香港浸會大學
HONG KONG BAPTIST UNIVERSITY

Tools Installation

JOUR7280

Big Data Analytics for Media and Communication

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Getting started: Tools

- Talking to your computer: Command line interface (CLI)
- Text Editor: vscode, sublime, notepad++, or others
- Platform for publishing and socializing: Git and GitHub, and Markdown language
- The tool: Python 3.x (Anaconda 3) and Jupyter Notebook

Programming Language

- A programming language is a formal language, which comprises a set of instructions used to produce various kinds of output.

- The term programming language usually refers to *high-level languages*, such as C, C++, Java, Python, Matlab…

Introduction to Python

- **Python** is a widely used general-purpose, high level programming language. It was initially designed by Guido van Rossum in 1991 and developed by Python Software Foundation.

Increasingly popular!

Aug 2018	Aug 2017	Change	Programming Language	Ratings	Change
1	1		Java	16.881%	+3.92%
2	2		C	14.966%	+8.49%
3	3		C++	7.471%	+1.92%
4	5	↑	Python	6.992%	+3.30%
5	6	↑	Visual Basic .NET	4.762%	+2.19%
6	4	↓	C#	3.541%	-0.65%
7	7		PHP	2.925%	+0.63%
8	8		JavaScript	2.411%	+0.31%
9	-	⇈	SQL	2.316%	+2.32%
10	14	⇈	Assembly language	1.409%	-0.40%

Jan 2020	Jan 2019	Change	Programming Language	Ratings	Change
1	1		Java	16.896%	-0.01%
2	2		C	15.773%	+2.44%
3	3		Python	9.704%	+1.41%
4	4		C++	5.574%	-2.58%
5	7	↑	C#	5.349%	+2.07%
6	5	↓	Visual Basic .NET	5.287%	-1.17%
7	6	↓	JavaScript	2.451%	-0.85%
8	8		PHP	2.405%	-0.28%
9	15	⇈	Swift	1.795%	+0.61%
10	9	↓	SQL	1.504%	-0.77%

TIOBE Rankings

Introduction to Python

- Reason for increasing popularity & Features
- Code readability, shorter codes, ease of writing
  - fewer lines of code in comparison to languages such as C++ or Java.
- “Simplicity is the best”
  - Closer to English language; Easy to learn
  - More emphasis on the solution to the problem rather than the syntax
- Interpreted language
  - Directly run the program from the source code.
  - No separate compilation and execution steps like C and C++.
- Rich Library Support
  - The Python Standard Library is very vast.

```java
public class HelloWorld
{
   public static void main (String[] args)
   {
      System.out.println("Hello, world!");
   }
}
```

Java Code

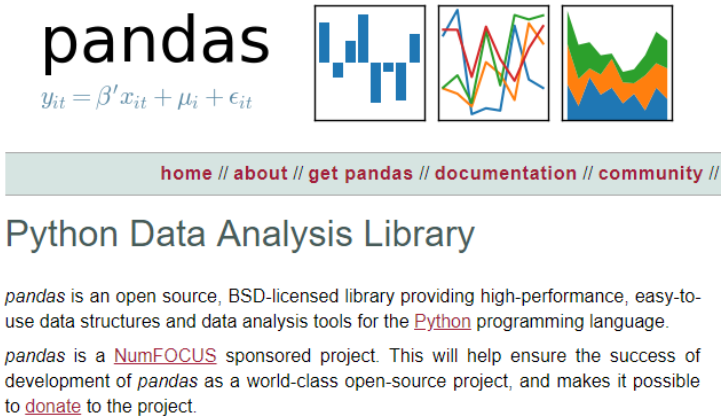
```python
print("Hello, world!") # Python version 3
```

