INSTITUTE FOR
NETWORKED SOLUTIONS

Python Basics

Version 1.0
March 19, 2022
Institute for Networked Solutions

Contents

Part I.

Introduction

1. Environment Setup

With this guide we will now set up the environment with which you can complete the entire Python Basics course.

Of course, there are different environments to code Python and are completely user dependent, which suits them best. Here we just give you a way how you can easily complete the course with our documentation.

The exercises in this course are all written in Jupyter notebooks, which contain a tutorial and the Python code can be executed directly.

To be ready for the course, you will need the following:

- Python 3
- Visual Studio Code
- Python Extension for Visual Studio Code

1.1. Install Python 3

Python is a programming language that lets you work quickly and integrate systems more effectively.

Before you start, you will need Python on your computer. You can download Python for Windows, macOS, and Ubuntu for free at . If you download the latest version from the website's download page, all of the programs in this course should work.

1.1.1. Windows

On Windows, download the Python installer and double-click it. Follow the instructions the installer displays on the screen to install Python, as listed here:

1. Choose the checkbox Add Python to PATH at the bottom.
2. Select Install Now to install Python with default settings.

1.1.2. Ubuntu

Python 3 is already included in a standard Ubuntu installation, since system components also require Python as a prerequisite. The following command in the terminal shows which version is installed:

```
python3 --version
```

If you're running Ubuntu, you can install Python from the Terminal by following these steps:

```
sudo apt install python3
```

Use the following command to install pip for Python 3:

```
sudo apt install python3-pip
```

Pip is a package management system that simplifies installation and management of software packages written in Python.

1.1.3. macOS

On macOS, download the .dmg file that's right for your version of macOS and double-click it. Follow the instructions the installer displays on the screen to install Python, as listed here:

1. When the DMG package opens in a new window, double-click the Python.mpkg file. You may have to enter the administrator password.
2. Accept the default options for the next several windows by clicking Continue and click Agree to accept the license.
3. On the final window, click Install.

1.2. Install Visual Studio Code

Visual Studio Code is a lightweight but powerful source code editor which runs on your desktop and is available for Windows, macOS and Linux. It comes with built-in support for JavaScript, TypeScript and Node.js and has a rich ecosystem of extensions for other languages (such as C++, C#, Java, Python, PHP, Go) and runtimes (such as .NET and Unity).

Getting up and running with Visual Studio Code is quick and easy. It is a small download so you can install in a matter of minutes and give VS Code a try. VS Code is a free code editor.

Follow the platform-specific guides below:

1.2.1. Windows

1. Download the Visual Studio Code Installer for Windows.
2. Once it is downloaded, run the installer `VSCodeUserSetup-version.exe`. This will only take a minute.
3. Now start Visual Studio Code from your Desktop by clicking the Icon.

1.2.2. Ubuntu

The easiest way to install Visual Studio Code for Debian/Ubuntu based distributions is to download and install the .deb package (64-bit), either through the graphical software center if it's available, or through the command line with:

```
sudo apt install ./<file>.deb
# If you're on an older Linux distribution, you will need to run this instead:
# sudo dpkg -i <file>.deb
# sudo apt-get install -f # Install dependencies
```

Installing the .deb package will automatically install the apt repository and signing key to enable auto-updating using the system's package manager.

1.2.3. MacOS

1. Download Visual Studio Code for macOS.
2. Open the browser's download list and locate the downloaded archive.
3. Select the 'magnifying glass' icon to open the archive in Finder.

4. Drag Visual Studio Code.app to the Applications folder, making it available in the macOS Launchpad.

5. Add VS Code to your Dock by right-clicking on the icon to bring up the context menu and choosing Options, Keep in Dock.

