동국대학교
dongguk university

Introduction to Programming Environment

Machine Learning

Notice

- Code Practice
  - It is Python programming practice of what you have learned in the lecture
  - Code practice file (Week**_given_code.ipynb) will be provided. It consists of practice code template & quiz
  - After you completed each practice, summit your practice code file(Week**_<id>_<name>.ipynb) to e-class until next day (Friday midnight)
  - You may upload your file without the code for quiz, but it may be include in homework or exam, so it is recommended to take the quiz as well

- Homework
  - Every 3 weeks, homework will be given
  - It covers contents of last 3 weeks lecture and code practice

What is Python?

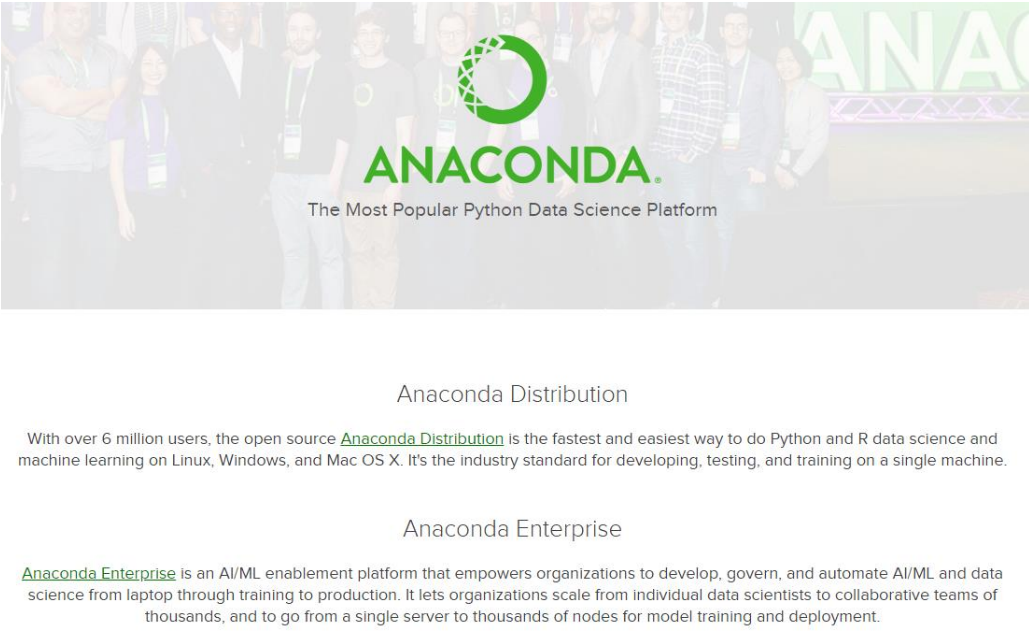
- Python
  - High-level programming language was released in 1991 , which was created by Guido van Rossum
    - Name of the Python is derived from the comedy program , <Monty Python’s Flying Circus>, that Guido likes
  - Python is interpretive, object-oriented, dynamic typed(check the data type in run time) and interactive programming language
  - Python is dynamically typed and garbage-collected as well as, It supports multiple programming paradigms, including procedural, object-oriented, and functional programming
  - The Zen of Python
    - Beautiful is better than ugly
    - Explicit is better than implicit
    - Simple is better than complex
    - Readability counts
    - Sparse is better than dense
    - …

https://en.wikipedia.org/wiki/Python_(programming_language

https://www.python.org/dev/peps/pep-0020/

Anaconda environment

- Anaconda
  - A free and open-source distribution of the Python programming language for scientific computing
  - Python + Libraries + Tools



ANACONDA.

The Most Popular Python Data Science Platform

Anaconda Distribution

With over 6 million users, the open source Anaconda Distribution is the fastest and easiest way to do Python and R data science and machine learning on Linux, Windows, and Mac OS X. It's the industry standard for developing, testing, and training on a single machine.

Anaconda Enterprise

Anaconda Enterprise is an AI/ML enablement platform that empowers organizations to develop, govern, and automate AI/ML and data science from laptop through training to production. It lets organizations scale from individual data scientists to collaborative teams of thousands, and to go from a single server to thousands of nodes for model training and deployment.

https://www.anaconda.com/

Anaconda environment

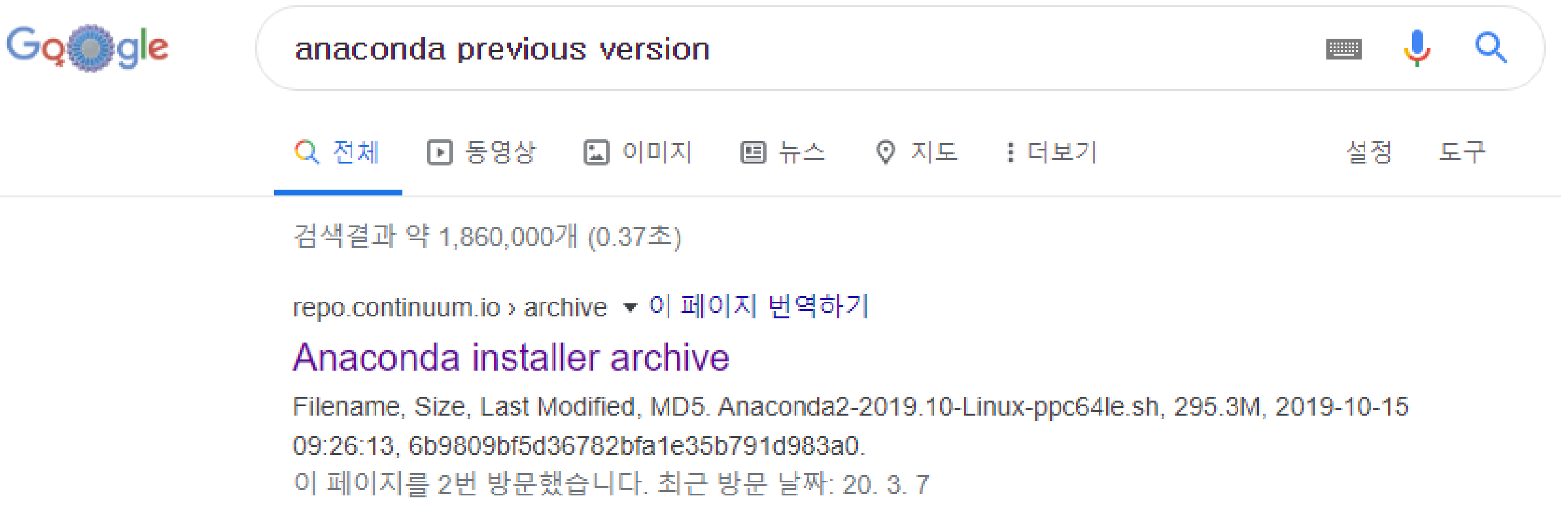
- Typical AI/ML-related libraries supported by Anaconda
  - Numpy
    - It provides multidimensional array object, vector operation and linear algebra
  - Pandas
    - It provides ‘Dataframe’ to address the type of table data
  - Matplotlib
    - It provides several tools of drawing graph, chart and visualization
  - Scikit-Learn
    - It provides packages of some machine Learning algorithms and various models of machine learning functions

https://www.anaconda.com/

How to Install Anaconda

1. Search Google for “anaconda previous version”

   (due to the dependency problem of the lecture, we will use previous version.)



검색결과 약 1,860,000개 (0.37초)

repo.continuum.io › archive ▾ 이 페이지 번역하기

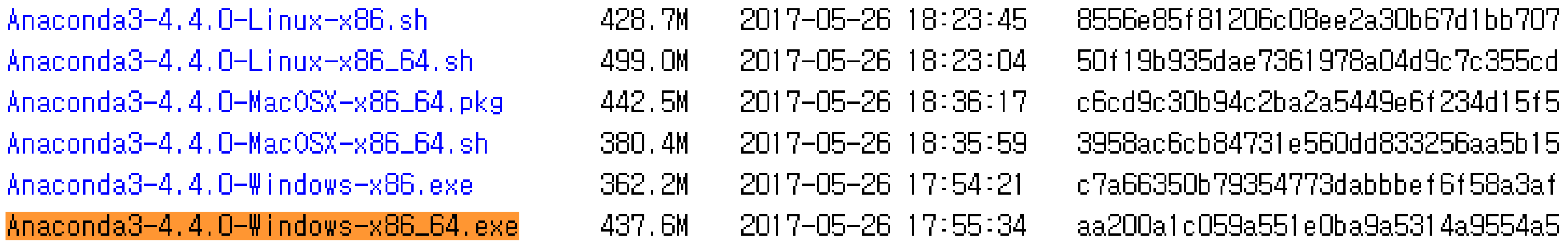
Anaconda installer archive

Filename, Size, Last Modified, MD5. Anaconda2-2019.10-Linux-ppc64le.sh, 295.3M, 2019-10-15 09:26:13, 6b9809bf5d36782bfa1e35b791d983a0.

