Iteration
Announcements
Office Hours: You Should Go!

You are not alone!

http://cs61a.org/office-hours.html
Iteration Example: Fibonacci Numbers
def fib(n):
    """Compute the nth Fibonacci number."

    >>> fib(0)
    0
    >>> fib(8)
    21
    """
    k, kth, difference = 0, 0, 1
    while k < n:
        kth, difference = kth + difference, kth
        k = k + 1
    return kth

The Fibonacci Sequence

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987
Return
Return Statements

A return statement completes the evaluation of a call expression and provides its value \( f(x) \) for user-defined function \( f \): switch to a new environment; execute \( f \)'s body

\[ \text{return} \] statement within \( f \): switch back to the previous environment; \( f(x) \) now has a value

Only one return statement is ever executed while executing the body of a function

```python
def end(n, d):
    """Print the final digits of N in reverse order until D is found."""

>>> end(34567, 5)
7
6
5
"""
while n > 0:
    last, n = n % 10, n // 10
    print(last)
    if d == last:
        return None
```

(Demo)
Self-Reference

(Demo)
Returning a Function Using Its Own Name

1. `def print_sums(n):
2.     print(n)
3.     def next_sum(k):
4.         return print_sums(n+k)
5.     return next_sum
6. 
7. print_sums(1)(3)(5)
Function Example: Sounds
WAV Files

The Waveform Audio File Format encodes a sampled sound wave.

A triangle wave is the simple wave form with the most pleasing sound.

https://en.wikipedia.org/wiki/Triangle_wave
https://en.wikipedia.org/wiki/Sampling_(signal_processing)