LING 300 - Topics in Linguistics:
Introduction to Programming and Text Processing for Linguists

Week 6

—

Jupyter and Basic Python 3

Notes on Assignment 4

- Using *flags* (like `remove_blank`):
  - “flags” are arguments that give options rather than data
  - Try to have core functionality only be written once; helpful if you ever need to change anything
- `letter_counts` - no need to tokenize, loop over words etc:
  - Can simply do `for character in s`
  - Remember strings are sequences

Notes on Assignment 4

- You can use random.random() in a conditional directly rather than saving it in a variable that you only use once

```
if random.random() > 0.5:
```

- Avoid **hardcoding**: e.g., in the dice sums problem:

```
sum_counts = {0: 0, 1: 0, 2: 0, 3: 0, 4: 0...
```

Notes on Assignment 4

- string.split() splits in a greedy way,
  e.g. maximum amount of whitespace

- What's the difference?

```
s.split()   vs.   s.split(" ")
```

Notes on Assignment 4

- Variable naming:
  try to have names reflect the contents/purpose

- Which is better?

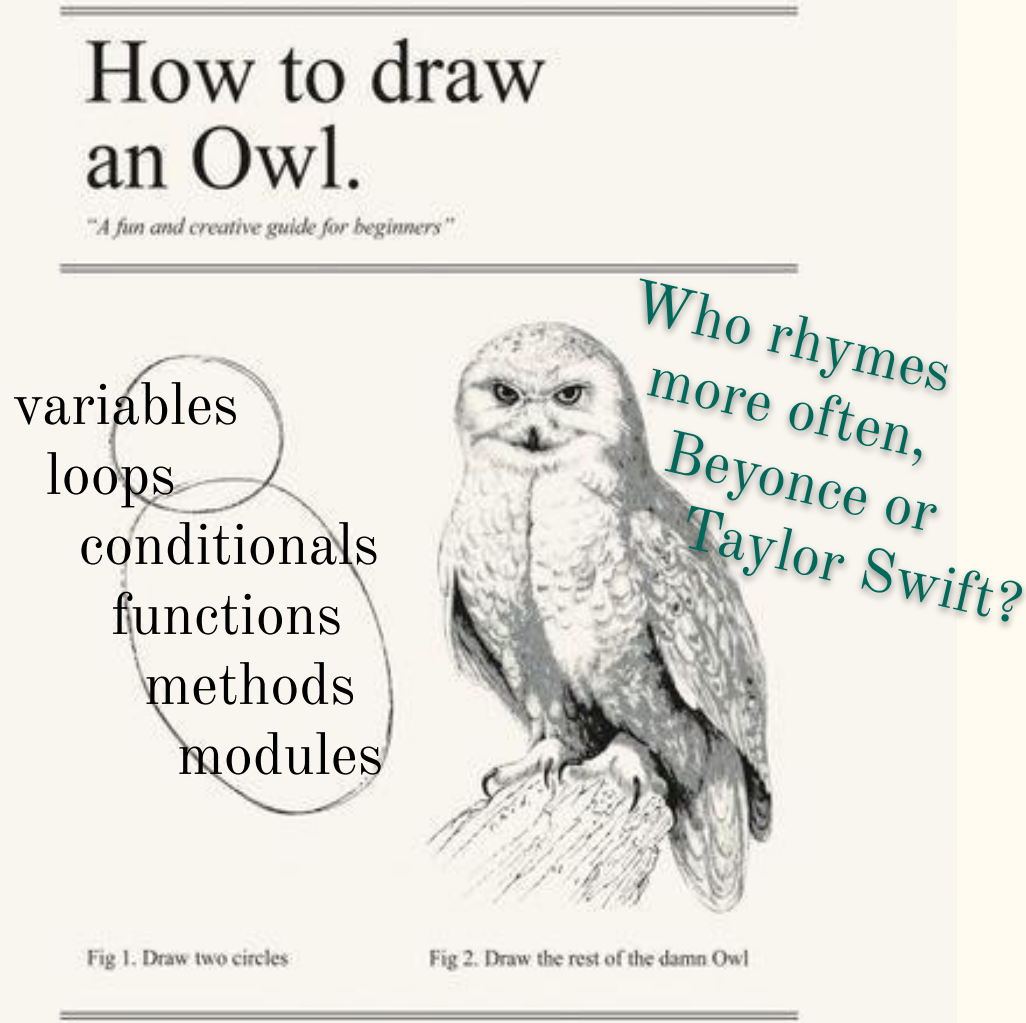
```
for word in line.split()
```

or

```
for words in line.split()
```

Decomposition

Breaking down
an abstract problem
into smaller parts
we can handle



Question-Answer pair worked example

Notes on Assignment 4

- Style point: make objects what we will use them for
  - e.g., `proportion_of_oneoff_types`

    Accumulate counts on an integer

    vs.

    Accumulate a list of oneoff types and get its length

Writing Files

- With a file path as a str `f`, we've seen `open(f)`
- `open` takes a `mode` argument which explains how to open it
  - Actions:

    `'r'` to read (default) — like Unix <

    `'w'` to write (to a new file) — like Unix >

    `'a'` to append (add to existing file) — like Unix >>
  - Formats:

    `'t'` for text (default)

    `'b'` for binary

action and format can both be included and are both optional

Writing Files

- Write using the `.write()` method on a file object.
- Say given a `Counter` of word counts in some text

```
file = open('output.txt', 'w') # creates/overwrites
for word in counts:
    line = "{}, {}".format(word, counts[word])
    file.write(line + '\n') # must be str
file.close() # makes sure everything is written
```

- Unlike `print`, `.write()` only takes one argument, a string

JSON (Javascript String Object Notation)

provides a way to save objects **as text**

- Say given our dictionary variable `cmudict`

```
import json
json.dump(cmudict, open('cmudict.json','wt'))
```

Later, or in another script:

```
cmudict = json.load(open('cmudict.json','rt'))
```

JSON (Javascript String Object Notation)

provides a way to save objects **as text**

- Can also just convert them to strings:

```
json.dumps(cmudict)
```

```
'{"3-D": ["TH R IY1 D IY2"], "3D": ["TH R IY1 D IY2"], "A":
["AH0", "EY1"], "A\'S": ["EY1 Z"], "A.": ["EY1"], "A.\'S": ["EY1
Z"], "A.S": ["EY1 Z"], "A42128": ["EY1 F AO1 R T UW1 W AH1 N T
UW1 EY1 T"], "AA": ["EY2 EY1"], "AAA": ["T R IH2 P AH0 L EY1"],
"AABERG": ["AA1 B ER0 G"], "AACHEN": ["AA1 K AH0 N"], "AACHENER":
["AA1 K AH0 N ER0"], "AAH": ["AA1"], ...
```

Pickle

provides a way to save objects **in binary**

- Say given our dictionary variable `cmudict`

```
import pickle
pickle.dump(cmudict, open('cmudict.pkl','wb'))
```

Later, or in another script:

```
cmudict = pickle.load(open('cmudict.pkl','rb'))
```

JSON vs. Pickle

- Saved as plaintext (easy to open and look at)
- Can even be edited directly outside python (carefully)
- Compatible with many other programming langs
- Some objects are not JSON serializable, e.g. set

- Not human readable
- Python-only
- Slower (generally)
- But works on almost any object

Takeaway

Use JSON unless you can't.

FYI, Jupyter notebooks are in JSON format!