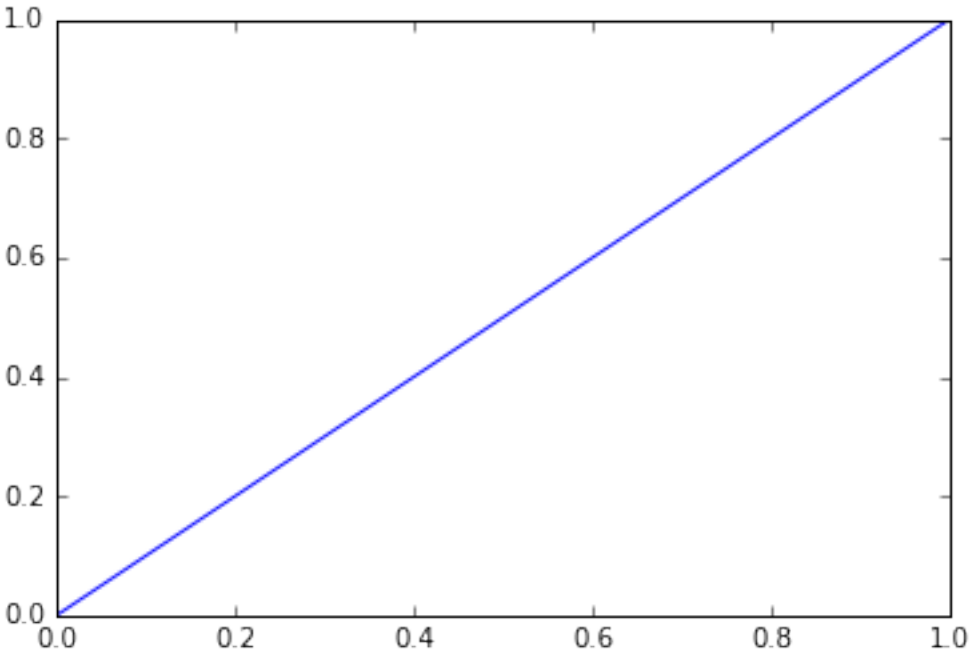
Notebook - March 17

March 21, 2016

In [3]:
```
%matplotlib inline
import pylab as pl
pl.plot([0,1])
```

Out[3]:
```
[<matplotlib.lines.Line2D at 0x10d1dc588>]
```



In [5]:
```
%matplotlib nbagg
import pylab as pl
pl.plot([0,1])
```

```
<IPython.core.display.Javascript object>
```

```
<IPython.core.display.HTML object>
```

Out[5]:
```
[<matplotlib.lines.Line2D at 0x10d174f60>]
```

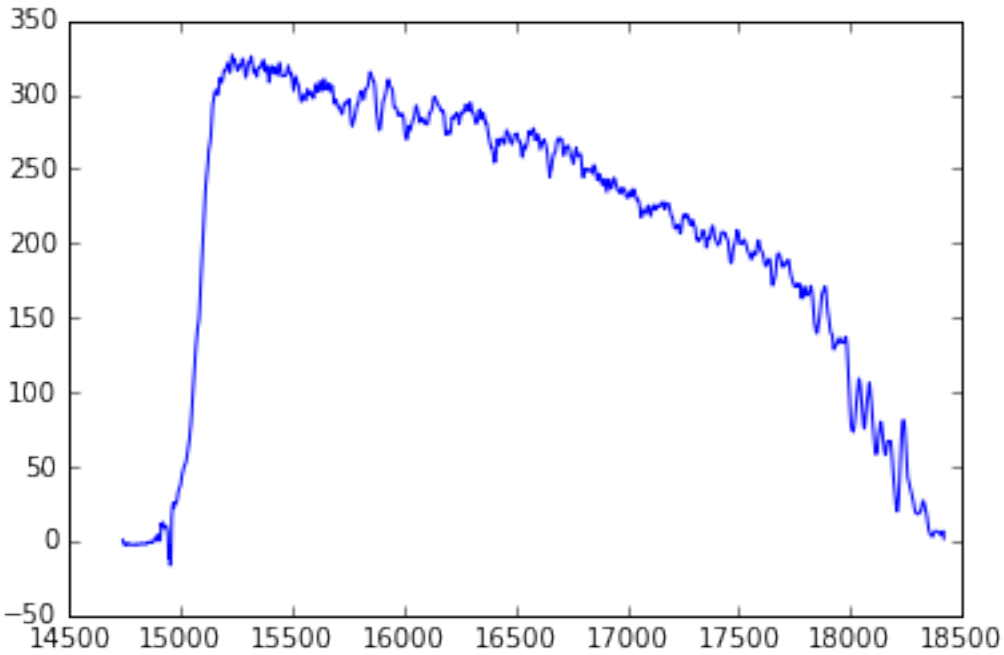
```
In [7]: %%bash
        export LC_ALL=en_US.UTF-8
        export LANG=en_US.UTF-8
        echo $LC_ALL
        echo $LANG

en_US.UTF-8
en_US.UTF-8

In [14]: %%bash
         curl -O https://raw.githubusercontent.com/astropy/specutils/master/specutils/io/tests/files/mu

% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 27461  100 27461    0     0  31239      0 --:--:-- --:--:-- --:--:-- 31241

In [15]: ls -lh *dat

-rw-r--r--+ 1 adam 27K Mar 17 09:44 multispec_equispec.11.dat

In [112]: #cat multispec_equispec.11.dat

In [17]: with open('multispec_equispec.11.dat','r') as fh:
             text = fh.read()

In [20]: fh = open('multispec_equispec.11.dat','r')
         text = fh.read()
         fh.close()

In [34]: with open('multispec_equispec.11.dat','r') as fh:
             all_lines = []
             for line in fh:
                 all_lines.append(line.split())

In [50]: with open('multispec_equispec.11.dat','r') as fh:
             all_lines = []
             for line in fh:
                 all_lines.append(list(map(float, line.split())))

In [53]: float('23.5')

Out[53]: 23.5

In [55]: list(map(float, ["1.2","2.3"]))

Out[55]: [1.2, 2.3]

In [57]: float_lines_array = np.array(all_lines)

In [61]: float_lines_array[4,0]

Out[61]: 14754.649971697299

In [64]: all_lines[:2]

Out[64]: [[14740.266391838, 0.8220932], [14743.8622868028, -1.856567]]

In [67]: float_lines_array[0:3, 0]
```

```
Out[67]: array([ 14740.26639184,  14743.8622868 ,  14747.45818177])

In [68]: wavelengths = float_lines_array[:, 0]

In [69]: fluxes = float_lines_array[:,1]

In [71]: wavelengths_list = list(zip(*all_lines))[0]

In [72]: a = [1,2,3]
         b = ['a','b','c']
         list(zip(a,b))

Out[72]: [(1, 'a'), (2, 'b'), (3, 'c')]

In [73]: list(zip(*[a,b]))

Out[73]: [(1, 'a'), (2, 'b'), (3, 'c')]
```

