00	C	First	
888	0	3	female	NaN	1	2	23.45	S	Third	
887	1	1	female	19.0	0	0	30.00	S	First	
886	0	2	male	27.0	0	0	13.00	S	Second	

	who	adult_male	deck	embark_town	alive	alone
890	man	True	NaN	Queenstown	no	True
889	man	True	C	Cherbourg	yes	True
888	woman	False	NaN	Southampton	no	False
887	woman	False	B	Southampton	yes	True
886	man	True	NaN	Southampton	no	True

[ ]:
```
# Reset the index number
df.loc[::-1].reset_index(drop=True).head()
```

[ ]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	\
0	0	3	male	32.0	0	0	7.75	Q	Third	
1	1	1	male	26.0	0	0	30.00	C	First	
2	0	3	female	NaN	1	2	23.45	S	Third	
3	1	1	female	19.0	0	0	30.00	S	First	
4	0	2	male	27.0	0	0	13.00	S	Second	

	who	adult_male	deck	embark_town	alive	alone
0	man	True	NaN	Queenstown	no	True
1	man	True	C	Cherbourg	yes	True
2	woman	False	NaN	Southampton	no	False
3	woman	False	B	Southampton	yes	True
4	man	True	NaN	Southampton	no	True

1.7 07- Reverse Column Order

[ ]:
```
import pandas as pd
import seaborn as sns

df = sns.load_dataset('titanic')
df.head()
```

[ ]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	\
0	0	3	male	22.0	1	0	7.2500	S	Third	
1	1	1	female	38.0	1	0	71.2833	C	First	
2	1	3	female	26.0	0	0	7.9250	S	Third	
3	1	1	female	35.0	1	0	53.1000	S	First	

```
4         0       3    male  35.0      0      0   8.0500        S  Third

     who  adult_male deck  embark_town alive  alone
0    man        True  NaN  Southampton    no  False
1  woman       False    C    Cherbourg   yes  False
2  woman       False  NaN  Southampton   yes   True
3  woman       False    C  Southampton   yes  False
4    man        True  NaN  Southampton    no   True
```

[ ]:
```
df.loc[:, ::-1].head()
```

[ ]:
```
   alone alive  embark_town deck  adult_male    who  class embarked     fare  \
0  False    no  Southampton  NaN        True    man  Third        S   7.2500
1  False   yes    Cherbourg    C       False  woman  First        C  71.2833
2   True   yes  Southampton  NaN       False  woman  Third        S   7.9250
3  False   yes  Southampton    C       False  woman  First        S  53.1000
4   True    no  Southampton  NaN        True    man  Third        S   8.0500

   parch  sibsp   age     sex  pclass  survived
0      0      1  22.0    male       3         0
1      0      1  38.0  female       1         1
2      0      0  26.0  female       3         1
3      0      1  35.0  female       1         1
4      0      0  35.0    male       3         0
```

1.8 08- Select a Column by dtype

[ ]:
```
import pandas as pd
import seaborn as sns

df = sns.load_dataset('titanic')
df.head()
```

[ ]:
```
   survived  pclass     sex   age  sibsp  parch     fare embarked  class  \
0         0       3    male  22.0      1      0   7.2500        S  Third
1         1       1  female  38.0      1      0  71.2833        C  First
2         1       3  female  26.0      0      0   7.9250        S  Third
3         1       1  female  35.0      1      0  53.1000        S  First
4         0       3    male  35.0      0      0   8.0500        S  Third

     who  adult_male deck  embark_town alive  alone
0    man        True  NaN  Southampton    no  False
1  woman       False    C    Cherbourg   yes  False
2  woman       False  NaN  Southampton   yes   True
3  woman       False    C  Southampton   yes  False
4    man        True  NaN  Southampton    no   True
```

[ ]:
```
df.dtypes
```

[ ]:
```
survived          int64
pclass            int64
sex              object
age             float64
sibsp             int64
parch             int64
fare            float64
embarked         object
class          category
who              object
adult_male         bool
deck           category
embark_town      object
alive            object
alone              bool
dtype: object
```

[ ]:
```
# Only select those have numeric dtype
df.select_dtypes(include=['number']).head()
```

[ ]:

	survived	pclass	age	sibsp	parch	fare
0	0	3	22.0	1	0	7.2500
1	1	1	38.0	1	0	71.2833
2	1	3	26.0	0	0	7.9250
3	1	1	35.0	1	0	53.1000
4	0	3	35.0	0	0	8.0500

[ ]:
```
# Only select those have object dtype
df.select_dtypes(include=['object']).head()
```

[ ]:

	sex	embarked	who	embark_town	alive
0	male	S	man	Southampton	no
1	female	C	woman	Cherbourg	yes
2	female	S	woman	Southampton	yes
3	female	S	woman	Southampton	yes
4	male	S	man	Southampton	no

[ ]:
```
# Only select those have multiple dtype
df.select_dtypes(include=['object', 'number']).head()
```

[ ]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	who	\
0	0	3	male	22.0	1	0	7.2500	S	man	
1	1	1	female	38.0	1	0	71.2833	C	woman	
2	1	3	female	26.0	0	0	7.9250	S	woman	
3	1	1	female	35.0	1	0	53.1000	S	woman	
4	0	3	male	35.0	0	0	8.0500	S	man	

```
   embark_town alive
0  Southampton    no
1    Cherbourg   yes
2  Southampton   yes
3  Southampton   yes
4  Southampton    no
```

[ ]:
```
# exclude numeric dtype columns
df.select_dtypes(exclude=['number']).head()
```

[ ]:
```
      sex embarked  class    who  adult_male deck  embark_town alive  alone
0    male        S  Third    man        True  NaN  Southampton    no  False
1  female        C  First  woman       False    C    Cherbourg   yes  False
2  female        S  Third  woman       False  NaN  Southampton   yes   True
3  female        S  First  woman       False    C  Southampton   yes  False
4    male        S  Third    man        True  NaN  Southampton    no   True
```

1.9 09- Convert String into Numeric

[ ]:
```
df = pd.DataFrame({
    'col_A': ['1','2','3','4','5'],
    'col_B': ['11','23','3','47','5']
})
df.head()
```

[ ]:
```
  col_A col_B
0     1    11
1     2    23
2     3     3
3     4    47
4     5     5
```

[ ]:
```
df.dtypes
```

[ ]:
```
col_A    object
col_B    object
dtype: object
```

[ ]:
```
# Converting string into int
df.astype({'col_A': 'float64', 'col_B': 'int64'}).dtypes
```

