

Bachelor Studiengang
Digital Construction

Digital Construction
Programmierung 1

Modul: Submodul 1: Grundlagen und Theorie

Thema: Setup Werkzeuge

Datum: 23.09.2024, 18:30 – 20:55 Uhr

Dozierende:

Michal Rontsinsky, beyondBIM AG

Nora Bukovits, PAZ ACADEMY

Andrés Velasco Muro, PAZ ACADEMY

Martin Loucka, ioLabs AG

Juri Jerg, HSLU

Hochschule Luzern

Departement Technik & Architektur

FH Zentralschweiz



Agenda

Agenda

Zeit	Thema
18:30 – 19:30	Setup Werkzeuge
	Anaconda (conda), Venv, Editor, Git und GitHub
19:30 – 19:45	Pause
19:45 – 20:10	Projektsetup
20:10 – 21:00	Wiederholung Python

Programmübersicht

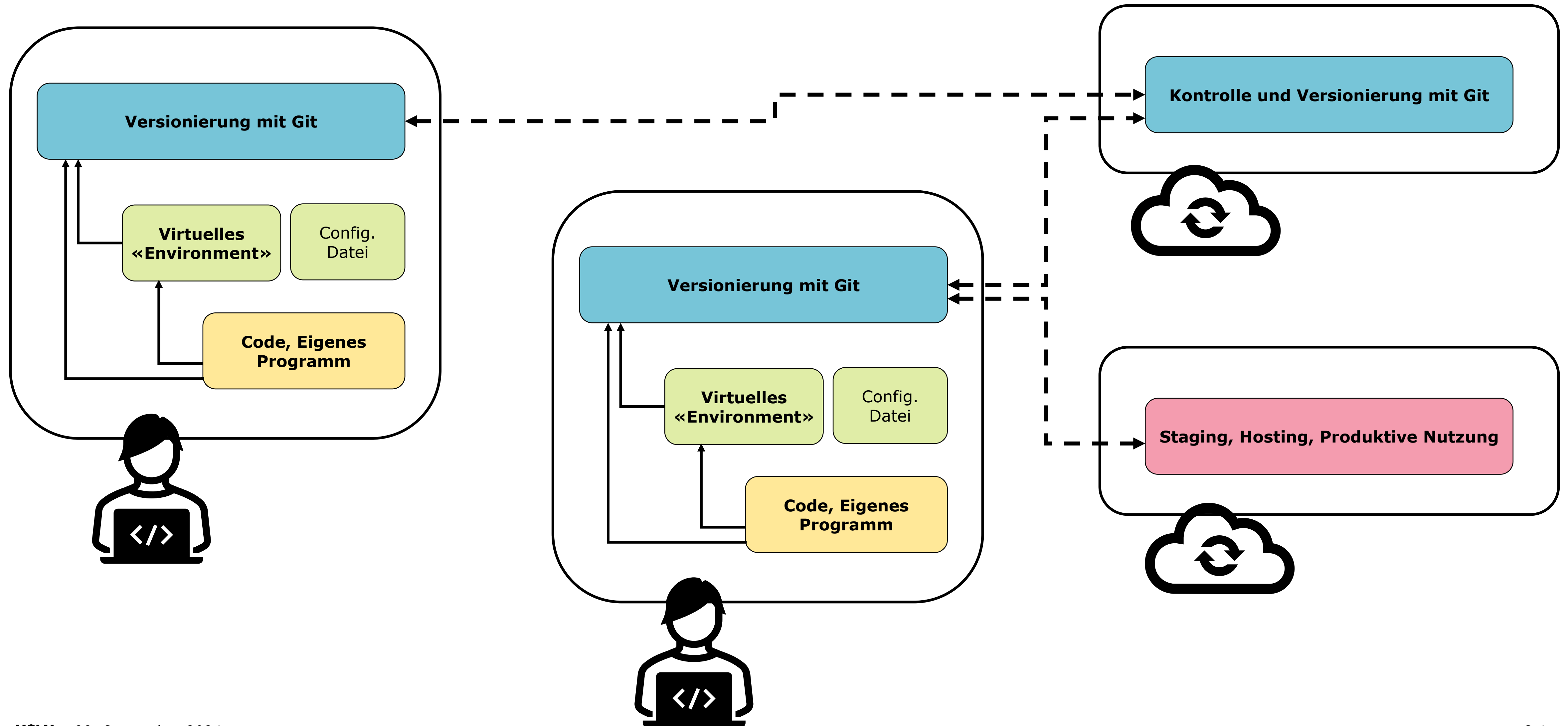
SW	Datum	Ort	Submodul	Bezeichnung Submodul	Thema	Inhalt	Anwesen- heitspflicht	Dozent/in
SW1	16.09.2024	Online	Submodul 1	Grundlagen und Theorie	Einführung	Einführung ins Modul, Aufgabestellung Semesterprojekte Kontext Scripting vs. Programing	x	M. Rontsinsky
SW2	23.09.2024	Vor Ort	Submodul 1	Grundlagen und Theorie	Setup Werkzeuge, Wiederholung Python 1	Wiederholung Grundlagen Python 1 Werkzeuge, Entwicklungsumgebung		M. Rontsinsky
SW3	30.09.2024	Online	Submodul 1	Grundlagen und Theorie	Setup Werkzeuge, Wiederholung Python 2	Wiederholung Grundlagen Python 2 Werkzeuge, Entwicklungsumgebung, Live Coding		M. Rontsinsky
SW4	07.10.2024	Online	Submodul 1	Grundlagen und Theorie	Einführung Python Module und Bibliotheken	lfcOpenshell, Pandas, TkInter, etc. Beispiele und Live Coding		M. Rontsinsky
SW5	14.10.2024	Vor Ort	Submodul 1	Grundlagen und Theorie	Vertiefung Parametrisierung und Geometrie	Erstellen und Manipulieren der Geometrie		N. Bukovits, A.Velasco Muro
SW6	21.10.2024	Online	Submodul 1	Grundlagen und Theorie	Vertiefung Parametrisierung und Geometrie	Erstellen und Manipulieren der Geometrie		N. Bukovits, A.Velasco Muro
SW7	28.10.2024	Online	Submodul 1	Grundlagen und Theorie	Spezialthemen und Algorithmen	Machine Learning		M. Rontsinsky, N. Bukovits, A.Velasco Muro
SW8	04.11.2024	Online	Submodul 2	Konzeption und Entwicklu	Zischenpräsentation 1		x	M. Rontsinsky, N. Bukovits, A.Velasco Muro, Martin Loucka
SW9	11.11.2024	Online	Submodul 2	Konzeption und Entwicklu	Coaching Semesterprojekte	"Get together", individuelles Coaching		M. Rontsinsky
SW10	18.11.2024	Vor Ort	Submodul 2	Konzeption und Entwicklu	Coaching Semesterprojekte	"Get together", individuelles Coaching		M. Rontsinsky, N. Bukovits, A.Velasco Muro
SW11	25.11.2024	Online	Submodul 2	Konzeption und Entwicklu	Coaching Semesterprojekte	"Get together", individuelles Coaching		M. Rontsinsky, N. Bukovits, A.Velasco Muro
SW12	02.12.2024	Online	Submodul 3	Testing und Anwendung	Coaching Semesterprojekte	"Get together", individuelles Coaching		M. Rontsinsky
SW13	09.12.2024	Online	Submodul 3	Testing und Anwendung	Zischenpräsentation 2		x	M. Rontsinsky, N. Bukovits, A.Velasco Muro, Martin Loucka
SW14	16.12.2024	Online	MEP Vorbereitung	MEP Vorbereitung	Abschluss und Vorbereitung MEP			M. Rontsinsky
MEP	tbd	Vor Ort	MEP Durchführung	MEP Durchführung	MEP			M. Rontsinsky, N. Bukovits, A.Velasco Muro, Martin Loucka