이 페이지를 2번 방문했습니다. 최근 방문 날짜: 20. 3. 7

How to Install Anaconda

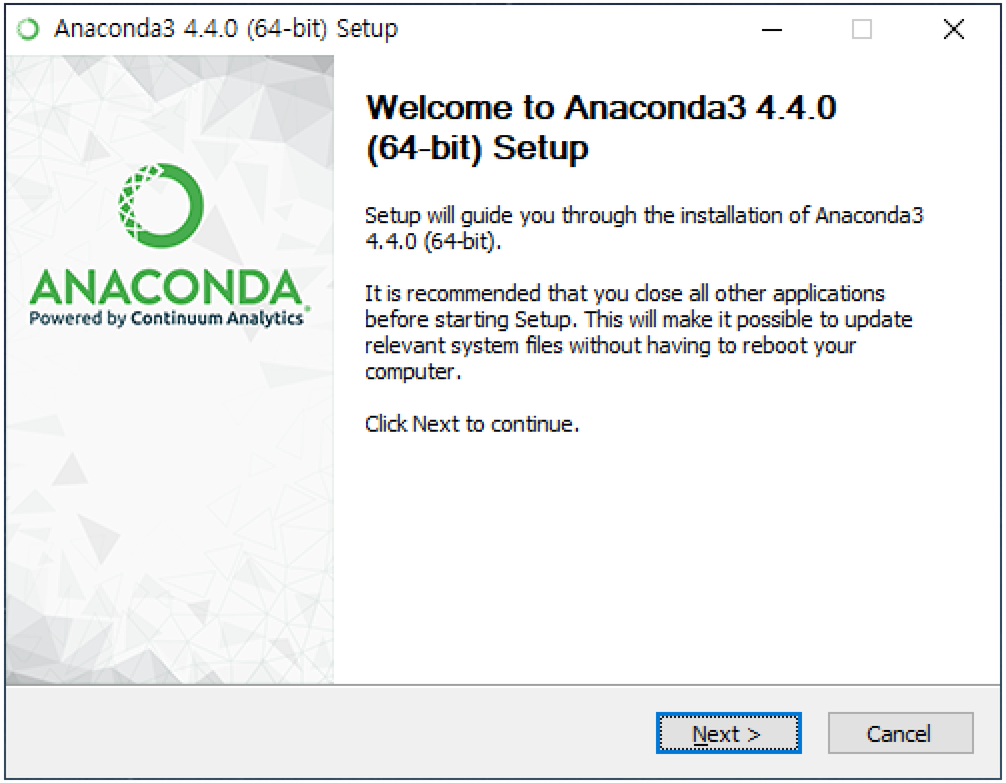
2. Download “Anaconda3-4.4.0”



```
Anaconda3-4.4.0-Linux-x86.sh             428.7M   2017-05-26 18:23:45   8556e85f81206c08ee2a30b67d1bb707
Anaconda3-4.4.0-Linux-x86_64.sh          499.0M   2017-05-26 18:23:04   50f19b935dae7361978a04d9c7c355cd
Anaconda3-4.4.0-MacOSX-x86_64.pkg        442.5M   2017-05-26 18:36:17   c6cd9c30b94c2ba2a5449e6f234d15f5
Anaconda3-4.4.0-MacOSX-x86_64.sh         380.4M   2017-05-26 18:35:59   3958ac6cb84731e560dd833256aa5b15
Anaconda3-4.4.0-Windows-x86.exe          362.2M   2017-05-26 17:54:21   c7a66350b79354773dabbbef6f58a3af
Anaconda3-4.4.0-Windows-x86_64.exe       437.6M   2017-05-26 17:55:34   aa200a1c059a551e0ba9a5314a9554a5
```

How to Install Anaconda

3. Run the install programs, click the “next” button.



Anaconda3 4.4.0 (64-bit) Setup

Welcome to Anaconda3 4.4.0 (64-bit) Setup

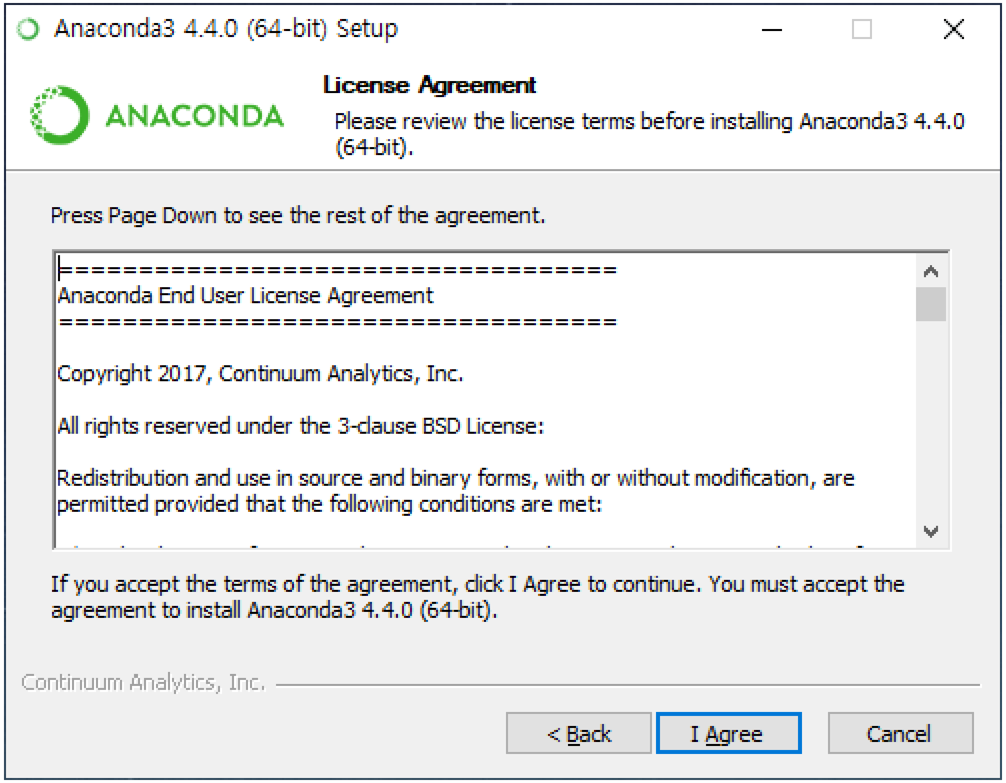
Setup will guide you through the installation of Anaconda3 4.4.0 (64-bit).

It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.

Click Next to continue.

How to Install Anaconda

4. Click “I Agree” button



Anaconda3 4.4.0 (64-bit) Setup

License Agreement

Please review the license terms before installing Anaconda3 4.4.0 (64-bit).

Press Page Down to see the rest of the agreement.

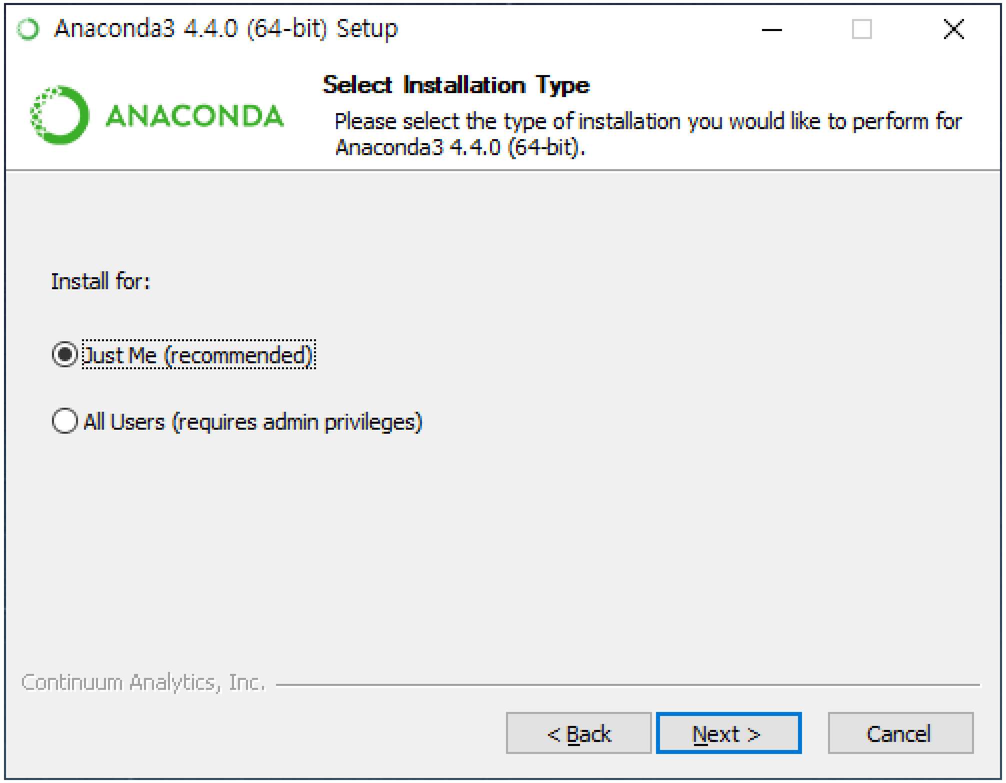
```
====================================
Anaconda End User License Agreement
====================================

Copyright 2017, Continuum Analytics, Inc.

All rights reserved under the 3-clause BSD License:

Redistribution and use in source and binary forms, with or without modification, are
permitted provided that the following conditions are met:
```

If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install Anaconda3 4.4.0 (64-bit).

Continuum Analytics, Inc.

How to Install Anaconda

5. Go on with default value("Just Me"), and Click the "next" button



Anaconda3 4.4.0 (64-bit) Setup

Select Installation Type

Please select the type of installation you would like to perform for Anaconda3 4.4.0 (64-bit).

