

Python

Day03

Programming for everyone

The Python logo, featuring two interlocking snakes, one blue and one yellow.

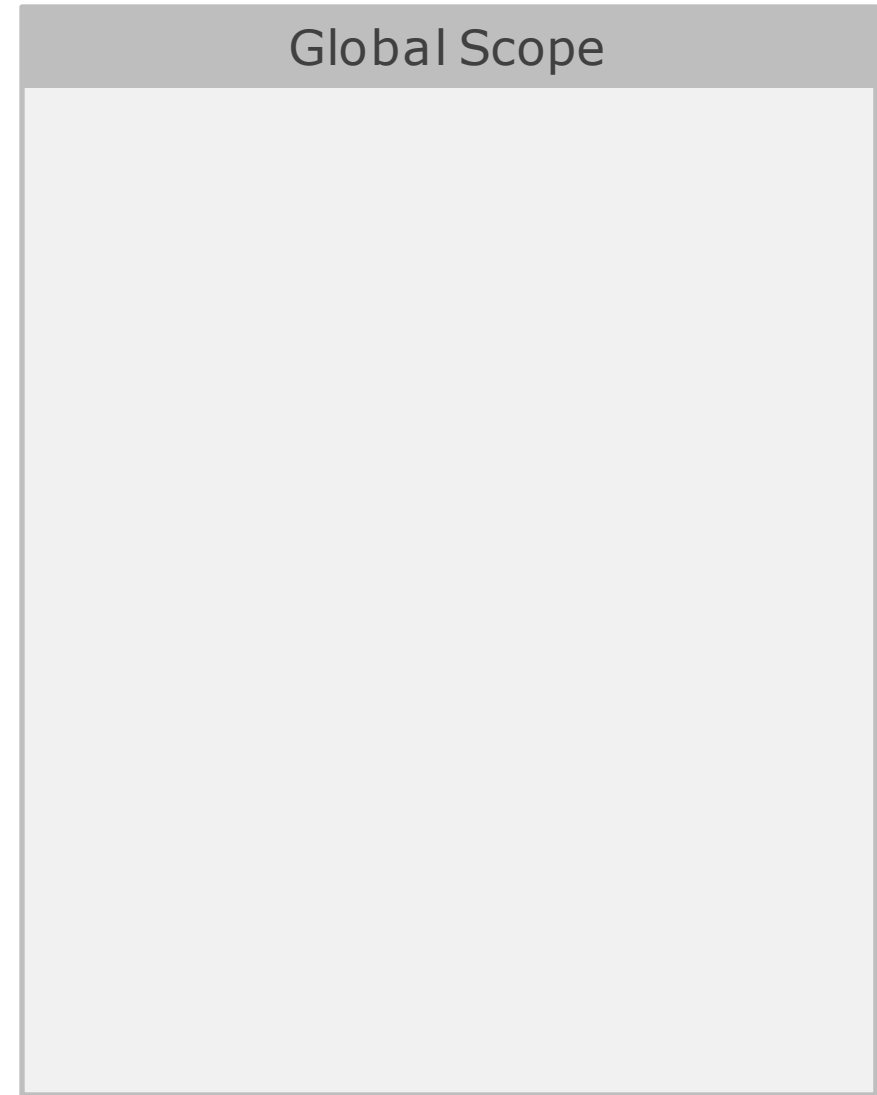
Scope

To know your limits





Output:



Lexical Scope

```
name = "Ahmed"
```

Output:

Global Scope

```
name = "Ahmed"
```



Lexical Scope

```
name = "Ahmed"

def outerFn():
    name = "Ali"

    def innerFn():
        print(name)

    innerFn()
```

Output:

Global Scope

```
name = "Ahmed"
```



Lexical Scope

```
name = "Ahmed"

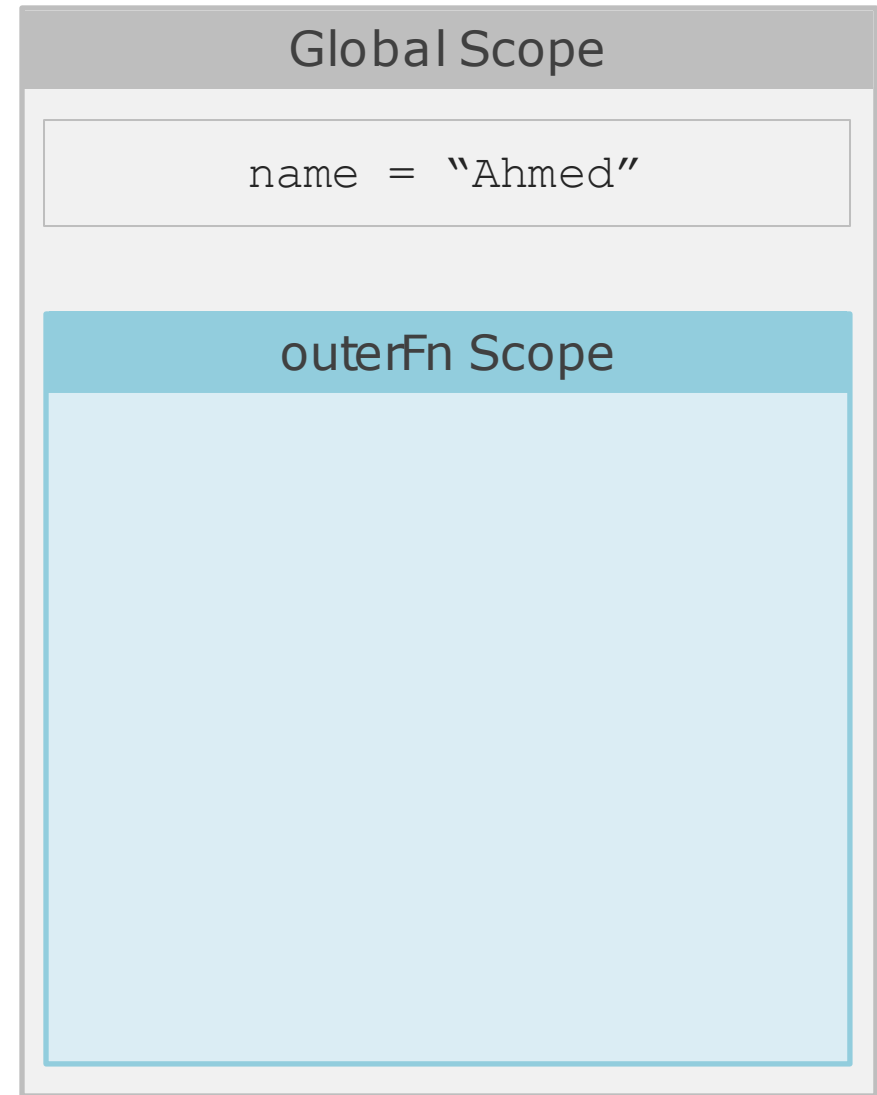
def outerFn():
    name = "Ali"

    def innerFn():
        print(name)

    innerFn()

outerFn()
```

Output:



Lexical Scope

```
name = "Ahmed"

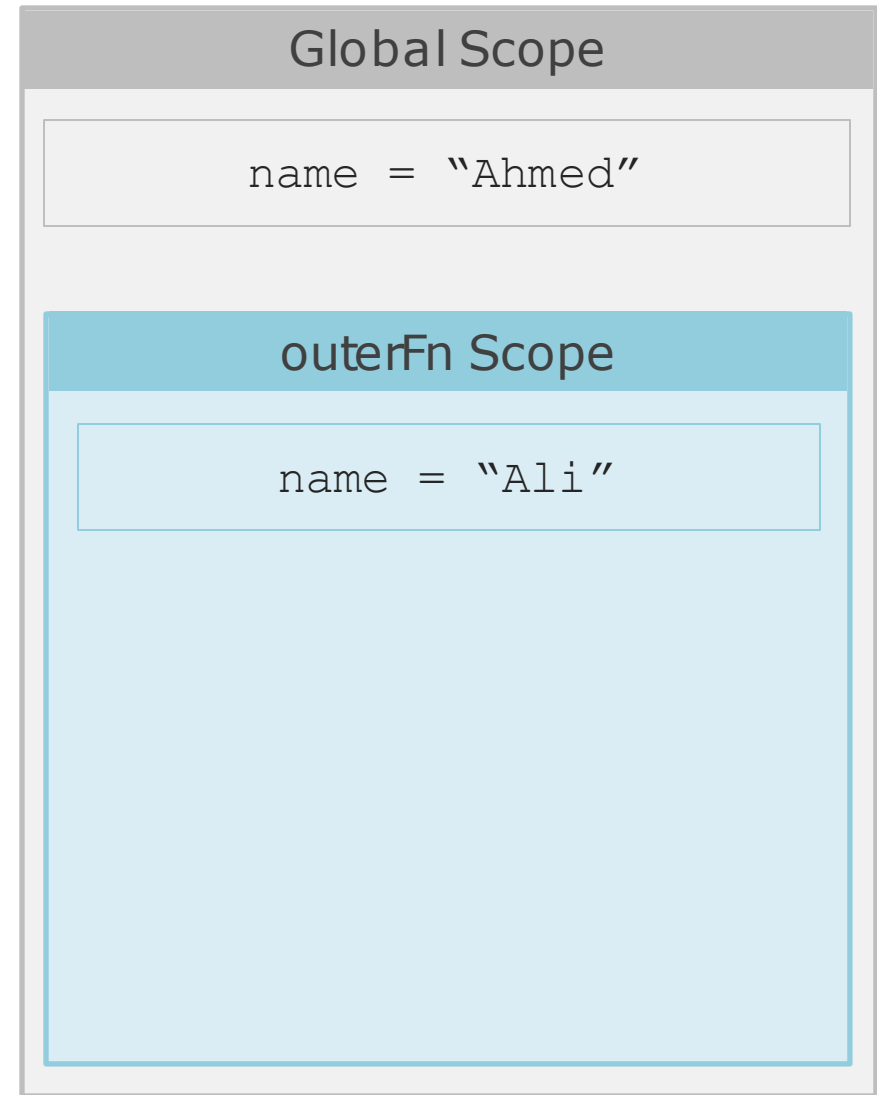
def outerFn():
    → name = "Ali"

    def innerFn():
        print(name)

    innerFn()

outerFn()
```

Output:



Lexical Scope

```
name = "Ahmed"

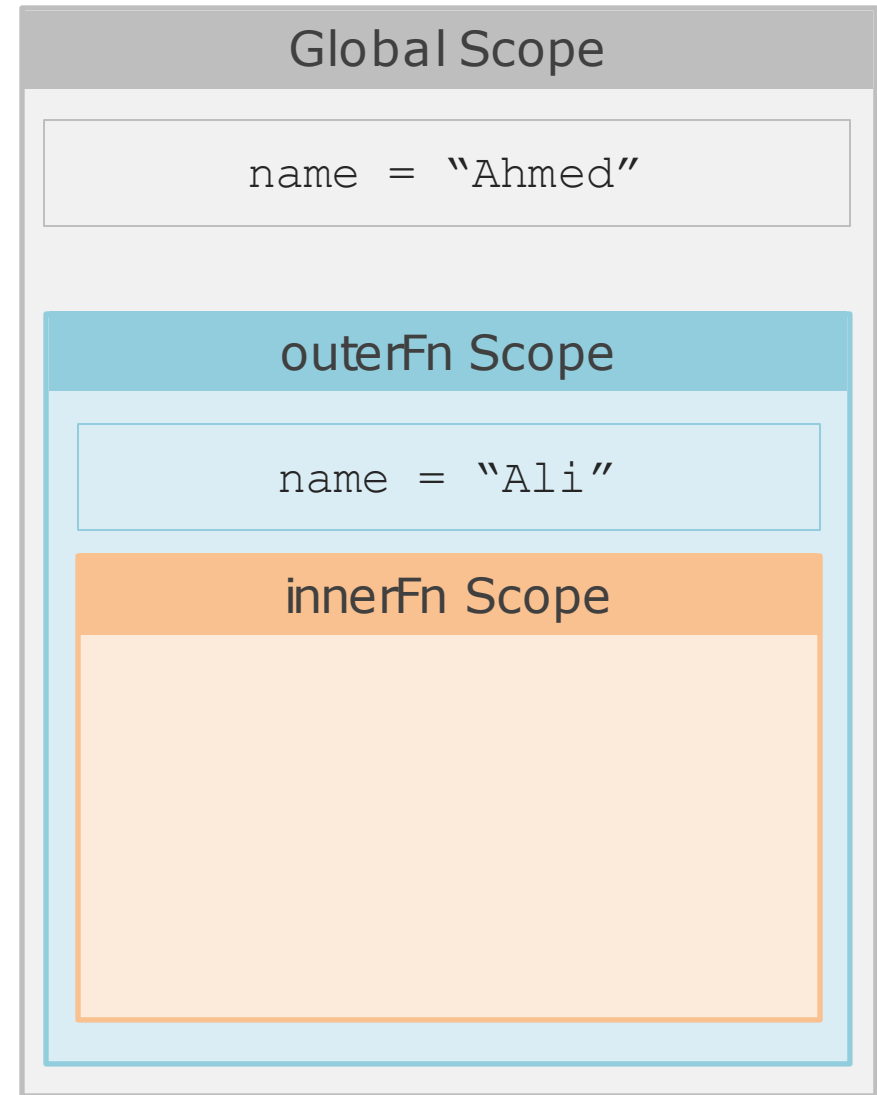
def outerFn():
    name = "Ali"

    def innerFn():
        print(name)

    → innerFn()

outerFn()
```

Output:



Lexical Scope

```
name = "Ahmed"

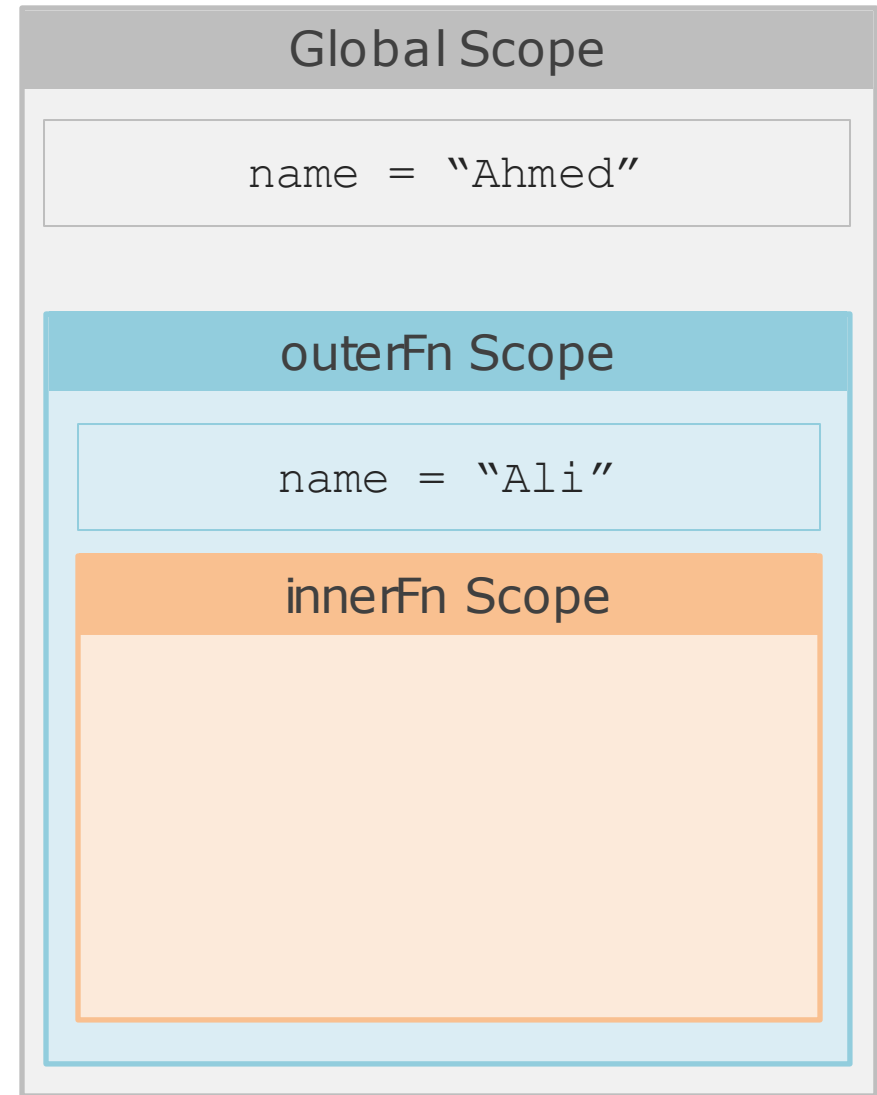
def outerFn():
    name = "Ali"

    def innerFn():
        → print(name)

    innerFn()

outerFn()
```

Output:



Lexical Scope

```
name = "Ahmed"

def outerFn():
    name = "Ali"

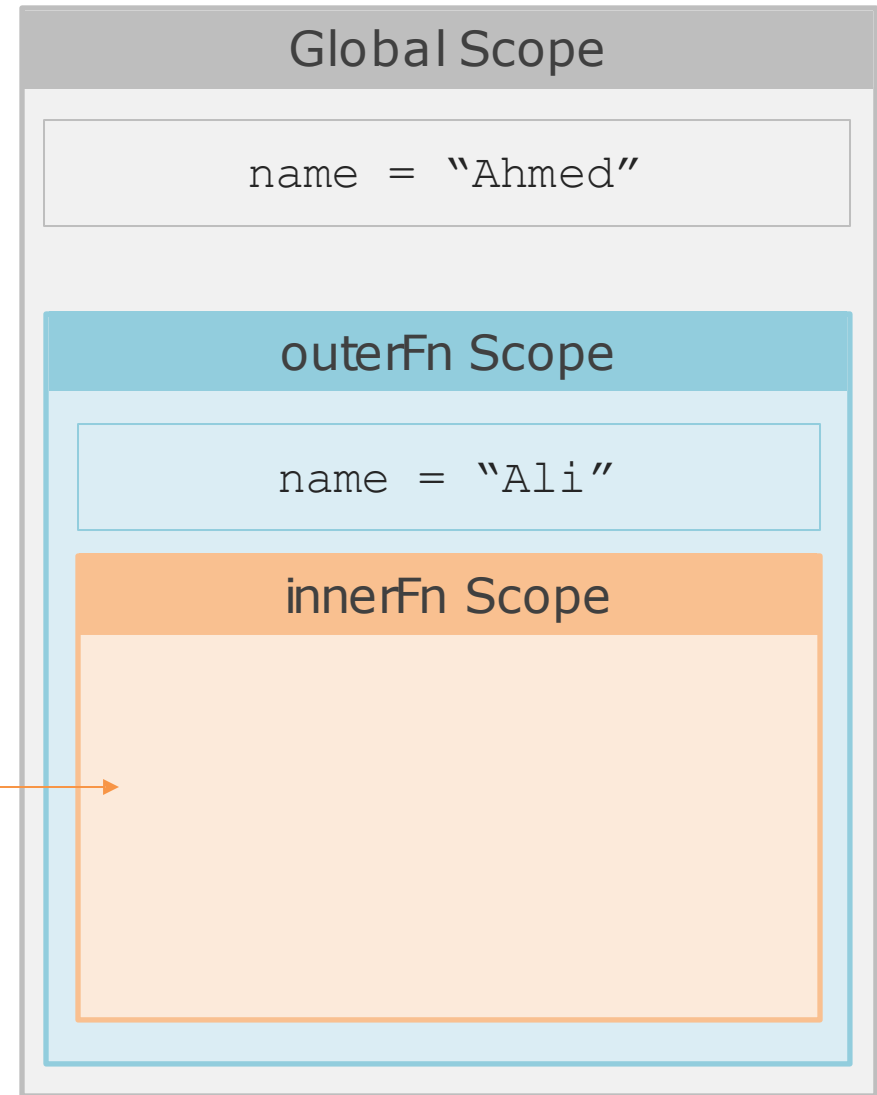
    def innerFn():
        → print(name)

    innerFn()

outerFn()
```

Output:

name
???



Lexical Scope

```
name = "Ahmed"

def outerFn():
    name = "Ali"

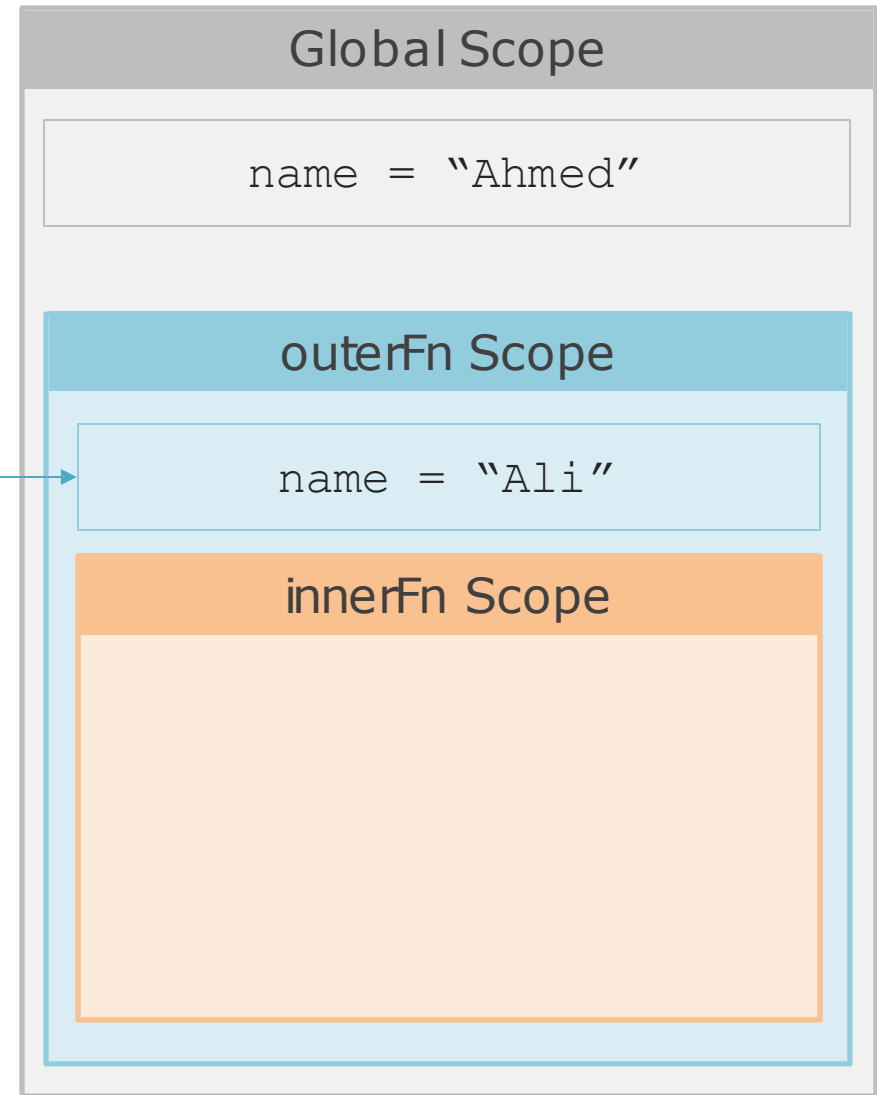
    def innerFn():
        → print(name)

    innerFn()

outerFn()
```

Output:

name
???



Lexical Scope

```
name = "Ahmed"

def outerFn():
    name = "Ali"

    def innerFn():
        → print(name)

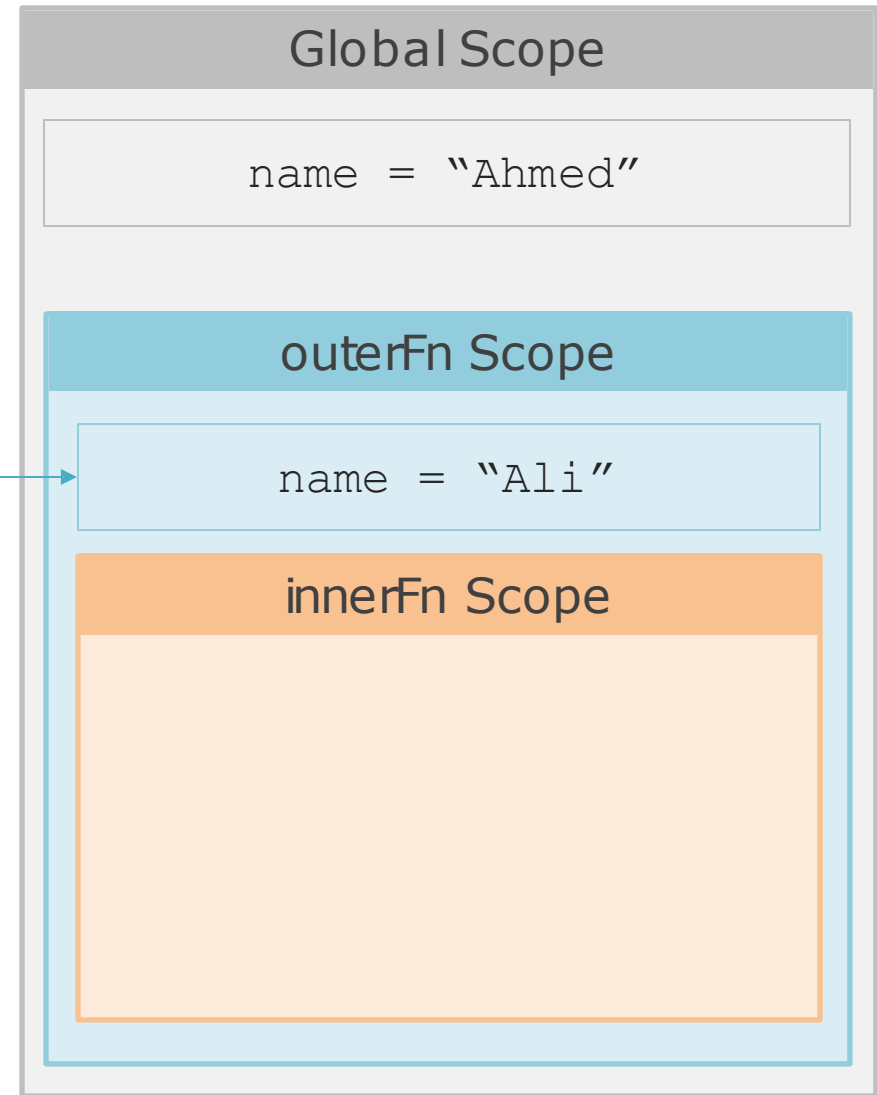
    innerFn()

outerFn()
```

Output:

Ali

name
???



Lexical Scope

```
name = "Ahmed"

def outerFn():
    name = "Ali"

    def innerFn():
        print(name)

    innerFn()

outerFn()
print(name)
```

Output:

Ali

Global Scope

name = "Ahmed"



Lexical Scope

```
name = "Ahmed"

def outerFn():
    name = "Ali"

    def innerFn():
        print(name)

    innerFn()

outerFn()
print(name)
```

Output:

Ali

name
???



Global Scope

name = "Ahmed"



Lexical Scope

```
name = "Ahmed"

def outerFn():
    name = "Ali"

    def innerFn():
        print(name)

    innerFn()

outerFn()
print(name)
```

Output:

Ali

Ahmed

name
???



