READMEFIRST

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Setup Instructions

Overview

This is a modified version of the setup instructions from the Software Carpentry lesson: Programming with Python. Copyright by Software Carpentry http://software-carpentry.org/.

This lesson is designed to be run on a personal computer. All of the software and data used in this lesson are freely available online, and instructions on how to obtain them are provided below.

Install Python

In this lesson, we will be using Python 3 with some of its most popular scientific libraries. Although one can install a plain-vanilla Python and all required libraries by hand, we recommend installing Anaconda, a Python distribution that comes with everything we need for the lesson. If you already have python3 and miniconda, you do not have to install Anaconda.

- If you do not have python on your local machine, install it using Anaconda3: https://www.anaconda.com/products/individual *** Make sure you have enough space on your computer to install this application, otherwise the installation will fail.***

- Click "download" and then click the link that makes sense for your operating system. You likely have a 64-bit machine and want to use the graphical installer unless you are very familiar with the command line and how your computer works

Obtain lesson materials (Skip if you just downloaded the files)

1. Download intro_to_scientific_computing-materials.zip. **("Download All Files" link on the main page)**
2. Create a folder called intro-python on your Desktop.
3. Move downloaded files to intro-python.
4. Unzip the files. You should see two folders called data and code in the intro-python directory on your Desktop.

Important: Versions of packages may be different

As you go through this course, you will need to install some packages, which are periodically updated. You can find a list of the installed packages and their versions at the time these lessons were written below. If you encounter errors, it may be because there is a newer version of the

package, and the old one is outdated. In this case, look at the pdf or html version of the notebook you are reading so you can see the intended output.

```
[1]: pip list
```

```
Package                           Version
--------------------------------- -------------------
alabaster                         0.7.12
altair                            4.1.0
anaconda-client                   1.7.2
anaconda-navigator                2.0.3
anaconda-project                  0.9.1
anyio                             2.2.0
appdirs                           1.4.4
applaunchservices                 0.2.1
appnope                           0.1.2
appscript                         1.1.2
argh                              0.26.2
argon2-cffi                       20.1.0
asn1crypto                        1.4.0
astroid                           2.5
astropy                           4.2.1
async-generator                   1.10
atomicwrites                      1.4.0
attrs                             20.3.0
autopep8                          1.5.6
Babel                             2.9.0
backcall                          0.2.0
backports.functools-lru-cache     1.6.4
backports.shutil-get-terminal-size 1.0.0
backports.tempfile                1.0
backports.weakref                 1.0.post1
beautifulsoup4                    4.9.3
bitarray                          1.9.2
bkcharts                          0.2
black                             19.10b0
bleach                            3.3.0
bokeh                             2.3.2
boto                              2.49.0
Bottleneck                        1.3.2
brotlipy                          0.7.0
certifi                           2020.12.5
cffi                              1.14.5
chardet                           4.0.0
click                             7.1.2
cloudpickle                       1.6.0
clyent                            1.2.2
colorama                          0.4.4
```

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conda                       4.10.1
conda-build                 3.21.4
conda-content-trust         0+unknown
conda-package-handling      1.7.3
conda-repo-cli              1.0.4
conda-token                 0.3.0
conda-verify                3.4.2
contextlib2                 0.6.0.post1
cryptography                3.4.7
cycler                      0.10.0
Cython                      0.29.23
cytoolz                     0.11.0
dask                        2021.4.0
decorator                   5.0.6
defusedxml                  0.7.1
diff-match-patch            20200713
distributed                 2021.4.0
docutils                    0.17
entrypoints                 0.3
et-xmlfile                  1.0.1
fastcache                   1.1.0
filelock                    3.0.12
flake8                      3.9.0
Flask                       1.1.2
fsspec                      0.9.0
future                      0.18.2
gevent                      21.1.2
glob2                       0.7
gmpy2                       2.0.8
greenlet                    1.0.0
h5py                        2.10.0
HeapDict                    1.0.1
html5lib                    1.1
idna                        2.10
imageio                     2.9.0
imagesize                   1.2.0
importlib-metadata          3.10.0
iniconfig                   1.1.1
intervaltree                3.1.0
ipykernel                   5.3.4
ipython                     7.22.0
ipython-genutils            0.2.0
ipywidgets                  7.6.3
isort                       5.8.0
itsdangerous                1.1.0
jdcal                       1.4.1
jedi                        0.17.2
Jinja2                      2.11.3
```