given: `params = [a0,a1,a2,a3]`
Equivalent:

```
f(a0,a1,a2,a3)
f(*params)
```

```
In [77]: %matplotlib inline
         import pylab as pl
         pl.plot(wavelengths, fluxes)
         pl.savefig('first_spectrum.png')
         pl.savefig('first_spectrum.pdf')
```




```
In [79]: %%bash
         open first_spectrum.pdf
```

```
In [80]: import numpy as np

In [81]: # simple text loading
         arr = np.loadtxt('multispec_equispec.11.dat')
         arr

Out[81]: array([[  1.47402664e+04,   8.22093200e-01],
                [  1.47438623e+04,  -1.85656700e+00],
                [  1.47474582e+04,  -2.08070000e+00],
                ...,
                [  1.84116752e+04,   5.27366100e+00],
                [  1.84152710e+04,   6.57225800e+00],
                [  1.84188669e+04,   1.60453100e+00]])

In [83]: # genfromtxt: more complicated, more flexible
         arr = np.genfromtxt('multispec_equispec.11.dat')
         arr

Out[83]: array([[  1.47402664e+04,   8.22093200e-01],
                [  1.47438623e+04,  -1.85656700e+00],
                [  1.47474582e+04,  -2.08070000e+00],
                ...,
                [  1.84116752e+04,   5.27366100e+00],
                [  1.84152710e+04,   6.57225800e+00],
                [  1.84188669e+04,   1.60453100e+00]])

In [84]: # genfromtxt: more complicated, more flexible
         # line wrapping: pep8 tells you how you "should" write code conventionally
         arr = np.genfromtxt('multispec_equispec.11.dat', delimiter=" ", comments="#",
                             skip_header=0, skip_footer=0)
         arr

In [87]: from astropy.table import Table
         from astropy.io import ascii

In [113]: tbl = Table.read('multispec_equispec.11.dat', format='ascii.no_header', delimiter=' ')
          #tbl

In [114]: # wavelengths
          #tbl['col1']

In [93]: type(tbl['col1'])

Out[93]: astropy.table.column.Column

In [98]: wavelength = tbl['col1'].data

In [99]: wavelength

Out[99]: array([ 14740.26639184,  14743.8622868 ,  14747.45818177, ...,
                 18411.67515091,  18415.27104588,  18418.86694084])

In [103]: import pandas as pd

In [108]: pdtbl = tbl.to_pandas()

In [107]: ptbl = pd.read_csv('multispec_equispec.11.dat', delim_whitespace=True, header=None)
```

```
In [109]: %timeit ptbl = pd.read_csv('multispec_equispec.11.dat', delim_whitespace=True, header=None)

1000 loops, best of 3: 1.1 ms per loop

In [111]: %timeit tbl = Table.read('multispec_equispec.11.dat', format='ascii.no_header', delimiter=' '

1000 loops, best of 3: 1.31 ms per loop

In [115]: tbl.

Out[115]: <Table length=1024>
     col1        col2
   float64     float64
------------- ---------
14740.2663918 0.8220932
14743.8622868 -1.856567
14747.4581818   -2.0807
14751.0540767  -2.75078
14754.6499717 -1.882897
14758.2458667 -1.653645
14761.8417616 -2.496639
14765.4376566 -2.216392
14769.0335516 -1.711144
14772.6294465 -2.086175
          ...       ...
18386.5038862  6.753047
18390.0997811  6.417622
18393.6956761  6.072701
18397.2915711  5.728085
 18400.887466  4.878081
 18404.483361  3.940828
18408.0792559  4.006176
18411.6751509  5.273661
18415.2710459  6.572258
18418.8669408  1.604531
```