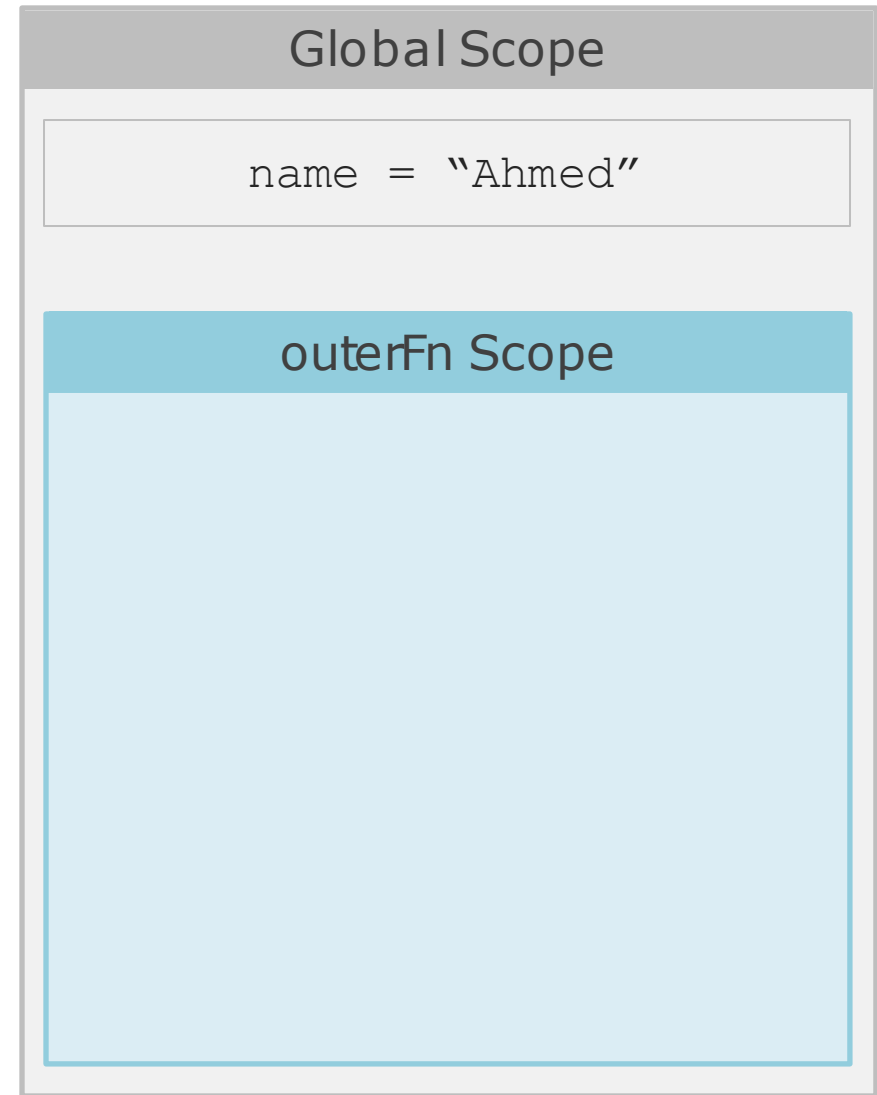
global Keyword

```
name = "Ahmed"

def outerFn():
    global name
    name = "Ali"
    def innerFn():
        print(name)
    innerFn()

outerFn()
```

Output:



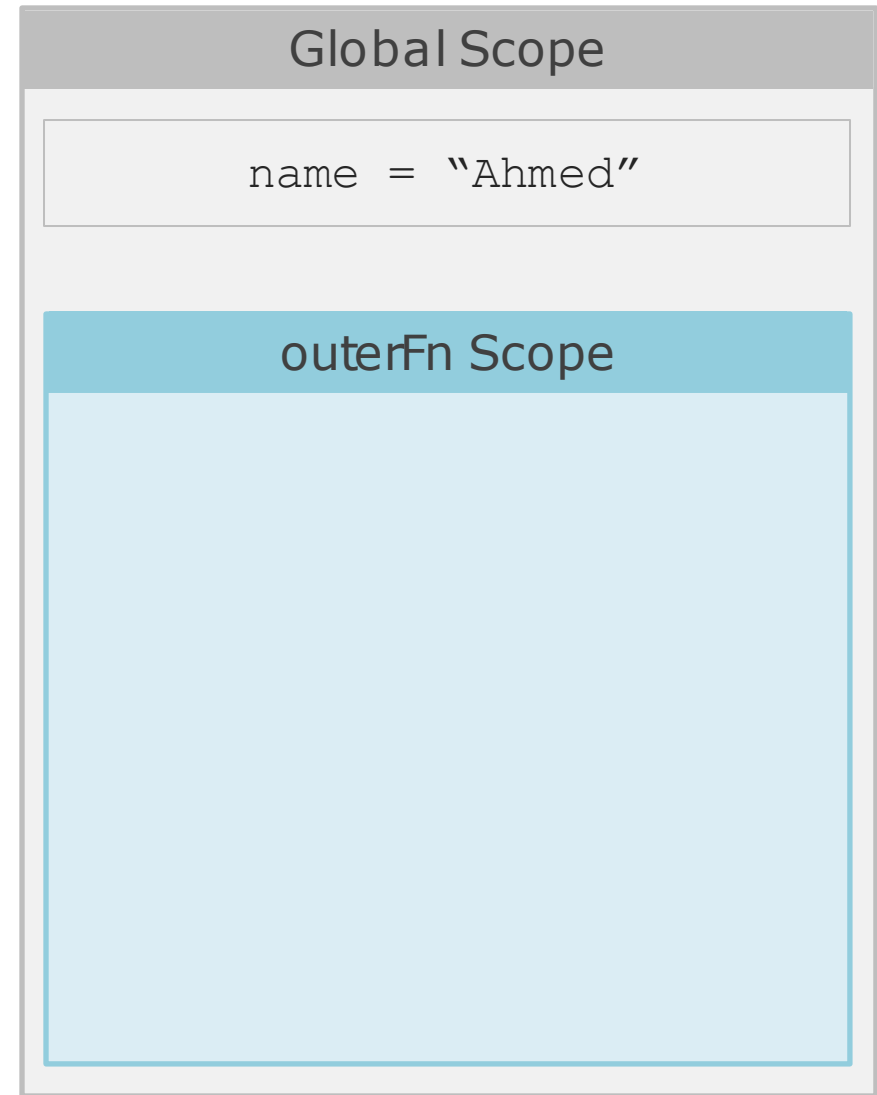
global Keyword

```
name = "Ahmed"

def outerFn():
    → global name
    name = "Ali"
    def innerFn():
        print(name)
    innerFn()

outerFn()
```

Output:



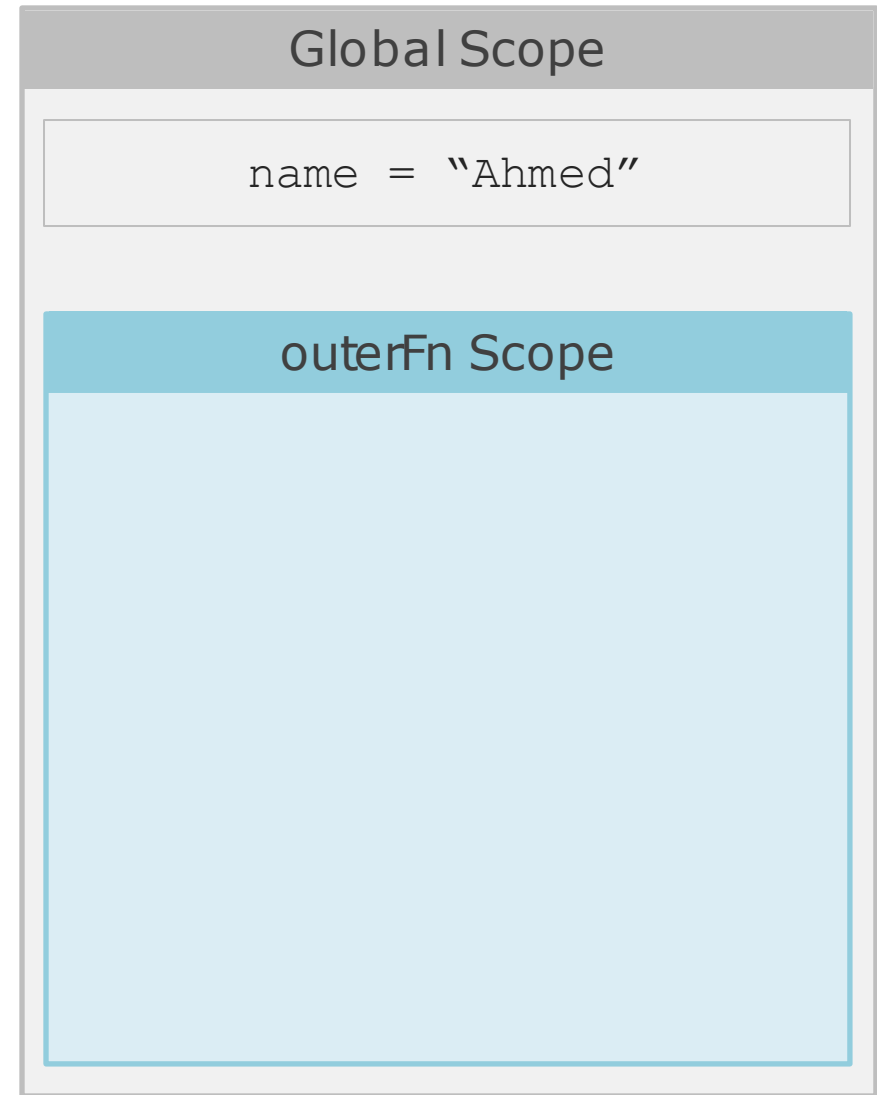
global Keyword

```
name = "Ahmed"

def outerFn():
    global name
    → name = "Ali"
    def innerFn():
        print(name)
    innerFn()

outerFn()
```

Output:



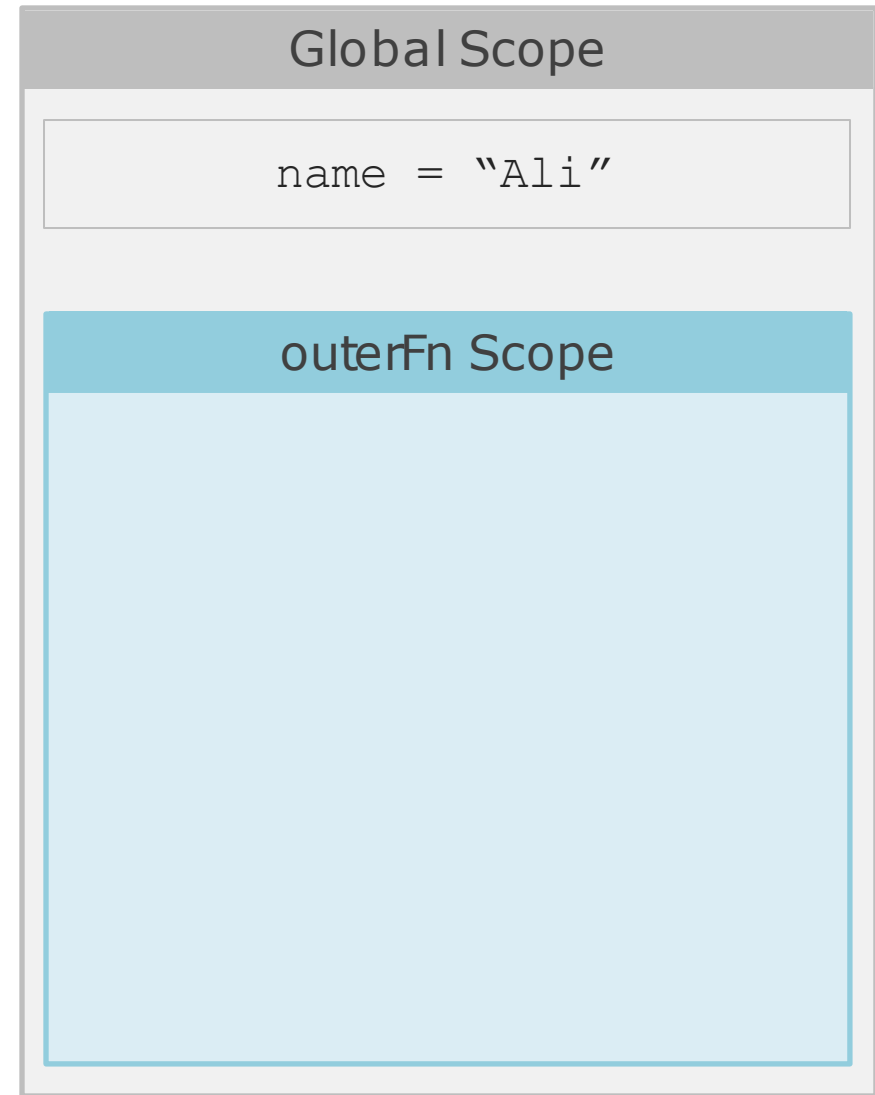
global Keyword

```
name = "Ahmed"

def outerFn():
    global name
    → name = "Ali"
    def innerFn():
        print(name)
    innerFn()

outerFn()
```

Output:

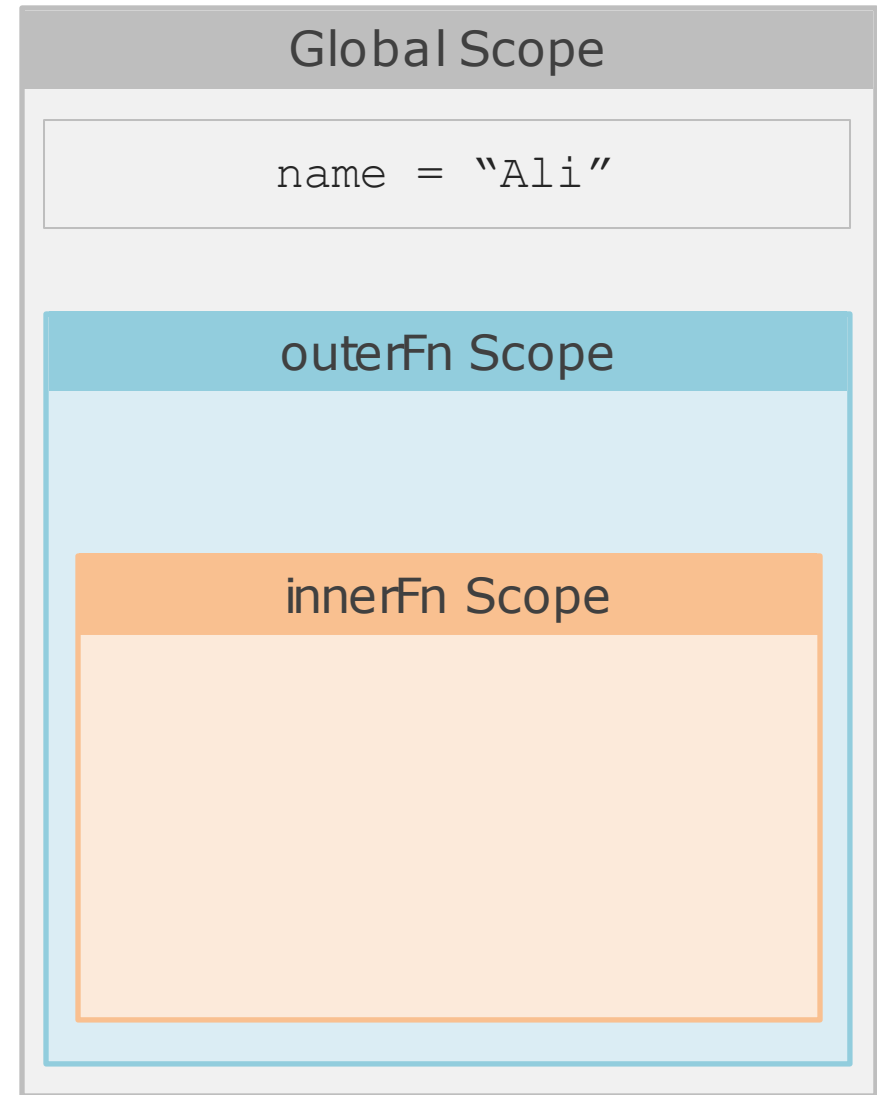


global Keyword

```
name = "Ahmed"

def outerFn():
    global name
    name = "Ali"
    def innerFn():
        print(name)
    → innerFn()
outerFn()
```

Output:



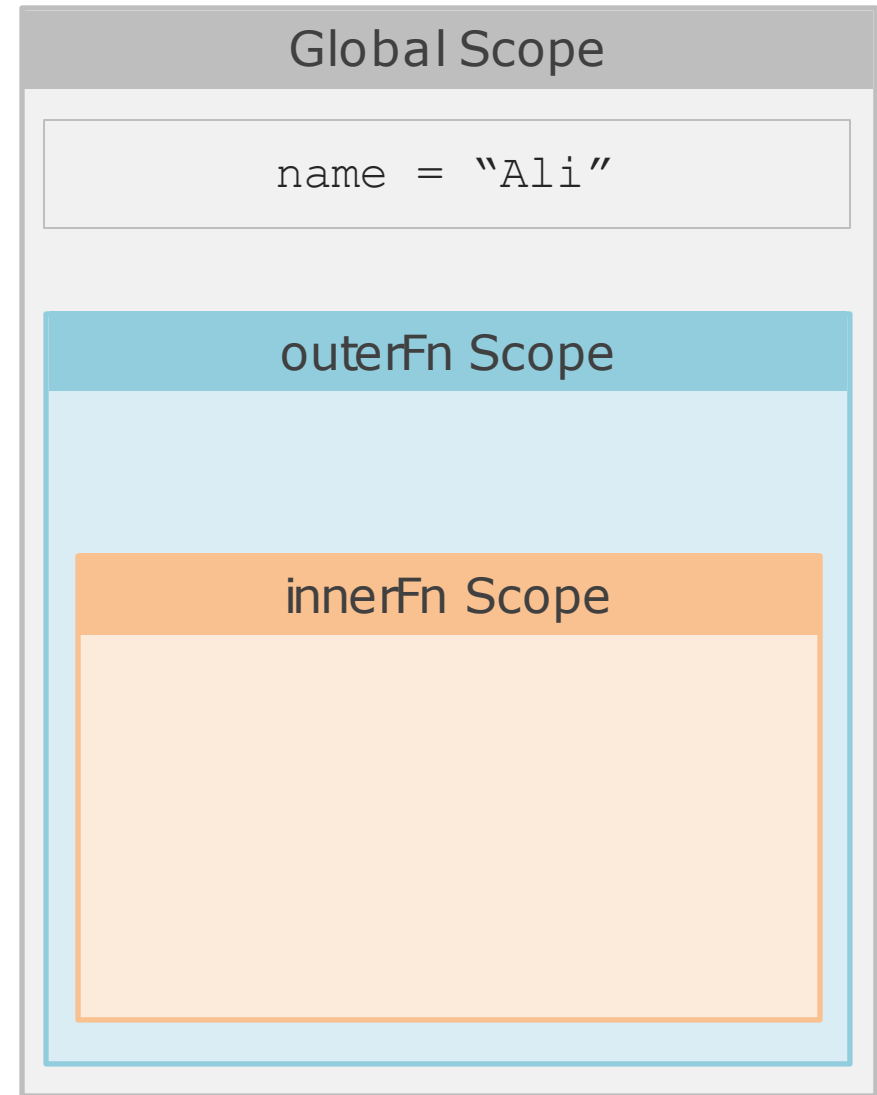
global Keyword

```
name = "Ahmed"

def outerFn():
    global name
    name = "Ali"
    def innerFn():
        → print(name)
    innerFn()

outerFn()
```

Output:



global Keyword

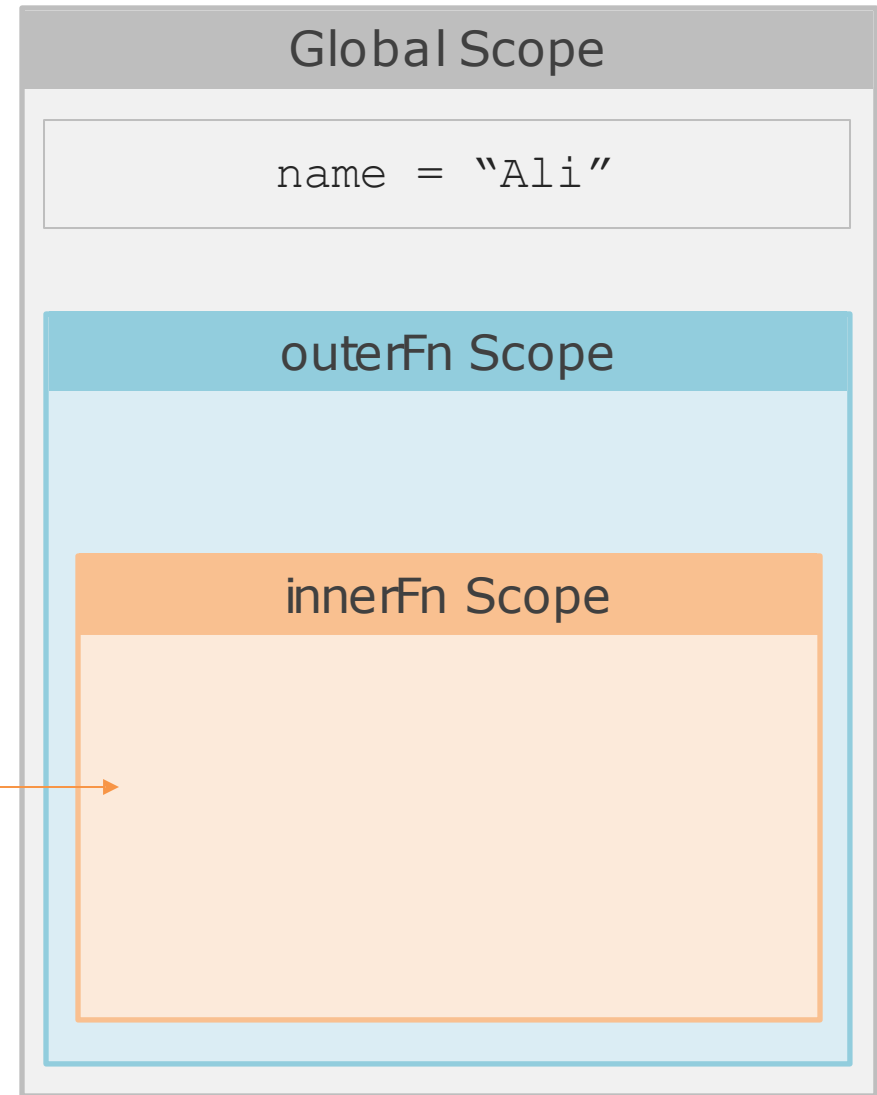
```
name = "Ahmed"

def outerFn():
    global name
    name = "Ali"
    def innerFn():
        → print(name)
    innerFn()

outerFn()
```

Output:

name
???



global Keyword

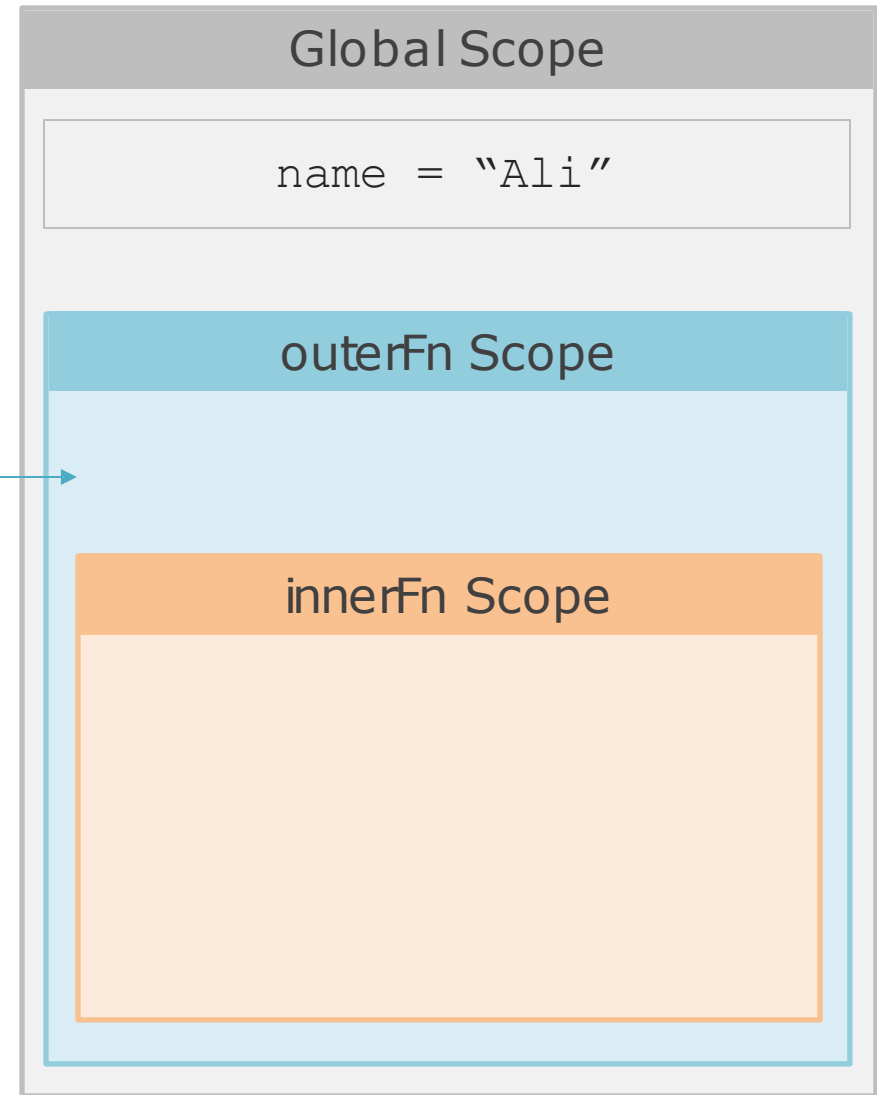
```
name = "Ahmed"

def outerFn():
    global name
    name = "Ali"
    def innerFn():
        → print(name)
    innerFn()

outerFn()
```

Output:

name
???



global Keyword

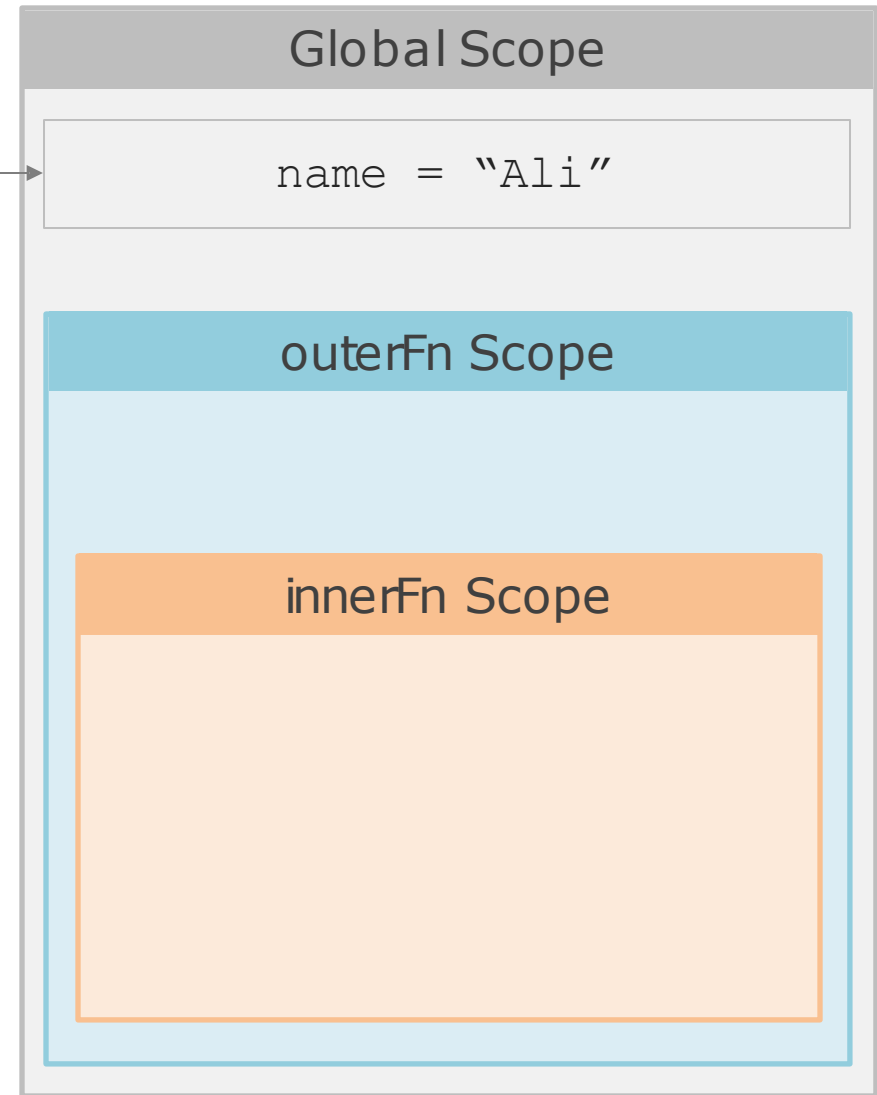
```
name = "Ahmed"

def outerFn():
    global name
    name = "Ali"
    def innerFn():
        → print(name)
    innerFn()

outerFn()
```