SW 1 – SW 4

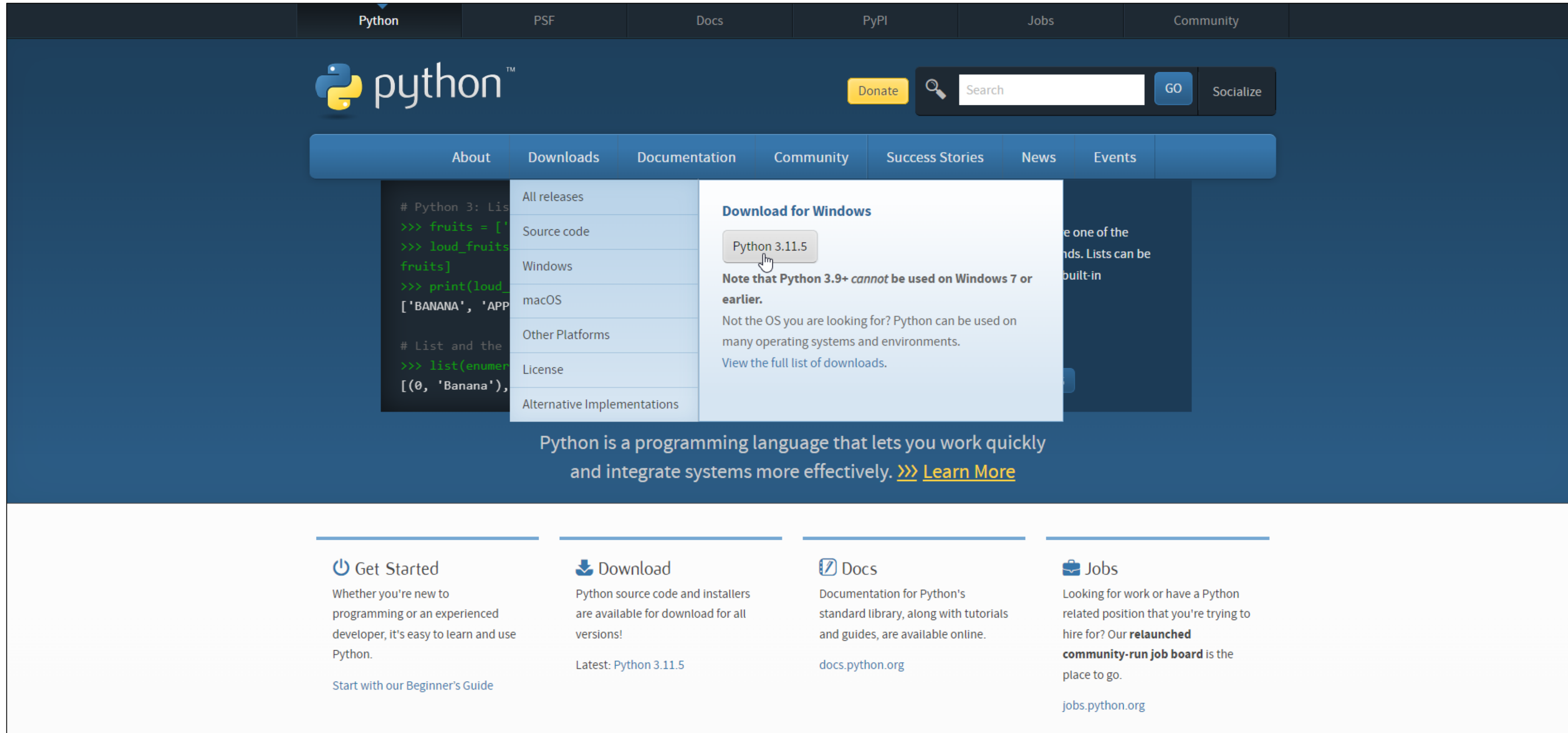
- Dozent/In: M. Rontsinsky, J.Jerg
- **Einrichten der Werkzeuge**, Einführung in die **Entwicklungsumgebung**
- **Wiederholung Python**
- Einführung in die externen Python Module
- **Auswahl Themen Semesterprojekte**

Setup Werkzeuge

Werkzeuge im Kontext – Gesamtübersicht



Installation Python



The screenshot shows the Python.org homepage. The top navigation bar includes links for Python, PSF, Docs, PyPI, Jobs, and Community. The main header features the Python logo, a 'Donate' button, a search bar, and a 'Socialize' button. Below the header is a secondary navigation bar with links for About, Downloads, Documentation, Community, Success Stories, News, and Events. The 'Downloads' link is active, and a dropdown menu is open, showing options for All releases, Source code, Windows, macOS, Other Platforms, License, and Alternative Implementations. The 'Windows' option is selected, leading to the 'Download for Windows' section. This section highlights Python 3.11.5 as the latest version and includes a note that Python 3.9+ cannot be used on Windows 7 or earlier. It also provides a link to view the full list of downloads. Below the download section, a banner states: 'Python is a programming language that lets you work quickly and integrate systems more effectively. >>> [Learn More](#)'. The footer contains four columns: 'Get Started' (with a power icon), 'Download' (with a download icon), 'Docs' (with a document icon), and 'Jobs' (with a briefcase icon). Each column provides a brief description and a link to the relevant resource.

Python

PSF

Docs

PyPI

Jobs

Community

python™

Donate

Search

GO

Socialize

About

Downloads

Documentation

Community

Success Stories

News

Events

All releases

Source code

Windows

macOS

Other Platforms

License

Alternative Implementations

Download for Windows

Python 3.11.5

Note that Python 3.9+ *cannot* be used on Windows 7 or earlier.

Not the OS you are looking for? Python can be used on many operating systems and environments.

[View the full list of downloads.](#)

Python is a programming language that lets you work quickly and integrate systems more effectively. >>> [Learn More](#)

Get Started

Whether you're new to programming or an experienced developer, it's easy to learn and use Python.

