

Hydroinformatik I - WiSe 2020/2021

HyBHW-S1-01-V3: Werkzeuge

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Dresden, 06.11.2020

Fahrplan für heute ...

1. Rückblick letzte Veranstaltung (HyBHW-S1-01-V1/2: Intro/Hydroinformatik)

2. OPAL (Freigabe für registrierte Nutzer)
3. HA01: Tools: Compiler-Installation (MinGW) + Übung
4. Tools: Python (HA02)
5. Ihre Fragen

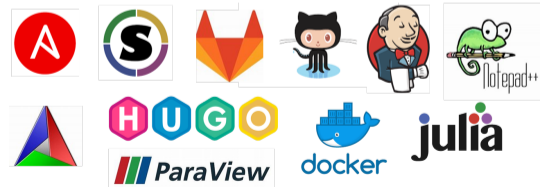
6. Ausblick auf die nächste Veranstaltung (HyBHW-S1-01-V4: Datentypen)

Rückblick letzte Veranstaltung: Tools

1. Software
2. Compiler / Interpreter
3. Dokumentation (Repositories) / Visualisierung



- Editor: Notepad++, ...
- Compiler: Qt, ...
- Skripte: Python (Jupyter), ...
- Visualisierung: ParaView, ...



OPAL

Freigabe für registrierte Nutzer

Hydroinformatik I - Helmholtz x OPAL - Online-Plattform für Akademische Lernaktivitäten x

https://bildungsportal.sachsen.de/opal/auth/RepositoryEntry/2725

Suchen

Suche

Olaf Kolditz

Startseite Lehren & Lernen Kursangebote Hydroinformatik

Hydroinformatik

Hydroinformatik

Linkliste

TU Dresden | Wintersemester 2020 / 2021
Hydroinformatik
Verantwortliche/r: Olaf Kolditz
Hydroinformatik

Die Einsatzmöglichkeiten rechnergestützter Software bei der Bearbeitung wissenschaftlicher Fragen im Bereich der Hydrowissenschaften werden vorgestellt. Dies beinhaltet sowohl die Anwendung allgemein verfügbarer als auch die Entwicklung eigener Softwarekomponenten. Die vorgestellten Methoden werden durch geeignete Beispiele erläutert und geübt. Die Studierenden sind in der Lage quantitative Problemstellungen rechnergestützt zu bearbeiten. Dazu gehören auch die Auswahl, der Einsatz und die (Weiter-)Entwicklung von Software bzw. Softwarekomponenten.

[Weitere Informationen anzeigen](#)

Linkliste

- Lehrowebseite
- Videovorlesung



Übung

Compiler Installation

- EX01

C++ Compiler Installation

MinGW

- Anleitung für die Installation (siehe Lehre-Webseite), automatischer Download:
https://www.ufz.de/export/data/2/244688_mingw-installation-2020.pdf
 - Voting (als Chat (privat)):
 - "+": hat funktioniert
 - "+-": hat noch nicht ganz funktioniert, weiß aber im Prinzip, wie es geht
 - "-": hat nicht funktioniert, weiß nicht wie es funktioniert
 - >> Übung: EX01 (von der Webseite runter laden, später machen wir dies über GitHub)
-

- DOS Kommandos / BATch Befehle:
https://www.script-example.com/themen/cmd_Batch_Befehle.php

C++ Compiler Installation

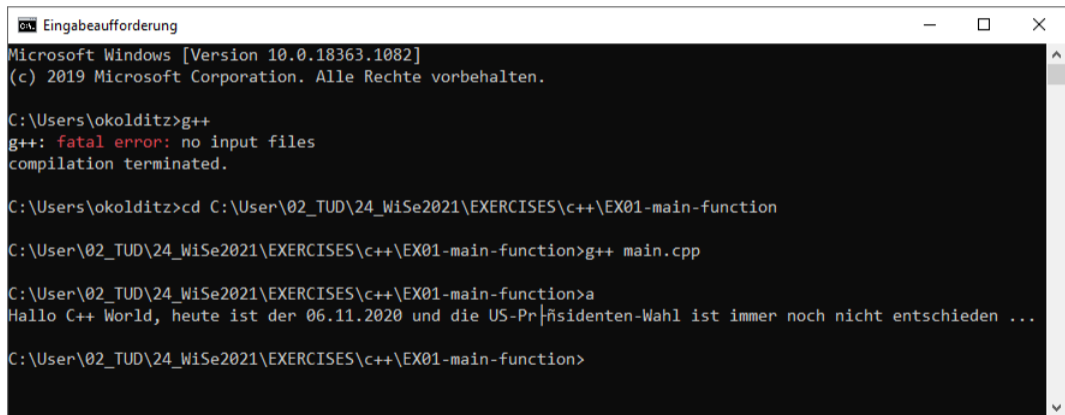
Übung EX01: Source code

```
1 #include <iostream>
2 using namespace std;
3 int main()
4 {
5     std::cout << "Hallo C++ World, heute ist der 06.11.2020 und die US-
        Präsidenten-Wahl ist immer noch nicht entschieden ..." << std::endl;
6     return 0;
7 }
```

