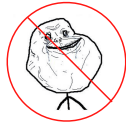


## Iteration

## Announcements

## Office Hours: You Should Go!

You are not alone!

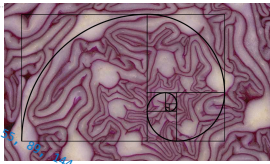


<http://cs61a.org/office-hours.html>

## Iteration Example: Fibonacci Numbers

## The Fibonacci Sequence


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



```
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
```

old_diff = difference
difference = kth
kth = kth + old_diff

kth = kth + difference
difference = kth



## 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  
**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

```
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

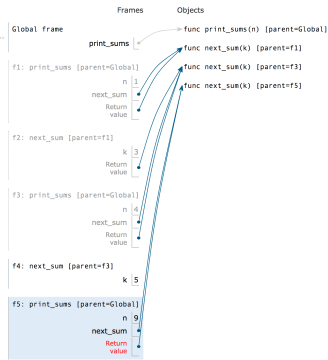
(Demo)

## 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)

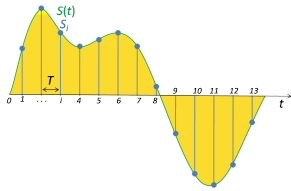
```



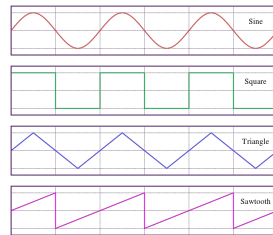
Function Example: Sounds

## 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



(Demo)