Lecture 2: Functions

Brian Hou
June 21, 2016

Announcements

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- Homework 0 is due tomorrow (Wednesday) at 11:59pm

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- Quiz 1 will be on Thursday at the beginning of lecture

Expressions

Primitive expressions, names, and environments

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  - *Numbers* (e.g. 42, 3.14, 0)
  - *Names* (e.g. pi, add)
  - *Functions* (later today!)
- Some non-primitive expressions: 1 * 2, add(3, 4)

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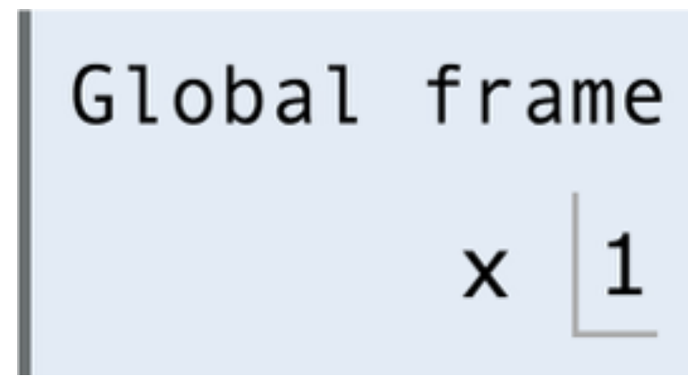

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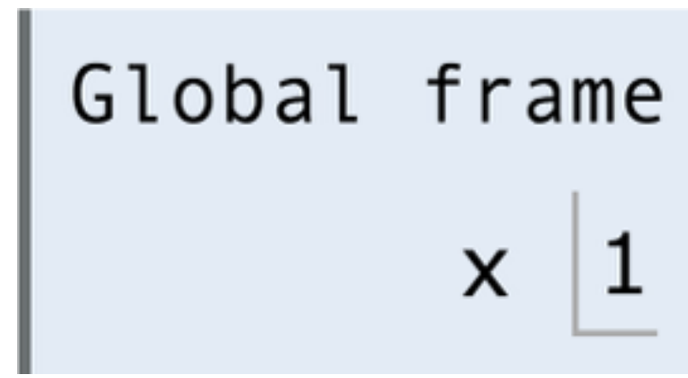

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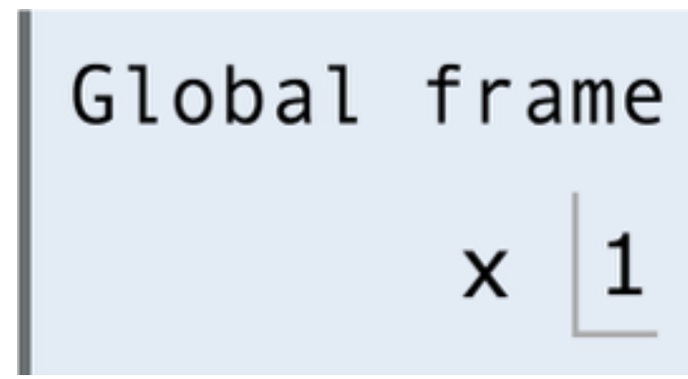

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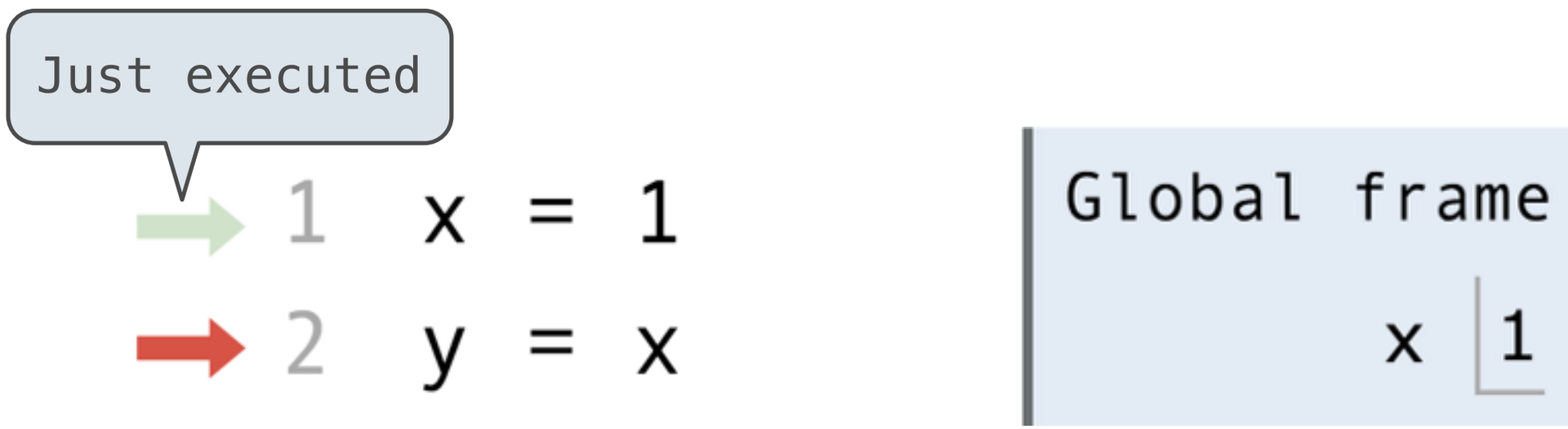

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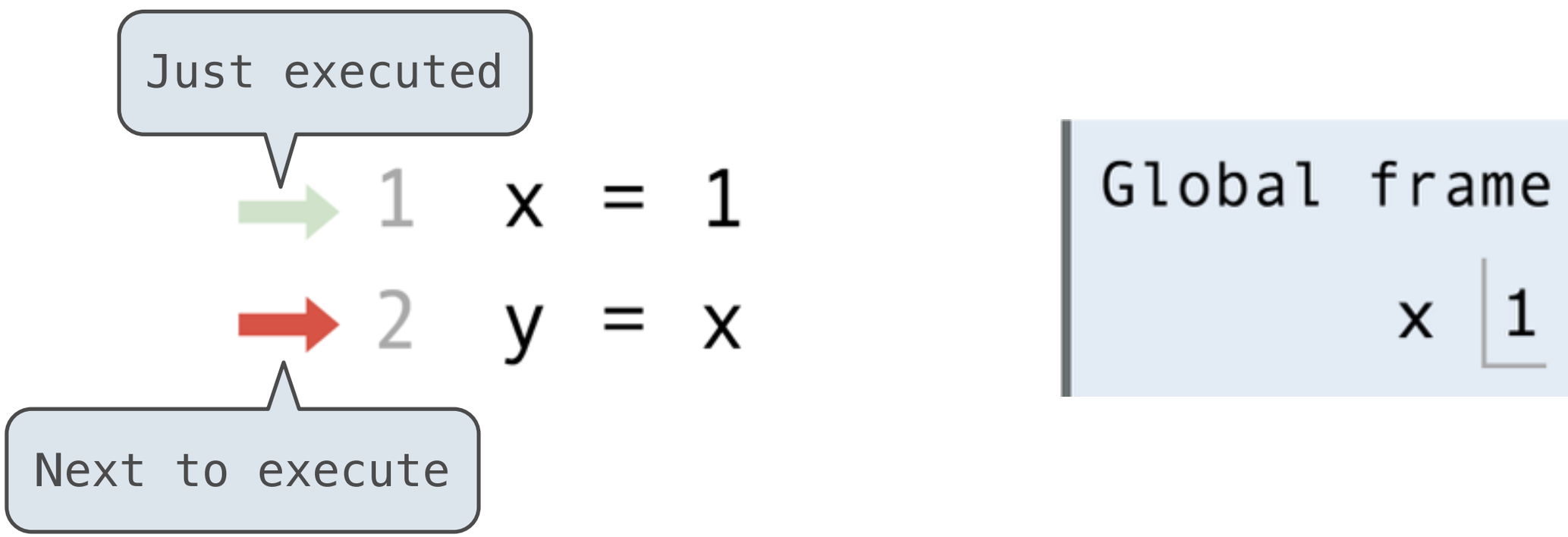

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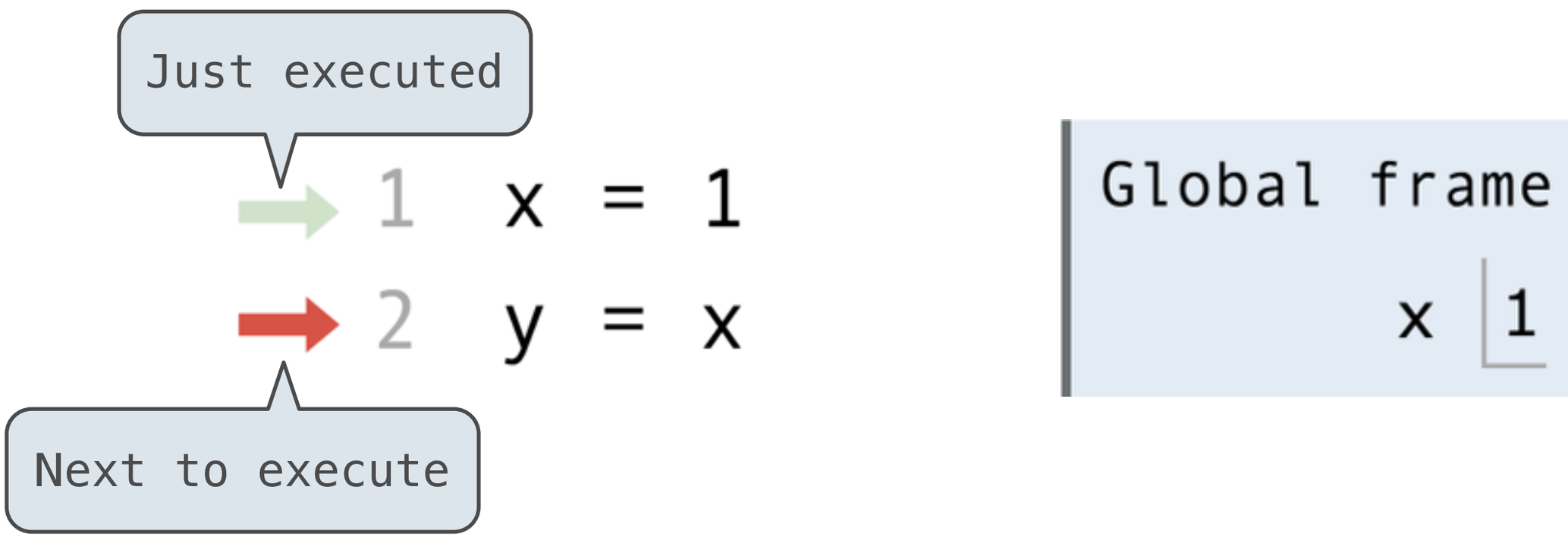

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Statements and expressions

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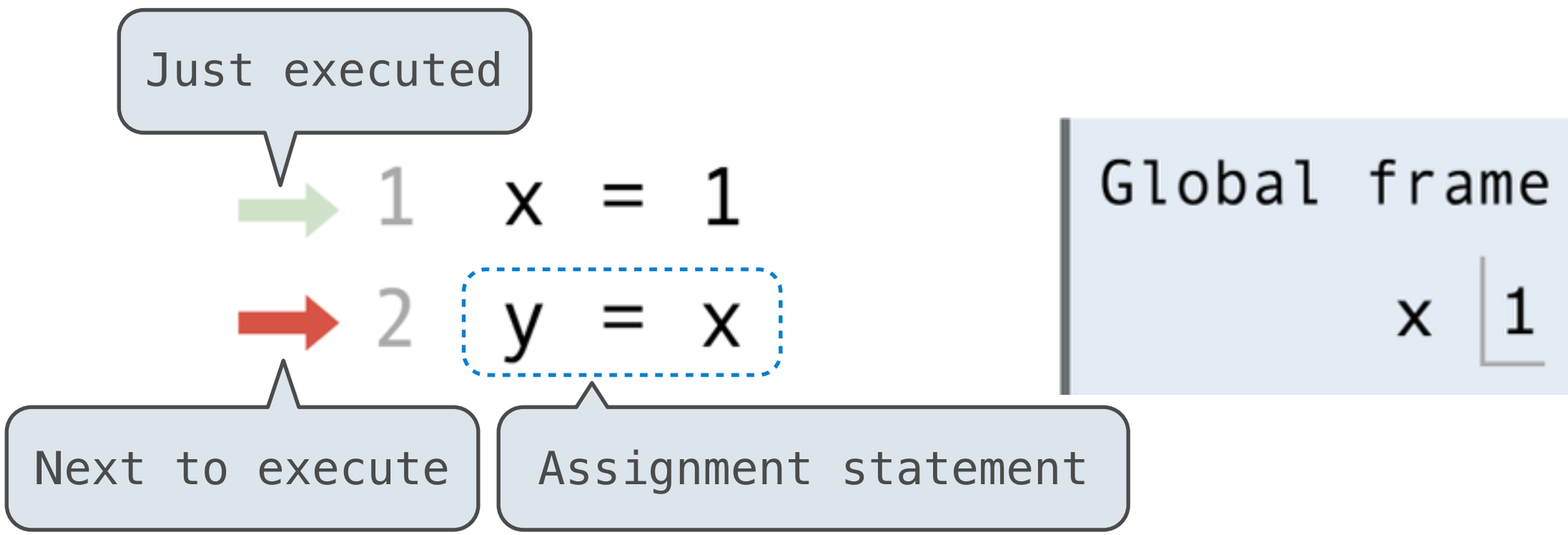

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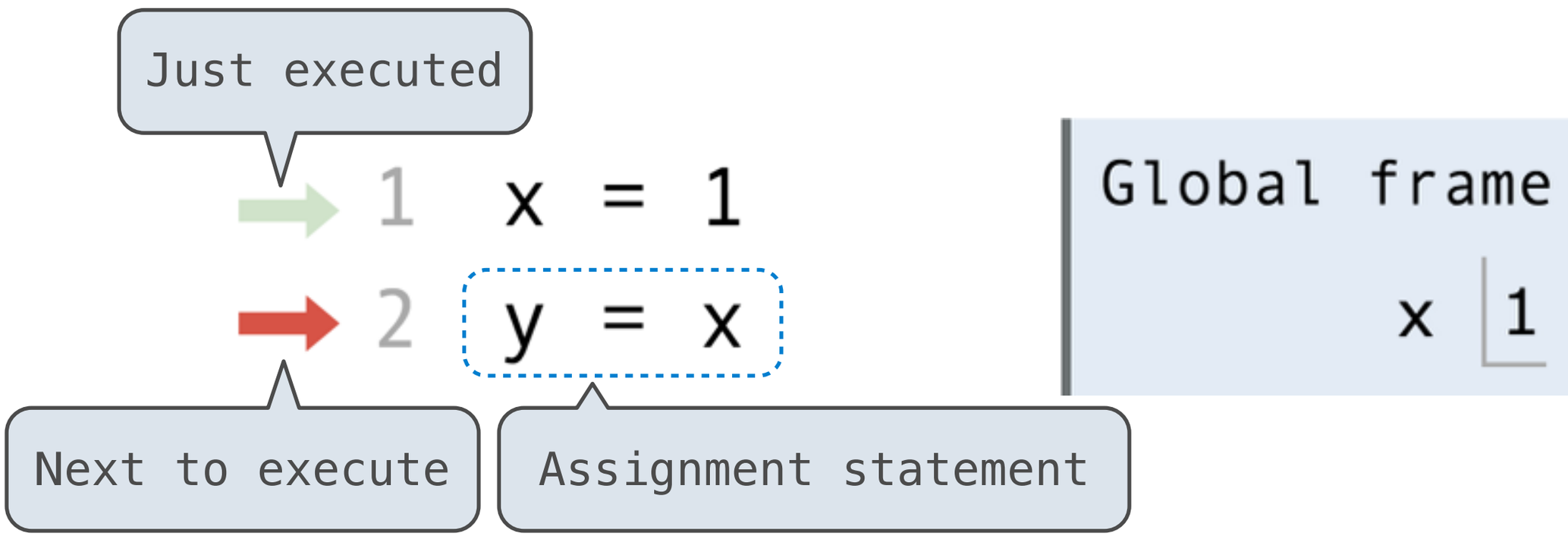

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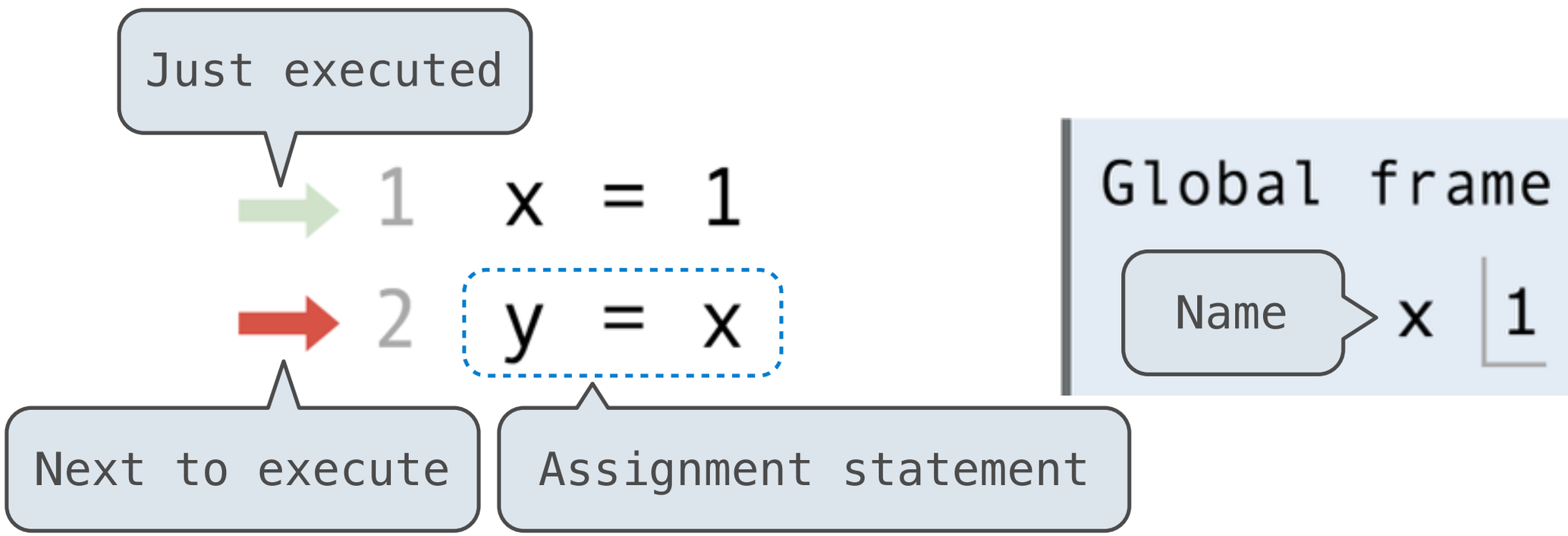