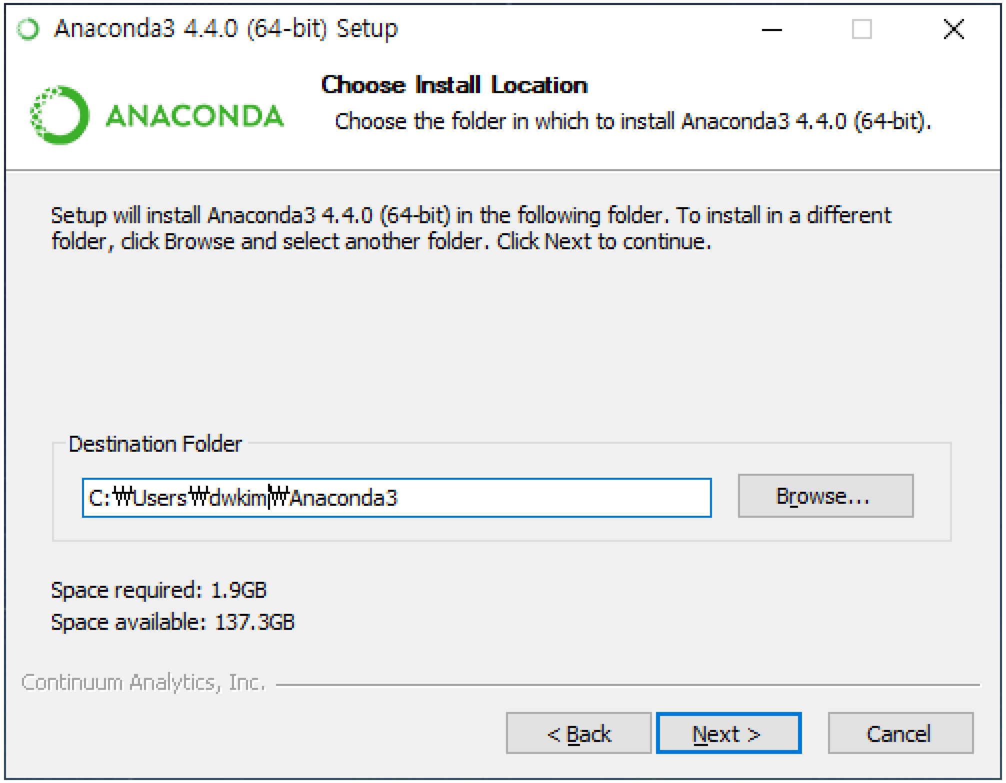
Install for:

● Just Me (recommended)

○ All Users (requires admin privileges)

How to Install Anaconda

6. Click the “next” button



Anaconda3 4.4.0 (64-bit) Setup

Choose Install Location

Choose the folder in which to install Anaconda3 4.4.0 (64-bit).

Setup will install Anaconda3 4.4.0 (64-bit) in the following folder. To install in a different folder, click Browse and select another folder. Click Next to continue.

Destination Folder

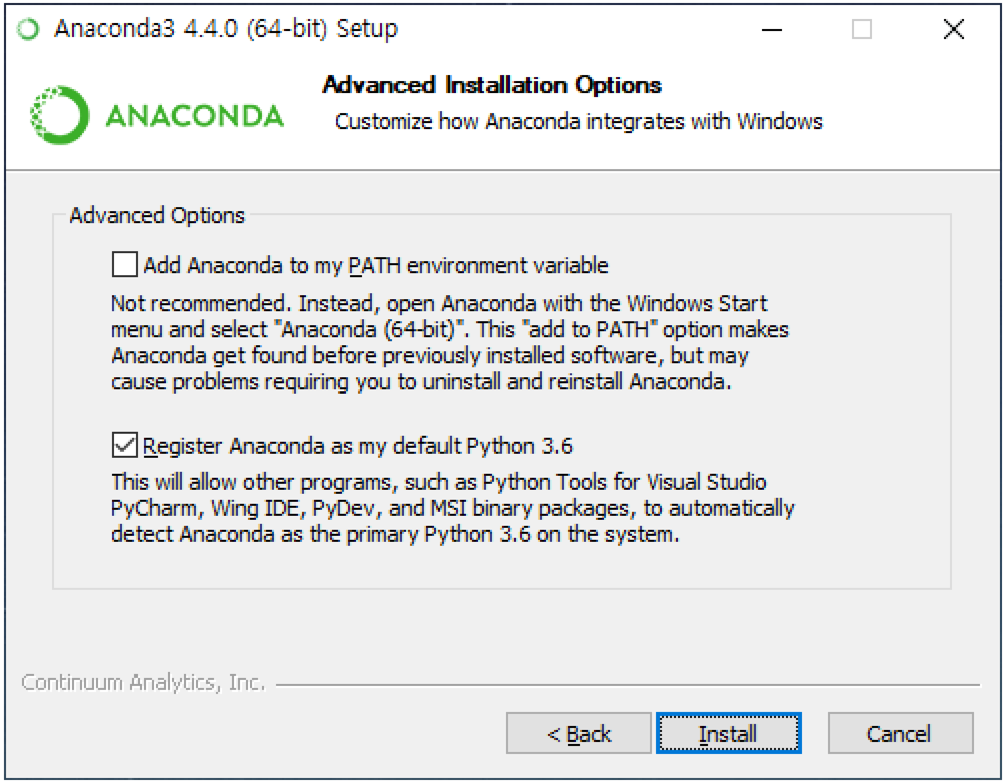
C:₩Users₩dwkim₩Anaconda3

Space required: 1.9GB
Space available: 137.3GB

Continuum Analytics, Inc.

How to Install Anaconda

7. Go on with default value, Click the “Install” button



Anaconda3 4.4.0 (64-bit) Setup

Advanced Installation Options

Customize how Anaconda integrates with Windows

Advanced Options

□ Add Anaconda to my PATH environment variable

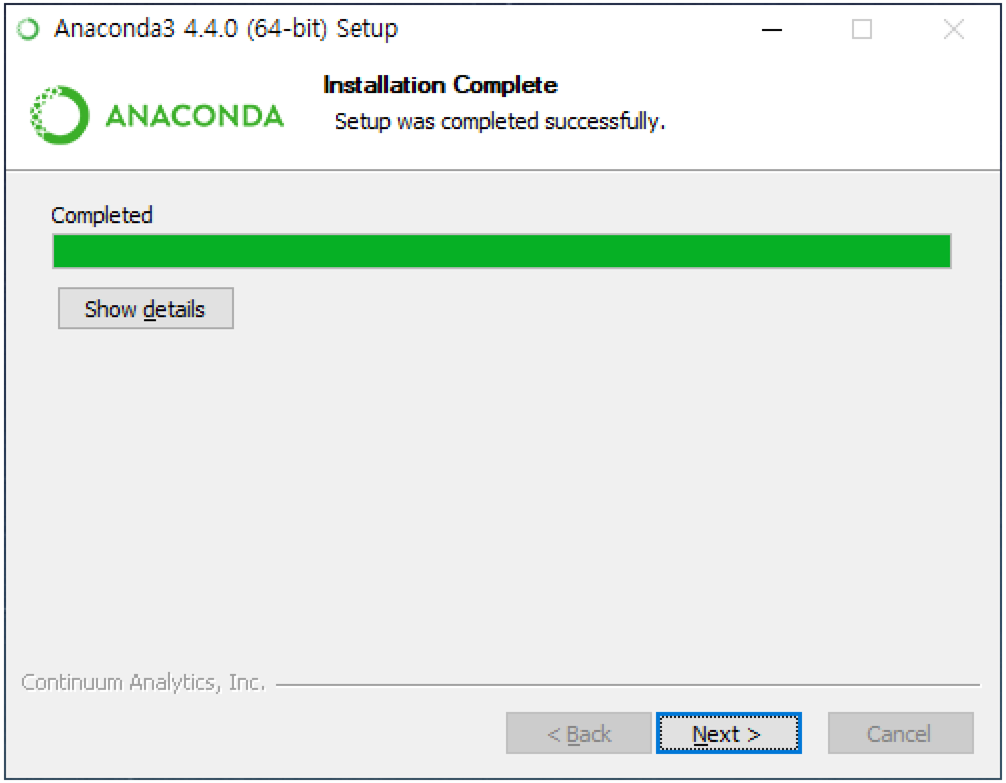
Not recommended. Instead, open Anaconda with the Windows Start menu and select "Anaconda (64-bit)". This "add to PATH" option makes Anaconda get found before previously installed software, but may cause problems requiring you to uninstall and reinstall Anaconda.

☑ Register Anaconda as my default Python 3.6

This will allow other programs, such as Python Tools for Visual Studio PyCharm, Wing IDE, PyDev, and MSI binary packages, to automatically detect Anaconda as the primary Python 3.6 on the system.

How to Install Anaconda

8. Install Complete, Click the “Next”.



Anaconda3 4.4.0 (64-bit) Setup

Installation Complete

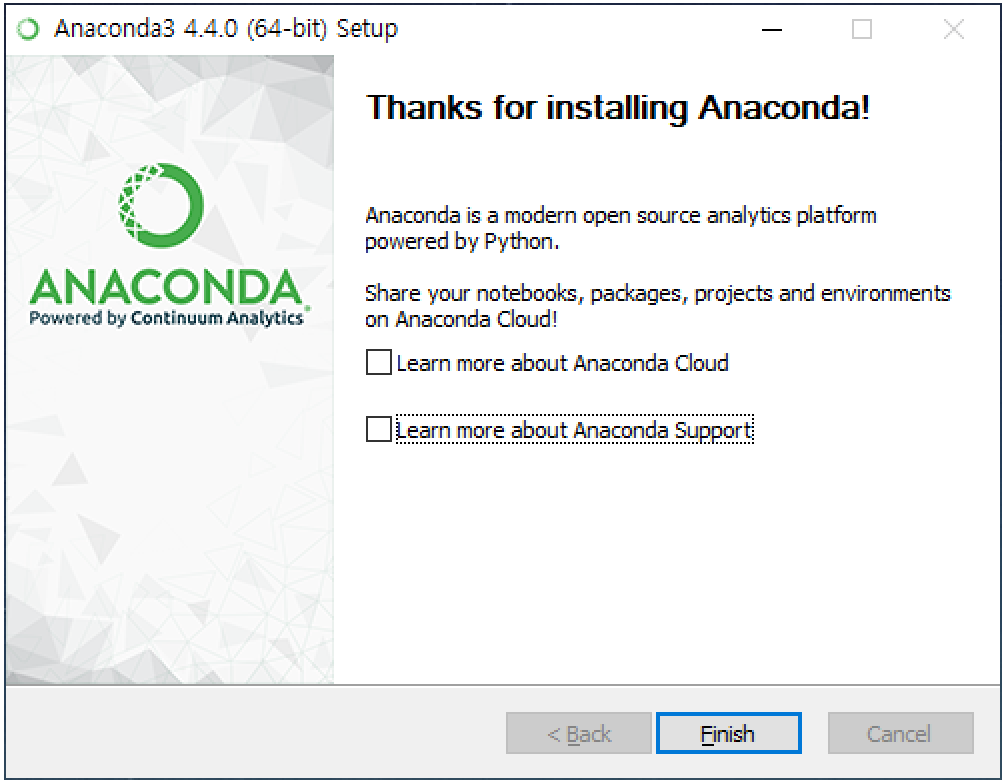
Setup was completed successfully.

