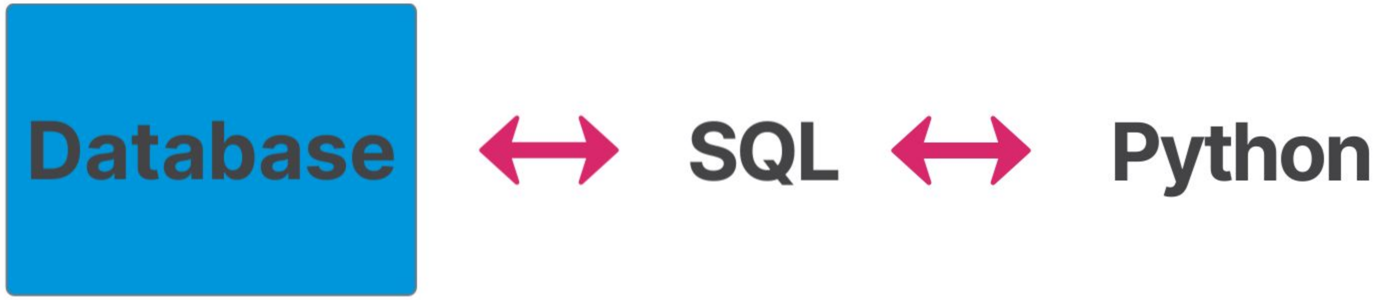
