Getting started with Python 3

For beginners

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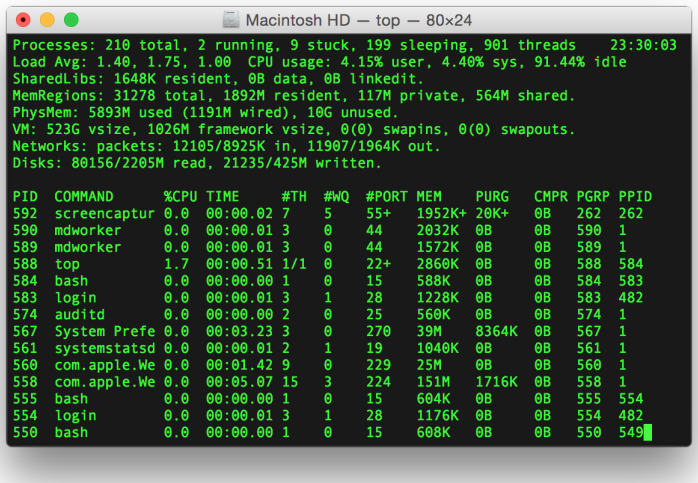
Hva er Python?

Python is a highly versatile programming language. Python is often used in scientific applications, ranging from simulating space to making statistical analyzers of data of various disciplines. It can also be used to create websites and applications for tablets and mobiles. You have probably already heard about Netflix, Instagram or Spotify? All this was created in Python.

To be able to write own programs in Python, you need a total of 3 tools: the terminal, Anaconda, and text editors. All of these tools will be introduced and explained in separate sections, and finally we will go through how to download Python and use all of these tools to run a simple Python code in the last section.

The Terminal

The terminal gives us access to the computer's command line. Why is this command line necessary? The whole point of the operating system is to offer the user a graphical user interface (also called a GUI) so that one never has to use the terminal. However, in many cases the terminal is faster than the operating system's GUI. In addition, there are a number of tools and software that are only available via the command line. For example, Python code can only be run via the terminal.



An incomplete list of usable commands will be provided. These following commands are only useful to the terminal on MacOS. The terminal comes with the operating system and already exists among the applications on your Mac. Note that many of the commands are the same or partially the same as in a Windows terminal, but here there will only be a list of commands that are usable for a MacOS terminal.

Note that the enter-buttons needs to be used to execute every line of command in the terminal.

1. Change directory

You write the following command in the terminal in order to change your directory:

```
$ cd "filename"
```

This command will change which folder you're currently in. Sometimes you need to change the folder you're in in order to execute certain commands in another folder, such as when you want to run Python code that is in other folders. Or in other cases, you have to change the folder you are in to be able to see the contents of another folder, or to be able to open a file.

The following command allows you to exit a folder you're currently in:

```
$ cd ..
```

If you want to exit all folders you're in (back to home directory), just type "cd" in the terminal:

```
$ cd
```

Example:
This command will take you into a folder named "images" which is inside another folder named "documents".

```
$ cd ~/documents/images
```

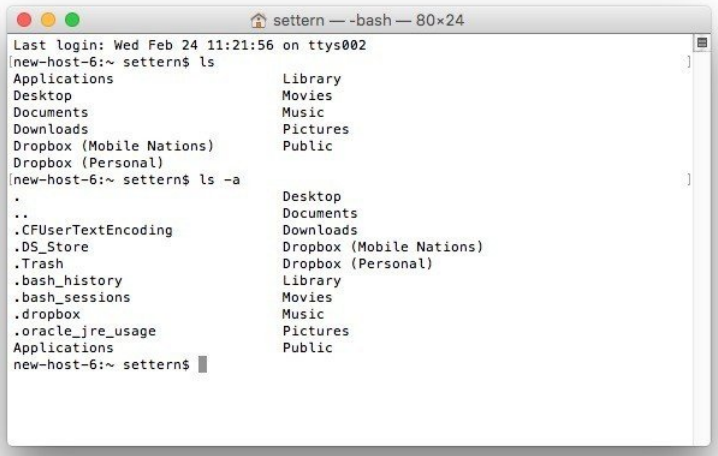
To be able to go back to the outer folder named "documents", you can type "cd .." in the terminal to get out of the folder "photos".

2. Listing Directory

To get a list of which files are contained in the folder you're in, you can type the following in the terminal:

```
$ ls
```

Example:



3. Open files

To open a file in the folder you are in, this can be done by the following command:

```
$ open "filename"
```

By entering "open" followed by a space and the filename will open the file with the program that is capable of opening this file type. You do not need to enter the full file name, but enter the beginning of the file name and press the tab button to auto-complete the remaining text.