[ ]:
```
col_A    float64
col_B      int64
dtype: object
```

[ ]:
```
pd.to_numeric(df['col_A'], errors='coerce')
```

```
0    1
1    2
2    3
3    4
4    5
Name: col_A, dtype: int64
```

1.10 10- Reduce DataFrame Size

```
df = sns.load_dataset('titanic')
df.shape
```

```
(891, 15)
```

```
df.info(memory_usage='deep')
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 15 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   survived     891 non-null    int64
 1   pclass       891 non-null    int64
 2   sex          891 non-null    object
 3   age          714 non-null    float64
 4   sibsp        891 non-null    int64
 5   parch        891 non-null    int64
 6   fare         891 non-null    float64
 7   embarked     889 non-null    object
 8   class        891 non-null    category
 9   who          891 non-null    object
 10  adult_male   891 non-null    bool
 11  deck         203 non-null    category
 12  embark_town  889 non-null    object
 13  alive        891 non-null    object
 14  alone        891 non-null    bool
dtypes: bool(2), category(2), float64(2), int64(4), object(5)
memory usage: 313.7 KB
```

```
# Getting random 10% of whole data as Sample
df.sample(frac=0.1).shape
```

```
(89, 15)
```

```
df.sample(frac=0.1).info(memory_usage='deep')
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 89 entries, 42 to 14
Data columns (total 15 columns):
```

```
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   survived     89 non-null     int64
 1   pclass       89 non-null     int64
 2   sex          89 non-null     object
 3   age          80 non-null     float64
 4   sibsp        89 non-null     int64
 5   parch        89 non-null     int64
 6   fare         89 non-null     float64
 7   embarked     89 non-null     object
 8   class        89 non-null     category
 9   who          89 non-null     object
 10  adult_male   89 non-null     bool
 11  deck         24 non-null     category
 12  embark_town  89 non-null     object
 13  alive        89 non-null     object
 14  alone        89 non-null     bool
dtypes: bool(2), category(2), float64(2), int64(4), object(5)
memory usage: 32.9 KB
```

1.11 11- Copy Data from clip board

[ ]:
```
# Download Dataset
import seaborn as sns
import pandas as pd

df = sns.load_dataset('titanic')
df.to_excel('titanic.xlsx')
```

[ ]:
```
# Read clipboard in python
df1 = pd.read_clipboard()
df1.head()

# Saving clipboard data
df1.to_csv('excel_ka_data.csv')
```

1.12 12- Split DataFrame into two subsets

[ ]:
```
import seaborn as sns
import pandas as pd

df = sns.load_dataset('titanic')
df.head()
```

[ ]:
```
   survived  pclass     sex   age  sibsp  parch     fare embarked  class  \
0         0       3    male  22.0      1      0   7.2500        S  Third
1         1       1  female  38.0      1      0  71.2833        C  First
```

```
2         1       3  female  26.0      0      0   7.9250        S  Third
3         1       1  female  35.0      1      0  53.1000        S  First
4         0       3    male  35.0      0      0   8.0500        S  Third

     who  adult_male deck  embark_town alive  alone
0    man        True  NaN  Southampton    no  False
1  woman       False    C    Cherbourg   yes  False
2  woman       False  NaN  Southampton   yes   True
3  woman       False    C  Southampton   yes  False
4    man        True  NaN  Southampton    no   True
```

[ ]:
```
df.shape
```

[ ]:
```
(891, 15)
```

[ ]:
```
from random import random
kashti_1 = df.sample(frac=0.50, random_state=1)
kashti_1.shape
```

[ ]:
```
(446, 15)
```

[ ]:
```
kashti_2 = df.drop(kashti_1.index)
kashti_2.shape
```

[ ]:
```
(445, 15)
```

[ ]:
```
kashti_1.head()
```

[ ]:
```
     survived  pclass     sex   age  sibsp  parch     fare embarked   class  \
862         1       1  female  48.0      0      0  25.9292        S   First
223         0       3    male   NaN      0      0   7.8958        S   Third
84          1       2  female  17.0      0      0  10.5000        S  Second
680         0       3  female   NaN      0      0   8.1375        Q   Third
535         1       2  female   7.0      0      2  26.2500        S  Second

       who  adult_male deck  embark_town alive  alone
862  woman       False    D  Southampton   yes   True
223    man        True  NaN  Southampton    no   True
84   woman       False  NaN  Southampton   yes   True
680  woman       False  NaN   Queenstown    no   True
535  child       False  NaN  Southampton   yes  False
```

[ ]:
```
kashti_2.head()
```

[ ]:
```
    survived  pclass     sex   age  sibsp  parch     fare embarked   class  \
1          1       1  female  38.0      1      0  71.2833        C   First
7          0       3    male   2.0      3      1  21.0750        S   Third
10         1       3  female   4.0      1      1  16.7000        S   Third
```

```
15          1       2  female  55.0      0      0  16.0000        S  Second
18          0       3  female  31.0      1      0  18.0000        S   Third

      who  adult_male deck  embark_town alive  alone
1   woman       False    C    Cherbourg   yes  False
7   child       False  NaN  Southampton    no  False
10  child       False    G  Southampton   yes  False
15  woman       False  NaN  Southampton   yes   True
18  woman       False  NaN  Southampton    no  False
```

1.13 13- Joining Two Datasets

[ ]:
```
# Appending both datasets
df1 = kashti_1.append(kashti_2)
df1.shape
```

[ ]:
```
(891, 15)
```

1.14 14- Filtering a Dataset

[ ]:
```
df.head()
```

[ ]:
```
   survived  pclass     sex   age  sibsp  parch     fare embarked  class  \
0         0       3    male  22.0      1      0   7.2500        S  Third
1         1       1  female  38.0      1      0  71.2833        C  First
2         1       3  female  26.0      0      0   7.9250        S  Third
3         1       1  female  35.0      1      0  53.1000        S  First
4         0       3    male  35.0      0      0   8.0500        S  Third

     who  adult_male deck  embark_town alive  alone
0    man        True  NaN  Southampton    no  False
1  woman       False    C    Cherbourg   yes  False
2  woman       False  NaN  Southampton   yes   True
3  woman       False    C  Southampton   yes  False
4    man        True  NaN  Southampton    no   True
```

