Pandas Tutorial By Krish Naik

Pandas is an open source, BSD-licensed library providing high-performance, easy-to-use data structures and data analysis tools for the Python programming language. Agenda What is Data Frames? What is Data Series? Different operation in Pandas

In [1]:

```python
## First step is to import pandas

import pandas as pd
import numpy as np
```

CREATING DATAFRAMES

In [2]:

```python
## Playing with Dataframe:- DataFrame functions contain (rows,column) and data inside it.

df=pd.DataFrame(np.arange(0,20).reshape(5,4),index=['Row1','Row2','Row3','Row4','Row5'],
                columns=["Column1","Column2","Column3","Coumn4"])
```

In [3]:

```python
df.head()
```

Out[3]:

	Column1	Column2	Column3	Coumn4
Row1	0	1	2	3
Row2	4	5	6	7
Row3	8	9	10	11
Row4	12	13	14	15
Row5	16	17	18	19

In [4]:

```python
df.to_csv('krish_pandas_test.csv') # exporting data into csv
```

In [5]:

```python
## df.to_csv('krish_pandas_test.csv', sep =';')  # jb file m data semicolumn se seperate
kiya gya ho
```

LOC AND ILOC

In [6]:

```python
# Accessing the elements:-
# For this we have 2 ways:- 1) .loc :- here we focus on row index
#                           2) .iloc :- here we focus on both row and colum n index

df.loc['Row1']
```

Out[6]:

```
Column1    0
Column2    1
Column3    2
Coumn4     3
```

```
Name: Row1, dtype: int32
```

```python
type(df.loc['Row1'])   # Series can either be one row or 1 column,
                       # data frames are the combination of more than one rows and column
```

```
pandas.core.series.Series
```

```python
df.iloc[:,:]
```

	Column1	Column2	Column3	Coumn4
Row1	0	1	2	3
Row2	4	5	6	7
Row3	8	9	10	11
Row4	12	13	14	15
Row5	16	17	18	19

```python
df.iloc[0:2,0:3]
```

	Column1	Column2	Column3
Row1	0	1	2
Row2	4	5	6

```python
type(df.iloc[0:2,0:3])
```

```
pandas.core.frame.DataFrame
```

```python
df.iloc[0:2,0:1]
```

	Column1
Row1	0
Row2	4

```python
type(df.iloc[0:2,0:1])
```

```
pandas.core.frame.DataFrame
```

```python
type(df.iloc[0:2,2])
```

```
pandas.core.series.Series
```

```
df['Column1']
```

```
Row1     0
Row2     4
Row3     8
Row4    12
Row5    16
Name: Column1, dtype: int32
```

```
df[['Column1','Coumn4']]
```

	Column1	Coumn4
Row1	0	3
Row2	4	7
Row3	8	11
Row4	12	15
Row5	16	19

CONVERTING DATAFRAMES INTO ARRAYS

```
#convert Dataframes into array
df.iloc[:,1:].values          # IT IGONORES COLUMN NAMES AND ROWS NAMES
```

```
array([[ 1,  2,  3],
       [ 5,  6,  7],
       [ 9, 10, 11],
       [13, 14, 15],
       [17, 18, 19]])
```

```
df.iloc[:,1:].values.shape
```

```
(5, 3)
```

SOME INBUILT FUNCTIONS

```
df.isnull().sum()    #column1,column2,column3 and column4 has zero(0) null values
```

```
Column1    0
Column2    0
Column3    0
Coumn4     0
dtype: int64
```

In [19]:

```
df
```

Out[19]:

	Column1	Column2	Column3	Coumn4
Row1	0	1	2	3
Row2	4	5	6	7
Row3	8	9	10	11
Row4	12	13	14	15
Row5	16	17	18	19

In [20]:

```
df['Column1'].value_counts()   # zero is present 1 time
                               # 8 is present 1 time
                               # 4,16,12 is present 1 time
```

