python™

unittest

unit tests

integration tests

acceptance tests

python™

unittest

integration

acceptance
tests

unittest

automated

&

repeatable

python™

TestCase

groups together related test functions

Basic unit of test organization in `unittest`.

python™

fixtures

code run before and/or after each test function

fixtures

code run before and/or after each test function

```
set-up fixture
```

```
def test_line_count(self):
    "Check that the line count is correct."
    self.assertEqual(
        analyze_text(self.filename)[0], 4)
```

```
tear-down/clean-up fixture
```

assertions

specific tests for conditions and behaviors

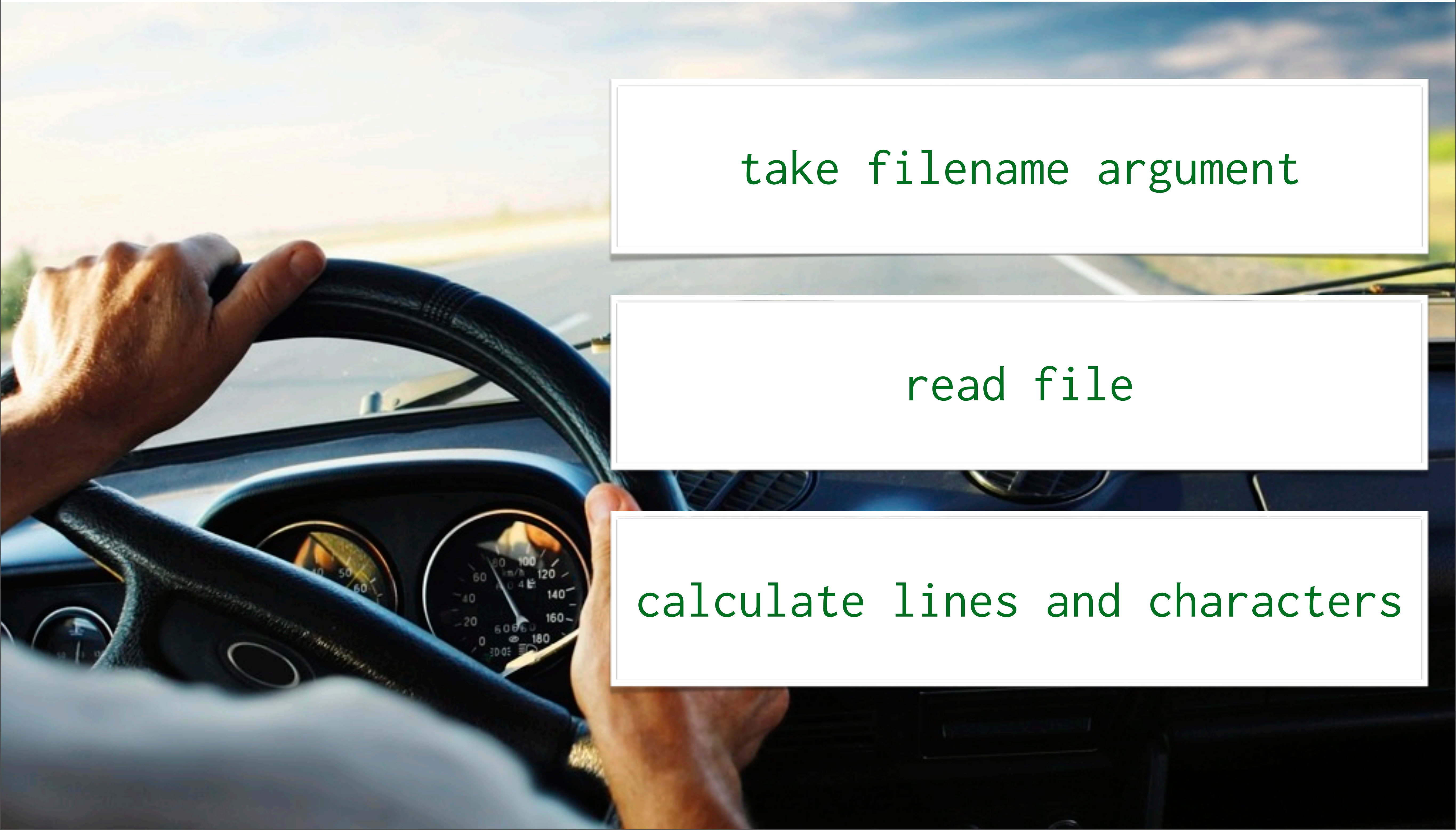
`x.is_valid()`

`x == y`

`raise ValueError()`

If an assertion fails, then a test fails.

Test-Driven Development



take filename argument

read file

calculate lines and characters

PDB

The Python DeBugger

python™

PDB

The Python DeBugger

PDB

programmatic access

```
>>> import pdb
>>> pdb.set_trace()
```

python™

is_palindrome()

determines if an integer is a palindrome or not

12321
2468642
~~11235813~~

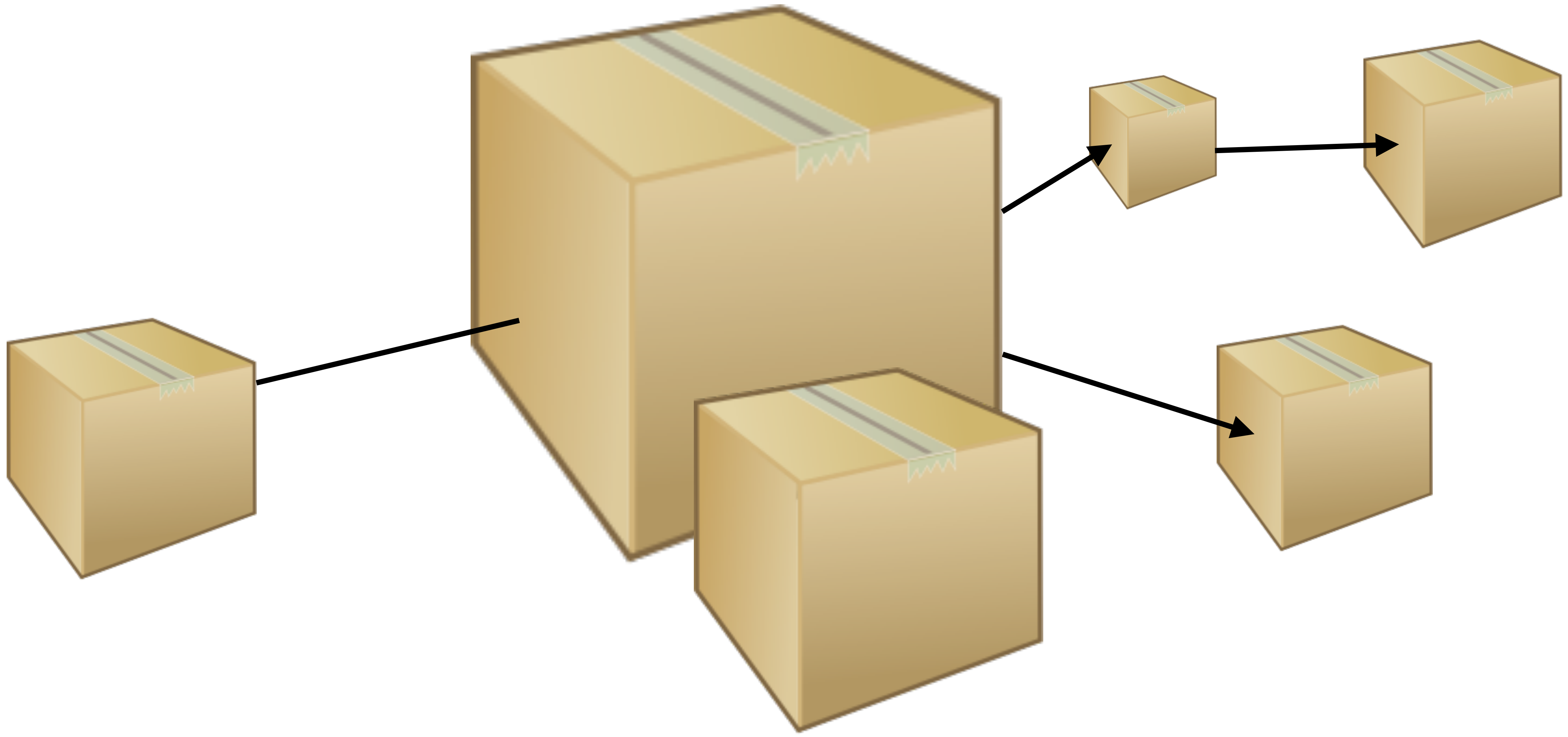
python™

virtual environment

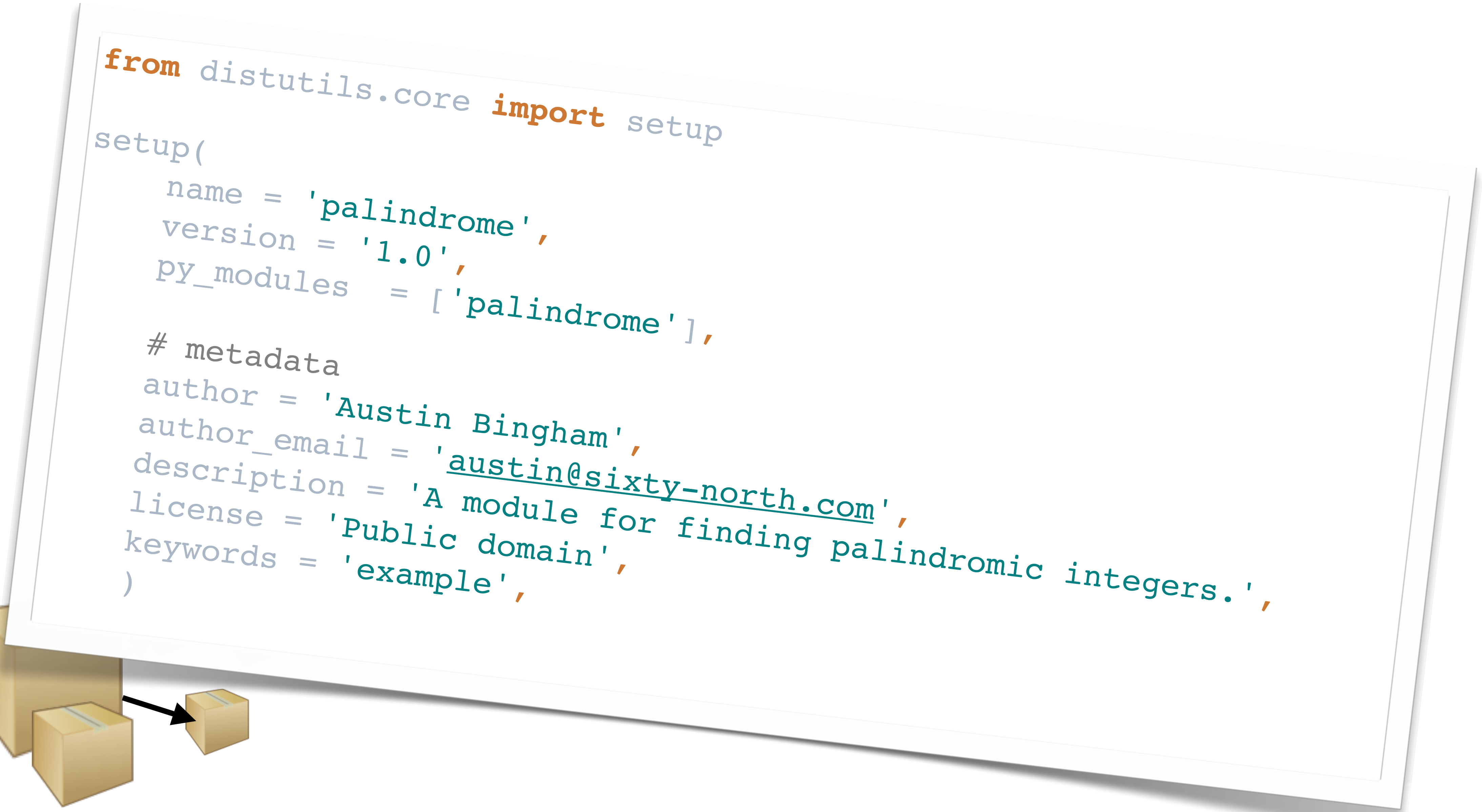
light-weight, self-contained Python installation on Windows:

```
> venv3\bin\activate
```