```
joblib                  1.0.1
json5                   0.9.5
jsonschema              3.2.0
jupyter                 1.0.0
jupyter-client          6.1.12
jupyter-console         6.4.0
jupyter-core            4.7.1
jupyter-packaging       0.7.12
jupyter-server          1.4.1
jupyterlab              3.0.14
jupyterlab-pygments     0.1.2
jupyterlab-server       2.4.0
jupyterlab-widgets      1.0.0
keyring                 22.3.0
kiwisolver              1.3.1
lazy-object-proxy       1.6.0
libarchive-c            2.9
llvmlite                0.36.0
locket                  0.2.1
lxml                    4.6.3
MarkupSafe              1.1.1
matplotlib              3.3.4
matplotlib-venn         0.11.6
mccabe                  0.6.1
mistune                 0.8.4
mkl-fft                 1.3.0
mkl-random              1.2.1
mkl-service             2.3.0
mock                    4.0.3
more-itertools          8.7.0
mpmath                  1.2.1
msgpack                 1.0.2
multipledispatch        0.6.0
mypy-extensions         0.4.3
navigator-updater       0.2.1
nbclassic               0.2.6
nbclient                0.5.3
nbconvert               6.0.7
nbformat                5.1.3
nest-asyncio            1.5.1
networkx                2.5
nltk                    3.6.1
nose                    1.3.7
notebook                6.3.0
numba                   0.53.1
numexpr                 2.7.3
numpy                   1.20.1
numpydoc                1.1.0
```

```
olefile                      0.46
openpyxl                     3.0.7
packaging                    20.9
pandas                       1.2.4
pandocfilters                1.4.3
parso                        0.7.0
partd                        1.2.0
path                         15.1.2
pathlib2                     2.3.5
pathspec                     0.7.0
patsy                        0.5.1
pep8                         1.7.1
pexpect                      4.8.0
pickleshare                  0.7.5
Pillow                       8.2.0
pip                          21.0.1
pkginfo                      1.7.0
pluggy                       0.13.1
ply                          3.11
prometheus-client            0.10.1
prompt-toolkit               3.0.17
psutil                       5.8.0
ptyprocess                   0.7.0
py                           1.10.0
pycodestyle                  2.6.0
pycosat                      0.6.3
pycparser                    2.20
pycurl                       7.43.0.6
pydocstyle                   6.0.0
pyerfa                       1.7.3
pyflakes                     2.2.0
Pygments                     2.8.1
pylint                       2.7.4
pyls-black                   0.4.6
pyls-spyder                  0.3.2
pyodbc                       4.0.0-unsupported
pyOpenSSL                    20.0.1
pyparsing                    2.4.7
pyrsistent                   0.17.3
PySocks                      1.7.1
pytest                       6.2.3
python-dateutil              2.8.1
python-jsonrpc-server        0.4.0
python-language-server       0.36.2
pytz                         2021.1
PyWavelets                   1.1.1
PyYAML                       5.4.1
pyzmq                        20.0.0
```

```
QDarkStyle                        2.8.1
QtAwesome                         1.0.2
qtconsole                         5.0.3
QtPy                              1.9.0
regex                             2021.4.4
requests                          2.25.1
rope                              0.18.0
Rtree                             0.9.7
ruamel-yaml-conda                 0.15.100
scikit-image                      0.18.1
scikit-learn                      0.24.1
scipy                             1.6.2
seaborn                           0.11.1
Send2Trash                        1.5.0
setuptools                        52.0.0.post20210125
simplegeneric                     0.8.1
singledispatch                    0.0.0
six                               1.15.0
sniffio                           1.2.0
snowballstemmer                   2.1.0
sortedcollections                 2.1.0
sortedcontainers                  2.3.0
soupsieve                         2.2.1
Sphinx                            4.0.1
sphinxcontrib-applehelp           1.0.2
sphinxcontrib-devhelp             1.0.2
sphinxcontrib-htmlhelp            1.0.3
sphinxcontrib-jsmath              1.0.1
sphinxcontrib-qthelp              1.0.3
sphinxcontrib-serializinghtml     1.1.4
sphinxcontrib-websupport          1.2.4
spyder                            4.2.5
spyder-kernels                    1.10.2
SQLAlchemy                        1.4.7
statsmodels                       0.12.2
sympy                             1.8
tables                            3.6.1
tblib                             1.7.0
terminado                         0.9.4
testpath                          0.4.4
textdistance                      4.2.1
threadpoolctl                     2.1.0
three-merge                       0.1.1
tifffile                          2020.10.1
toml                              0.10.2
toolz                             0.11.1
tornado                           6.1
tqdm                              4.59.0
```