[Start with our Beginner's Guide](#)

Download

Python source code and installers are available for download for all versions!

Latest: Python 3.11.5

Docs

Documentation for Python's standard library, along with tutorials and guides, are available online.

[docs.python.org](#)

Jobs

Looking for work or have a Python related position that you're trying to hire for? Our **relaunched community-run job board** is the place to go.

[jobs.python.org](#)

Python

- **Link: www.python.org**

Werkzeuge / Editoren

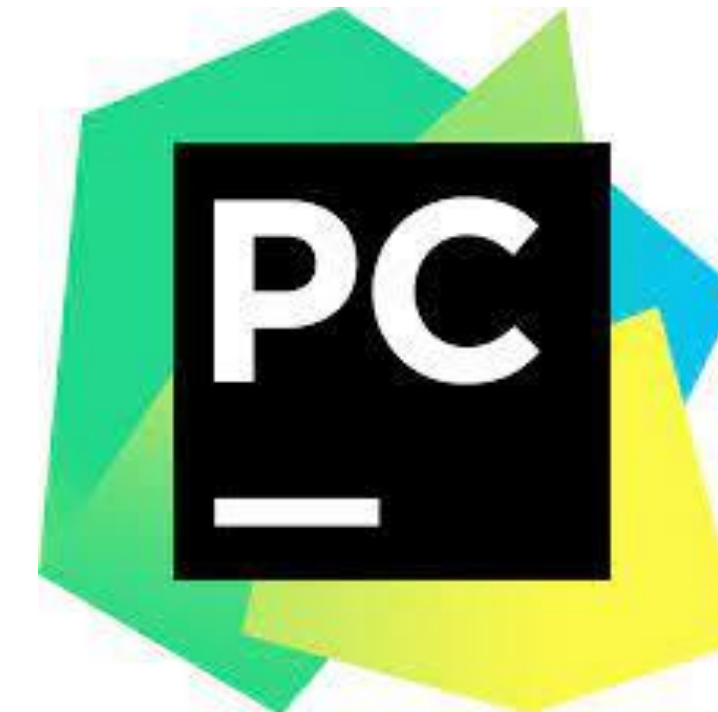
Visual Studio Code

- Link: <https://code.visualstudio.com/>

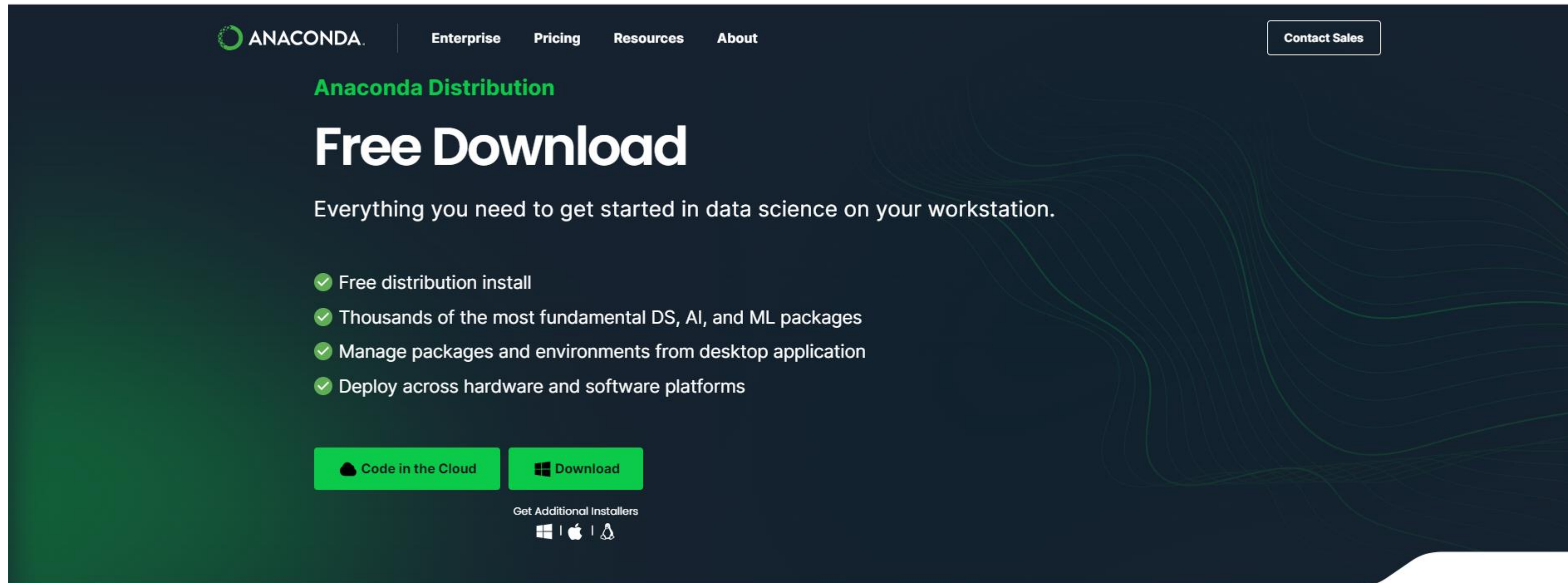


PyCharm

- Link: <https://www.jetbrains.com/pycharm/>



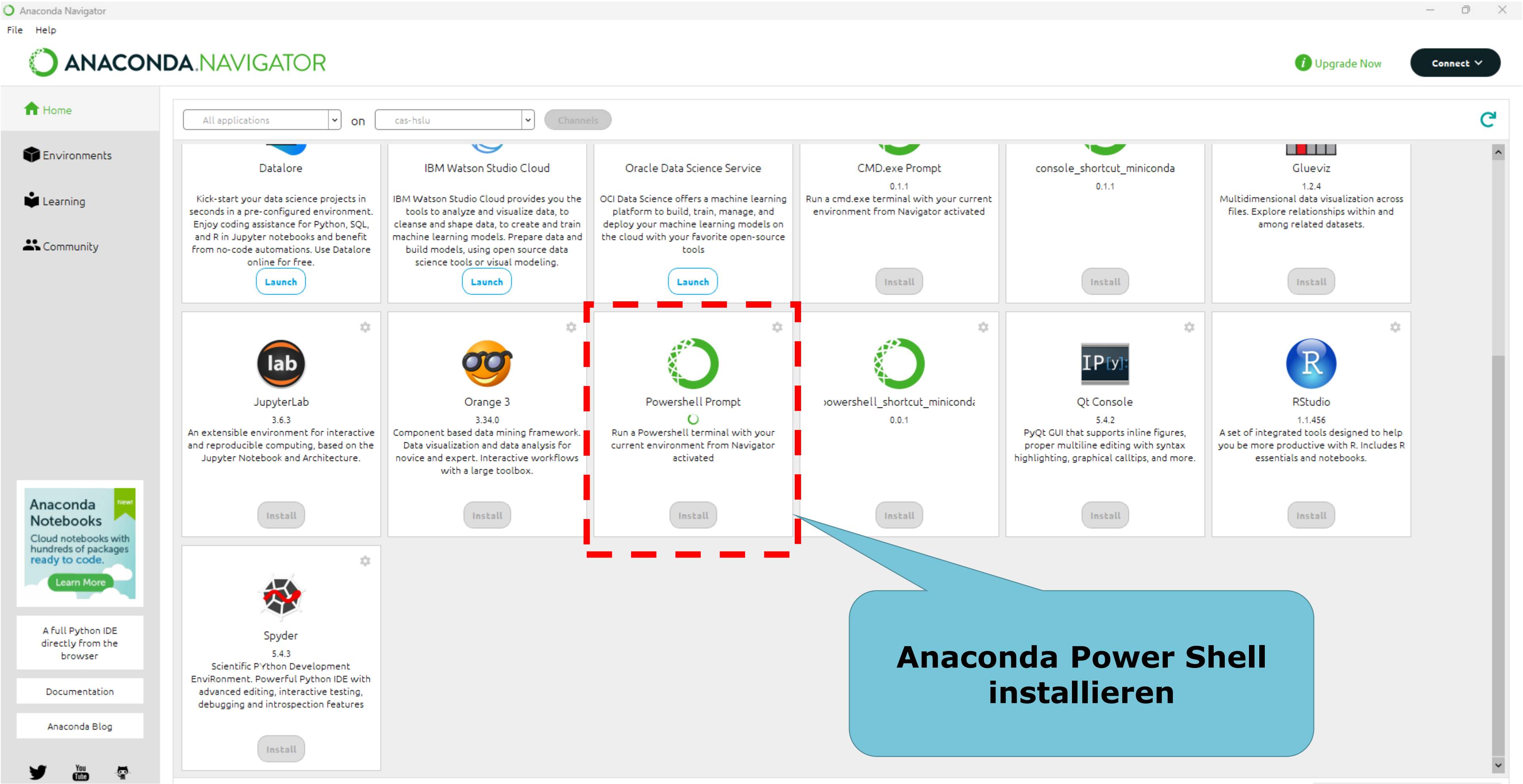
Werkzeuge / Management der Umgebungen



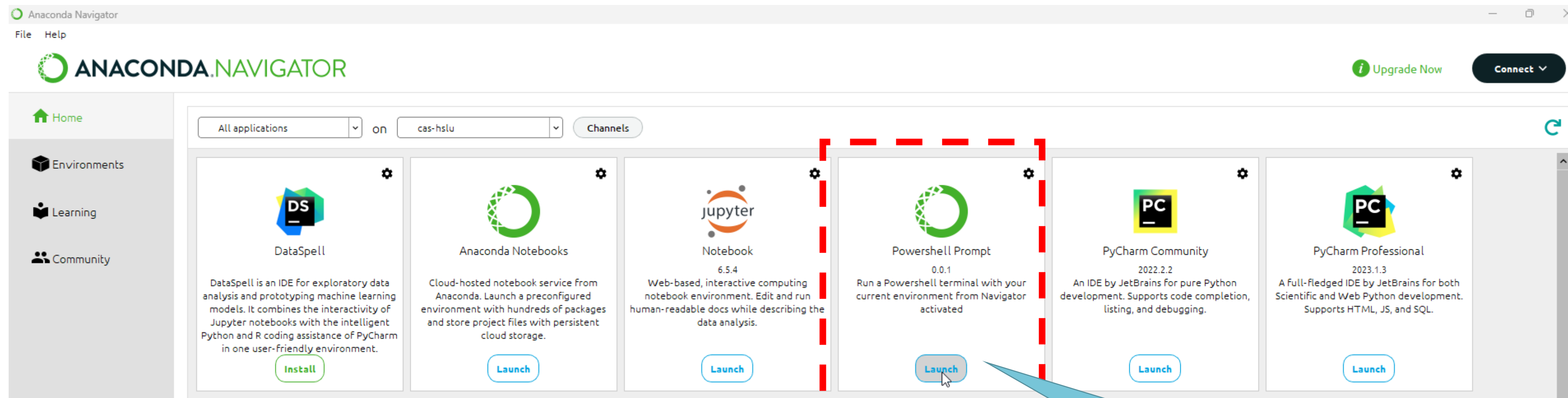
Anaconda Navigator

- **Link:** <https://www.anaconda.com/download>
- **Doku:** <https://docs.anaconda.com/free/anaconda/install/windows/>

Installation Anaconda Power Shell



Prüfen ob conda richtig installiert wurde



```
C:\WINDOWS\System32\Win... x + v
(cas-hslu) PS C:\Users\MichalRontsinsky> conda --version
conda 23.7.2
(cas-hslu) PS C:\Users\MichalRontsinsky> |
```


Conda Einrichten der Python-Umgebung

```
C:\WINDOWS\System32\Win... x + v
PS C:\Users\MichalRontsinsky> conda --version
conda 23.7.2
PS C:\Users\MichalRontsinsky> conda env list
# conda environments:
#
cas-hslu             C:\Users\MichalRontsinsky\.conda\envs\cas-hslu
cas-test             C:\Users\MichalRontsinsky\.conda\envs\cas-test