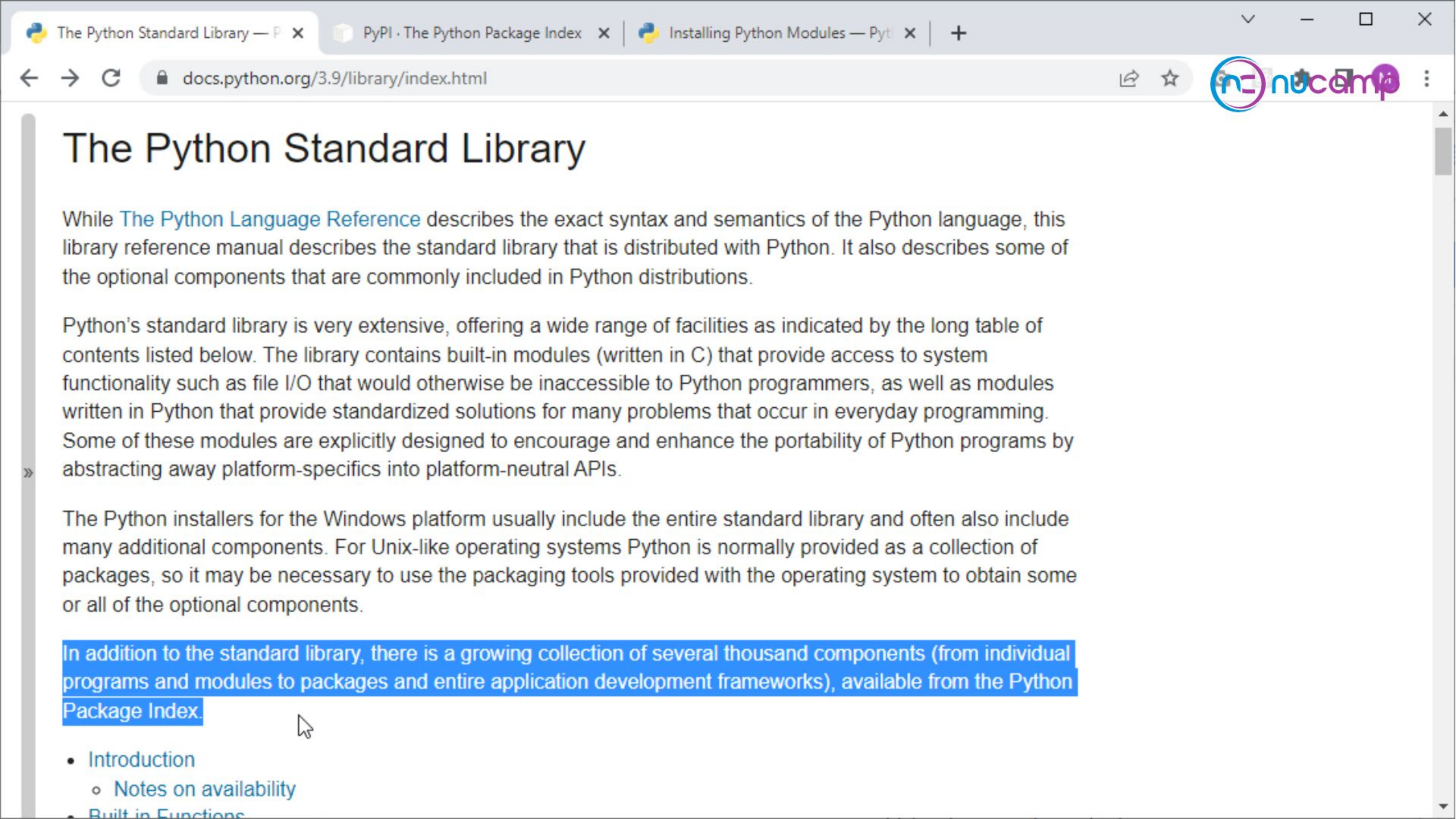
Overview:

Python Packages and Virtual Environments



You've learned how to use SQL to query and manipulate relational databases such as Postgres

This week, we'll look at using SQL with a programming language: Python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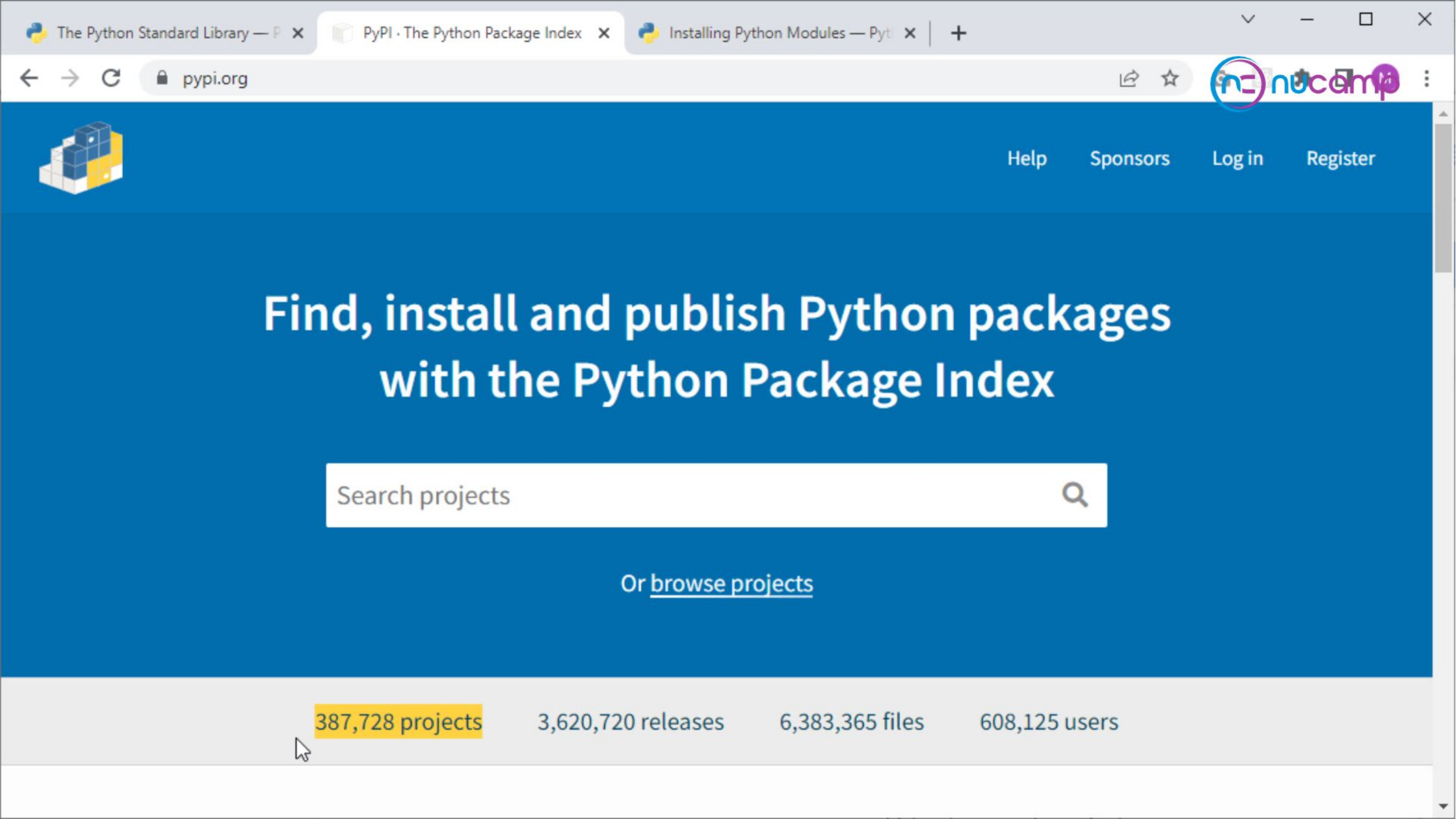
The Python Standard Library

While The Python Language Reference describes the exact syntax and semantics of the Python language, this library reference manual describes the standard library that is distributed with Python. It also describes some of the optional components that are commonly included in Python distributions.

Python's standard library is very extensive, offering a wide range of facilities as indicated by the long table of contents listed below. The library contains built-in modules (written in C) that provide access to system functionality such as file I/O that would otherwise be inaccessible to Python programmers, as well as modules written in Python that provide standardized solutions for many problems that occur in everyday programming. Some of these modules are explicitly designed to encourage and enhance the portability of Python programs by abstracting away platform-specifics into platform-neutral APIs.

The Python installers for the Windows platform usually include the entire standard library and often also include many additional components. For Unix-like operating systems Python is normally provided as a collection of packages, so it may be necessary to use the packaging tools provided with the operating system to obtain some or all of the optional components.

In addition to the standard library, there is a growing collection of several thousand components (from individual programs and modules to packages and entire application development frameworks), available from the Python Package Index.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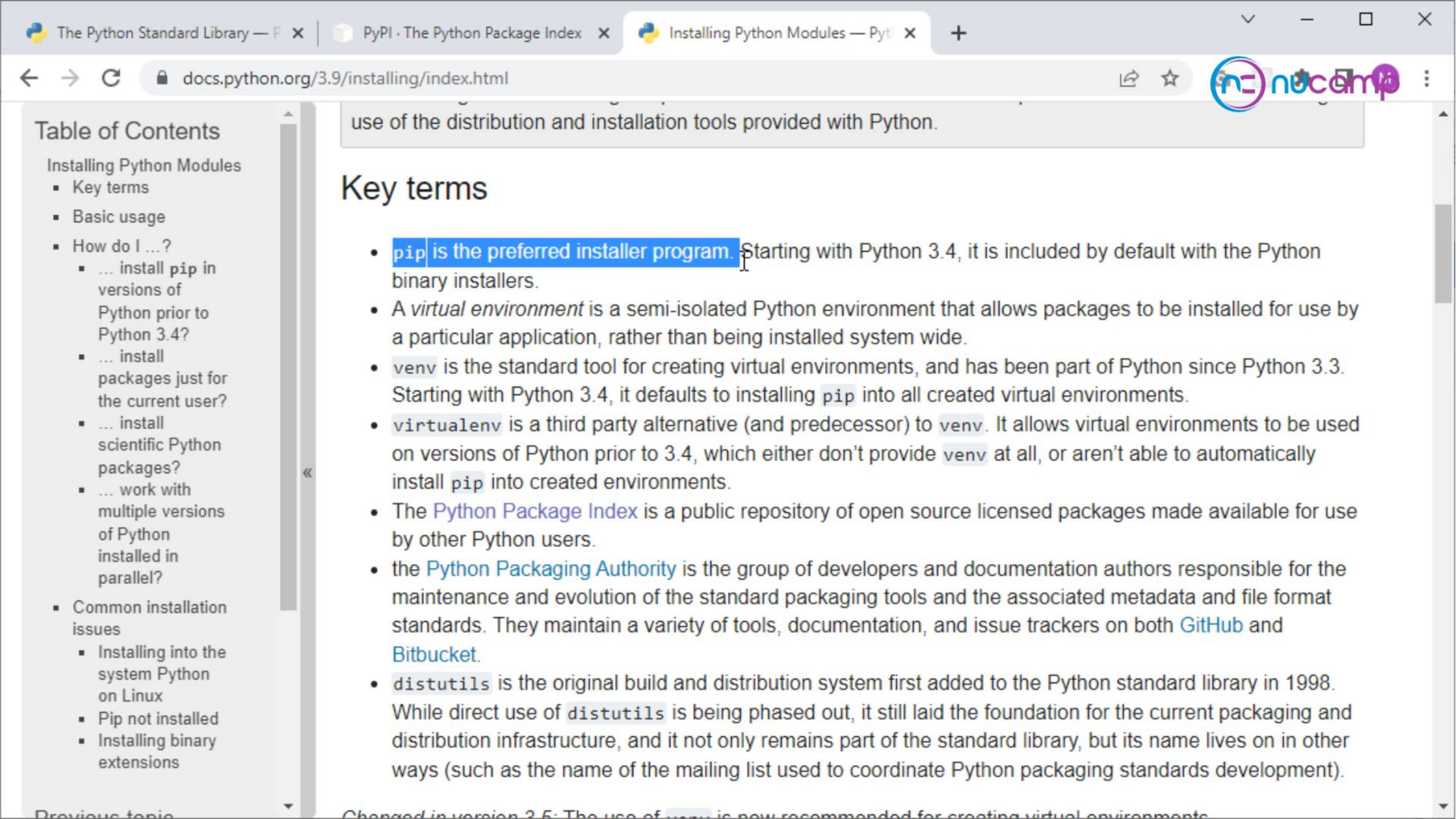
Find, install and publish Python packages with the Python Package Index