Output:

name
???



global Keyword

```
name = "Ahmed"

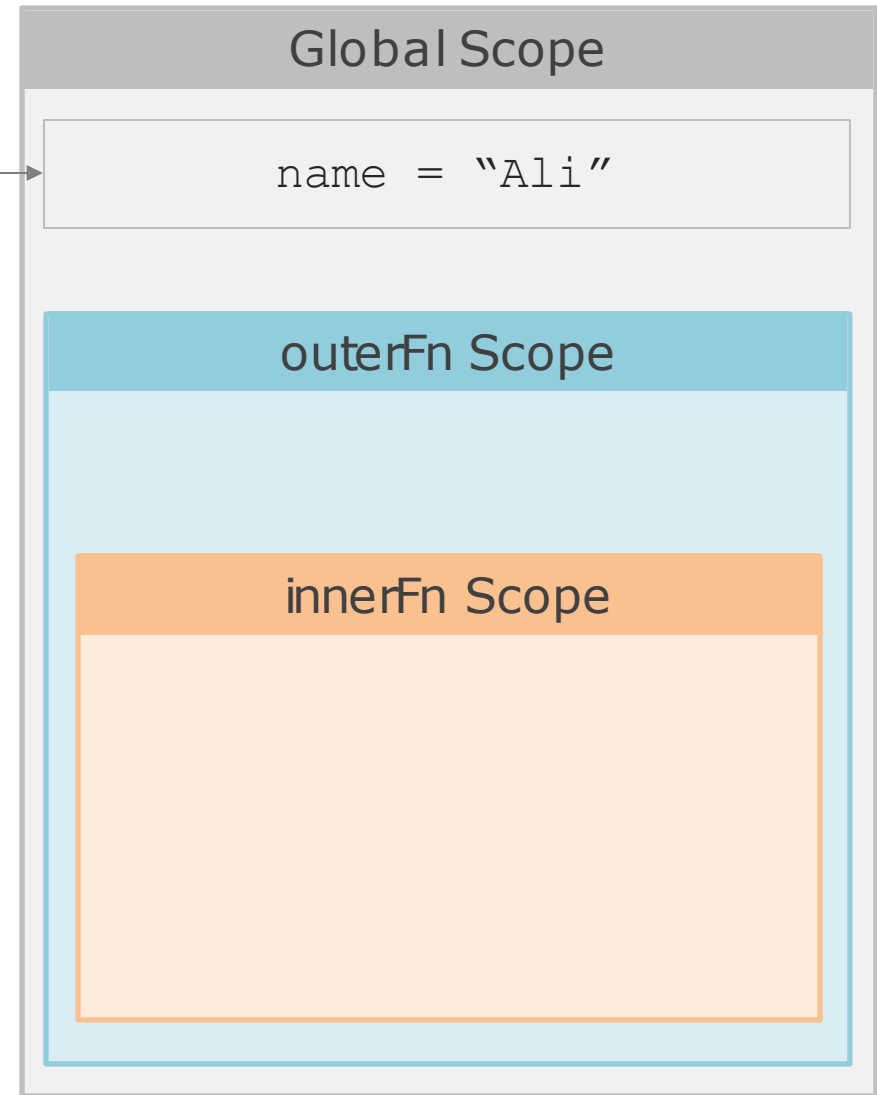
def outerFn():
    global name
    name = "Ali"
    →      print(name)
    innerFn()

outerFn()
```

Output:

Ali

name
???



global Keyword

```
name = "Ahmed"

def outerFn():
    global name
    name = "Ali"

    def innerFn():
        print(name)

    innerFn()

outerFn()
```

Output:

Ali

name
???



Global Scope

name = "Ali"



global Keyword

```
name = "Ahmed"

def outerFn():
    global name
    name = "Ali"
    def innerFn():
        print(name)
    innerFn()

outerFn()
print(name)
```

Output:

Ali

Ali

name
???



Global Scope

name = "Ali"



nonlocal Keyword

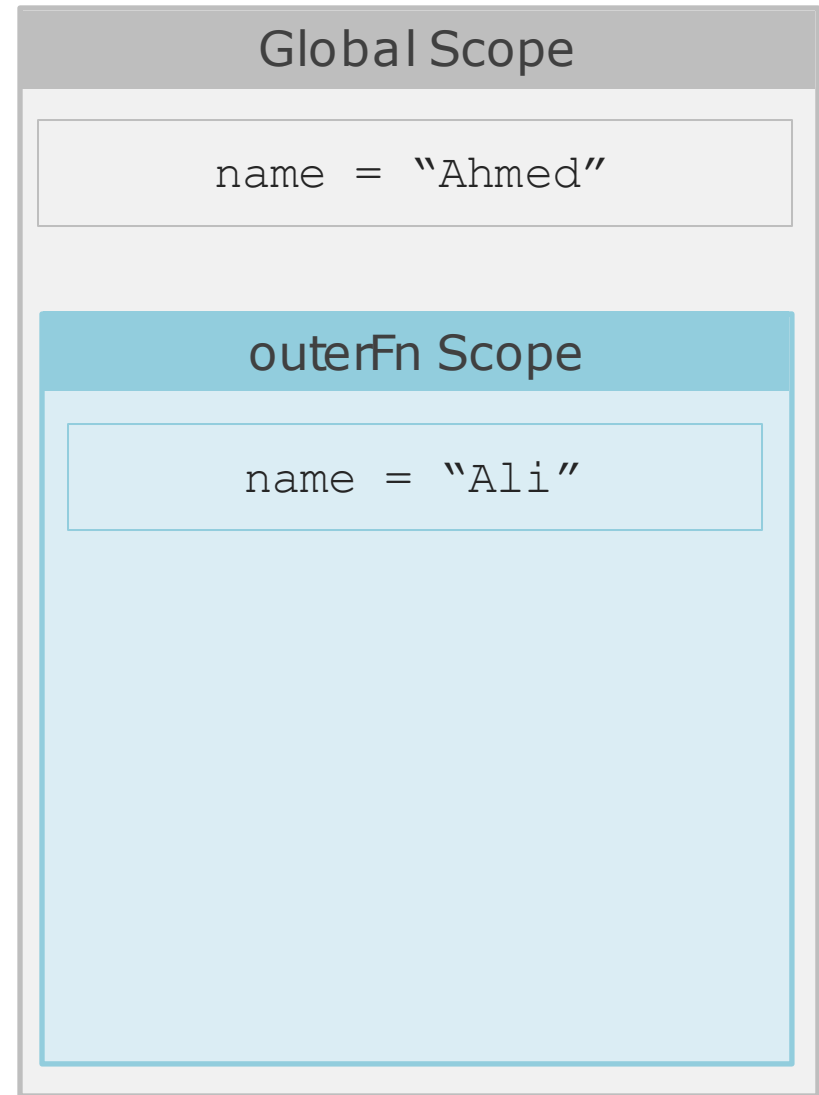
```
name = "Ahmed"

def outerFn():
    → name = "Ali"
    def innerFn():
        nonlocal name
        print(name)
        name = "Sara"

    innerFn()
    print(name)

outerFn()
```

Output:



nonlocal Keyword

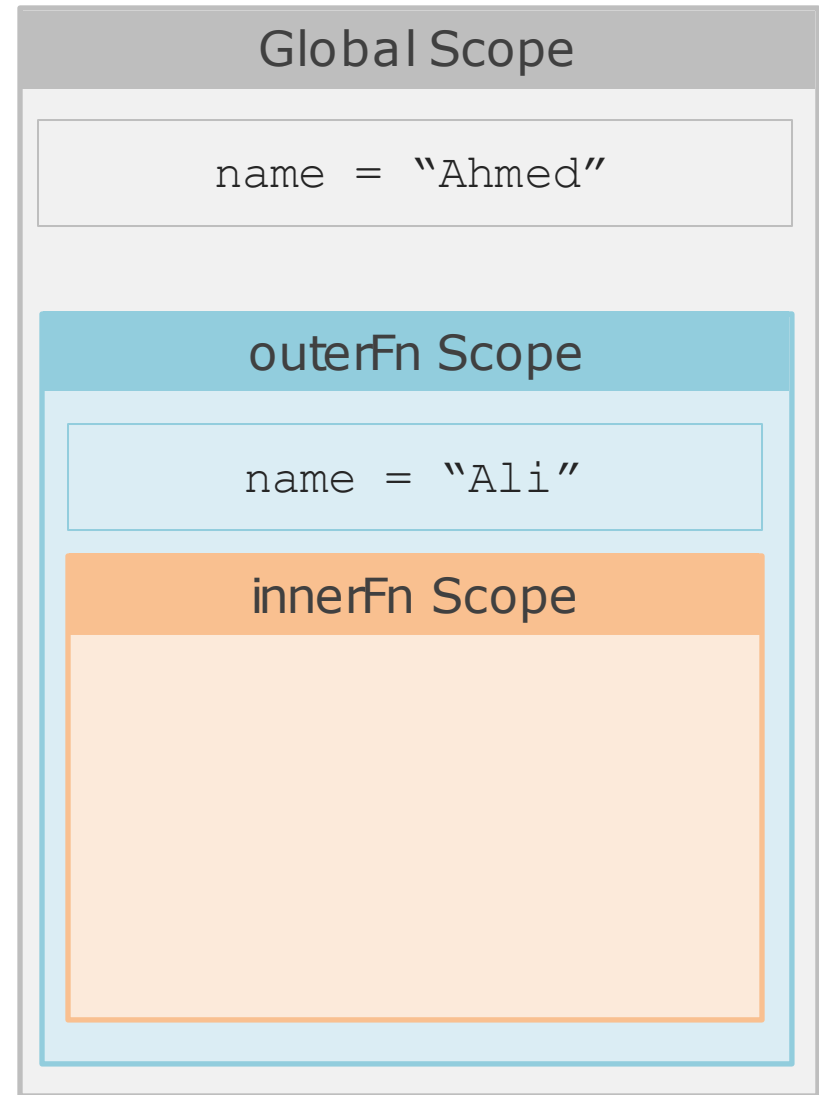
```
name = "Ahmed"

def outerFn():
    name = "Ali"
    def innerFn():
        nonlocal name
        print(name)
        name = "Sara"

    → innerFn()
    print(name)

outerFn()
```

Output:



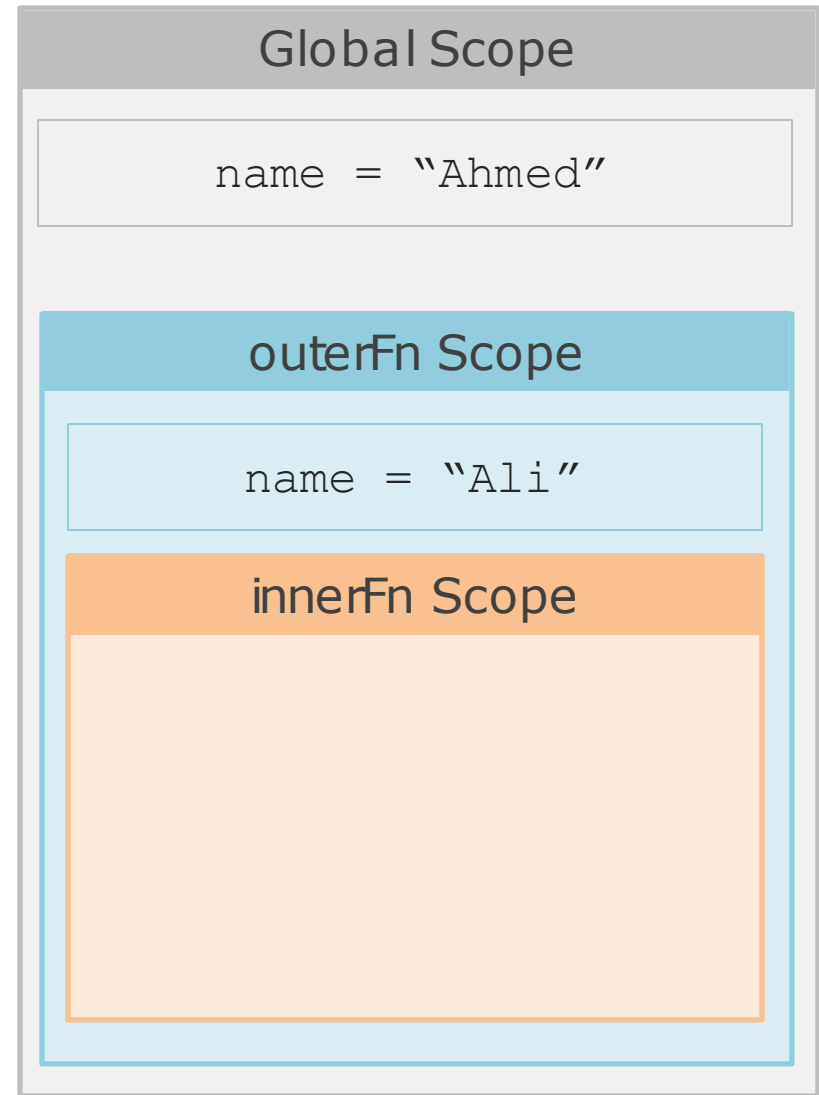
nonlocal Keyword

```
name = "Ahmed"

def outerFn():
    name = "Ali"
    def innerFn():
        → nonlocal name
        print(name)
        name = "Sara"
    innerFn()
    print(name)

outerFn()
```