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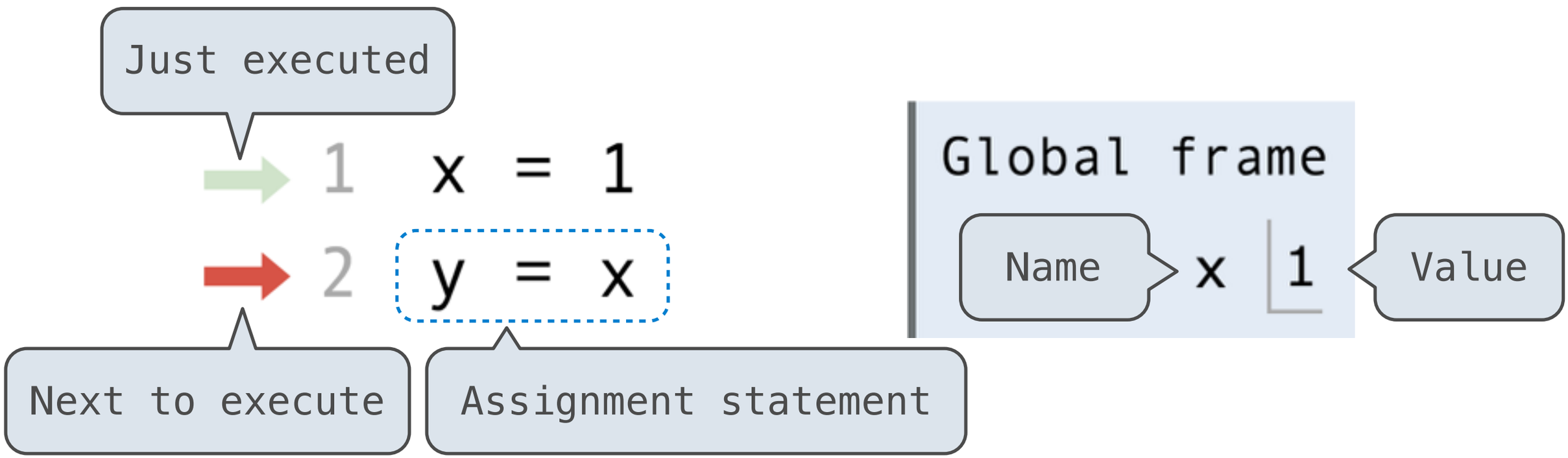

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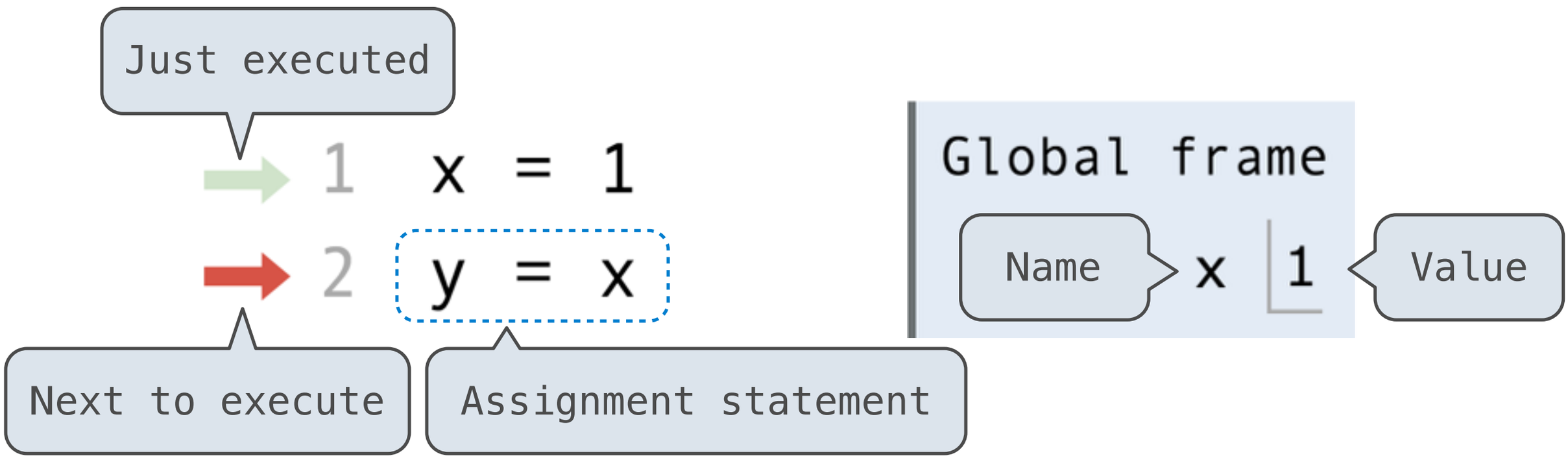

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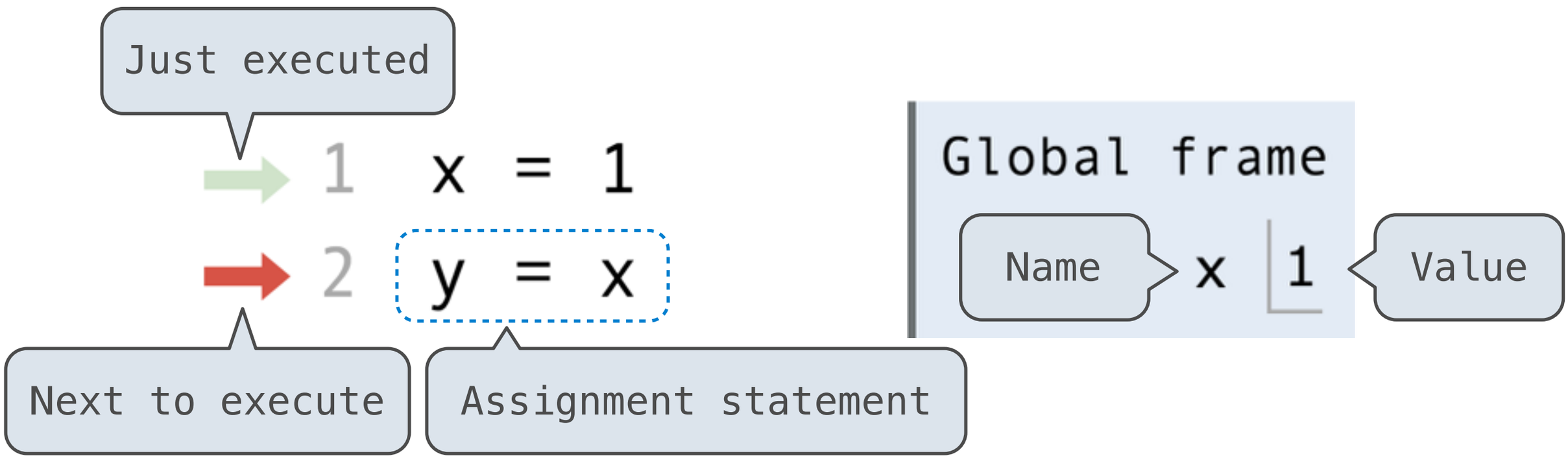

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Functions

Call expressions, functions, and **def** statements

Call expressions

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add ( 2 , 3 )
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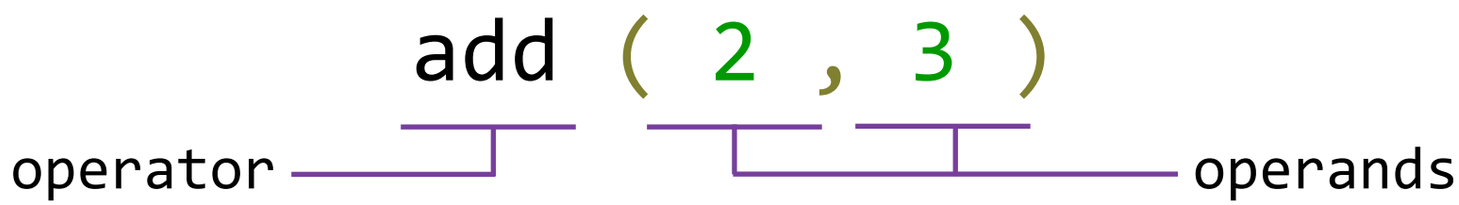
operator

Call expressions



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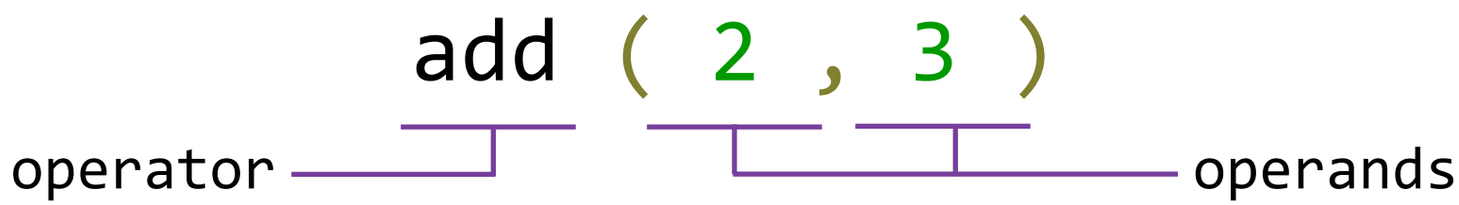

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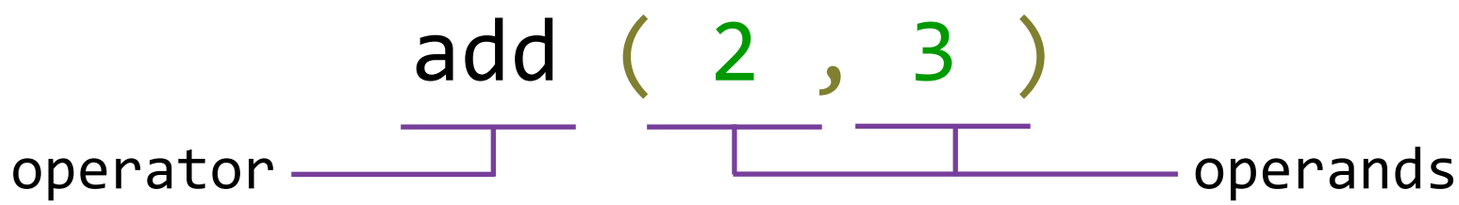

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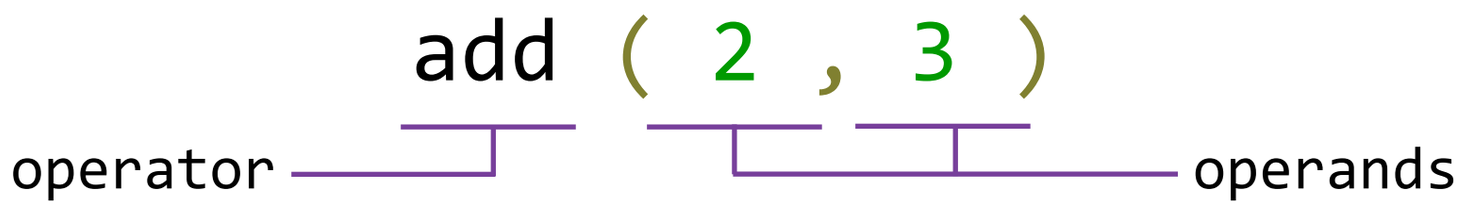

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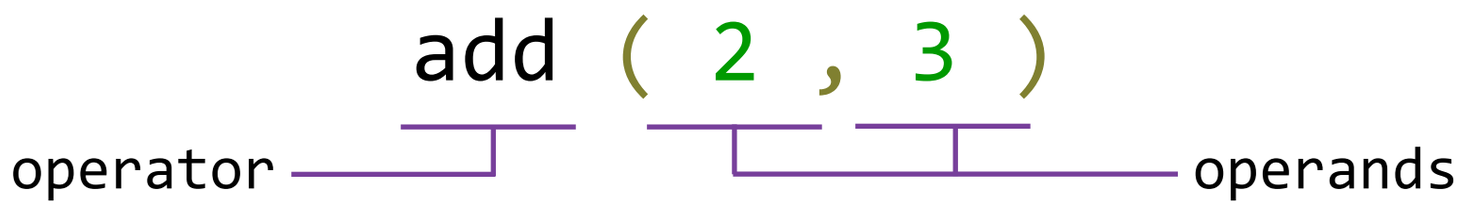

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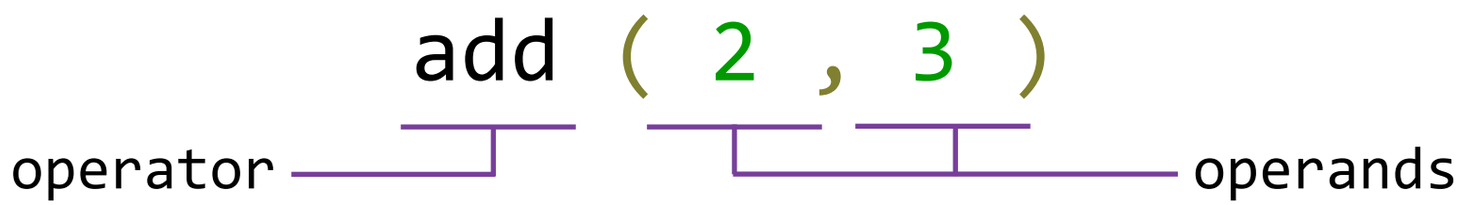

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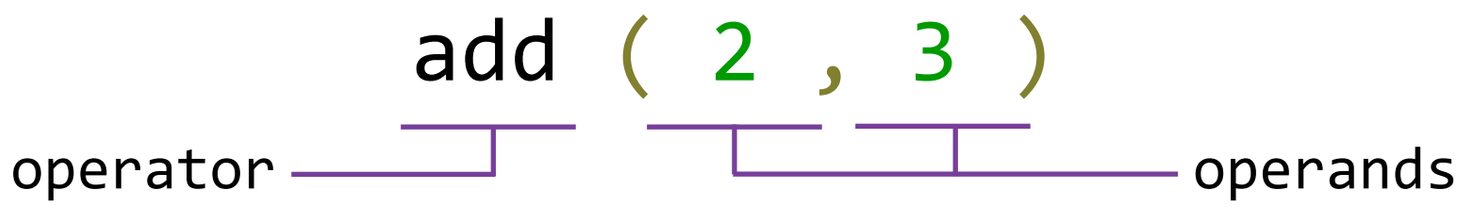

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  3. *Apply* the function to the values of the operands to get the final value

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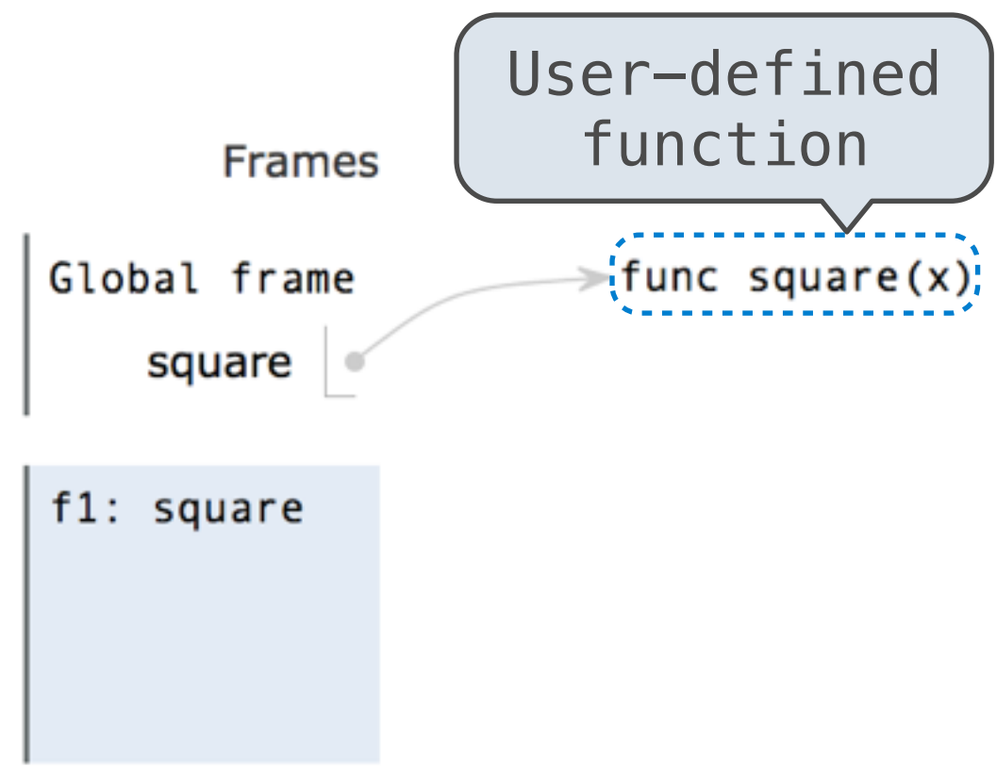

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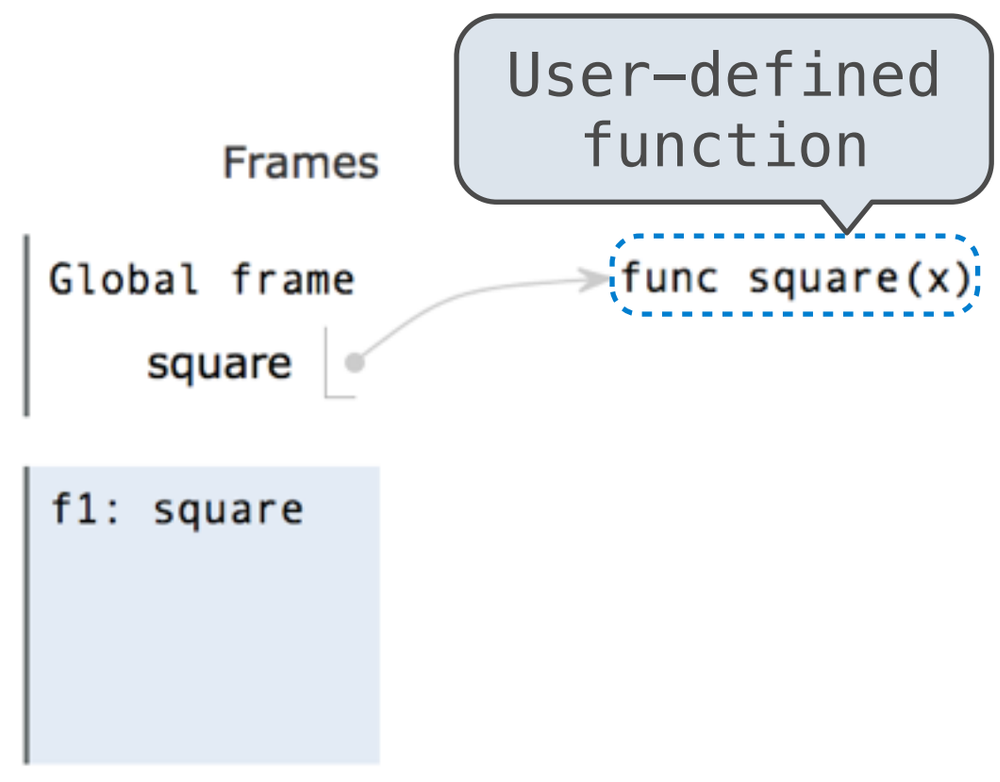