[ ]:
```
# finding unique values in sex column
df.sex.unique()
```

[ ]:
```
array(['male', 'female'], dtype=object)
```

[ ]:
```
# Filtering Female Data
df[(df.sex == 'female')]
```

[ ]:
```
     survived  pclass     sex   age  sibsp  parch     fare embarked   class  \
1           1       1  female  38.0      1      0  71.2833        C   First
2           1       3  female  26.0      0      0   7.9250        S   Third
```

```
3           1       1  female  35.0      1      0  53.1000        S   First
8           1       3  female  27.0      0      2  11.1333        S   Third
9           1       2  female  14.0      1      0  30.0708        C  Second
..        …     …      …   …    …     …       …      …     …
880         1       2  female  25.0      0      1  26.0000        S  Second
882         0       3  female  22.0      0      0  10.5167        S   Third
885         0       3  female  39.0      0      5  29.1250        Q   Third
887         1       1  female  19.0      0      0  30.0000        S   First
888         0       3  female   NaN      1      2  23.4500        S   Third

       who  adult_male deck  embark_town alive  alone
1    woman       False    C    Cherbourg   yes  False
2    woman       False  NaN  Southampton   yes   True
3    woman       False    C  Southampton   yes  False
8    woman       False  NaN  Southampton   yes  False
9    child       False  NaN    Cherbourg   yes  False
..     …         …  …          …   …    …
880  woman       False  NaN  Southampton   yes  False
882  woman       False  NaN  Southampton    no   True
885  woman       False  NaN   Queenstown    no  False
887  woman       False    B  Southampton   yes   True
888  woman       False  NaN  Southampton    no  False

[314 rows x 15 columns]
```

[ ]:
```
df.embark_town.unique()
```

[ ]:
```
array(['Southampton', 'Cherbourg', 'Queenstown', nan], dtype=object)
```

[ ]:
```
# Multiple filtering
df[(df.embark_town == 'Southampton') & (df.sex == 'female')]
```

[ ]:
```
     survived  pclass     sex   age  sibsp  parch     fare embarked   class  \
2           1       3  female  26.0      0      0   7.9250        S   Third
3           1       1  female  35.0      1      0  53.1000        S   First
8           1       3  female  27.0      0      2  11.1333        S   Third
10          1       3  female   4.0      1      1  16.7000        S   Third
11          1       1  female  58.0      0      0  26.5500        S   First
..        …     …      …   …    …     …       …      …     …
871         1       1  female  47.0      1      1  52.5542        S   First
880         1       2  female  25.0      0      1  26.0000        S  Second
882         0       3  female  22.0      0      0  10.5167        S   Third
887         1       1  female  19.0      0      0  30.0000        S   First
888         0       3  female   NaN      1      2  23.4500        S   Third

       who  adult_male deck  embark_town alive  alone
2    woman       False  NaN  Southampton   yes   True
```

```
3    woman       False    C  Southampton   yes  False
8    woman       False  NaN  Southampton   yes  False
10   child       False    G  Southampton   yes  False
11   woman       False    C  Southampton   yes   True
..     …           …  …          …    …    …
871  woman       False    D  Southampton   yes  False
880  woman       False  NaN  Southampton   yes  False
882  woman       False  NaN  Southampton    no   True
887  woman       False    B  Southampton   yes   True
888  woman       False  NaN  Southampton    no  False

[203 rows x 15 columns]
```

[ ]:
```
df[((df.embark_town == 'Southampton') | (df.embark_town == 'Queenstown')) &
(df.sex == 'female')]
```

[ ]:
```
     survived  pclass     sex   age  sibsp  parch     fare embarked   class  \
2           1       3  female  26.0      0      0   7.9250        S   Third
3           1       1  female  35.0      1      0  53.1000        S   First
8           1       3  female  27.0      0      2  11.1333        S   Third
10          1       3  female   4.0      1      1  16.7000        S   Third
11          1       1  female  58.0      0      0  26.5500        S   First
..        …     …      …   …    …    …       …      …     …
880         1       2  female  25.0      0      1  26.0000        S  Second
882         0       3  female  22.0      0      0  10.5167        S   Third
885         0       3  female  39.0      0      5  29.1250        Q   Third
887         1       1  female  19.0      0      0  30.0000        S   First
888         0       3  female   NaN      1      2  23.4500        S   Third

       who  adult_male deck  embark_town alive  alone
2    woman       False  NaN  Southampton   yes   True
3    woman       False    C  Southampton   yes  False
8    woman       False  NaN  Southampton   yes  False
10   child       False    G  Southampton   yes  False
11   woman       False    C  Southampton   yes   True
..     …           …  …          …    …    …
880  woman       False  NaN  Southampton   yes  False
882  woman       False  NaN  Southampton    no   True
885  woman       False  NaN   Queenstown    no  False
887  woman       False    B  Southampton   yes   True
888  woman       False  NaN  Southampton    no  False

[239 rows x 15 columns]
```

[ ]:
```
# Another way of filtering
df[df.embark_town.isin(['Queenstown', "Southampton"])].head()
```

[ ]:
```
   survived  pclass     sex   age  sibsp  parch     fare embarked  class  \
0         0       3    male  22.0      1      0   7.2500        S  Third
2         1       3  female  26.0      0      0   7.9250        S  Third
3         1       1  female  35.0      1      0  53.1000        S  First
4         0       3    male  35.0      0      0   8.0500        S  Third
5         0       3    male   NaN      0      0   8.4583        Q  Third

     who  adult_male deck  embark_town alive  alone
0    man        True  NaN  Southampton    no  False
2  woman       False  NaN  Southampton   yes   True
3  woman       False    C  Southampton   yes  False
4    man        True  NaN  Southampton    no   True
5    man        True  NaN   Queenstown    no   True
```

[ ]:
```
df[df.age < 18].shape
```

[ ]:
```
(113, 15)
```

1.15 15- Filtering by Large Categories

[ ]:
```
df.shape
```

[ ]:
```
(891, 15)
```

[ ]:
```
# Getting values of each category
df.embark_town.value_counts()
```

[ ]:
```
Southampton    644
Cherbourg      168
Queenstown      77
Name: embark_town, dtype: int64
```

[ ]:
```
# How many male and females are there
df.sex.value_counts()
```

[ ]:
```
male      577
female    314
Name: sex, dtype: int64
```

[ ]:
```
# finding Largest categories i.e: age=24 are largest group
df.age.value_counts().nlargest(3)
```

[ ]:
```
24.0    30
22.0    27
18.0    26
Name: age, dtype: int64
```

[ ]:
```
# Top Three Age groups
counts = df.age.value_counts()
counts.nlargest(3).index
```