Python Code

What Python can do

Scientific Computing

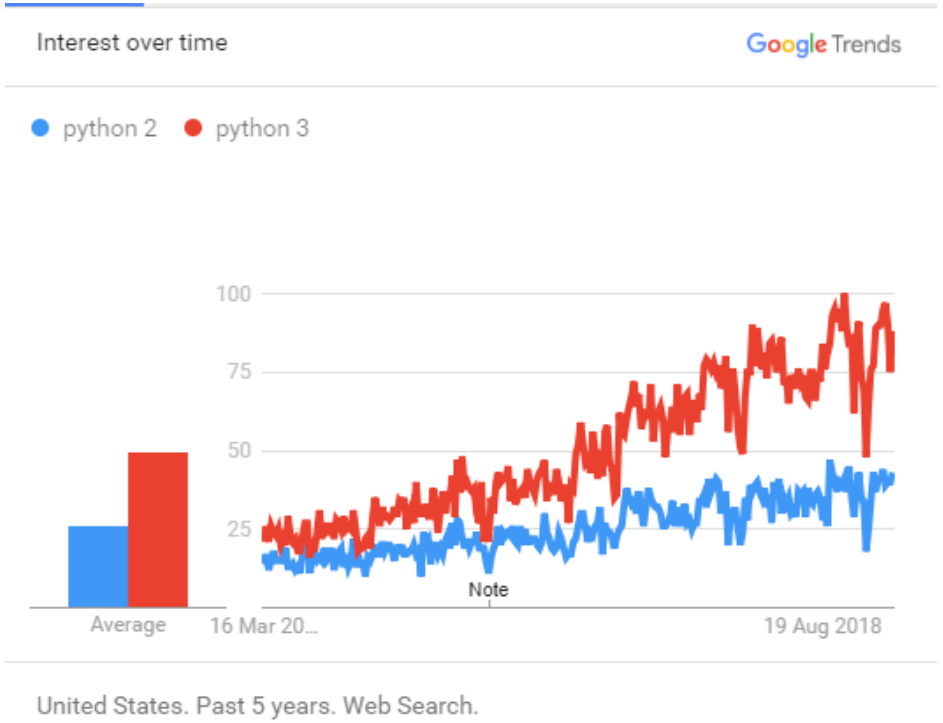
Machine Learning



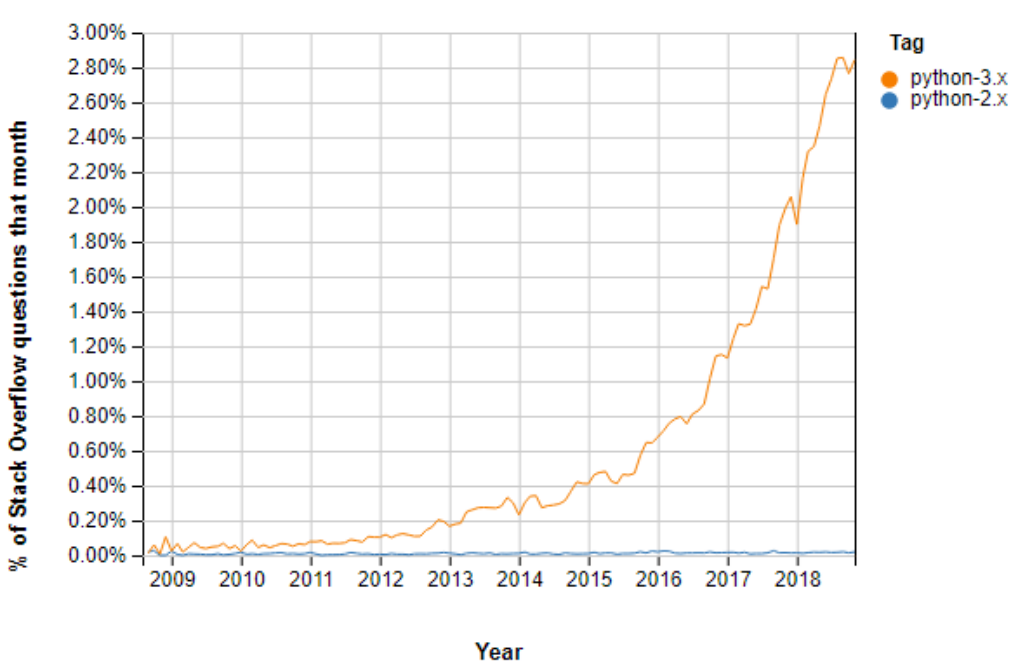
Data analysis

Data Visualization

Python 2 vs 3



Google Trends Python 2 vs. Python 3



Stack Overflow Questions Python 2 vs. Python 3

Command Line Interface (CLI) basics

- Open CLI: spotlight search – “terminal” / start menu search - ”cmd”
- An interesting tutorial (macOS, Windows)
- Basic commands of CLI:
  - – pwd
  - – date
  - – mkdir
  - – echo
  - – ls
  - – cd
  - – touch
  - – cp
  - – rm
  - – mv

Git

- Git is a “version control system”: records changes to a file or set of files over time and users can recall specific versions later.
  - Useful for collaboration project
- Download and install Git (mac, windows)
- Setting up your Git account
  - git config --global user.email "your@email.com"
  - git config --global user.name "your name"

GitHub

- GitHub is a web-based hosting service for software development projects that use Git version control system.” (What is GitHub)
- Push and pull
- Public repositories
- The social aspects of GitHub (share, fork, star)
  - A profile that shows your portfolio