Search projects

Or browse projects

387,728 projects 3,620,720 releases 6,383,365 files 608,125 users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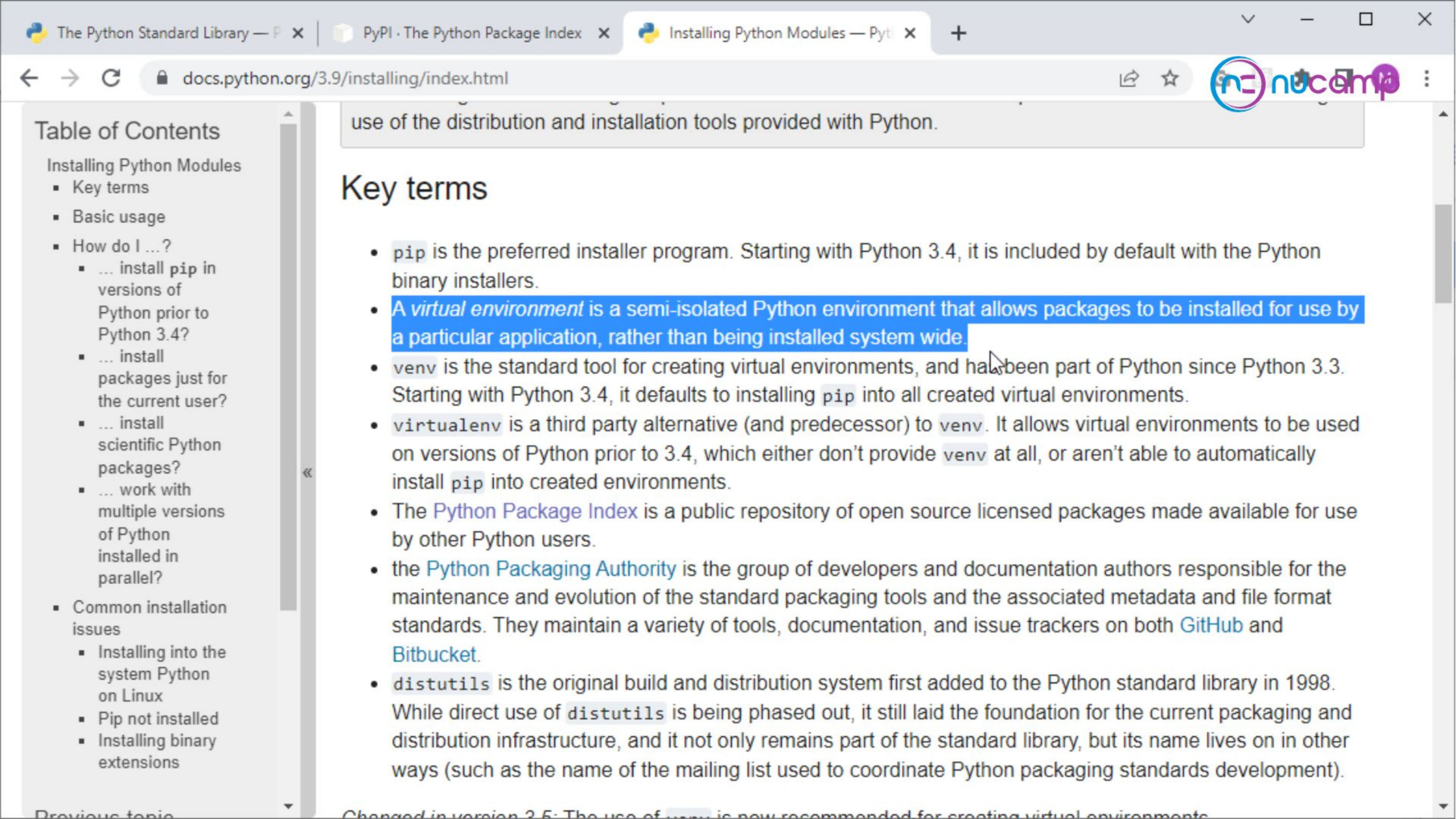
use of the distribution and installation tools provided with Python.

Key terms

- `pip` is the preferred installer program. Starting with Python 3.4, it is included by default with the Python binary installers.
- A *virtual environment* is a semi-isolated Python environment that allows packages to be installed for use by a particular application, rather than being installed system wide.
- `venv` is the standard tool for creating virtual environments, and has been part of Python since Python 3.3. Starting with Python 3.4, it defaults to installing `pip` into all created virtual environments.
- `virtualenv` is a third party alternative (and predecessor) to `venv`. It allows virtual environments to be used on versions of Python prior to 3.4, which either don't provide `venv` at all, or aren't able to automatically install `pip` into created environments.
- The Python Package Index is a public repository of open source licensed packages made available for use by other Python users.
- the Python Packaging Authority is the group of developers and documentation authors responsible for the maintenance and evolution of the standard packaging tools and the associated metadata and file format standards. They maintain a variety of tools, documentation, and issue trackers on both GitHub and Bitbucket.
- `distutils` is the original build and distribution system first added to the Python standard library in 1998. While direct use of `distutils` is being phased out, it still laid the foundation for the current packaging and distribution infrastructure, and it not only remains part of the standard library, but its name lives on in other ways (such as the name of the mailing list used to coordinate Python packaging standards development).