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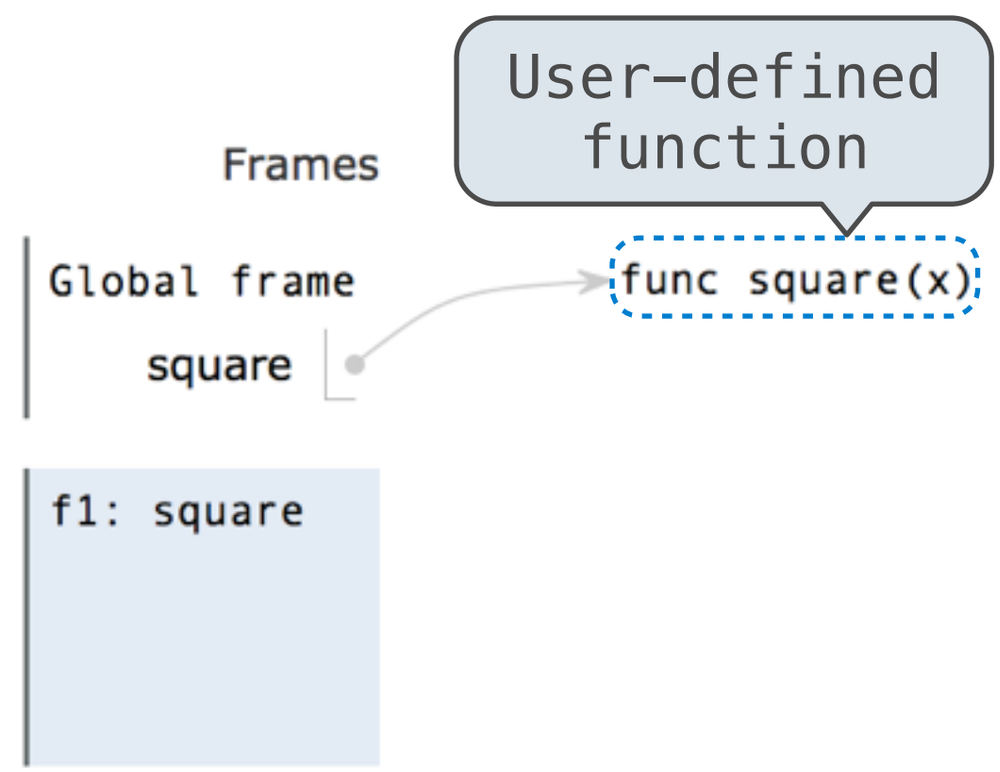

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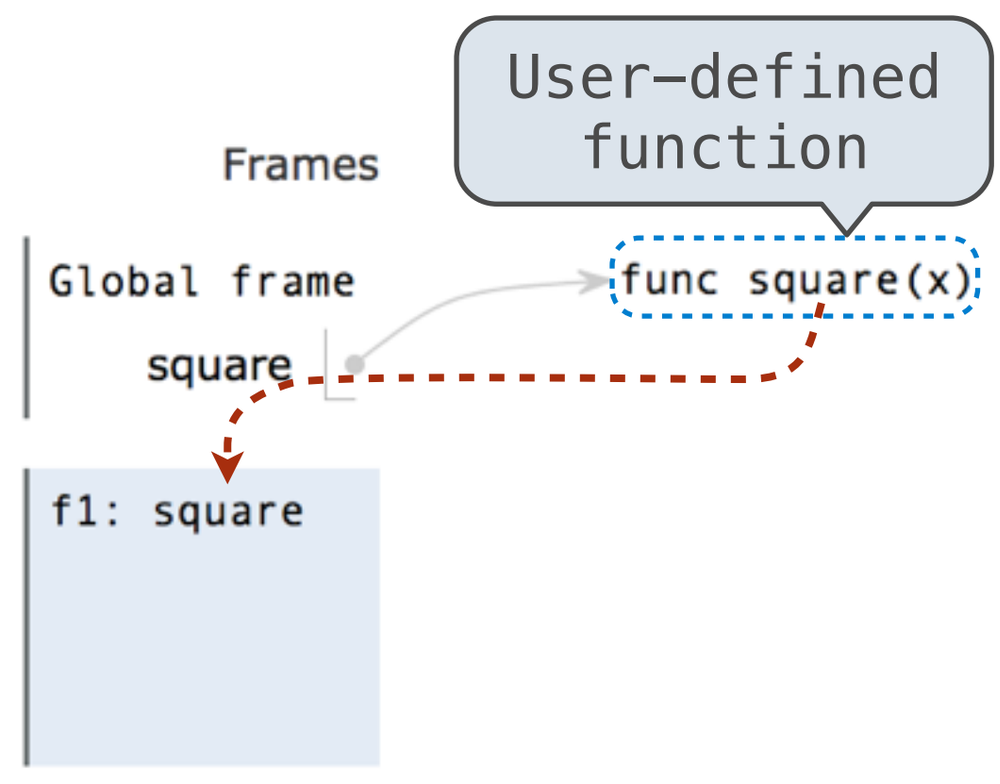

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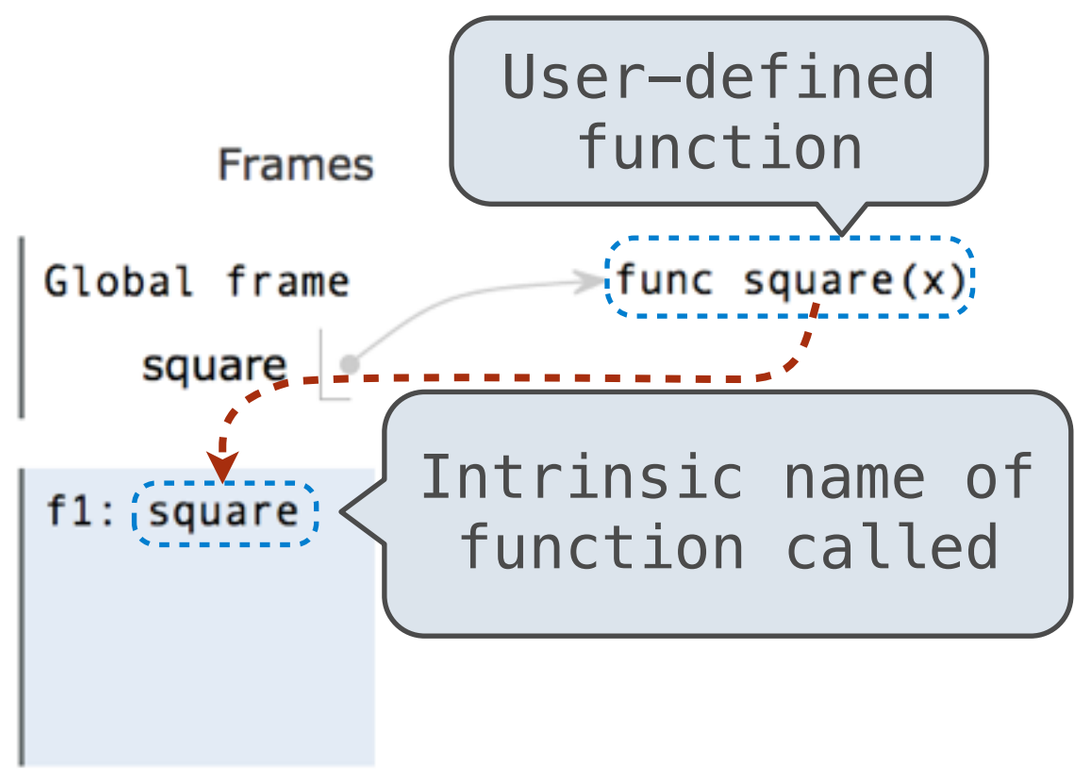

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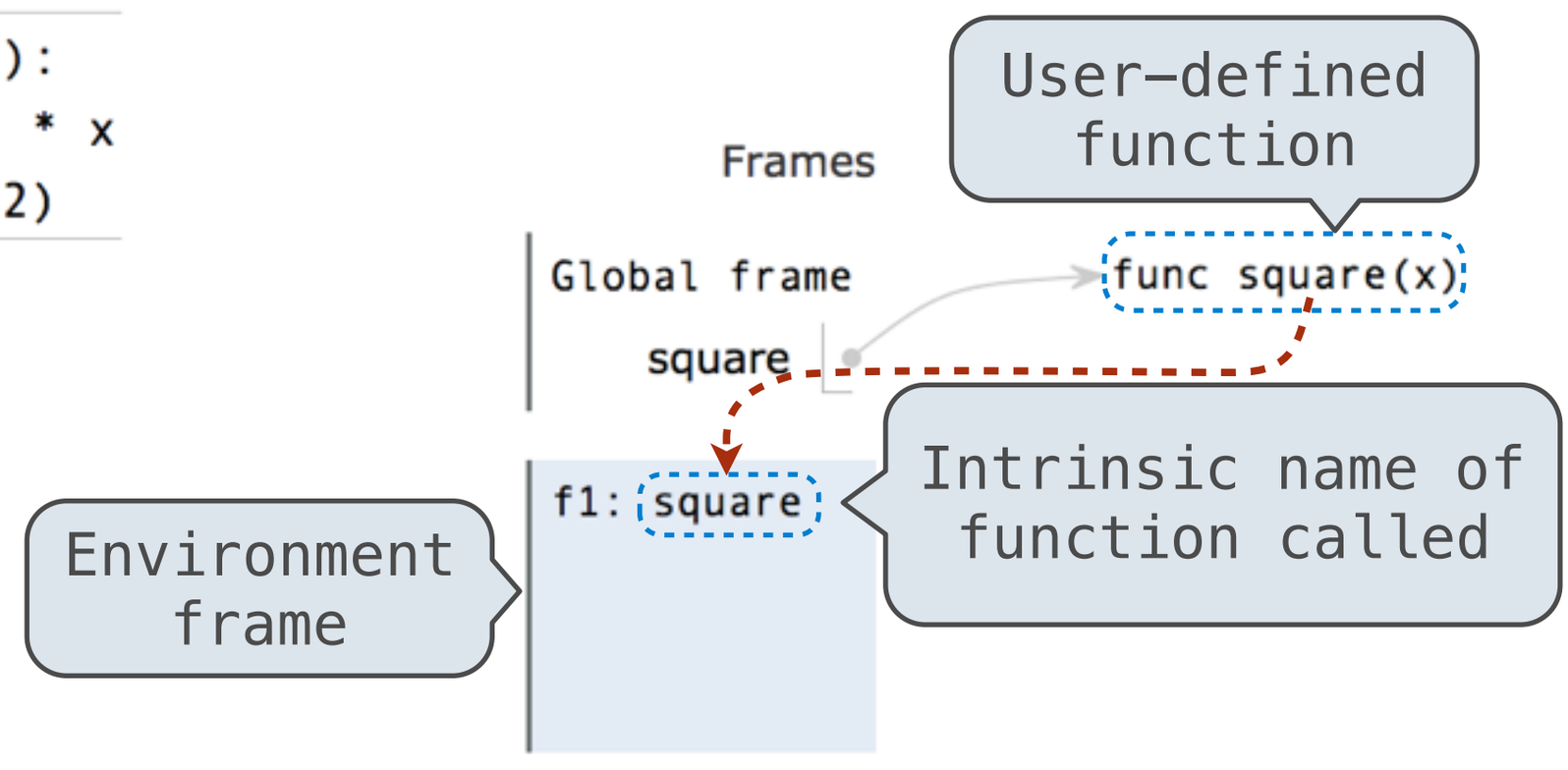

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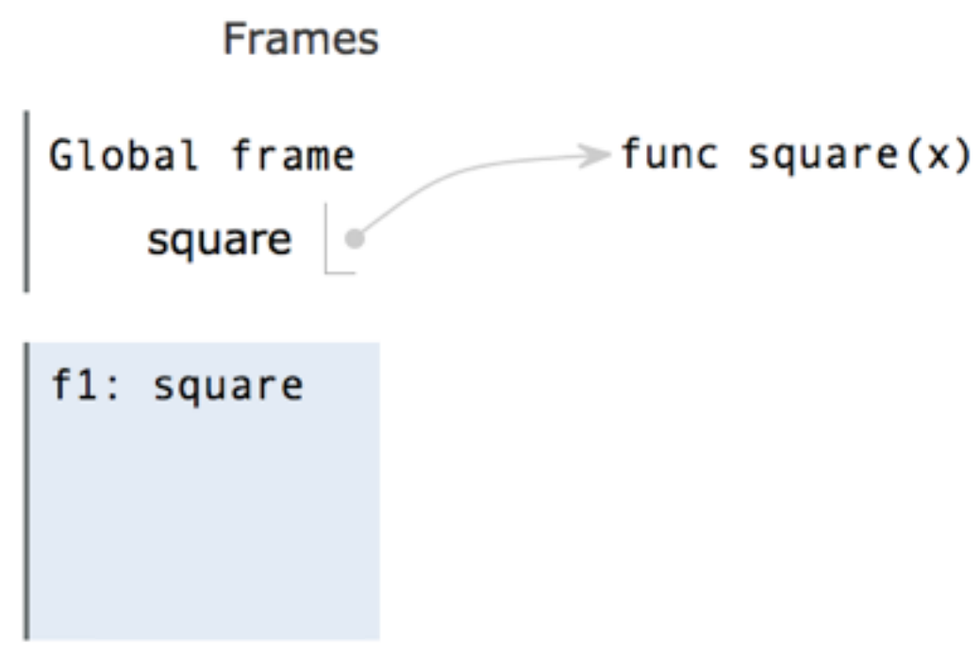

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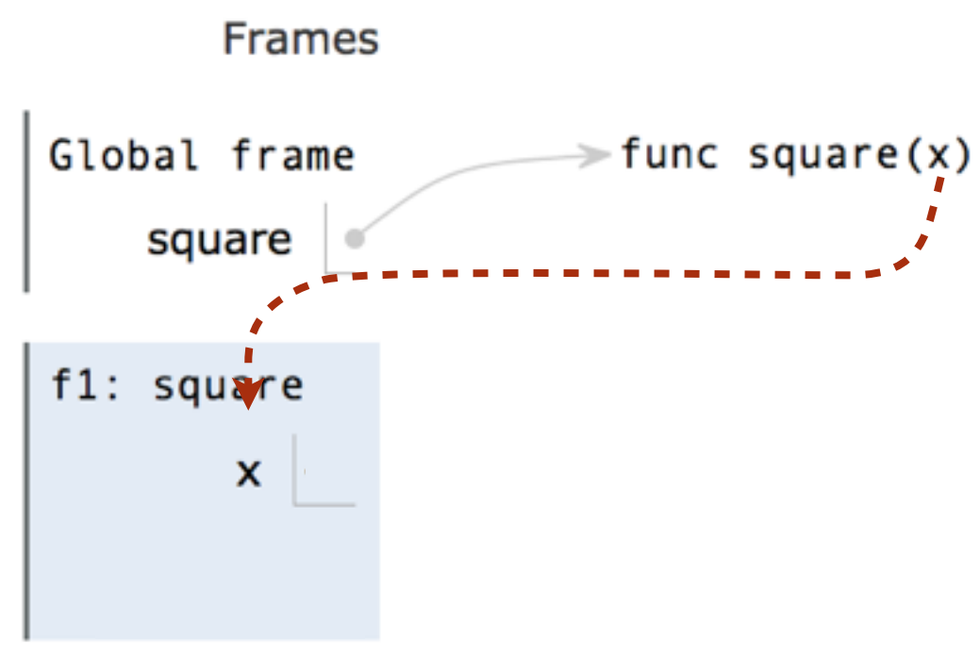

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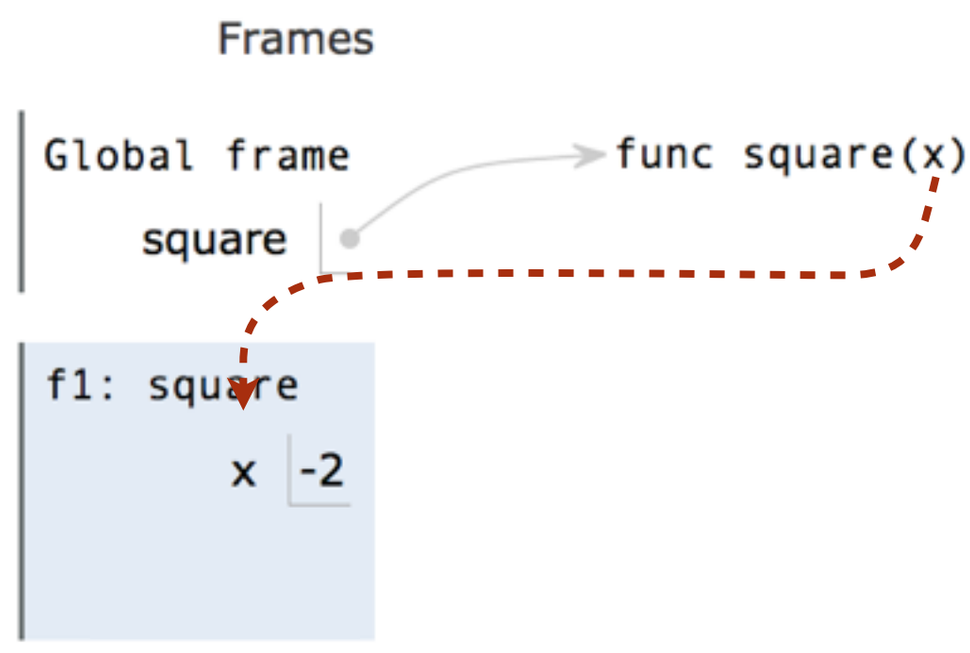

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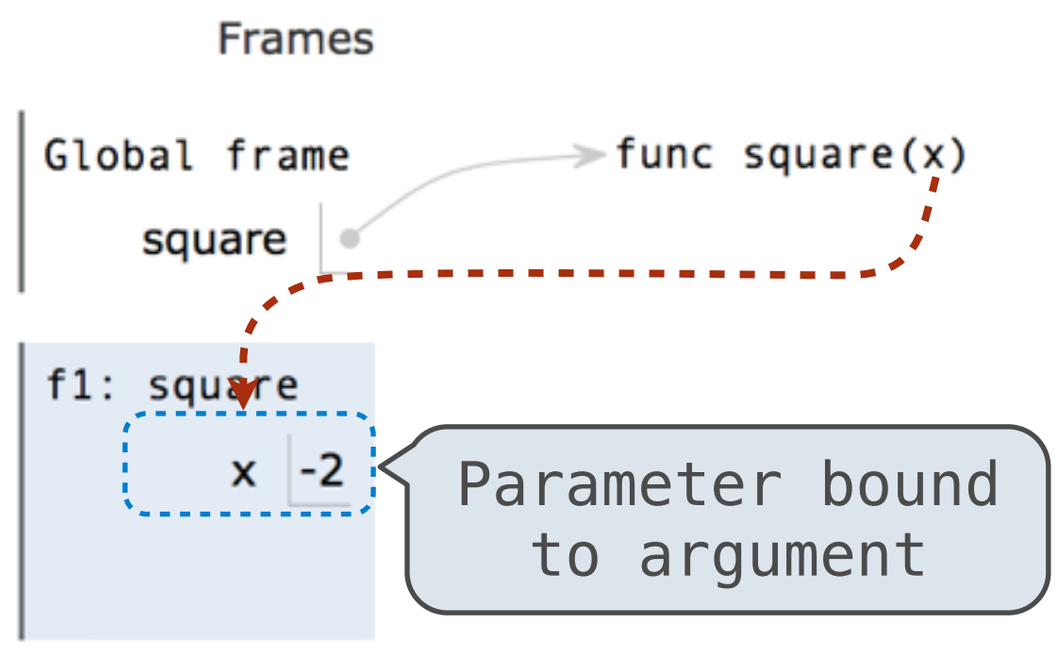