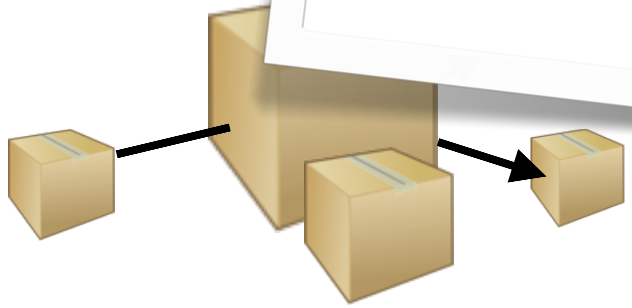
packaging



packaging



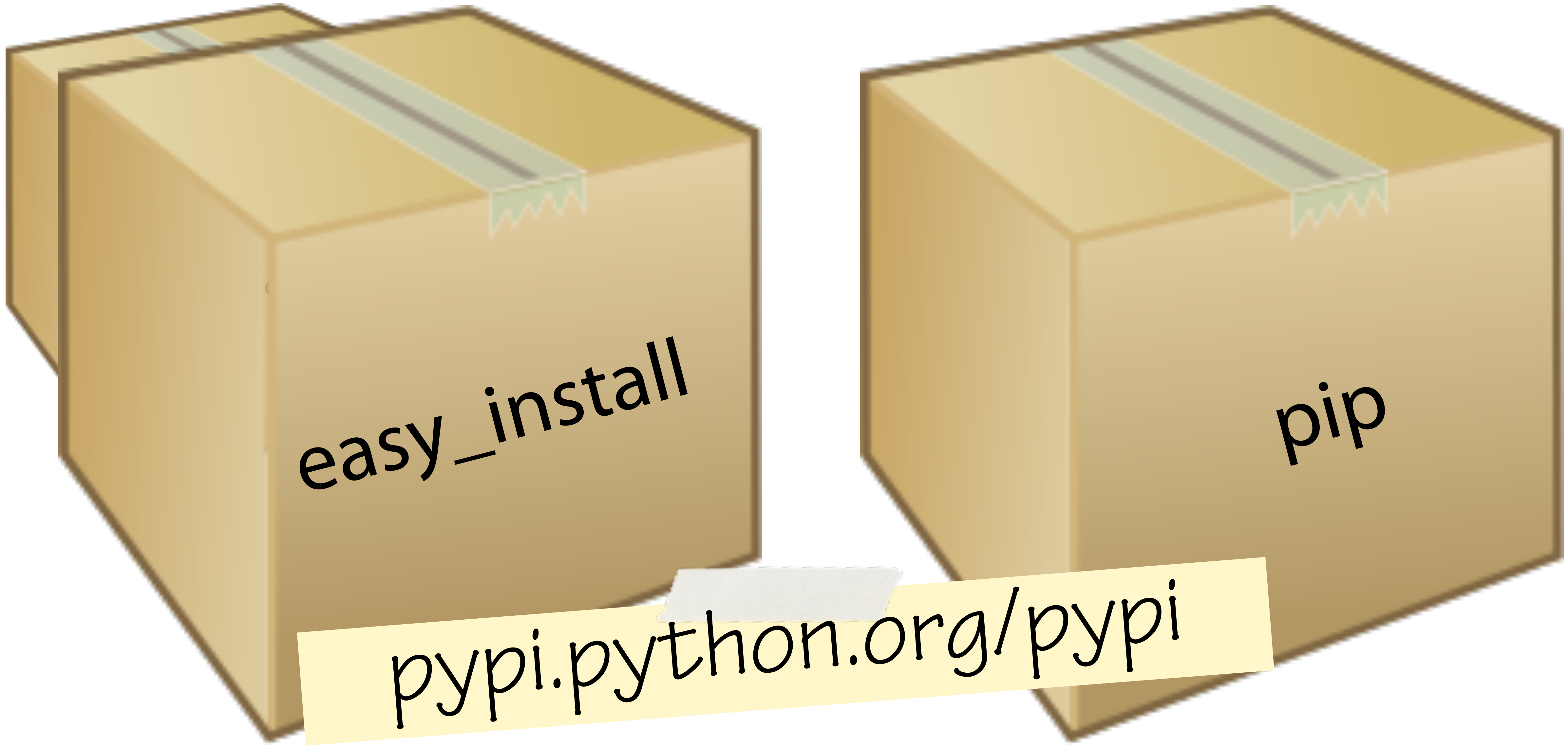
```
from distutils.core import setup

setup(
    name = 'palindrome',
    version = '1.0',
    py_modules  = ['palindrome'],

    # metadata
    author = 'Austin Bingham',
    author_email = 'austin@sixty-north.com',
    description = 'A module for finding palindromic integers.',
    license = 'Public domain',
    keywords = 'example',
    )
```