deploy               C:\Users\MichalRontsinsky\.conda\envs\deploy
motion_backend_group3 C:\Users\MichalRontsinsky\.conda\envs\motion_backend_group3
recipe-app           C:\Users\MichalRontsinsky\.conda\envs\recipe-app
to-do-sql            C:\Users\MichalRontsinsky\.conda\envs\to-do-sql
base                 C:\Users\MichalRontsinsky\anaconda3
                    C:\Users\MichalRontsinsky\miniconda3
PS C:\Users\MichalRontsinsky> conda create --name dc-hslu
```

conda --version

Aktuelle Version von conda abfragen

conda env list

Liste der vorhandenen Umgebungen erstellen

conda create --name dc-hslu

Umgebung mit Name dc-hslu erstellen

conda activate dc-hslu

Umgebung dc-hslu aktivieren

conda deactivate

Aktuelle Umgebung deaktivieren

Conda Einrichten der Python-Umgebung

```
C:\WINDOWS\System32\Win... x + v
PS C:\Users\MichalRontsinsky> conda --version
conda 23.7.2
PS C:\Users\MichalRontsinsky> conda env list
# conda environments:
#
cas-hslu             C:\Users\MichalRontsinsky\.conda\envs\cas-hslu
cas-test             C:\Users\MichalRontsinsky\.conda\envs\cas-test
deploy               C:\Users\MichalRontsinsky\.conda\envs\deploy
motion_backend_group3 C:\Users\MichalRontsinsky\.conda\envs\motion_backend_group3
recipe-app           C:\Users\MichalRontsinsky\.conda\envs\recipe-app
to-do-sql            C:\Users\MichalRontsinsky\.conda\envs\to-do-sql
base                 C:\Users\MichalRontsinsky\anaconda3
                    C:\Users\MichalRontsinsky\miniconda3
PS C:\Users\MichalRontsinsky> conda create --name dc-hslu
```