Out[20]:

```
0     1
8     1
4     1
16    1
12    1
Name: Column1, dtype: int64
```

In [21]:

```
df['Column1'].unique()    # jo values many times rahegi Dataframes mai woh nhi print hogi
```

Out[21]:

```
array([ 0,  4,  8, 12, 16])
```

In [22]:

```
df=pd.read_csv('mercedesbenz.csv')
```

In [23]:

```
df.head(5)
```

Out[23]:

	ID	y	X0	X1	X2	X3	X4	X5	X6	X8	...	X375	X376	X377	X378	X379	X380	X382	X383	X384	X385
0	0	130.81	k	v	at	a	d	u	j	o	...	0	0	1	0	0	0	0	0	0	0
1	6	88.53	k	t	av	e	d	y	l	o	...	1	0	0	0	0	0	0	0	0	0
2	7	76.26	az	w	n	c	d	x	j	x	...	0	0	0	0	0	0	1	0	0	0
3	9	80.62	az	t	n	f	d	x	l	e	...	0	0	0	0	0	0	0	0	0	0
4	13	78.02	az	v	n	f	d	h	d	n	...	0	0	0	0	0	0	0	0	0	0

5 rows × 378 columns

In [24]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4209 entries, 0 to 4208
Columns: 378 entries, ID to X385
dtypes: float64(1), int64(369), object(8)
memory usage: 12.1+ MB
```

```
In [25]:
df.describe()      #only the floatng and int datatypes are taken into consideration. not t
he objects
```

Out[25]:

	ID	y	X10	X11	X12	X13	X14	X15	X16	
count	4209.000000	4209.000000	4209.000000	4209.0	4209.000000	4209.000000	4209.000000	4209.000000	4209.000000	4209
mean	4205.960798	100.669318	0.013305	0.0	0.075077	0.057971	0.428130	0.000475	0.002613	0
std	2437.608688	12.679381	0.114590	0.0	0.263547	0.233716	0.494867	0.021796	0.051061	0
min	0.000000	72.110000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0
25%	2095.000000	90.820000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0
50%	4220.000000	99.150000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0
75%	6314.000000	109.010000	0.000000	0.0	0.000000	0.000000	1.000000	0.000000	0.000000	0
max	8417.000000	265.320000	1.000000	0.0	1.000000	1.000000	1.000000	1.000000	1.000000	1

8 rows × 370 columns

```
In [26]:
# GET THE UNIQUE CATEGORIES COUNTS
df['X0'].value_counts()
```

Out[26]:

```
z     360
ak    349
y     324
ay    313
t     306
x     300
o     269
f     227
n     195
w     182
j     181
az    175
aj    151
s     106
ap    103
h      75
d      73
al     67
v      36
af     35
ai     34
m      34
e      32
ba     27
at     25
a      21
ax     19
am     18
i      18
aq     18
u      17
l      16
aw     16
ad     14
b      11
k      11
au     11
r      10
as     10
```

```
bc        6
ao        4
c         3
aa        2
q         2
ab        1
ac        1
g         1
Name: X0, dtype: int64
```

In [27]:

```python
df[df['y']>100]   # ONLY SHOW DATA BIGGER THAN y>100
```

Out[27]:

	ID	y	X0	X1	X2	X3	X4	X5	X6	X8	...	X375	X376	X377	X378	X379	X380	X382	X383	X384	X385
0	0	130.81	k	v	at	a	d	u	j	o	...	0	0	1	0	0	0	0	0	0	0
6	24	128.76	al	r	e	f	d	f	h	s	...	0	0	0	0	0	0	0	0	0	0
8	27	108.67	w	s	as	e	d	f	i	h	...	1	0	0	0	0	0	0	0	0	0
9	30	126.99	j	b	aq	c	d	f	a	e	...	0	0	1	0	0	0	0	0	0	0
10	31	102.09	h	r	r	f	d	f	h	p	...	0	0	0	0	0	0	0	0	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4202	8402	123.34	ap	l	s	c	d	aa	d	r	...	0	0	0	0	0	0	0	0	0	0
4204	8405	107.39	ak	s	as	c	d	aa	d	q	...	1	0	0	0	0	0	0	0	0	0
4205	8406	108.77	j	o	t	d	d	aa	h	h	...	0	1	0	0	0	0	0	0	0	0
4206	8412	109.22	ak	v	r	a	d	aa	g	e	...	0	0	1	0	0	0	0	0	0	0
4208	8417	110.85	z	r	ae	c	d	aa	g	w	...	1	0	0	0	0	0	0	0	0	0

2004 rows × 378 columns

CSV

In [28]:

```python
from io import StringIO, BytesIO
```

In [29]:

```python
data = ('col1','col2','col3\n'
        'x','y','1\n'
        'a','b','2\n'
        'c','d','3')
```

In [30]:

```python
type(data)
```

Out[30]:

```
tuple
```

In [31]:

```python
data = ('col1,col2,col3\n'
        'x,y,1\n'
        'a,b,2\n'
        'c,d,3')        #  this is like a csv file.
```

In [32]:

```python
type(data)
```

```
Out[32]:

str
```

```
In [33]:

StringIO()
```

```
Out[33]:

<_io.StringIO at 0x1026e558>
```

```
In [34]:

pd.read_csv(StringIO(data))    # StringIO(data), yaha pr StringIO data ko csv mai badal rh
a hai
```

Out[34]:

	col1	col2	col3
0	x	y	1
1	a	b	2
2	c	d	3

```
In [35]:

## Read from specific columns

df = pd.read_csv(StringIO(data),usecols=['col1','col3'])
```

```
In [36]:

df
```

Out[36]:

	col1	col3
0	x	1
1	a	2
2	c	3

```
In [37]:

df.to_csv('Testing_StringIO.csv')
```

```
In [38]:

## Specifying columns data types

data = ('a,b,c,d\n'
         '1,2,3,4\n'
         '5,6,7,8\n'
         '9,10,11,12')
```

```
In [39]:

print(data)

a,b,c,d
1,2,3,4
5,6,7,8
9,10,11,12
```

```
In [40]:

df=pd.read_csv(StringIO(data),dtype=object)   # make my data type as object and object mea
```

```
ns string here
```

Toh Basically Stringio ne sidhe csv file bana kr save kr diya in-memory of code.

In [41]:

```
df    # agar dtype string hai aur agar koi column ya row khali hai toh error nhi aayega,
      ## agar dtype int hai aur agar koi column ya row khali hai toh error aayega
```

Out[41]:

	a	b	c	d
0	1	2	3	4
1	5	6	7	8
2	9	10	11	12

In [42]:

```
df['a']
```

Out[42]:

```
0    1
1    5
2    9
Name: a, dtype: object
```

In [43]:

```
df=pd.read_csv(StringIO(data),dtype=int)
```

In [44]:

```
df
```

Out[44]:

	a	b	c	d
0	1	2	3	4
1	5	6	7	8
2	9	10	11	12

In [45]:

```
df['a'][0]
```

Out[45]:

```
1
```

In [46]:

```
df['a']
```

Out[46]:

```
0    1
1    5
2    9
Name: a, dtype: int32
```

different columns and different data types

agar sab coumns ke dtypes aLAG alag rakhna ho toh hume dict dena pardti hai.

In [47]:

```python
df=pd.read_csv(StringIO(data),dtype={'b':int,'c':float,'a':'Int64'})    # we provide a di
ctionary...

