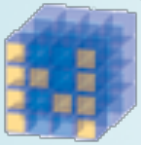
Python Packages

SciPy

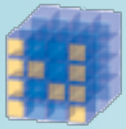
NumPy



SymPy

Matplotlib

Pandas



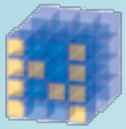
NumPy:

import numpy

```
>>> import numpy
>>> print dir(numpy)
['ALLOW_THREADS', 'BUFSIZE', 'CLIP', 'ComplexWarning', 'DataSource', 'ERR_CALL', 'ERR_DEFAULT
```

import numpy as np

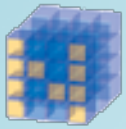
```
>>> import numpy as np
```



NumPy

numpy.linalg.norm: Length of a vector

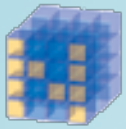
```
>>> np.linalg.norm([2,4])
4.4721359549995796
```



NumPy

numpy.linalg.inv:
Inverse of the Matrix

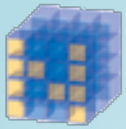
```
>>> np.linalg.inv([[2,0],[0,2]])
array([[ 0.5,  0. ],
       [ 0. ,  0.5]])
```



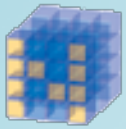
NumPy

numpy.matrix:
alternative to numpy.array

```
>>> M = np.matrix([[2,0],[0,2]])
>>> M * M
matrix([[4, 0],
        [0, 4]])
>>> M.I
matrix([[ 0.5,  0. ],
        [ 0. ,  0.5]])
>>> _*M
matrix([[ 1.,  0.],
        [ 0.,  1.]])
```

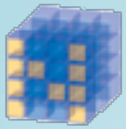


NumPy:
numpy.random:
Random sampling



NumPy: numpy.random.permutation()

```
>>> np.random.permutation(6)
array([5, 1, 4, 0, 3, 2])
>>> sequence = np.random.permutation(10)
>>> print(sequence)
[1 2 5 9 8 3 4 6 0 7]
```



NumPy: numpy.random.uniform()

```
>>> np.random.uniform(-1,1, size=10)
array([-0.08,  0.74, -0.64, -0.98,  0.98, -0.21, -0.36, -0.34, -0.16, -0.86])
```

scipy.stats

Statistical functions

This module contains a large number of probability distributions as well as a growing library of statistical functions.

scipy.stats.describe

```
>>> np.random.permutation(6)
array([5, 1, 4, 0, 3, 2])
>>> sequence = np.random.permutation(10)
>>> print(sequence)
[1 2 5 9 8 3 4 6 0 7]
>>> stats.describe(sequence)
DescribeResult(nobs=10, minmax=(0, 9), mean=4.5, variance=9.1666666666666661,
 skewness=0.0, kurtosis=-1.2242424242424244)
```

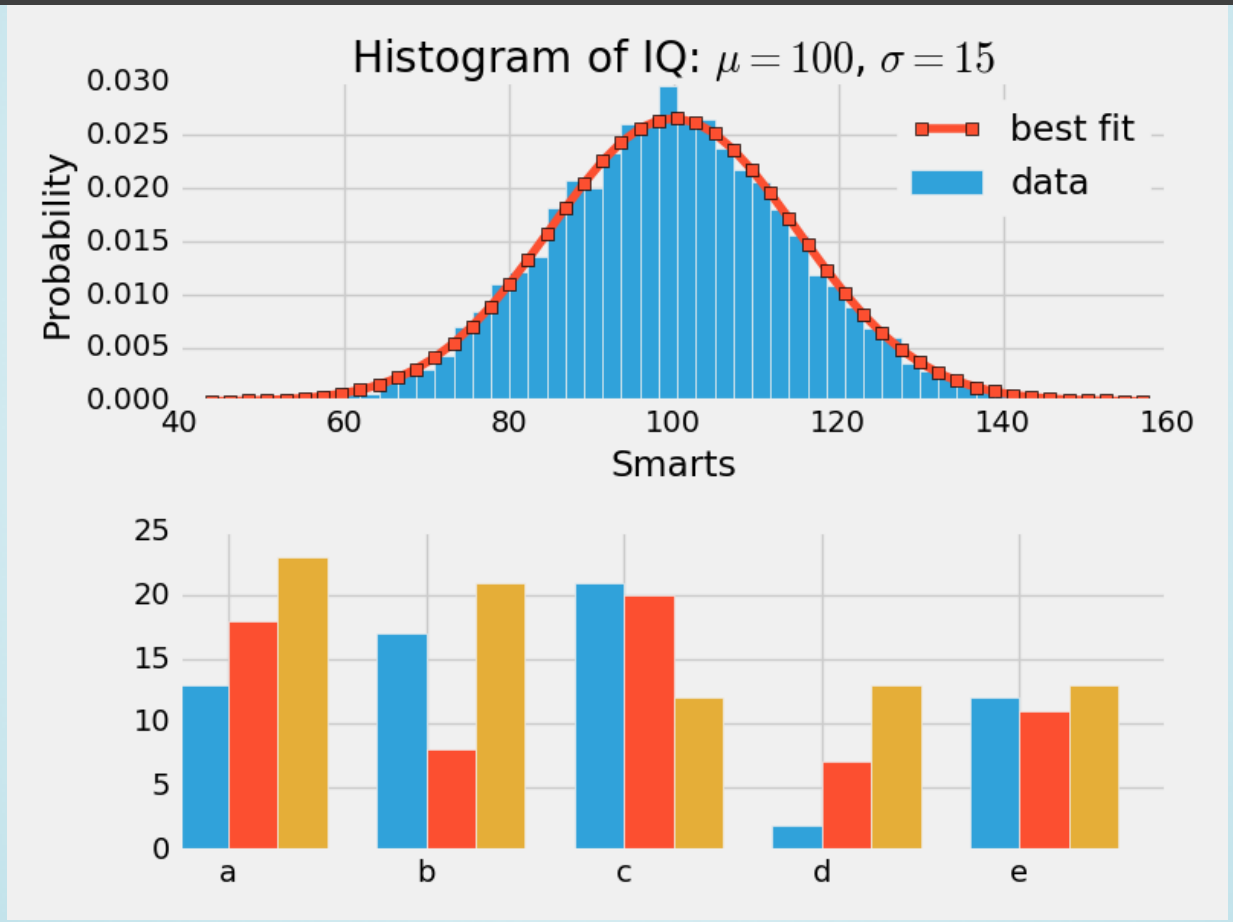
scipy.misc.comb

```
>>> from scipy.special import comb
>>> comb(10,2)
45.0
>>> comb(3,2)
3.0
>>>
```