[ ]:
```
Float64Index([24.0, 22.0, 18.0], dtype='float64')
```

[ ]:
```
# Top Three Age groups
counts = df.who.value_counts()
counts.nlargest(3)
```

[ ]:
```
man      537
woman    271
child     83
Name: who, dtype: int64
```

[ ]:
```
# Filtering on based of 'who' column largst group i.e 'man'
df[df.who.isin(counts.nlargest(1).index)].head()
```

[ ]:
```
    survived  pclass   sex   age  sibsp  parch     fare embarked  class  who  \
0          0       3  male  22.0      1      0   7.2500        S  Third  man
4          0       3  male  35.0      0      0   8.0500        S  Third  man
5          0       3  male   NaN      0      0   8.4583        Q  Third  man
6          0       1  male  54.0      0      0  51.8625        S  First  man
12         0       3  male  20.0      0      0   8.0500        S  Third  man

    adult_male deck  embark_town alive  alone
0         True  NaN  Southampton    no  False
4         True  NaN  Southampton    no   True
5         True  NaN   Queenstown    no   True
6         True    E  Southampton    no   True
12        True  NaN  Southampton    no   True
```

1.16 16- Splitting a string into multiple columns

[ ]:
```
# Import libraries
import pandas as pd

df = pd.DataFrame({'Name': ['Muhammad Waleed', 'Ali Afzal', 'Muhammad Ahmad'],
                   'Location': ['Islamabad, Pakistan', 'Lahore, Pakistan',␣
 ↪'Berlin, Germany'],})

df
```

[ ]:
```
              Name             Location
0  Muhammad Waleed  Islamabad, Pakistan
1        Ali Afzal     Lahore, Pakistan
2   Muhammad Ahmad      Berlin, Germany
```

[ ]:
```
# Split a column into two columns
df.Name.str.split(' ', expand=True)
```

[ ]:
```
          0       1
0  Muhammad  Waleed
1       Ali   Afzal
2  Muhammad   Ahmad
```

[ ]:
```
# Adding splits into new columns
df[['first_name', 'last_name']] = df.Name.str.split(' ', expand=True)
df
```

[ ]:
```
              Name             Location first_name last_name
0  Muhammad Waleed  Islamabad, Pakistan   Muhammad    Waleed
1        Ali Afzal     Lahore, Pakistan        Ali     Afzal
2   Muhammad Ahmad      Berlin, Germany   Muhammad     Ahmad
```

[ ]:
```
# Splitting Location column and then adding to new columns
df[['City', 'Country']] = df.Location.str.split(', ', expand=True)
df
```

[ ]:
```
              Name             Location first_name last_name       City  \
0  Muhammad Waleed  Islamabad, Pakistan   Muhammad    Waleed  Islamabad
1        Ali Afzal     Lahore, Pakistan        Ali     Afzal     Lahore
2   Muhammad Ahmad      Berlin, Germany   Muhammad     Ahmad     Berlin

    Country
0  Pakistan
1  Pakistan
2   Germany
```

[ ]:
```
# Refine Data Manipulation
df = df[['first_name', 'last_name', 'City', 'Country']]
df
```

[ ]:
```
  first_name last_name       City   Country
0   Muhammad    Waleed  Islamabad  Pakistan
1        Ali     Afzal     Lahore  Pakistan
2   Muhammad     Ahmad     Berlin   Germany
```

1.17 17- Aggregate by multiple groups/ functions

[ ]:
```
# Importing Libraries
import pandas as pd
import seaborn as sns

# Import dataset
df = sns.load_dataset('titanic')
```

```
df.head()
```

```
[ ]:    survived  pclass     sex   age  sibsp  parch     fare embarked  class  \
0         0       3    male  22.0      1      0   7.2500        S  Third
1         1       1  female  38.0      1      0  71.2833        C  First
2         1       3  female  26.0      0      0   7.9250        S  Third
3         1       1  female  35.0      1      0  53.1000        S  First
4         0       3    male  35.0      0      0   8.0500        S  Third

     who  adult_male deck  embark_town alive  alone
0    man        True  NaN  Southampton    no  False
1  woman       False    C    Cherbourg   yes  False
2  woman       False  NaN  Southampton   yes   True
3  woman       False    C  Southampton   yes  False
4    man        True  NaN  Southampton    no   True
```

```
[ ]: # Details of Specific Column (who)
df.groupby('who').count()
```

```
[ ]:        survived  pclass  sex  age  sibsp  parch  fare  embarked  class  \
who
child         83      83   83   83     83     83    83        83     83
man          537     537  537  413    537    537   537       537    537
woman        271     271  271  218    271    271   271       269    271

        adult_male  deck  embark_town  alive  alone
who
child           83    13           83     83     83
man            537    99          537    537    537
woman          271    91          269    271    271
```

```
[ ]: # Details of Specific Column (sex)
df.groupby('sex').count()
```

```
[ ]:         survived  pclass  age  sibsp  parch  fare  embarked  class  who  \
sex
female       314     314  261    314    314   314       312    314  314
male         577     577  453    577    577   577       577    577  577

         adult_male  deck  embark_town  alive  alone
sex
female          314    97          312    314    314
male            577   106          577    577    577
```

```
[ ]: # Total Elements
len(df.sex)
```

```
[ ]: 891
```

[ ]:
```
# Finding Number of categories in a column
len(df.groupby('who'))
```

[ ]: 3

[ ]:
```
# Grouping data based on multiple categories
df.groupby(['sex', 'pclass', 'who']).count()
```

[ ]:

sex	pclass	who	survived	age	sibsp	parch	fare	embarked	class
female	1	child	3	3	3	3	3	3	3
		woman	91	82	91	91	91	89	91
	2	child	10	10	10	10	10	10	10
		woman	66	64	66	66	66	66	66
	3	child	30	30	30	30	30	30	30
		woman	114	72	114	114	114	114	114
male	1	child	3	3	3	3	3	3	3
		man	119	98	119	119	119	119	119
	2	child	9	9	9	9	9	9	9
		man	99	90	99	99	99	99	99
	3	child	28	28	28	28	28	28	28
		man	319	225	319	319	319	319	319

sex	pclass	who	adult_male	deck	embark_town	alive	alone
female	1	child	3	3	3	3	3
		woman	91	78	89	91	91
	2	child	10	1	10	10	10
		woman	66	9	66	66	66
	3	child	30	2	30	30	30
		woman	114	4	114	114	114
male	1	child	3	3	3	3	3
		man	119	91	119	119	119
	2	child	9	3	9	9	9
		man	99	3	99	99	99
	3	child	28	1	28	28	28
		man	319	5	319	319	319

