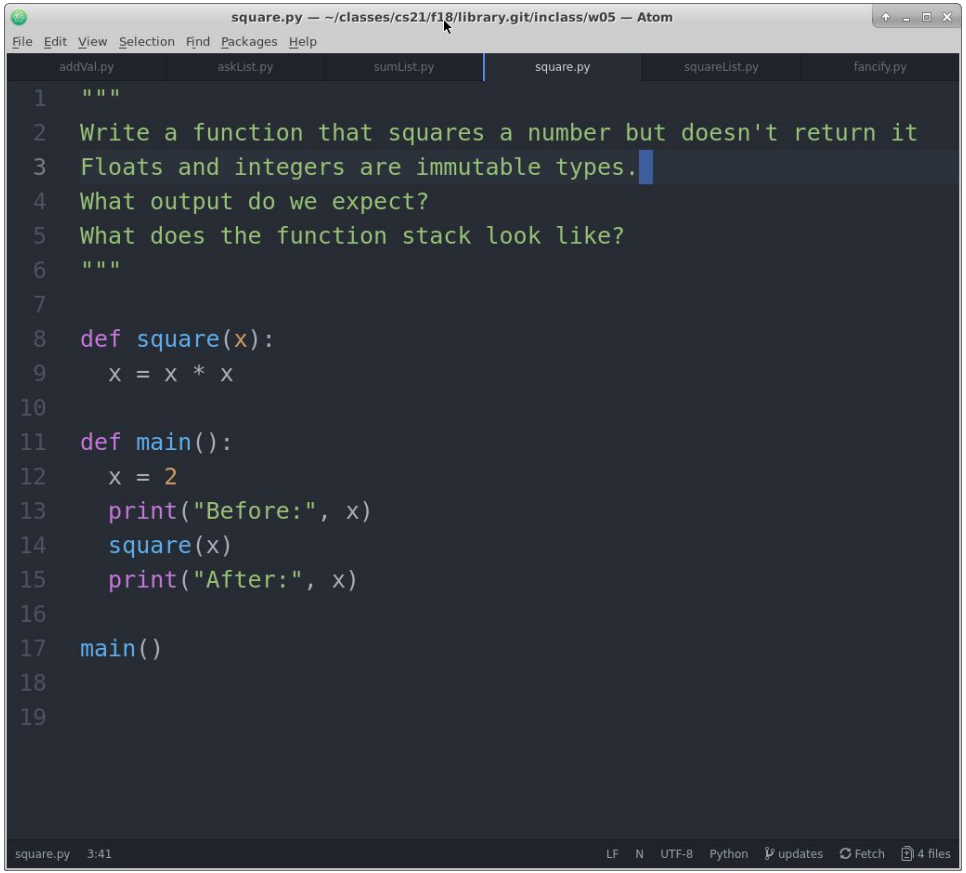
Changing values of parameters

If a variable is **immutable** and you change its value inside a function, the change **does not last** past the lifetime of the function

If a variable is **mutable** and you change its value inside a function, the change is permanent

Example: square.py

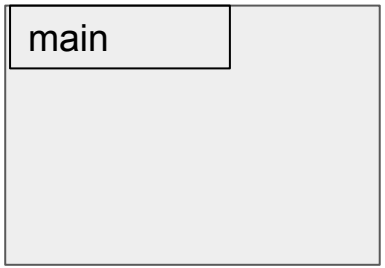
```
almond[w05]$ python3 square.py

Before: 2

After: 2
```