For many more stat related functions install the software R and the interface package rpy.

MatplotLib

```
matplotlib.style.use('fivethirtyeight')
```



Without this change, most styles will default to the "jet" colormap.

GitHub

"a 2 billion dollar
facebook for programmers"

GitHub

"15 billion active users who learn, share, and work together to build software"

- Github: file repository like dropbox
- Git: version control system for software dev.

"free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency."

```
$ git clone
```

Clone a repository

```
$ git push
```

Update server with your commits across all branches that are common between your local copy and server

```
$ git fork
```

Points your repo to original via an alternates file

```
$ git pull
```

Fetch changes from server and merge into current branch

MatplotLib

To run the gallery showing styles available, simply grab the source and run the package as a script:

```
$ git clone https://github.com/tonysyu/matplotlib-style-gallery.git
$ cd matplotlib-style-gallery
$ python -m mpl_style_gallery
```

Jupyter Notebooks

"Open source, interactive data science and scientific computing across over 40 programming languages."

The Jupyter Notebook is a web application that allows you to create and share documents that contain live code, equations, visualizations and explanatory text.

Uses include: data cleaning and transformation, numerical simulation, statistical modeling, machine learning and much more.

Notebooks may be exported to a range of static formats:

- HTML (for example, for blog posts)
- LaTeX
- PDF
- Slide shows (via reveal.js)

Jupyter Notebooks

Any .ipynb notebook document available from a public URL can be shared via the Jupyter Notebook Viewer (nbviewer).

Jupyter Notebooks

The landing page of the Jupyter notebook web application, the **dashboard**, shows the notebooks currently available in the notebook directory

Jupyter Notebooks

Ok, I want to download a notebook and start working with it. What next?

Cloning notebooks from Github

- Use browser (Github.com)
- Use Git

Open Jupyter notebook


```
C:\Users\jajaco3\Documents>jupyter notebook
[W 16:55:15.381 NotebookApp] Unrecognized JSON config file version, assuming version 1
[I 16:55:17.400 NotebookApp] [nb_conda_kernels] enabled, 4 kernels found
[I 16:55:18.250 NotebookApp] Γ£ô nbpresent HTML export ENABLED
[W 16:55:18.253 NotebookApp] Γ£ù nbpresent PDF export DISABLED: No module named nbbrowserpdf.e
[I 16:55:18.263 NotebookApp] [nb_conda] enabled
[I 16:55:18.414 NotebookApp] [nb_anacondacloud] enabled
[I 16:55:18.767 NotebookApp] Serving notebooks from local directory: C:\Users\jajaco3\Document
[I 16:55:18.770 NotebookApp] 0 active kernels
[I 16:55:18.772 NotebookApp] The Jupyter Notebook is running at: http://localhost:8888/
[I 16:55:18.776 NotebookApp] Use Control-C to stop this server and shut down all kernels (twic
```

Open any .ipynb file and you are on your way to learning python using Jupyter notebooks and Github!