



20 FEBRUARY 2017 / LEARN PYTHON

# Pandas Cheat Sheet — Python for Data Science

Pandas is arguably the most important Python package for data science. Not only does it give you lots of methods and functions that make working with data easier, but it has been optimized for speed which gives you a significant advantage compared with working with numeric data using Python's built-in functions.

It's common when first learning pandas to have trouble remembering all the functions and methods that you need, and while at [Dataquest](#) we advocate getting used to consulting the [pandas documentation](#), sometimes it's nice to have a handy reference, so we've put together this cheat sheet to help you out!

If you're interested in learning pandas, you can consult our two-part [pandas tutorial](#) blog post, or you can signup for free and start learning pandas through our interactive [pandas for data science course](#).

[Download a Printable PDF of this Cheat Sheet](#)

## Key and Imports

In this cheat sheet, we use the following shorthand:

`df` | Any pandas DataFrame object

`s` | Any pandas Series object

You'll also need to perform the following imports to get started:

```
import pandas as pd
import numpy as np
```

## Importing Data

`pd.read_csv(filename)` | From a CSV file

`pd.read_table(filename)` | From a delimited text file (like TSV)

`pd.read_excel(filename)` | From an Excel file

`pd.read_sql(query, connection_object)` | Read from a SQL table/database

`pd.read_json(json_string)` | Read from a JSON formatted string, URL or file.

`pd.read_html(url)` | Parses an html URL, string or file and extracts tables to a list of dataframes

`pd.read_clipboard()` | Takes the contents of your clipboard and passes it to `read_table()`

`pd.DataFrame(dict)` | From a dict, keys for columns names, values for data as lists

## Exporting Data

`df.to_csv(filename)` | Write to a CSV file

`df.to_excel(filename)` | Write to an Excel file

`df.to_sql(table_name, connection_object)` | Write to a SQL table

`df.to_json(filename)` | Write to a file in JSON format

## Create Test Objects

*Useful for testing code segments*

`pd.DataFrame(np.random.rand(20,5))` | 5 columns and 20 rows of random floats

`pd.Series(my_list)` | Create a series from an iterable `my_list`

`df.index = pd.date_range('1900/1/30', periods=df.shape[0])` | Add a date index

## Viewing/Inspecting Data

`df.head(n)` | First n rows of the DataFrame

`df.tail(n)` | Last n rows of the DataFrame

`df.shape` | Number of rows and columns

`df.info()` | Index, Datatype and Memory information

`df.describe()` | Summary statistics for numerical columns

`s.value_counts(dropna=False)` | View unique values and counts

`df.apply(pd.Series.value_counts)` | Unique values and counts for all columns

## Selection

`df[col]` | Returns column with label `col` as Series

`df[[col1, col2]]` | Returns columns as a new DataFrame

`s.iloc[0]` | Selection by position

`s.loc['index_one']` | Selection by index

`df.iloc[0,:]` | First row

`df.iloc[0,0]` | First element of first column

# Data Cleaning

`df.columns = ['a','b','c']` | Rename columns

`pd.isnull()` | Checks for null Values, Returns Boolean Array

`pd.notnull()` | Opposite of `pd.isnull()`

`df.dropna()` | Drop all rows that contain null values

`df.dropna(axis=1)` | Drop all columns that contain null values

`df.dropna(axis=1,thresh=n)` | Drop all rows have have less than n non null values

`df.fillna(x)` | Replace all null values with x

`s.fillna(s.mean())` | Replace all null values with the mean (mean can be replaced with almost any function from the statistics section)

`s.astype(float)` | Convert the datatype of the series to float

`s.replace(1, 'one')` | Replace all values equal to 1 with 'one'

`s.replace([1,3],['one','three'])` | Replace all 1 with 'one' and 3 with 'three'