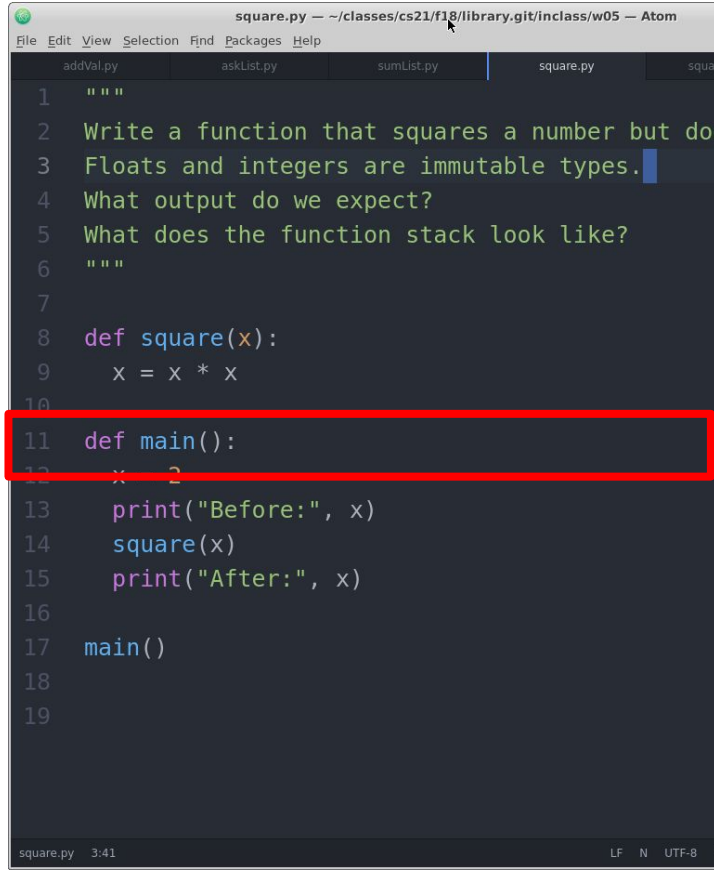


Function stack diagram

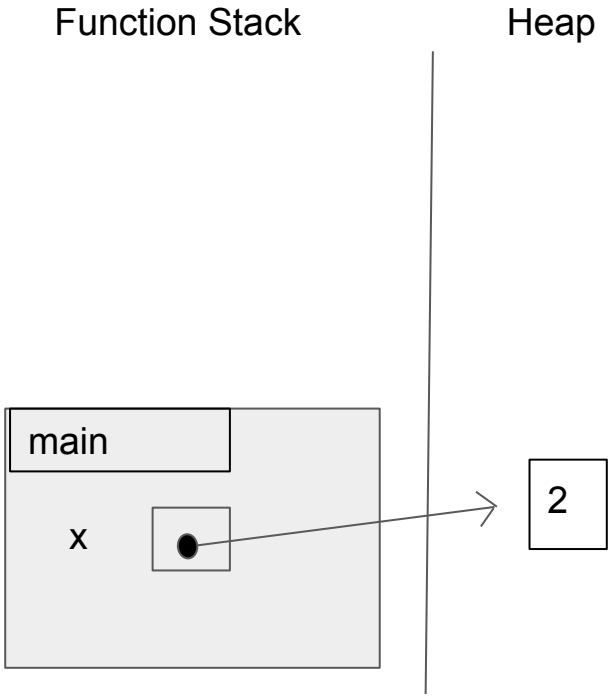
Function Stack

Heap





Function stack diagram



square.py — ~/classes/cs21/f18/library.git/inclass/w05 — Atom

File Edit View Selection Find Packages Help

addVal.py | askList.py | sumList.py | square.py

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3  Floats and integers are immutable types.
4  What output do we expect?
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13   print("Before:", x)
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15   print("After:", x)
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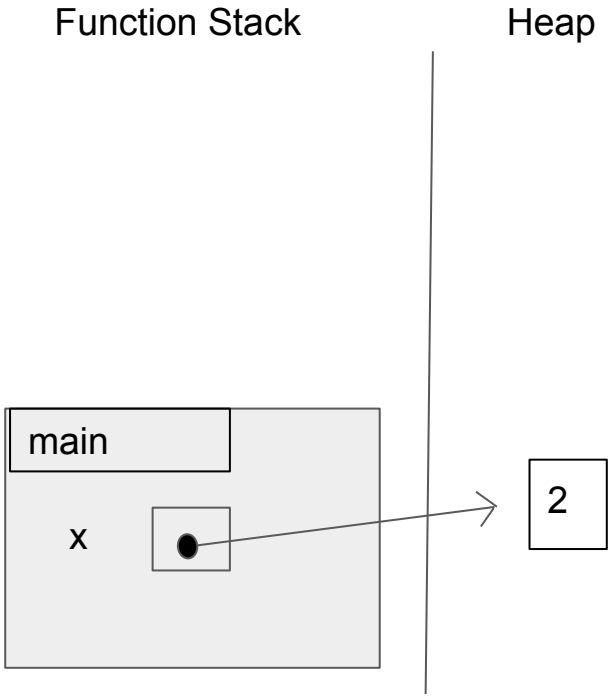
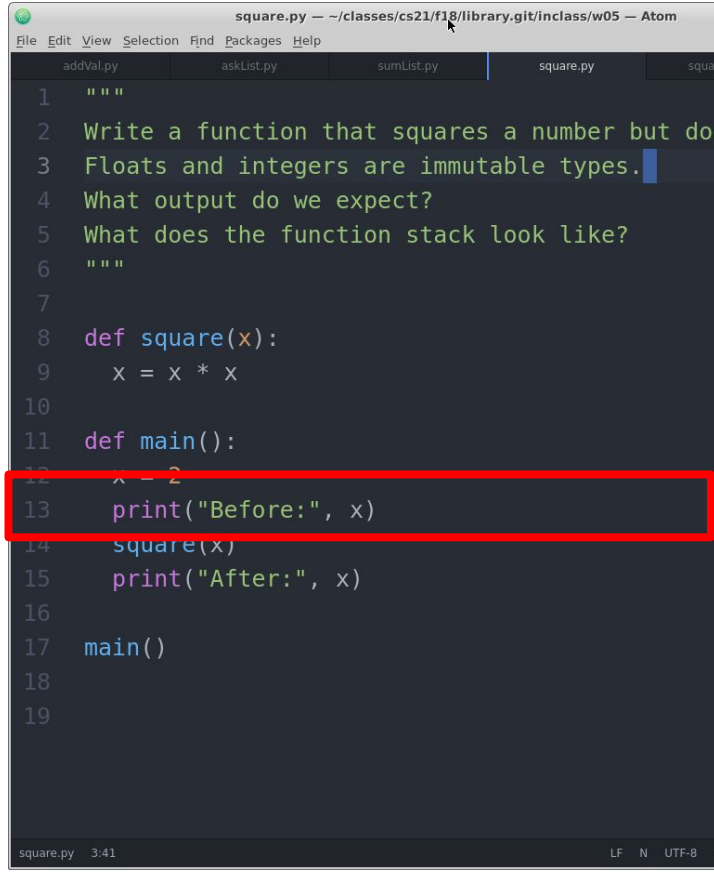
square.py 3:41 LF N UTF-8

Function stack diagram





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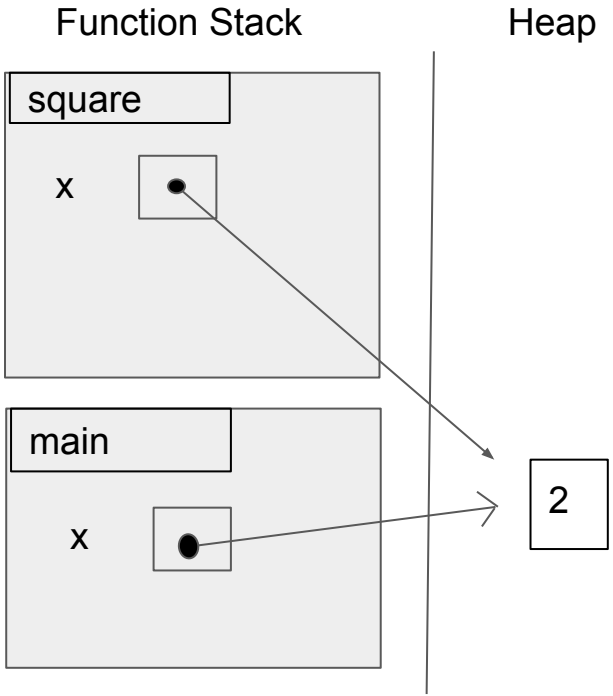

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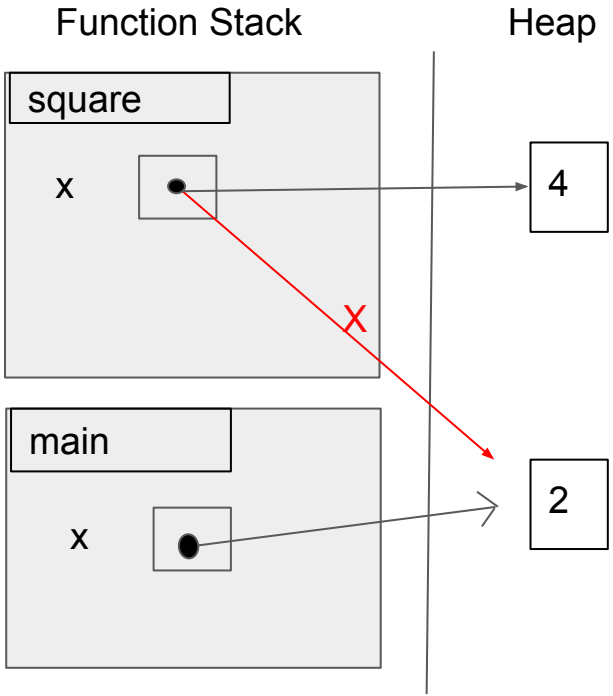

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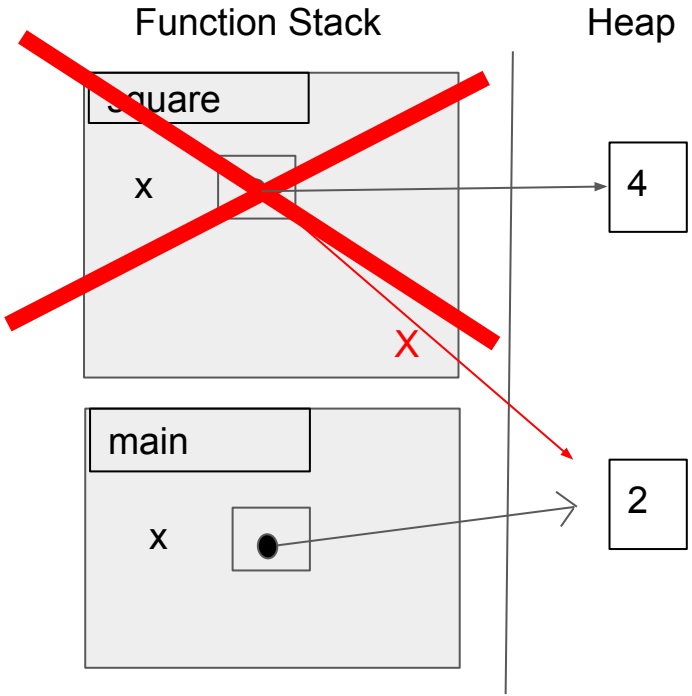

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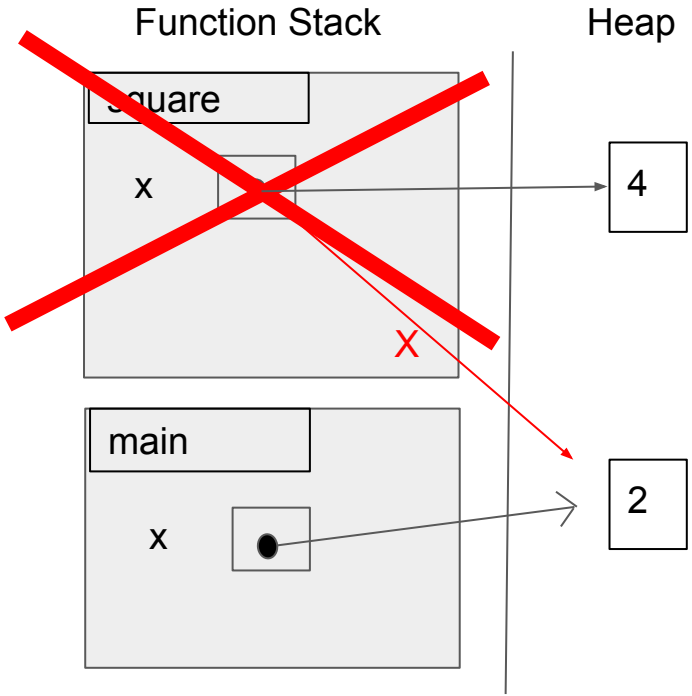
square.py 3:41 LF N UTF-8