Completed

Continuum Analytics, Inc.

How to Install Anaconda

9. Uncheck all boxes, And Click the “Finish”.



Anaconda3 4.4.0 (64-bit) Setup

Thanks for installing Anaconda!

Anaconda is a modern open source analytics platform powered by Python.

Share your notebooks, packages, projects and environments on Anaconda Cloud!

□ Learn more about Anaconda Cloud

□ Learn more about Anaconda Support

How to use Jupyter Notebook

1. What is Jupyter notebook?
2. How to run “Jupyter Notebook”
3. How to create folder and file
4. How to save and delete file
5. Tip(Markdown Language & Keyboard shotcuts)

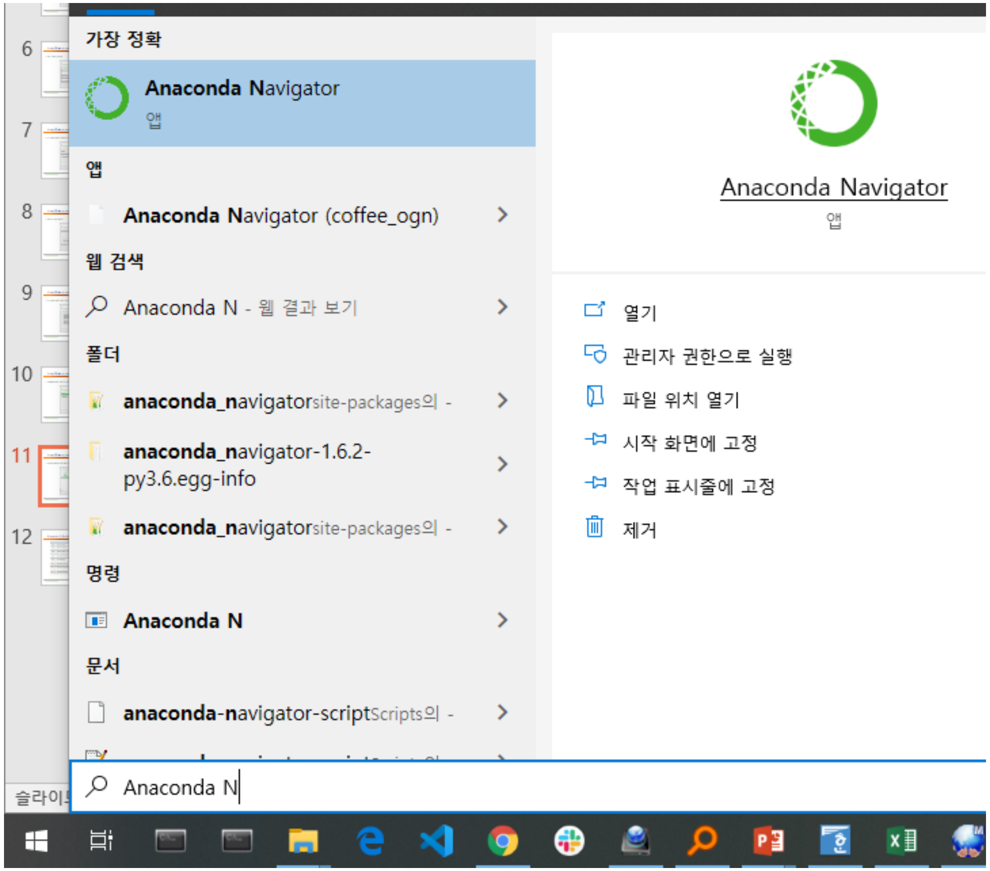
What is Jupyter Notebook

- Jupyter Notebook
  - It is a tool for writing codes and executing the codes in the web browser such as Chrome, Edge etc.
  - The way to execute
    - Start– Anaconda3 – Click the Jupyter Notebook
    - Run – Anaconda Prompt –Type “jupyter notebook” and enter
  - Jupyter lab can be executed instead of the Jupyter Notebook
    - You can check file structures, console, editor, charts and also this notebook in the one window dividing the shells
    - It can be installed by just type this command (**conda install -c conda-forge jupyterlab**)
  - Other python editors
    - Visual Studio, Visual Studio Code, PyCharm, Vim, Sublime Text, Atom etc.

https://jupyterlab.readthedocs.io/en/stable/getting_started/installation.ht

How to run Jupyter Notebook

1. Run the “Anaconda Navigator”



가장 정확

Anaconda Navigator
앱

앱

Anaconda Navigator (coffee_ogn) >

웹 검색

Anaconda N - 웹 결과 보기 >

폴더

anaconda_navigatorsite-packages의 - >

anaconda_navigator-1.6.2-py3.6.egg-info >

anaconda_navigatorsite-packages의 - >

명령

Anaconda N >

문서

anaconda-navigator-scriptScripts의 - >

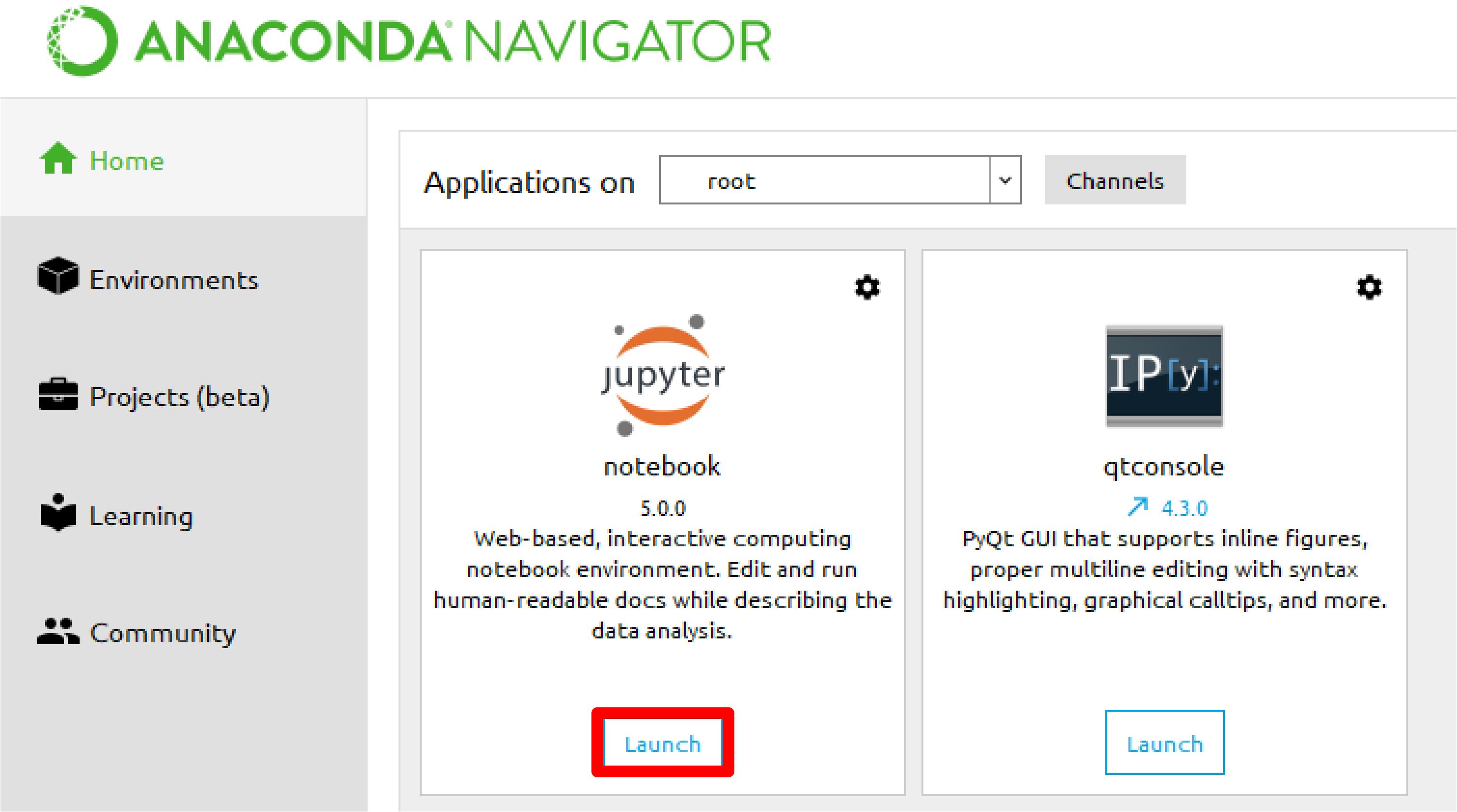
Anaconda N

Anaconda Navigator
앱

- 열기
- 관리자 권한으로 실행
- 파일 위치 열기
- 시작 화면에 고정
- 작업 표시줄에 고정
- 제거

How to run Jupyter Notebook

2. Click the notebook’s Launch button.



ANACONDA NAVIGATOR

Applications on root

notebook

5.0.0

Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.

