A Motivating Example

Function Definition

```python
def foo(a,b):
    """Do something
    Param a: number
    Param b: number"
    x = a
    y = b
    return x*y+y
```

Function Call

```python
>>> x = 2
>>> foo(3,4)
```

What is in the box?

A: 2
B: 3
C: 16
D: Nothing!
E: I do not know

How Do Functions Work?

- **Function Frame**: Representation of function call
- **A conceptual model** of Python

Text (Section 3.10) vs. Class

Textbook

```python
def to_centigrade(x):
    return 5*(x-32)/9.0
```

This Class

```python
def to_centigrade(x):
    return 5*(x-32)/9.0
to_centigrade(50.0)
```

Example: `to_centigrade(50.0)`

1. Draw a frame for the call
2. Assign the argument value to the parameter (in frame)
3. Execute the function body
   - Look for variables in the frame
   - If not there, look for global variables with that name
4. Erase the frame for the call

Example: `to_centigrade(50.0)`

Visualizing Frames: The Python Tutor
Visualizing Frames: The Python Tutor

Global Space

Call Frame

Variables from second lecture go in here

Function Access to Global Space

- All function definitions are in some module
- Call can access global space for that module
  - Example: `math.cos` uses global `math`
  - Example: `temperature.to_centigrade` uses global `temperature`
- But cannot change values
  - Assignment to a global makes a new local variable!
  - Why we limit to constants

Exercise Time

Function Definition

```python
def foo(a, b):
    """Do something""
    Param x: a number
    Param y: a number"
    x = a
    y = b
    return x*y + y
```

Function Call

```python
>>> x = foo(3, 4)
```

What does the frame look like at the start?

A1: The Module urllib2

- Module urllib2 is used to read web pages
  - `urlopen` creates a url object
  - `u = urllib2.urlopen('http://www.cornell.edu')`
  - `url has a method called read()`
    - Returns contents of web page
  - Usage: `s = u.read()` # `s` is a string