Function stack diagram



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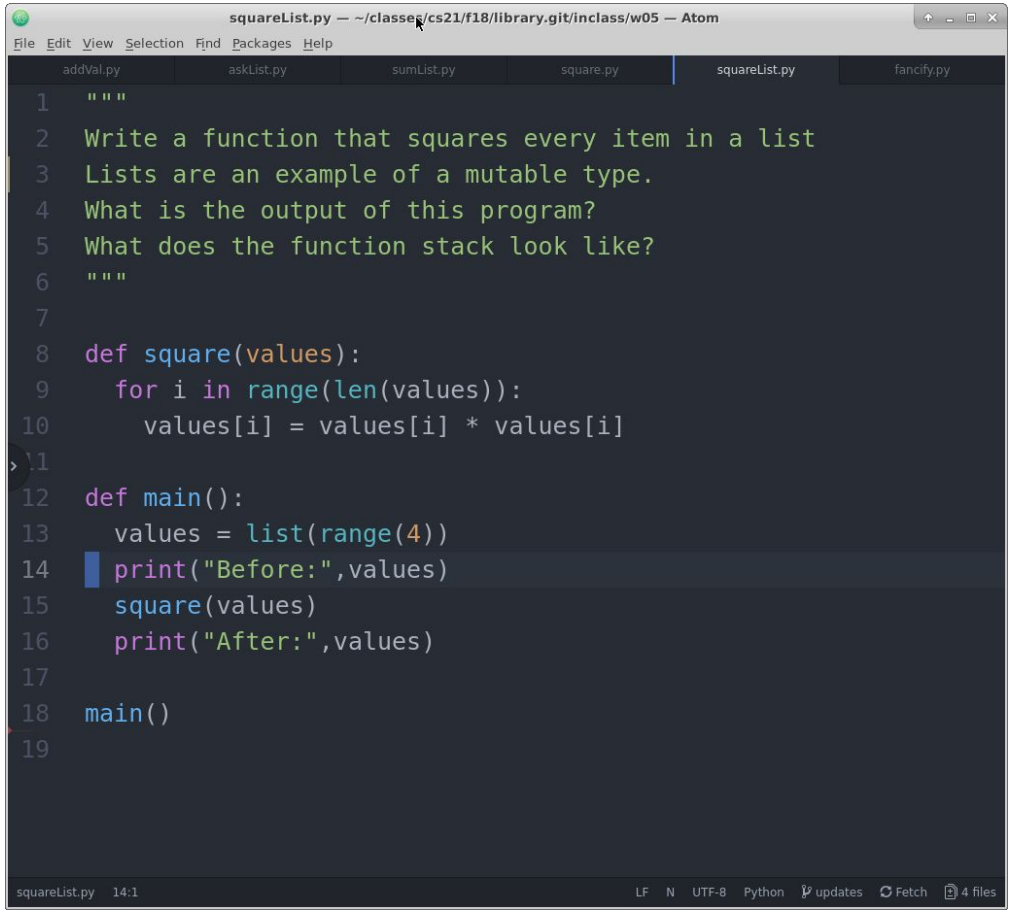
square.py 3:41 LF N UTF-8

Example: squareList.py

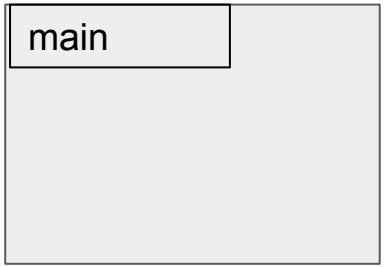
```
almond[w05]$ python3 squareList.py

Before: [0, 1, 2, 3]

After: [0, 1, 4, 9]
```



Function Stack diagram

Function Stack

Heap



squareList.py — ~/classes/cs21/f18/library.git/inclass/w05 — Atom

File Edit View Selection Find Packages Help

addVal.py askList.py sumList.py square.py squareList.p

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def main():
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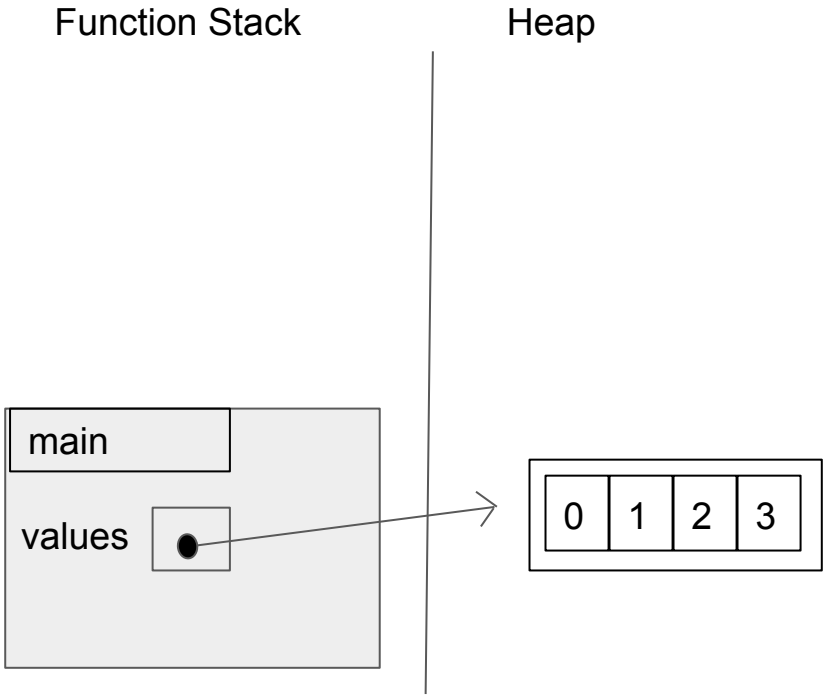
  print("After:",values)