1.18 18- Select specific rows and columns

[ ]:
```
df.head()
```

[ ]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class
0	0	3	male	22.0	1	0	7.2500	S	Third
1	1	1	female	38.0	1	0	71.2833	C	First
2	1	3	female	26.0	0	0	7.9250	S	Third
3	1	1	female	35.0	1	0	53.1000	S	First

```
4         0       3    male  35.0      0      0   8.0500        S  Third

     who  adult_male deck  embark_town alive  alone
0    man        True  NaN  Southampton    no  False
1  woman       False    C    Cherbourg   yes  False
2  woman       False  NaN  Southampton   yes   True
3  woman       False    C  Southampton   yes  False
4    man        True  NaN  Southampton    no   True
```

[ ]:
```
# Select columns
df[['sex', 'class', 'deck']]
```

[ ]:
```
        sex   class deck
0      male   Third  NaN
1    female   First    C
2    female   Third  NaN
3    female   First    C
4      male   Third  NaN
..      …     …  …
886    male  Second  NaN
887  female   First    B
888  female   Third  NaN
889    male   First    C
890    male   Third  NaN

[891 rows x 3 columns]
```

[ ]:
```
df.describe()
```

[ ]:
```
         survived      pclass         age       sibsp       parch        fare
count  891.000000  891.000000  714.000000  891.000000  891.000000  891.000000
mean     0.383838    2.308642   29.699118    0.523008    0.381594   32.204208
std      0.486592    0.836071   14.526497    1.102743    0.806057   49.693429
min      0.000000    1.000000    0.420000    0.000000    0.000000    0.000000
25%      0.000000    2.000000   20.125000    0.000000    0.000000    7.910400
50%      0.000000    3.000000   28.000000    0.000000    0.000000   14.454200
75%      1.000000    3.000000   38.000000    1.000000    0.000000   31.000000
max      1.000000    3.000000   80.000000    8.000000    6.000000  512.329200
```

[ ]:
```
# Method 1: Selecting specific rows
df.describe().loc[['min','25%','50%','75%', 'max']]
```

[ ]:
```
     survived  pclass     age  sibsp  parch      fare
min       0.0     1.0   0.420    0.0    0.0    0.0000
25%       0.0     2.0  20.125    0.0    0.0    7.9104
50%       0.0     3.0  28.000    0.0    0.0   14.4542
75%       1.0     3.0  38.000    1.0    0.0   31.0000
```

```
max       1.0     3.0  80.000    8.0    6.0  512.3292
```

[ ]:
```
# Method 2: Selecting specific rows
df.describe().loc['min':'max']
```

[ ]:
```
     survived  pclass     age  sibsp  parch      fare
min       0.0     1.0   0.420    0.0    0.0    0.0000
25%       0.0     2.0  20.125    0.0    0.0    7.9104
50%       0.0     3.0  28.000    0.0    0.0   14.4542
75%       1.0     3.0  38.000    1.0    0.0   31.0000
max       1.0     3.0  80.000    8.0    6.0  512.3292
```

[ ]:
```
# Selecting specific rows with specific columns as well
df.describe().loc['min':'max', ['survived', 'age']]
```

[ ]:
```
     survived     age
min       0.0   0.420
25%       0.0  20.125
50%       0.0  28.000
75%       1.0  38.000
max       1.0  80.000
```

[ ]:
```
# Selecting specific rows with specific columns as well
df.describe().loc['min':'max', 'survived':'age']
```

[ ]:
```
     survived  pclass     age
min       0.0     1.0   0.420
25%       0.0     2.0  20.125
50%       0.0     3.0  28.000
75%       1.0     3.0  38.000
max       1.0     3.0  80.000
```

1.19 19- Reshape Multiindex Series

[ ]:
```
df.head()
```

[ ]:
```
   survived  pclass     sex   age  sibsp  parch     fare embarked  class  \
0         0       3    male  22.0      1      0   7.2500        S  Third
1         1       1  female  38.0      1      0  71.2833        C  First
2         1       3  female  26.0      0      0   7.9250        S  Third
3         1       1  female  35.0      1      0  53.1000        S  First
4         0       3    male  35.0      0      0   8.0500        S  Third

     who  adult_male deck  embark_town alive  alone
0    man        True  NaN  Southampton    no  False
1  woman       False    C    Cherbourg   yes  False
2  woman       False  NaN  Southampton   yes   True
```

```
3  woman       False    C  Southampton   yes  False
4    man        True  NaN  Southampton    no   True
```

[ ]:
```
# Mean of a column
df.survived.mean()
```

[ ]:
```
0.3838383838383838
```

[ ]:
```
# Mean of both categories of a column
df.groupby('sex').survived.mean()
```

[ ]:
```
sex
female    0.742038
male      0.188908
Name: survived, dtype: float64
```

[ ]:
```
df.groupby(['sex', 'class']).survived.mean()
```

[ ]:
```
sex     class
female  First     0.968085
        Second    0.921053
        Third     0.500000
male    First     0.368852
        Second    0.157407
        Third     0.135447
Name: survived, dtype: float64
```

[ ]:
```
df.groupby(['sex', 'class']).survived.mean().unstack()
```

[ ]:
```
class      First    Second     Third
sex
female  0.968085  0.921053  0.500000
male    0.368852  0.157407  0.135447
```

1.20 20- Continuous to Categorical Data Conversion

[ ]:
```
df.head()
```

[ ]:
```
   survived  pclass     sex   age  sibsp  parch     fare embarked  class  \
0         0       3    male  22.0      1      0   7.2500        S  Third
1         1       1  female  38.0      1      0  71.2833        C  First
2         1       3  female  26.0      0      0   7.9250        S  Third
3         1       1  female  35.0      1      0  53.1000        S  First
4         0       3    male  35.0      0      0   8.0500        S  Third

     who  adult_male deck  embark_town alive  alone
0    man        True  NaN  Southampton    no  False
1  woman       False    C    Cherbourg   yes  False
```

```
2  woman       False  NaN  Southampton   yes   True
3  woman       False    C  Southampton   yes  False
4    man        True  NaN  Southampton    no   True
```

[ ]:
```
df.age.head()
```

[ ]:
```
0    22.0
1    38.0
2    26.0
3    35.0
4    35.0
Name: age, dtype: float64
```