conda create --name dc-hslu python=3.11.5

Aktuelle Version von conda abfragen

conda remove dc-hslu

Conda Einrichten der Python-Umgebung

```
C:\WINDOWS\System32\Win... x + v
PS C:\Users\MichalRontsinsky> conda --version
conda 23.7.2
PS C:\Users\MichalRontsinsky> conda env list
# conda environments:
#
cas-hslu             C:\Users\MichalRontsinsky\.conda\envs\cas-hslu
cas-test             C:\Users\MichalRontsinsky\.conda\envs\cas-test
deploy               C:\Users\MichalRontsinsky\.conda\envs\deploy
motion_backend_group3 C:\Users\MichalRontsinsky\.conda\envs\motion_backend_group3
recipe-app           C:\Users\MichalRontsinsky\.conda\envs\recipe-app
to-do-sql            C:\Users\MichalRontsinsky\.conda\envs\to-do-sql
base                 C:\Users\MichalRontsinsky\anaconda3
                    C:\Users\MichalRontsinsky\miniconda3
PS C:\Users\MichalRontsinsky> conda create --name dc-hslu
```

Pip install pandas

Pip install ifcopenshell

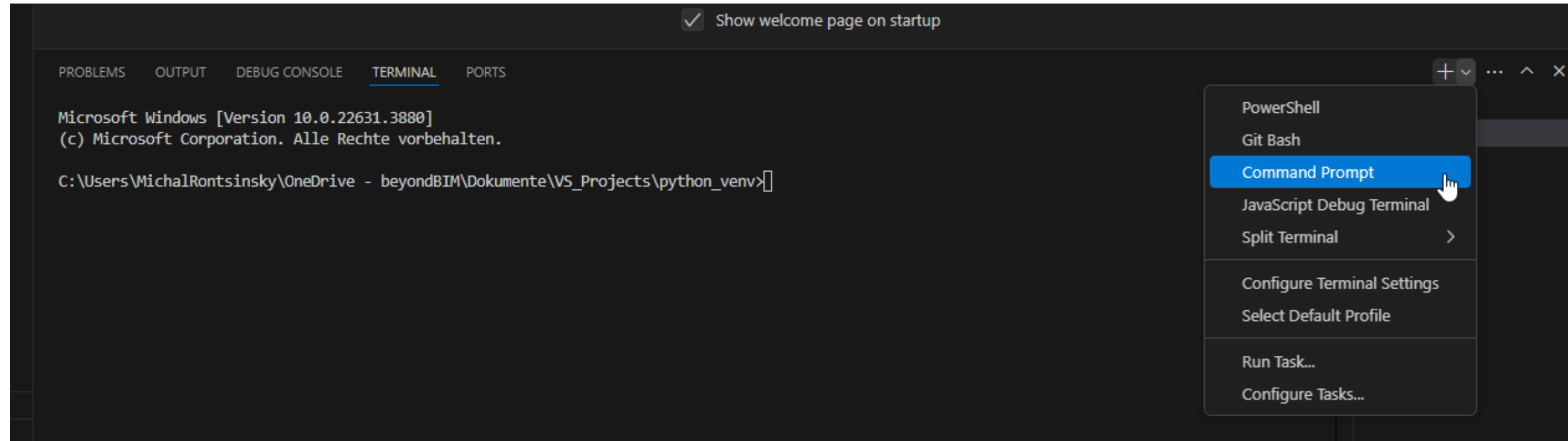
für Mac User

pip3

Mit dem Pip (Python Package Manager) Module:

Pandas und IfcOpenShell installieren.