python™

installing

installing



pypi.python.org/pypi

python™

installing

installing

```
$ easy_install <package name>
```

python™

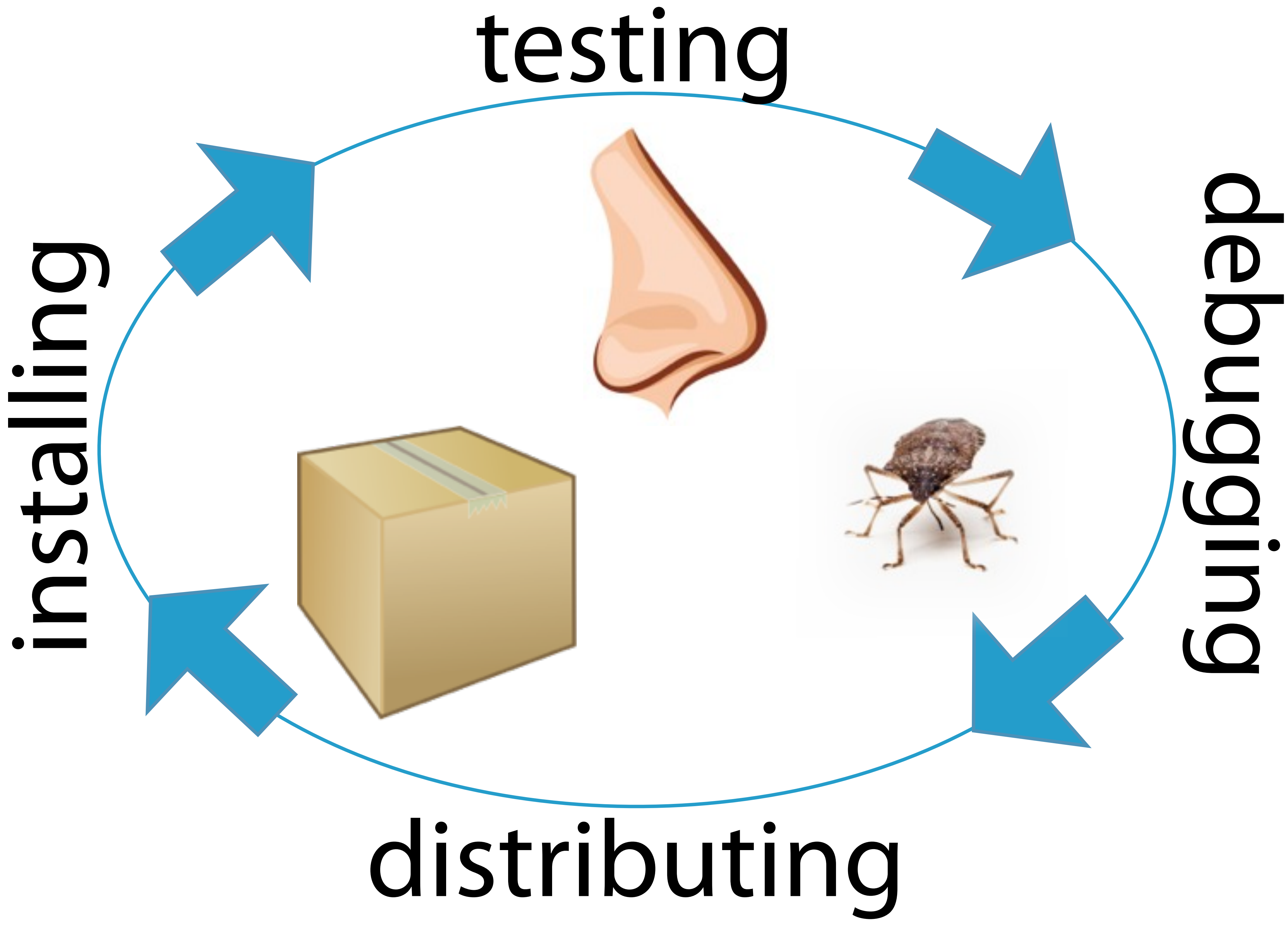
installing

installing

installing

```
$ pip install <package name>
```

Shipping working and maintainable code
Summary



Shipping working and maintainable code
Summary

- `unittest` **is a framework for developing reliable automated tests**
- **You define *test cases* by subclassing from** `unittest.TestCase`
- `unittest.main()` **is useful for running all of the tests in a module**
- `setUp()` **and** `tearDown()` **run code before and after each test method**
- **Test methods are defined by creating method names that start with** `test_`
- `TestCase.assert...` **methods make a test method fail when the right conditions aren't met**
- **Use** `TestCase.assertRaises()` **in a with-statement to check that the right exceptions are thrown in a test**
- **Python's standard debugger is called** `PDB`
- `PDB` **is a standard command-line debugger**
- `pdb.set_trace()` **can be used to stop program execution and enter the debugger**
- **Your REPL's prompt will change to** `(Pdb)` **when you're in the debugger**

Shipping working and maintainable code Summary

- **You can access** `PDB`**'s built-in help system by typing** `help`
- **Use "**`python -m pdb <script name>`**" to run a program under PDB from the start**
- `PDB`**'s** `where` **command shows the current call stack**
- `PDB`**'s** `next` **command lets execution continue to the next line of code**
- `PDB`**'s** `continue` **command lets program execution continue indefinitely, or until you stop it with** `control-c`
- `PDB`**'s** `list` **command shows you the source code at your current location**
- `PDB`**'s** `return` **command resumes execution until the end of the current function**
- `PDB`**'s** `print` **command lets you see the values of objects in the debugger**
- **Use** `quit` **to exit** `PDB`
- **Virtual environments are light-weight, self-contained Python installations that any user can create**
- `pyvenv` **is the standard tool for creating virtual environments**

Shipping working and maintainable code
Summary