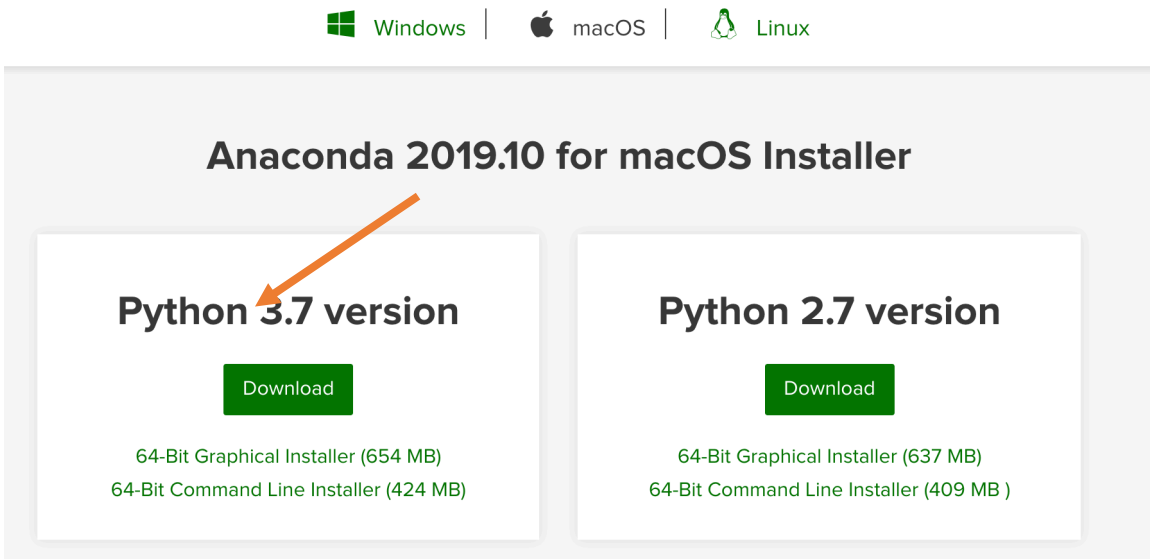
GitHub

- Creating your GitHub repository (“repo”)
  - Creating your own repo (with a Readme file)
  - “Fork” another user’s repository
- Creating a local copy
- Clone the Repo
- Pull request and collaborative projects

Markdown language

- Markdown is a lightweight markup language with plain text formatting syntax
- filename.md
- Markdown language quick guide [Link]
- Work with markdown language
  - vscode Preview
  - GIT MD Syntax [Link]
  - GIT Deeper MD Syntax [Link]
  - GIT MD Emojis! [Link]