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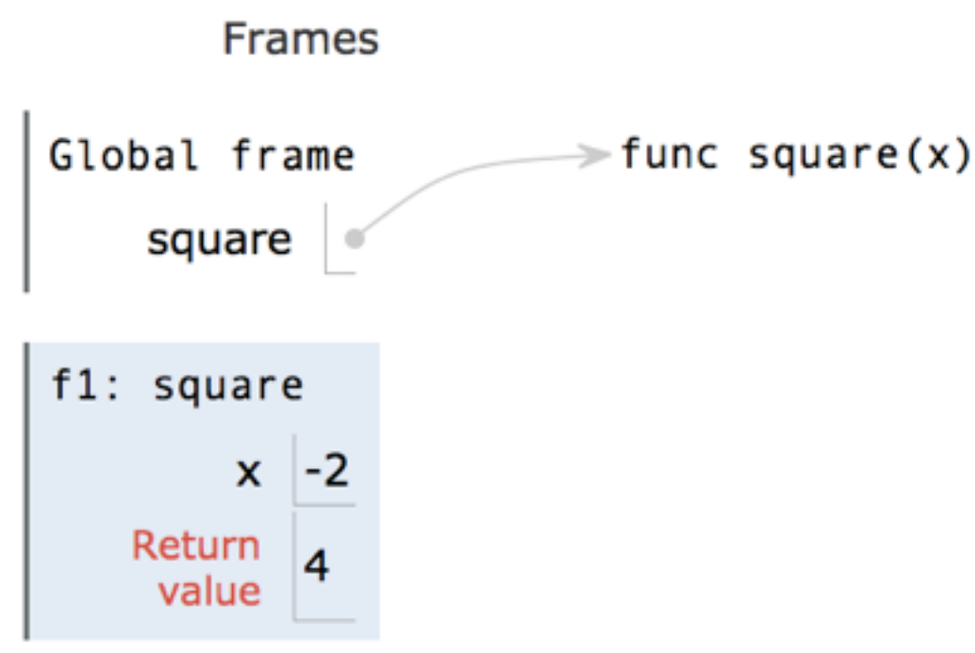

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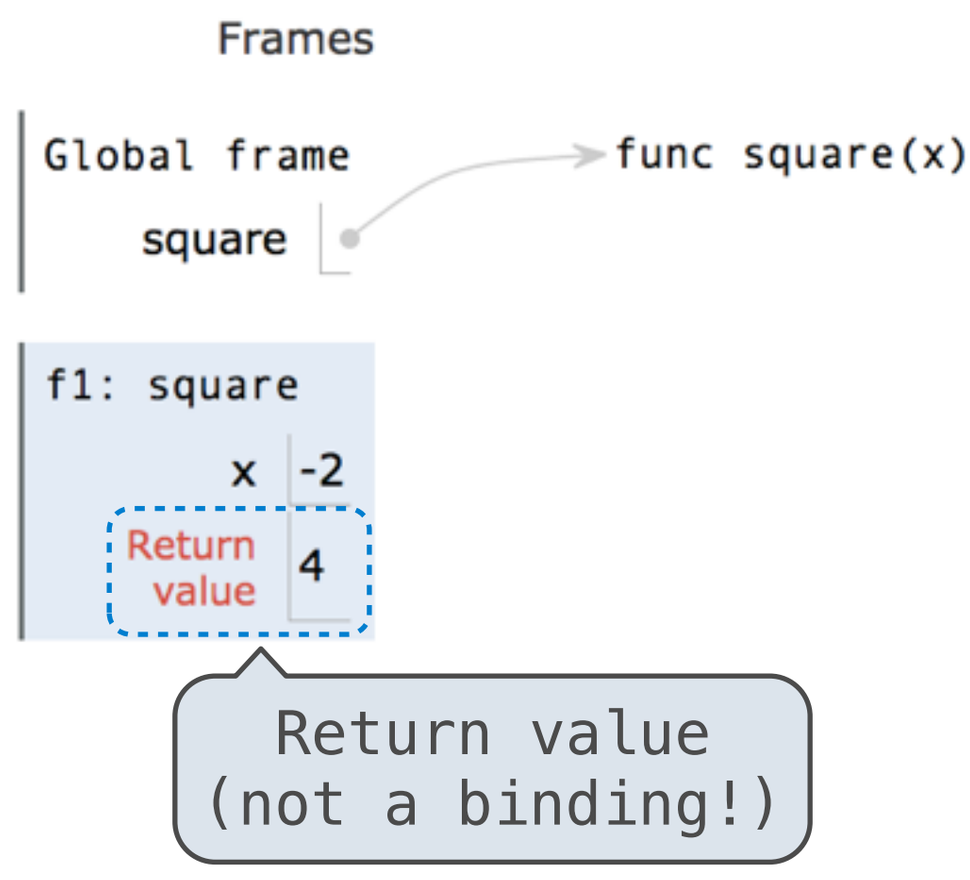

Break!

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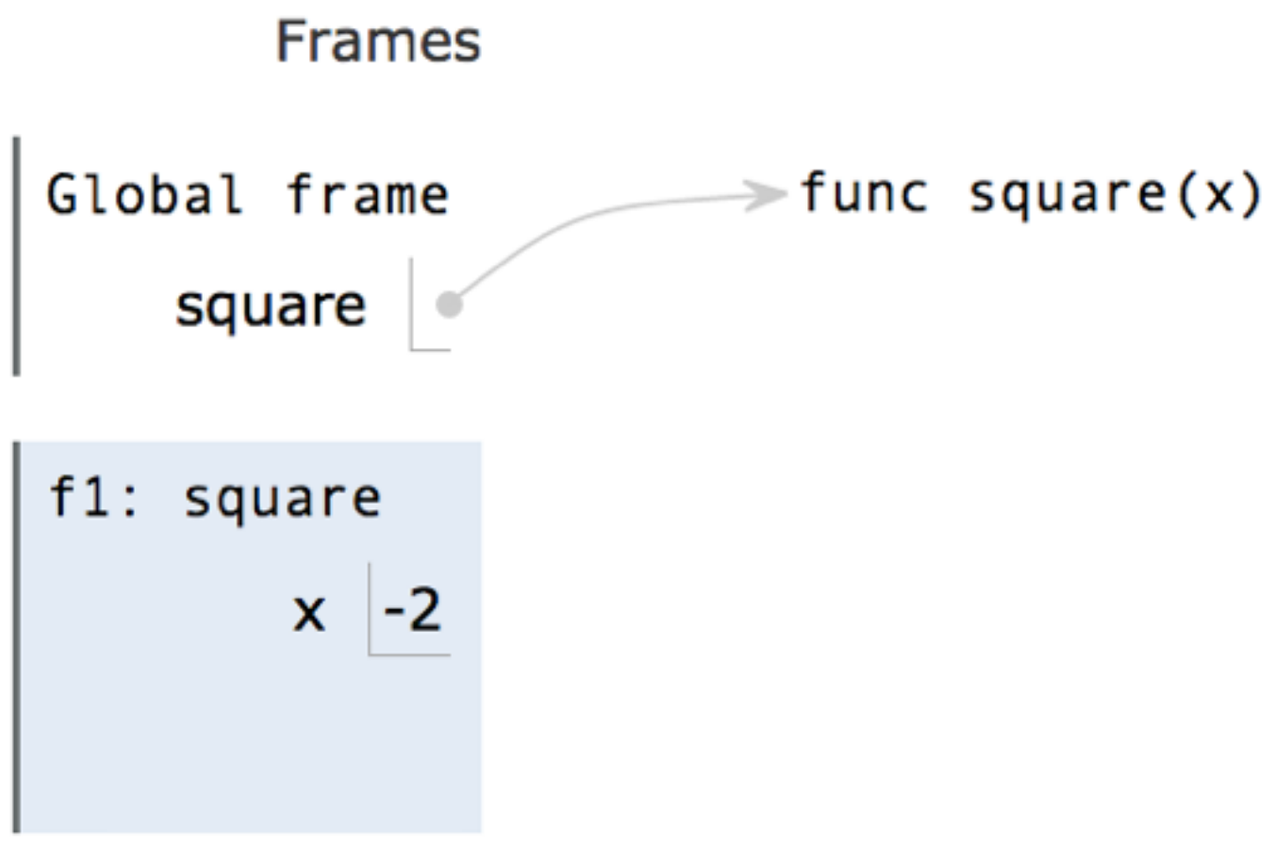
Looking up names in environments



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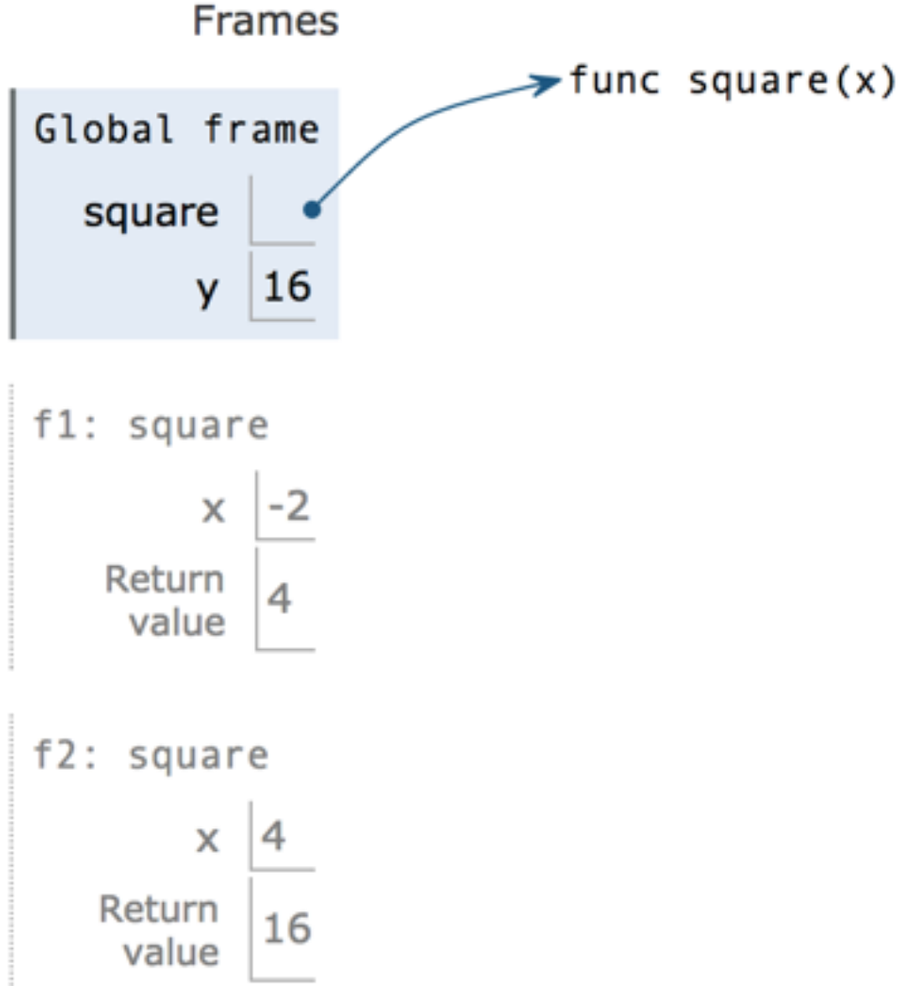

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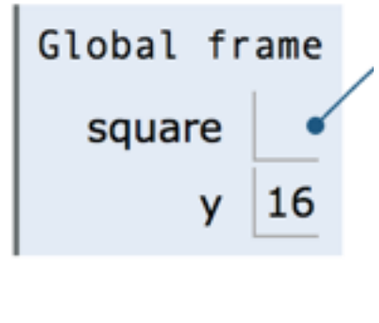

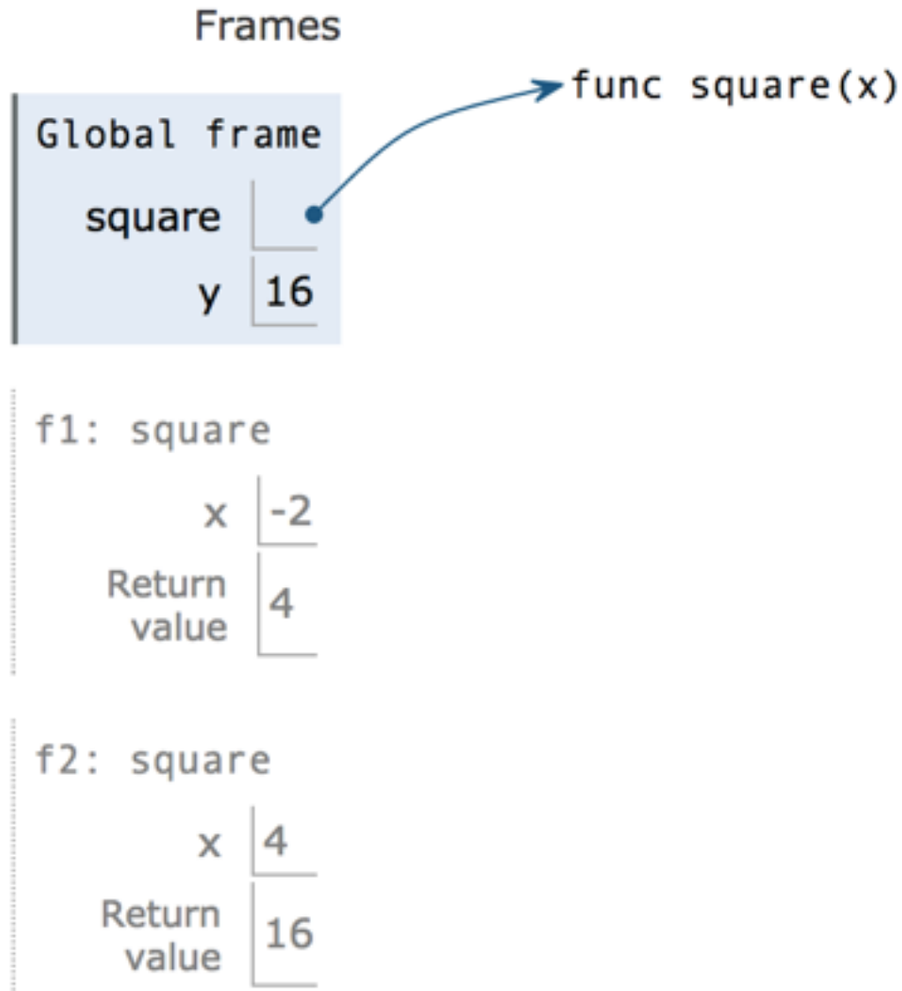

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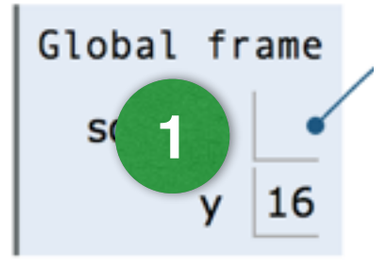

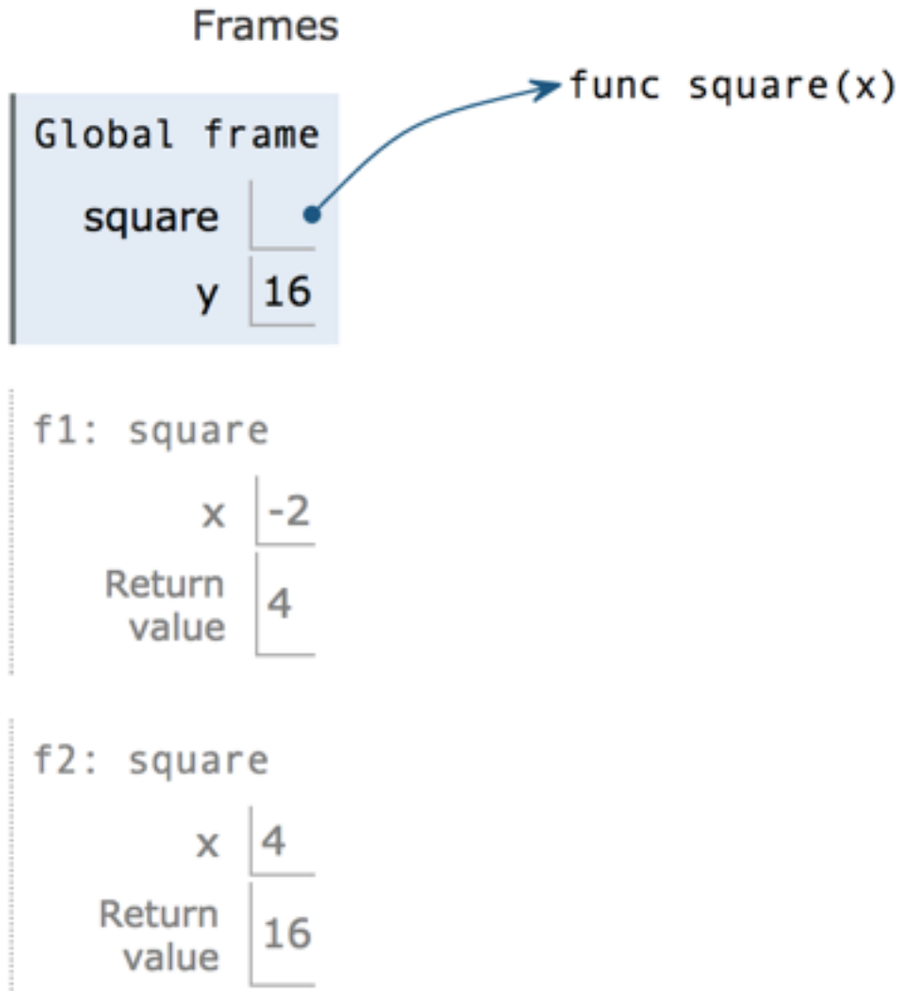

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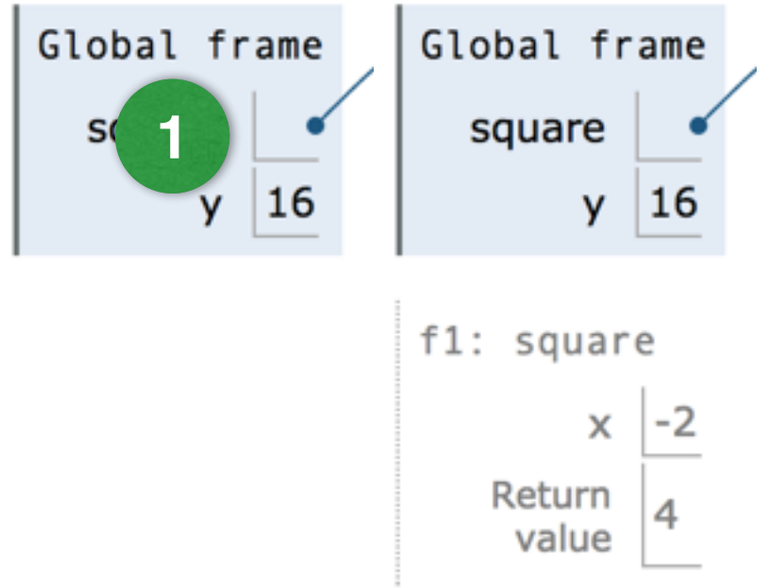

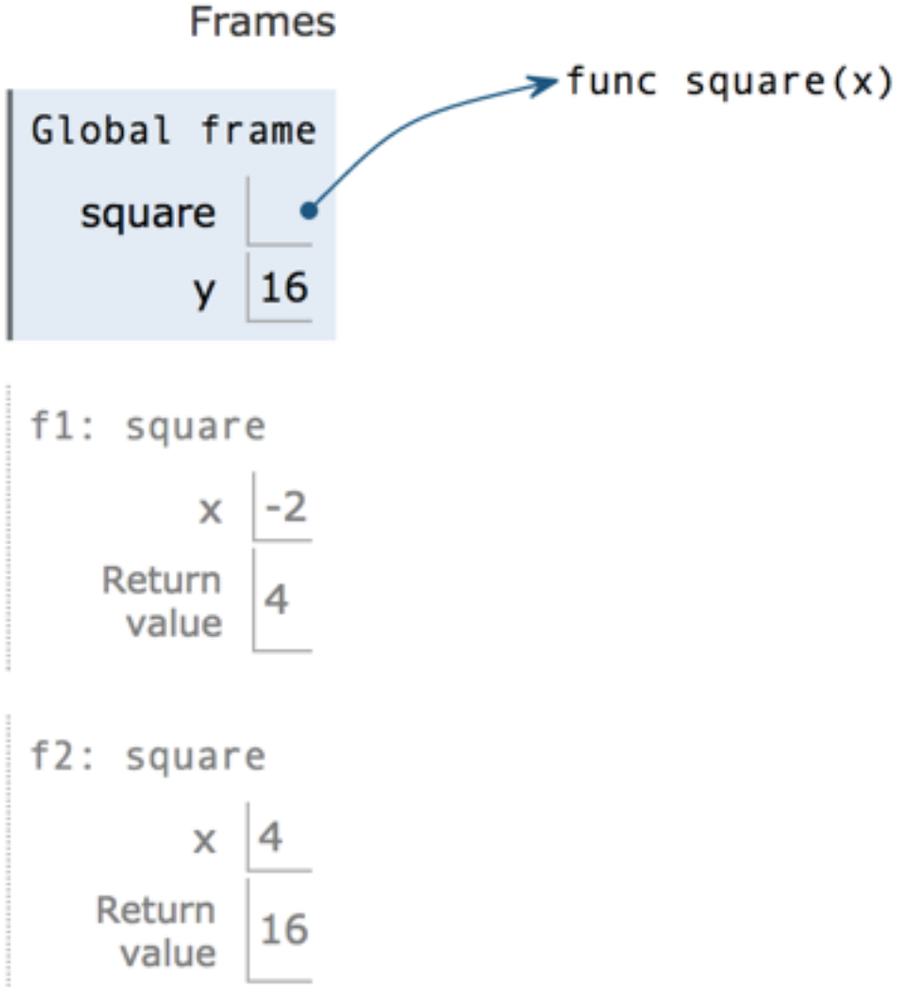

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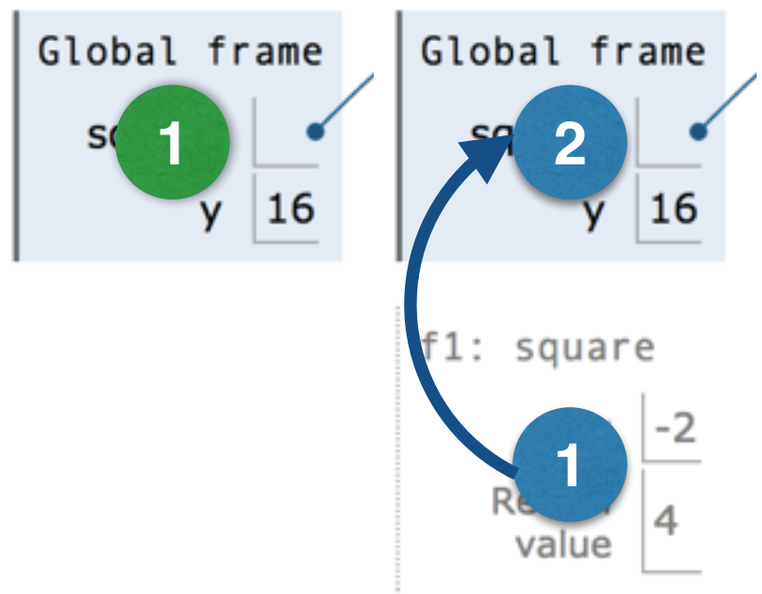

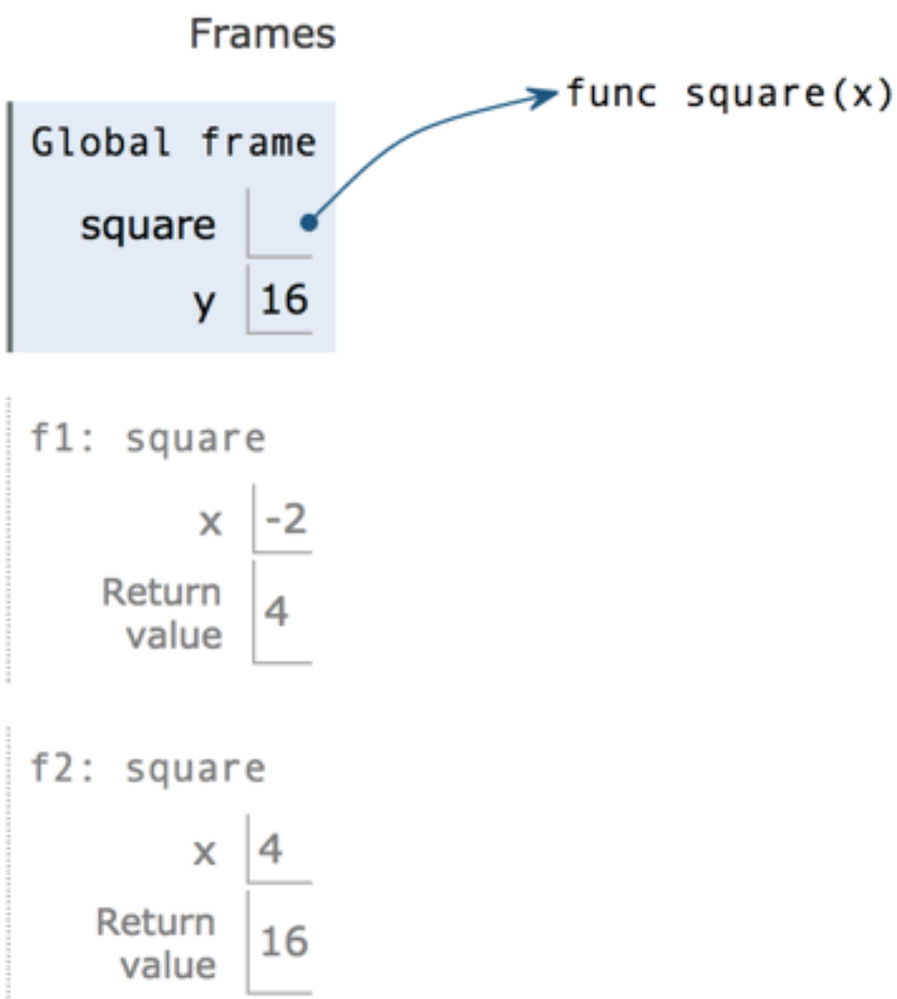

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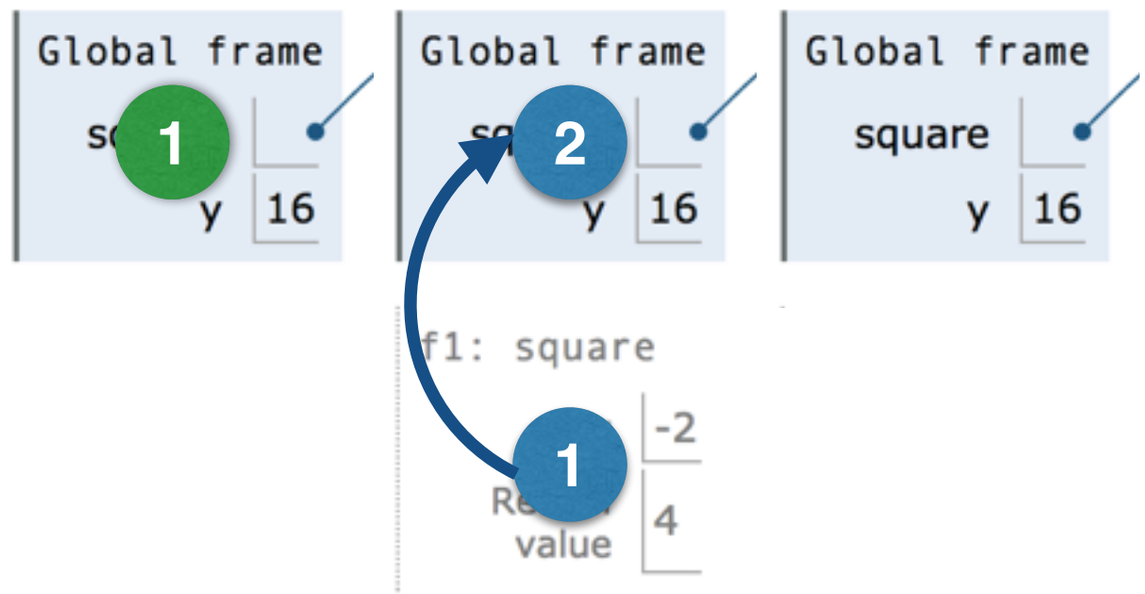

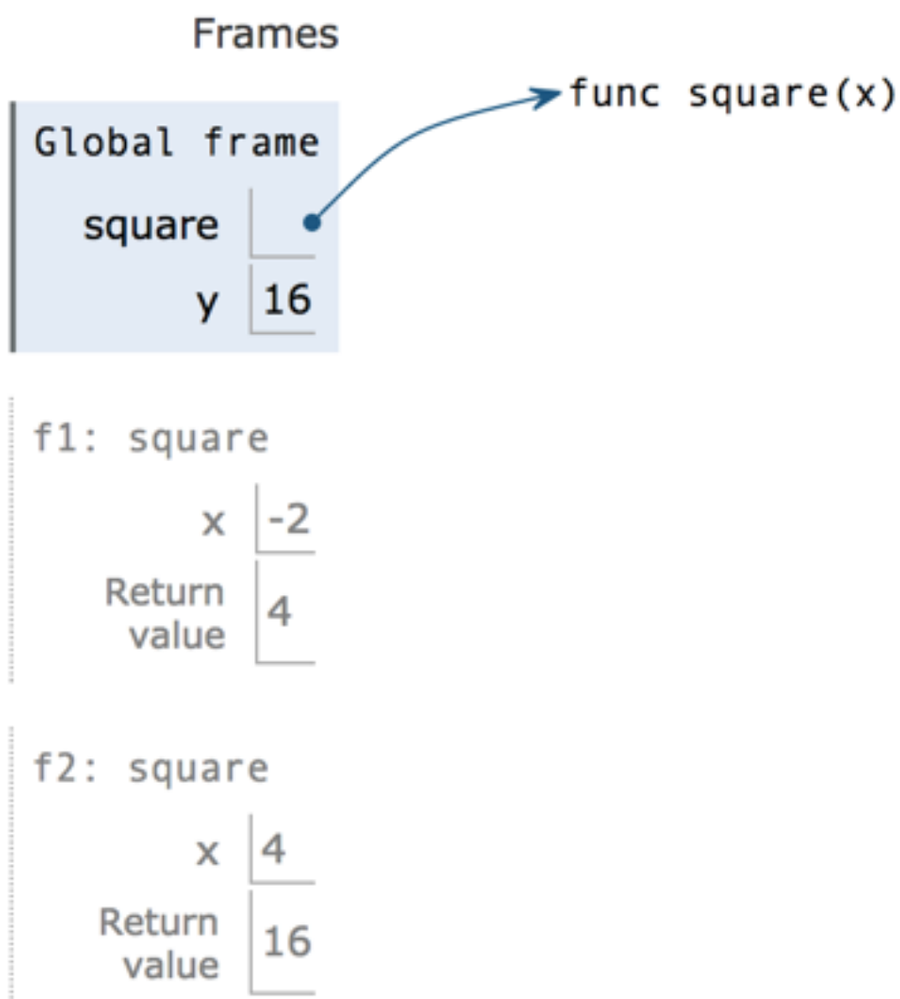

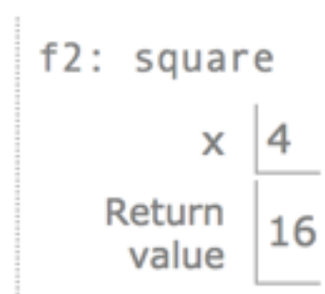

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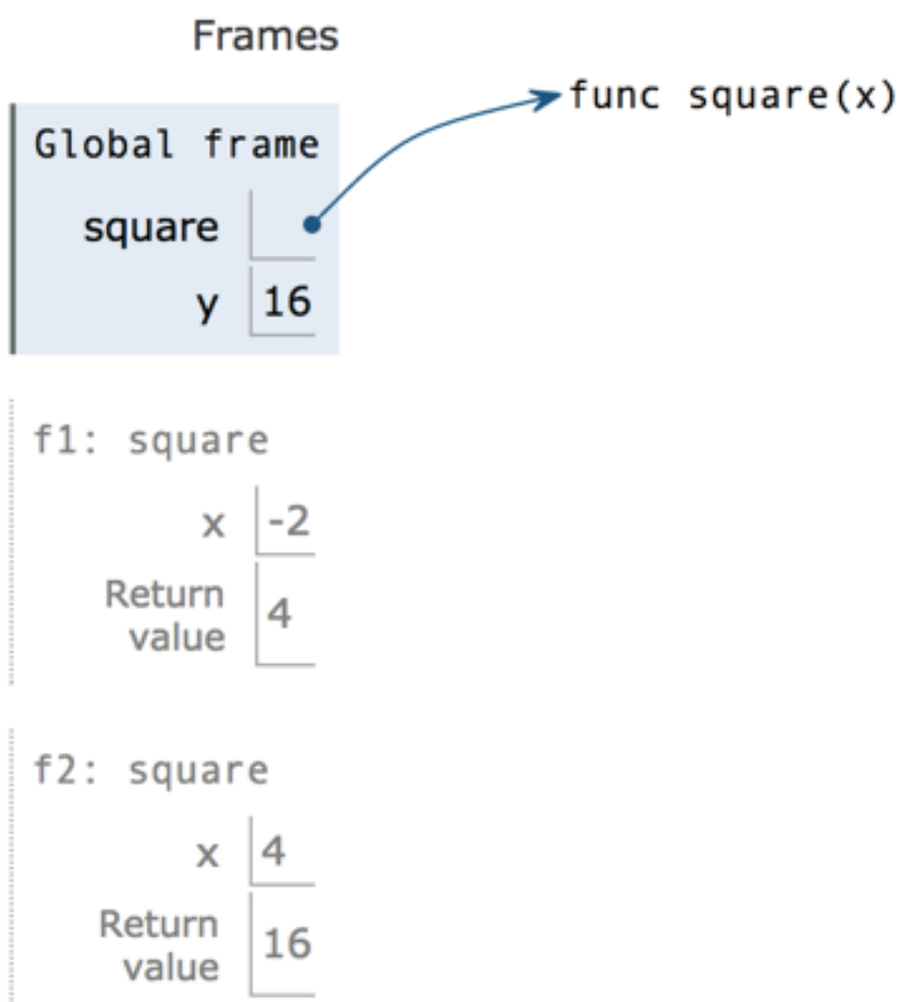

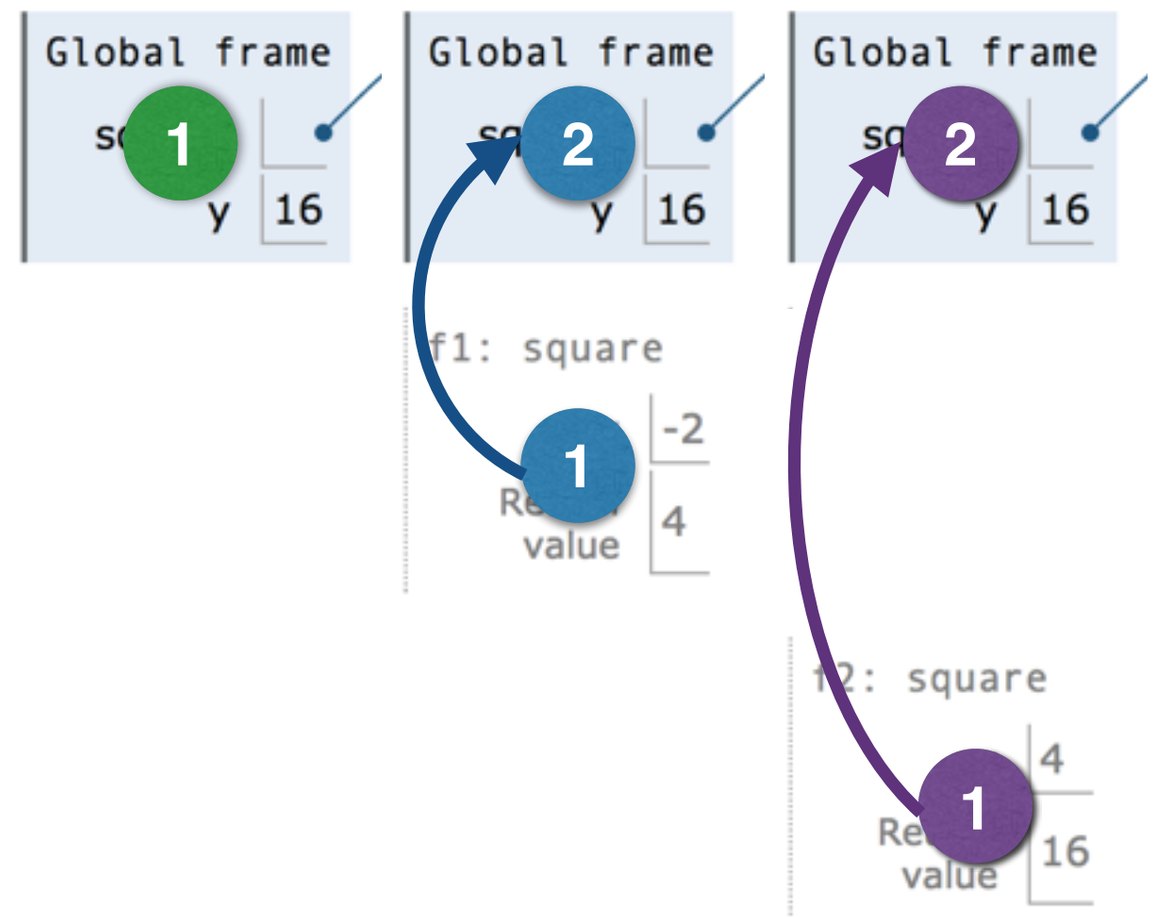

None and Print

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>>> def does_not_square(x):
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```