main()
```

squareList.py 14:1 LF N UTF-8 Python

Function Stack diagram



squareList.py — ~/classes/cs21/f18/library.git/inclass/w05 — Atom

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squareList.py 14:1 LF N UTF-8 Python

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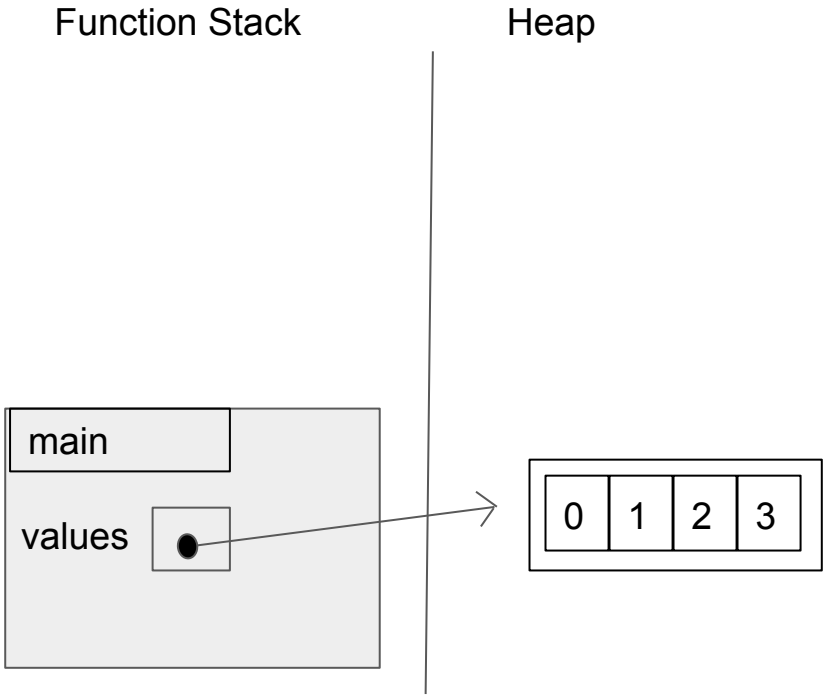

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squareList.py 14:1 LF N UTF-8 Python

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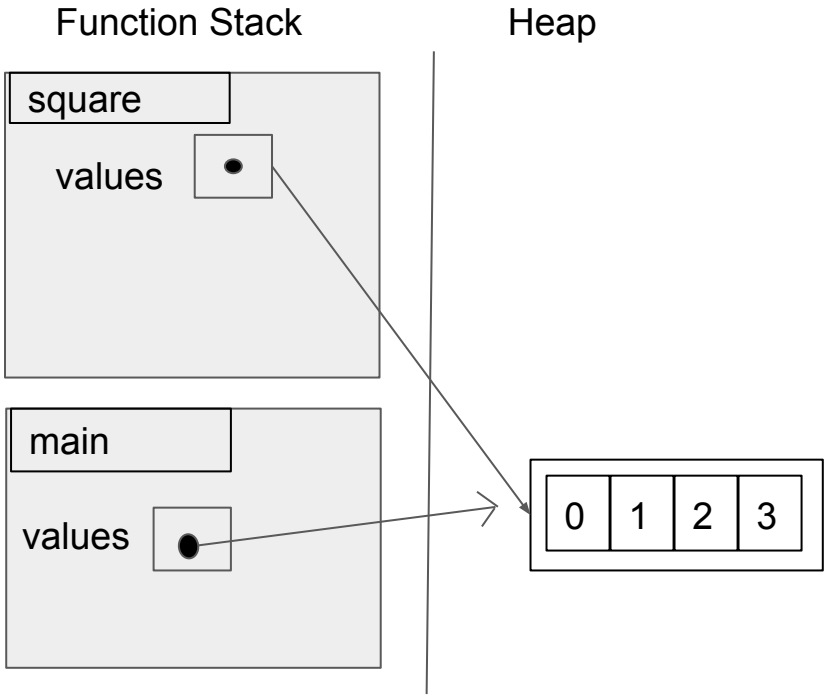

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squareList.py 14:1 LF N UTF-8 Python

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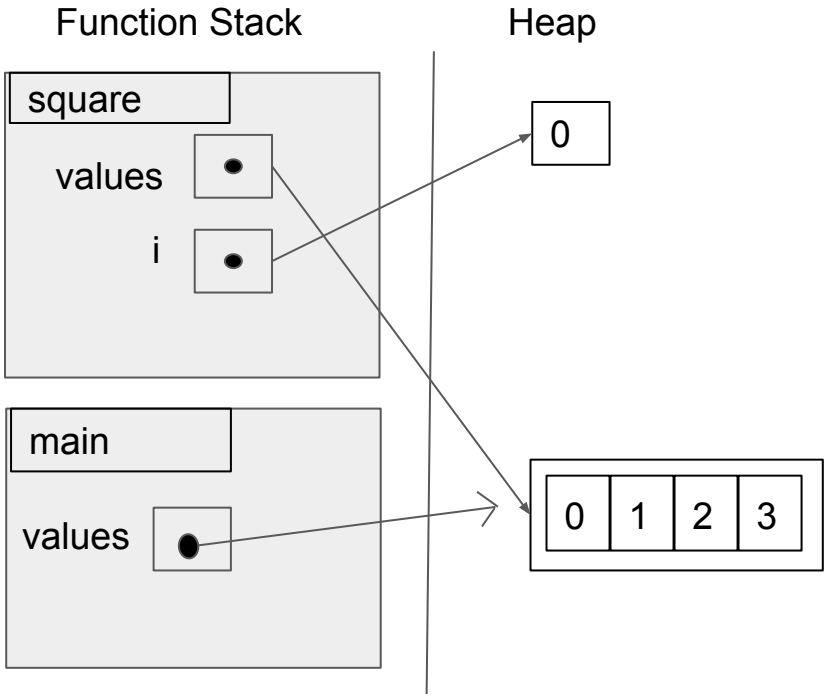

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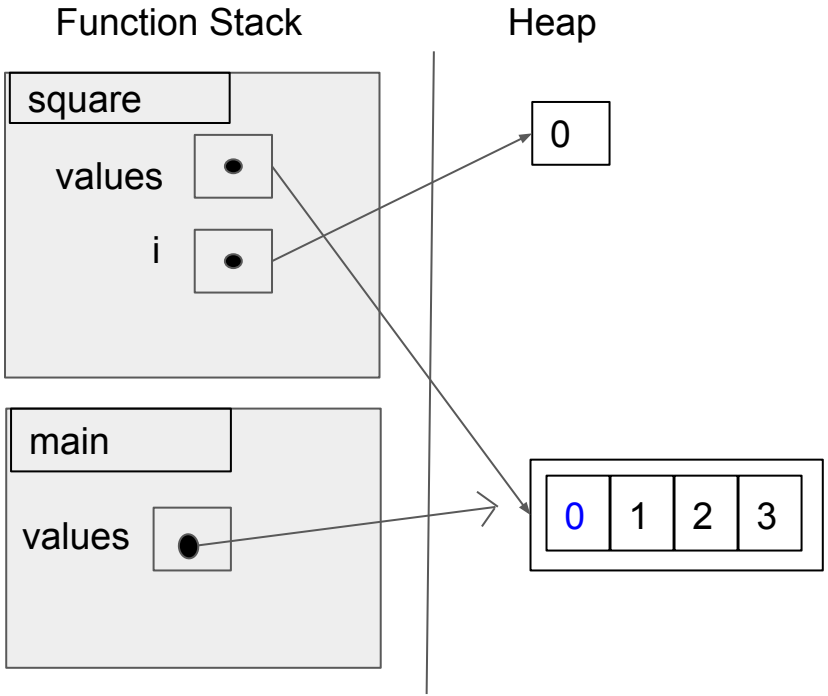

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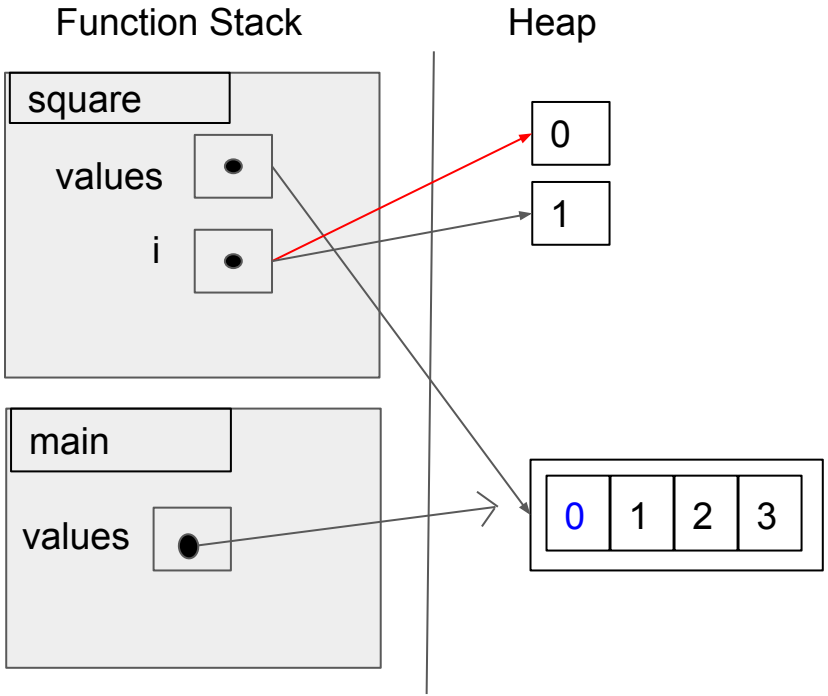

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squareList.py 14:1 LF N UTF-8 Python

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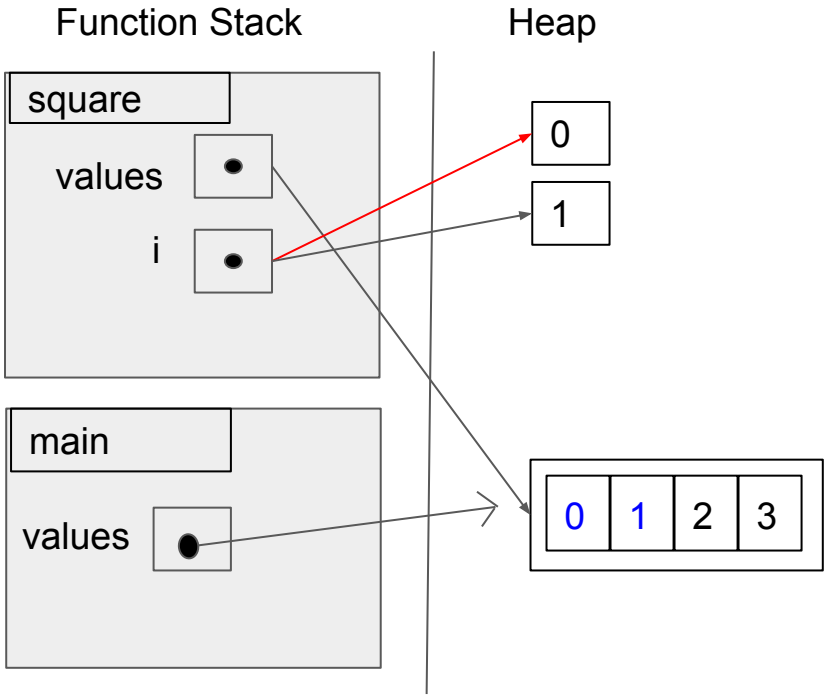

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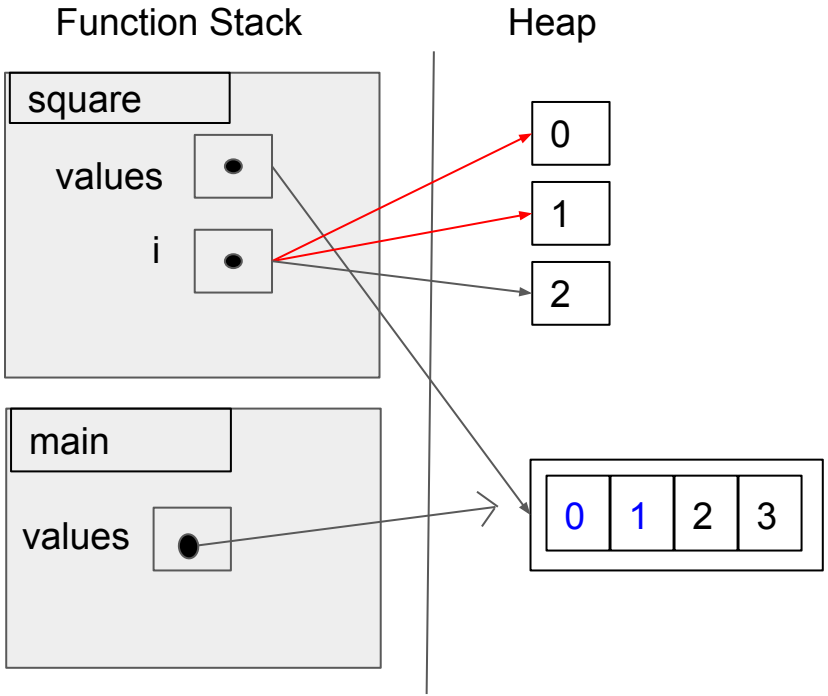

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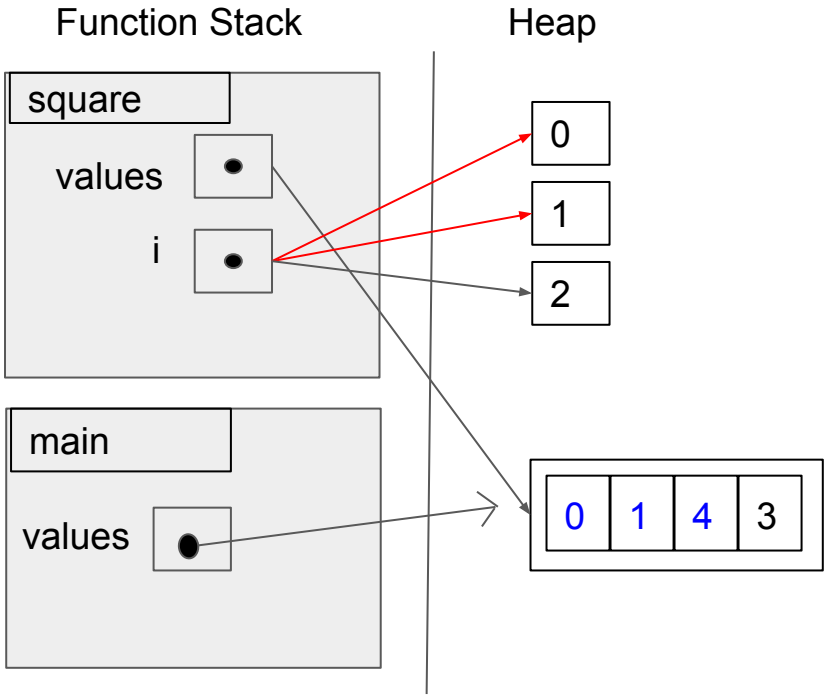

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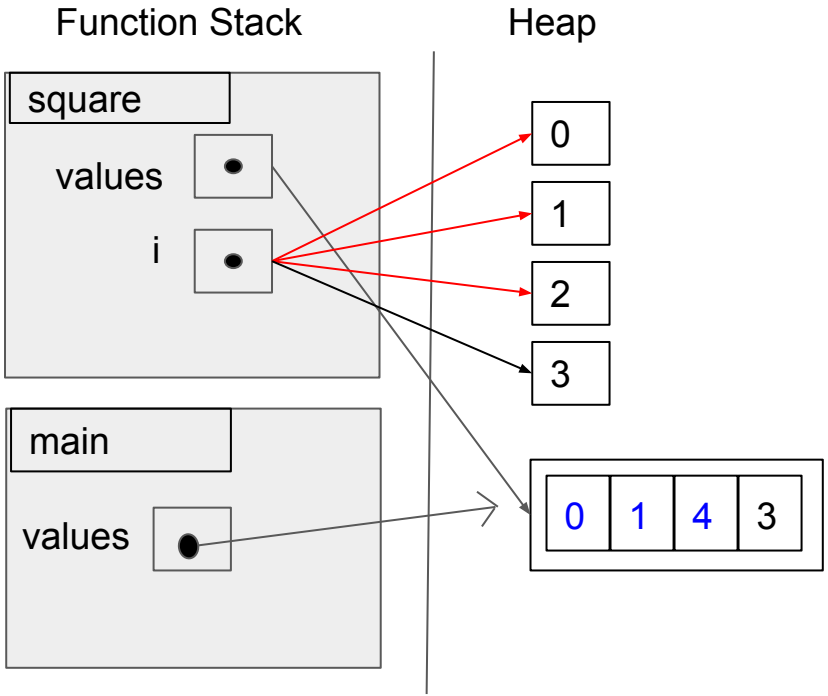

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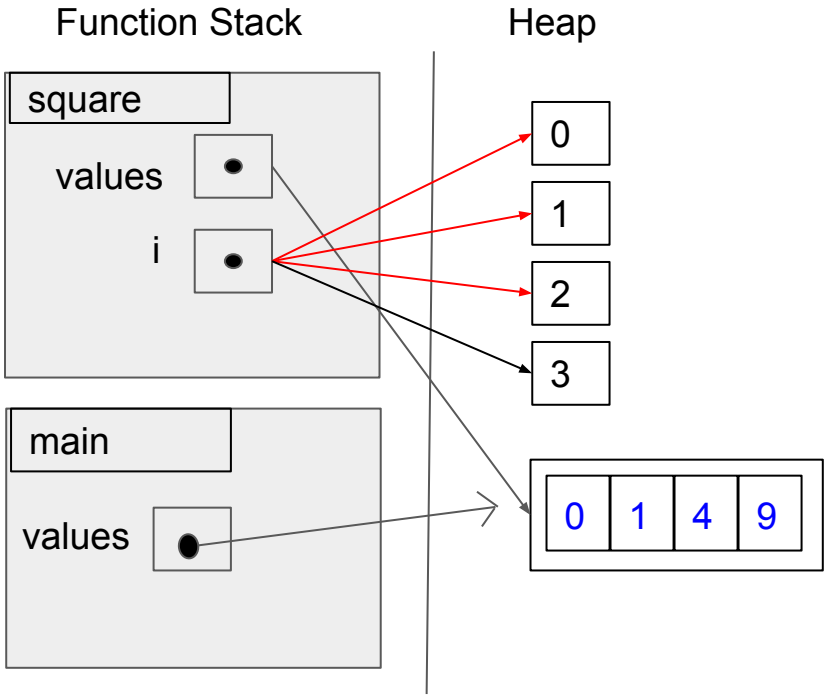

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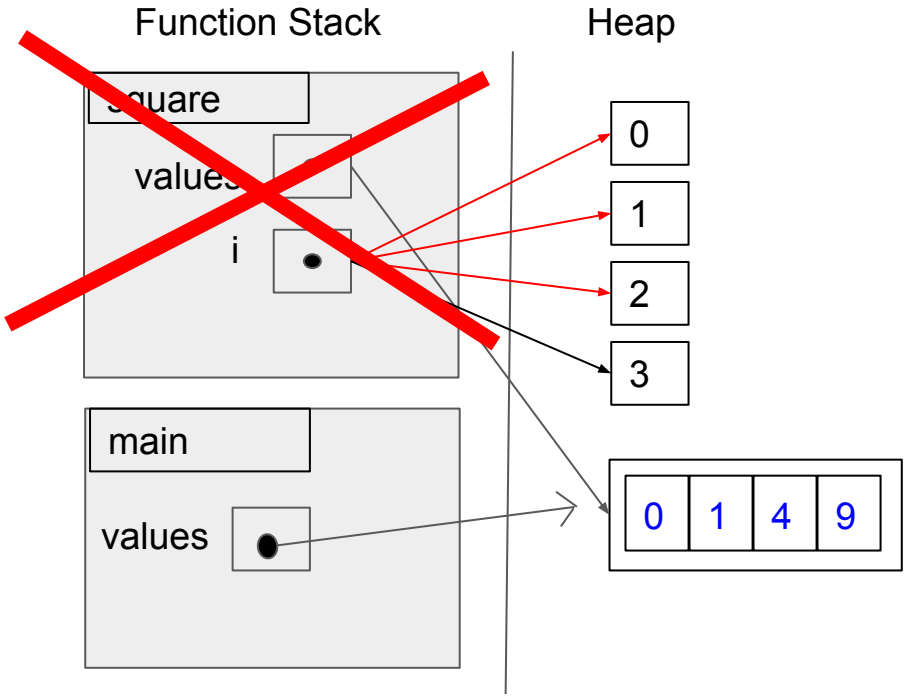

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squareList.py 14:1 LF N UTF-8 Python

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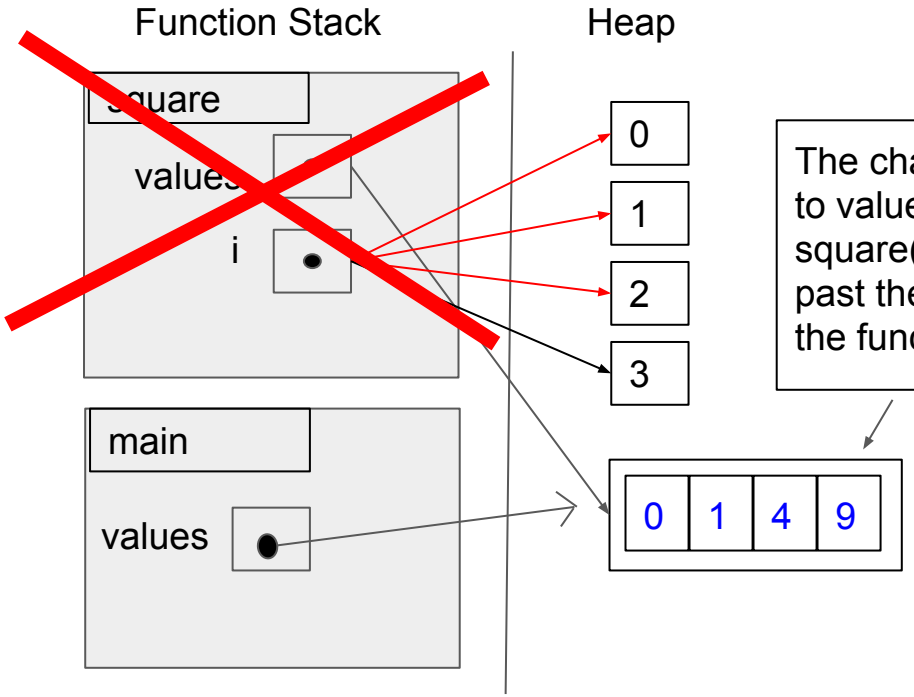

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```
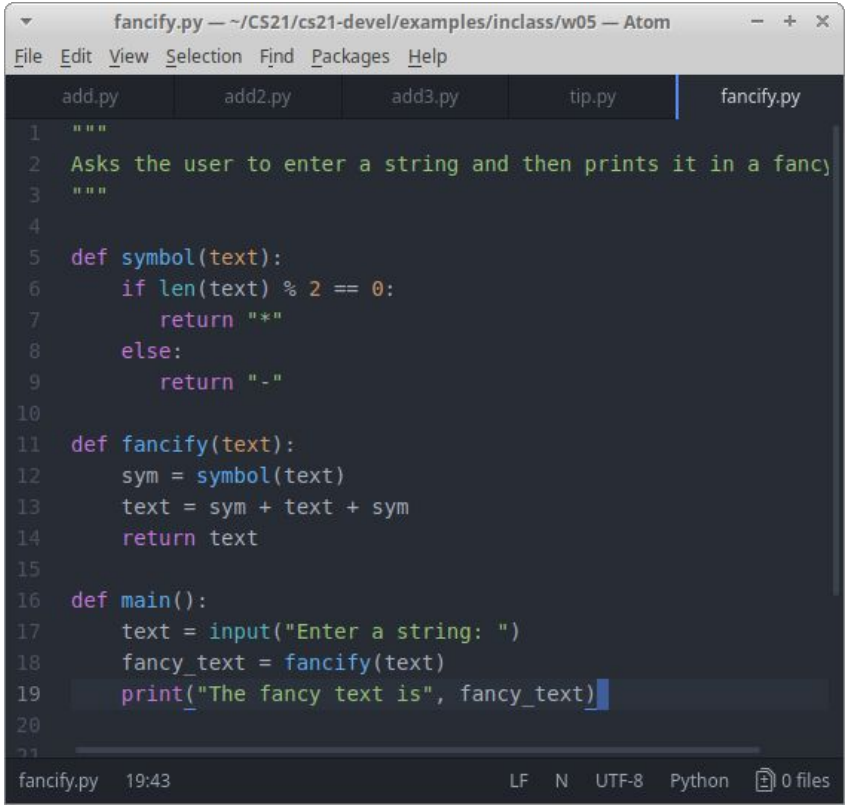

squareList.py 14:1 LF N UTF-8 Python

fancify.py

strings are immutable types, so they work on the heap similarly to ints, floats, and booleans

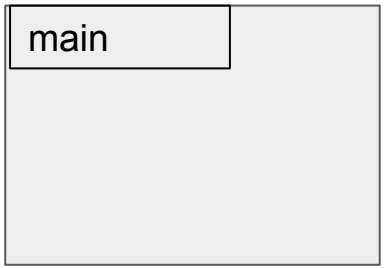
```
almond[w05]$ python3 fancify.py
Enter a string: hello
The fancy text is -hello-

