[301] Programming

Tyler Caraza-Harter

Learning Objectives

Skills:

- Run Python
- Run PyCharm

Learn common Python operators:

- Mathematical (e.g., “+” and “-“)
- Comparison (e.g., “==” and “>”)
- Logical (e.g., “and” and “not”)

Learn about different data types:

- int, float, str, bool

Learn about boolean logic

Today's Outline

Software

- Interpreters
- Editors

Demos

Operator Precedence

Demos

Boolean Logic

Demos

What you need to write/run code

An interpreter

- Python 3 (not Python 2)
- We prefer you install Python 3 with Anaconda
(Anaconda is not strictly necessary yet)

An editor

- Which one doesn’t matter much
- PyCharm is a good choice, and is installed in the labs

Interpreter

A program that runs a program

- Translates something human likes (nice Python code) to something the machine likes (ONEs and ZEROs)

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Worksheet:
Put 11 in
the box

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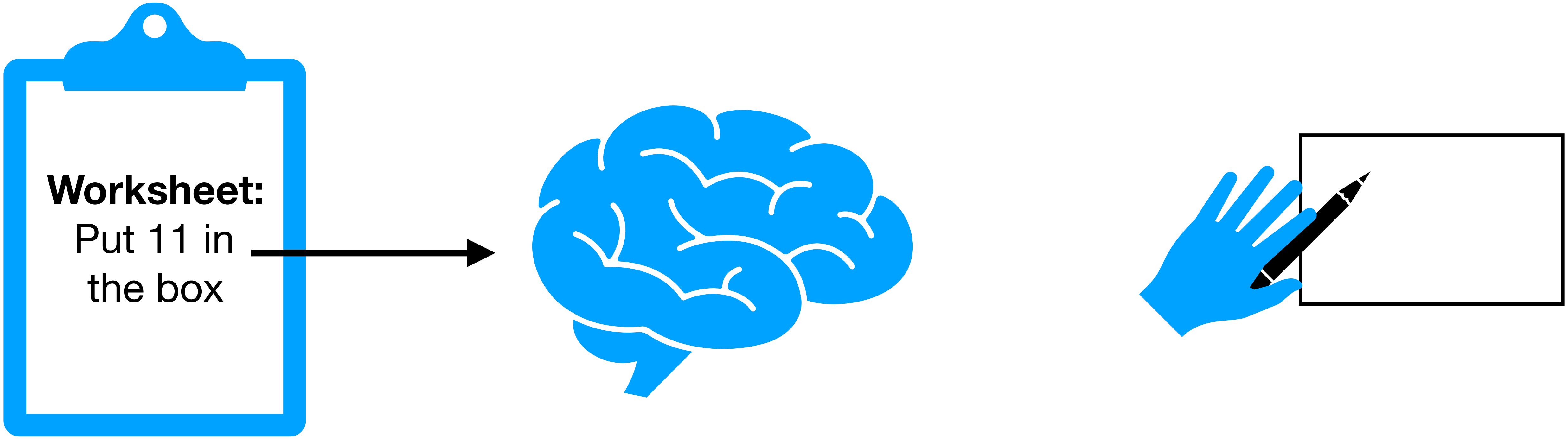

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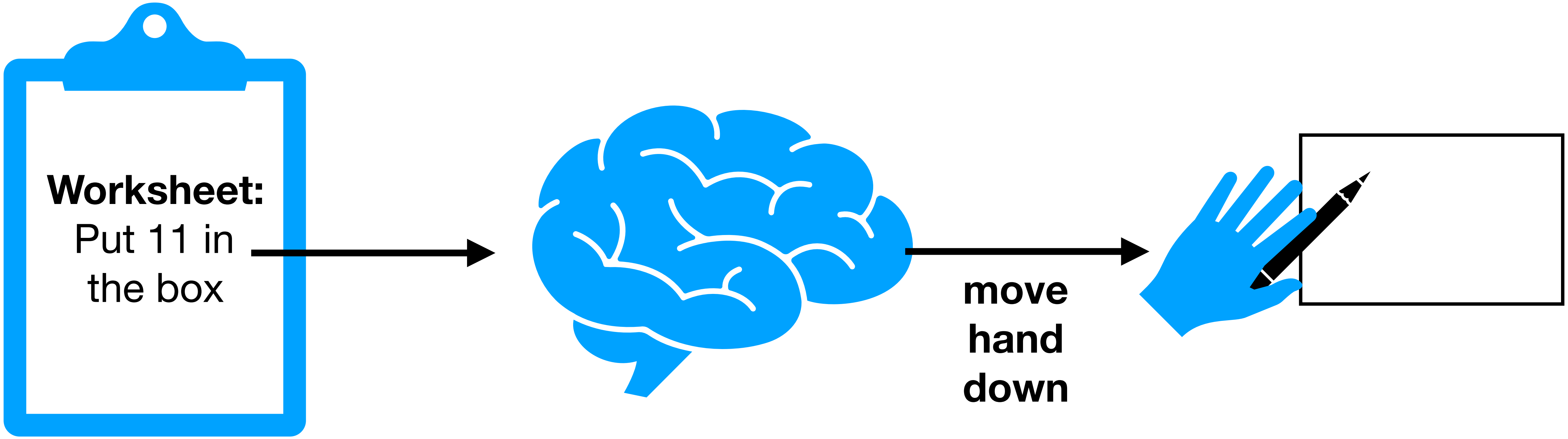