`df.rename(columns=lambda x: x + 1)` | Mass renaming of columns

`df.rename(columns={'old_name': 'new_name'})` | Selective renaming

`df.set_index('column_one')` | Change the index

`df.rename(index=lambda x: x + 1)` | Mass renaming of index

## Filter, Sort, and Groupby

`df[df[col] > 0.5]` | Rows where the column `col` is greater than 0.5

`df[(df[col] > 0.5) & (df[col] < 0.7)]` | Rows where  $0.7 > col > 0.5$

`df.sort_values(col1)` | Sort values by `col1` in ascending order

`df.sort_values(col2,ascending=False)` | Sort values by `col2` in descending order

`df.sort_values([col1,col2],ascending=[True,False])` | Sort values by `col1` in ascending order then `col2` in descending order

`df.groupby(col)` | Returns a groupby object for values from one

## column

`df.groupby([col1,col2])` | Returns groupby object for values from multiple columns

`df.groupby(col1)[col2]` | Returns the mean of the values in `col2`, grouped by the values in `col1` (mean can be replaced with almost any function from the statistics section)

`df.pivot_table(index=col1,values=[col2,col3],aggfunc=mean)` | Create a pivot table that groups by `col1` and calculates the mean of `col2` and `col3`

`df.groupby(col1).agg(np.mean)` | Find the average across all columns for every unique `col1` group

`df.apply(np.mean)` | Apply the function `np.mean()` across each column

`df.apply(np.max,axis=1)` | Apply the function `np.max()` across each row

## Join/Combine

`df1.append(df2)` | Add the rows in `df1` to the end of `df2` (columns should be identical)

`pd.concat([df1, df2],axis=1)` | Add the columns in `df1` to the end of `df2` (rows should be identical)

`df1.join(df2,on=col1,how='inner')` | SQL-style join the columns in `df1` with the columns on `df2` where the rows for `col1` have identical values. `how` can be one of 'left', 'right', 'outer', 'inner'

## Statistics

*These can all be applied to a series as well.*

`df.describe()` | Summary statistics for numerical columns

`df.mean()` | Returns the mean of all columns

`df.corr()` | Returns the correlation between columns in a DataFrame

`df.count()` | Returns the number of non-null values in each DataFrame column

`df.max()` | Returns the highest value in each column

`df.min()` | Returns the lowest value in each column

`df.median()` | Returns the median of each column

`df.std()` | Returns the standard deviation of each column

## Test out the commands in the cheat sheet

If you want to test out some of the commands in the cheat sheet, you can use the interactive Python editor below:

script.py

```
1 import pandas as pd
2 import numpy as np
3
4 df =
  pd.DataFrame(np.random.rand(20
    ,5))
5 print(df)
6
```

Run

POWERED BY DATAQUEST

## Download a printable version of this cheat sheet

If you'd like to download a printable version of this cheat sheet you

can do so below.

[Download a Printable PDF of this Cheat Sheet](#)

SUBSCRIBE TO OUR MAILING LIST!



## Josh Devlin

Data Scientist at Dataquest.io. Loves Data and Aussie Rules Football.  
Australian living in Texas.

[Read More](#)

— Dataquest Data Science Blog —

## Learn Python

An Intro to Deep Learning in Python

Python vs R: Head to Head Data  
Analysis

Python Dictionary Tutorial

[See all 80 posts →](#)

### UPDATES

Mar 01, 2017

## What's New in v1.14: Data Engineering Path & Performance Improvements!

Read about the latest features from Dataquest, including our new data engineering path, dramatically faster code running speed and much, much more!



JOSH DEVLIN

### DATA VISUALIZATION

Feb 08, 2017

## 1 tip for effective data visualization in Python

Data visualization is a common way to represent tabular data in an easier to parse format. In this tutorial, you'll learn how to make effective data visualizations in Python.

VIK PARUCHURI

Dataquest Data Science Blog © 2018

[Latest Posts](#) [Facebook](#) [Twitter](#)