CSE 8A: Intro to Programming in Python

Fall 2021

Lecture 13 - Stack frames / Functions

UC San Diego

A few things to address

- Interval: 0 <=a<=b

A few things to address

- indentations in python

A few things to address

- index of an element vs the element in a list

Topics for Today

- Stack frames and scopes

Stack Frames

Every time a function is invoked (i.e., called), the invocation gets a new "frame" for holding variables

- The parameters also exist in a frame
- When a variable name is used within a function, Python looks for it in the current frame first
- We call these variables local variables

Global frame

- There is always one global frame that all functions can access
- When a variable name is used, Python looks two places:
  1. the function invocation's frame (first)
  2. the global frame (only if not found before)

Exercise: Call Stack with One Stack Frame

What will happen when we run this code?

```
def set_x():
        x = 100

print(x)
```

A) 100 will be printed

B) 0 will be printed

C) Error: variable x is not defined

D) I don't know! :(

Exercise: Call Stack with One Stack Frame

What will happen when we run this code?

```
def set_x():
        x = 100

set_x()
print(x)
```

A) 100 will be printed

B) 0 will be printed

C) Error: variable x is not defined

D) I don't know! :(

Exercise: Call Stack with One Stack Frame

What will happen when we run this code?

```
def count():
    x = 1
    x += 1
    print(x)

count()
count()
count()
```

A) The program will print 2, 3, 4

B) The program will print 2, 2, 2

C) Error: variable x is not defined

D) I don't know! :(

Exercise: Call Stack with Two Stack Frame

What will happen when we run this code?

```
def display_x():
    print(x)

def main():
    x = 100
    display_x()

main()
```

A) 100 will be printed

B) 0 will be printed

C) Error: variable x is not defined

D) I don't know! :(

Exercise: Call Stack with Two Stack Frame

What will happen when we run this code?

```
msg = 'hello'

def greeting():
    print(msg)

print('before: ' + msg)
greeting()
print('after: ' + msg)
```

A)
before: hello
after: hello

B)
before: hello
hello
after: hello

C) Error: variable msg is not defined

D) I don't know! :(

Exercise: Modifying Global Variables in Functions

What will happen when we run this code?

```
msg = 'hello'
def greeting():
    msg = 'welcome!'
    print('greeting: ' + msg)

print('before: ' + msg)
greeting()
print('after: ' + msg)
```

A)
before: hello
greeting: welcome!
after: hello

B)
before: hello
greeting: welcome!
after: welcome!

C) Error: variable msg is not defined

D) I don't know! :(

Exercise: Passing Parameters/Arguments to Functions

What will happen when we run this code?

```
def f(x):
    x = 'B'
    print('inside: ' + x)

val = 'A'
print('before: ' + val)
f(val)
print('after: ' + val)
```

A)
before: A
inside: B
after: B

B)
before: A
inside: B
after: A

C) Error: variable x is not defined

D) I don't know! :(

Exercise: Passing Parameters/Arguments to Functions

What will happen when we run this code?

```
x = 'A'

def f(x):
    x = 'B'
    print('inside: ' + x)

print('before: ' + x)
f(x)
print('after: ' + x)
```

A)
before: A
inside: B
after: B

B)
before: A
inside: B
after: A

C) Error: variable x is not defined

D) I don't know! :(