[ ]:
```
# Creating bins
df['age_groups'] = pd.cut(df.age, bins=[0,6,18,25,99], labels=['Childs',␣
 ↪'Adults', 'Y_Adults', 'Seniors'])
df.head()
```

[ ]:
```
   survived  pclass     sex   age  sibsp  parch     fare embarked  class  \
0         0       3    male  22.0      1      0   7.2500        S  Third
1         1       1  female  38.0      1      0  71.2833        C  First
2         1       3  female  26.0      0      0   7.9250        S  Third
3         1       1  female  35.0      1      0  53.1000        S  First
4         0       3    male  35.0      0      0   8.0500        S  Third

     who  adult_male deck  embark_town alive  alone age_groups
0    man        True  NaN  Southampton    no  False   Y_Adults
1  woman       False    C    Cherbourg   yes  False    Seniors
2  woman       False  NaN  Southampton   yes   True    Seniors
3  woman       False    C  Southampton   yes  False    Seniors
4    man        True  NaN  Southampton    no   True    Seniors
```

1.21 21- Converting one set of values into other

[ ]:
```
df.sex.head()
```

[ ]:
```
0      male
1    female
2    female
3    female
4      male
Name: sex, dtype: object
```

[ ]:
```
# Converting string into number and adding new column
df['sex_num'] = df.sex.map({'male':0, 'female':1})
df.head()
```

[ ]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	\
0	0	3	male	22.0	1	0	7.2500	S	Third	
1	1	1	female	38.0	1	0	71.2833	C	First	
2	1	3	female	26.0	0	0	7.9250	S	Third	
3	1	1	female	35.0	1	0	53.1000	S	First	
4	0	3	male	35.0	0	0	8.0500	S	Third	

	who	adult_male	deck	embark_town	alive	alone	age_groups	sex_num
0	man	True	NaN	Southampton	no	False	Y_Adults	0
1	woman	False	C	Cherbourg	yes	False	Seniors	1
2	woman	False	NaN	Southampton	yes	True	Seniors	1
3	woman	False	C	Southampton	yes	False	Seniors	1
4	man	True	NaN	Southampton	no	True	Seniors	0

[ ]:
```
df.embarked.unique()
```

[ ]:
```
array(['S', 'C', 'Q', nan], dtype=object)
```

[ ]:
```
# it converts first value into 0 and then carry on. i.e 'S' = 0, 'C' = 1 etc
df['embarked_num'] = df.embarked.factorize()[0]
df.head()
```

[ ]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	\
0	0	3	male	22.0	1	0	7.2500	S	Third	
1	1	1	female	38.0	1	0	71.2833	C	First	
2	1	3	female	26.0	0	0	7.9250	S	Third	
3	1	1	female	35.0	1	0	53.1000	S	First	
4	0	3	male	35.0	0	0	8.0500	S	Third	

	who	adult_male	deck	embark_town	alive	alone	age_groups	sex_num	\
0	man	True	NaN	Southampton	no	False	Y_Adults	0	
1	woman	False	C	Cherbourg	yes	False	Seniors	1	
2	woman	False	NaN	Southampton	yes	True	Seniors	1	
3	woman	False	C	Southampton	yes	False	Seniors	1	
4	man	True	NaN	Southampton	no	True	Seniors	0	

	embarked_num
0	0
1	1
2	0
3	0
4	0

1.22 22- Transpose a wide Dataframe

[ ]:
```
# Importing libraries
import pandas as pd
import numpy as np

# Creating dataframe
df = pd.DataFrame(np.random.rand(200, 26),␣
 ↪columns=list('abcdefghijklmnopqrstuvwxyz'))
df.head(10)
```

[ ]:

	a	b	c	d	e	f	g	\
0	0.201703	0.135029	0.374172	0.763812	0.852855	0.132139	0.873590	
1	0.063368	0.147200	0.032335	0.563744	0.318301	0.728718	0.233408	
2	0.216120	0.336841	0.906176	0.391956	0.047098	0.606971	0.620351	
3	0.872670	0.950020	0.990168	0.765825	0.581282	0.741381	0.969179	
4	0.055473	0.858643	0.211557	0.477728	0.736888	0.375787	0.268674	
5	0.574941	0.934380	0.379117	0.663629	0.036117	0.993644	0.436906	
6	0.849177	0.842857	0.670421	0.863216	0.129854	0.035909	0.110452	
7	0.538195	0.451312	0.528153	0.365444	0.677603	0.775636	0.240745	
8	0.797661	0.962550	0.828348	0.181993	0.084051	0.314920	0.204264	
9	0.217576	0.107959	0.884347	0.269231	0.857867	0.118196	0.669781	

	h	i	j	…	q	r	s	t	\
0	0.088316	0.821946	0.054740	…	0.873884	0.241710	0.097130	0.700090	
1	0.319267	0.822457	0.904410	…	0.433036	0.404046	0.768738	0.276054	
2	0.715519	0.791418	0.423006	…	0.468293	0.119611	0.030742	0.424739	
3	0.323027	0.338753	0.243239	…	0.568251	0.528863	0.029448	0.989548	
4	0.250678	0.670422	0.213576	…	0.940291	0.441734	0.618799	0.459429	
5	0.387152	0.369340	0.817950	…	0.600148	0.952264	0.950338	0.785418	
6	0.443088	0.678845	0.894593	…	0.098708	0.909669	0.959967	0.906249	
7	0.301079	0.357944	0.068382	…	0.998741	0.396042	0.240140	0.906310	
8	0.409976	0.973265	0.557229	…	0.925317	0.950845	0.997877	0.924727	
9	0.167293	0.682184	0.469616	…	0.149417	0.790114	0.529446	0.475183	

	u	v	w	x	y	z
0	0.748450	0.871133	0.776842	0.700265	0.243160	0.360953
1	0.393116	0.229473	0.734242	0.607934	0.915527	0.514608
2	0.901006	0.668923	0.193554	0.142442	0.990259	0.848503
3	0.454280	0.666078	0.571974	0.221417	0.629646	0.599574
4	0.171408	0.876614	0.360369	0.147470	0.398544	0.359889
5	0.975484	0.890387	0.074264	0.922902	0.055370	0.983692
6	0.180830	0.023470	0.133108	0.723512	0.357414	0.489705
7	0.319072	0.432644	0.397888	0.038290	0.444793	0.994379
8	0.788528	0.420524	0.118947	0.368350	0.693848	0.940649
9	0.618486	0.173262	0.712356	0.396047	0.193693	0.110640

[10 rows x 26 columns]

[ ]:
```
df.head(10).T
```

[ ]:

	0	1	2	3	4	5	6	\
a	0.201703	0.063368	0.216120	0.872670	0.055473	0.574941	0.849177	
b	0.135029	0.147200	0.336841	0.950020	0.858643	0.934380	0.842857	
c	0.374172	0.032335	0.906176	0.990168	0.211557	0.379117	0.670421	
d	0.763812	0.563744	0.391956	0.765825	0.477728	0.663629	0.863216	
e	0.852855	0.318301	0.047098	0.581282	0.736888	0.036117	0.129854	
f	0.132139	0.728718	0.606971	0.741381	0.375787	0.993644	0.035909	
g	0.873590	0.233408	0.620351	0.969179	0.268674	0.436906	0.110452	
h	0.088316	0.319267	0.715519	0.323027	0.250678	0.387152	0.443088	
i	0.821946	0.822457	0.791418	0.338753	0.670422	0.369340	0.678845	
j	0.054740	0.904410	0.423006	0.243239	0.213576	0.817950	0.894593	
k	0.457831	0.416622	0.466917	0.155751	0.747701	0.553847	0.405390	
l	0.683309	0.667787	0.422176	0.678708	0.365104	0.276355	0.426049	
m	0.198598	0.183195	0.713513	0.739941	0.846797	0.429083	0.228027	
n	0.760954	0.266206	0.622164	0.852725	0.463962	0.837206	0.559026	
o	0.991299	0.339849	0.861738	0.727244	0.821926	0.343404	0.046159	
p	0.998508	0.625235	0.217219	0.158164	0.660965	0.221073	0.347985	
q	0.873884	0.433036	0.468293	0.568251	0.940291	0.600148	0.098708	
r	0.241710	0.404046	0.119611	0.528863	0.441734	0.952264	0.909669	
s	0.097130	0.768738	0.030742	0.029448	0.618799	0.950338	0.959967	
t	0.700090	0.276054	0.424739	0.989548	0.459429	0.785418	0.906249	
u	0.748450	0.393116	0.901006	0.454280	0.171408	0.975484	0.180830	
v	0.871133	0.229473	0.668923	0.666078	0.876614	0.890387	0.023470	
w	0.776842	0.734242	0.193554	0.571974	0.360369	0.074264	0.133108	
x	0.700265	0.607934	0.142442	0.221417	0.147470	0.922902	0.723512	
y	0.243160	0.915527	0.990259	0.629646	0.398544	0.055370	0.357414	
z	0.360953	0.514608	0.848503	0.599574	0.359889	0.983692	0.489705	

	7	8	9
a	0.538195	0.797661	0.217576
b	0.451312	0.962550	0.107959
c	0.528153	0.828348	0.884347
d	0.365444	0.181993	0.269231
e	0.677603	0.084051	0.857867
f	0.775636	0.314920	0.118196
g	0.240745	0.204264	0.669781
h	0.301079	0.409976	0.167293
i	0.357944	0.973265	0.682184
j	0.068382	0.557229	0.469616
k	0.696137	0.854437	0.495109
l	0.926084	0.894735	0.635686
m	0.670127	0.696601	0.505538
n	0.456568	0.688040	0.007670

```
o  0.451446  0.651322  0.740275
p  0.556916  0.889165  0.368336
q  0.998741  0.925317  0.149417
r  0.396042  0.950845  0.790114
s  0.240140  0.997877  0.529446
t  0.906310  0.924727  0.475183
u  0.319072  0.788528  0.618486
v  0.432644  0.420524  0.173262
w  0.397888  0.118947  0.712356
x  0.038290  0.368350  0.396047
y  0.444793  0.693848  0.193693
z  0.994379  0.940649  0.110640
```

[ ]:
```
df.describe()
```

[ ]:
```
                a           b           c           d           e           f  \
count  200.000000  200.000000  200.000000  200.000000  200.000000  200.000000
mean     0.528171    0.518313    0.517858    0.491059    0.506671    0.496140
std      0.292466    0.288156    0.287364    0.273862    0.288931    0.296947
min      0.004028    0.001361    0.008827    0.001383    0.000049    0.001692
25%      0.280353    0.240546    0.284986    0.266538    0.266555    0.247857
50%      0.526299    0.527718    0.536833    0.500398    0.513259    0.482155
75%      0.794457    0.775000    0.797905    0.709122    0.739084    0.755492
max      0.999757    0.991683    0.990544    0.999384    0.998830    0.999227

                g           h           i           j  …           q  \
count  200.000000  200.000000  200.000000  200.000000  …  200.000000
mean     0.490907    0.492657    0.522402    0.499816  …    0.495873
std      0.290487    0.286146    0.269645    0.296031  …    0.291104
min      0.010223    0.004242    0.001739    0.002951  …    0.003682
25%      0.239234    0.258948    0.320922    0.234566  …    0.255013
50%      0.494505    0.454298    0.529469    0.501046  …    0.484183
75%      0.749146    0.740823    0.740479    0.767219  …    0.764356
max      0.989750    0.993873    0.999223    0.996669  …    0.998741

                r           s           t           u           v           w  \
count  200.000000  200.000000  200.000000  200.000000  200.000000  200.000000
mean     0.506426    0.495764    0.529437    0.491643    0.500769    0.498108
std      0.306795    0.291017    0.273449    0.302485    0.279936    0.284294
min      0.003203    0.012493    0.008083    0.004285    0.001536    0.022584
25%      0.252481    0.244629    0.284341    0.192956    0.277577    0.241249
50%      0.487270    0.488967    0.540254    0.509703    0.482356    0.470944
75%      0.785846    0.750267    0.748748    0.754138    0.740042    0.750339
max      0.999851    0.998835    0.989548    0.988521    0.997523    0.999912

                x           y           z
count  200.000000  200.000000  200.000000
```

```
mean     0.495044    0.511081    0.498729
std      0.274608    0.285375    0.293618
min      0.001009    0.000416    0.007464
25%      0.277240    0.291298    0.245526
50%      0.474709    0.514128    0.475005
75%      0.708001    0.744700    0.768704
max      0.991892    0.999747    0.994379

[8 rows x 26 columns]
```

