Introduction to Programming using Python

This is meant to be a short course that helps you to start programming in Python, especially if you have little to no background in programming. There is no need for yet another course on how to learn Python, instead I will select a subset of topics that are likely to be interesting for researchers, give a short introduction and point towards resources where you can learn more. First we will cover the basics of how to program in Python and get everyone up and running. After having mastered the very basics, each student will design a small programming project, e.g. downloading data from the internet, reorganizing a dataset, statistical analysis of some data... In general many repetitive tasks can be automated in a python script and we'll learn how to do that in the next few weeks. Over time you will appreciate the versatility and simplicity of Python!

Class 0 - Git and installing python

1. Before we start with Python, you should make yourself familiar with Git and Github. Git is a distributed version control system, mainly used for code. To get familiar with git follow this tutorial

2. Install Python. I suggest the Anaconda Distribution. It comes with many packages preinstalled and an IDE similar to RStudio. Please install python 3.*

Excercises Class 0

0.1. As an exercise you should create a private repository on github (sign up as an academic account if possible so you get unlimited private repositories). Clone the repository to your computer and add a txt file. Commit your work and then push it to the github server.

0.2. Open Spyder and run the "Hello World!" program.

Class 1 - First Introduction to Python

- Why programming in general?
- Why python?
- Some use cases
- Basic introduction: Define variables, lists and dictionaries
- Operators on numbers/strings
- Data types

Class 2 - Programming Essentials

After this class you know the most important programming concepts, based on which you can write almost any program.

- Revisit basics
- if-else, for-, while-loops
- Functions
- import a package
- numpy/scipy/pandas

Class 3 - Working with packages

One of the biggest benefits of Python is its large user base. You will find a lot of code/packages that make your life a lot easier. In this class you will learn how to install packages, load them and make use of them.

- Quick review on Conditionals, Loops and Functions
- Installing Packages with pypi
- Example usages of numpy/scipy/pandas, simple statistics example
- Beautiful Soup and urrlib, simple web scraping example

Class 4 - Student Projects

From now on, classes will be more like a QA session. You can only learn programming by doing, therefore it's important to get started on your projects and along the way I can help with issues that come up.

- Plan your own project using python, what concepts do you need to learn? What packages do you need?

For some tips on best practices for your own code see the top answer here.

Class 5 and 6: Support and Presentation of projects

- Work on personal project
- Help with issues and setup of project.
- students should present their use case