# Exercise #1

## Function Definition

```python
def foo(a, b):
    x = a
    y = b
    return x*y+y
```

## Function Call

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

What does the frame look like at the start?
Which One is Closest to Your Answer?

A: foo
   a 3 b 4
   x a

B: foo
   a 3 b 4

C: foo
   a 3 b 4
   x 3

D: foo
   a 3 b 4
   x 3 y
And the answer is...

A:

```
  foo
  a  3  b  4
  x  a
```

B:

```
  foo
  a  3  b  4
```

C:

```
  foo
  a  3  b  4
  x  3
```

D:

```
  foo
  a  3  b  4
  x  3  y
```
Exercise #2

Function Definition

```python
def foo(a, b):
    x = a
    y = b
    return x*y+y
```

Function Call

```python
>>> foo(3, 4)
B:
```

What is the next step?
Which One is Closest to Your Answer?

A: 
- foo
- a 3
- b 4
- 1/2

B: 
- foo
- a 3
- b 4
- 1

C: 
- foo
- a 3
- b 4
- 1/2
- x 3

D: 
- foo
- a 3
- b 4
- 1/2
- x 3
- y
And the answer is...

A:  

```
<table>
<thead>
<tr>
<th>foo</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>3</td>
</tr>
<tr>
<td>b</td>
<td>4</td>
</tr>
<tr>
<td>x</td>
<td>3</td>
</tr>
</tbody>
</table>
```

B:  

```
<table>
<thead>
<tr>
<th>foo</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>3</td>
</tr>
<tr>
<td>b</td>
<td>4</td>
</tr>
<tr>
<td>x</td>
<td>3</td>
</tr>
</tbody>
</table>
```

C:  

```
<table>
<thead>
<tr>
<th>foo</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>3</td>
</tr>
<tr>
<td>b</td>
<td>4</td>
</tr>
<tr>
<td>x</td>
<td>3</td>
</tr>
</tbody>
</table>
```

D:  

```
<table>
<thead>
<tr>
<th>foo</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>3</td>
</tr>
<tr>
<td>b</td>
<td>4</td>
</tr>
<tr>
<td>x</td>
<td>3</td>
</tr>
</tbody>
</table>
```
**Exercise Time (no poll, just discuss)**

<table>
<thead>
<tr>
<th>Function Definition</th>
<th>Function Call</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>def foo(a, b):</code></td>
<td><code>&gt;&gt;&gt; foo(3, 4)</code></td>
</tr>
<tr>
<td>1 x = a</td>
<td></td>
</tr>
<tr>
<td>2 y = b</td>
<td></td>
</tr>
<tr>
<td>3 <code>return x*y+y</code></td>
<td></td>
</tr>
</tbody>
</table>

```
>>> foo(3, 4)
```

```
foo
<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

What is the next step?
Exercise #3

**Function Definition**

```python
def foo(a, b):
    x = a
    y = b
    return x*y+y
```

**Function Call**

```python
>>> foo(3, 4)
27
```

What is the next step?
Which One is Closest to Your Answer?

A: foo
   RETURN
   123
   16

B: foo
   a 3
   b 4
   x 3
   y 4
   RETURN
   123
   16

C: foo
   a 3
   b 4
   x 3
   y 4
   RETURN
   123
   16

D: CROSS OUT THE FRAME
And the answer is...

A:

```
foo
123
RETURN
16
```

B:

```
foo
123
a 3  b 4
x 3  y 4
RETURN
16
```

C:

```
foo
123
✓
RETURN
16
```

D:

```
foo
CROSS OUT THE FRAME
```
Lots of code for today:

https://www.cs.cornell.edu/courses/cs1110/2022sp/schedule/lecture/lec04/lec04.html

Paste it into the Python Tutor (http://cs1110.cs.cornell.edu/tutor/#mode=edit)

- Visualize the code as is
- Change the code
  - Try something new!
  - Insert an error! (misspell `ht_in_inches` or `feet`)
- Visualize again and see what is different
# bad_swap.py

def swap(a,b):
    
    """Bad attempt at swapping
    globals a & b""

    tmp = a
    a = b
    b = tmp

a = 1
b = 2
swap(a,b)

Question: Does this work?

What exactly gets swapped with function `swap`?

Paste this into the Python Tutor and see for yourself!
More Exercises (1)

Module Text

```python
# my_module.py

def foo(x):
    return x + 1

x = 1 + 2
x = 3 * x
```

Python Interactive Mode

```python
>>> import my_module
>>> my_module.x
...
```

What does Python give me?

A: 9
B: 10
C: 1
D: Nothing
E: Error
More Exercises (1)

Module Text

```python
# my_module.py

def foo(x):
    return x+1

x = 1+2
x = 3*x
```

Python Interactive Mode

```python
>>> import my_module
>>> my_module.x
...
```

What does Python give me?

A: 9   CORRECT
B: 10
C: 1
D: Nothing
E: Error
More Exercises (2)

Function Definition

```python
# silly.py

def foo(a, b):
    x = a
    y = b
    return x * y + y
```

Function Call

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

What does Python give me?

A: 2
B: 3
C: 16
D: Nothing
E: I do not know
# silly.py

def foo(a,b):
    x = a
    y = b
    return x*y+y

>>> import silly
>>> x = 2
>>> foo(3,4)
>>> x
...

What does Python give me?

A: 2  CORRECT
B: 3
C: 16
D: Nothing
E: I do not know
Module Text

# module.py

def foo(x):
    x = 1+2
    x = 3*x

Python Interactive Mode

>>> import module
>>> module.x
...

What does Python give me?

A: 9
B: 10
C: 1
D: Nothing
E: Error
More Exercises (3)

Module Text

# module.py

def foo(x):
    x = 1+2
    x = 3*x

Python Interactive Mode

>>> import module

>>> module.x

... What does Python give me?

A: 9
B: 10
C: 1
D: Nothing
E: Error

CORRECT
```python
# module.py

def foo(x):
    x = 1+2
    x = 3*x
x = foo(0)
```

```python
>>> import module
>>> module.x
... What does Python give me?
```

**A:** 9  
**B:** 10  
**C:** 1  
**D:** Nothing  
**E:** Error
# module.py

def foo(x):
    x = 1+2
    x = 3*x

x = foo(0)

>>> import module
>>> module.x
...

What does Python give me?

A: 9  
B: 10  
C: 1  
D: Nothing  
E: Error  

CORRECT
More Exercises (5)

Module Text

```python
# module.py

def foo(x):
    x = 1+2
    x = 3*x
    return x+1

x = foo(0)
```

Python Interactive Mode

```python
>>> import module
>>> module.x
...
```

What does Python give me?

A: 9  
B: 10  
C: 1  
D: Nothing  
E: Error
More Exercises (5)

Module Text

```python
# module.py

def foo(x):
    x = 1+2
    x = 3*x
    return x+1

x = foo(0)
```

Python Interactive Mode

```python
>>> import module
>>> module.x
...
What does Python give me?
```

Options:
A: 9
B: 10
C: 1
D: Nothing
E: Error

CORRECT