almond[w05]$ python3 fancify.py
Enter a string: cats
The fancy text is *cats*
```



Function stack diagram

Function Stack

Heap



fancify.py — ~/CS21/cs21-devel/examples/inclass/w05 — Atom

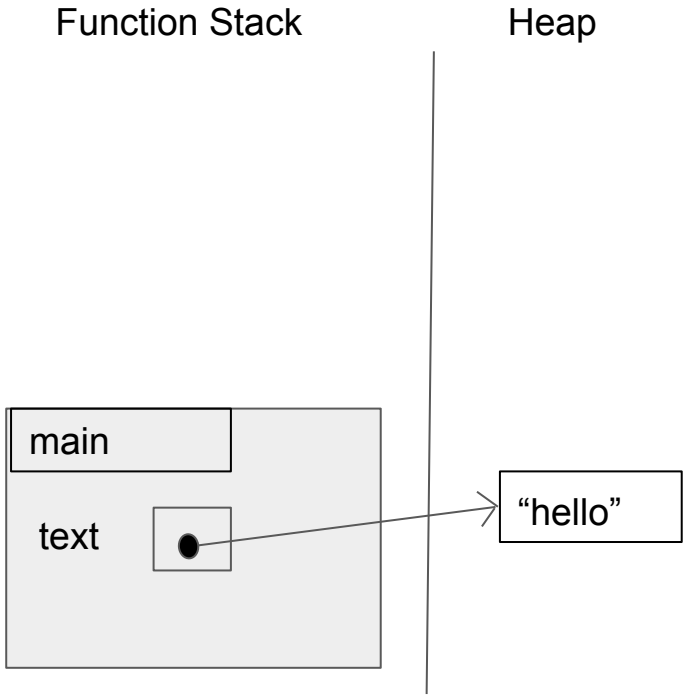
File Edit View Selection Find Packages Help

add.py | add2.py | add3.py | tip.py | fancify.py