```
traitlets                       5.0.5
typed-ast                       1.4.2
typing-extensions               3.7.4.3
ujson                           4.0.2
unicodecsv                      0.14.1
urllib3                         1.26.4
vega-datasets                   0.9.0
watchdog                        1.0.2
wcwidth                         0.2.5
webencodings                    0.5.1
Werkzeug                        1.0.1
wheel                           0.36.2
widgetsnbextension              3.5.1
wrapt                           1.12.1
wurlitzer                       2.1.0
xlrd                            2.0.1
XlsxWriter                      1.3.8
xlwings                         0.23.0
xlwt                            1.3.0
xmltodict                       0.12.0
yapf                            0.31.0
zict                            2.0.0
zipp                            3.4.1
zope.event                      4.5.0
zope.interface                  5.3.0
Note: you may need to restart the kernel to use updated packages.
```

Launch Python interface

To start working with Python, we need to launch a program that will interpret and execute our Python commands. We recommend using the Jupyter Notebook interface.

Jupyter Notebook

A Jupyter Notebook provides a browser-based interface for working with Python. If you installed Anaconda, you can launch a notebook in two ways: **(you only need to complete one method)**

1. Anaconda Navigator   Step 1. Launch Anaconda Navigator. It might ask you if you would like to send anonymized usage information to Anaconda developers:
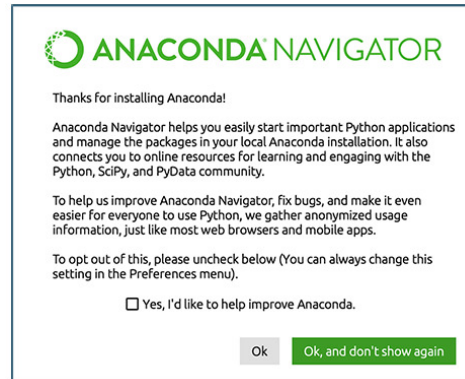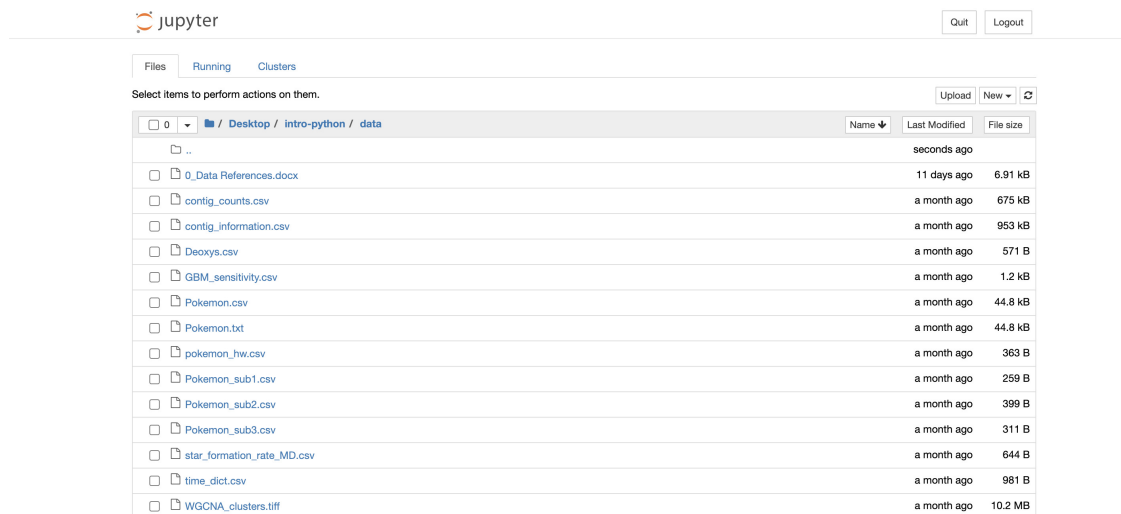
Make your choice and click "Ok, and do not show again" button.

Step 2. Find the "Notebook" tab and click on the "Launch" button:
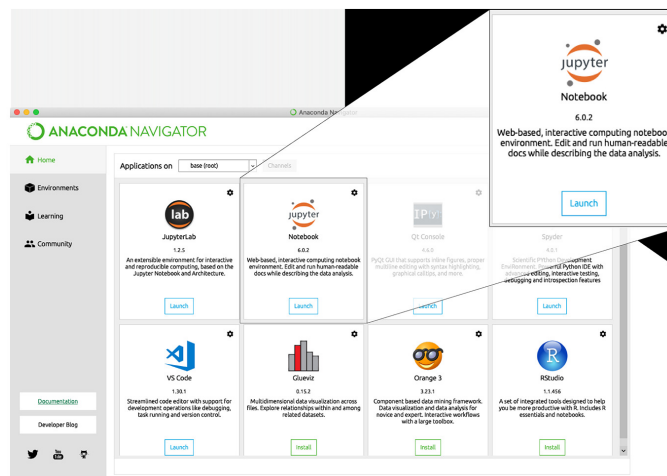
Anaconda will open a new browser window or tab with a Notebook Dashboard showing you the contents of your Home (or User) folder.

Step 3. Navigate to the "data" directory by clicking on the directory names leading to it: "Desktop", "intro-python", then "data":

Step 4. Launch the notebook by clicking on the "New" button and then selecting "Python 3":
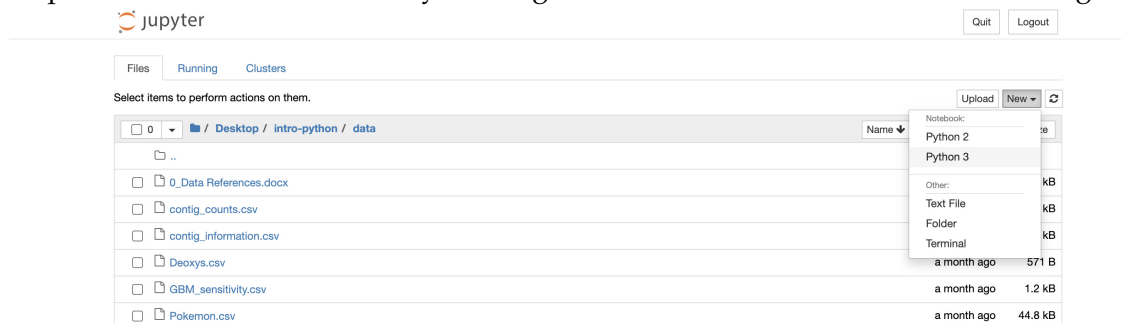
2. Command line (Terminal)   Step 1. Navigate to the "data" directory: * If you are using a Unix shell application, such as Terminal app in macOS, Console or Terminal in Linux, or Git Bash on Windows, execute the following command:

```Bash
cd ~/Desktop/swc-python/data
```

- On Windows, you can use its native Command Prompt program. The easiest way to start it up is pressing **Windows Logo Key+R**, entering "cmd", and hitting **Return**. In the Command Prompt, use the following command to navigate to the "data" folder:

```Code
cd /D %userprofile%\Desktop\swc-python\data
```

Step 2. Start Jupyter server

- Unix shell

```Bash
jupyter notebook
```

- Command Prompt (Windows)

Code

```
python —m notebook
```

Step 3. Launch the notebook by clicking on the "New" button on the right and selecting "Python 3" from the drop-down menu: