



PyQB

Monga

Third-party
libraries

NumPy

Homework

Programming in Python¹

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Homework

Python is “sold” *batteries included* (with many useful built-in libraries). Moreover, like many modern programming environments, it has standard **online package directories** that list libraries produced by independent developers.

<https://pypi.org/>

The Python package index currently lists almost 300K libraries!



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Third-party
libraries

NumPy

Homework

The details are explained here: <https://packaging.python.org/tutorials/installing-packages/>

- In most cases it is very easy, the pip program does all the magic
- It is **very** important to understand the difference between a **system-wide** and a **project-specific** installation.



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Third-party
libraries

NumPy

Homework

Python provides the idea of **virtual development environments** (venv)

- You can create one with: `python -m venv CHOOSE_A_NAME`
- You must activate it (syntax depends on your OS):
`CHOOSE_A_NAME\Scripts \activate`
- In an active virtual environment all the installation are **confined** to it
- You can get the list of installed packages with `pip freeze`



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Third-party
libraries

NumPy

Homework

Virtual environments are key to avoid messing up your system.

Many tools simplify their administration.

- `pipenv` (my preferred one, we will use this)
- `poetry` (similar to `pipenv`, currently less popular, but it has a better dependency control, a bit more complex)
- `conda` (uses its own package index, great flexibility and complexity, manage different python versions)

Virtual environments caveats



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Third-party
libraries

NumPy

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When you are working in a Python virtual environment, remember to launch **all** your development tools “inside” the virtual space.

For example, to use IDLE don't click on the main application launcher, instead: `python -m idlelib`.



NumPy is a third-party library very popular for scientific/numerical programming (<https://numpy.org/>).

- Features familiar to `matlab`, R, Julia programmers
- The key data structure is the **array**
 - 1-dimension arrays: **vectors**
 - 2-dimension arrays: **matrices**
 - n-dimension arrays

In some languages array is more or less synonym of list: Python distinguishes: **lists** (mutable, arbitrary elements), **arrays** (mutable, all elements have the same type), **tuples** (immutable, fixed length, arbitrary elements).



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Third-party
libraries

NumPy

Homework

- One-triangle: tried by 26, ok for 18
- triangle-kinds: tried by 22, ok for 11
- dna-hamming: tried by 22, ok for 14
- newton-sqrt: tried by 21, ok for 15
- py-triplets: tried by 19, ok for 13
- flatten-list: tried by 19, ok for 6
- dna-files: tried by 20, ok for 7
- dna-forensics: tried by 14, ok for 5