Python For Data Science Cheat Sheet

Pandas Basics

Learn Python for Data Science Interactively

Pandas

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

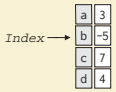
Use the following import convention:

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

Pandas Data Structures

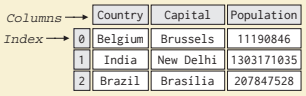
Series

A one-dimensional labeled array a 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' column
>>> df.iat([0],[0])
    'Belgium'
```

Select single value by row &

By Label

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

Select single value by row &

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)]
>>> df[df['Population']>1200000000]
```

Series s where value is not >1

s 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

I/O

Read and Write to CSV

```
>>> pd.read_csv('file.cvs', header=None, nrows=5)
>>> df.to_csv('myDataFrame.csv')
```

Read and Write to Excel

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

Read multiple sheets from the same file
>>> xlsx = pd.ExcelFile('file.xlsx')
>>> df = pd.read_excel(xlsx, 'Sheet1')
```

Read and Write to SQL Query or Database Table

```
>>> from sqlalchemy import create_engine
>>> engine = create_engine('sqlite:///:memory:')
>>> pd.read_sql("SELECT * FROM my_table;", engine)
>>> pd.read_sql_table('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()

```
>>> df.to_sql('myDf', engine)
```

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
```

Summary

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)
```