[ ]:
```
df.describe().T
```

[ ]:

	count	mean	std	min	25%	50%	75%	max
a	200.0	0.528171	0.292466	0.004028	0.280353	0.526299	0.794457	0.999757
b	200.0	0.518313	0.288156	0.001361	0.240546	0.527718	0.775000	0.991683
c	200.0	0.517858	0.287364	0.008827	0.284986	0.536833	0.797905	0.990544
d	200.0	0.491059	0.273862	0.001383	0.266538	0.500398	0.709122	0.999384
e	200.0	0.506671	0.288931	0.000049	0.266555	0.513259	0.739084	0.998830
f	200.0	0.496140	0.296947	0.001692	0.247857	0.482155	0.755492	0.999227
g	200.0	0.490907	0.290487	0.010223	0.239234	0.494505	0.749146	0.989750
h	200.0	0.492657	0.286146	0.004242	0.258948	0.454298	0.740823	0.993873
i	200.0	0.522402	0.269645	0.001739	0.320922	0.529469	0.740479	0.999223
j	200.0	0.499816	0.296031	0.002951	0.234566	0.501046	0.767219	0.996669
k	200.0	0.494429	0.297458	0.003364	0.242555	0.480420	0.750029	0.997675
l	200.0	0.470941	0.308133	0.004829	0.208179	0.418348	0.733526	0.990787
m	200.0	0.497739	0.286060	0.005294	0.252048	0.505797	0.734134	0.990137
n	200.0	0.506163	0.294940	0.007223	0.247741	0.512308	0.753081	0.995754
o	200.0	0.537653	0.285020	0.002860	0.298508	0.563865	0.787824	0.998689
p	200.0	0.517751	0.281901	0.003040	0.284766	0.541548	0.738839	0.999237
q	200.0	0.495873	0.291104	0.003682	0.255013	0.484183	0.764356	0.998741
r	200.0	0.506426	0.306795	0.003203	0.252481	0.487270	0.785846	0.999851
s	200.0	0.495764	0.291017	0.012493	0.244629	0.488967	0.750267	0.998835
t	200.0	0.529437	0.273449	0.008083	0.284341	0.540254	0.748748	0.989548
u	200.0	0.491643	0.302485	0.004285	0.192956	0.509703	0.754138	0.988521
v	200.0	0.500769	0.279936	0.001536	0.277577	0.482356	0.740042	0.997523
w	200.0	0.498108	0.284294	0.022584	0.241249	0.470944	0.750339	0.999912
x	200.0	0.495044	0.274608	0.001009	0.277240	0.474709	0.708001	0.991892
y	200.0	0.511081	0.285375	0.000416	0.291298	0.514128	0.744700	0.999747
z	200.0	0.498729	0.293618	0.007464	0.245526	0.475005	0.768704	0.994379

1.23 23- Reshaping a DataFrame

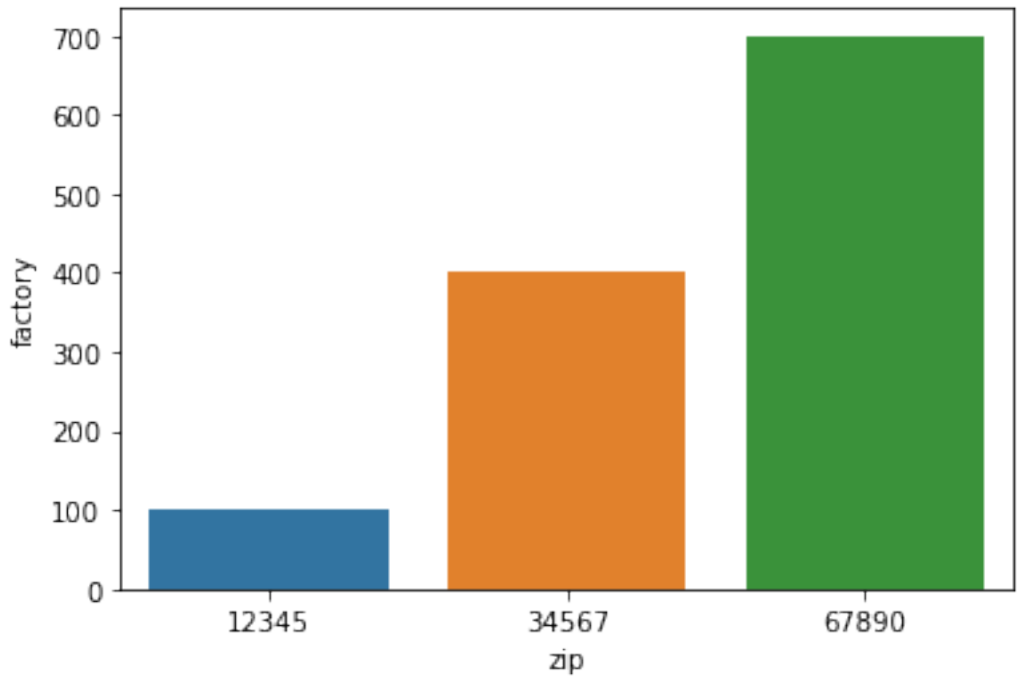
[ ]:
```
fasla = pd.DataFrame([['12345', 100, 200, 300], ['34567', 400, 500, 600],␣
↪['67890', 700, 800, 900]],
                     columns=['zip', 'factory', 'warehouse', 'retail'])
fasla.head()
```

[ ]:

	zip	factory	warehouse	retail
0	12345	100	200	300
1	34567	400	500	600
2	67890	700	800	900

[ ]:
```
sns.barplot(x='zip', y='factory', data=fasla)
```

[ ]: <AxesSubplot:xlabel='zip', ylabel='factory'>



[ ]:
```
fasla.head().T
```

[ ]:

	0	1	2
zip	12345	34567	67890
factory	100	400	700
warehouse	200	500	800
retail	300	600	900

[ ]:
```
fasla2 = pd.DataFrame([[1, '12345', 'factory'], [2, '34567', 'warehouse']],
                      columns=['user_id', 'zip', 'location_type'])
fasla2.head()
```

[ ]:

	user_id	zip	location_type
0	1	12345	factory
1	2	34567	warehouse

[ ]:
```
# melt function is useful to convert wide format into long format and for␣
↪visualization
df = fasla.melt(id_vars='zip', var_name='location_type', value_name='distance')
df
```

[ ]:

	zip	location_type	distance
0	12345	factory	100
1	34567	factory	400
2	67890	factory	700
3	12345	warehouse	200
4	34567	warehouse	500
5	67890	warehouse	800
6	12345	retail	300
7	34567	retail	600
8	67890	retail	900

[ ]:
```
import seaborn as sns
sns.barplot(x='zip', y='distance', hue='location_type' ,data=df)
```

[ ]: <AxesSubplot:xlabel='zip', ylabel='distance'>