Venv Einrichten der Python-Umgebung



python -m venv myenv

myenv ist Name der Umgebung, kann frei gewählt werden

myenv\Scripts\activate

Umgebung ist für weitere Bearbeitung aktiviert

pip install pandas

Installieren der python module

pip freeze > requirements.txt

Einstellungen «freezen» in die Req.Datei zum Teilen

pip install -r requirements.txt

Installieren der Module ist der Req.Datei

Venv Einrichten der Python-Umgebung

```
File Edit Selection View Go Run Terminal Help
python_venv

EXPLORER
PYTHON_VENV
  hsluenv
  requirements.txt

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

Microsoft Windows [Version 10.0.22631.3880]
(c) Microsoft Corporation. Alle Rechte vorbehalten.

C:\Users\MichalRontsinsky\OneDrive - beyondBIM\Dokumente\VS_Projects\python_venv>python -m venv hsluenv

C:\Users\MichalRontsinsky\OneDrive - beyondBIM\Dokumente\VS_Projects\python_venv>hsluenv\Scripts\activate

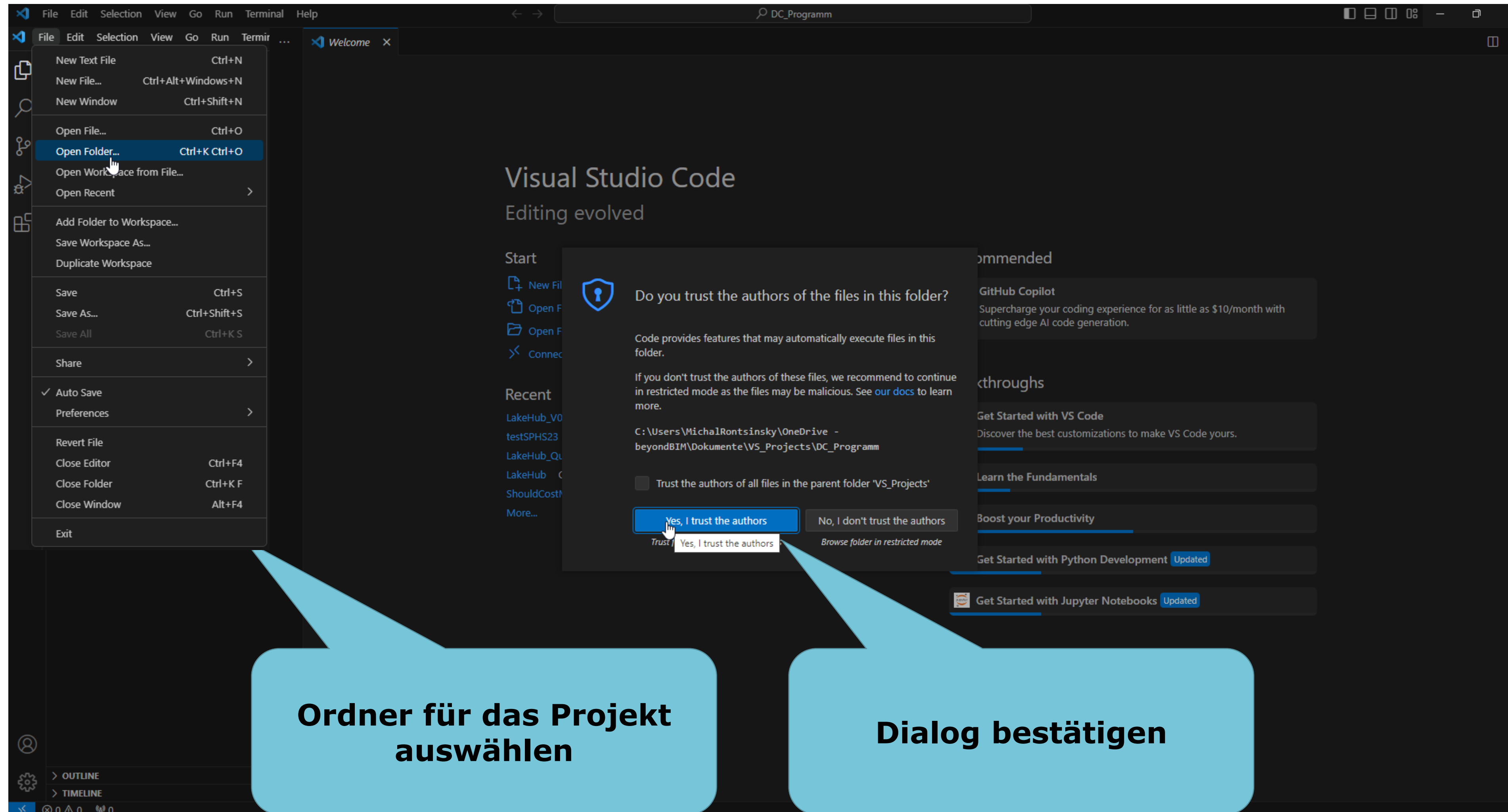
(hsluenv) C:\Users\MichalRontsinsky\OneDrive - beyondBIM\Dokumente\VS_Projects\python_venv>pip freeze

(hsluenv) C:\Users\MichalRontsinsky\OneDrive - beyondBIM\Dokumente\VS_Projects\python_venv>pip freeze > requirements.txt

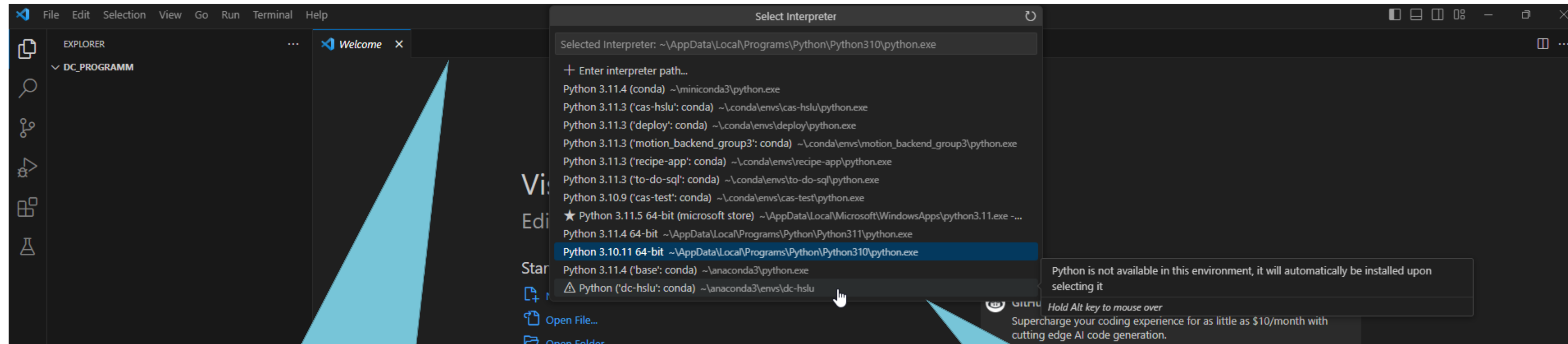
(hsluenv) C:\Users\MichalRontsinsky\OneDrive - beyondBIM\Dokumente\VS_Projects\python_venv>
```

