Course Material for the Software Carpentry workshop Würzburg 2016-11-09/2016-11-10

1 About

This is the course material for the Software Carpentry workshop taking place in Würzburg at November 9th and 10th, 2016. The course is an introduction for novices to the Unix Shell, Python and git.

2 Schedule

2.1 Welcome and introduction [9:00 - 9:30]

- Introduction of the instructors and helpers
- Introduction of the participants
- Name tags
- Photos
- Ice breaker - Sort people by the following values:
  - In which year of your PhD are you?
  - How strong are the computational requirement in your PhD
  - Considerung the course topic - how strong do you feel about knowing this already?
  - Group by research field
- Breaks
- Material of the course
- The etherpad
  - http://pad.software-carpentry.org/p/2016-11-09-Wuerzburg
  - Short URL: http://bit.ly/2emNADR
  - Exercise - add your name to the list of participants
- HackyHour and WUBSyB
- Motivation
  - Access to (bioinformatical) tools that only have CLI
  - Automation
  - Reproducibility / Transparency

2.2 Unix Shell (Konrad) [9:30 - 12:00]

- Files, folders, locations
- Manipulating files and folders
- Connecting tools with pipes
- `for` loops
- Shell scripting

2.3 Python [13:00 - 16:00]

2.3.0 Installation of Jupyter notebook

2.3.1 Session 1 (Markus):

- Print, literal constants
- Variables
- String format operators
- Data structures: str, int, float, list, dict
- File handling
- New lines, tab etc., regular expression

- `if else` startement
- `for` loop

2.3.2 Session 2 (Markus):

- Function definition: reproducibility
- Doc string, sensible names, arguments

2.3.3 Session 3 (Konrad):

- Importing module and module recommendations (important modules: sys, math, pandas, numpy, scipy, matplotlib, openpyxl, requests, biopython, collections, scikit-learn,)
- Writing scripts

2.4 Git (Markus) [9:00 - 12:00]

- Setup
- Creating a Repository
- Tracking Changes
- Exploring History
- Ignoring things
- Remote repositories

2.5 Open Session [13:00 - 16:00]

This session offers space for further exercises, questions and related topics like open source / open content licenses, open science practices, reproducible research.

- Fill out the post- workshop survey of SWC
- Fill out the feedback form of the GSLS
- Discussion and feedback

3 Sources

- Unix shell - Was created based on Introduction to the Unix Shell for biologists by Konrad Förstner
- Python - Was created based on a SWC course by Malvika Sharan and Toby Hodges
- Git - Was created based on the Software Carpentry introduction to Git for novices course maintained by Ivan Gonzalez and Daisie Huang

4 License