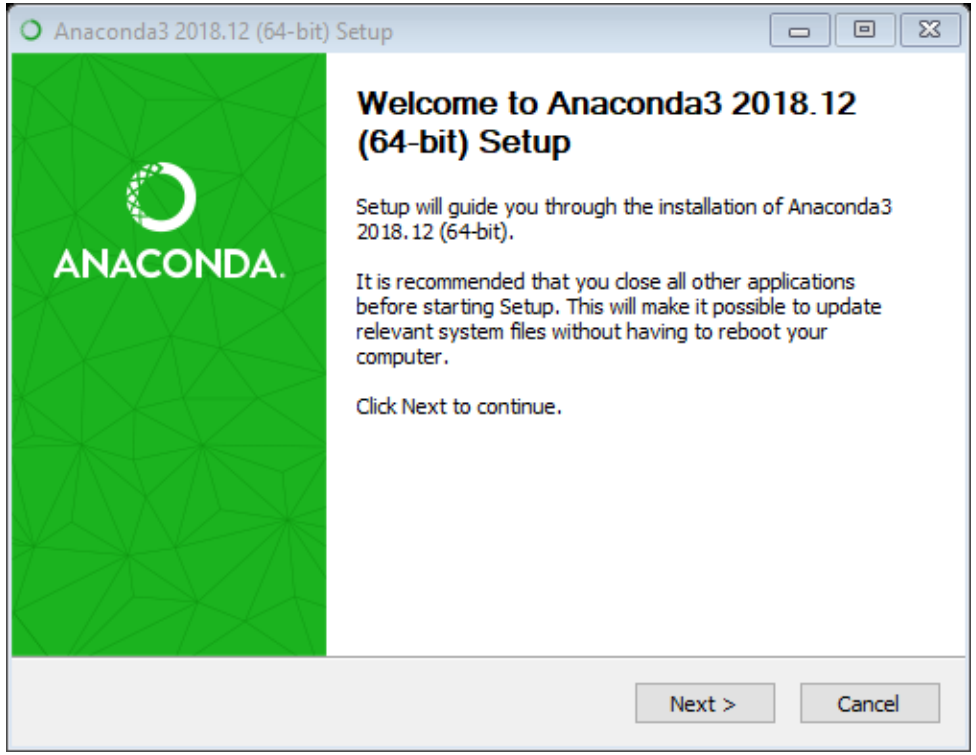
Installing Python and Jupyter Notebook

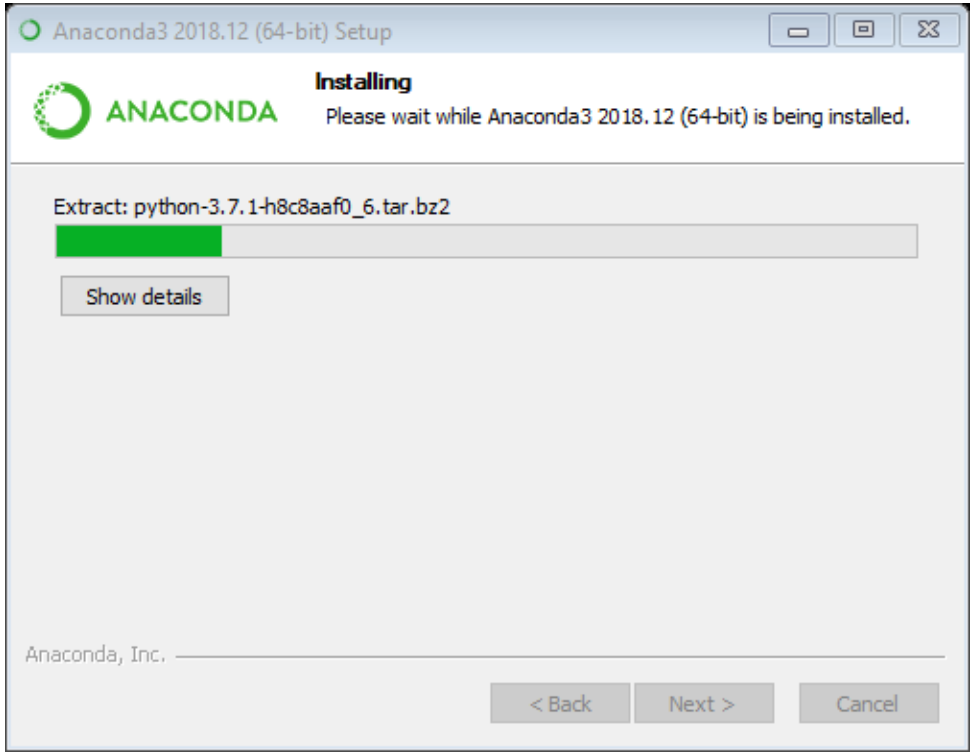


- Python 3.7
  - Anaconda [Link]
  - A free and open-source distribution of the Python and R programming languages
- Jupyter Notebook
  - Included in the Anaconda installation

Install Anaconda

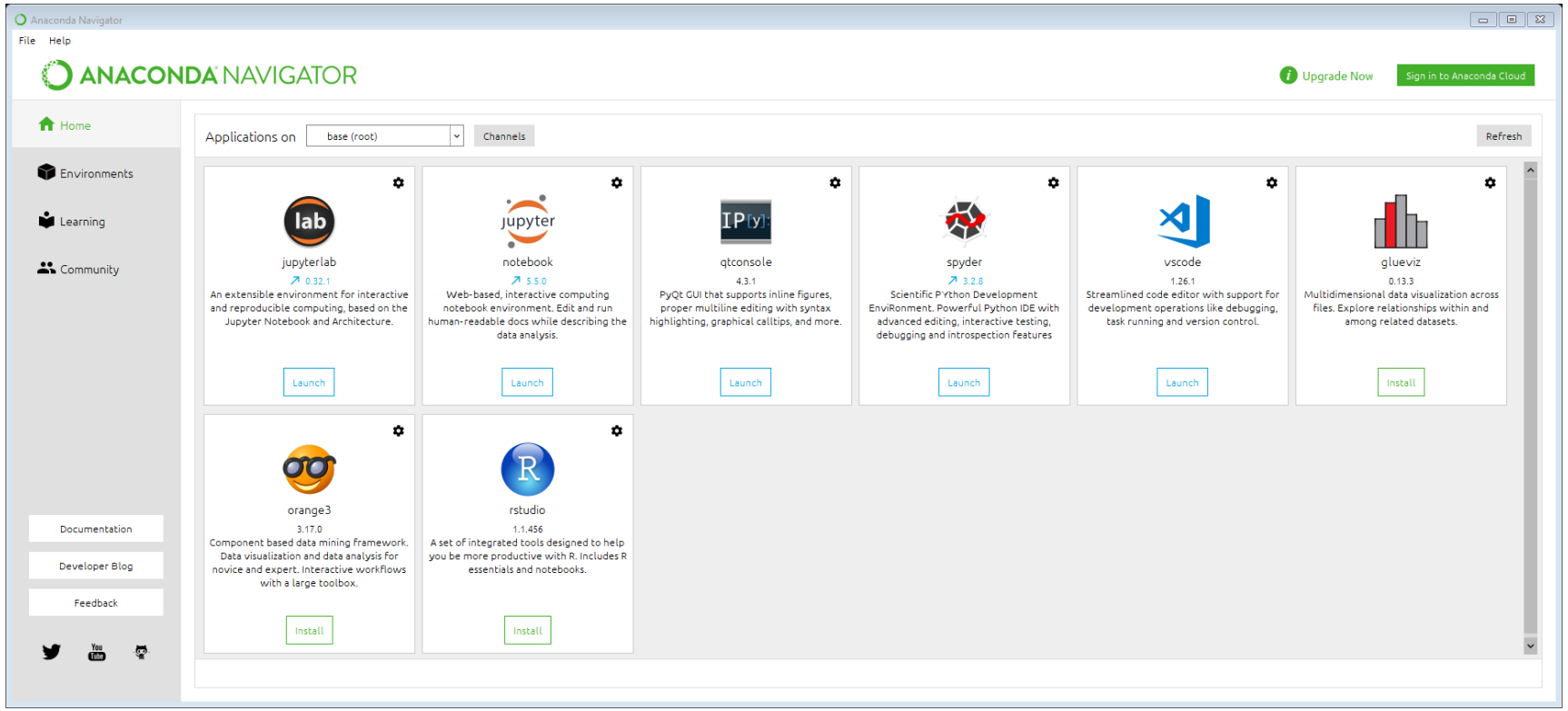
- Run the Anaconda installer.