Changed in version 3.5: The use of `venv` is now recommended for creating virtual environments.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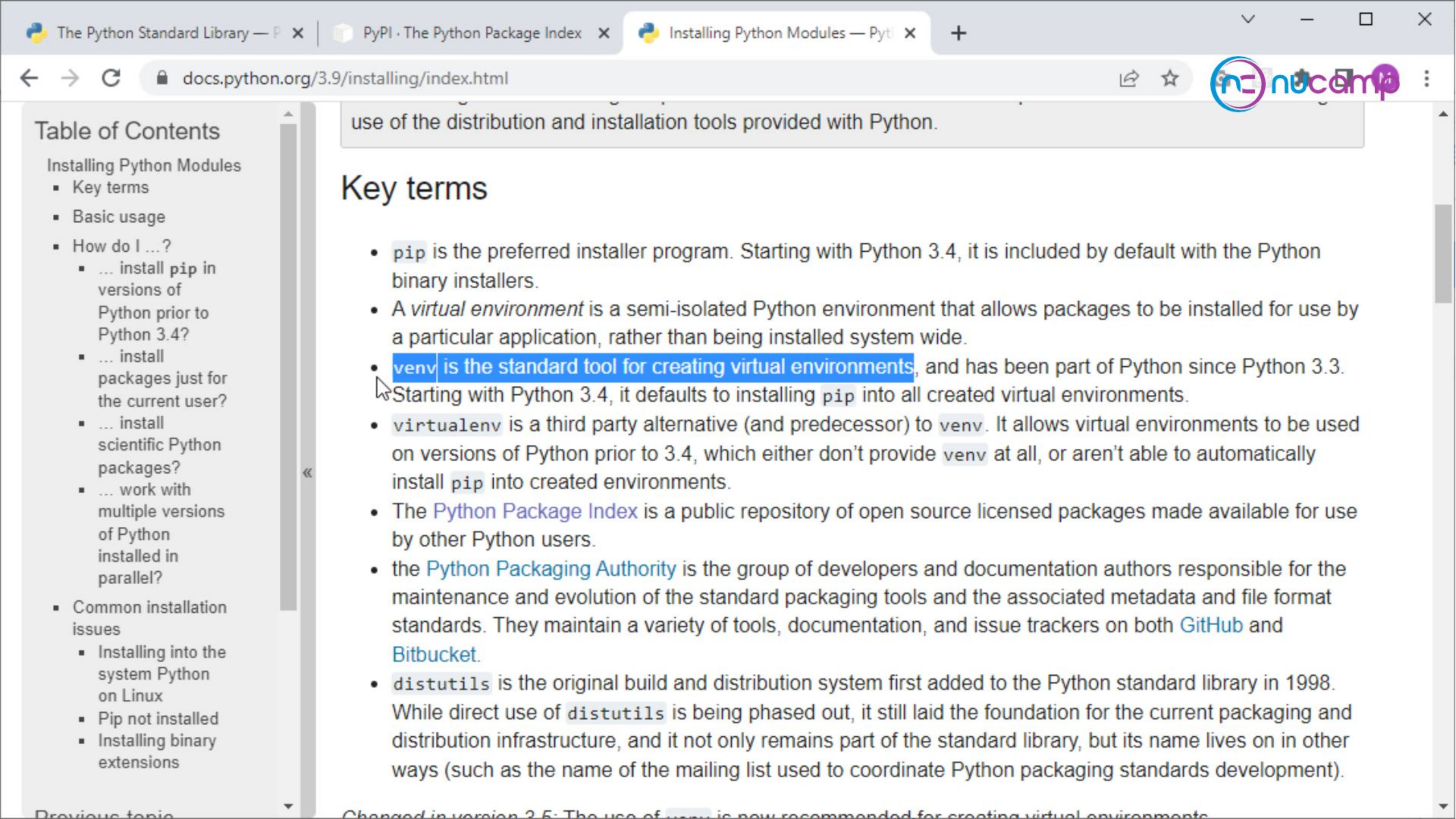
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Python packages

pip: **p**ackage **i**nstaller for **p**ython:
CLI tool to install packages from **Python Package Index**
Install packages one by one, or from a list in a text file

<u>This week, we will:</u>

Install Python packages used to run SQL statements on a database from a Python app, as well as receive data back that can be manipulated with Python

Set up a back end server using a package called **Flask**

This server will act as a middleman between a client and our Postgres server

Virtual environment

Best practice: Install Python packages into a locally scoped virtual environment

Use built-in module called **venv**

Keep track of packages required for each project

Avoid package version conflicts between projects

In the following exercise

We will set up a virtual environment using **venv**

We will **activate** that virtual environment

Then install third-party Python packages into it, using **pip**