# df=pd.read_csv(StringIO(data),dtype={'b':int,'c':np.float,'a':'Int64'})
```

In [48]:

```python
df
```

Out[48]:

	a	b	c	d
0	1	2	3.0	4
1	5	6	7.0	8
2	9	10	11.0	12

In [49]:

```python
df['a'][0]
```

Out[49]:

```
1
```

In [50]:

```python
type(df['c'][0])
```

Out[50]:

```
numpy.float64
```

In [51]:

```python
df['a']
```

Out[51]:

```
0    1
1    5
2    9
Name: a, dtype: Int64
```

In [52]:

```python
# checking data types
df.dtypes
```

Out[52]:

```
a      Int64
b      int32
c    float64
d      int64
dtype: object
```

In [53]:

```python
data = ('index,a,b,c\n'
        '4,apple,bat,5.7\n'
        '8,orange,cow,10')
```

In [54]:

```python
pd.read_csv(StringIO(data))
```

Out[54]:

index	a	b	c
0	4	apple	bat	5.7
1	8	orange	cow	10.0

```python
pd.read_csv(StringIO(data),index_col=0)  # make the 0th column as index
```

Out[55]:

index	a	b	c
4	apple	bat	5.7
8	orange	cow	10.0

In [56]:

```python
pd.read_csv(StringIO(data),index_col=1)  # make the 1st column as index
```

Out[56]:

a	index	b	c
apple	4	bat	5.7
orange	8	cow	10.0

In [57]:

```python
data = ('a,b,c\n'
        '4,apple,bat,\n'
        '8,orange,cow')
```

In [58]:

```python
pd.read_csv(StringIO(data)) # prblm ho gyi :-( 4,8 ko index le rha hai jabki hmko a,b ke
niche chahiye
```

Out[58]:

	a	b	c
4	apple	bat	NaN
8	orange	cow	NaN

In [59]:

```python
pd.read_csv(StringIO(data),index_col=False) #problem solved :-)
```

Out[59]:

	a	b	c
0	4	apple	bat
1	8	orange	cow

In [60]:

```python
# combining usecol and index_col=

pd.read_csv(StringIO(data), usecols=['b','c'], index_col=False)
```

Out[60]:

	b	c
0	apple	bat
1	orange	cow

In [61]:

```
## Quoting and Escape Characters¶. Very useful in NLP
data = 'a,b\n"hello, \\"Bob\\", nice to see you",5'
```

In [62]:

```
pd.read_csv(StringIO(data),escapechar='\\')
```

Out[62]:

	a	b
0	hello, "Bob", nice to see you	5

In [63]:

```
## URL to CSV
df=pd.read_csv('https://download.bls.gov/pub/time.series/cu/cu.item',
               sep='\t')
```

In [64]:

```
df.head()
```

Out[64]:

	item_code	item_name	display_level	selectable	sort_sequence
0	AA0	All items - old base	0	T	2
1	AA0R	Purchasing power of the consumer dollar - old ...	0	T	399
2	SA0	All items	0	T	1
3	SA0E	Energy	1	T	374
4	SA0L1	All items less food	1	T	358

In [65]:

```
df=pd.read_csv('tab sepration data.csv',sep='\t')
```

In [66]:

```
df
```

Out[66]:

	item_code	item_name	display_level	selectable	sort_sequence
0	AA0	All items - old base	0	T	2
1	AA0R	Purchasing power of the consumer dollar - old ...	0	T	399
2	SA0	All items	0	T	1
3	SA0E	Energy	1	T	374

Reading Json File

Reading Json File

```python
Data = '{"employee_name": "James", "email": "james@gmail.com", "job_profile": [{"title1":
"Team Lead", "title2":"Sr. Developer"}]}'
pd.read_json(Data)
```

Out[67]:

	employee_name	email	job_profile
0	James	james@gmail.com	{'title1': 'Team Lead', 'title2': 'Sr. Develop...

In [68]:

```python
df = pd.read_csv('https://archive.ics.uci.edu/ml/machine-learning-databases/wine/wine.data', header=None)
```

In [69]:

```python
df
```

Out[69]:

	0	1	2	3	4	5	6	7	8	9	10	11	12	13
0	1	14.23	1.71	2.43	15.6	127	2.80	3.06	0.28	2.29	5.64	1.04	3.92	1065
1	1	13.20	1.78	2.14	11.2	100	2.65	2.76	0.26	1.28	4.38	1.05	3.40	1050
2	1	13.16	2.36	2.67	18.6	101	2.80	3.24	0.30	2.81	5.68	1.03	3.17	1185
3	1	14.37	1.95	2.50	16.8	113	3.85	3.49	0.24	2.18	7.80	0.86	3.45	1480
4	1	13.24	2.59	2.87	21.0	118	2.80	2.69	0.39	1.82	4.32	1.04	2.93	735
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
173	3	13.71	5.65	2.45	20.5	95	1.68	0.61	0.52	1.06	7.70	0.64	1.74	740
174	3	13.40	3.91	2.48	23.0	102	1.80	0.75	0.43	1.41	7.30	0.70	1.56	750
175	3	13.27	4.28	2.26	20.0	120	1.59	0.69	0.43	1.35	10.20	0.59	1.56	835
176	3	13.17	2.59	2.37	20.0	120	1.65	0.68	0.53	1.46	9.30	0.60	1.62	840
177	3	14.13	4.10	2.74	24.5	96	2.05	0.76	0.56	1.35	9.20	0.61	1.60	560

178 rows × 14 columns

In [70]:

```python
df = pd.read_csv('wine.data',header = None)
```

In [71]:

```python
df
```

Out[71]:

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	NaN	0	1.00	2.00	3.00	4.0	5	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13
1	0.0	1	14.23	1.71	2.43	15.6	127	2.80	3.06	0.28	2.29	5.64	1.04	3.92	1065
2	1.0	1	13.20	1.78	2.14	11.2	100	2.65	2.76	0.26	1.28	4.38	1.05	3.40	1050
3	2.0	1	13.16	2.36	2.67	18.6	101	2.80	3.24	0.30	2.81	5.68	1.03	3.17	1185
4	3.0	1	14.37	1.95	2.50	16.8	113	3.85	3.49	0.24	2.18	7.80	0.86	3.45	1480
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
174	173.0	3	13.71	5.65	2.45	20.5	95	1.68	0.61	0.52	1.06	7.70	0.64	1.74	740

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
175	174.0	3	13.40	3.91	2.48	23.0	102	1.80	0.75	0.43	1.41	7.30	0.70	1.56	750
176	175.0	3	13.27	4.28	2.26	20.0	120	1.59	0.69	0.43	1.35	10.20	0.59	1.56	835
177	176.0	3	13.17	2.59	2.37	20.0	120	1.65	0.68	0.53	1.46	9.30	0.60	1.62	840
178	177.0	3	14.13	4.10	2.74	24.5	96	2.05	0.76	0.56	1.35	9.20	0.61	1.60	560

179 rows × 15 columns

In [72]:

```python
df.head()
```

Out[72]:

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	NaN	0	1.00	2.00	3.00	4.0	5	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13
1	0.0	1	14.23	1.71	2.43	15.6	127	2.80	3.06	0.28	2.29	5.64	1.04	3.92	1065
2	1.0	1	13.20	1.78	2.14	11.2	100	2.65	2.76	0.26	1.28	4.38	1.05	3.40	1050
3	2.0	1	13.16	2.36	2.67	18.6	101	2.80	3.24	0.30	2.81	5.68	1.03	3.17	1185
4	3.0	1	14.37	1.95	2.50	16.8	113	3.85	3.49	0.24	2.18	7.80	0.86	3.45	1480

In [73]:

```python
# Converting json into a csv file

df.to_csv('wine.csv')
```

In [74]:

```python
# convert Json to different json formats

Data = '{"employee_name": "James", "email": "james@gmail.com", "job_profile": [{"title1":
"Team Lead", "title2":"Sr. Developer"}]}'
```

In [75]:

```python
pd.read_json(Data)
```

Out[75]:

	employee_name	email	job_profile
0	James	james@gmail.com	{'title1': 'Team Lead', 'title2': 'Sr. Develop...

In [76]:

```python
df1 = pd.read_json(Data)
```

In [77]:

```python
df1.to_json()
```

Out[77]:

```
'{"employee_name":{"0":"James"},"email":{"0":"james@gmail.com"},"job_profile":{"0":{"title1":"Team Lead","title2":"Sr. Developer"}}}'
```

In [78]:

```python
df1.to_json(orient="records")    # changed the dict into records dict.
```

Out[78]:

```
'[{"employee_name":"James","email":"james@gmail.com","job_profile":{"title1":"Team Lead","title2":"Sr. Developer"}}]'
```

```python
a = df1.to_json(orient="records")
```

```python
# convert string of list to string

import json

res = json.loads(a)
```

```python
res
```

Out[81]:

```
[{'employee_name': 'James',
  'email': 'james@gmail.com',
  'job_profile': {'title1': 'Team Lead', 'title2': 'Sr. Developer'}}]
```

```python
# exctracting dict from list of dict.

d = dict()
for i in res:
    temp_dict = i
    print(temp_dict)
```

```
{'employee_name': 'James', 'email': 'james@gmail.com', 'job_profile': {'title1': 'Team Le
ad', 'title2': 'Sr. Developer'}}
```

```python
d.update(temp_dict)
print(d)
```

```
{'employee_name': 'James', 'email': 'james@gmail.com', 'job_profile': {'title1': 'Team Le
ad', 'title2': 'Sr. Developer'}}
```

```python
df
```

Out[84]:

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	NaN	0	1.00	2.00	3.00	4.0	5	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13
1	0.0	1	14.23	1.71	2.43	15.6	127	2.80	3.06	0.28	2.29	5.64	1.04	3.92	1065
2	1.0	1	13.20	1.78	2.14	11.2	100	2.65	2.76	0.26	1.28	4.38	1.05	3.40	1050
3	2.0	1	13.16	2.36	2.67	18.6	101	2.80	3.24	0.30	2.81	5.68	1.03	3.17	1185
4	3.0	1	14.37	1.95	2.50	16.8	113	3.85	3.49	0.24	2.18	7.80	0.86	3.45	1480
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
174	173.0	3	13.71	5.65	2.45	20.5	95	1.68	0.61	0.52	1.06	7.70	0.64	1.74	740
175	174.0	3	13.40	3.91	2.48	23.0	102	1.80	0.75	0.43	1.41	7.30	0.70	1.56	750
176	175.0	3	13.27	4.28	2.26	20.0	120	1.59	0.69	0.43	1.35	10.20	0.59	1.56	835
177	176.0	3	13.17	2.59	2.37	20.0	120	1.65	0.68	0.53	1.46	9.30	0.60	1.62	840
178	177.0	3	14.13	4.10	2.74	24.5	96	2.05	0.76	0.56	1.35	9.20	0.61	1.60	560

179 rows × 15 columns

```python
df.to_json(orient="records") # orient nhi dege toh eh column & index k names
                             # ko bhi dataset m include kr lenga
```

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In [89]:

```
df1.to_json(orient="values")
```

Out[89]:

'[["James","james@gmail.com",{"title1":"Team Lead","title2":"Sr. Developer"}]]'

In [90]:

```
df1.to_json(orient="index")
```

Out[90]:

'{"0":{"employee_name":"James","email":"james@gmail.com","job_profile":{"title1":"Team Le
ad","title2":"Sr. Developer"}}}'

In [91]:

```
df1.to_json(orient="table")
```

Out[91]:

'{"schema":{"fields":[{"name":"index","type":"integer"},{"name":"employee_name","type":"s
tring"},{"name":"email","type":"string"},{"name":"job_profile","type":"string"}],"primary
Key":["index"],"pandas_version":"0.20.0"},"data":[{"index":0,"employee_name":"James","ema
il":"james@gmail.com","job_profile":{"title1":"Team Lead","title2":"Sr. Developer"}}]}'

In [92]:

```
df1.to_json(orient="columns")
```

Out[92]:

'{"employee_name":{"0":"James"},"email":{"0":"james@gmail.com"},"job_profile":{"0":{"titl
e1":"Team Lead","title2":"Sr. Developer"}}}'

Reading Tables Data From html page

pip install html5libpip install BeautifulSoup4

In [93]:

```
url = 'https://www.fdic.gov/resources/resolutions/bank-failures/failed-bank-list/'

dfs = pd.read_html(url)     #it gives us the list of tables from the webpages
```

In [94]:

```
dfs[0]
```

Out[94]:

	Bank NameBank	CityCity	StateSt	CertCert	Acquiring InstitutionAI	Closing DateClosing	FundFund
0	Almena State Bank	Almena	KS	15426	Equity Bank	October 23, 2020	10538
1	First City Bank of Florida	Fort Walton Beach	FL	16748	United Fidelity Bank, fsb	October 16, 2020	10537
2	The First State Bank	Barboursville	WV	14361	MVB Bank, Inc.	April 3, 2020	10536
3	Ericson State Bank	Ericson	NE	18265	Farmers and Merchants Bank	February 14, 2020	10535
4	City National Bank of New Jersey	Newark	NJ	21111	Industrial Bank	November 1, 2019	10534
...	...	...	...	...	...	...	...
558	Superior Bank, FSB	Hinsdale	IL	32646	Superior Federal, FSB	July 27, 2001	6004
559	Malta National Bank	Malta	OH	6629	North Valley Bank	May 3, 2001	4648
560	First Alliance Bank & Trust Co.	Manchester	NH	34264	Southern New Hampshire Bank & Trust	February 2, 2001	4647
561	National State Bank of Metropolis	Metropolis	IL	3815	Banterra Bank of Marion	December 14, 2000	4646
562	Bank of Honolulu	Honolulu	HI	21029	Bank of the Orient	October 13, 2000	4645

563 rows × 7 columns

In [95]:

```
type(dfs)
```

Out[95]:

```
list
```

In [96]:

```
url_mcc = 'https://en.wikipedia.org/wiki/Mobile_country_code'
dfs = pd.read_html(url_mcc, match='Country',header=0)

# match="country" is matching(country) in column & when it matches it prints all tables related to country
# header=0 , it ,makes first row index as zero
```

In [97]:

```
dfs[0]  #first Table
```

Out[97]:

	Mobile country code	Country	ISO 3166	Mobile network codes	National MNC authority	Remarks

	Mobile country code	Country	ISO 3166	Mobile network codes	National MNO authority	Remarks
0	289	A Abkhazia	GE-AB	List of mobile network codes in Abkhazia	NaN	MCC is not listed by ITU
1	412	Afghanistan	AF	List of mobile network codes in Afghanistan	NaN	NaN
2	276	Albania	AL	List of mobile network codes in Albania	NaN	NaN
3	603	Algeria	DZ	List of mobile network codes in Algeria	NaN	NaN
4	544	American Samoa (United States of America)	AS	List of mobile network codes in American Samoa	NaN	NaN
...	...	...	...	...	...	...
247	452	Vietnam	VN	List of mobile network codes in the Vietnam	NaN	NaN
248	543	W Wallis and Futuna	WF	List of mobile network codes in Wallis and Futuna	NaN	NaN
249	421	Y Yemen	YE	List of mobile network codes in the Yemen	NaN	NaN
250	645	Z Zambia	ZM	List of mobile network codes in Zambia	NaN	NaN
251	648	Zimbabwe	ZW	List of mobile network codes in Zimbabwe	NaN	NaN

252 rows × 6 columns

In [98]:

```
url_mcc = 'https://en.wikipedia.org/wiki/Mobile_country_code'
dfs = pd.read_html(url_mcc, match='Operator',header=0)
```

In [99]:

```
dfs[0] #dfs[0] k jagh agr srf dfs print kr diya toh table nhi milega balki sab idher udher ho jaaayega
     # actually yeh match function se hum tables ko match kar rhe hai, jisme operator word ho.
```

Out[99]:

	MCC	MNC	Brand	Operator	Status	Bands (MHz)	References and notes
0	1	1	TEST	Test network	Operational	any	NaN
1	1	1	TEST	Test network	Operational	any	NaN
2	999	99	NaN	Internal use	Operational	any	Internal use in private networks, no roaming[4]
3	999	999	NaN	Internal use	Operational	any	Internal use in private networks, no roaming[4]

In [106]:

```
dfs
```

Out[106]:

```
[   MCC  MNC Brand       Operator      Status Bands (MHz)  \
 0    1    1  TEST  Test network  Operational         any
 1    1    1  TEST  Test network  Operational         any
 2  999   99   NaN  Internal use  Operational         any
 3  999  999   NaN  Internal use  Operational         any

                          References and notes
 0                                         NaN
 1                                         NaN
 2  Internal use in private networks, no roaming[4]
 3  Internal use in private networks, no roaming[4]  ,
    MCC  MNC    Brand                         Operator  \
 0  901    1      ICO         ICO Satellite Management
 1  901    2      NaN                       Unassigned
```

```
 1    901   2         NaN                                      Unassigned
 2    901   3     Iridium                                             NaN
 3    901   4         NaN                                      Unassigned
 4    901   5         NaN                              Thuraya RMSS Network
..    ...  ...        ...                                            ...
81    901  88         NaN  UN Office for the Coordination of Humanitarian...
82    902   1         NaN                               MulteFire Alliance
83    991   1         NaN                            World's Global Telecom
84    991   2    5G Croco                                    Orange S.A.
85    991   3         NaN                                      Halys SAS

              Status      Bands (MHz)  \
0    Not operational      Satellite
1    Returned spare         Unknown
2        Operational      Satellite
3    Returned spare       Satellite
4        Operational      Satellite
..              ...            ...
81          Unknown        Unknown
82      Operational            LTE
83  Not operational        Unknown
84          Unknown             5G
85          Unknown        Unknown

                               References and notes
0                               MNC withdrawn[48]
1       Formerly: Sense Communications International
2                                             NaN
3                             Formerly: Globalstar
4                                             NaN
..                                            ...
81                                           [95]
82                                        [4][96]
83   temporarily assigned until 15 January 2021[85]...
84       temporarily assigned until 6 August 2021[98]
85   temporary assignment for trial until 5.IV.2022...

[86 rows x 7 columns],
   MCC  MNC    Brand                    Operator      Status  Bands (MHz)  \
0  995    1  FonePlus  Sure (Diego Garcia) Ltd  Operational    GSM 900

                               References and notes
0  There appears to be no officially assigned MCC...  ]
```

Read Excel Files

In [100]:

```
df_excel=pd.read_excel('Excel_Sample.xlsx')   # isme hum comma lga kr sheet_name=1,2,3,...
de skte h
```

In [101]:

```
df_excel.head()
```

Out[101]:

	Unnamed: 0	a	b	c	d
0	0	0	1	2	3
1	1	4	5	6	7
2	2	8	9	10	11
3	3	12	13	14	15

Pickling

All pandas objects are equipped with to_pickle methods which use Python's cPickle module to save data structures to disk using the pickle format.

In [102]:

```
## Machine Learning mai hum sab data ko pickle file mai save karte hai
```

In [103]:

```
df_excel.to_pickle('df_pickle')
```

In [104]:

```
df=pd.read_pickle('df_pickle')
```

In [105]:

```
df.head()
```

Out[105]:

	Unnamed: 0	a	b	c	d
0	0	0	1	2	3
1	1	4	5	6	7
2	2	8	9	10	11
3	3	12	13	14	15