4. Create new folder

To create a new folder in the terminal, enter the following command in the terminal:

```
$ mkdir "fodername"
```

If you type "mkdir" followed by a space and the name of the folder you want to create, the folder will automatically be saved inside the folder you are already in. If you want to have the folder in a specific place, you must enter where you want the file name. See the example below.

Example:

```
$ mkdir ~/documents/images/new_folder
```

This example shows that you want to create a folder named "new_folder" in a folder called images, which is a subfolder of "documents".

Anaconda

Compared to Python, there are a number of toolboxes (most commonly referred to as packages or libraries) that can be installed for free from the web. Pip stands for «Python's package manager». This is a built-in Python feature used to install Python libraries such as Numpy, Pandas, Matplotlib and Jupyter Notebook.

Numpy is a library that handles various mathematical functions, which make it easier to to perform numerous calculations at once. This library is considered as a fundamental tool for scientific computing. Pandas is a library that makes it easier to manipulate and analyze data. Matplotlib is a visualization tool, making it possible to create your own graphs and figures. Jupyter Notebook is a web solution that supports the programming languages Julia, Python and R. This makes it easier for users to create and share documents that contain code, equations and visualizations along with explanatory text.

To use "pip install" you must write the following in the terminal:

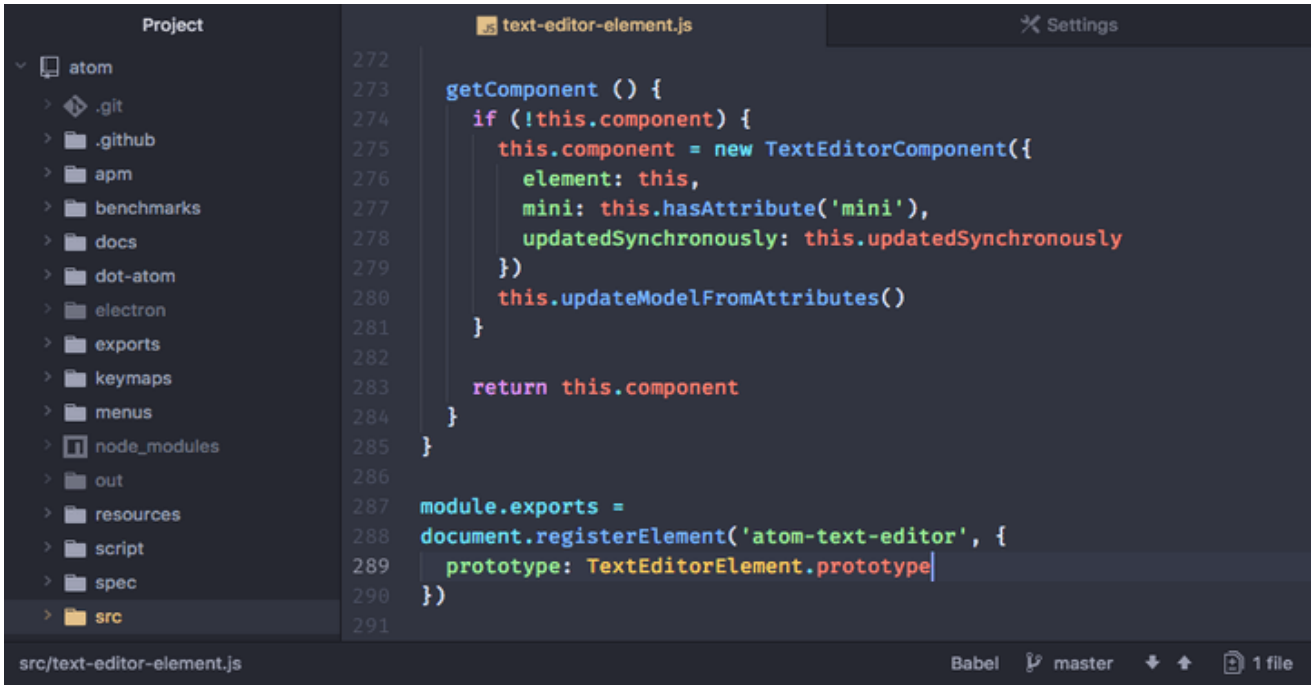
```
$ Pip install <your_favourite_library>
```

Instead of installing every single library separately using "pip install", you can instead download Anaconda. This is a Python-based platform that contains built-in Python libraries. It is often the case that beginners in programming experience various problems if they only use "pip install", and therefore Anaconda is most often preferred.