```
"""
Asks the user to enter a string and then prints it in a fancy
"""

def symbol(text):
    if len(text) % 2 == 0:
        return "*"
    else:
        return "-"

def fancify(text):
    sym = symbol(text)
    text = sym + text + sym
    return text

def main():
    text = input("Enter a string: ")
    fancy_text = fancify(text)
    print("The fancy text is", fancy_text)
```

fancify.py 19:43 LF N UTF-8 Python 0 files

Function stack diagram



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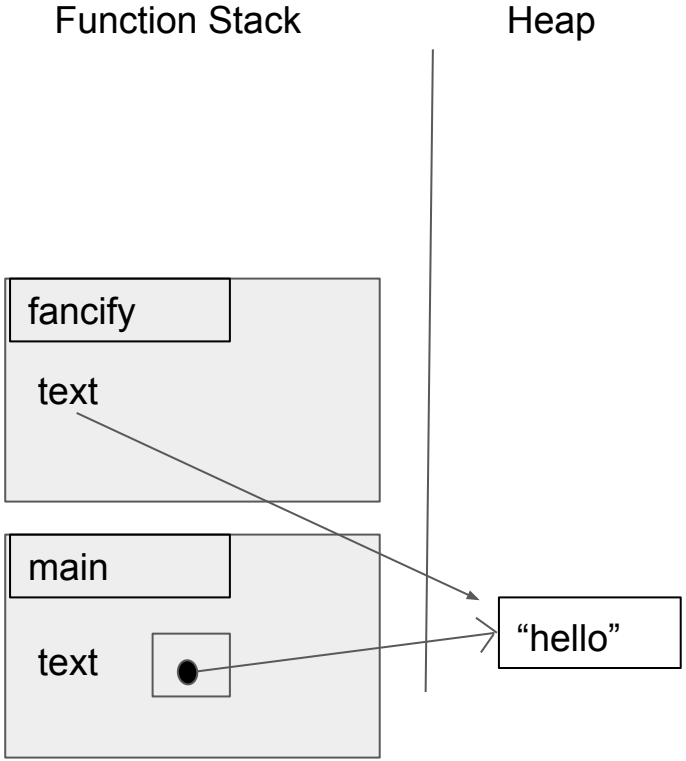
```