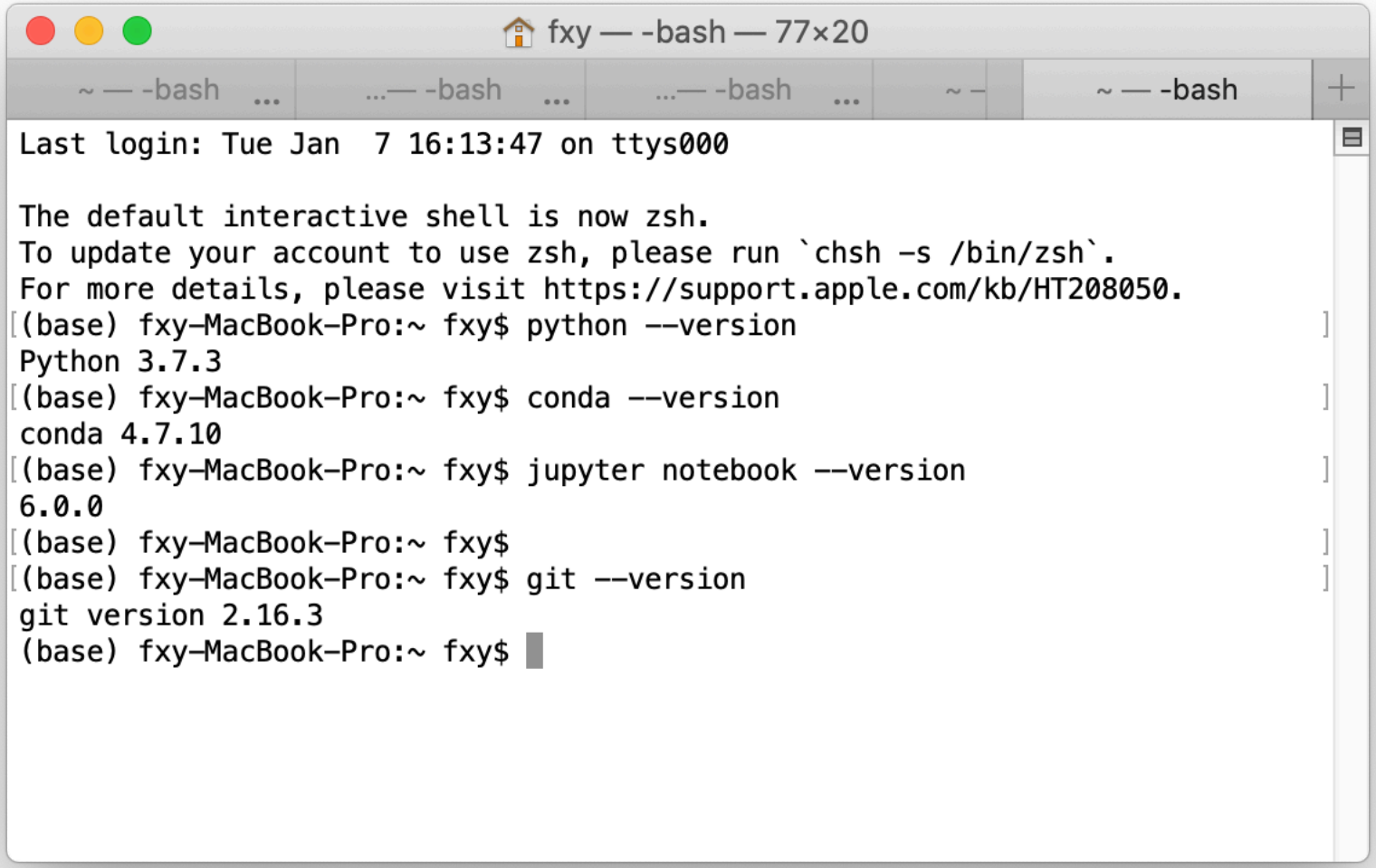


Anaconda

- Open the *Anaconda Navigator* after installation. You can install and launch different environment for later development.