Anaconda will take up about 450 MB of space on your computer, this is because Anaconda has many built-in libraries. If you do not have enough available space, it is possible to download Miniconda. This is a smaller version of Anaconda and will take approximately 50 to 60 MB of available space on your local computer. This contains fewer libraries, but has most of the basic libraries that will be suitable for a beginner programmer.
Miniconda can be downloaded here: https://docs.conda.io/en/latest/miniconda.html

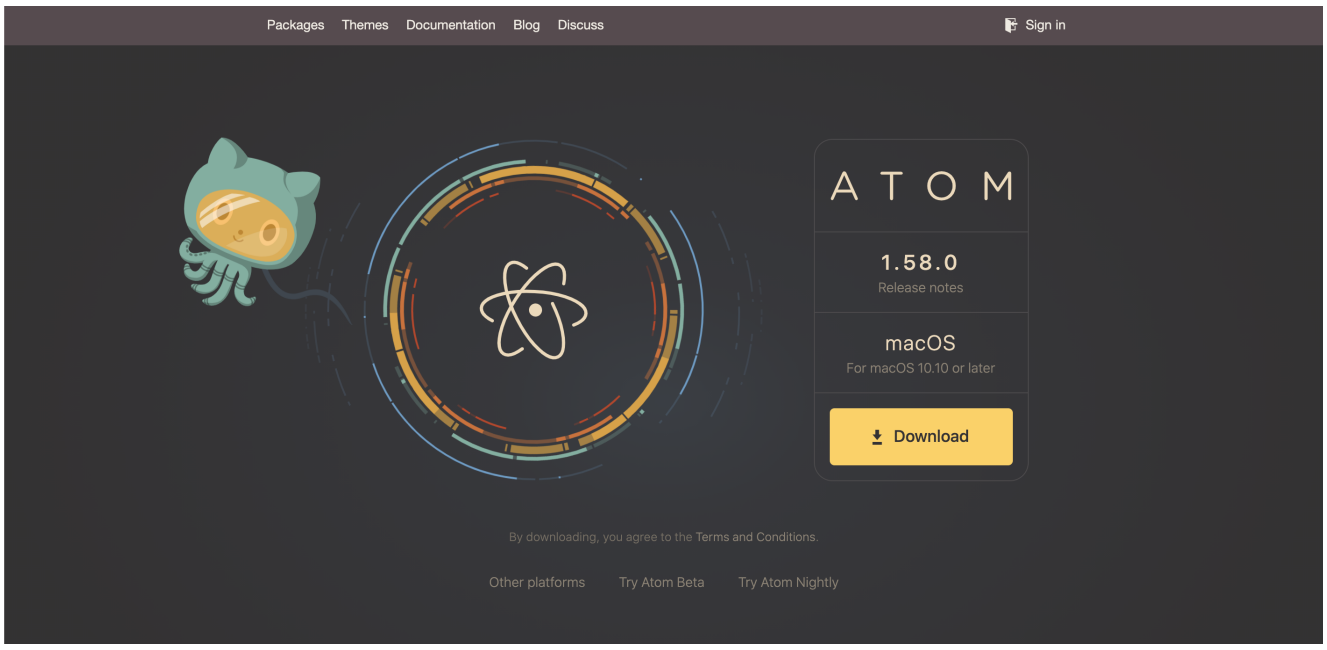
Text Editor

Furthermore, we need to download a text editor in order to write Python code. Note that code is only plain text written in a specific format. The format depends on the programming language you use. Python code will be in a different format compared to e.g. Java code. It doesn't matter where you write the code, as long as you can save it in the correct file type. For example Microsoft Word is not a valid text editor, as it creates all files in a .docx format by default. A text editor is a tool used to open, manage and edit code. The text editors Atom or Visual Studio Code is often recommended among beginners, but it really depends on personal preference.
Atom can be downloaded here: https://atom.io/



To be considered as a good text editor it needs to be able to make it easier for the user to differentiate between different elements in the code. This makes it easier for programmers to both manage their code afterwards and also to make it simple for other them to read other people's code. The image above shows an example of how Atom differentiates different elements in the code using different colors and indentations.