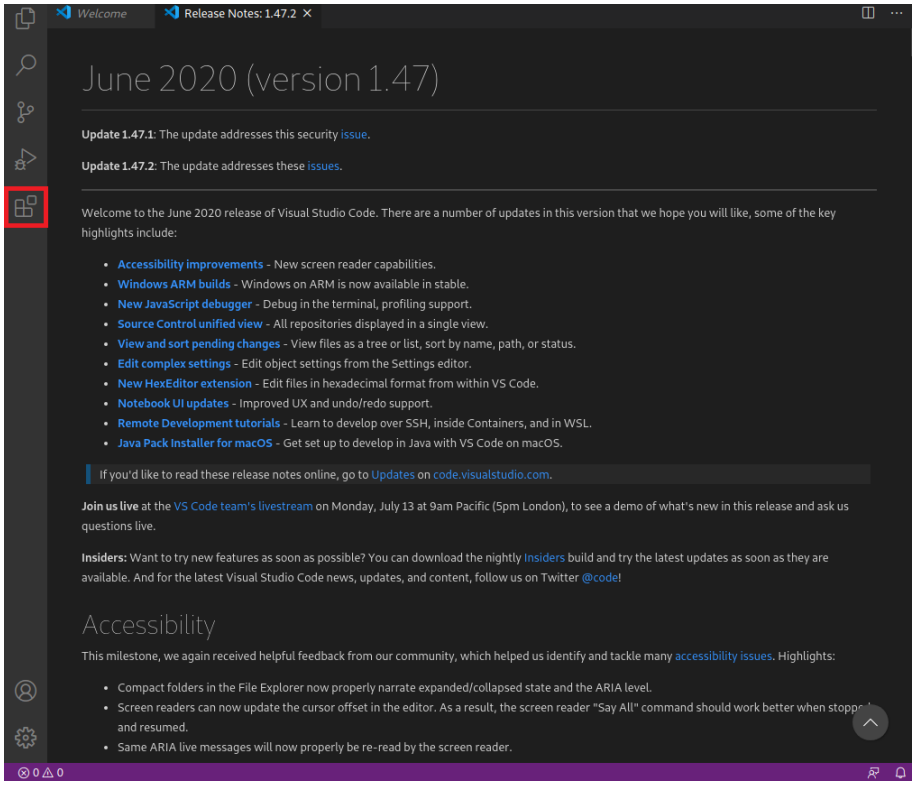
1.3. Install the Python extension for Visual Studio Code

Working with Python in Visual Studio Code, using the Microsoft Python extension, is simple, fun, and productive. The extension makes VS Code an excellent Python editor, and works on any operating system with a variety of Python interpreters.

For a quick install we use Python and install the extension from the Visual Studio Code Marketplace.

1. Open Visual Studio Code.

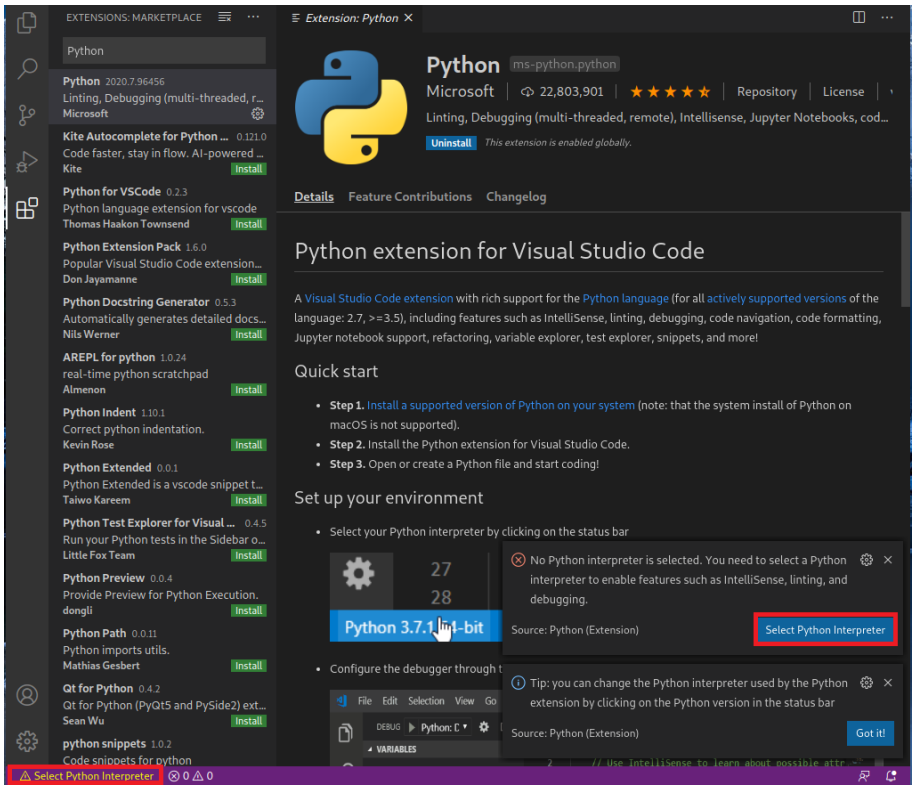
2. You can browse and install extensions from within VS Code. Bring up the Extensions view by clicking on the `Extensions icon` in the `Activity Bar` on the side of VS Code or the `View: Extensions command (Ctrl+Shift+X)`.