Assume user enters “hello”

fancify.py 19:43 LF N UTF-8 Python 0 files

Function stack diagram



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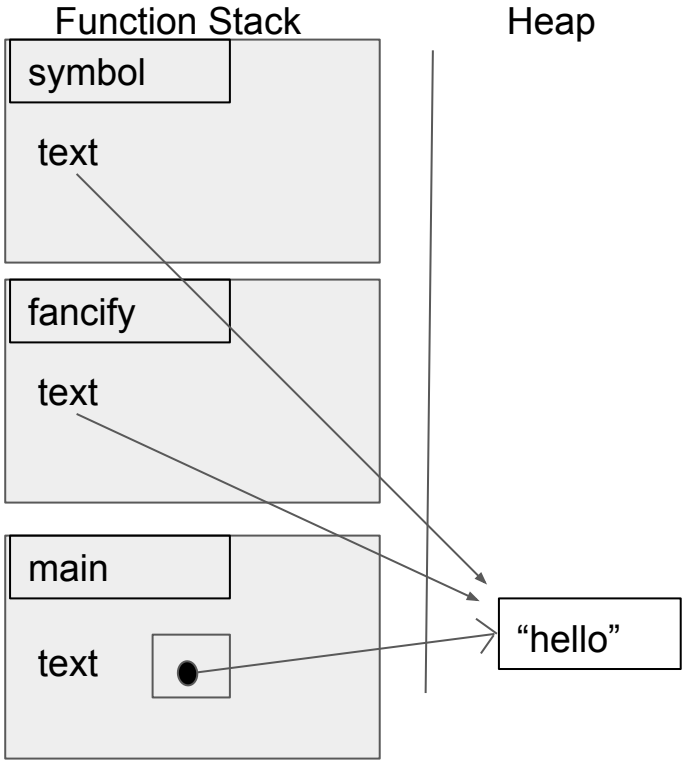

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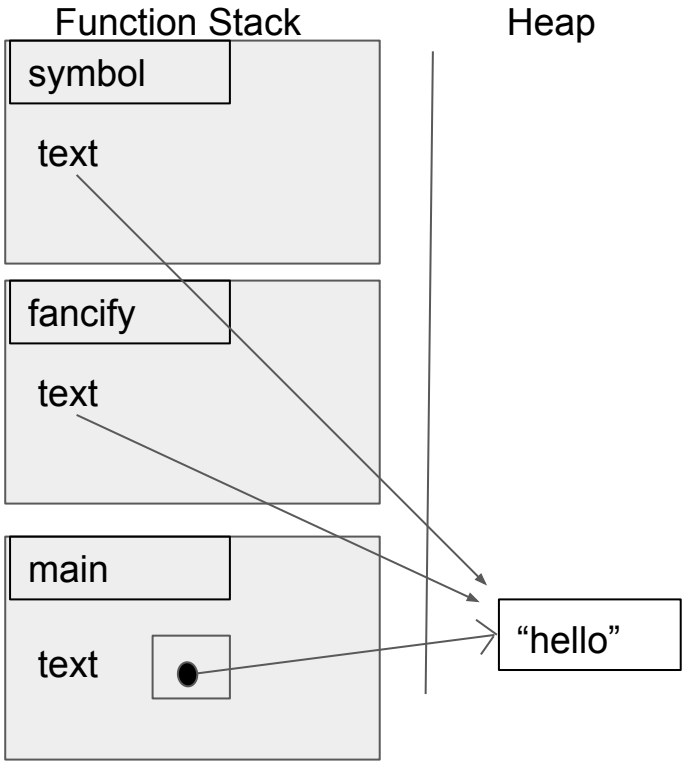

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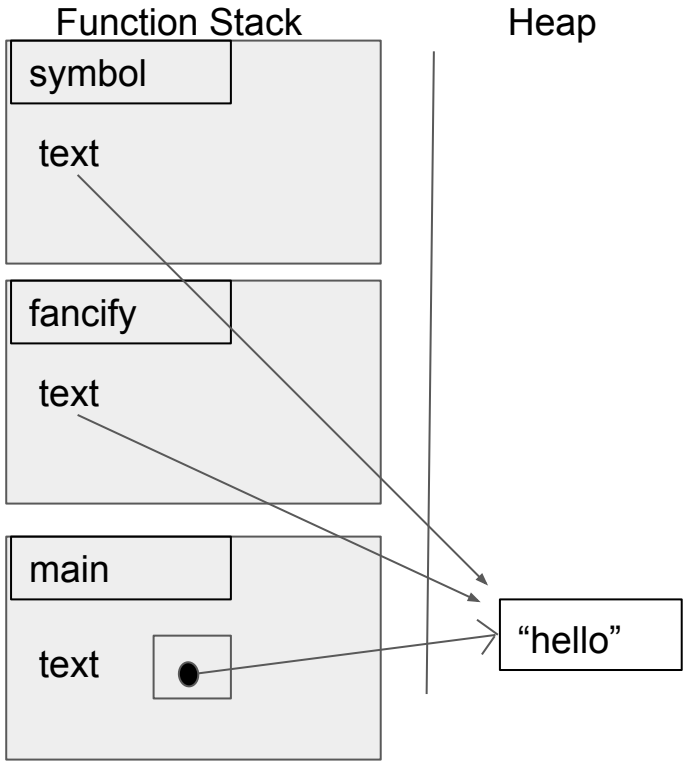
condition is False

fancify.py 19:43 LF N UTF-8 Python 0 files

Function stack diagram



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```
"""
Asks the user to enter a string and then prints it in a fancy
"""

def symbol(text):
    if len(text) % 2 == 0:
        return "*"
    else:
        return "."

def fancify(text):
    sym = symbol(text)
    text = sym + text + sym
    return text

def main():
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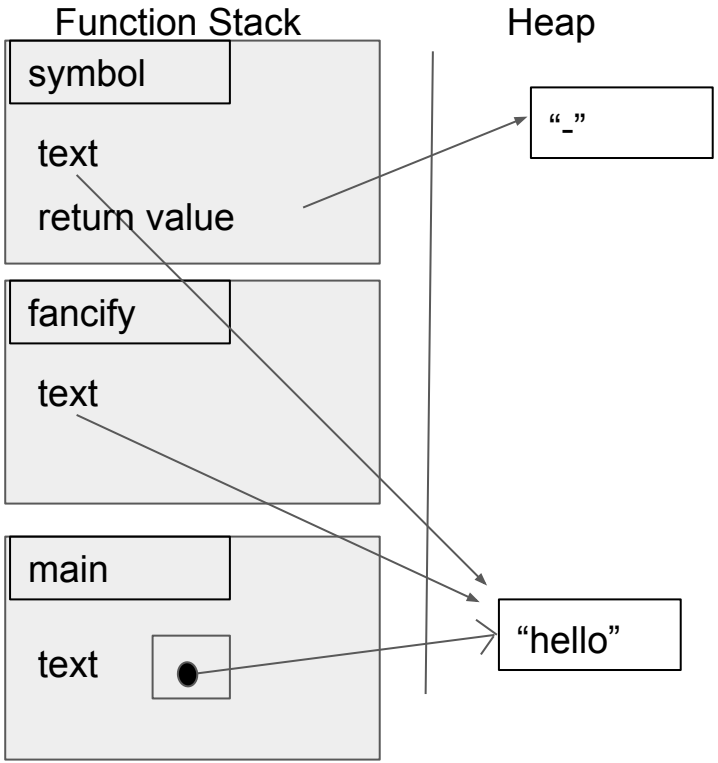
fancify.py 19:43 LF N UTF-8 Python 0 files