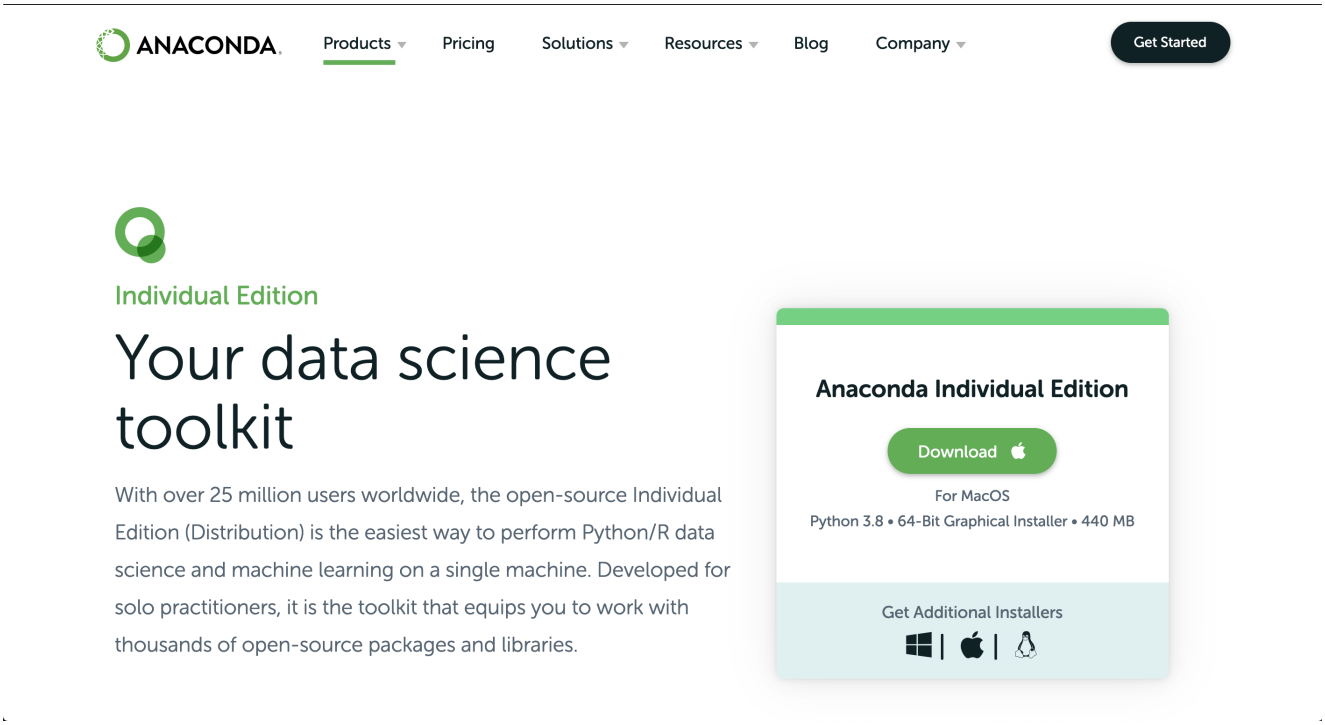
Atom kan lastes ned på: https://atom.io/



The website here will recognize the computer's operating system, so that the software version compatible with your operating system will be downloaded.

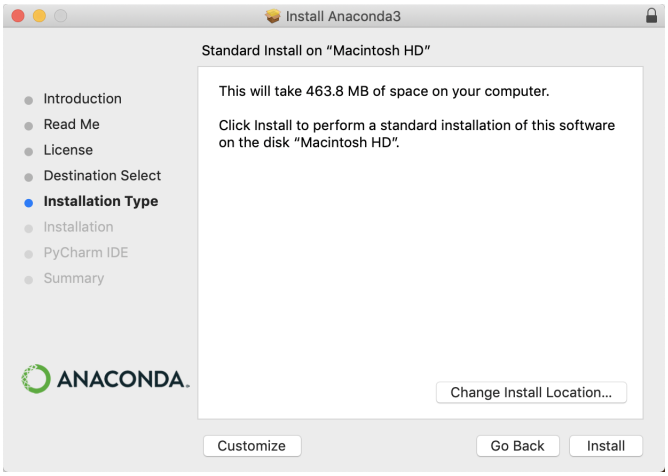
Download Anaconda on Mac

The following URL gives you the downloading page for Anaconda: **https://www.anaconda.com/pro** The website will recognize your operating system via the web browser such that the downloading file will be compatible with MacOS.



If it does not say "For MacOS" under the Download button, then press one of the three logos that are compatible with your computer.