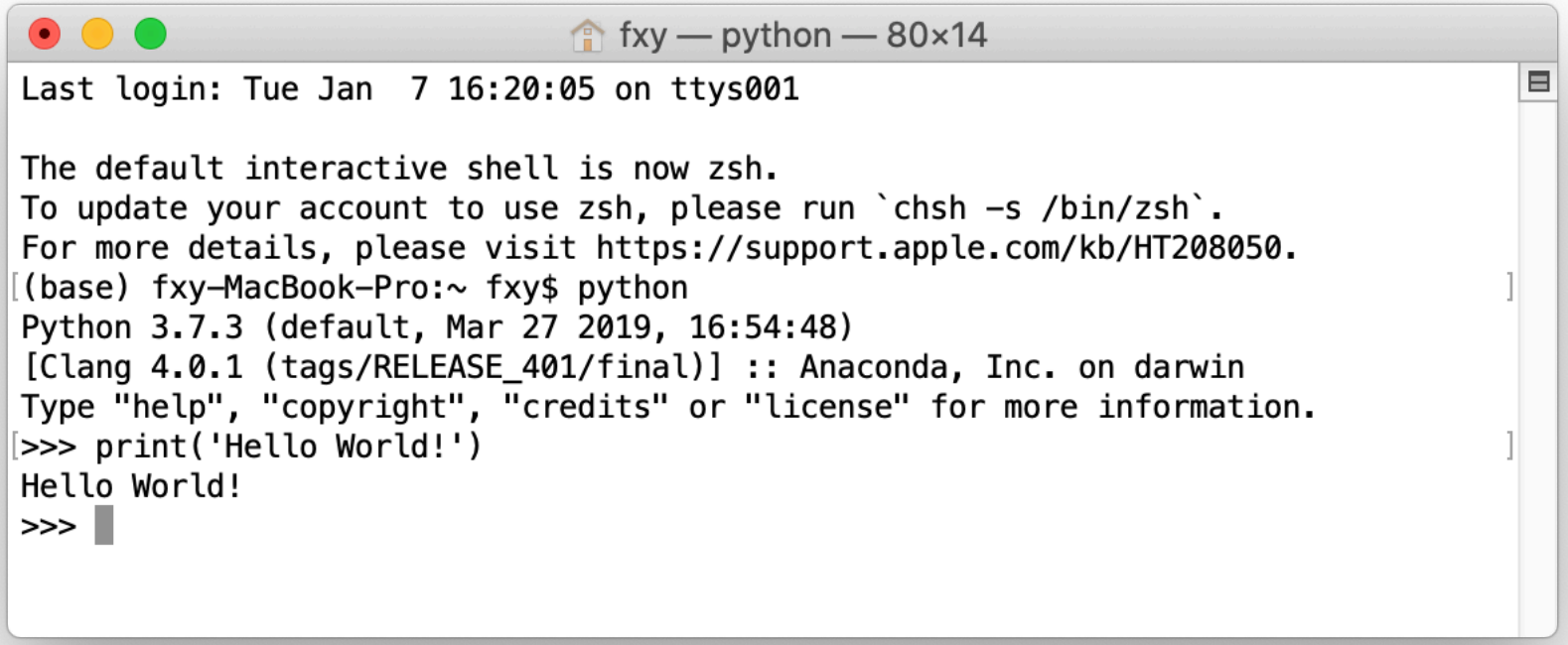


Check your existing versions



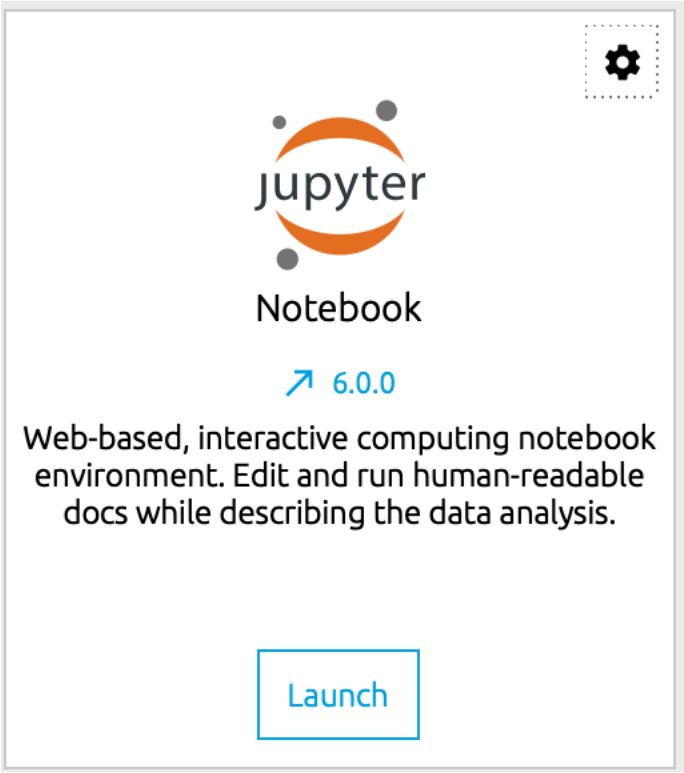
Your first Python program

- Two ways of printing “Hello World!”
  - via CLI



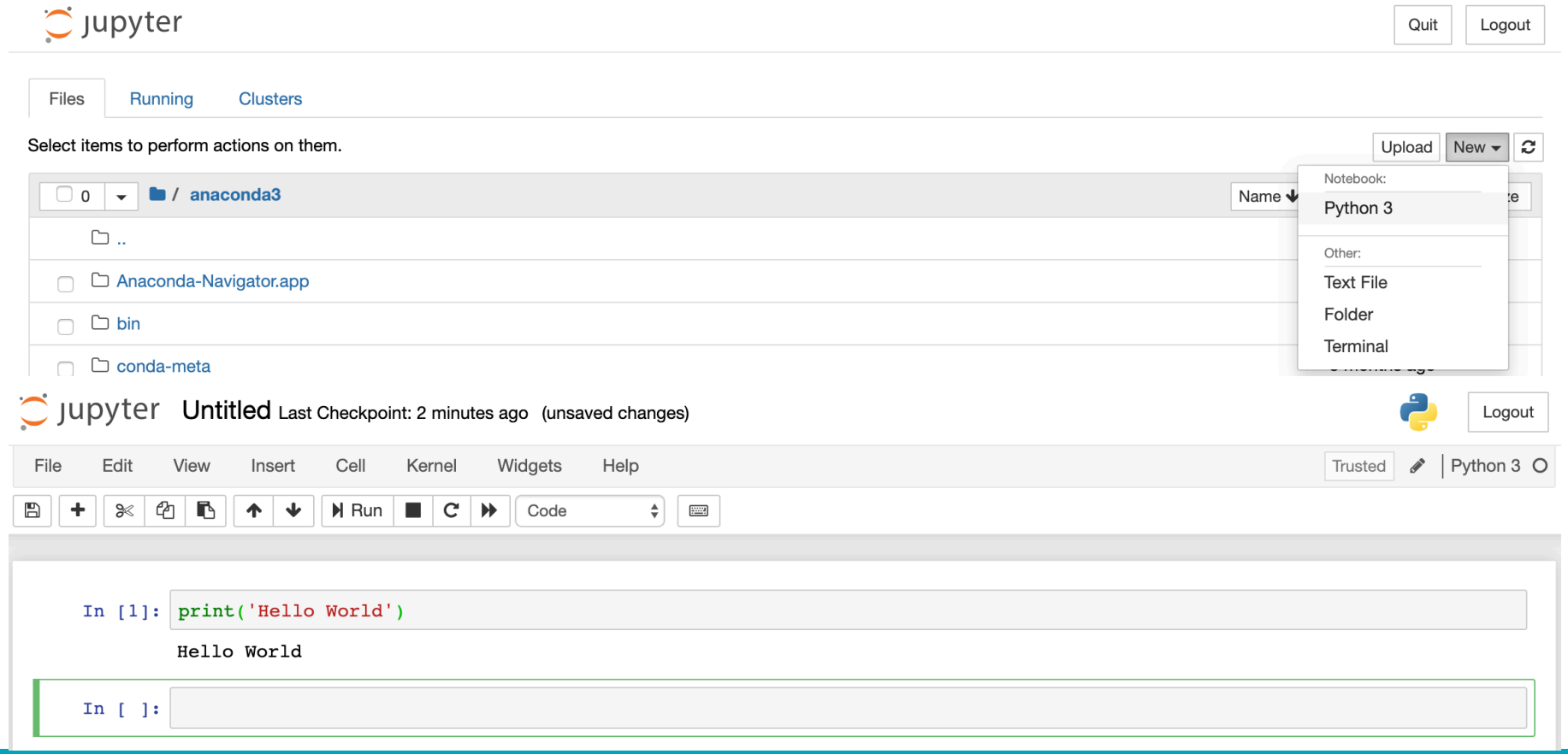
Your first Python program

- Via Jupyter Notebook
  - Contain both code and rich text elements, such as figures, links, equations, ...
  - The ideal place to bring together an analysis description, and its results
  - We will use Jupyter Notebook in this course



