In [3]:
```
import pandas as pd
import numpy as np
```

Series

In [5]:
```
obj = pd.Series([1,2,3,4,5])
obj
```

Out[5]:
```
0    1
1    2
2    3
3    4
4    5
dtype: int64
```

In [6]:
```
obj.values
```

Out[6]:
```
array([1, 2, 3, 4, 5], dtype=int64)
```

In [7]:
```
obj.index
```

Out[7]:
```
RangeIndex(start=0, stop=5, step=1)
```

In [8]:
```
obj2 = pd.Series([4,5,6,7],index = ['a','b','c','d'])
obj2
```

Out[8]:
```
a    4
b    5
c    6
d    7
dtype: int64
```

In [9]:
```
obj2.index
```

Out[9]:
```
Index(['a', 'b', 'c', 'd'], dtype='object')
```

In [10]:
```
obj2['a']
```

Out[10]:
```
4
```

In [12]:
```
obj2['d']=9
```

In [13]:
```
obj2
```

Out[13]:
```
a    4
b    5
c    6
d    9
dtype: int64
```

In [14]:
```
obj2[obj2 > 5]
```

Out[14]:
```
c    6
d    9
dtype: int64
```

In [15]:
```
obj2 * 2
```

Out[15]:
```
a     8
b    10
c    12
d    18
dtype: int64
```

In [17]:
```
np.exp(obj2)
```

Out[17]:
```
a      54.598150
b     148.413159
c     403.428793
d    8103.083928
dtype: float64
```

In [18]:
```
'c' in obj2
```

Out[18]: True

In [19]:
```
'a' in obj2
```

Out[19]: True

DataFrame

In [45]:
```
data = {'state': ['Ohio', 'Ohio', 'Ohio', 'Nevada', 'Nevada', 'Nevada'],
     'year': [2000, 2001, 2002, 2001, 2002, 2003],
     'pop': [1.5, 1.7, 3.6, 2.4, 2.9, 3.2]}
```

In [46]:
```
frame = pd.DataFrame(data , columns=["year" , "state" , "pop"])
```

In [47]:
```
frame
```

Out[47]:

	year	state	pop
0	2000	Ohio	1.5
1	2001	Ohio	1.7
2	2002	Ohio	3.6
3	2001	Nevada	2.4
4	2002	Nevada	2.9
5	2003	Nevada	3.2

In [18]:
```
frame.head()
```

Out[18]:

	year	state	pop
0	2000	Ohio	1.5
1	2001	Ohio	1.7
2	2002	Ohio	3.6
3	2001	Nevada	2.4
4	2002	Nevada	2.9

In [48]:
```
frame2 = pd.DataFrame(data , columns=["year" , "state" , "pop" , "debt"] , index = ["one","two","three","four","five","six
```

In [49]:
```
frame2
```

Out[49]:

	year	state	pop	debt
one	2000	Ohio	1.5	NaN
two	2001	Ohio	1.7	NaN
three	2002	Ohio	3.6	NaN
four	2001	Nevada	2.4	NaN
five	2002	Nevada	2.9	NaN
six	2003	Nevada	3.2	NaN

In [50]:
```
frame2.columns
```

Out[50]: Index(['year', 'state', 'pop', 'debt'], dtype='object')

In [51]:
```
frame2["state"]
```

Out[51]:
```
one        Ohio
two        Ohio
three      Ohio
four     Nevada
five     Nevada
six      Nevada
Name: state, dtype: object
```

In [52]:
```
frame2.year
```

Out[52]:
```
one      2000
two      2001
three    2002
four     2001
five     2002
six      2003
Name: year, dtype: int64
```

In [53]:
```
frame2.loc[:,"year":"pop"]
```

Out[53]:

	year	state	pop
one	2000	Ohio	1.5
two	2001	Ohio	1.7
three	2002	Ohio	3.6
four	2001	Nevada	2.4
five	2002	Nevada	2.9
six	2003	Nevada	3.2

In [54]:
```
frame2['debt'] = 16
```

In [55]:
```
frame2
```

Out[55]:

	year	state	pop	debt
one	2000	Ohio	1.5	16
two	2001	Ohio	1.7	16
three	2002	Ohio	3.6	16
four	2001	Nevada	2.4	16
five	2002	Nevada	2.9	16
six	2003	Nevada	3.2	16

In [56]:
```
frame2['debt'] = np.arange(6.0)
```

In [57]:
```
frame2
```

Out[57]:

	year	state	pop	debt
one	2000	Ohio	1.5	0.0
two	2001	Ohio	1.7	1.0
three	2002	Ohio	3.6	2.0
four	2001	Nevada	2.4	3.0
five	2002	Nevada	2.9	4.0
six	2003	Nevada	3.2	5.0

In [58]:
```
val = pd.Series([-1.2,3,5.3],index = ['two','three','five'])
val
```

Out[58]:
```
two     -1.2
three    3.0
five     5.3
dtype: float64
```

In [59]:
```
frame2['debt'] = val
```

In [60]:
```
frame2
```

Out[60]:

	year	state	pop	debt
one	2000	Ohio	1.5	NaN
two	2001	Ohio	1.7	-1.2
three	2002	Ohio	3.6	3.0
four	2001	Nevada	2.4	NaN
five	2002	Nevada	2.9	5.3
six	2003	Nevada	3.2	NaN

In [61]:
```
frame2['eastern'] = frame2['state'] == 'Ohio'
```

In [62]:
```
frame2
```

Out[62]:

	year	state	pop	debt	eastern
one	2000	Ohio	1.5	NaN	True
two	2001	Ohio	1.7	-1.2	True
three	2002	Ohio	3.6	3.0	True
four	2001	Nevada	2.4	NaN	False
five	2002	Nevada	2.9	5.3	False
six	2003	Nevada	3.2	NaN	False

In [63]:
```
del frame2['eastern']
```

In [64]:
```
frame2
```

Out[64]:

	year	state	pop	debt
one	2000	Ohio	1.5	NaN
two	2001	Ohio	1.7	-1.2
three	2002	Ohio	3.6	3.0
four	2001	Nevada	2.4	NaN
five	2002	Nevada	2.9	5.3
six	2003	Nevada	3.2	NaN

In [65]:
```
frame2.T
```

Out[65]:

	one	two	three	four	five	six
year	2000	2001	2002	2001	2002	2003
state	Ohio	Ohio	Ohio	Nevada	Nevada	Nevada
pop	1.5	1.7	3.6	2.4	2.9	3.2
debt	NaN	-1.2	3.0	NaN	5.3	NaN

In [ ]:
```

```