Topic 4: Functions

David H Smith IV

University of Illinois Urbana-Champaign

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String Formatting

Poll Question: String Formatting

What is the value of x after the following code executes:

```
1 x = "{1} {0} {1}".format("S", "O", "Y")
```

A. "S O Y"

B. "SOY"

C. "O S O"

D. "Y O Y"

E. "OSO"

Poll Question: String Formatting

What is the value of x after the following code executes:

```
1 import math
2 x = "{1:.3f} {0:.2f} {2:.4f}".format(math.pi, math.e, math.
      tau)
```

A. SyntaxError

B. `"2.718 3.14 6.2832"`

C. `"2.71 3.1 6.283"`

D. `"3.142 2.72 6.2832"`

Function Overview

Poll Questions: Making Functions

What bugs are in the following code?

```
1 def add_one(x):
2 return x + 1
3
4 x = 2
5 x = x + add_one(x)
```

- A No bugs. The code is fine.
- B The function body is not indented.
- C We use `x` as both a parameter and a variable, but we are not allowed to do that.
- D B and C

- A In Python indentation is both **syntactic** and **semantic**.
- B These three programs are all different even through they have the same text

```
1 def test():
2 print('first')
3 print('second')
4
5 test()
```

```
1 def test():
2   print('first')
3 print('second')
4
5 test()
```

```
1 def test():
2   print('first')
3   print('second')
4
5 test()
```

Poll Question: Calling Functions

What is the result of running the following code?

```
1 def test():
2 print('first')
3 print('second')
4 test()
```

A. SyntaxError

B.
```
first
```

C.
```
first
second
```

D. IndentationError

E.
```
second
first
```

Poll Question: Calling Functions

What is the result of running the following code?

```
1 def test():
2   print('first')
3 print('second')
4 test()
```

A. SyntaxError

B.
```
first
```

C.
```
first
second
```

D.
```
    first
second
```

E.
```
second
first
```

Poll Question: Calling Functions

What is the result of running the following code?

```
1 def test():
2   print('first')
3   print('second')
4 test()
```

A. SyntaxError

B.
```
first
```

C.
```
first
second
```

D.
```
    first
second
```

E.
```
second
first
```

Function Definition Template

```
def <function_name>(parameter1, parameter2, ...):
  <function_body>
  ...
  ...
  return (optional)
```

Function Definitions vs Function Calls

Function Definition:

```
1 def product_of_three(num1, num2, num3):
2   product = num1 * num2 * num3
3   return product
```

Function Definitions vs Function Calls

Function Definition:

```
1 def product_of_three(num1, num2, num3):
2   product = num1 * num2 * num3
3   return product
```

Function Call:

```
1 foo = product_of_three(1, 2, 3) # x = 6
2 bar = product_of_three(1, 5, 3) # x = 15
3 baz = product_of_three(2, 5, 3) # x = 30
4 qux = product_of_three(2, 5, 5) # x = 50
```

Function Polls

Poll Question: Function Scope

What value is printed?

```
1 def do_thing(var1):
2   var1 = 2
3
4 var1 = 1
5 do_thing(var1)
6 print(var1)
```

- A 0
- B 1
- C 2
- D SyntaxError

Poll Question: Function Scope

What value is printed?

```
1 def do_thing(var1):
2   var1.append(4)
3
4 var1 = [1, 2, 3]
5 do_thing(var1)
6 print(len(var1))
```

- A 0
- B 3
- C 4
- D SyntaxError

Poll Questions: Function Scope

What value is printed?

```
1 def do_thing(var1):
2   var1 = [1, 2, 3, 4]
3
4 var1 = [1, 2, 3]
5 do_thing(var1)
6 print(len(var1))
```

A. 0
B. 3
C. 4
D. TypeError
E. SyntaxError

Poll Questions: Making Functions

```
1 def f1():
2   return 5
```

```
1 def f2():
2   print(5)
```

```
1 def f3():
2   return print(5)
```

Considering the previous functions, which of the following assigns `x` to 5?

- A `x = f1()`
- B `x = f2()`
- C `x = f3()`
- D All of the above
- E None of the above

Poll Question: Function Parameters

What is x equal to?

```
1 def do_thing(v1, v2, v3):
2   a = v2
3   b = v1 + v3
4   print(a * b)
5
6 x = do_thing(3, 2, 1)
```

A. None
B. 6
C. 8
D. 9

Poll Questions: Nesting Functions

Given the following function, what value is returned by `f(f(2))`?

```
1 def f(x):
2   return 3 * x
```

A. 3
B. 6
C. 9
D. 12
E. 18

Poll Question: Return Count

How many values does the following function return?

```
1 def return_stuff():
2   return "hello"
3   return "world"
4   return "foo"
5   return "bar"
```

- A 1
- B 2
- C 3
- D 4

Key Takeaways

Most important takeaways from today's lecture:

A. `print()` is not the same as `return`
   A. `print()` →Prints to the monitor. It does not give you a value you can work with.
   B. `return` →Isn't used to print things to the screen. It's used to give data back after a function has finished doing stuff.

B. A function only returns **once**. No matter how many return statements you put in the program the only one that matters is the first one that's reached.

Review

Poll Question

What is the the type of `x` after the following code runs?

```
1 x = ()
```

A. Set
B. Dictionary
C. List
D. Tuple

Poll Question

What is the the type of `x` after the following code runs?

```
1 x = {}
```

A. Set
B. Dictionary
C. List
D. Tuple

Poll Question

What is the the type of `x` after the following code runs?

```
1 x = []
```

A. Set
B. Dictionary
C. List
D. Tuple

Poll Question: Appending

What is the correct way to put the value 4 at the end of a list referenced by `x`?

A. `x.append(4)`
B. `x = x.append(3)`
C. `x.add(4)`
D. A & B

Poll Question: Appending

What is the correct way to combine two sets `x` and `y` and update `x` such that it contains the resulting combination?

A. `x.union(y)`
B. `x = x.update(y)`
C. `x.update(y)`
D. `x = x.union(y)`
E. A & B (use ?)
F. C & D (use all options)

Poll Question: Appending

Given two dictionaries, `x` and `y`, how do you combine them such that `x` contains the result of the operation?

A. `x.update(y)`

B. `x.union(y)`

C. `x = x + y`

D. `x = x.update(y)`

Reminders

Weekly Reminders

A. No reading/post-reading due tomorrow
B. Homework 4 due tomorrow
C. Use the extra time to study