- `pyvenv` **accepts both a source-installation argument as well as a directory name into which is create the new environment**
- **To use a virtual environment, you need to run its** `activate` **script**
- **When you activate a virtual environment, your prompt is modified to remind you**
- **The** `distutils` **package is used to help you distribute your Python code**
- `distutils` **is generally used inside a** `setup.py` **script which users run to install your software**
- **The main function in** `distutils` **is** `setup()`
- `setup()` **takes a number of arguments describing both the source files as well as metadata for the code**
- **The most common way to use** `setup.py` **is to install code using** `python setup.py install`
- `setup.py` **can also be used to generate distributions of your code**
- **Distributions can be zip files, tarballs, or several other formats**

Shipping working and maintainable code Summary

- **Pass** `--help` **to** `setup.py` **to see all of its options**
- **Three common tools for installing third-party software are** `distutils`, `easy_install`**, and** `pip`
- **The central repository for Python packages is the Python Package Index, also called PyPI or "cheeseshop"**
- **You can install** `easy_install` **by downloading and running** `distribute_setup.py`
- **You use** `easy_install` **to install modules by running** `easy_install package-name` **from the command line**
- **You can install** `pip` **via** `easy_install`
- **To install modules with** `pip`**, use the subcommand notation** `pip install package-name`

Shipping working and maintainable code Summary

- `divmod()` **calculates the quotient and remainder for a division operation at one time**
- `reversed()` **function can reverse a sequence**
- **You can pass** `-m` **to your Python command to have it run a module as a script**
- **Debugging makes is clear that Python is evaluating everything at run time**
- **You can use the** `__file__` **attribute on a module to find out where its source file is located**
- **Third-party python is generally installed into your installation's** `site-packages` **directory**
- `nose` **is a useful tool for working with** `unittest`**-based tests**