Function stack diagram



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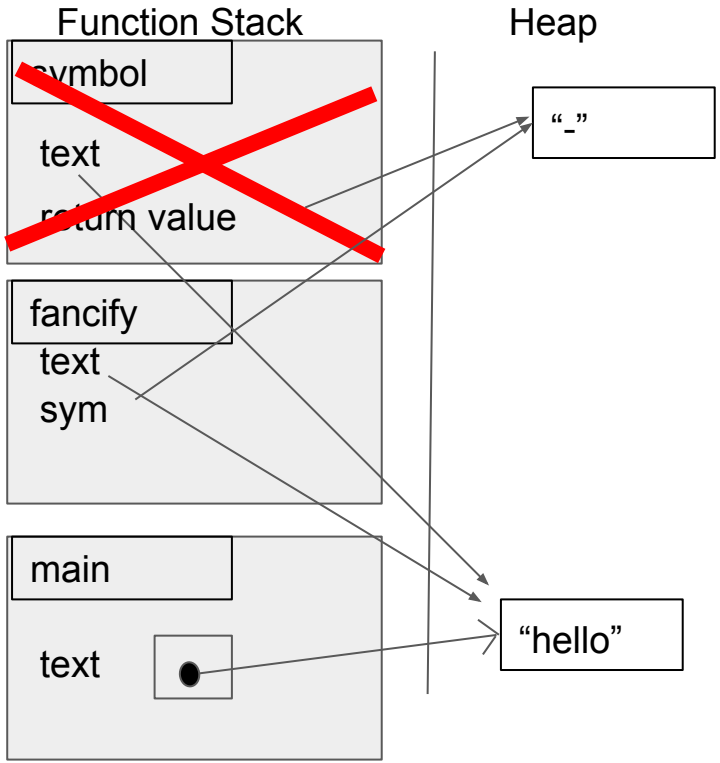

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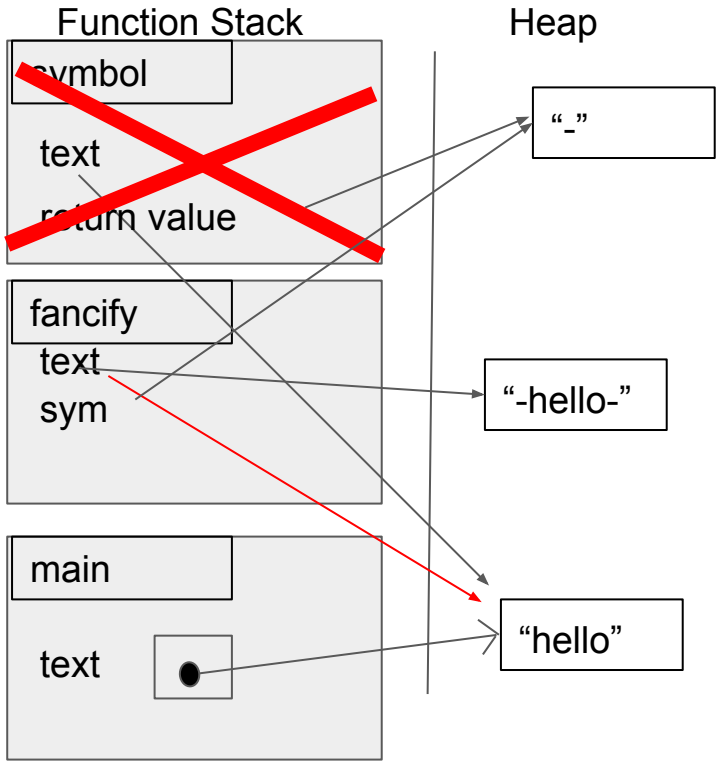

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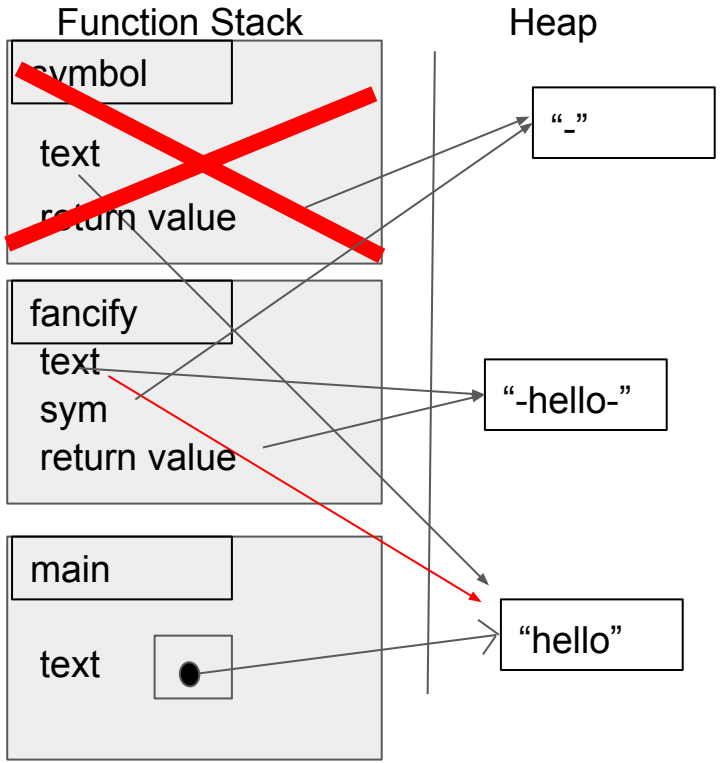

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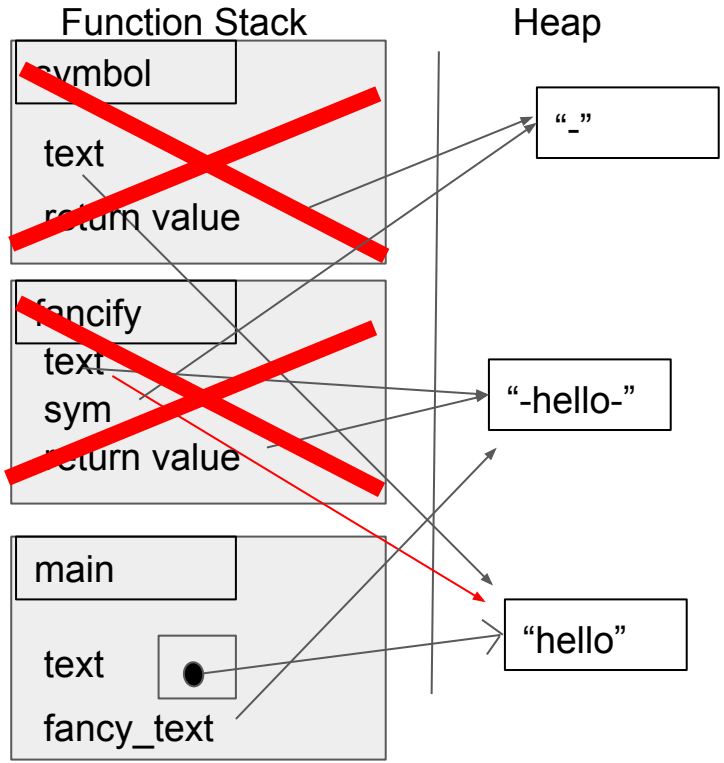

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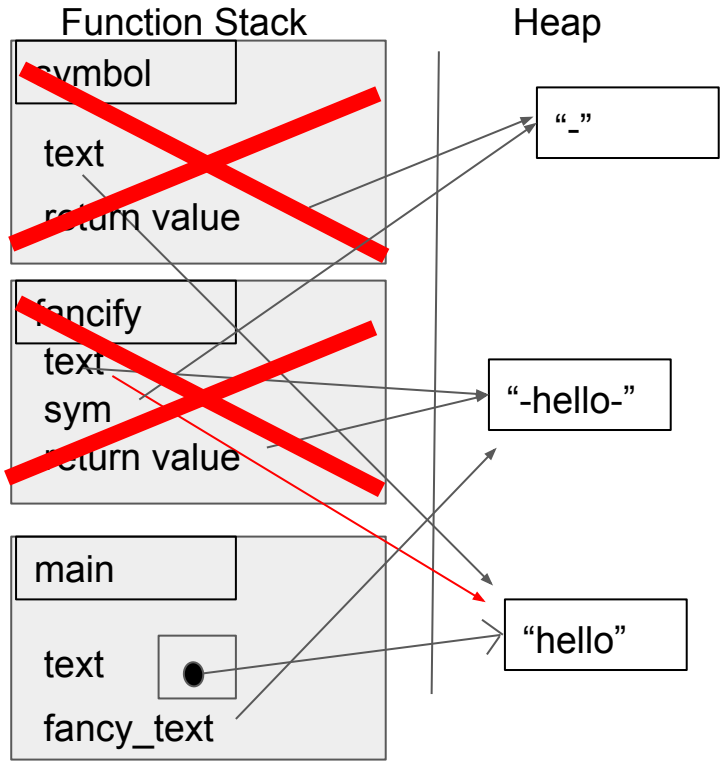

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