# Programming in Python

## Week 8

## Installing stuff

Syllabus:
`http://briandorsey.github.com/uwpython_onsite/`

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# Introductions, comments (...)

# assignment

wow

# there sure are a lot of ways to install modules

tools used:

pip

virtualenv

setup.py

apt-get

easy_install

make

mix of success and failure

sometimes

fail

fail

fail

success

interesting side note:

I had never heard of *any* of the modules you installed.

Python is glue with superpowers

you can connect anything with it

lots more discussion of installation / distribution later today

# Unit A
# (25)
## debugging

# debugging techniques?

interactive debuggers
print statements
logging
tests

# interactive debuggers

not an expert here,
I almost never use them

# pdb

# in stdlib

# command line
# local
# in process

# demo

# gui debuggers

nearly all IDEs include one

WingIDE for example:

http://wingware.com/wingide/debugger

more

# getting started with pdb (blog post)

http://pythonconquerstheuniverse.wordpress.com/2009/09/10/debugging-in-python/

# use pdb to debug Django (screencast)

http://ericholscher.com/blog/2008/aug/31/using-pdb-python-debugger-django-debugging-series-/

# python debugging techniques (blog post)

http://aymanh.com/python-debugging-techniques

# print statements

# tried and true

I use them all the time

with nose and py.test, you can leave them in test code forever

when things go wrong again, you'll already have a ton of detail printed

# use print

# logging

“enterprise level print statments”

# 15.7. logging — Logging facility for Python

*New in version 2.3.*

This module defines functions and classes which implement a flexible event logging system for applications and libraries.

The key benefit of having the logging API provided by a standard library module is that all Python modules can participate in logging, so your application log can include your own messages integrated with messages from third-party modules.

**Important**

This page contains the API reference information. For tutorial information and discussion of more advanced topics, see

- *Basic Tutorial*
- *Advanced Tutorial*
- *Logging Cookbook*

The module provides a lot of functionality and flexibility. If you are unfamiliar with logging, the best way to get to grips with it is to see the tutorials (see the links on the right).

The basic classes defined by the module, together with their functions, are listed below.

- Loggers expose the interface that application code directly uses.
- Handlers send the log records (created by loggers) to the appropriate destination.
- Filters provide a finer grained facility for determining which log records to output.
- Formatters specify the layout of log records in the final output.

## 15.7.1. Logger Objects

Loggers have the following attributes and methods. Note that Loggers are never instantiated directly, but always through the module-level function `logging.getLogger(name)`.

# logging module is powerful, awesome, and a bit annoying

http://docs.python.org/library/logging.html

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## 15.7.1. Logger Objects

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```python
# myapp.py
import logging
import mylib

def main():
    logging.basicConfig(filename='myapp.log', level=logging.INFO)
    logging.info('Started')
    mylib.do_something()
    logging.info('Finished')

if __name__ == '__main__':
    main()
```

```python
# mylib.py
import logging

def do_something():
    logging.info('Doing something')
```

If you run *myapp.py*, you should see this in *myapp.log*:

```
INFO:root:Started
INFO:root:Doing something
INFO:root:Finished
```

- StreamHandler instances send messages to streams (file-like objects).
- FileHandler instances send messages to disk files.
- BaseRotatingHandler is the base class for handlers that rotate log files at a certain point. It is not meant to be instantiated directly. Instead, use RotatingFileHandler orTimedRotatingFileHandler.
- RotatingFileHandler instances send messages to disk files, with support for maximum log file sizes and log file rotation.
- TimedRotatingFileHandler instances send messages to disk files, rotating the log file at certain timed intervals.
- SocketHandler instances send messages to TCP/IP sockets.
- DatagramHandler instances send messages to UDP sockets.
- SMTPHandler instances send messages to a designated email address.
- SysLogHandler instances send messages to a Unix syslog daemon, possibly on a remote machine.
- NTEventLogHandler instances send messages to a Windows NT/2000/XP event log.
- MemoryHandler instances send messages to a buffer in memory, which is flushed whenever specific criteria are met.
- HTTPHandler instances send messages to an HTTP server using either GET or POSTsemantics.
- WatchedFileHandler instances watch the file they are logging to. If the file changes, it is closed and reopened using the file name. This handler is only useful on Unix-like systems; Windows does not support the underlying mechanism used.
- NullHandler instances do nothing with error messages. They are used by library developers who want to use logging, but want to avoid the 'No handlers could be found for logger XXX' message which can be displayed if the library user has not configured logging. See

customized levels
string interpolation
on the fly config
etc, etc...

# tests

# test suites find bugs

Ever written repro steps which should lead directly to the source of the bug?

# often get you pretty close to the source of the bug

sometimes you can get closer to the bug by writing more tests

for heisenbugs this may be your only option

heisenbug:
/hi-zen-buhg/, n.

A bug that disappears or alters its behavior when one attempts to probe or isolate it.

http://www.catb.org/jargon/html/H/heisenbug.html

# Lightning Talks!

# (15)

# Unit B
# (25)
## installation

# a quick diversion

# modules & packages

```
import sys
from sys import path
```

# demo

```
import xml
import xml.etree
__init__.py
```

packages
vs.
packaging

# installing Python

usually already installed

maybe you can use it

# system Python
# vs
# user installed Python

Windows is a special case

globally installed, shared, user installed Python

...but you can install multiple instances

every Python installation has its' own stdlib and site-packages folder

site-packages is the default location for installed packages

# PyPI

## catalog of packages

http://pypi.python.org/pypi

# PyPI - the Python Package Index

The Python Package Index is a repository of software for the Python programming language. There are currently **21199** packages here.
To contact the PyPI admins, please use the Get help or Bug reports links.

**Not Logged In**

Login
Register
Lost Login?
Use OpenID

**Get Packages**

To use a package from this index either "pip install *package*" (get pip) or download, unpack and "python setup.py install" it. Browse all packages or use the search box above.

**Package Authors**

To submit a package use "python setup.py upload" (full tutorial). The index also hosts documentation. You may submit packages using SSH or the web form. You must register.

**Infrastructure**

To interoperate with the index use the JSON, XML-RPC or HTTP interfaces. Use the mirror infrastructure to download even if the primary site is unavailable.

| Updated | Package | Description |
|---|---|---|
| 2012-05-23 | seriesoftubes 0.9.2 | An extended pipeline for Solexa ChIP-seq data |
| 2012-05-23 | solr_cli 0.1 | Command line client for Apache Solr |
| 2012-05-23 | pypi.trashfinder 0.0.4 | This is a fork of zopyx.trashfinder, with modifications made to make integration with pythonpackages.com easier. It is not intended to be used outside of pythonpackages.com. For a command line trash finder, please install zopyx.trashfinder. |
| 2012-05-23 | fspyrpc 0.0.1 | A simple RPC-framework written in Python |
| 2012-05-23 | raven 1.9.1 | Raven is a client for Sentry (https://www.getsentry.com) |
| 2012-05-23 | rackspace-monitoring-cli 0.4.0 | Command Line Utility for Rackspace Cloud Monitoring (MaaS) |
| 2012-05-23 | nerdy 0.01 | |
| 2012-05-23 | django-modeldict 1.3.1 | Stores a model as a dictionary |
| 2012-05-23 | Picatcha 0.1 | Python library for Picatcha |
| 2012-05-23 | haiku-lang 0.0.6 | An embedable LISP implemented on top of the Python interpreter. |
| 2012-05-23 | fatiando 0.0.1 | Geophysical direct and inverse modeling |
| 2012-05-23 | metaTED 2.0.1 | Creates metalink files of TED talks for easier downloading |
| 2012-05-23 | periscope_django 0.3 | Periscope is an analysis tool for production SQL databases. This module provides the API for Periscope to communicate with your Django app. |

# installing modules and packages

# python specific
# vs
# OS packaging

# so...

# I'm going to fail you on this topic.

no easy answers

no single path to success

distutils
setup.py
setuptools
pip
virtualenv
distribute
distutils2
packaging
...

*this is a*

# PUBLIC SERVICE ANNOUNCEMENT

*from your friendly python packaging experts!*

| OLD and BUSTED | NEW HOTNESS |
| --- | --- |
| setuptools | distribute |
| easy_install | pip |

## Make the transition today!