Listing 1: C++ example of a main function

C++ Compiler Installation

Übung EX01: Step-by-step



```
ca. Eingabeaufforderung
Microsoft Windows [Version 10.0.18363.1082]
(c) 2019 Microsoft Corporation. Alle Rechte vorbehalten.

C:\Users\okolditz>g++
g++: fatal error: no input files
compilation terminated.

C:\Users\okolditz>cd C:\User\02_TUD\24_WiSe2021\EXERCISES\c++\EX01-main-function

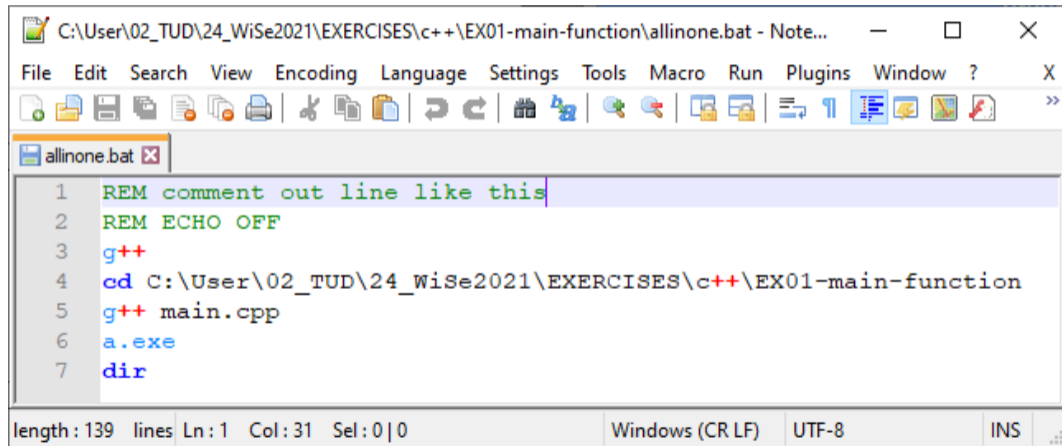
C:\User\02_TUD\24_WiSe2021\EXERCISES\c++\EX01-main-function>g++ main.cpp

C:\User\02_TUD\24_WiSe2021\EXERCISES\c++\EX01-main-function>a
Hallo C++ World, heute ist der 06.11.2020 und die US-Präsidenten-Wahl ist immer noch nicht entschieden ...

C:\User\02_TUD\24_WiSe2021\EXERCISES\c++\EX01-main-function>
```


C++ Compiler Installation

Übung EX01: BATch file



```
C:\User\02_TUD\24_WiSe2021\EXERCISES\c++\EX01-main-function\allinone.bat - Note...
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ? X
allinone.bat x
1 REM comment out line like this
2 REM ECHO OFF
3 g++
4 cd C:\User\02_TUD\24_WiSe2021\EXERCISES\c++\EX01-main-function
5 g++ main.cpp
6 a.exe
7 dir
length: 139 lines Ln: 1 Col: 31 Sel: 0|0 Windows (CR LF) UTF-8 INS
```

Übung GitHub

- EX01

GitHub

- "GitHub ist ein netzbasierter Dienst zur Versionsverwaltung für Software-Entwicklungsprojekte ..."
- Webseite: <https://github.com/>
- Vorteil: Webbasiert (und damit Plattform-unabhängig)
- ... wir nutzen GitHub zum archivieren unserer Übungen (>> Demo)
- Webseite:
<https://github.com/OlafKolditz>
<https://github.com/OlafKolditz/HYDROINFORMATIK-I>



