

Scripting and Versioning with Git, Bash and Python

Compact Course @ Max-Planck

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General Information

Organization

- About 1.5 hours lecture
 - Slides and live demonstrations
- About 1.5 hours tutorials
 - We suggest tasks to practice
 - You can work on whatever you want
 - We'll try to answer your questions
- Breaks

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Outline

- 2 days Git
- 2 days Bash
- 5 days Python

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Preliminaries

- Your background?
- Prior programming knowledge?
- Feedback!

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More information

- Slides, tutorials and code on website:

https://www5.in.tum.de/wiki/index.php/Python/_Git_/_Bash_Course

Contents

Git:

- The graph idea behind git
- How does git do the versioning?
- Most important commands
- A GUI if you like that

Bash:

- Overview, most important basics:
 - Files and directories: ls, dir, cd, mkdir, find, touch, . . .
 - Variables, manipulation of variables, arrays, special variables
 - Control structures, functions, parameters
- Shell configuration
 - Aliases and variables
 - Configuration examples for bash (bashrc)
 - Pipes and wildcards

Contents

Bash:

- Advanced topics
 - Regular expressions
 - String-manipulation, regular expressions: grep, cut, sed, head, ...
 - Operating on files
 - Grouping, subshells
 - awk
- Working remote
 - ssh, scp, rsync, unison, nx ...
 - Process management

Contents

Scripting with Python

1. Basics

- Writing and running Python programs
- Environments and consoles (Spyder, Jupyter NB)
- Data types

2. Control flow

- Conditionals
- Loops

3. Functions, modules and packages

4. Object-oriented programming

5. File I/O

Contents

Scripting with Python

6. Scientific Computing with Python

- NumPy: Data structures for numerical mathematics
- Matplotlib: Beautiful plots
- Scipy: Numerical algorithms ready to use

7. Selected topics

- Operating system services
- Regular expressions
- Binding with C/C++
- Exceptions
- Lambda functions, sequence comprehensions
- ???

Requirements (see ¹)

Git

- Git command line tool
- (optional) GUI-based versioning with Git (e.g. GitKraken)

Bash

- Bash as shell (yes, tcsh works, too, but slightly different)
- Editor of your choice (vim, emacs, ...)
- Collection of standard tools
- If you are using Windows, we recommend to install cygwin full/extended

Python

- Python 3.X
- Anaconda: <https://www.continuum.io/downloads>

¹https://www5.in.tum.de/wiki/index.php/Python/_Git_/_Bash_Course