```
$ curl -O http://python-distribute.org/distribute_setup.py
$ python distribute_setup.py
$ easy_install pip
```

**You don't have to live with craptastic python packaging.**

# Attention Python Comrades

## New Orders From the Ministry of Packaging!

Sons and Daughters of the Glorious

People's Pythonic Republic

use **distribute** and **pip**

that is all.

This message has been approved by @jezdez, High Chancellor of Packaging

# PYTHON KOMRADES!

## NEW ORDERS FROM THE MINISTRY OF PACKAGING

## NOT: SETUPTOOLS / EASY_INSTALL

# DO: DISTRIBUTE / PIP

```
$ curl -O http://python-distribute.org/distribute_setup.py
$ python distribute_setup.py
$ easy_install pip
```

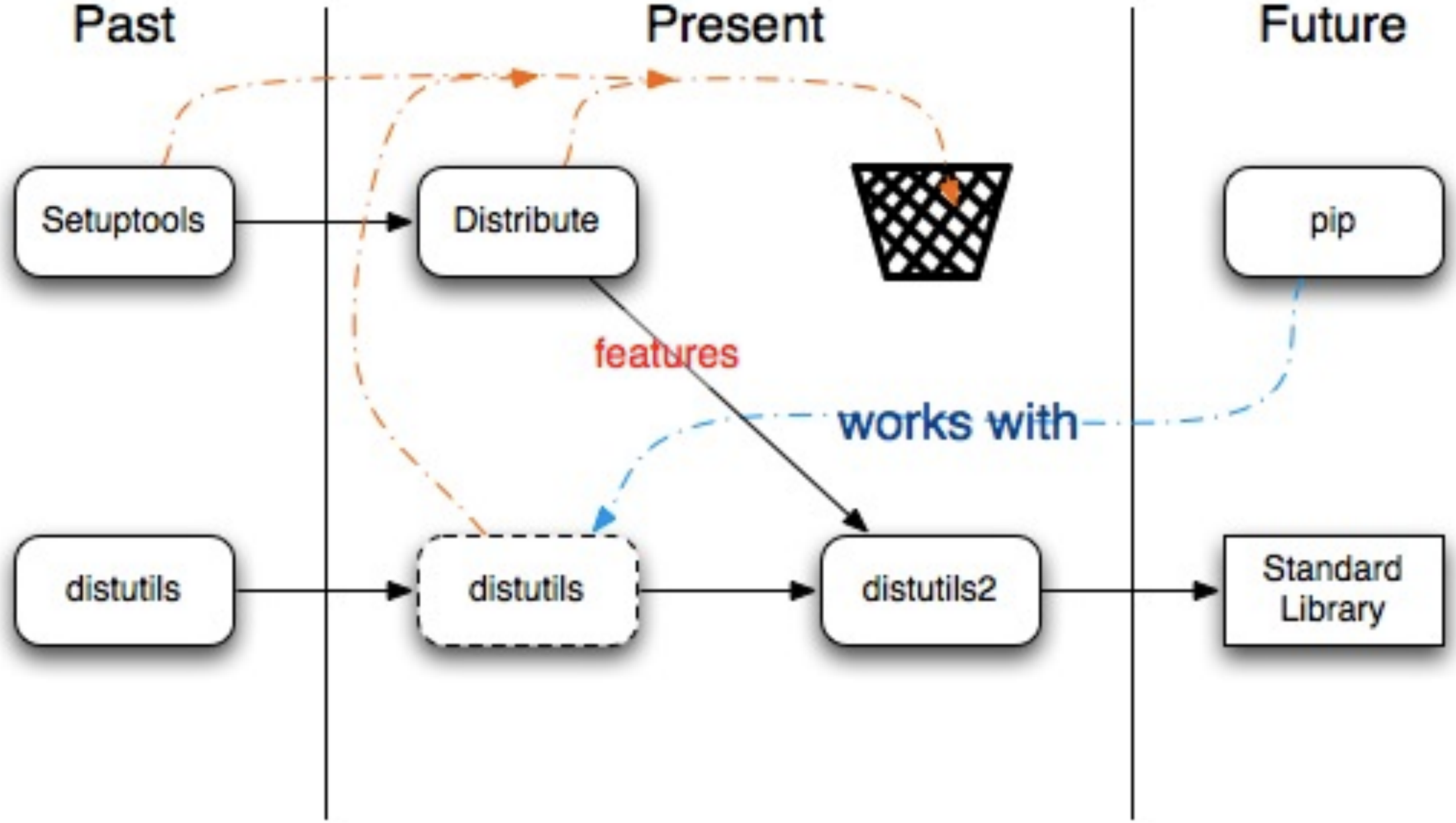
# REMEMBER:

## POOR PACKAGING TOOLS TARNISH THE BLAZING GLORY OF THE REPUBLIC

THIS MESSAGE HAS BEEN APPROVED BY THE MINISTRY OF PROPAGANDA

got it

# Current State of Packaging




http://guide.python-distribute.org/introduction.html

# really?

# timeline

# hopefully this will make some sense

data source: http://faassen.n--tree.net/blog/view/weblog/2009/11/09/0

# issues

this is where most of the failures in your homework happened.

# c modules

# binary?

# built at install time?

# dependencies?

# windows

# binaries avail?
# libraries assume unix?

# osx

# system python old?
# permissions issues?
# install to home dir?

linux

old system python?

python packaging vs. system packaging fight?

install to home dir?

recommendations?

read the docs for the package you want to install

do what they say

# pip install package

use virtualenv

*IF* you work on multiple projects

keep an eye on

distutils2 / packaging / pysetup

keep banging on it
until it works

# Lab B (20)