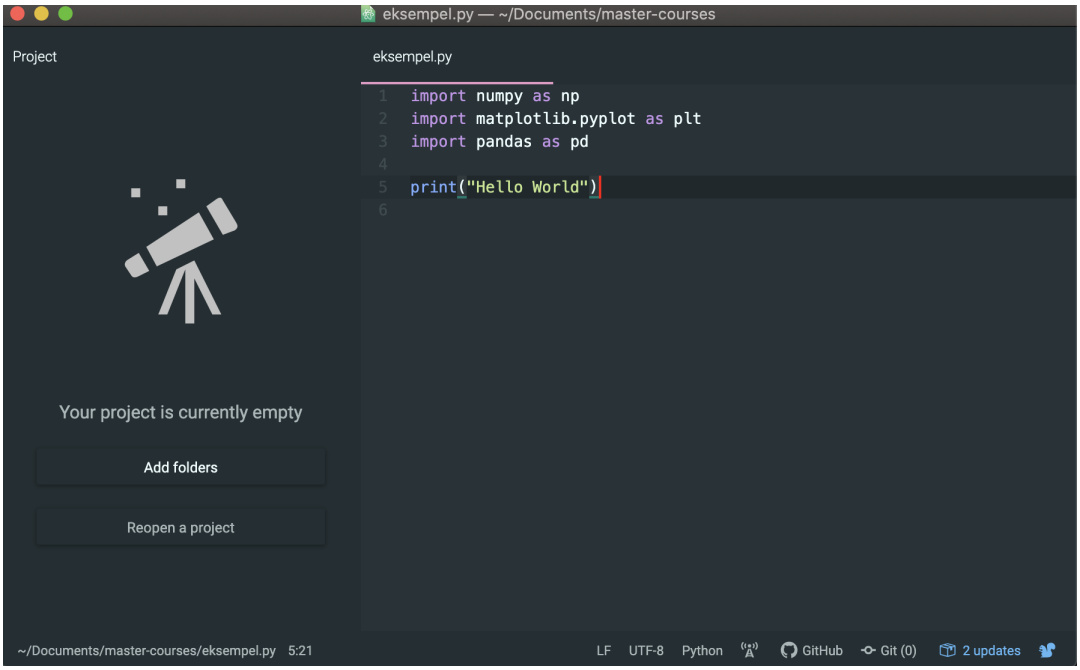
Browse through your installer and only accept the default settings.



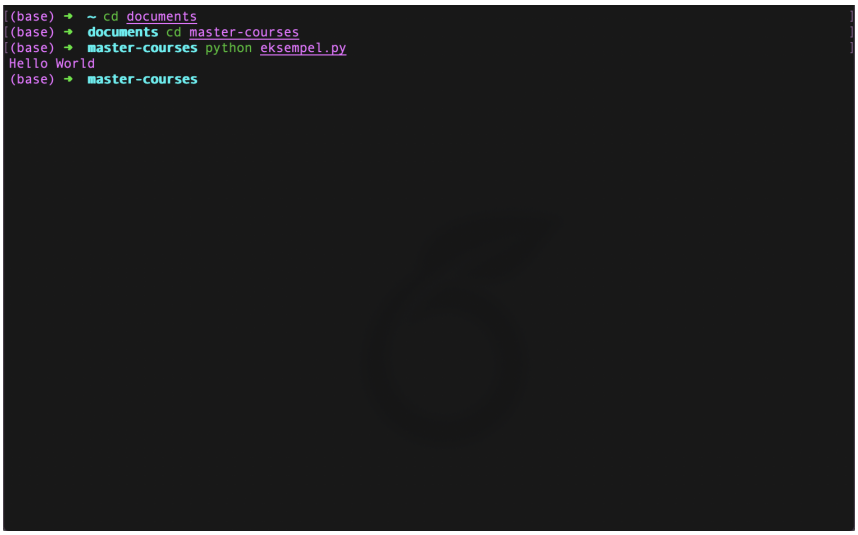
Note that all files ending with ".py" are a Python file. Executing a Python program (to run your code) must be done in the terminal. Typing "Python" followed by a space and the filename of the Python file will execute your code.

```
$ python eksempel.py
```

Create a new file in your text editor named "example.py", and import some libraries like fore example Numpy, Matplotlib and Pandas to test that Anaconda has been downloaded. If the Python file looks like this:



then the following text will appear in the terminal after you run the Python file:



Here we have accessed the folder called "documents", and went into the sub-folder named "masters-courses" and opened the Python code named "eksempel.py".

To stop running a Python program before it is completed, hold down the ctrl key and the c-button at the same time in the terminal.