Variables and While Loops

Today starts as a Paper + Pencil or Tablet + Pencil day... please keep laptops stowed away!

COMP110 - CL08 2024/02/20

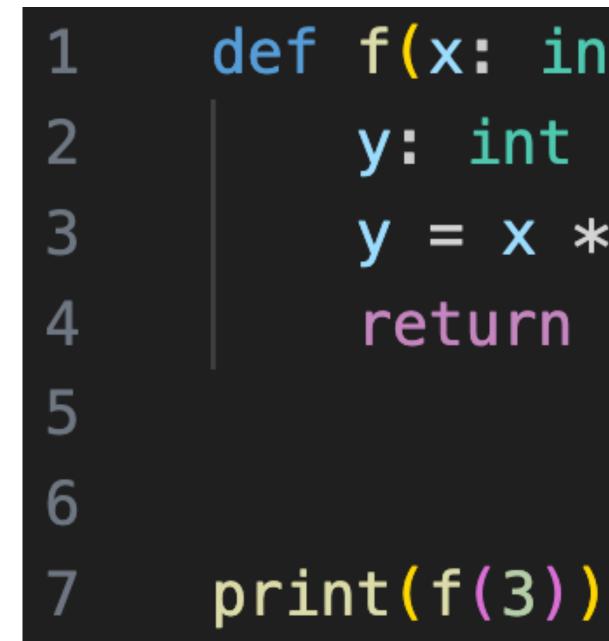


Announcements

- LSo7 Variables and While Loops due Tomorrow Night (February 21st)
 - Quick, supplemental reading on today's lecture subject
 - Reading Posted, Gradescope Questions by 5pm Today

- EXo₃ Wordle
 - Uses concepts of today and LSo7
 - Implement the popular online game Wordle! \bullet
 - Posts by February 22nd

Warm-up: Discuss the following questions with a neighbor, then, on paper, diagram how you believe this works.



def f(x: int) -> int: y = x * 2return y

Questions to discuss with a neighbor: What does line #2 remind you of? What does line number #3 remind you of?

1	<pre>def f(x: int) -> int:</pre>
2	y: int
3	y = x * 2
4	return y
5	
6	
7	print(f(3))

Introducing Variables

Trace the Following Program in a Diagram

1	<pre>def pizza_pr</pre>
2	"""Calcu
3	price: f
4	
5	if size :
6	pric
7	
8	return p
9	
10	
11	print <mark>(</mark> pizza_

'ice(size: int) -> float:
'late the price of a pizza."""
'loat = 10.0

>= 16: ce = 20.0

rice

price(size=16))

1	<pre>def pizza_price(size: int) -> float:</pre>
2	"""Calculate the price of a pizza."""
3	<pre>price: float = 10.0</pre>
4	
5	if size >= 16:
6	price = 20.0
7	
8	return price
9	
10	
11	<pre>print(pizza_price(size=16))</pre>

Key Variable Terminology

Variable Declaration / Definition

- Variable Assignment
- Variable Initialization

Variable Access

Identify Key Concepts Then Trace the Following Program in a Diagram

1	<pre>def pizza_price(si</pre>
2	"""Calculate t
3	<pre>price: float =</pre>
4	
5	if size >= 16:
6	price = 20
7	
8	price = price
9	
10	return price
11	
12	
13	<pre>print(pizza_price(</pre>

Identify: Declaration, Initialization vs. Assignment, Access

```
ize: int, toppings: int) -> float:
the price of a pizza with toppings."""
= 10.0
```

: 0.0

+ toppings * 0.75

(size=14, toppings=2))

```
def pizza_price(size: int, toppings: int) -> float:
         """Calculate the price of a pizza with toppings."""
 2
         price: float = 10.0
3
 4
5
         if size >= 16:
6
             price = 20.0
 7
8
         price = price + toppings * 0.75
9
10
         return price
11
12
     print(pizza_price(size=14, toppings=2))
13
```

Left-hand vs. Right-hand Side of Assignment The = Symbol is the Assignment Operator

• Each side of the assignment operator plays a distinct role in variable assignment!

1	<pre>def pizza_price(size)</pre>
2	"""Calculate the
3	price: float
4	
5	if size >= 16:
6	price = 20.0
7	
8	price = price + 1
9	
10	return price
11	
12	
13	print <mark>(</mark> pizza_price(siz



This program is very slightly modified from the previous. Can you spot the error? Try tracing again.

int, toppings: int) -> float: price of a pizza with toppings."""

toppings * 0.75

.ze=14, toppings=2))

Common Variable Errors

in a function but not yet initialized

Commonly from typos or renaming a variable and not updating all accesses.

• UnboundLocalError - Occurs when attempting to access a variable that is declared

• NameError - Occurs when attempting to access a variable that is not declared.



1	\sim (def	madli	os()	->	str	:	
2			name:	str	= i	npu	t("	G
3			adject	tive	st	r =	in	р
4			verb:	str	= i	npu	t("	G
5			retur	ר f "{	nam	e}	is	{ ;

Why variables?

One reason: Store the results of function calls (computation or data input) for later use!

Give me a name: ") out("Give me a positive adjective: ") live me a verb ending in ing:") adjective} at {verb}"

Speed Writing Exercise

Introducing: While Loops

• Follow-along in Trailhead / VSCode

1	def	love(n:
2		i: int
3		while i
4		pri
5		i =

int) -> None: = 0 i < n: int(f"i <3 u ({i})") = i + 1

Trace the Following Example

def sum(xs:	1
"""Sum t	2
total: i	3
i: int =	4
while i	5
tota	6
i = .	7
	8
return t	9
	10
	11
print(sum(xs	12

tuple[int, ...]) -> int: the values of a tuple.""" .nt = 0 < 0 < len(xs): l = total + xs[i] i + 1

otal

=(1, 2, 3)))

The Structure & Semantics of a While Loop