qtconsole

↗ 4.3.0

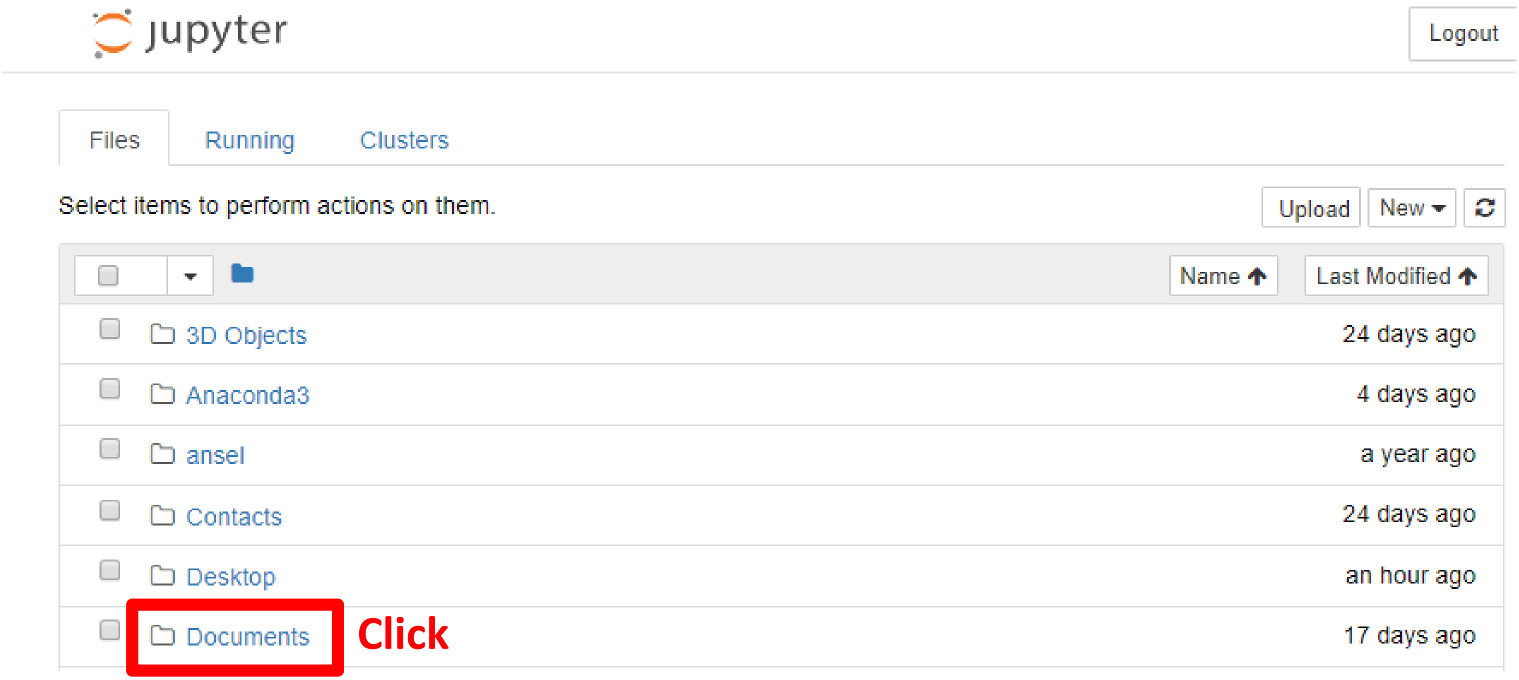
PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more.

How to create folder and file

1. We will make a workspace folder for this lecture named “2020ML”, on this path.

   “C:\Users\{UserName}\Documents\2020ML”

   you can follow this step or use other file explorer(It will be much easier than this).

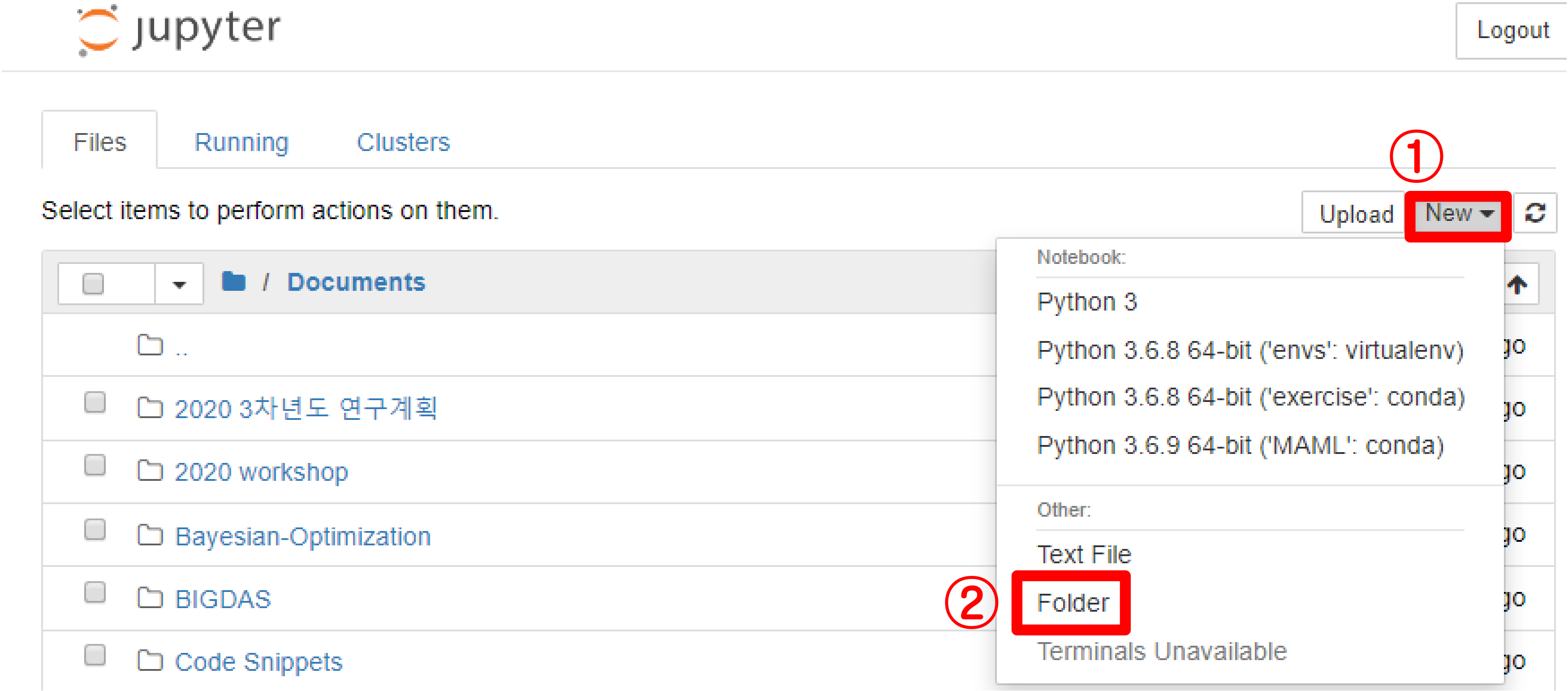


Select items to perform actions on them.

Name	Last Modified
3D Objects	24 days ago
Anaconda3	4 days ago
ansel	a year ago
Contacts	24 days ago
Desktop	an hour ago
Documents	17 days ago

How to create folder and file

2. Click “New” and “Folder” to make the “Untitled Folder”


jupyter
Logout
Files
Running
Clusters
①
Upload
New
Notebook:
Python 3
Python 3.6.8 64-bit ('envs': virtualenv)
Python 3.6.8 64-bit ('exercise': conda)
Python 3.6.9 64-bit ('MAML': conda)
Other:
Text File
②
Folder
Terminals Unavailable

Select items to perform actions on them.

/ Documents

..

