

Structure and Interpretation of Computer Programs

with Python 

Lesson 4

-Presented By: Sean Li

Exercise:

```
>>> def xk(c, d):  
...     if c == 4:  
...         return 6  
...     elif d >= 4:  
...         return 6 + 7 + c  
...     else:  
...         return 25  
>>> xk(10, 10)  
-----  
  
>>> xk(10, 6)  
-----  
  
>>> xk(4, 6)  
-----  
  
>>> xk(0, 0)  
-----
```

Exercise:

```
>>> def how_big(x):
...     if x > 10:
...         print('huge')
...     elif x > 5:
...         return 'big'
...     elif x > 0:
...         print('small')
...     else:
...         print("nothin'")
>>> how_big(7)
-----

>>> how_big(12)
-----

>>> how_big(1)
-----

>>> how_big(-1)
-----
```

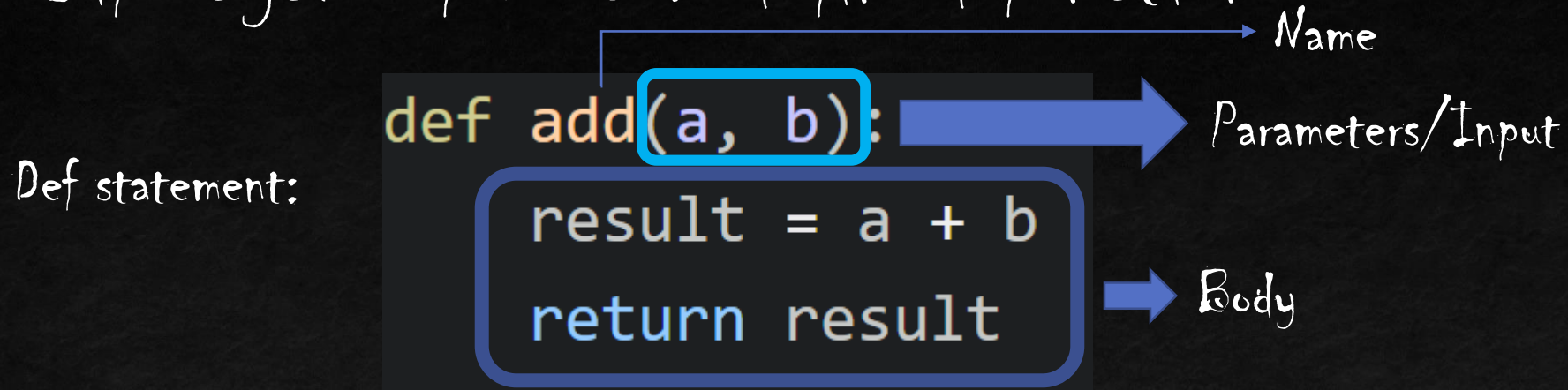

Quick Review

Return vs print?

Print vs none?

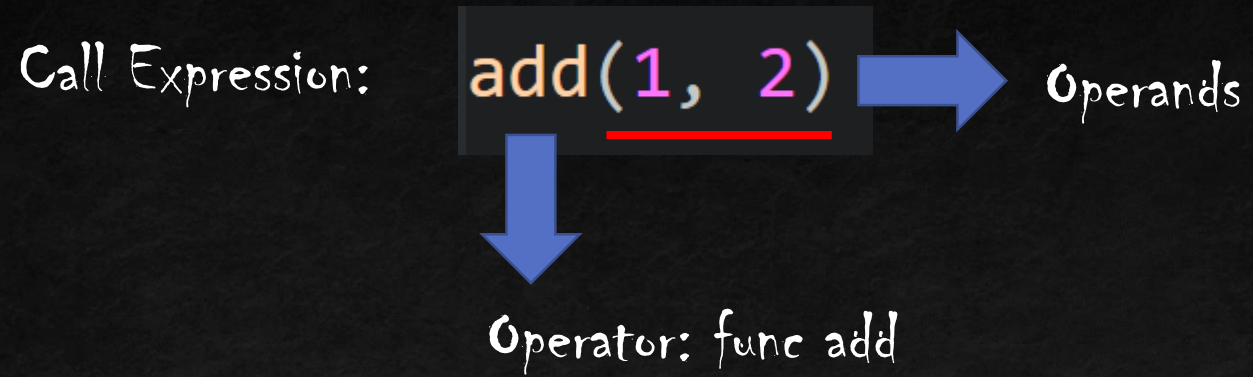
Life cycle of a user-defined function

Life cycle of a user-defined function



What happens: A new function is created! Name bound to that function in the current frame

Life cycle of a user-defined function



What happens: Operator & operands get evaluated, function (value of operator) gets called on arguments (values of operands)

Life cycle of a user-defined function

Calling:



What happens: This is the step where Python actually calls the function. A new frame is created! Parameters bound to arguments. Body is executed in that new environment

If statement

- Only one of them will happen
- Can have as many elif as possible
- Does not necessarily have to end with else, but it's always good to add one

Iteration/ Loops

While & For

While statement:

```
1  ###We want to calculate the result for 1 + 2 + 3 + ... + n
2
3  def sum(n):
4      i, result = 1, 0
5      while i <= n:
6          result = result + i
7          i = i + 1
8      return result
9
```

Execution Rule:

1. Evaluate the header's expression
2. If it is a true value, execute the (whole) suite, then return to step 1.

For loop:

```
1  sum = 0
2  for i in range(10):
3      sum = sum + i
4  print(sum)
5
```

Execution Rule:

For each value in the list, execute the (whole) suite,
then repeat for the next value.

Use of Range

<https://pynative.com/python-range-function/>

Exercise

Write a program that takes an integer n and prints out all the multiples of 7 that's smaller than n .

(Hint: Consider using a for loop)

Exercise

Find the max n that satisfies the following:

$$1 + 2 + 3 + \dots + n < 3000$$

Exercise

Let the computer displays a random integer between 1 and 100 and asks you to make a guess. You type a number into the system, if you are wrong, the computer should respond either “the number is too small”, or “the number is too large”. If you are correct, print something like “Congrats” or “You are correct!”

To use the random library: `import random`

To generate a random integer in range(a, b): `random.randint(a, b)`

To read input from user: `input()`