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>>> def does_not_square(x):
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No **return**

```
>>> def does_not_square(x):
...     x * x
>>> does_not_square(-2)
>>> not_four = does_not_square(-2)
```

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>>> not_four = does_not_square(-2)
```

No **return**

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```
>>> def does_not_square(x):
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>>> does_not_square(-2)
>>> not_four = does_not_square(-2)
>>> not_four + 4
```

No **return**

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>>> def does_not_square(x):
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>>> does_not_square(-2)
>>> not_four = does_not_square(-2)
>>> not_four + 4
TypeError: unsupported operand type(s) for +:
    'NoneType' and 'int'
```

No **return**

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Pure and non-pure functions

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Pure functions
just return values

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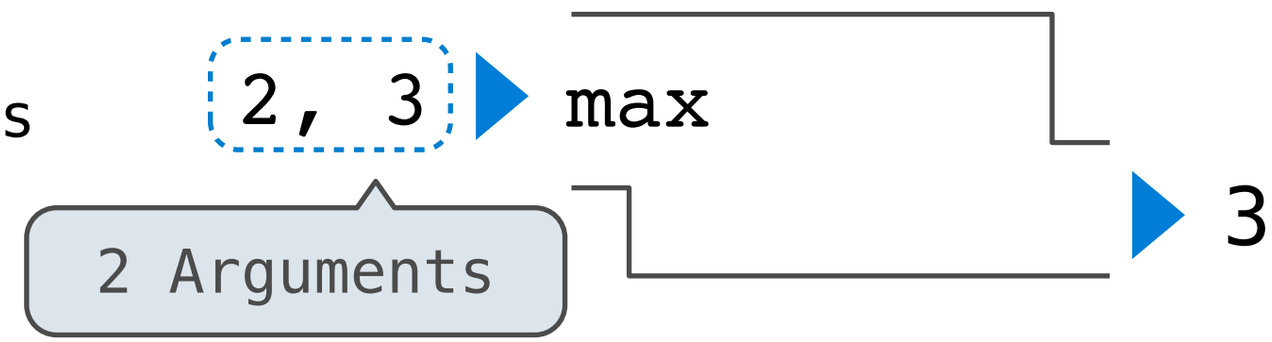

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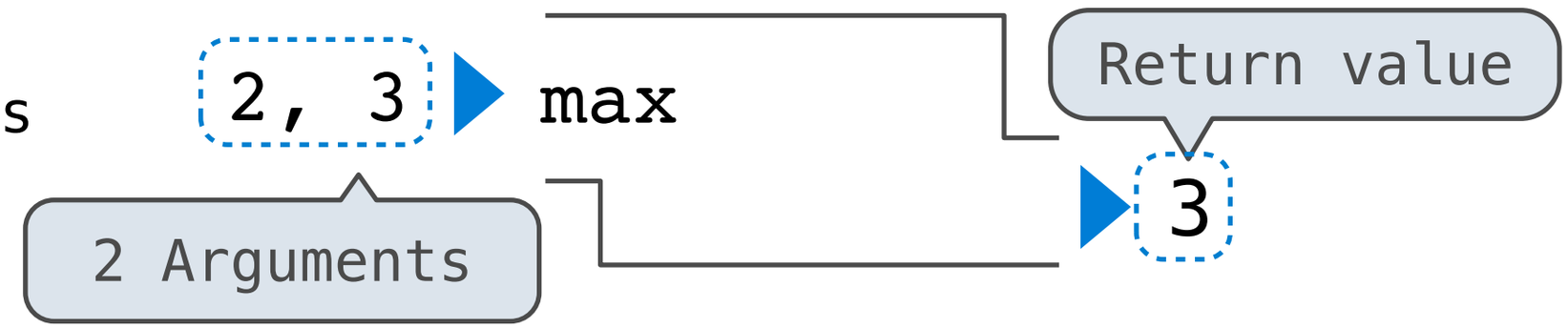

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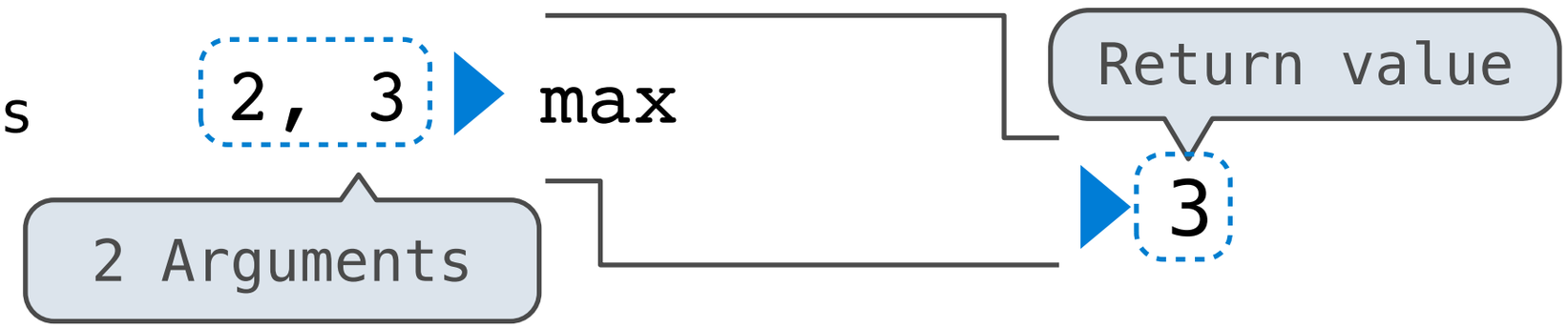

Non-Pure functions
have side effects

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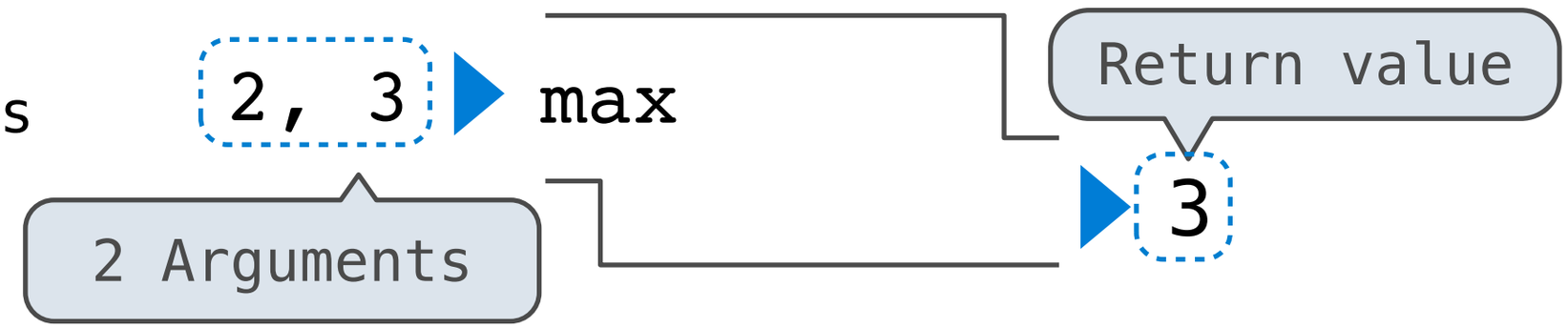

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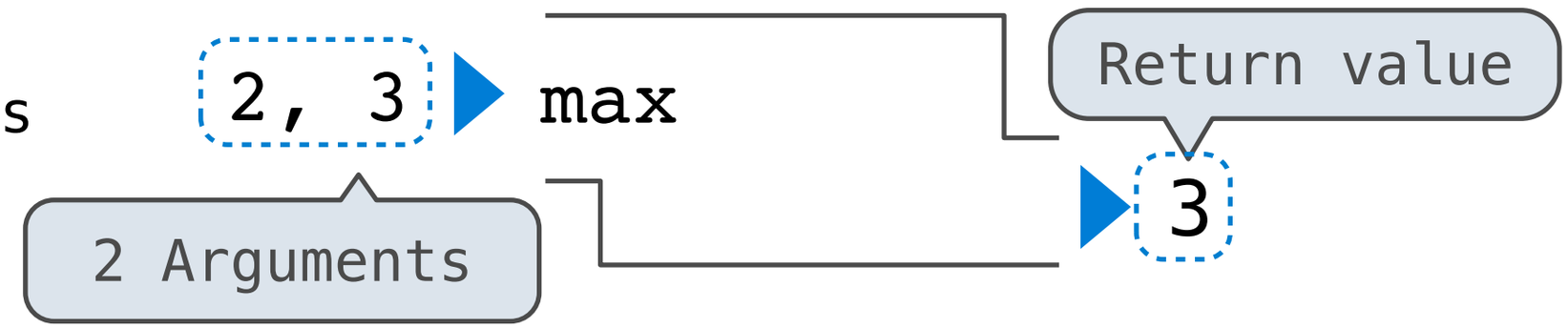

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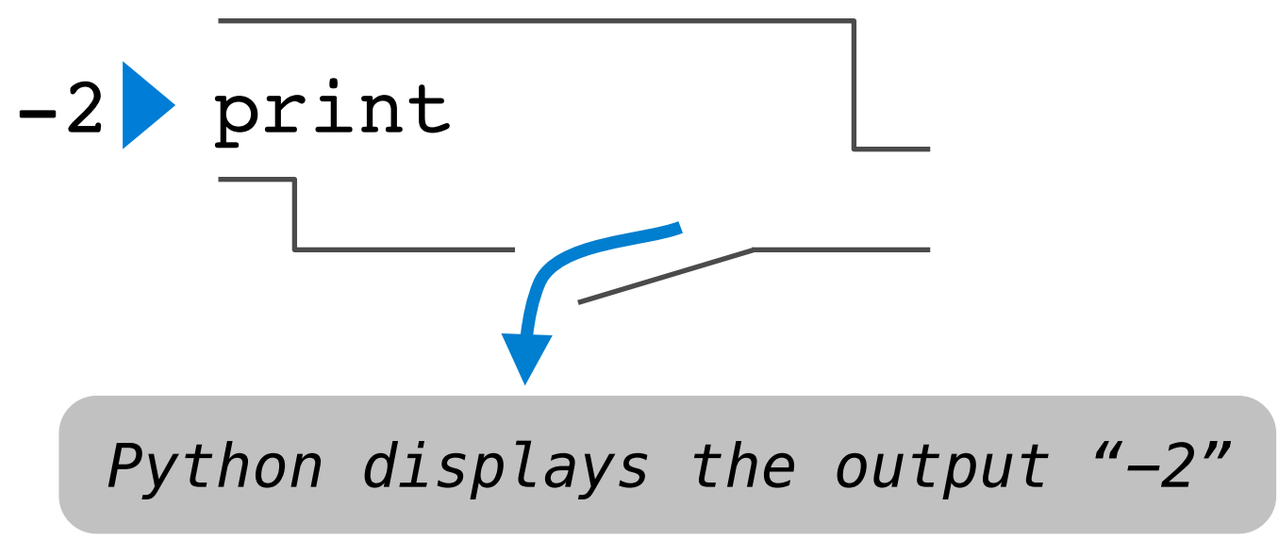

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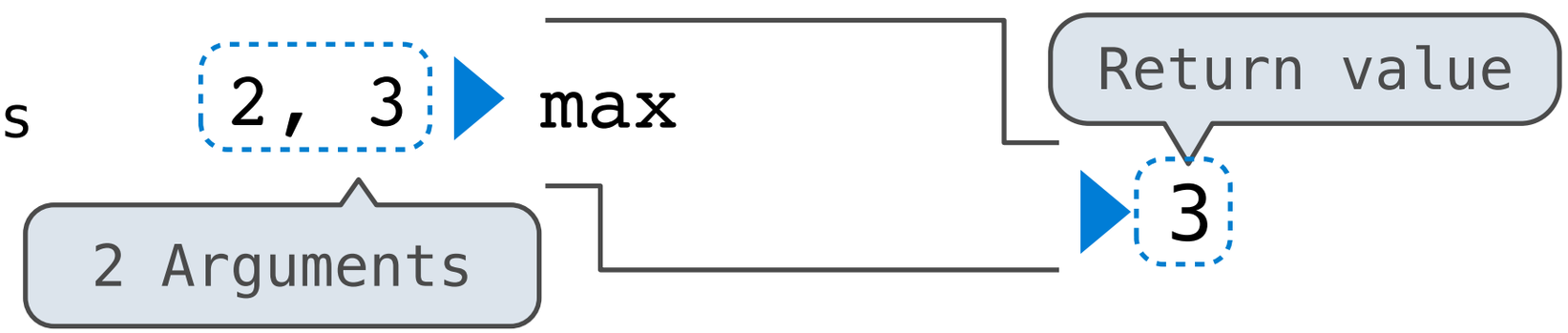

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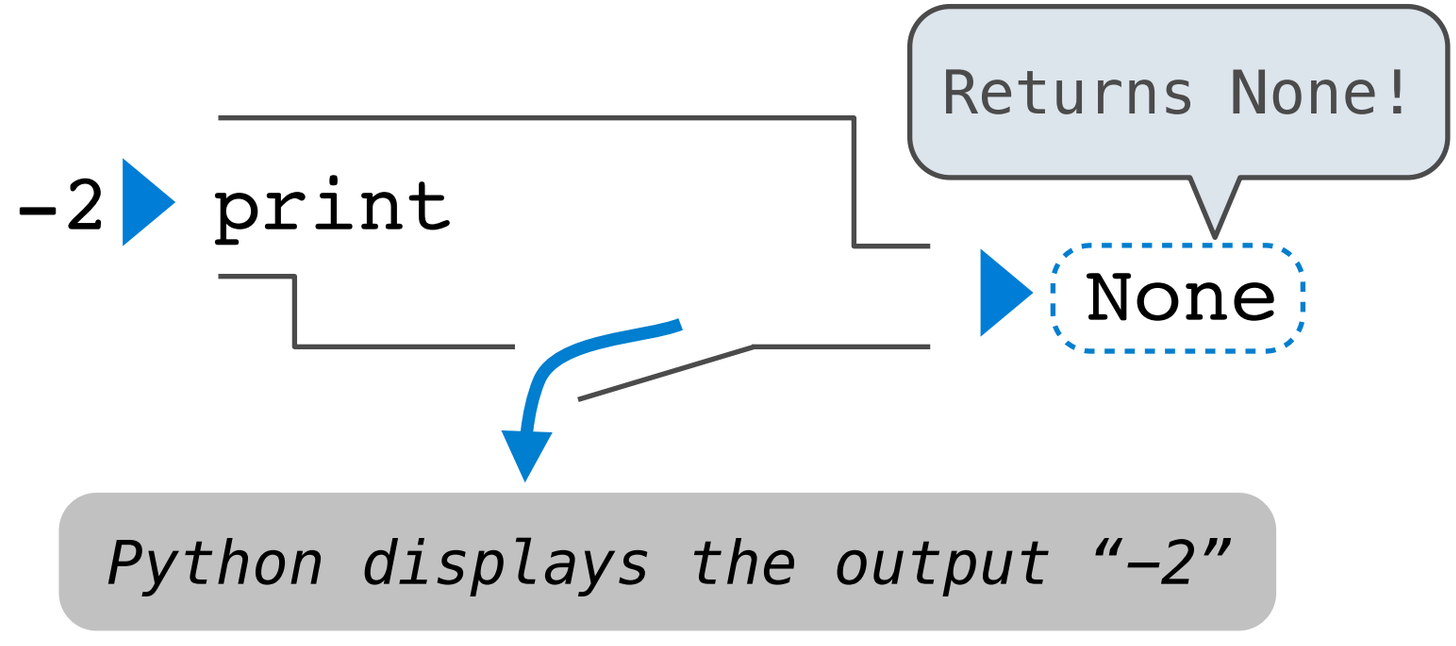

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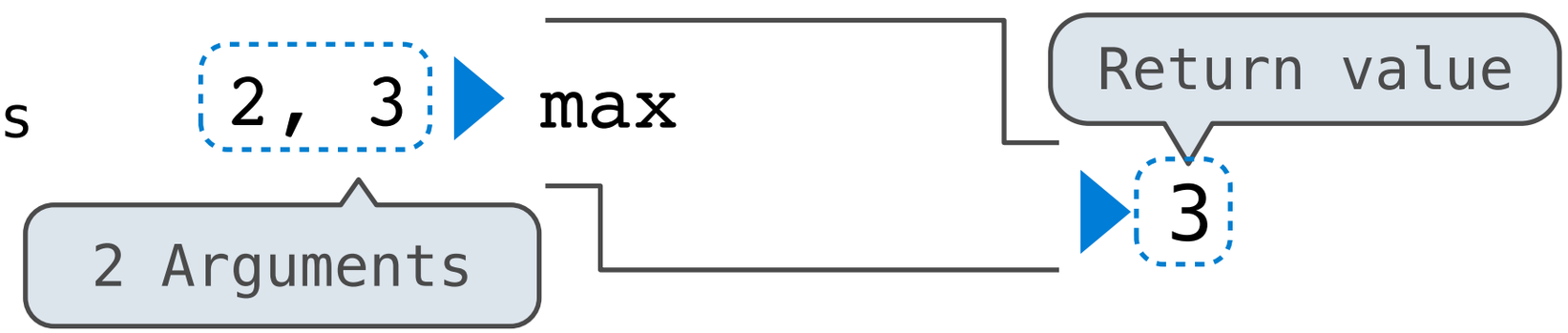

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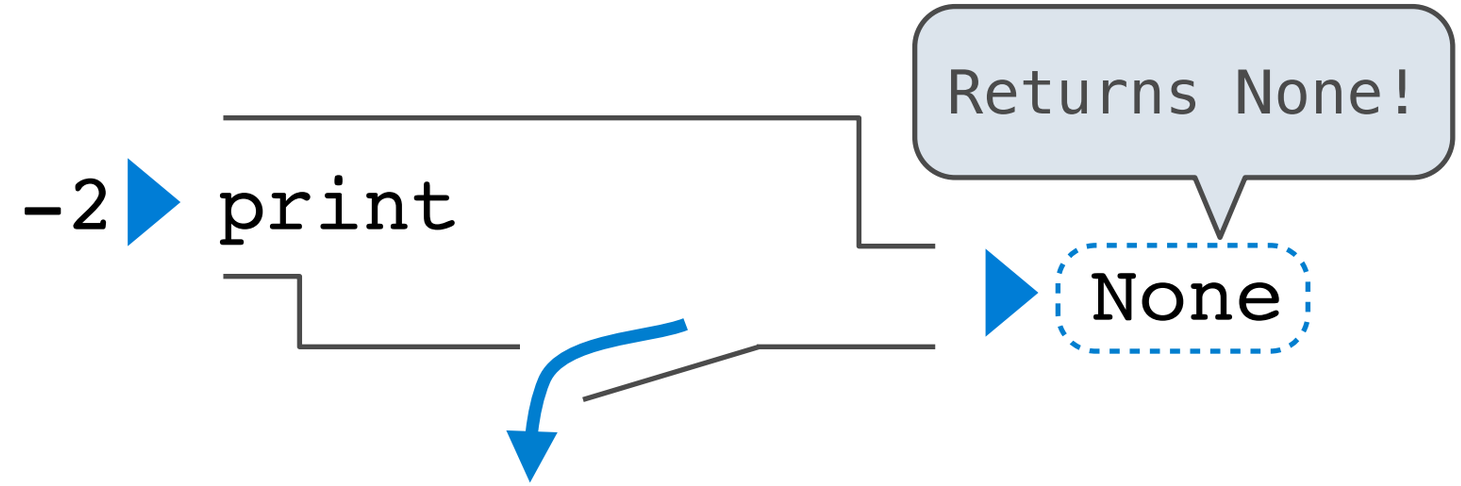

A side effect isn't a value; it's anything that happens as a consequence of calling a function

Python displays the output "-2"

Nested expressions with print

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```
>>> print(print(1), print(2))
```

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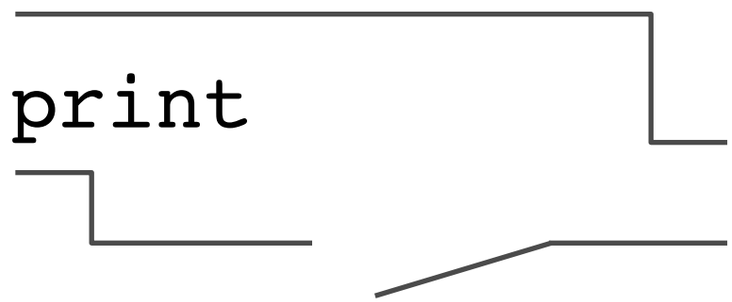

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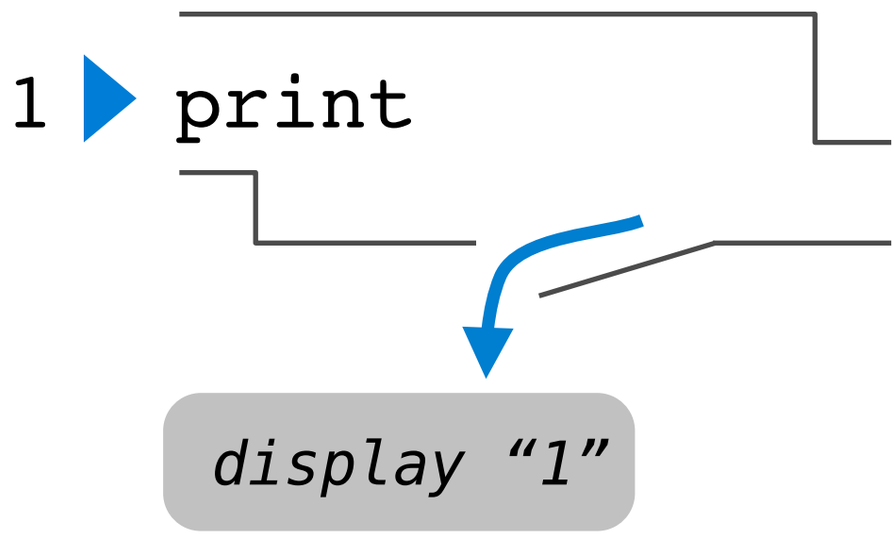
1 ▶ `print`

Nested expressions with print




```
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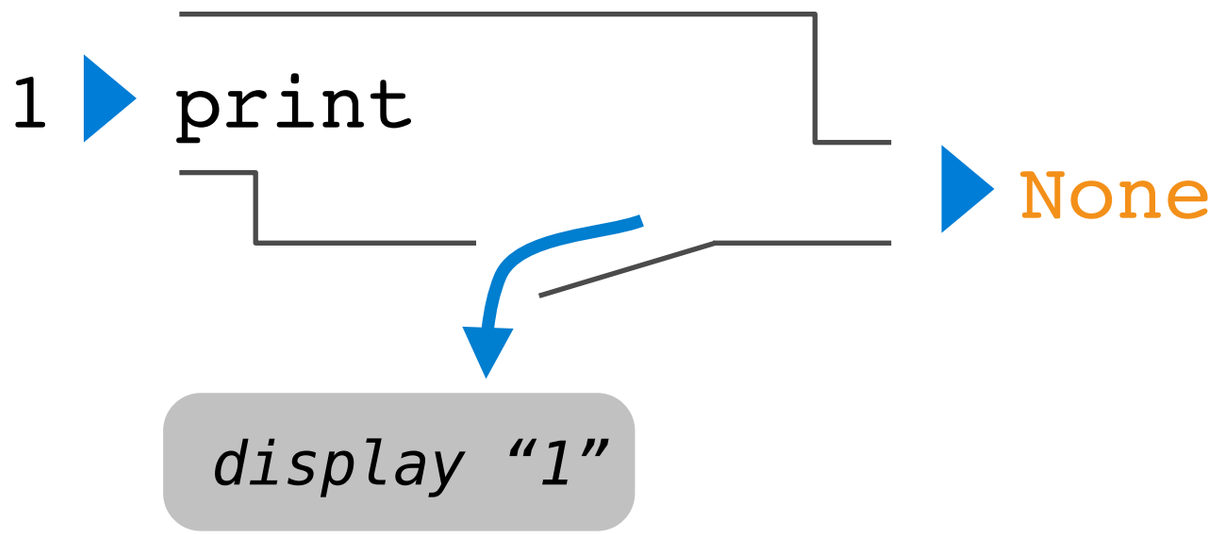
1
```

Nested expressions with print

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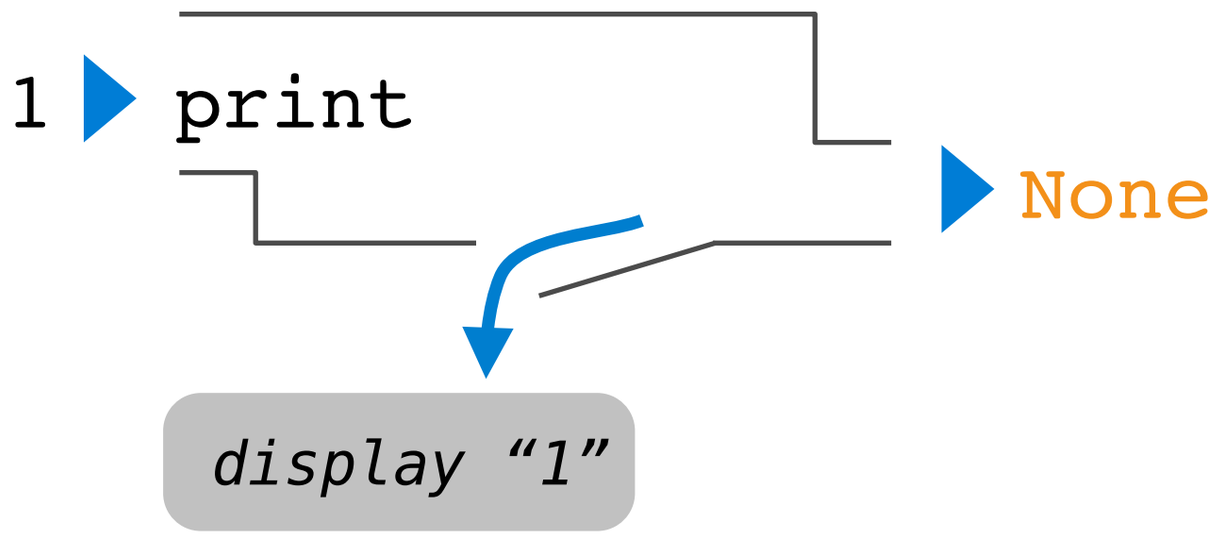


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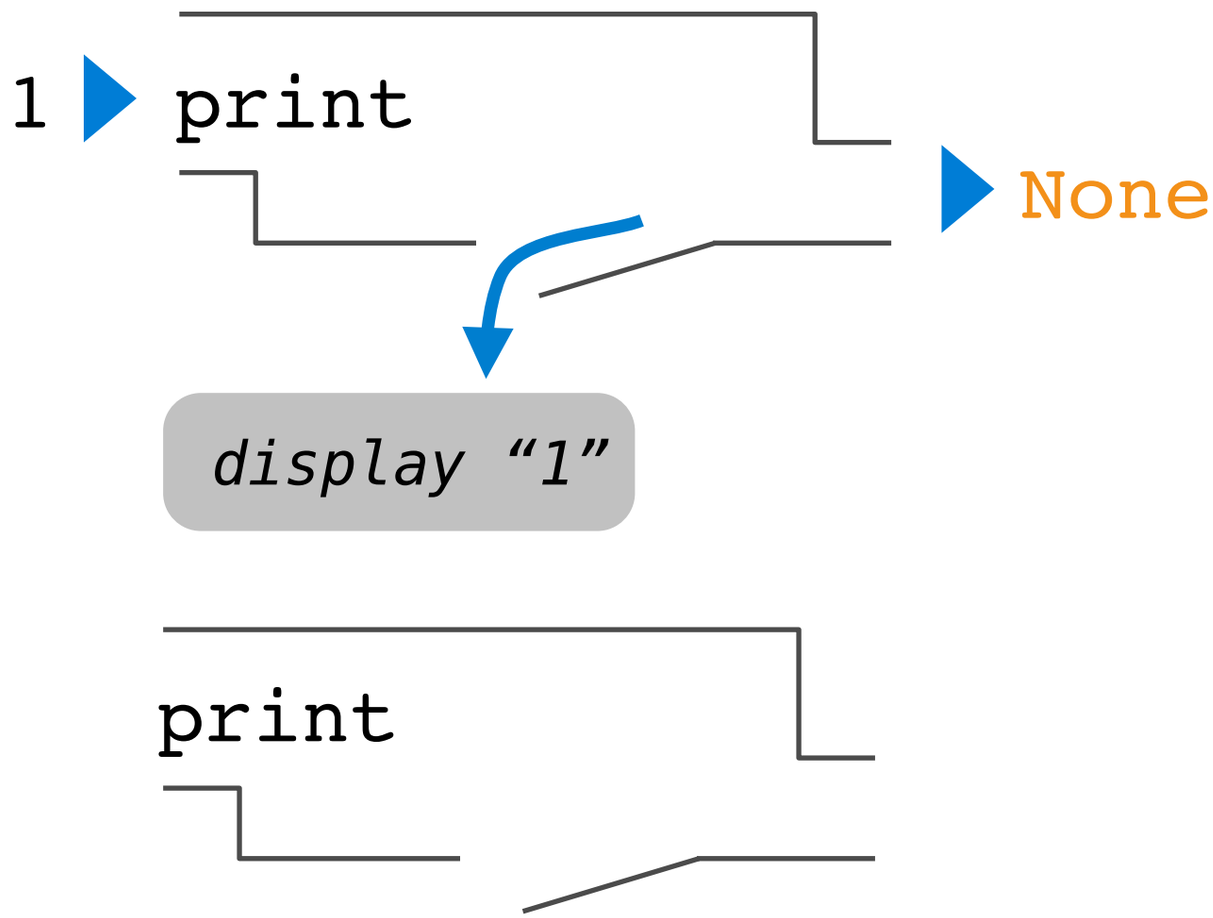


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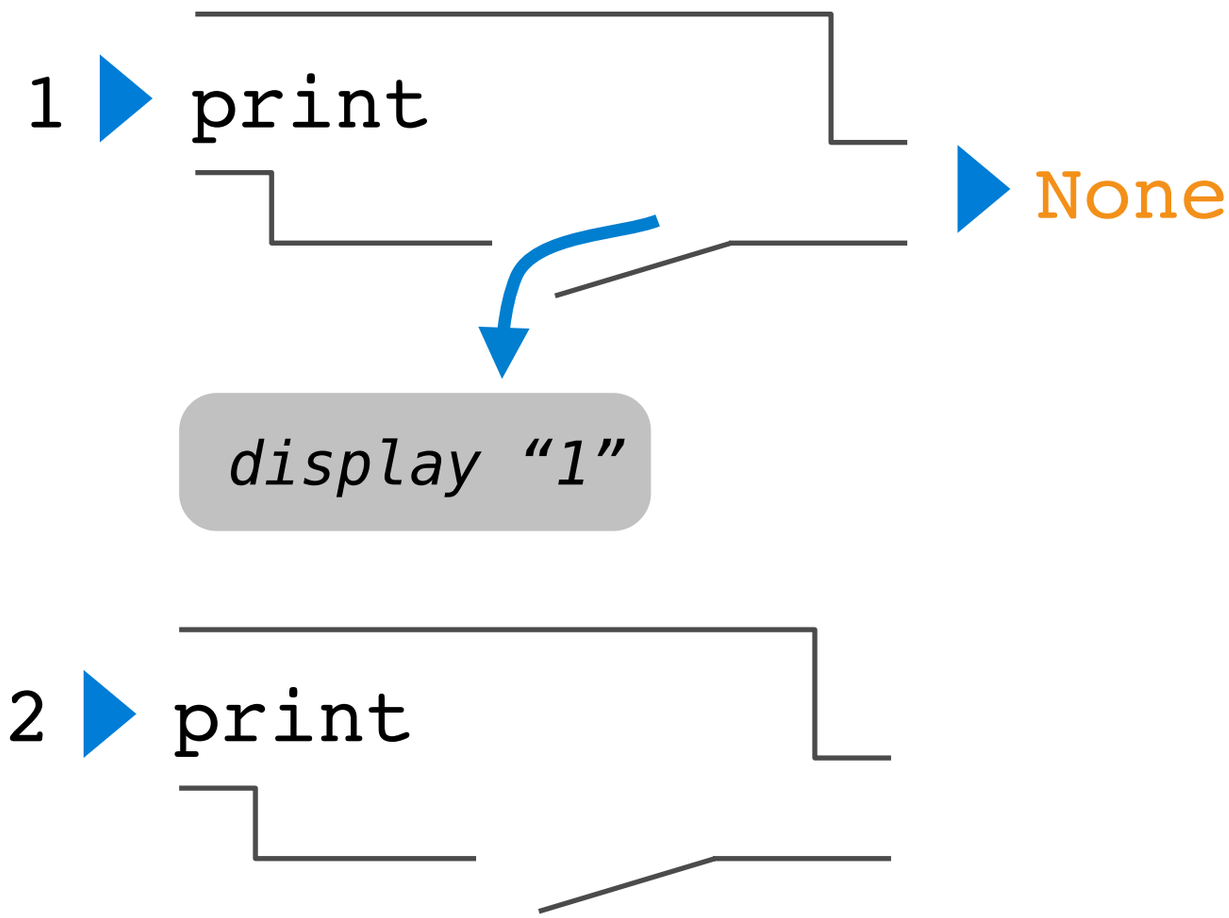

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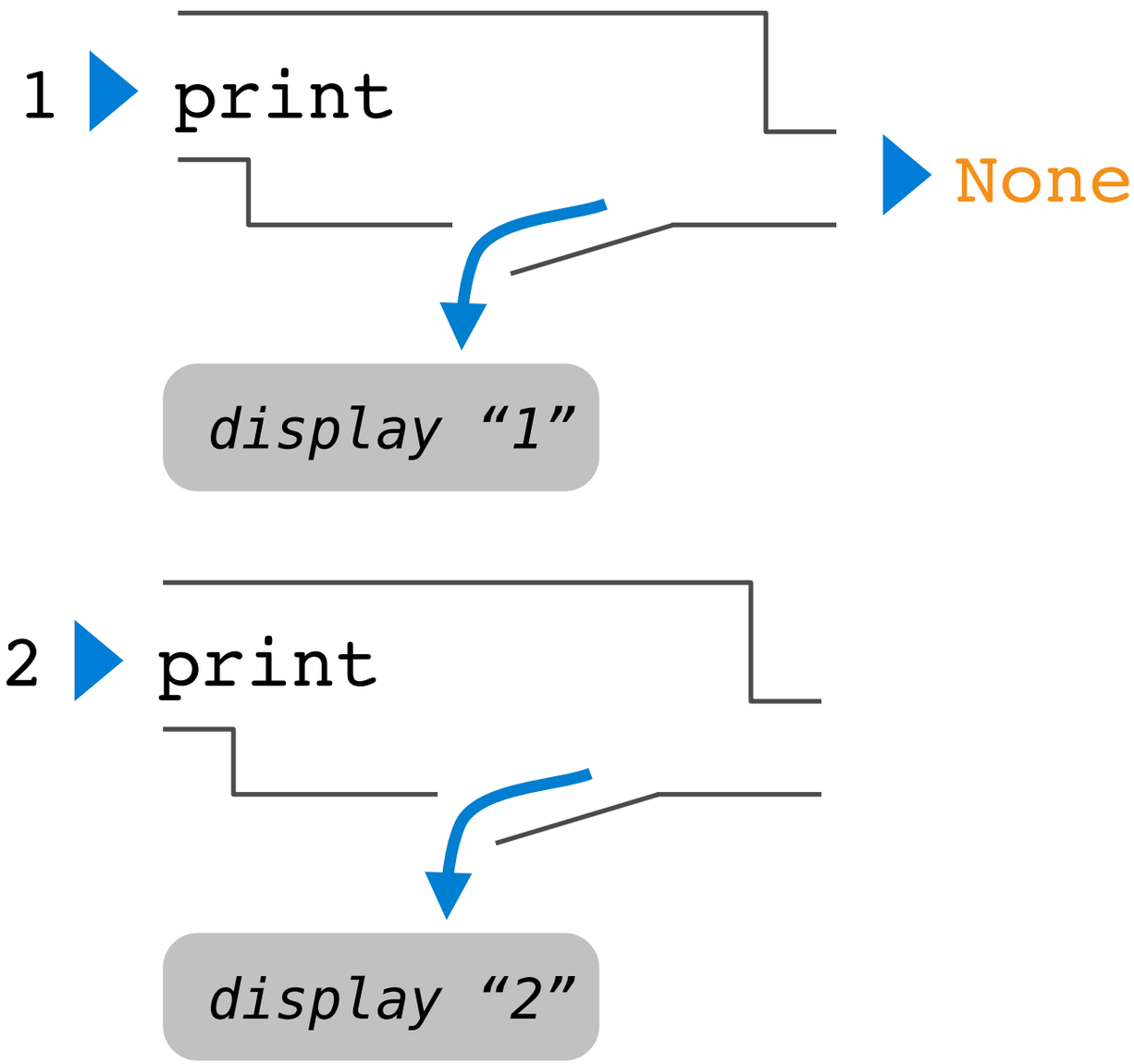


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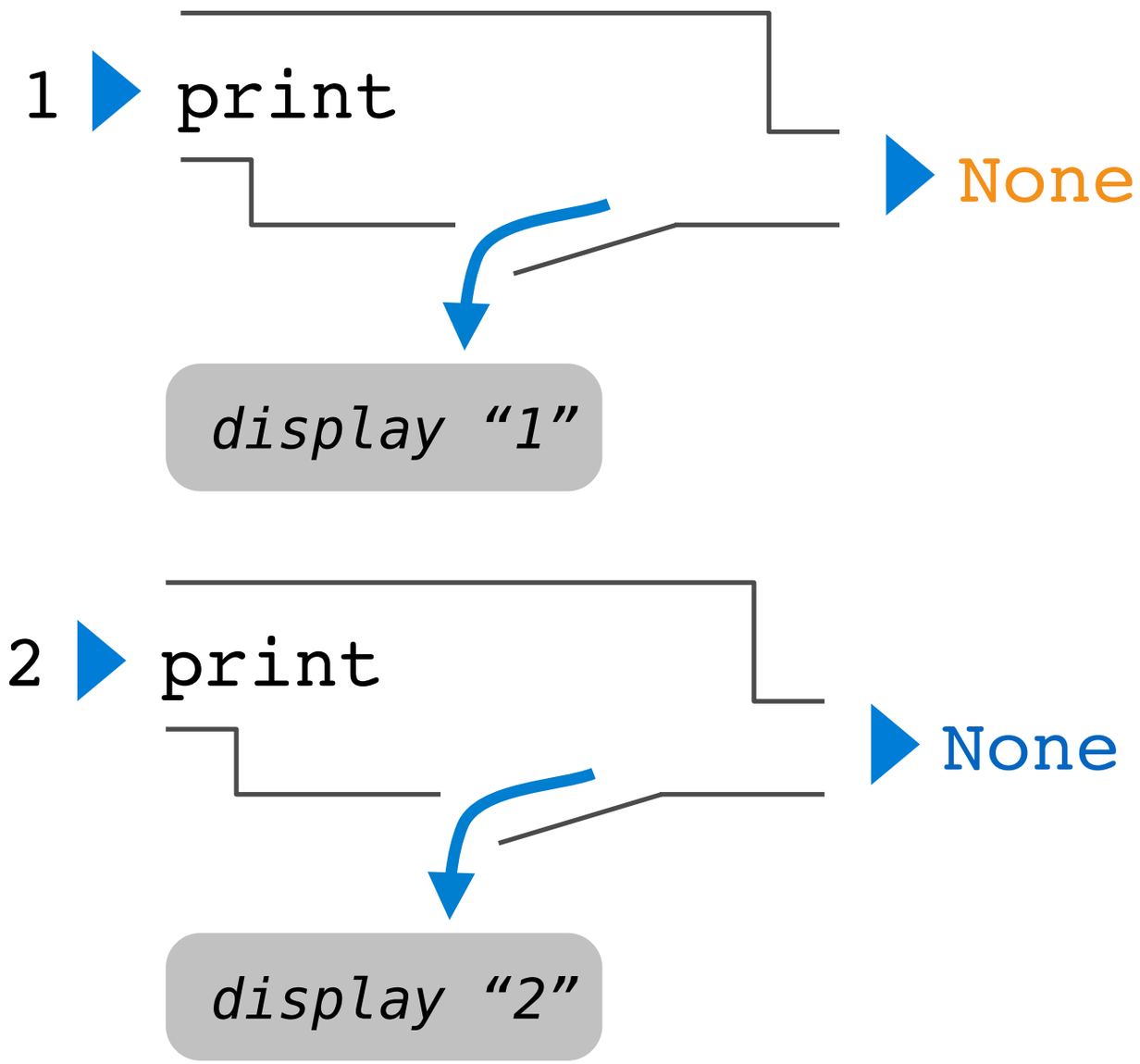

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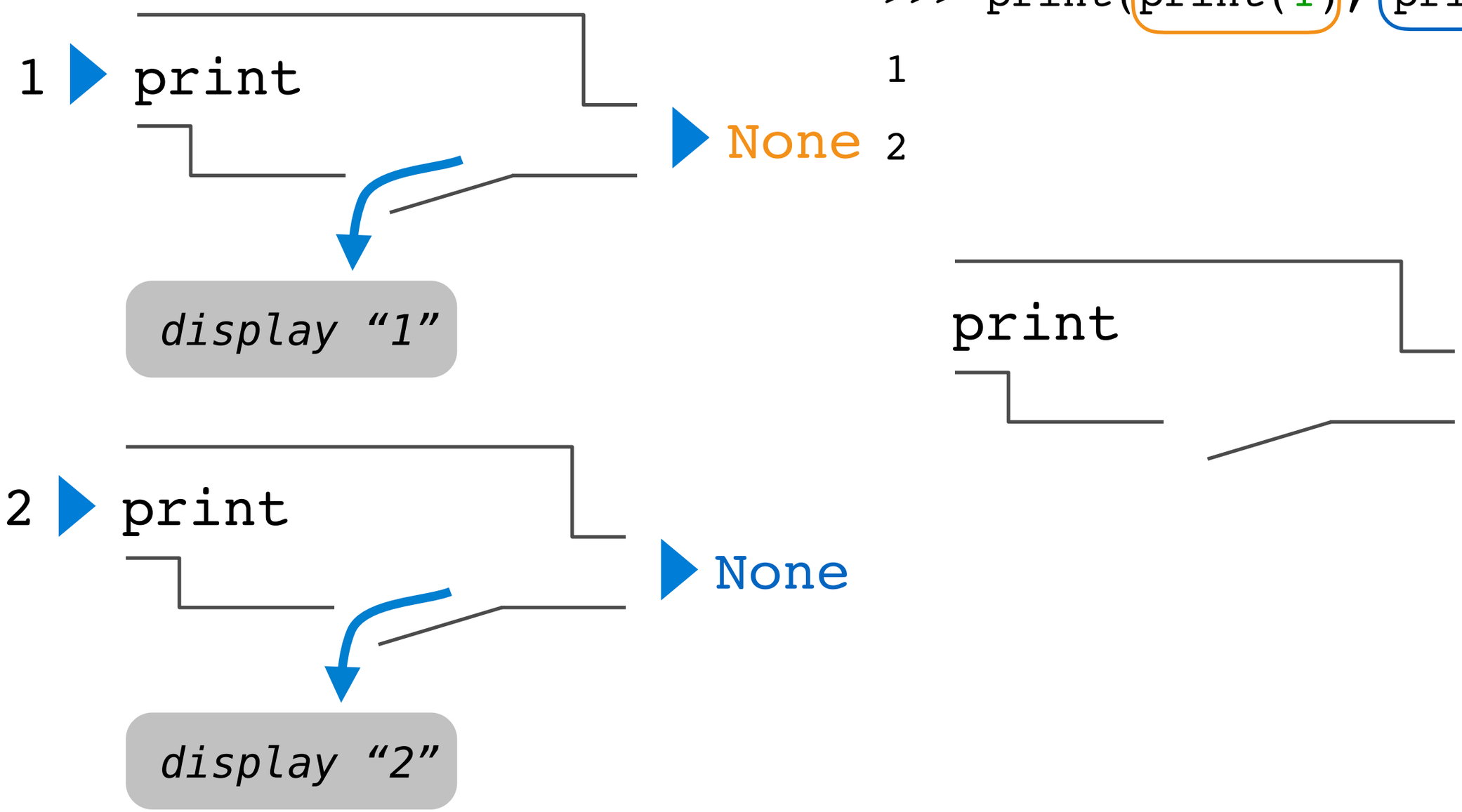

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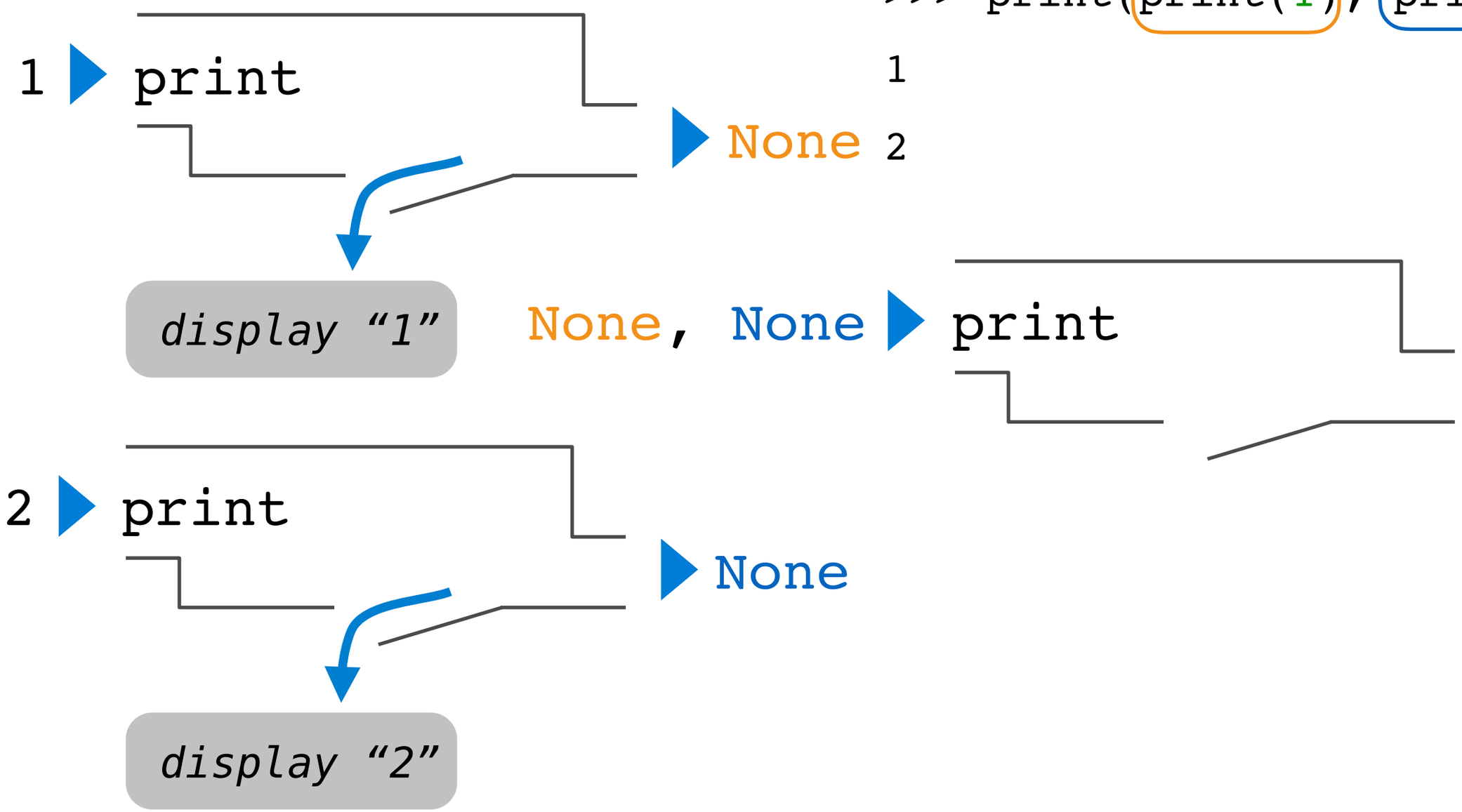

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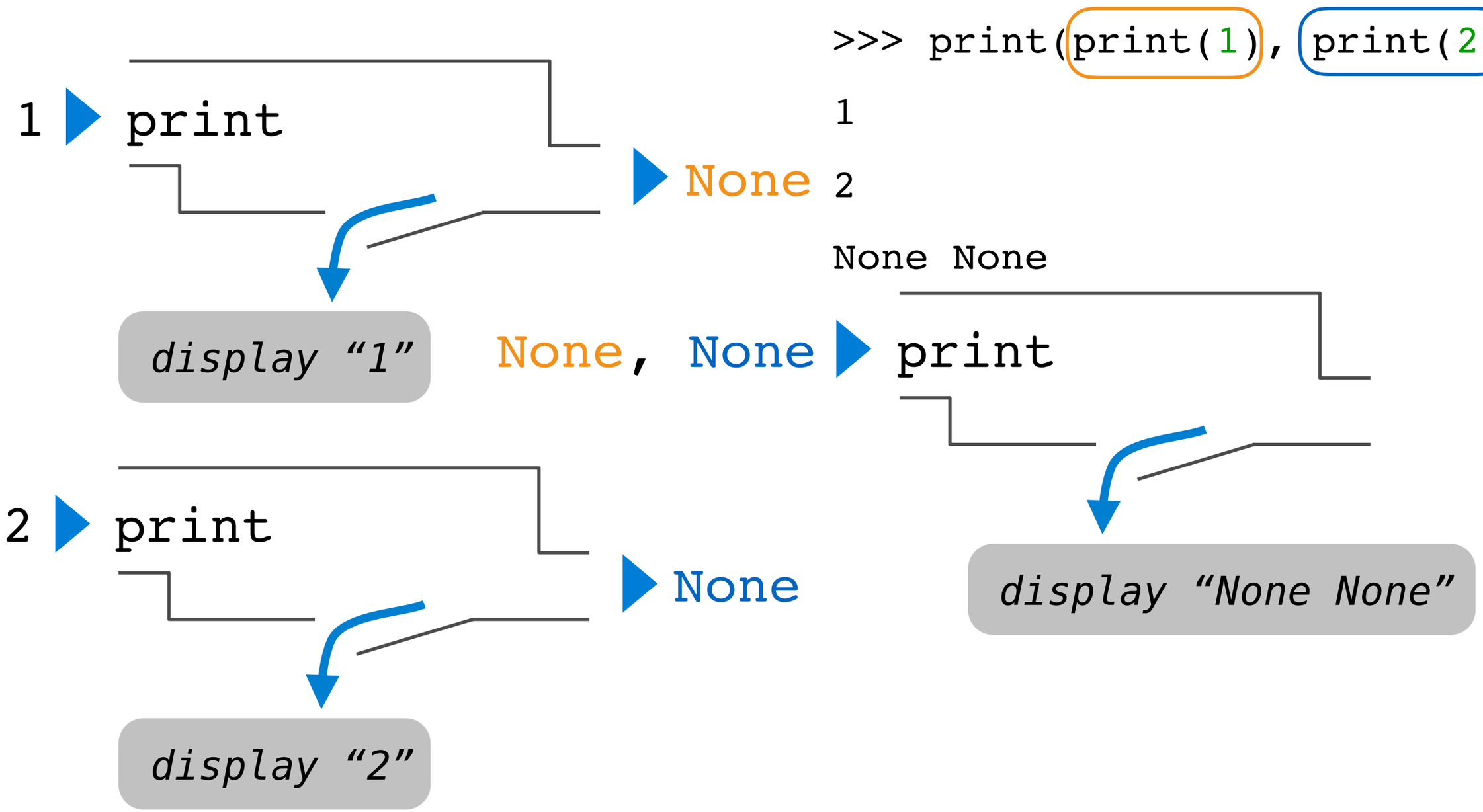

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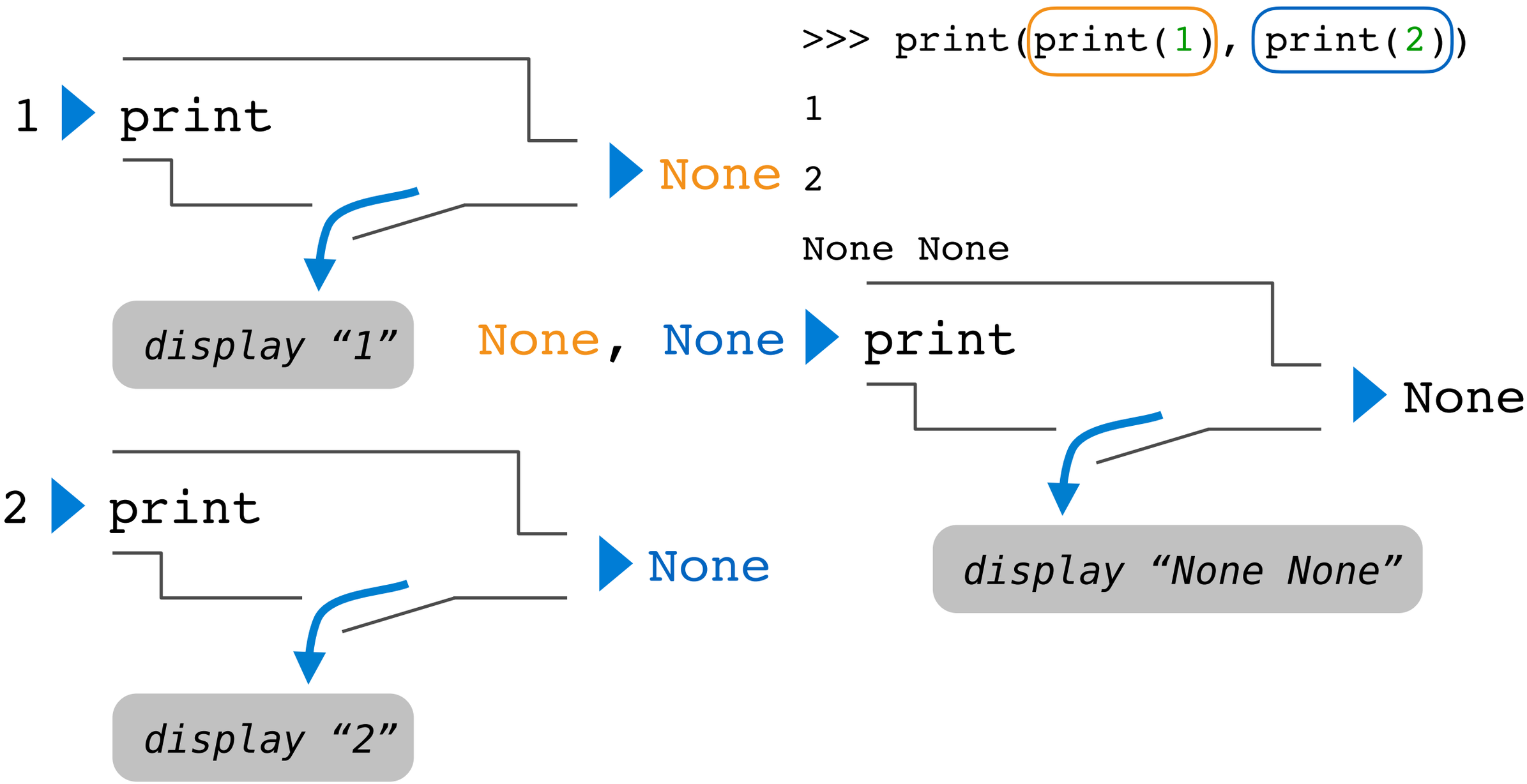

More Functions

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```
>>> four = describe(square, -2)
Calling function with argument -2
Result was 4
>>> four
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>>> sixteen = describe(square, four)
```

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Calling function with argument -2
Result was 4
>>> four
4
>>> sixteen = describe(square, four)
Calling function with argument 4
Result was 16
```

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Result was 4
>>> four
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Calling function with argument 4
Result was 16
>>> sixteen
```

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Result was 4
>>> four
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>>> sixteen = describe(square, four)
Calling function with argument 4
Result was 16
>>> sixteen
16
```

More Functions (demo)

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>>> four
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Calling function with argument 4
Result was 16
>>> sixteen
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```