2020 3차년도 연구계획

2020 workshop

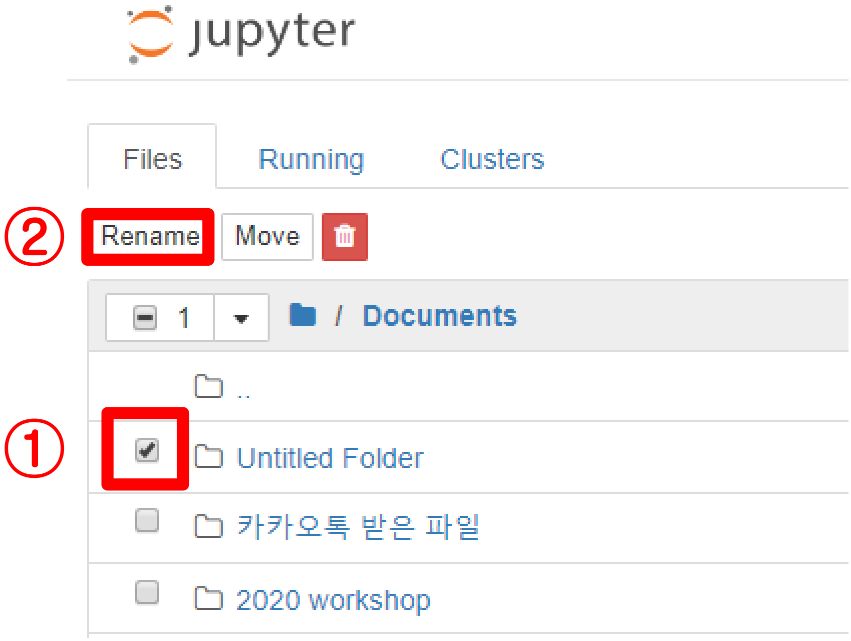
Bayesian-Optimization

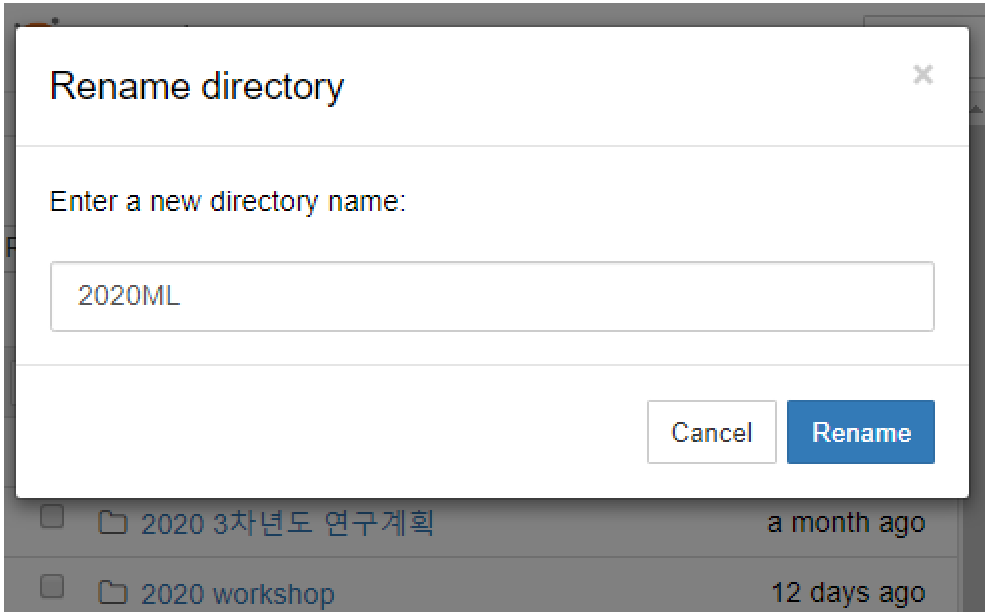
BIGDAS

Code Snippets

How to create folder and file

3. Check the box of “Untitled Folder” and Click the “Rename” and type “2020ML”.



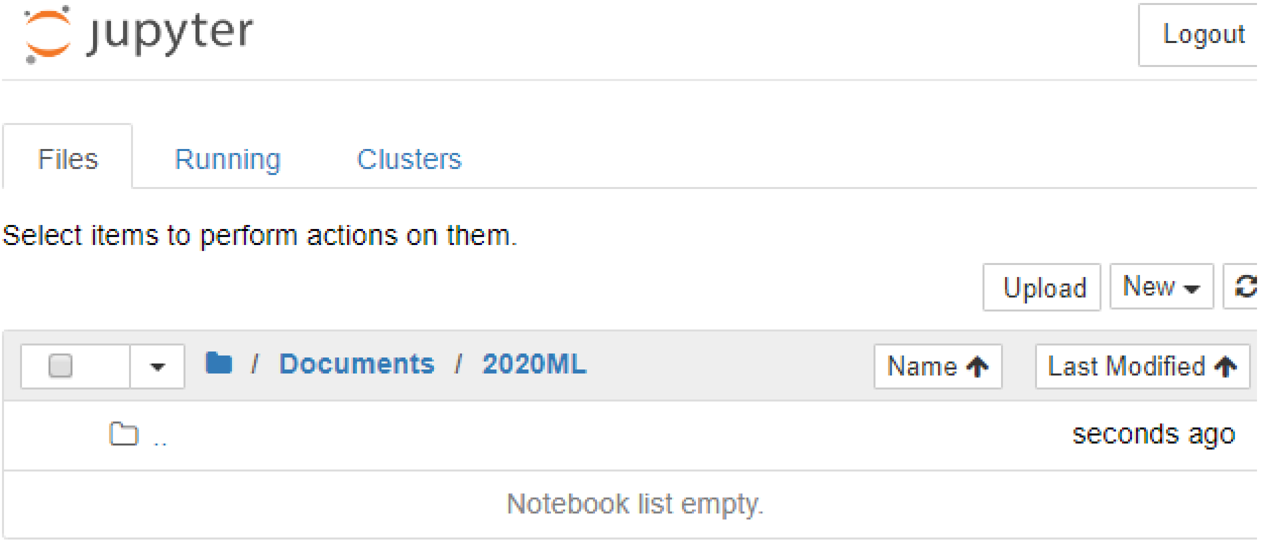

Rename directory

Enter a new directory name: 2020ML

×
Cancel
Rename
□ 2020 3차년도 연구계획 a month ago
□ 2020 workshop 12 days ago

How to create folder and file

4. “2020ML” folder has been created.



Select items to perform actions on them.

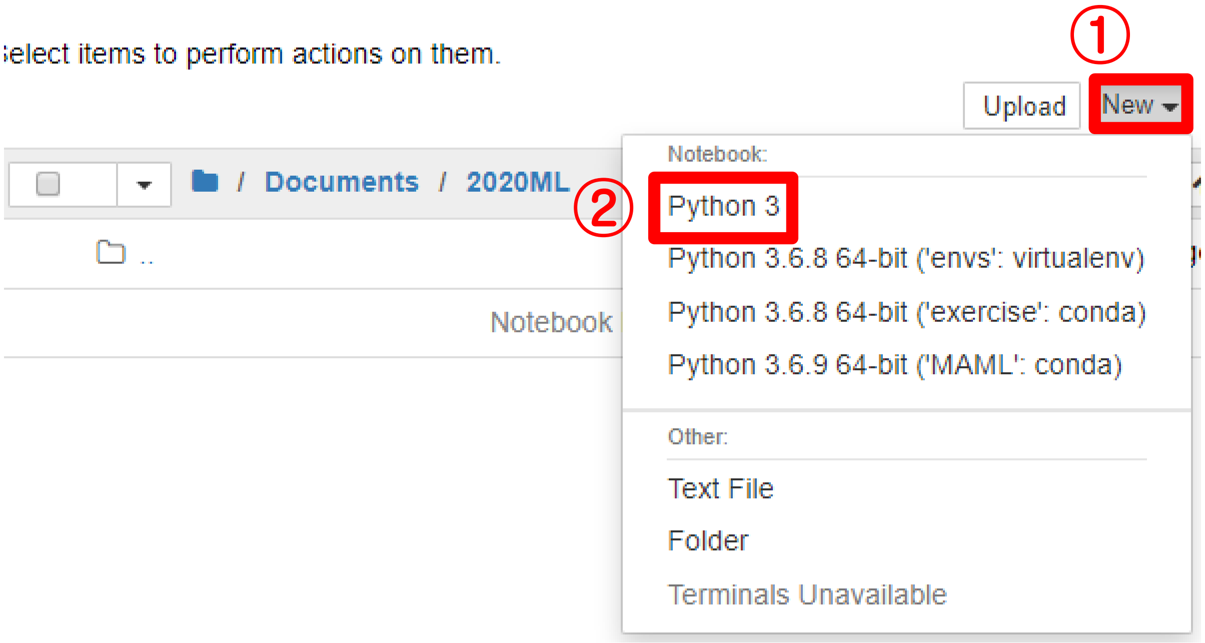
seconds ago

Notebook list empty.

How to create folder and file

5. Let’s create test file(*.ipynb(ipython notebook file)).

Click “New” and “Python3”

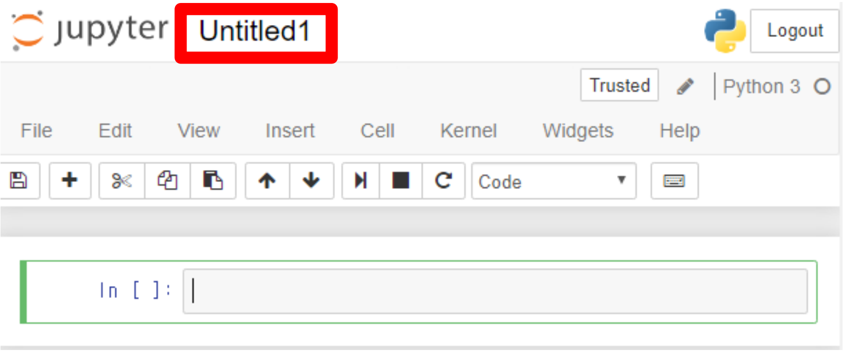


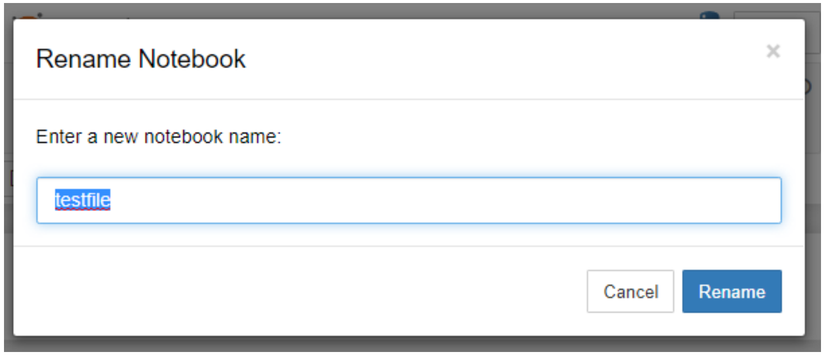
①
②
;elect items to perform actions on them.
Upload
New
/ Documents / 2020ML
..
Notebook
Notebook:
Python 3
Python 3.6.8 64-bit ('envs': virtualenv)
Python 3.6.8 64-bit ('exercise': conda)
Python 3.6.9 64-bit ('MAML': conda)
Other:
Text File
Folder
Terminals Unavailable

How to create folder and file

6. “Untitled1.ipynb” file has been created.

You can modify the file name by just click the title(Untitled1).