**Erstellen von Venv
«hsluenv», speichern
der Einstellungen in das
requirements.txt Datei**

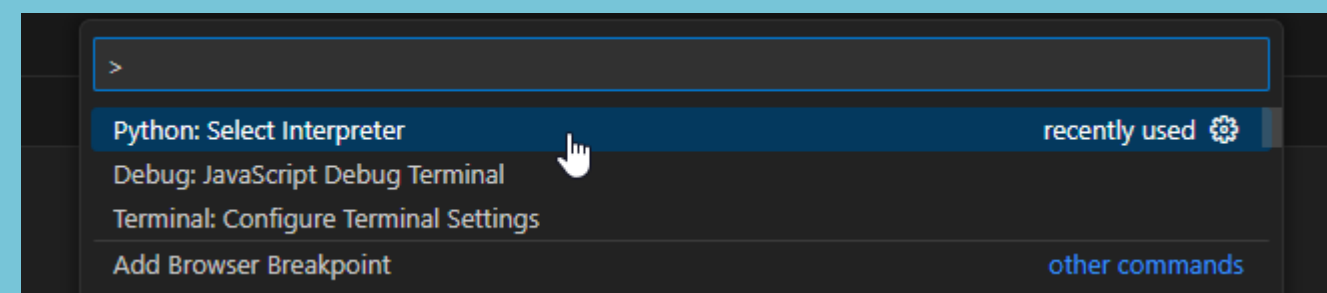
Editor VS Code Einrichten



Editor VS Code Einrichten

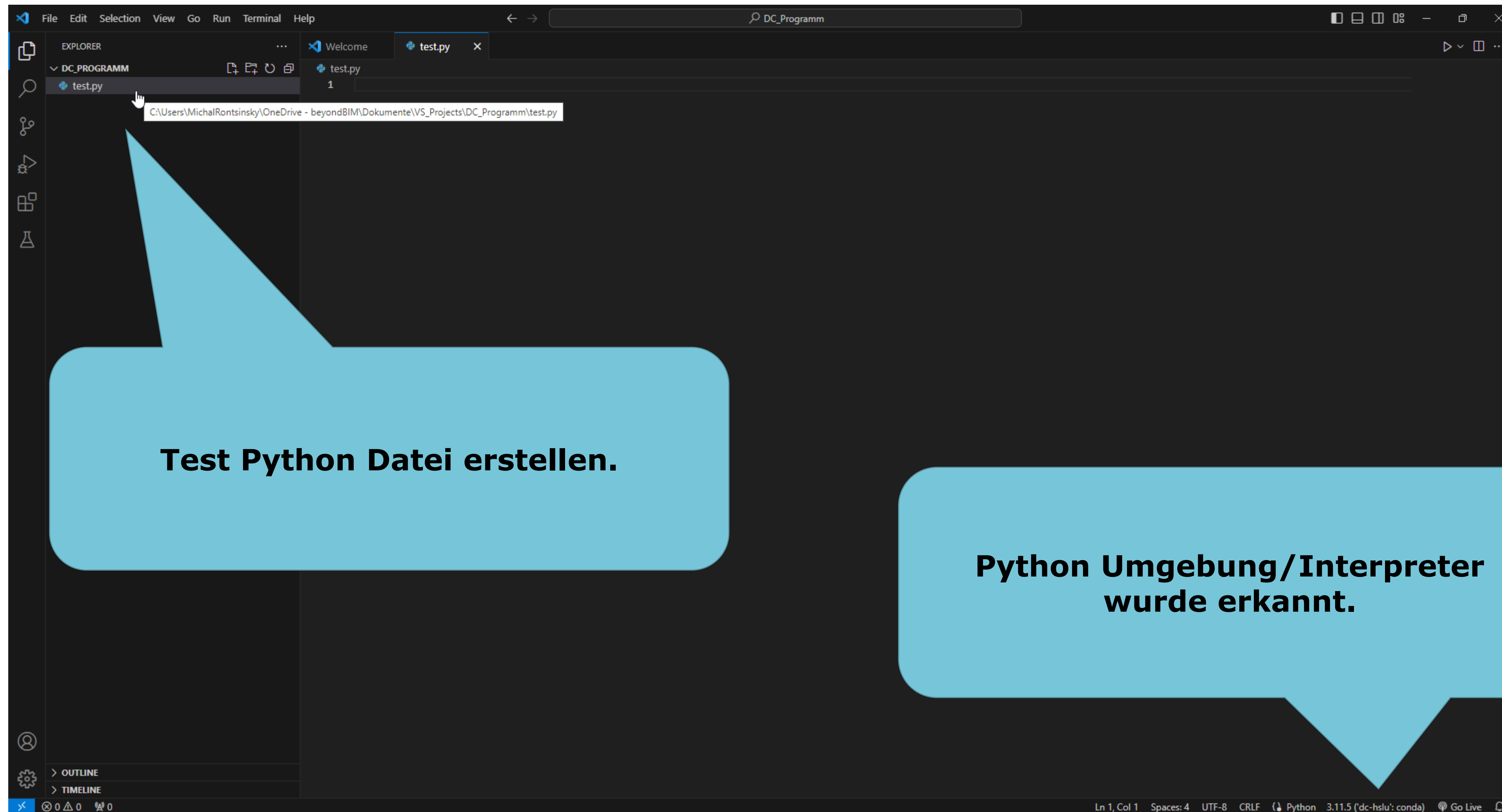


Shortcut: CTRL+Shift + P



Erstellte Umgebung wählen

Editor VS Code Einrichten



Konfiguration - GitHub

The screenshot shows the GitHub profile page for user 'michalRont'. The page includes a navigation bar with 'Overview', 'Repositories' (1), 'Projects', 'Packages', and 'Stars'. The main content area displays the user's profile picture, a repository 'testSPHS23' (Public, Python), and a contribution calendar for the last year. On the right, a dropdown menu is open, listing various options: 'Set status', 'Your profile', 'Your repositories', 'Your projects', 'Your codespaces', 'Your organizations', 'Your enterprises', 'Your stars', 'Your sponsors', 'Your gists', 'Upgrade', 'Try Enterprise', 'Try Copilot', 'Feature preview', 'Settings' (highlighted with a red dashed box and a mouse cursor), 'GitHub Docs', 'GitHub Support', and 'Sign out'.

Menü Settings öffnen

Konfiguration - GitHub

Public profile

Account

Appearance

Accessibility

Notifications

Access

Billing and plans

Emails

Password and authentication

Sessions

SSH and GPG keys

Organizations

Enterprises

Moderation

Code, planning, and automation

Repositories

Codespaces

Packages

Copilot

Pages

Saved replies

Security

Code security and analysis

Integrations

Applications

Scheduled reminders

Archives

Security log

Sponsorship log

Developer settings

Public profile

Name

Your name may appear around GitHub where you contribute or are mentioned. You can remove it at any time.

Public email

Select a verified email to display

You have set your email address to private. To toggle email privacy, go to [email settings](#) and uncheck "Keep my email address private."

Bio

Tell us a little bit about yourself

You can @mention other users and organizations to link to them.

Pronouns

Don't specify

URL

Social accounts

Link to social profile

Link to social profile

Link to social profile

Link to social profile

Company

You can @mention your company's GitHub organization to link it.

Location

Display current local time

Other users will see the time difference from their local time.

All of the fields on this page are optional and most can be updated at any time. If you're not sure, you can always refer to our [privacy statement](#) to learn more about how we use your data.

Update profile

Developer Settings

Personal access tokens (classic)

Generate new token

Revoke all

Tokens you have generated that can be used to access the GitHub API

Generate new token

Fine-grained, repo-scoped

Generate new token (classic)

For general use

Delete

Visual Studio Code — repo

Expires on Sun, Dec 17 2023.

Personal access tokens (classic) function like ordinary OAuth access tokens. They can be used instead of a password for Git over HTTPS, or can be used to [authenticate to the API over Basic Authentication](#).

Generate New Token (Classic)

Konfiguration - GitHub

GitHub Apps

OAuth Apps

Personal access tokens

Fine-grained tokens

Tokens (classic)

New personal access token (classic)

Personal access tokens (classic) function like ordinary OAuth access tokens. They can be used instead of a password for Git over HTTPS, or can be used to [authenticate to the API over Basic Authentication](#).

Note

DC-HSLU

What's this token for?

Expiration *

90 days

The token will expire on Sat, Dec 23 2023

Select scopes

Scopes define the access for personal tokens. [Read more about OAuth scopes](#).

☒ repo

Full control of private repositories

☒ repo:status

Access commit status

☒ repo_deployment

Access deployment status

☒ public_repo

Access public repositories

☒ repo:invite

Access repository invitations

☒ security_events

Read and write security events

Generate token

Cancel

Token erstellen

GitHub Apps

OAuth Apps

Personal access tokens

Fine-grained tokens

Tokens (classic)

Personal access tokens (classic)

Generate new token

Revoke all

Tokens you have generated that can be used to access the [GitHub API](#).

Make sure to copy your personal access token now. You won't be able to see it again!

✓ ghp_E45pq4bbnSVUtsbfKg1ELR9QvM3tN13rQ1Jm

Visual Studio Code — repo

Expires on Sun, Dec 17 2023.

Last used within the last week

Delete

Personal access tokens (classic) function like ordinary OAuth access tokens. They can be used instead of a password for Git over HTTPS, or can be used to [authenticate to the API over Basic Authentication](#).

