

Topic 4: Functions

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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 though 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

```
1 def <function_name>(parameter1, parameter2, ...):  
2     <function_body>  
3     ...  
4     ...  
5     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 Definition:

```
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 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 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

How many values does the following function return?

```
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 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:

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

Reminders

Weekly Reminders

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