Rename Notebook

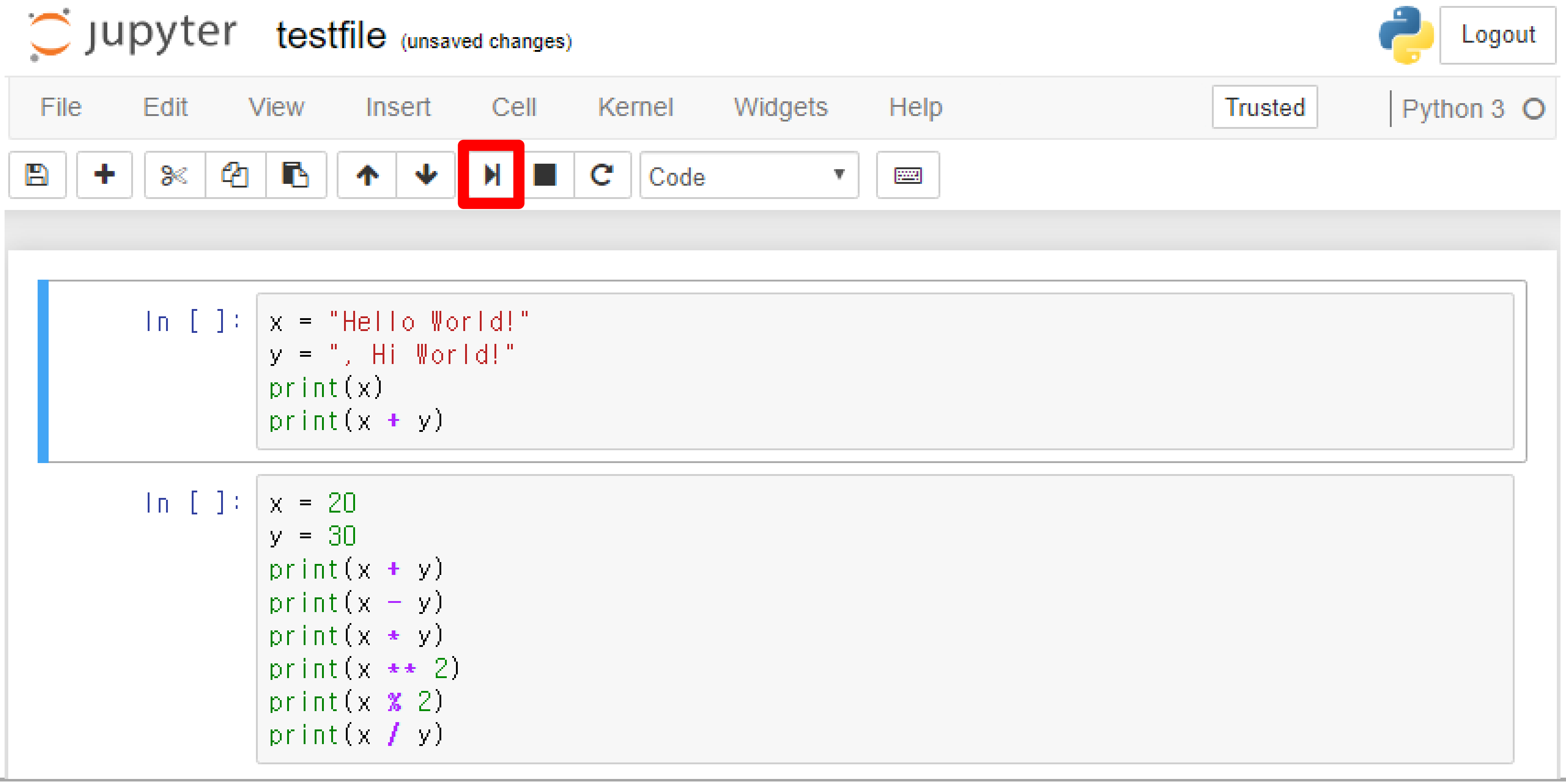
Enter a new notebook name:

testfile

How to create folder and file

7. Let’s run some sample code.

Type this code, and run the code by click ⏭ button.



In [ ]:

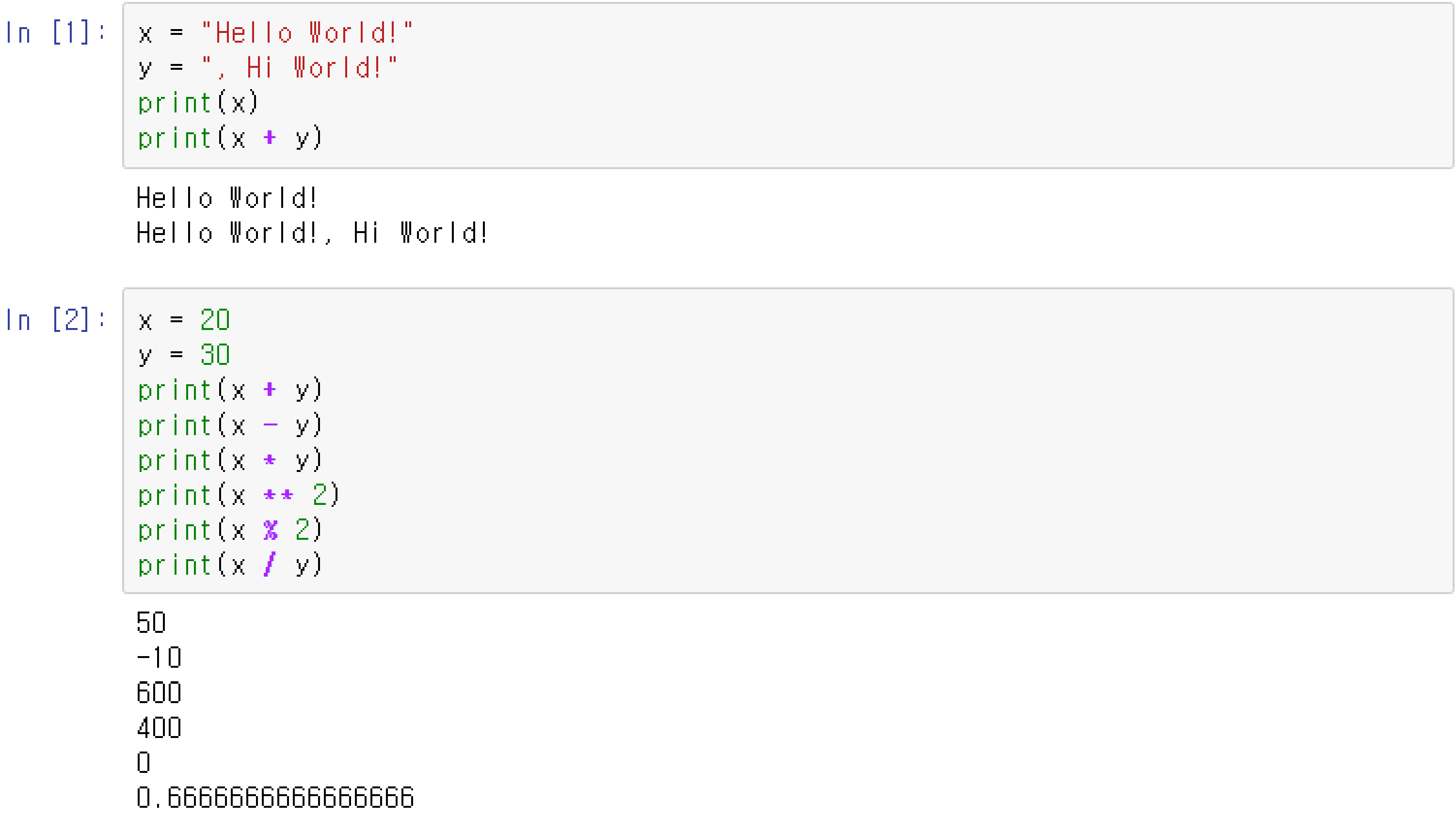
```
x = "Hello World!"
y = ", Hi World!"
print(x)
print(x + y)
```

In [ ]:

```
x = 20
y = 30
print(x + y)
print(x - y)
print(x * y)
print(x ** 2)
print(x % 2)
print(x / y)
```

How to create folder and file

8. Because python is interpreter language, We can run these codes cell by cell.



In [1]:
```
x = "Hello World!"
y = ", Hi World!"
print(x)
print(x + y)
```

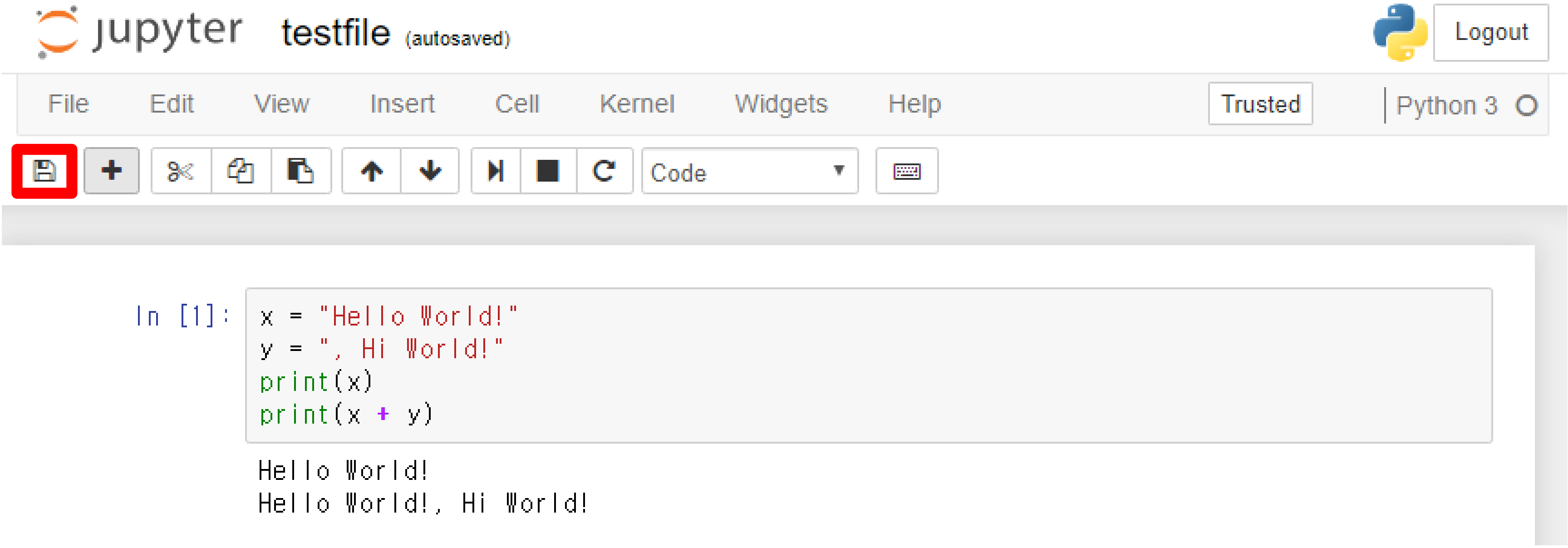
```
Hello World!
Hello World!, Hi World!
```

