

# Principles of Programming in Econometrics

Introduction, structure, and advanced programming techniques

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**Separate lecture slides**

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## Overview

# Principles of Programming in Econometrics

D0: Syntax, example 2<sup>8</sup>

D1: Structure, scope

D2: Numerics, packages

D3: Optimisation, speed

## Day 0: Syntax

### 9.30 Introduction

Example:  $2^8$

Elements

Main concepts

Closing thoughts

Revisit E0

### 13.30 Practical (at VU, main building)

- ▶ Checking variables, types, conversion and functions
- ▶ Implementing Backsubstitution

## Installation of Python

Many ways. . . Here:

- ▶ AnaConda (<https://www.anaconda.com/download/>): This installs the base Python 3.X+packages+Spyder, with minimal fuss.
- ▶ At Conda command prompt (= terminal on OSX/Linux), install missing packages (hardly ever needed, most was included already)

```
conda install numpy
```

- ▶ Once in a while, update it all from Conda command prompt, using

```
conda update --all  
conda clean --all
```

## Editor/IDE

For editing/running programs, several options again:

- ▶ Whatever editor of choice, run from command line (go ahead)
- ▶ Spyder: Install (if needed) through

```
conda install spyder
```

- ▶ Atom: Install from <https://atom.io> with packages Hydrogen, Autocomplete-python, and add

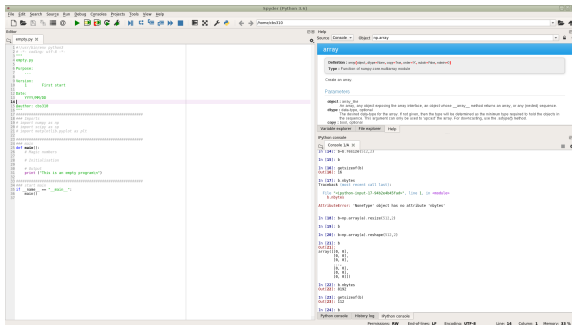
```
conda install jupyter
```

- ▶ PyCharm: Install from <https://www.jetbrains.com/pycharm/>

- ▶ IPython: Install (if needed) through
- ```
conda install ipython
```

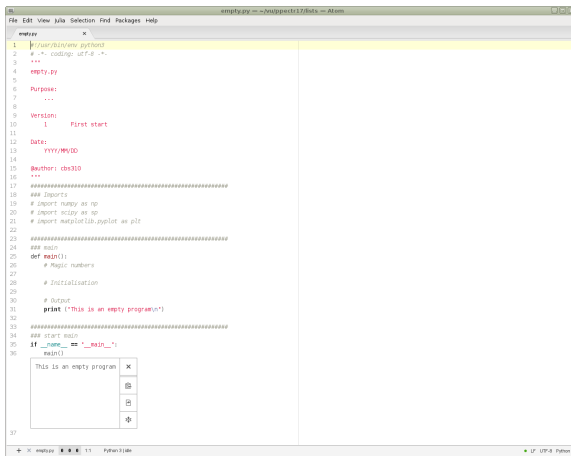
(You'll probably see me switching; I use Atom for all editing of Python, R, Ox,  $\text{\LaTeX}$ ,

# Spyder



Spyder environment

# Atom



```

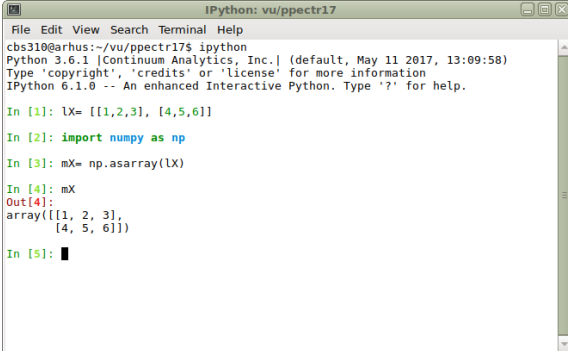
1 #!/usr/bin/env python3
2 # -*- coding: utf-8 -*-
3
4 empty.py
5
6 Purpose:
7 ...
8
9 Version:
10 1 First start
11
12 Date:
13 YYYY/MM/DD
14
15 @author: chs310
16 ...
17 #####
18 ## Imports
19 # Import numpy as np
20 # Import scipy as sp
21 # Import matplotlib.pyplot as plt
22
23 #####
24 ## main
25 def main():
26     # Magic numbers
27
28     # Initialization
29
30     # Output
31     print("This is an empty program")
32
33 #####
34 ## start main
35 if __name__ == '__main__':
36     main()
37

```

This is an empty program

Atom environment

# IPython



```
IPython: vu/ppectr17
File Edit View Search Terminal Help
cbs310@arhus:~/vu/ppectr17$ ipython
Python 3.6.1 |Continuum Analytics, Inc.| (default, May 11 2017, 13:09:58)
Type 'copyright', 'credits' or 'license' for more information
IPython 6.1.0 -- An enhanced Interactive Python. Type '?' for help.

In [1]: lX= [[1,2,3], [4,5,6]]

In [2]: import numpy as np

In [3]: mX= np.asarray(lX)

In [4]: mX
Out[4]:
array([[1, 2, 3],
       [4, 5, 6]])

In [5]: █
```

IPython environment