GitHub

Repository für Übungen

The screenshot shows a web browser window displaying the GitHub repository page for 'OlafKolditz / HYDROINFORMATIK-I'. The browser's address bar shows the URL 'https://github.com/OlafKolditz/HYDROINFORMATIK-I'. The page features a dark navigation bar with the GitHub logo, a search bar, and links for 'Pull requests', 'Issues', 'Marketplace', and 'Explore'. The main content area has a light blue background with the text 'Learn Git and GitHub without any code!' and a sub-headline 'Using the Hello World guide, you'll start a branch, write comments, and open a pull request.' Below this is a green 'Read the guide' button. The repository name 'OlafKolditz / HYDROINFORMATIK-I' is displayed, along with statistics for 'Unwatch' (1), 'Star' (0), and 'Fork' (0). A navigation bar includes links for 'Code', 'Issues', 'Pull requests', 'Actions', 'Projects', 'Wiki', 'Security', 'Insights', and 'Settings'. The repository details show the 'main' branch with 1 branch and 0 tags. A commit history table is visible, showing a commit by 'OlafKolditz' titled 'Add files via upload' with the hash 'd7fc244', made 6 minutes ago, and containing 1 commit. The file 'EX01-main-function.cpp' is listed with the same upload time. An 'About' section on the right describes the repository as a teaching resource for a course at TU Dresden.

Search or jump to... Pull requests Issues Marketplace Explore

Learn Git and GitHub without any code!

Using the Hello World guide, you'll start a branch, write comments, and open a pull request.

[Read the guide](#)

OlafKolditz / HYDROINFORMATIK-I

Unwatch 1 Star 0 Fork 0

[Code](#) [Issues](#) [Pull requests](#) [Actions](#) [Projects](#) [Wiki](#) [Security](#) [Insights](#) [Settings](#)

main 1 branch 0 tags

Go to file Add file Code

	OlafKolditz Add files via upload	d7fc244	6 minutes ago	1 commits
	EX01-main-function.cpp	Add files via upload	6 minutes ago	

About

A teaching repository for the Hydroinformatics I Course at TU Dresden

GitHub

Repository: Create a new repository on the command line

```
1 echo "# HYDROINFORMATIK-I" >> README.md
2 git init
3 git add README.md
4 git commit -m "first commit"
5 git branch -M main
6 git remote add origin
7   https://github.com/OlafKolditz/HYDROINFORMATIK-I.git
8 git push -u origin main
```

Listing 2: Creating Git repository on the command line

GitHub

Repository: Push an existing repository from the command line


```
1 git remote add origin  
2   https://github.com/OlafKolditz/HYDROINFORMATIK-I.git  
3 git branch -M main  
4 git push -u origin main
```

Listing 3: Creating new from an existing Git repository on the command line

Übung Python

- ...

Python: Webseite



The screenshot shows the Python website homepage with a dark blue header and navigation menu. The main content area features a large banner for downloading Python 3.8.3 for Windows, accompanied by an illustration of two parachutes carrying crates. The navigation menu includes links for About, Downloads, Documentation, Community, Success Stories, News, and Events. A search bar and a 'Socialize' button are also visible in the top right corner.

Python PSF Docs PyPI Jobs Community

python™

Donate Search GO Socialize

About Downloads Documentation Community Success Stories News Events

Download the latest version for Windows

[Download Python 3.8.3](#)

Looking for Python with a different OS? Python for [Windows](#), [Linux/UNIX](#), [Mac OS X](#), [Other](#)

Want to help test development versions of Python? [Prereleases](#), [Docker images](#)

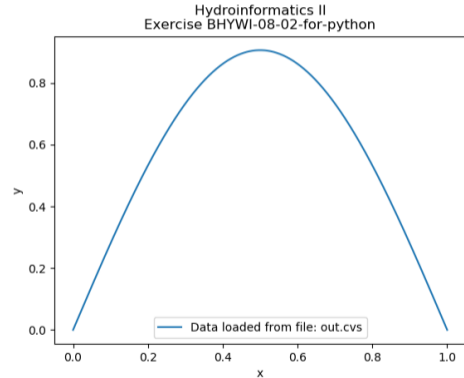
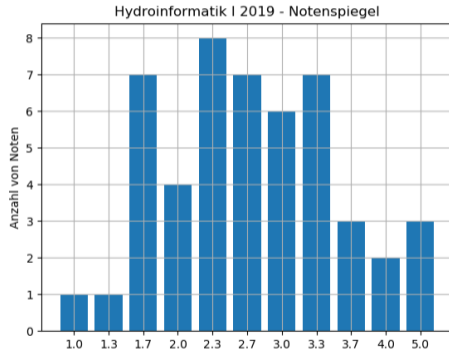
Looking for Python 2.7? See below for specific releases

