Python For Data Science *Cheat Sheet*

Pandas Basics

Simple | Smart | Speed

DATACAMP

Pandas

The **Pandas** library is built on NumPy and provides easy-to-use **data structures** and **data analysis** tools for the Python programming language.

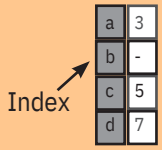
Use the following import convention:

```
>>> import pandas as pd
```

Pandas Data Structures

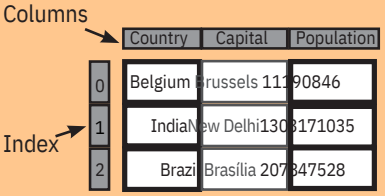
Series

A **one-dimensional** labeled array capable of holding any data type




```
>>> s = pd.Series([3, -5, 7, 4], index=['a', 'b', 'c', 'd'])
```

DataFrame



A **two-dimensional** labeled data structure with columns of potentially different types

```
>>> data = {'Country': ['Belgium', 'India', 'Brazil'],
'Capital': ['Brussels', 'New Delhi', 'Brasília'],
 'Population': [11190846, 1303171035, 207847528]}

>>> df = pd.DataFrame(data,
                      columns=['Country', 'Capital', 'Population'])
```

Asking For Help

```
>>> help(pd.Series.loc)
```

Selection

Also see NumPy Arrays

Getting

```
>>> s['b']
-5

>>> df[1:]
  Country Capital Population
1  India New Delhi 1303171035  2
Brazil Brasília 207847528
```

Get one element

Get subset of a DataFrame

Selecting, Boolean Indexing & Setting

By Position

```
>>> df.iloc[[0],[0]]
'Belgium'
>>> df.iat([0],[0])
'Belgium'
```

Select single value by row & column

By Label

```
>>> df.loc[[0], ['Country']]
'Belgium'
>>> df.at([0], ['Country'])
'Belgium'
```

Select single value by row & column labels

By Label/Position

```
>>> df.ix[2]
Country Brazil
Capital Brasília
Population 207847528
```

Select single row of subset of rows

```
>>> df.ix[:,'Capital']
0 Brussels
1 New Delhi
2 Brasília
```

Select a single column of subset of columns

```
>>> df.ix[1,'Capital']
'New Delhi'
```

Select rows and columns

Boolean Indexing

```
>>> s[~(s > 1)]
>>> s[(s < -1) | (s > 2)] s
>>> df[df['Population']>1200000000]
```

Series s where value is not >1 where value is <-1 or >2

Use filter to adjust DataFrame

Setting

```
>>> s['a'] = 6
```

Set index a of Series s to 6

Dropping

```
>>> s.drop(['a', 'c'])
>>> df.drop('Country', axis=1)
```

Drop values from rows (axis=0)
Drop values from columns(axis=1)

Sort & Rank

```
>>> df.sort_index()
>>>
df.sort_values(by='Country')
>>> df.rank()
```

Sort by labels along an axis
Sort by the values along an axis
Assign ranks to entries

Retrieving Series/DataFrame Information

Basic Information

```
>>> df.shape
>>> df.index
>>> df.columns
>>> df.info()
>>> df.count()
```

(rows,columns)
Describe index
Describe DataFrame columns
Info on DataFrame
Number of non-NA values

Summary

```
>>> df.sum()
>>> df.cumsum()
>>> df.min()/df.max()
>>> df.idxmin()/df.idxmax()
>>> df.describe()
>>> df.mean()
>>> df.median()
```

Sum of values
Cummulative sum of values
Minimum/maximum values
Minimum/Maximum index value
Summary statistics
Mean of values
Median of values

Applying Functions

```
>>> f = lambda x: x*2
>>> df.apply(f)
>>> df.applymap(f)
```

Apply function
Apply function element-wise

Data Alignment

Internal Data Alignment

NA values are introduced in the indices that don't overlap:

```
>>> s3 = pd.Series([7, -2, 3], index=['a', 'c',
'd']) >>> s + s3
 a 10.0   b
NaN
 c 5.0
 d 7.0
```

Arithmetic Operations with Fill Methods

You can also do the internal data alignment yourself with the help of the fill methods:

```
>>> s.add(s3, fill_value=0)
 a 10.0
 b -5.0   c
5.0
 d 7.0
>>>                s.sub(s3,
fill_value=2)           >>>
s.div(s3,    fill_value=4)
>>>                s.mul(s3,
fill_value=3)
```

I/O

Read and Write to CSV

```
>>>pd.read_csv('file.csv', header=None, nrows=5)>>> from sqlalchemy import create_engine
>>> df.to_csv('myDataFrame.csv')>>> engine = create_engine('sqlite:///:memory:')
```

Read and Write to Excel

```
>>> pd.read_sql_table('my_table', engine)
>>> pd.read_excel('file.xlsx')

>>> pd.to_excel('dir/myDataFrame.xlsx', sheet_name='Sheet1')
```

Read and Write to SQL Query or Database Table

```
>>> pd.read_sql("SELECT * FROM my_table;", engine)

>>> pd.read_sql_query("SELECT * FROM my_table;", engine)
```

read_sql()is a convenience wrapper around read_sql_table() and read_sql_query()

Read multiple sheets from the same file

```
>>> xlsx = pd.ExcelFile('file.xls')
>>> df = pd.read_excel(xlsx, 'Sheet1')
>>> pd.to_sql('myDf', engine)
```