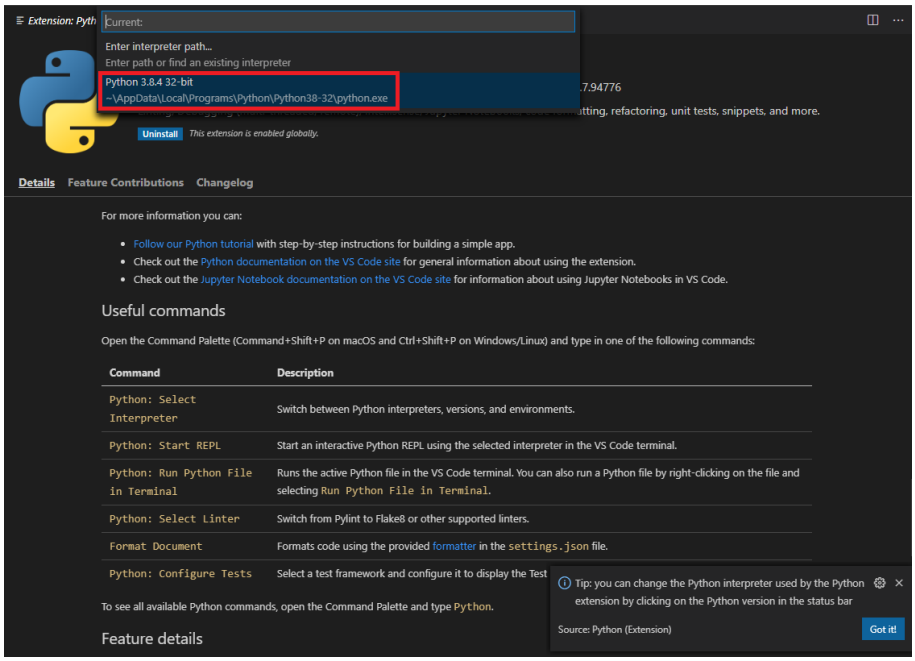
3. Search for `Python` and choose the Python Extension from Microsoft.

4. To install this extension, click the Install button. Once the installation is complete, the Install button will change.

5. Python is an interpreted language, and in order to run Python code and get Python IntelliSense, you must tell VS Code which interpreter to use. From within VS Code, select a Python 3 interpreter by opening the Command Palette Ctrl+Shift+P. You can also use the Select Python Environment option on the Status Bar if available (it may already show a selected interpreter, too).



6. Search for Python and select the Python interpreter of your previously installed Python version.

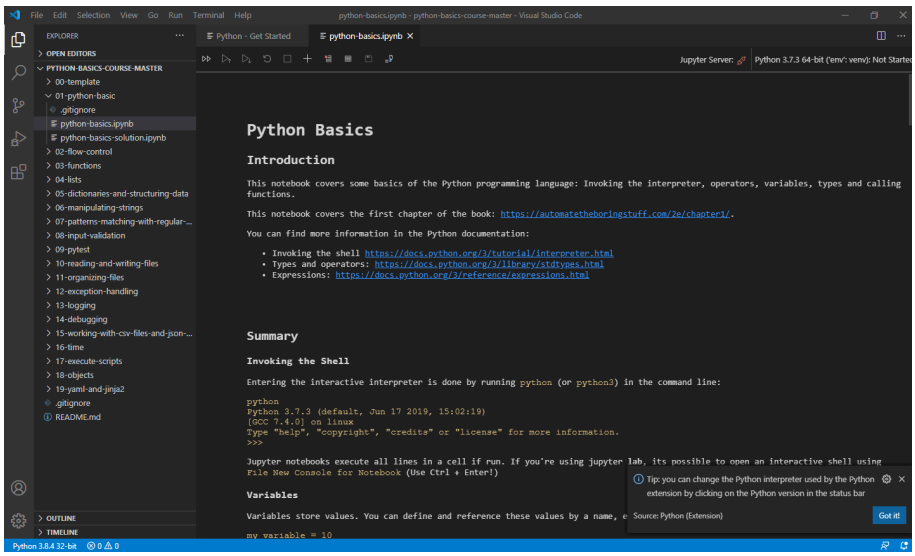


1.4. Download the documents for the course

You can find the course material on our GitHub repository. Open the link https://github.com/INSRapperswil/python-basic-labs and download the documents by going to Code > Download ZIP. Save and unpack the ZIP in a suitable folder.