Token kopieren und lokal speichern.

HSLU 22. September 2024

Seite 22

Konfiguration - GitHub

GitHub Apps

OAuth Apps

Personal access tokens

Fine-grained tokens

Tokens (classic)

New personal access token (classic)

Personal access tokens (classic) function like ordinary OAuth access tokens. They can be used instead of a password for Git over HTTPS, or can be used to [authenticate to the API over Basic Authentication](#).

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DC-HSLU

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Access commit status

☒ repo_deployment

Access deployment status

☒ public_repo

Access public repositories

☒ repo:invite

Access repository invitations

☒ security_events

Read and write security events

Generate token

Cancel

Token erstellen

GitHub Apps

OAuth Apps

Personal access tokens

Fine-grained tokens

Tokens (classic)

Personal access tokens (classic)

Generate new token

Revoke all

Tokens you have generated that can be used to access the [GitHub API](#).

Make sure to copy your personal access token now. You won't be able to see it again!

✓ ghp_E45pq4bbnSVUtsbfKg1ELR9QvM3tN13rQ1Jm

Delete

Visual Studio Code — repo

Last used within the last week

Delete

Expires on Sun, Dec 17 2023.

Personal access tokens (classic) function like ordinary OAuth access tokens. They can be used instead of a password for Git over HTTPS, or can be used to [authenticate to the API over Basic Authentication](#).

Token kopieren und lokal speichern.

HSLU 22. September 2024

Seite 23

GitHub - Repository



GitHub - Repository

Create a new repository
A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

Required fields are marked with an asterisk ().*

Owner * / Repository name *
✓ HS23_SW02 is available.

Great repository names are short and memorable. Need inspiration? How about [bug-free-lamp](#) ?

Description (optional)

☒ **Public**
Anyone on the internet can see this repository. You choose who can commit.

☐ **Private**
You choose who can see and commit to this repository.

Initialize this repository with:
☒ **Add a README file**
This is where you can write a long description for your project. [Learn more about READMEs.](#)

Add .gitignore

Choose a license

A license tells others what they can and can't do with your code. [Learn more about licenses.](#)

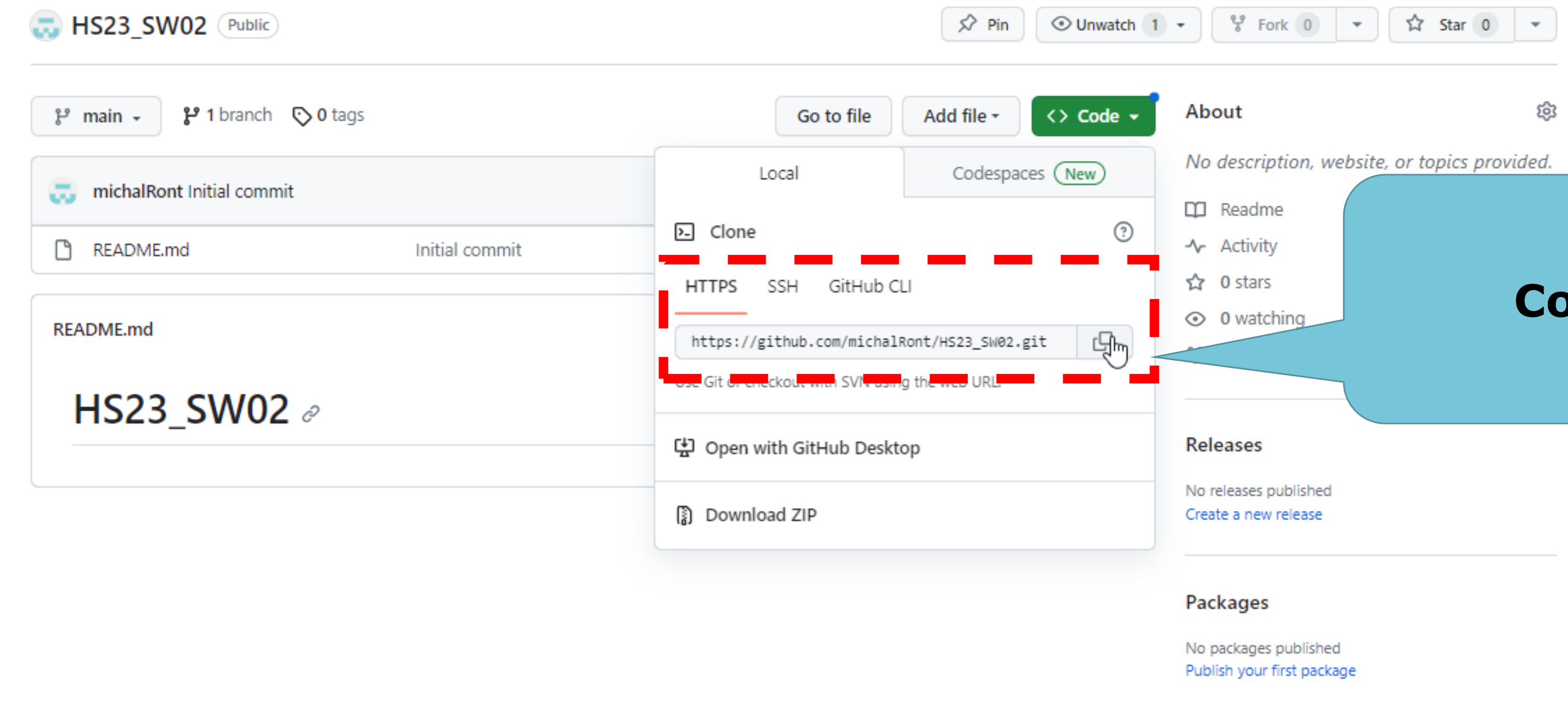
This will set `main` as the default branch. Change the default name in your [settings](#).

ⓘ You are creating a public repository in your personal account.

Name für Repository festlegen.

Neues Repository als Public erstellen.

GitHub – Repository im Editor verknüpfen



GitHub – Repository im Editor verknüpfen



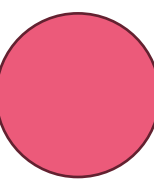
git status

git init

git remote add origin https://github.com/michalRont/HS23_SW02.git

git remote set-url origin https://<USERNAME>:<TOKEN>@github.com/<REPOSITORY_NAME>.git

**Verbindung zum
Repository einrichten**



GitHub – Repository im Editor verknüpfen

git branch -M main

git branch

git checkout my_branch

git status

git add .

git commit -m «new version»

git push origin master

git pull origin master

**Neues Branch erstellen
und aktivieren.**

**Inhalte zum Upload
hinzufügen.**

Änderungen hochladen.

Hochschule Luzern

Michal Rontsinsky
Dozent

Michal.Rontsinsky@hslu.ch