Your first Python program

- Two ways of printing “Hello World!”
  - via Jupyter Notebook



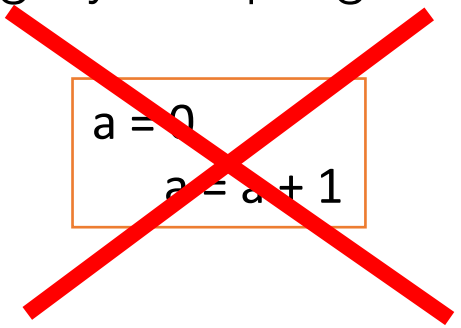
Before we start

- A good order is very important when writing Python programs

```
a = 0
a = a + 1
```

is different from

```
a = 0
    a = a + 1
```



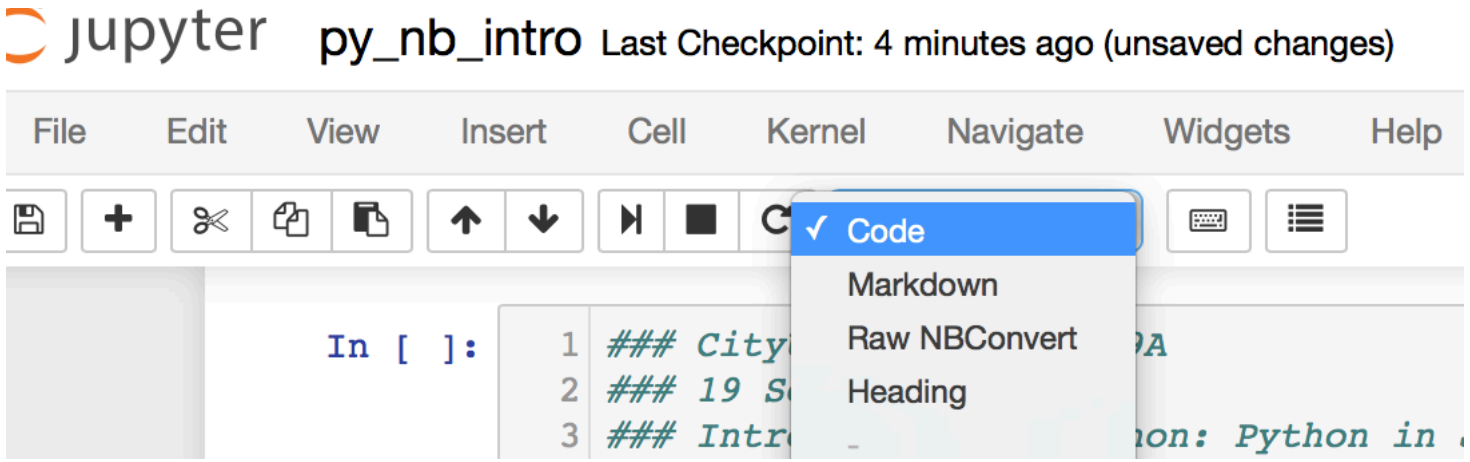
- This is called indentation
  - It is used to identify blocks of code
  - If a block of code is "inside" the other, it means it should be executed separately from the previous (or when something happens)

THIS IS A SYNTAX ERROR

- It is very important when
  - Using conditional statements (we'll see later)
  - Using iterative statements
  - Defining functions

Jupyter Notebook

- Jupyter Notebook can contain two main "cell types“
  - Markdown
  - Code
- To change cell type:



Jupyter Notebook

- Some short-cut keys
  - “alt” + “enter”: adding one more line
- When selecting a cell (NOT inside a cell)
  - “a” (adding one more line above the current line)
  - “b” (adding one more line below the current line)
  - “dd” (removing the current line - seems to be undoable...so please be careful here)
  - “m” turns the current line into markdown

Code cells

- This cell is ready to be executed

```
In [ ]: # print - comments are written in this way
        print( "Hello World!" )
```

  - No number inside brackets ([ ])
  - No output below
- This cell has been already executed

```
In [1]: # print - comments are written in this way
        print( "Hello World!" )

        Hello World!
```

  - Number in brackets ([1]) represents the order of execution
  - Output below the cell

Exercise

- Install Anaconda & Jupyter notebook
- Try “Hello World!” program
- Optional
  - Register a GitHub account
  - Create a new repository
  - Write a readme.md

References

- Anaconda installation FAQ [Link]
- Add Anaconda3 to path (mac) [link]
- Git tutorial [link]
- Learning website
  - https://www.learnpython.org/
  - https://stackoverflow.com/

Thank You

References

Books

- Magnus Lie Hetland. (2005). *Beginning Python: From Novice to Professional*. Apress. Retrieved from https://www.apress.com/gp/book/9781590599822
- Eric Matthes. (2015). Python Crash Course. A Hands-On, Project-Based Introduction to Programming. No Starch Press. Retrieved from https://nostarch.com/pythoncrashcourse
- Peter Harrington. (2012). Machine Learning in Action. Manning Publications Co., Greenwich, CT, USA. Retrieved from https://www.manning.com/books/machine-learning-in-action

Learning Websites

- https://www.learnpython.org/
- https://scikit-learn.org/stable/
- https://stackoverflow.com/