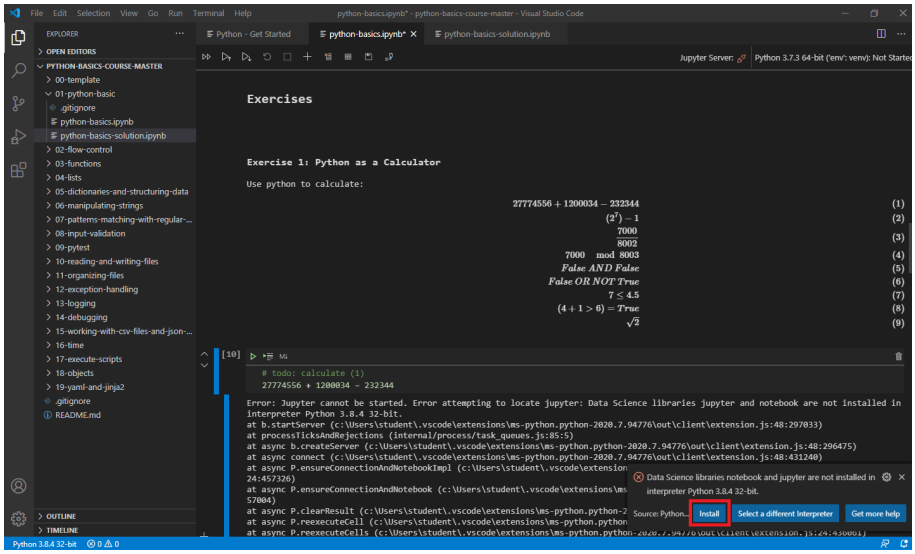
1.5. Open the course documents in VS Code

Open VS Code and open the course material by selecting File > Open Folder... and choose the folder where you saved the course material.



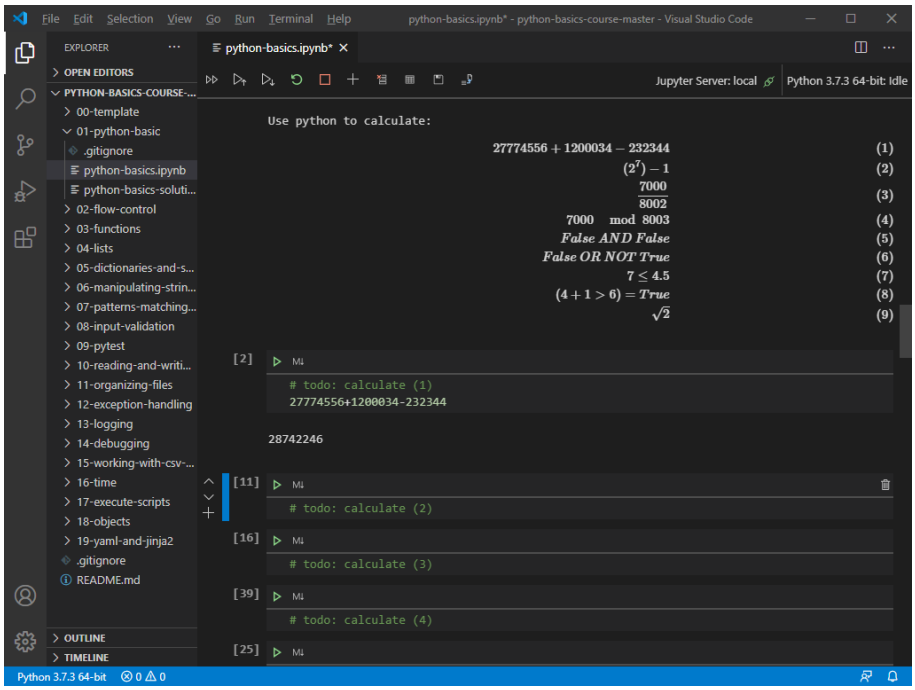
Now you can see the whole folder structure of the course on the left side of the explorer. Now open the first Jupyter Notebook by selecting the folder and opening the Jupyter Notebook 01-python-basic > python-basics.ipynb.

When you open a new Jupyter notebook, you'll notice that it contains a cell. Cells are how notebooks are structured and are the areas where you write your code. To run a piece of code, click on the cell to select it, then press `Shift + Enter` or press the `play button` in the toolbar above.



When running this field, an error message should appear that the `data science librarieries notebook and jupyter` still need to be installed. Click `Install` on this Popup window right.

This step will take 2-3 minutes. After this installation is complete, the code field can now be executed again and the result will be displayed directly below.



Now you are ready for the course!