```
git pull

svn update
```

# Lab B

- http://docs.python.org/howto/logging.html#logging-basic-tutorial
- Convert the print statements in logtacular.py to logging calls. Run the script and make sure you see logging output on the console.
- Wrap impossible_divide() in a try/catch and log a full traceback on exceptions.
- bonus: Update the logging configuration to log to a file instead (or in addition to) the console.
- double bonus: Send yourself email for the exception case.

# Unit C
# (25)
## distribution

scripts
libraries
applications

# scripts

# often you can just copy, share, or check in the script and call it good

when the script needs
more than just the stdlib
(or your company standard
environment)

you have an application,
not a script

# libraries

when you read the distutils docs, it's usually libraries they're talking about

http://docs.python.org/distutils/

for shared modules inside an organization, consider using source control for sharing code

# svn:externals

can pin to specific revisions as well: -r1234

# otherwise, it's time to learn distutils

http://docs.python.org/distutils/

# applications

web apps

usually use virtualenv, zc.buildout to setup environment (and maybe app)

VCS or package for main application

web apps

also, I've seen recommendations for building system packages of web apps for deployment

http://hynek.me/articles/python-app-deployment-with-native-packages/

desktop apps

system package system

or

bundle + installer

# bundle?

basically:

your app
python binary
all required modules

bonus: installer to put it
all in the right place

py2exe
py2app
pyinstaller
...

# Video: How I distribute Python apps on Windows

http://blip.tv/pycon-us-videos-2009-2010-2011/how-i-distribute-python-applications-on-windows-py2exe-innosetup-2090661

# Lab C

# (20)

```
git pull

svn update
```

# Lab C

---

- discussion / question time

# wrapup

# Assignment

- Look at bookdb.py.
- Make a new class which connects to a database which actually has this data in it.
- Two database drivers are in the stdlib: sqlite3, anydbm. Use them, or another database you prefer.
- Send me your implementation, and the database file if you used sqlite3 or anydbm.