Announcements

- HW1 grades emailed last night
- HW3 due Monday
- Midterm 1 in ~2 weeks
Recap: practice from last time

Given a list of words, create a new list called short words that consists of any words in the list that have ≤ 3 characters.
While loops (Ch 5.1)

- For loops iterate through an existing sequence
- If statements let us execute code without knowing current state ahead of time
- While loops combine this idea: specify code to repeat without knowing sequence or number of times ahead of time
While loops

Syntax:

while condition:
    body:
        code to repeat

- Condition can be arbitrary boolean expression
- Body can consist of many statements, all indented
Example

response = raw_input('Would you like to play a game?

while response.lower() == 'y' or response.lower() == 'yes':
    # code to play a game
    response = raw_input('Would you like to play again?')
Flow diagram

Condition

True

body

False

rest of program
Greatest common divisor

Recall that \( \gcd(x, y) \) is the greatest common divisor of \( x \) and \( y \).

Given \( x, y \), what was our first idea for what values to check as possible common divisors?

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Slow
Example: GCD again (Euclid’s algorithm)

Set $u = u \div v$ equal to the numbers

Reset $u$ and $v$ to values $u$ and $v$, respectively

Divide $u$ by $v$ and let $r$ = remainder

Is $v = 0$?

No

Yes

output $u$
Another example: searching in a list

Sequential or linear search is a program to search for an element in a list.

Example:

```python
theList = [5, 20, -1, 3, 99, 64, 7]
number = int(input('Enter a number to look for: '))

# loop to search for number
(cod this example)
```
Ex. (cont.)

Consider \([5, 20, -1, 3, 99, 64, 7]\)

Search for 20.
How many comparisons?

How many do we need to do?
(ie when can we stop?)
A better way: Sequential Search

\[ i = 0 \]
\[ \text{found} = \text{False} \]

while \( i < \text{len(data)} \) and not found:
    if data[i] == val:
        \( \text{found} = \text{True} \)
    else:
        \( i += 1 \)