# Python Programming Setup Guide

## Setting up a Python environment on your computer

Chair of Information Systems, Humboldt University Berlin

# Introduction


The tutorial materials typically consist of Jupyter notebooks. We will make these materials available through our Moodle page and via our GitHub repository.

You are encouraged to familiarize yourself with the concepts of GitHub and Jupyter notebooks. Introductory materials are available on the Moodle page as well as on the web and on YouTube.

The easiest way to open Jupyter notebooks is to use cloud-based environments like the Humboldt University JupyterHub or Google Colab. This is the right choice if you are hesitant to install software on your private computer and/or feel less comfortable with installing and configuring programs and packages.

This guide is here to help you if you choose to use your own computer for the tutorial. All the software we need is free to use and you do not need an account with Google or any other cloud provider. However, you should be ready to do some configuration work.

# Install Python and Git


## Install Python3

https://www.python.org/downloads/ (It is recommended to install Python 3.9, 3.10, or 3.11)

## Clone our GitHub repository (optional)

Install git: https://git-scm.com/ or download the GitHub Desktop App.

Clone the repository from our URL ...

... or type into the terminal:

```
git clone https://github.com/Humboldt-WI/IPML
```

This is optional since you can also download the files from Moodle and save them locally.

# Create a virtual environment and install requirements


## Choose a package manager

Decide between using PyPI and Anaconda to manage your packages.

PyPI has the advantage of having more packages and being more light-weight.
Anaconda has the advantage of having a nice interface and being more intuitive and user friendly.

## Option 1: PyPI

Create and activate a new environment by typing into your console:

```
python3 -m venv ipml-env
source ipml-env/bin/activate
```

Then install the requirements using pip:

```
pip install --upgrade pip
pip install -r requirements.txt
```

# Create a virtual environment and install requirements


## Option 2: Anaconda

Download and install Anaconda from https://www.anaconda.com/.
Create a new environment with our requirements by running:

```
conda env create -f ipml-env.yaml
```

## Open Jupyter or the IDE of your choice

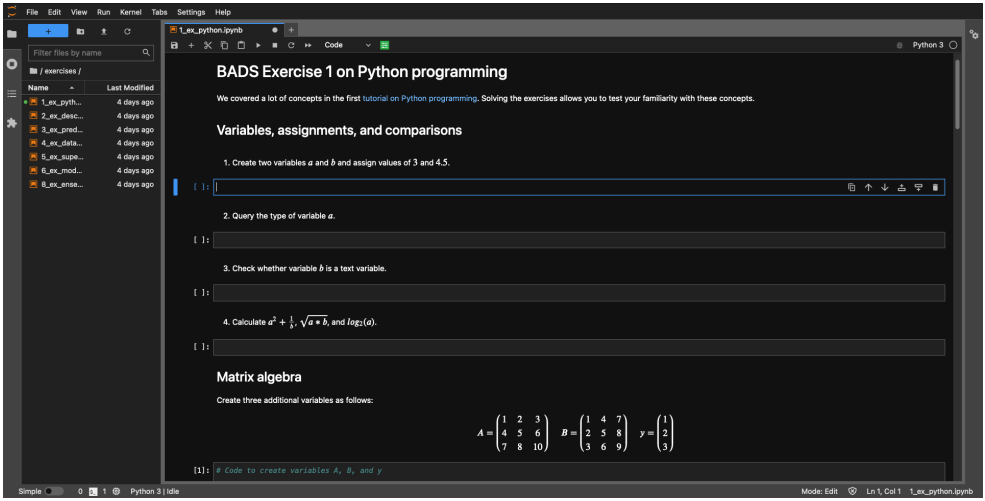
Now that you have activated your environment and installed the requirements with your preferred package manager you can open your IDE of choice and start coding, e.g. by typing into the terminal:

```
jupyter lab
```

A tab with Jupyter Lab should open in your default browser.

You can now browse the repository and open the tutorial notebooks.

# Juypter Lab


File Edit View Run Kernel Tabs Settings Help
1_ex_python.ipynb
Code
Python 3
Filter files by name
/ exercises /
Name
Last Modified
1_ex_pyth... 4 days ago
2_ex_desc... 4 days ago
3_ex_pred... 4 days ago
4_ex_data... 4 days ago
5_ex_supe... 4 days ago
6_ex_mod... 4 days ago
8_ex_ense... 4 days ago
BADS Exercise 1 on Python programming
We covered a lot of concepts in the first tutorial on Python programming. Solving the exercises allows you to test your familiarity with these concepts.
Variables, assignments, and comparisons
1. Create two variables a and b and assign values of 3 and 4.5.
2. Query the type of variable a.
3. Check whether variable b is a text variable.
4. Calculate $a^3 + \frac{1}{b}$, $\sqrt{a * b}$, and $log_2(a)$.
Matrix algebra
Create three additional variables as follows:
$A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 10 \end{pmatrix}$ $B = \begin{pmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{pmatrix}$ $y = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$
[1]: # Code to create variables A, B, and y
Simple 0 1 Python 3 | idle
Mode: Edit Ln 1, Col 1 1_ex_python.ipynb

# Useful resources and further reading


- Colab:
  https://www.kdnuggets.com/2020/06/google-colab-deep-learning.html
- Jupyter:
  https://towardsdatascience.com/getting-the-most-out-of-jupyter-lab-9b3198f88f2d
- More on Jupyter:
  https://pabloinsente.github.io/intro-jupyter-ide
- Virtual environments:
  https://www.dataquest.io/blog/a-complete-guide-to-python-virtual-environments/