COMP1531

🔨 Python
2.4 - Packages

In this lecture

Why?

- To utilise python fully, we needPython is a valuable tool to learn and necessary for the project

What?

- Learning a second language
- Python vs C
- Core python language features
- Python versions

Importing libraries

Python comes packaged with a number of standard libraries (e.g. "math"). However, many libraries that you may want to use have to be installed for usage.

Installing these extra libraries is quite easy due to the **pip** program, which makes installations of python dependencies doable in just a single line of code. **pip** is a package installer for python.

Pip installs a particular version of a particular python module to your system.

There is a version of pip used for python2 (known as "pip") and a version of pip used for python3 (known as "pip3")

Installing with pip

For example

To use the `numpy` library we need to first install it on our machine.

```
1 $ pip3 install numpy
```

npy.py

```
1  import numpy as np
2
3  a = np.array(42)
4  b = np.array([1, 2, 3, 4, 5])
5  c = np.array([[1, 2, 3], [4, 5, 6]])
6  d = np.array([[[1, 2, 3], [4, 5, 6]], [[1, 2, 3], [4, 5, 6]]])
7
8  print(a.ndim)
9  print(b.ndim)
10 print(c.ndim)
11 print(d.ndim)
```

Installing with pip

When you install something with pip (pip3) where is it actually stored?

Typically in your home directory

Potential issues with installing

Even though we know how to install modules, we now run into a problem:

- How do I easily share the modules that I've installed with my team members?
- How do I ensure my project doesn't end up accidentally using installed modules from other projects, and vice versa?

Virtual Environments

A virtual environment is a tool that helps to keep dependencies required by different projects separate by creating isolated python virtual environments for them.

You can read more about them here and here.

You may be asked a question about them on the exam, but you will never be required to use them.

They are often required for use with CI/CD (covered later).

Virtual Environments

Demonstration

```
pip3 install virtualenv
python3 -m virtualenv venv/
source venv/bin/activate

# Do stuff

pip3 freeze > requirements.txt # Save modules
pip3 install -r requirements.txt # Install modules

deactivate
```

Packages

In conclusion, non user-defined packages can be found in 1 of 4 places:

1. Built-in to python (no action needed)
2. Installed on the system (sudo pip3 install [x]) - in sys.path
3. Installed in your home directory (pip3 install [x]) - in sys.path
4. Installed in your project folder (pip3 install [x] within venv)

Activating a virtual environment means we no longer look in (3) and instead look in (4).

Feedback