In [2]:
```
x = 20
y = 30
print(x + y)
print(x - y)
print(x * y)
print(x ** 2)
print(x % 2)
print(x / y)
```

```
50
-10
600
400
0
0.6666666666666666
```

How to save and delete file

1. To save this file, just click 💾



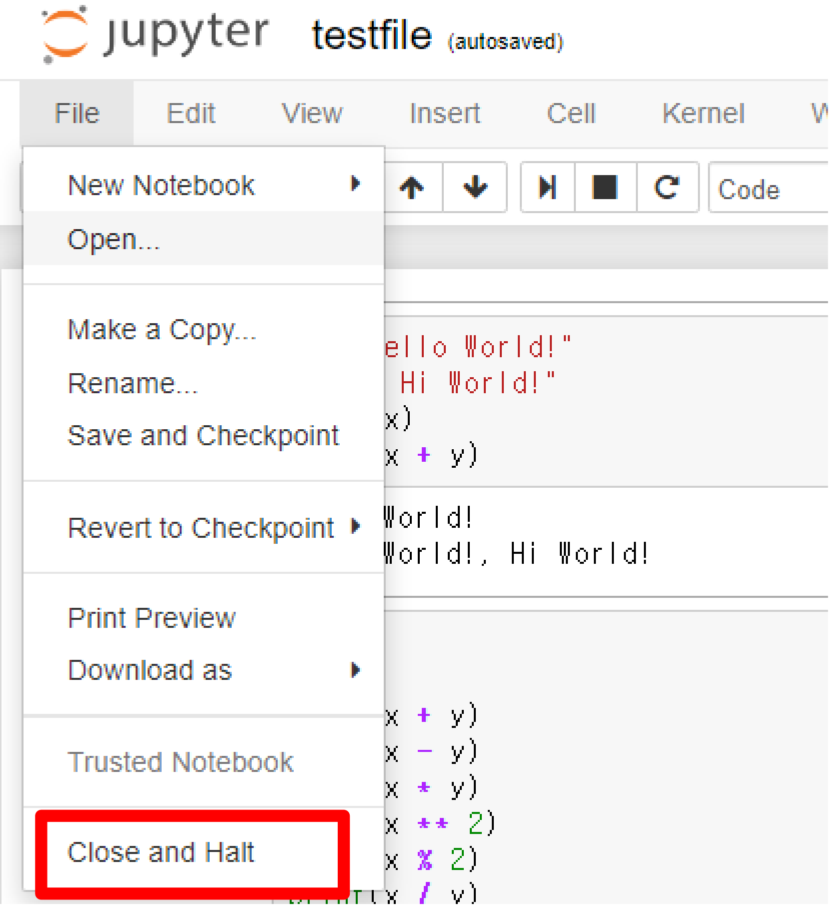
In [1]:

```
x = "Hello World!"
y = ", Hi World!"
print(x)
print(x + y)
```

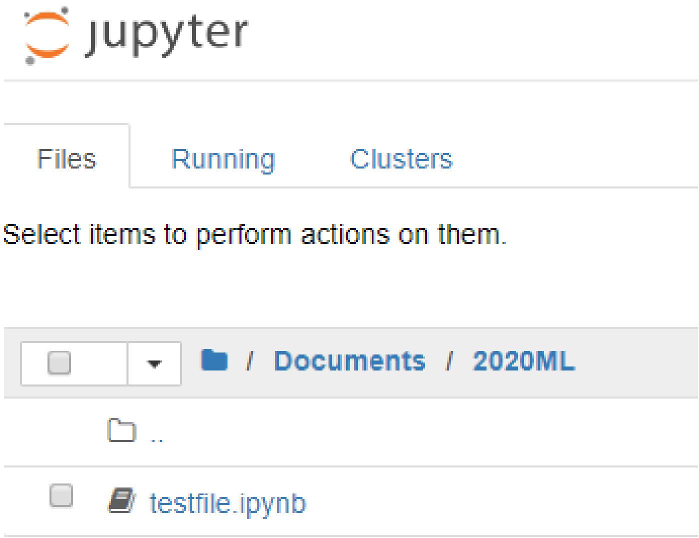
```
Hello World!
Hello World!, Hi World!
```

How to save and delete file

2. To close this file, click “File” button, and “Close and Halt” button.



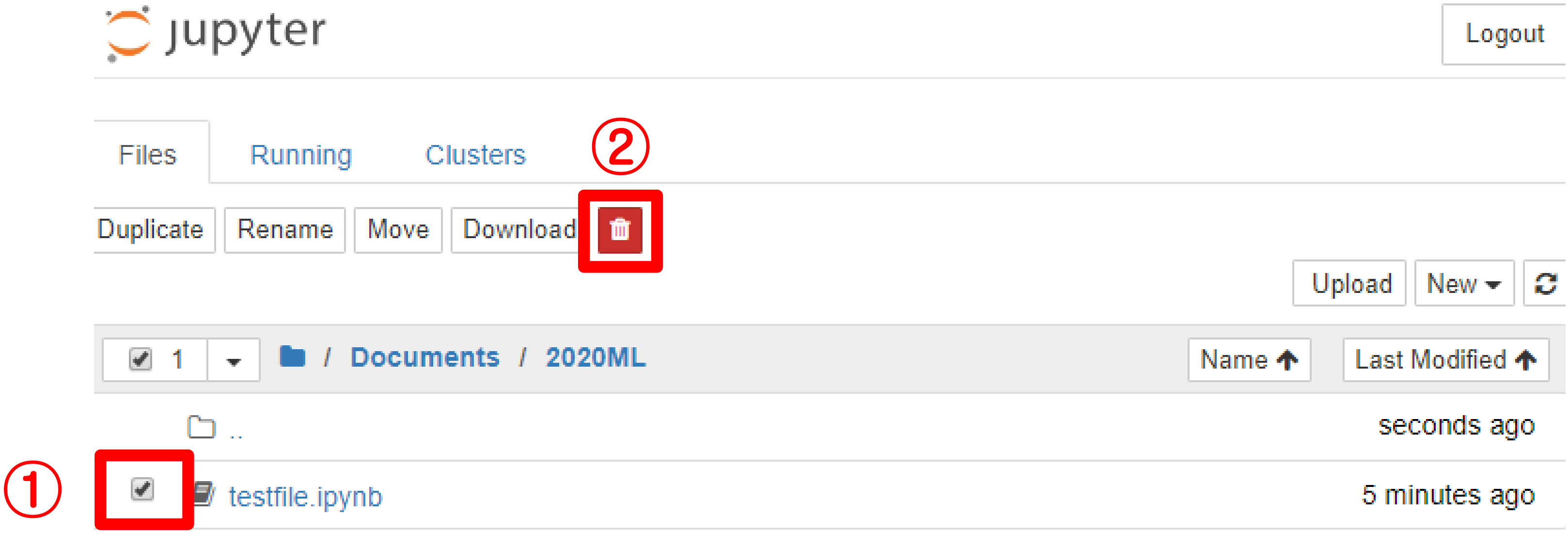
```
ello World!"
 Hi World!"
x)
x + y)
World!
World!, Hi World!
x + y)
x - y)
x * y)
x ** 2)
x % 2)
x / y)
```



Select items to perform actions on them.

How to save and delete file

3. To delete this file, check this file, and click 🗑 button.



Tip

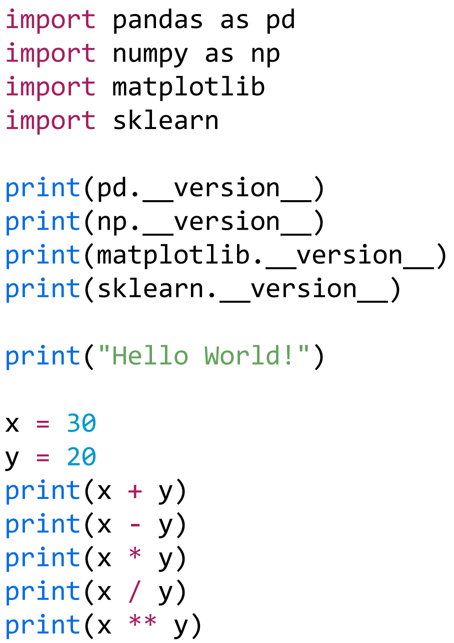
- Markdown
  - **Markdown** is a lightweight markup **language** with plain-text-formatting syntax
  - John Gruber created the Markdown language in 2004 in collaboration with Aaron Swartz on the syntax, with the goal of enabling people "to write using an easy-to-read and easy-to-write plain text format, optionally convert it to structurally valid XHTML (or HTML)".

- Keyboard Shortcuts
  - Command Mode Shortcuts
  - Edit Mode Shortcuts

https://en.wikipedia.org/wiki/Markdown

Upload your practice file

- Write and run the code below in jupyter notebook (use Week01_given_code.ipynb), rename the file, and summit the file to e-class
- Submit file name : Week01_<id>_<name>.ipynb
- Due : tomorrow(Friday) 11:59pm



```python
import pandas as pd
import numpy as np
import matplotlib
import sklearn

print(pd.__version__)
print(np.__version__)
print(matplotlib.__version__)
print(sklearn.__version__)

print("Hello World!")

x = 30
y = 20
print(x + y)
print(x - y)
print(x * y)
print(x / y)
print(x ** y)
```