Output:



nonlocal Keyword

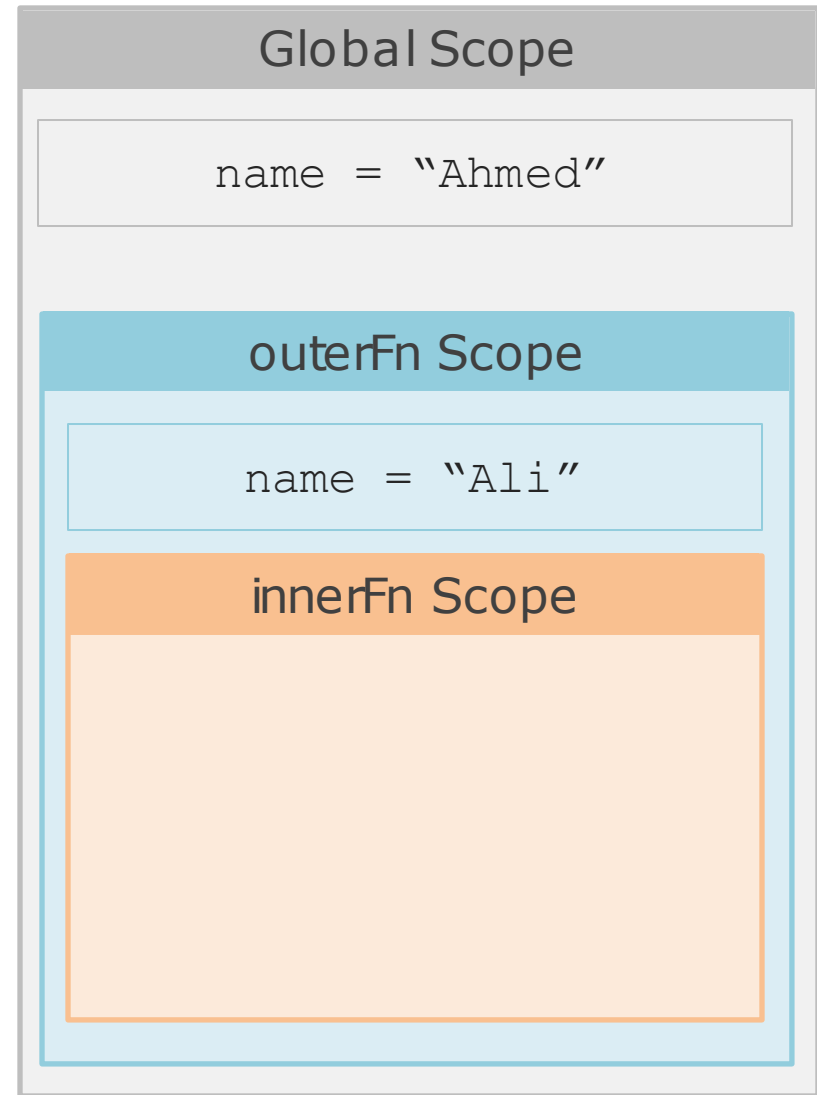
```
name = "Ahmed"

def outerFn():
    name = "Ali"
    def innerFn():
        nonlocal name
        → print(name)
        name = "Sara"
    innerFn()
    print(name)

outerFn()
```

Output:

Ali



nonlocal Keyword

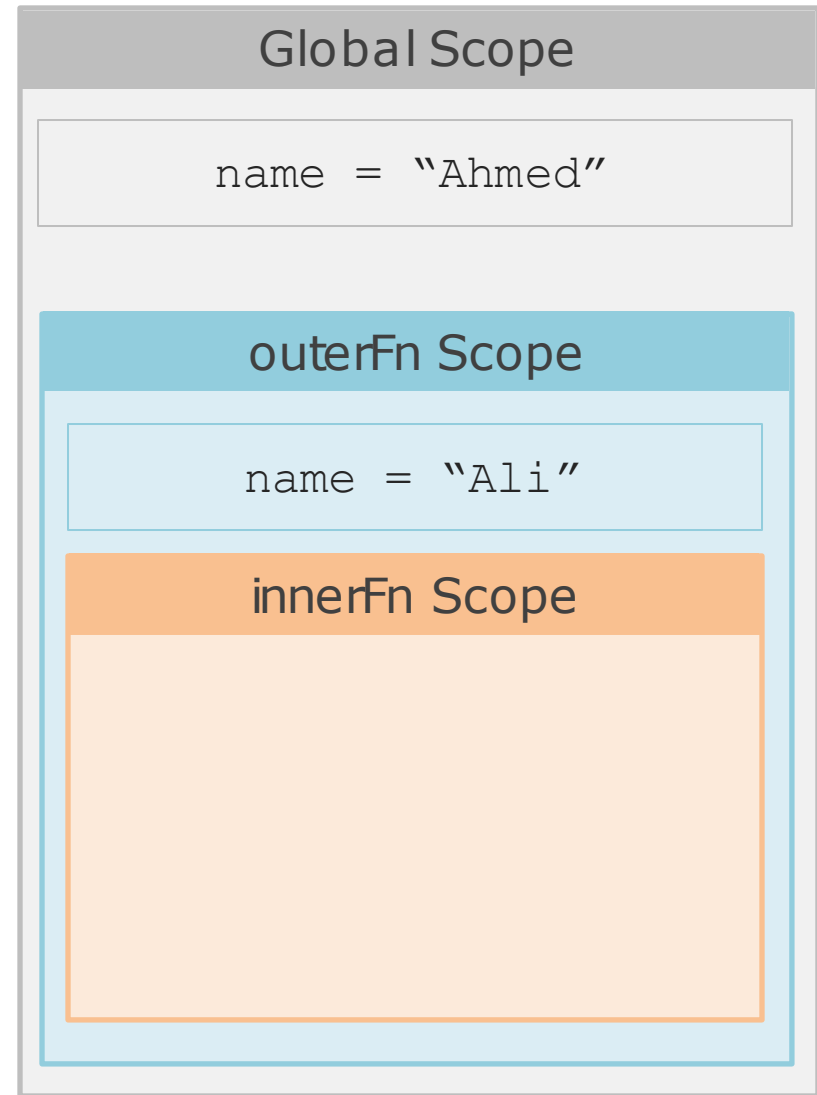
```
name = "Ahmed"

def outerFn():
    name = "Ali"
    def innerFn():
        nonlocal name
        print(name)
        → name = "Sara"
    innerFn()
    print(name)

outerFn()
```

Output:

Ali



nonlocal Keyword

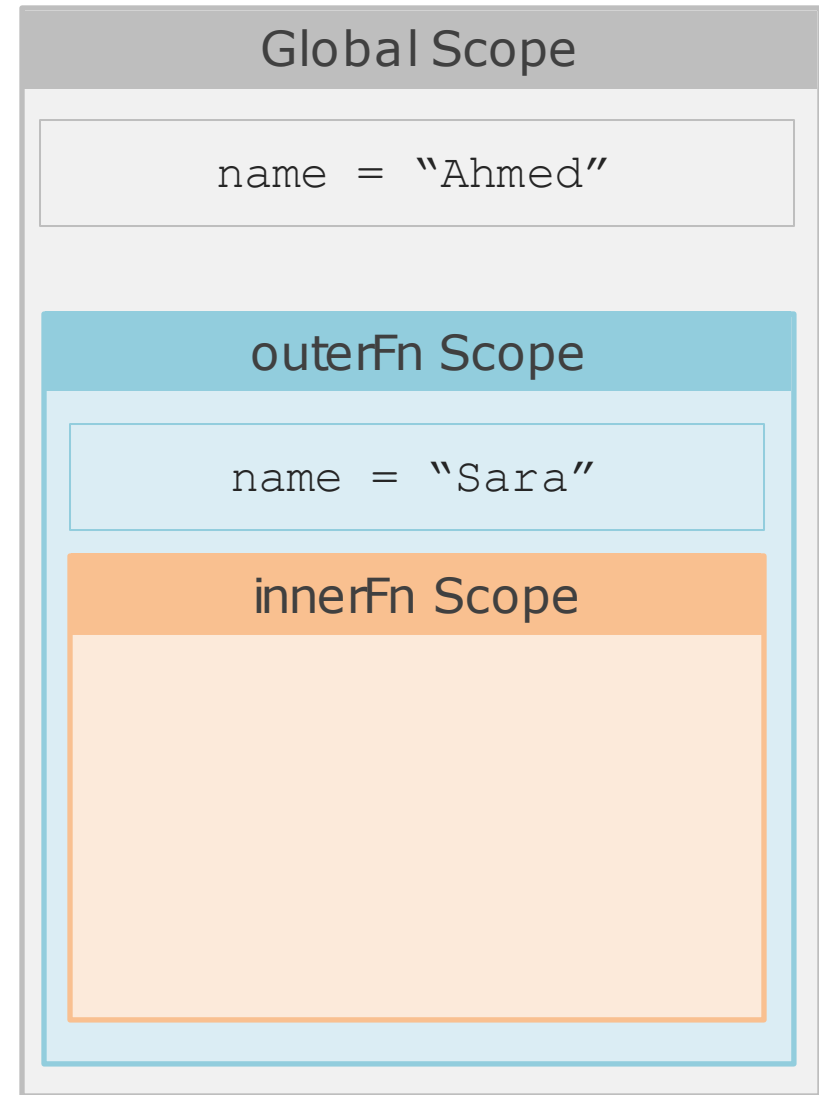
```
name = "Ahmed"

def outerFn():
    name = "Ali"
    def innerFn():
        nonlocal name
        print(name)
        → name = "Sara"
    innerFn()
    print(name)

outerFn()
```

Output:

Ali



nonlocal Keyword

```
name = "Ahmed"

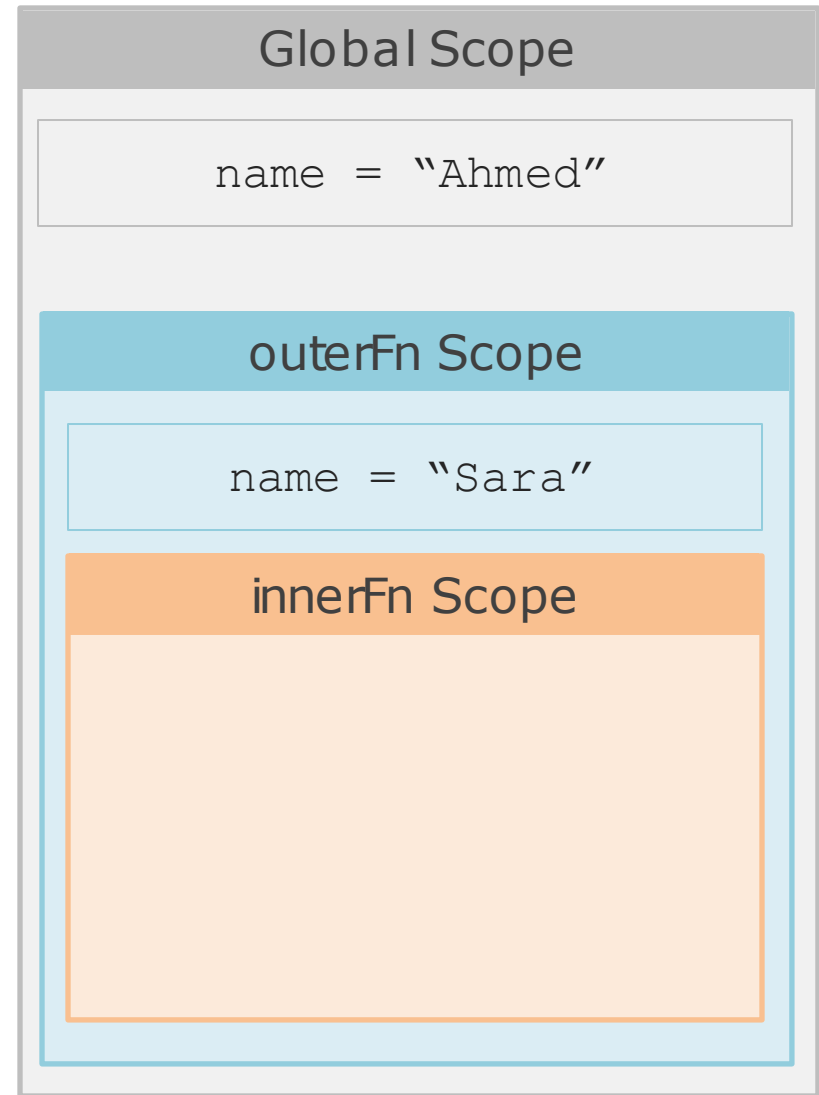
def outerFn():
    name = "Ali"
    def innerFn():
        nonlocal name
        print(name)
        name = "Sara"

    innerFn()
    → print(name)

outerFn()
```

Output:

Ali



nonlocal Keyword

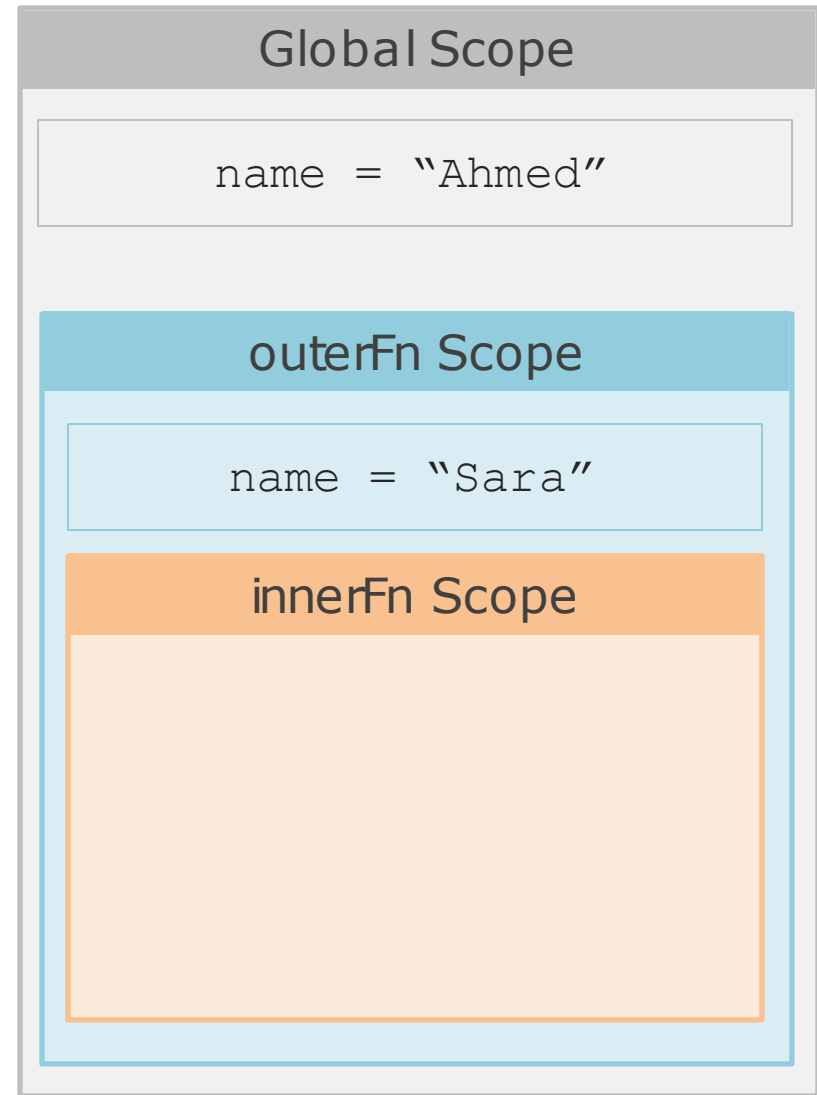
```
name = "Ahmed"

def outerFn():
    name = "Ali"
    def innerFn():
        nonlocal name
        print(name)
        name = "Sara"
    innerFn()
    → print(name)

outerFn()
```

Output:

```
Ali
Sara
```



******keywords

```
def doSum (**kwargs) :  
    for k in kwargs:  
        print (kwargs [k])
```

Calling It

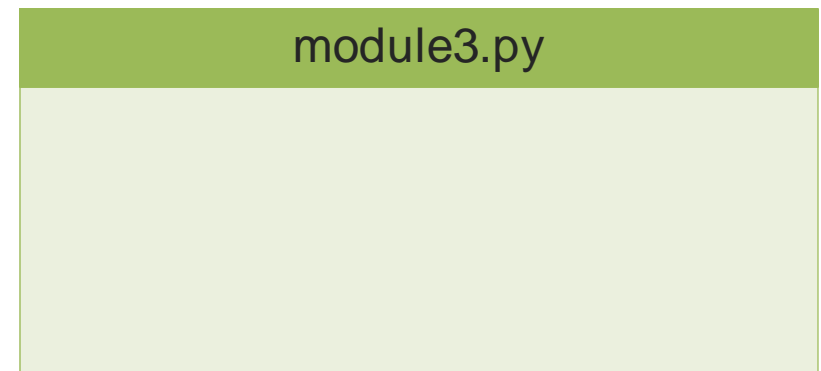
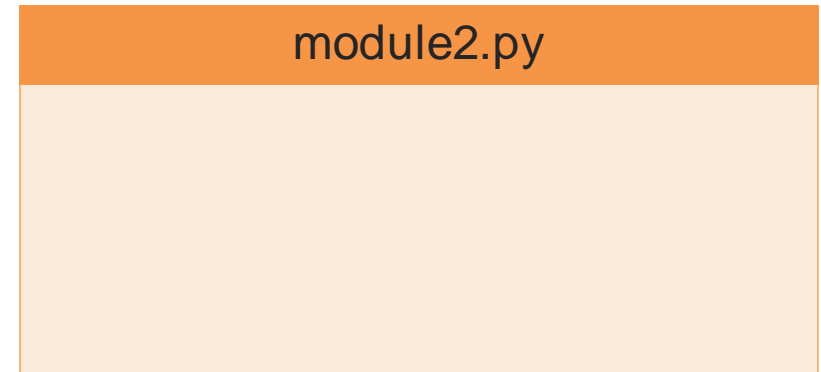
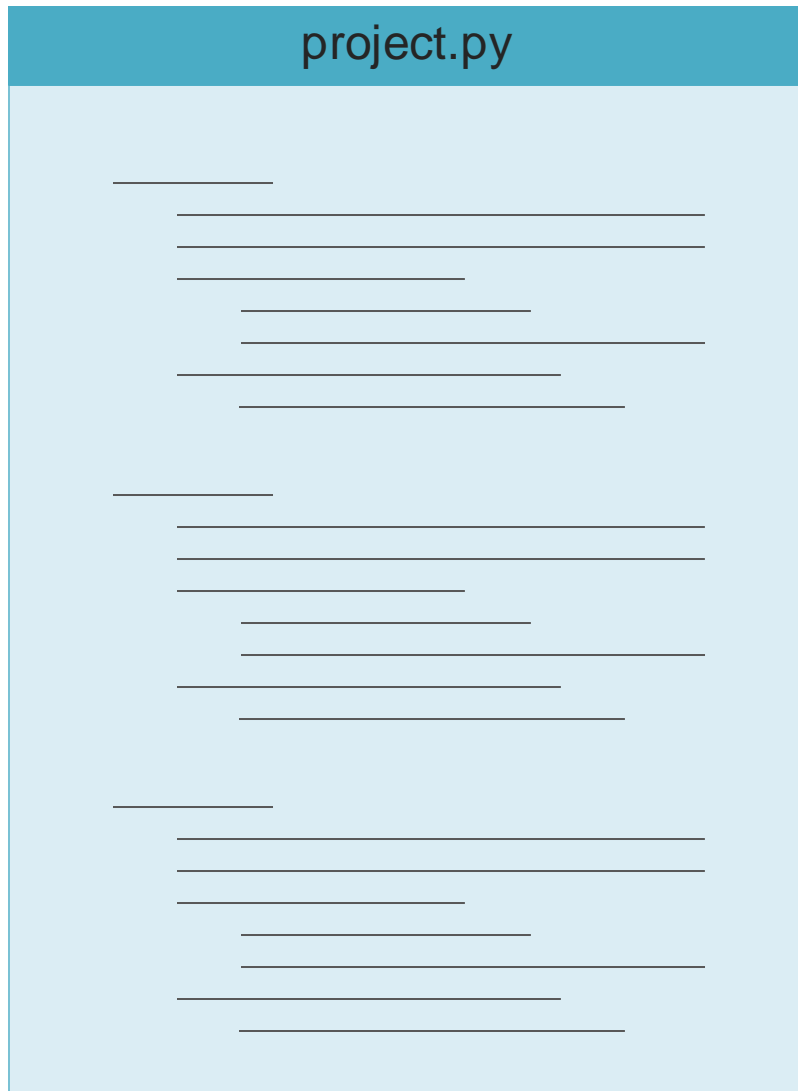
```
doSum (x = 2, y = 26)      # output: 2  
                             26
```

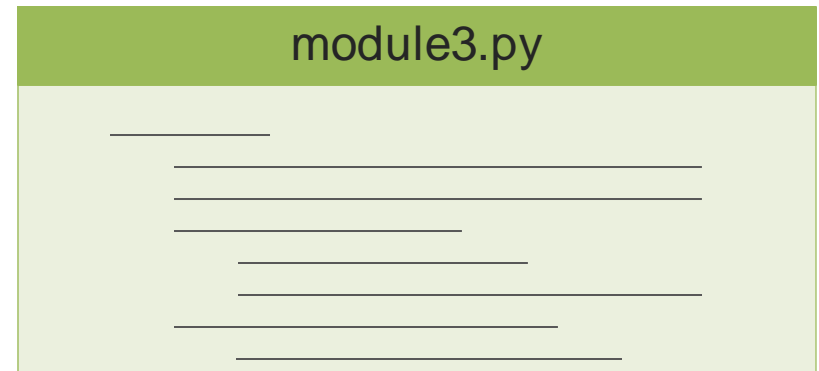
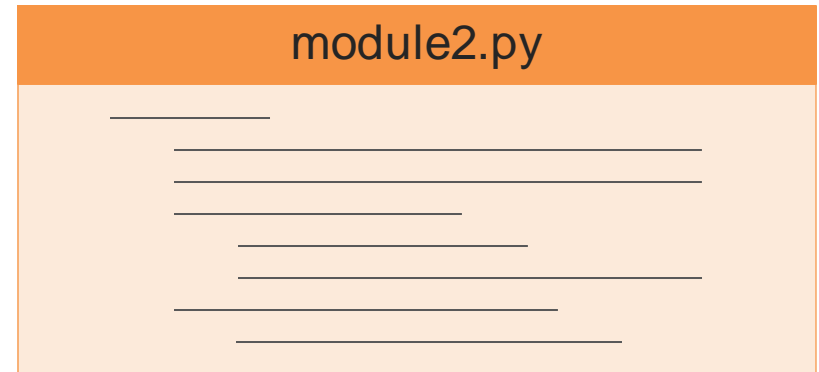
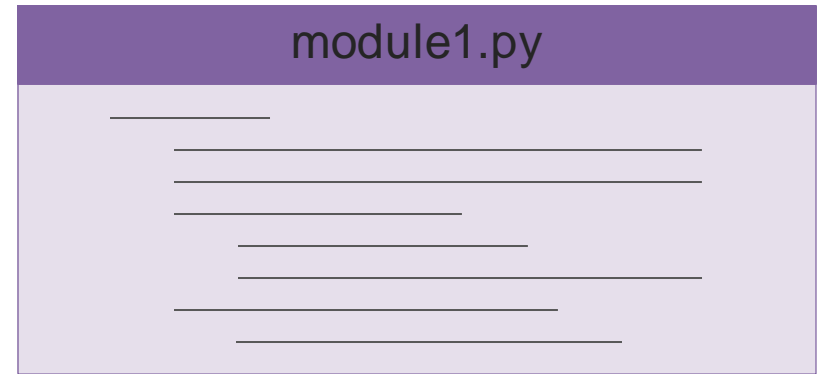
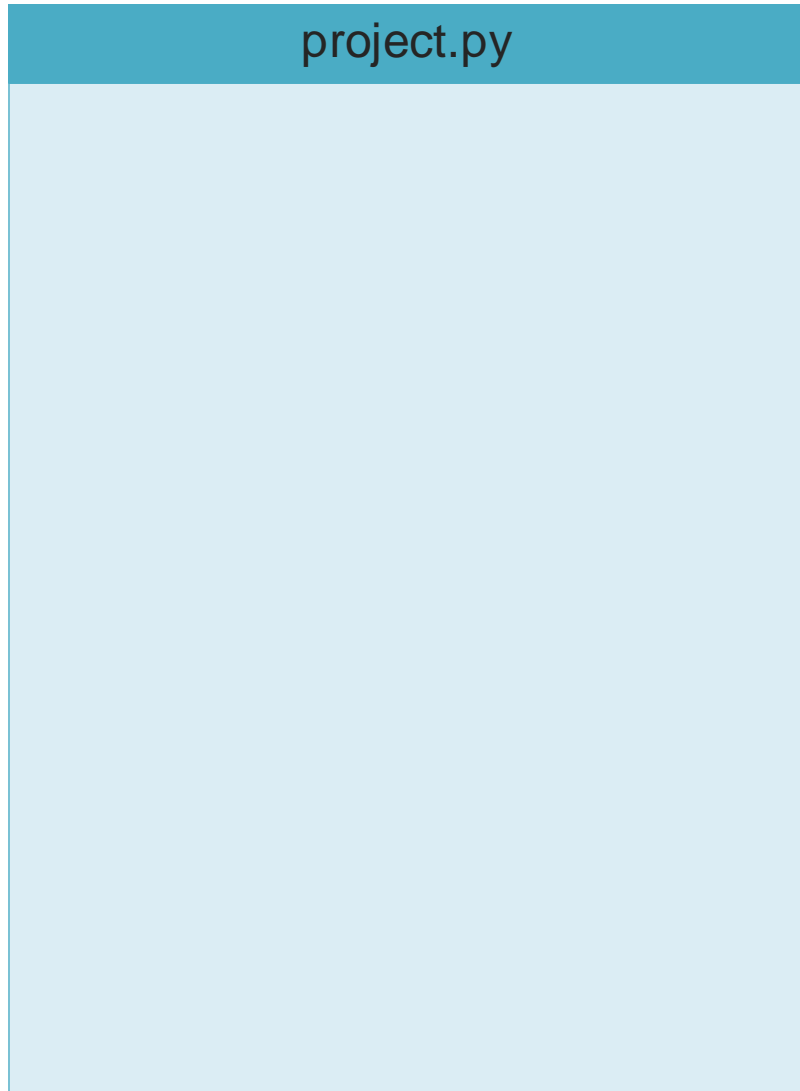


