

5 python libraries you probably
aren't using but should

Overview

- hypothesis (better unit testing)
- hugs (CLI + API in one package)
- begins (for when you're too lazy to use argparse)
- psutil (monitor system usage from within python)
- cython (C + python)
- Bonus: redis (redis-py)

hypothesis

Hypothesis = automated unit testing

- Most unit testing is manual and centered around *example-based testing*.
- Why should you use it?
- Automates the most time consuming part of writing tests - coming up with the specific examples using *property-based tests*.
- *Not related to statistical hypothesis testing*

Hypothesis - Example

```
def encode(input_string):
    count = 1
    prev = ''
    lst = []
    for character in input_string:
        if character != prev:
            if prev:
                entry = (prev, count)
                lst.append(entry)
            count = 1
            prev = character
        else:
            count += 1
    else:
        entry = (character, count)
        lst.append(entry)
    return lst
```

```
def decode(lst):
    q = ''
    for character, count in lst:
        q += character * count
    return q
```

- Example based testing:
assert encode('x') == 'y'
assert decode('y') == 'x'

...

```
from hypothesis import given, example
from hypothesis.strategies import text
```

```
@given(text())
@example('')
def test_decode_inverts_encode(s):
    assert decode(encode(s)) == s
```

Hypothesis – real world example

```
1 st_binary_kmers = st.sampled_from([True, False])
2 POSSIBLE_STORAGES = ["dict",
3                       "berkeleydb",
4                       "redis",
5                       "probabilistic-redis"]
6 KMER = st.text(min_size=31, max_size=31, alphabet=['A', 'T', 'C', 'G'])
7
8 @given(store=st_storage, kmer=KMER, binary_kmers=st_binary_kmers)
9 def test_insert_get_kmer(store, kmer, binary_kmers):
10     mc = McDBG(conn_config=conn_config, binary_kmers=binary_kmers,
11               storage=store)
12     mc.insert_kmer(kmer, 1)
13     assert [v for v in mc.get_kmer_colours(kmer).values()] == [[1]]
14     mc.insert_kmer(kmer, 2)
15     assert [v for v in mc.get_kmer_colours(kmer).values()] == [[1, 2]]
```

Hypothesis - summary

- Automates large numbers of example test cases based on “strategies”.
- Useful for testing nondeterministic functions + corner cases.
- <http://hypothesis.works/>

Hugs

- Very simple API + CLI development.
- Design/develop API and expose to HTTP/CLI
- <http://www.hug.rest/>

hug example

Hugs - summary

- Extend your CLI application with an API (or vice versa) with little effort.

Begins

- Small argparse API based on function decorators.
- Automatically convert command line arguments to expected types.
- Use environment variables and command line files to set defaults.
- <http://begins.readthedocs.io/en/latest/>

Begins example

psutil

- Psutil provides complete access to system information.

psutil example

cython

- Why might you want to use cython:
 - You want to wrap a C/C++ library, and use it from Python.
 - You want to speed up Python code.

Example – speeding up python code

Example - Wrap a C library and use it from Python.

- <https://github.com/Phelimb/pyseqfile>