Python: About

- "Python is a programming language that lets you work more quickly and integrate your systems more effectively."
- Webseite: <https://www.python.org>
- Vorteil: funktioniert auf allen Rechnern (>> Demo)



Python: Plotting (matplotlib)



Python: Example

Übung EX02: Source code

```
1 from matplotlib.ticker import FuncFormatter
2 import matplotlib.pyplot as plt
3 import numpy as np
4
5 year = np.arange(11)
6 publications = [1,1,7,4,8,7,6,7,3,2,3]
7 fig, ax = plt.subplots()
8 ax.set_title('Hydroinformatik I 2019 - Notenspiegel')
9 ax.set_ylabel('Anzahl von Noten')
10 plt.bar(year, publications)
11 plt.xticks(year, ('1.0', '1.3', '1.7', '2.0', '2.3', '2.7', '3.0', '3.3', '3.7',
12                  '4.0', '5.0'))
13 plt.grid(True)
14 plt.show()
```

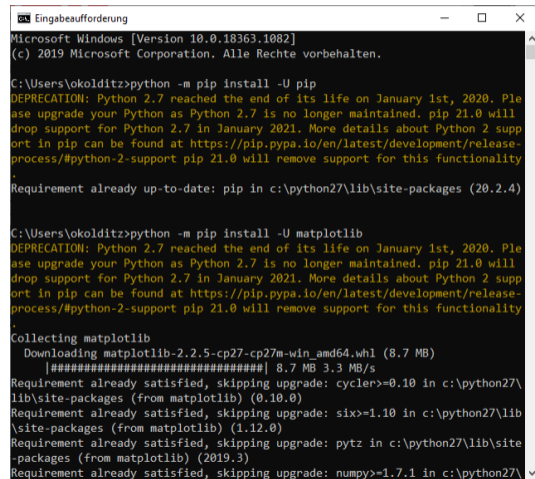
Listing 4: Python example for bar charts

Python: Module installieren

matplotlib

- 1 `python -m pip install -U pip`
- 2 `python -m pip install -U matplotlib`

Listing 5: Installieren von der Konsole



```
Eingabeaufforderung
Microsoft Windows [Version 10.0.18363.1082]
(c) 2019 Microsoft Corporation. Alle Rechte vorbehalten.

C:\Users\okolditz>python -m pip install -U pip
DEPRECATION: Python 2.7 reached the end of its life on January 1st, 2020. Please upgrade your Python as Python 2.7 is no longer maintained. pip 21.0 will drop support for Python 2.7 in January 2021. More details about Python 2 support in pip can be found at https://pip.pypa.io/en/latest/development/release-process/#python-2-support pip 21.0 will remove support for this functionality
Requirement already up-to-date: pip in c:\python27\lib\site-packages (20.2.4)

C:\Users\okolditz>python -m pip install -U matplotlib
DEPRECATION: Python 2.7 reached the end of its life on January 1st, 2020. Please upgrade your Python as Python 2.7 is no longer maintained. pip 21.0 will drop support for Python 2.7 in January 2021. More details about Python 2 support in pip can be found at https://pip.pypa.io/en/latest/development/release-process/#python-2-support pip 21.0 will remove support for this functionality
Collecting matplotlib
  Downloading matplotlib-2.2.5-cp27-cp27m-win_amd64.whl (8.7 MB)
    |#####| 8.7 MB 3.3 MB/s
Requirement already satisfied, skipping upgrade: cycler>=0.10 in c:\python27\lib\site-packages (from matplotlib) (0.10.0)
Requirement already satisfied, skipping upgrade: six>=1.10 in c:\python27\lib\site-packages (from matplotlib) (1.12.0)
Requirement already satisfied, skipping upgrade: pytz in c:\python27\lib\site-packages (from matplotlib) (2019.3)
Requirement already satisfied, skipping upgrade: numpy>=1.7.1 in c:\python27\lib\site-packages (from matplotlib) (1.17.0)
```