Modules

To make your code more modular







from module_name **import** block_name

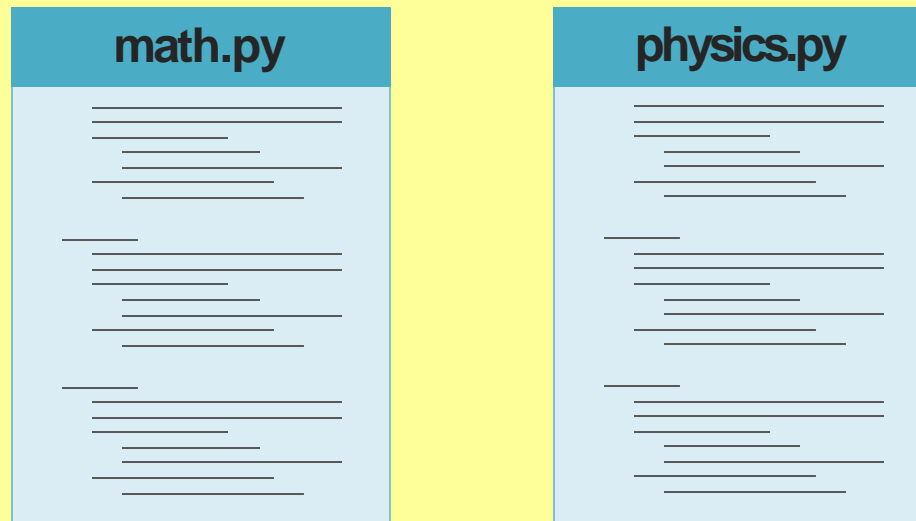


i.e. from **math** import **tan**




```
from pkge_name.module_name import block_name
```

Science Directory (Folder)



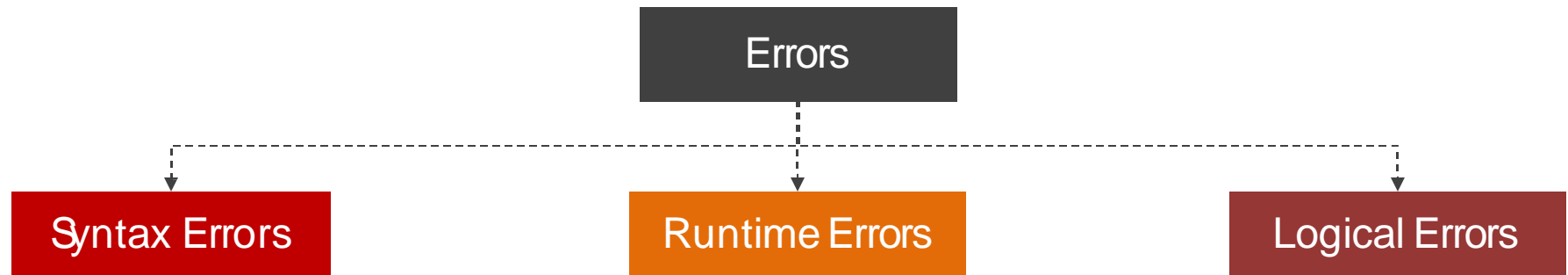
i.e. `from science.math import tan`

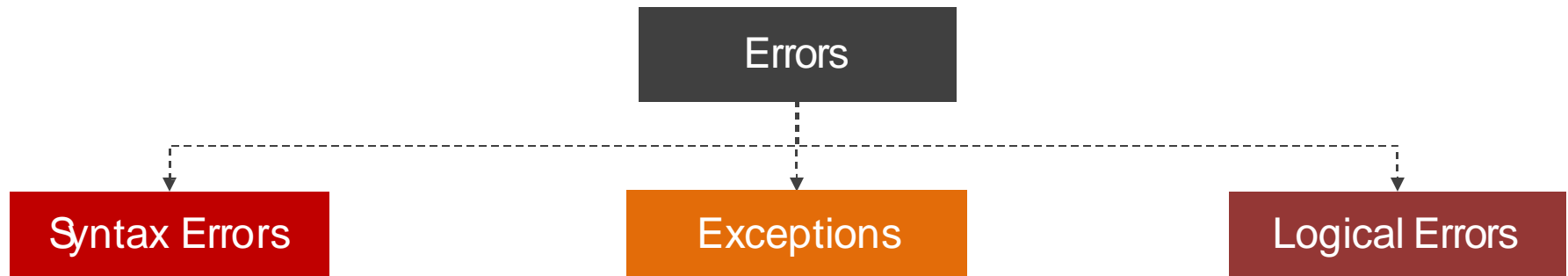


Errors & Exceptions

Gotta catch 'em all







Errors that will show up if you doesn't follow Python Syntax Rules

```
print("You missed the closing round braces "
```

```
print("You missed the closing round braces "
```

^

```
SyntaxError: invalid syntax
```



Errors detected during execution are called **Exceptions**

```
print(firstname);
```

```
NameError: name 'firstname' is not defined
```



Handling Exceptions

try: -----> Put the code that you want to handle its exceptions

`doTry()`

except: -----> Handle the exception if it raised in the try clause

`doExcept()`

else: -----> Run when code in try clause run without raising exceptions

`doElse()`

finally: -----> Put the code that you want to run always if there is an exception or not.

`doFinally()`



```
raise ErrorName (error_message)
```

i.e. **raise** **NameError**("It's Not a name")



File Input & Output

File Authoring



```
open (file_name, mode)
```

mode	Job description
r	Open Filesfor reading only
w	Open Filesfor writing only *
a	Open Filesfor appending *
r+	Open Filesfor reading and writing *
rb	Open Filesfor reading binary files
rb+	Open Files for reading and writing binary files *

* If the file not exist , It will create it.



Read Files

```
f1 = open("some_file.txt", 'r')
```

```
f1.read()
```

```
#output: Some text on line 1.  
         Other text on line 2.
```

```
f1.read(4)
```

```
#output: Some
```

```
f1.readline()
```

```
#output:  text on line 1.
```

```
f1 = open("some_file.txt", 'r')
```

```
for line in f1:
```

```
    print(line)
```

```
#output: Some text on line 1.  
         Other text on line 2.
```

some_file.txt

Some text on line 1.

Other text on line 2.



```
fl = open("some_file.txt", 'w')
```

some_file.txt

Some text on line 1.

Other text on line 2.



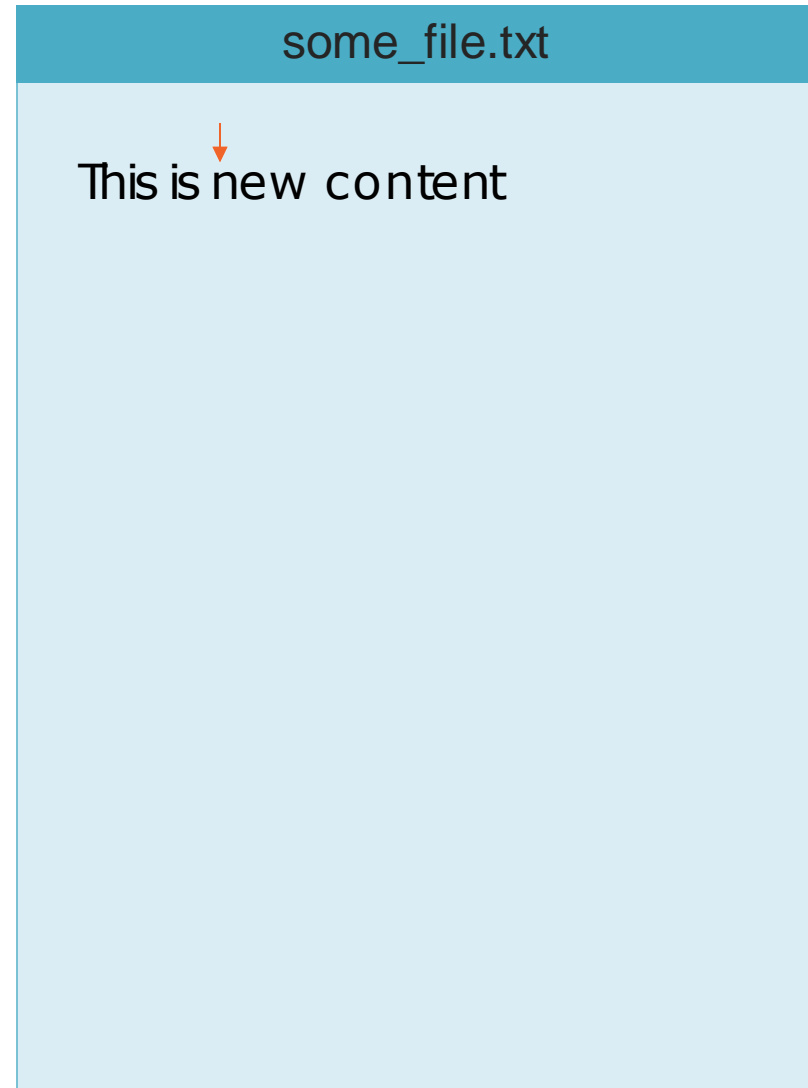
```
fl = open("some_file.txt", 'w')  
fl.write("This is new content")
```

some_file.txt

This is new content



```
fl = open("some_file.txt", 'w')  
fl.write("This is new content")  
fl.seek(8)
```



Write on Files

```
f1 = open("some_file.txt", 'w')  
f1.write("This is new content")  
f1.seek(8)  
f1.write("old")
```

some_file.txt

This is old content



Write on Files

```
fl = open("some_file.txt", 'w')
fl.write("This is new content")
fl.seek(8)
fl.write("old")
fl.close()

fl = open("some_file.txt", 'a')
fl.write("\n content is appended")
```

some_file.txt

This is old content
content is appended



Python Standard Library



os module provides functions for interacting with the operating system

```
import os
```

```
os.getcwd()           # /usr/bin/python33  
  
os.system("rmdir dir2") # it will remove dir2  
  
os.chdir("/home/ahmedmoawad") # change the dir. to /home/...  
  
os.getlogin()         # "Ahmed Moawad"
```



math module provides access to the mathematical functions by the C standard

```
import math
```

```
math.ceil(3.2)           # 4
```

```
math.floor(3.6)          # 3
```

```
math.sqrt(9)             # 3
```

```
math.pi                 # 3.14
```



re provides regular expression matching operations

```
import re
```

```
re.match(pattern, string)
```

```
#match string with pattern from its starting
```

```
re.fullmatch(pattern, string)
```

```
#match full string with the pattern
```

```
re.search(pattern, string)
```

```
#scan the string finding the part that match the pattern
```



External Libraries

pip tool



pip is a package management system used to install and manage software packages written in Python

```
pip install "some library"
```

i.e. `pip install libcloud`

Tips and Tricks



Sequence Unpacking

```
l = [1, 13, 3, 7]
```

```
a, b, c, d = l
```

```
# a=1, b=13, c=3, d=7
```

```
a, *b, c = l
```

```
# a=1, b=[13, 3], c=7
```



with statement

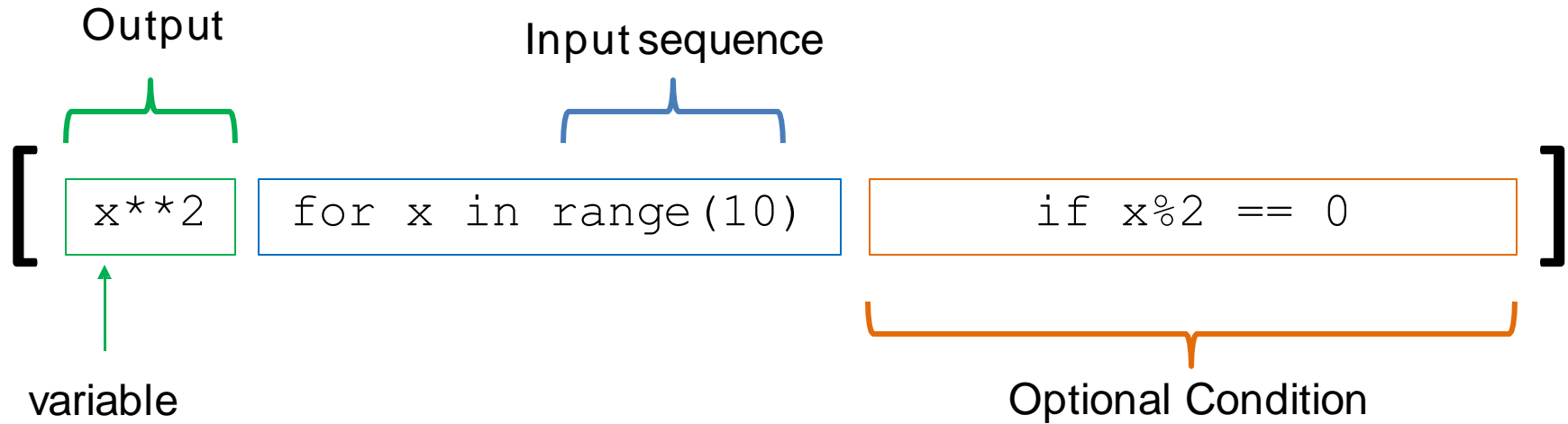
with statement is used for handling the entry (set-up) and exit (tear-down) tasks for its input

```
with open("file.txt", 'r') as fp:  
  
    fp.read()
```



List Comprehension

It is an easy method to construct a list



```
L = [ x**2 for x in range(10) if x%2 == 0 ]  
#output: [0, 4, 16, 36, 64]
```



enumerate Function

```
languages = ["JavaScript", "Python", "Java"]  
  
for i , l in enumerate(languages):  
    print("Element Value: " , l, end=", ")  
    print("Element Index: " , i)
```

Output:

```
Element Value: JavaScript, Element index: 0  
Element Value: Python, Element index: 1  
Element Value: Java, Element index: 2
```



all check if all items in an iterable are truthy value.
any check if one item at least in an iterable is truthy value.

```
L = [0, 5, 9, 7, 8]
```

```
all(L)
```

```
#False
```

```
any(L)
```

```
#True
```



Thank You