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**move
hand
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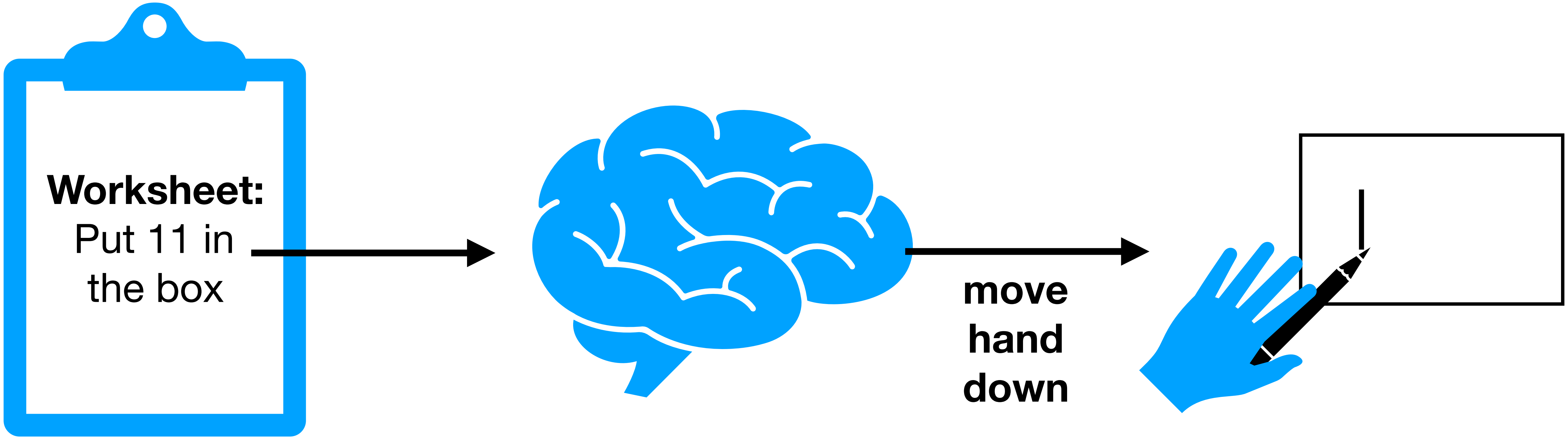

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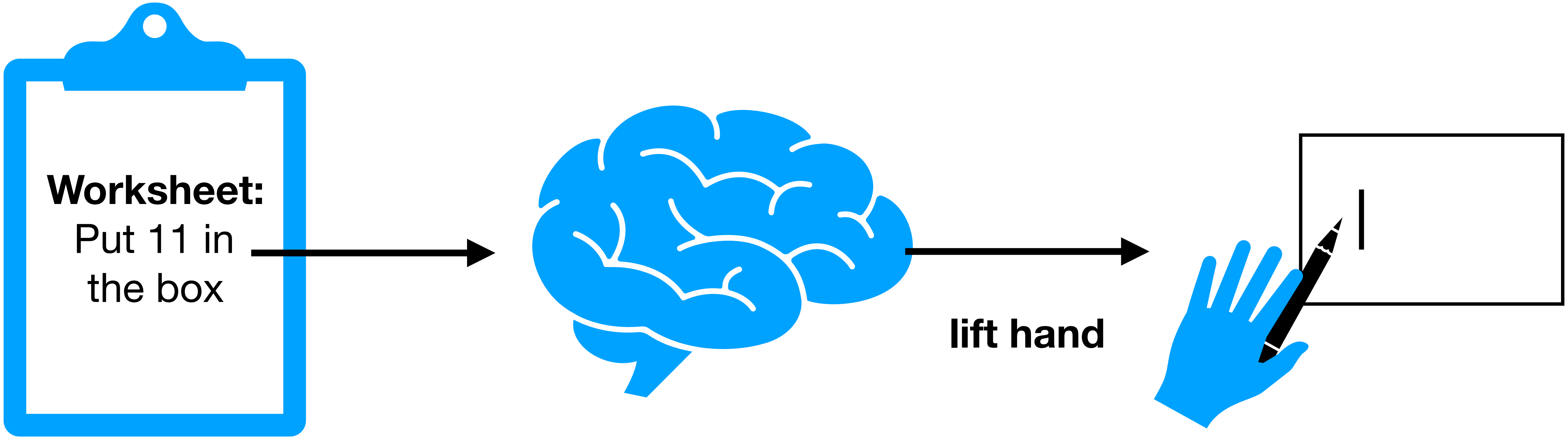

Worksheet: Put 11 in the box

lift hand

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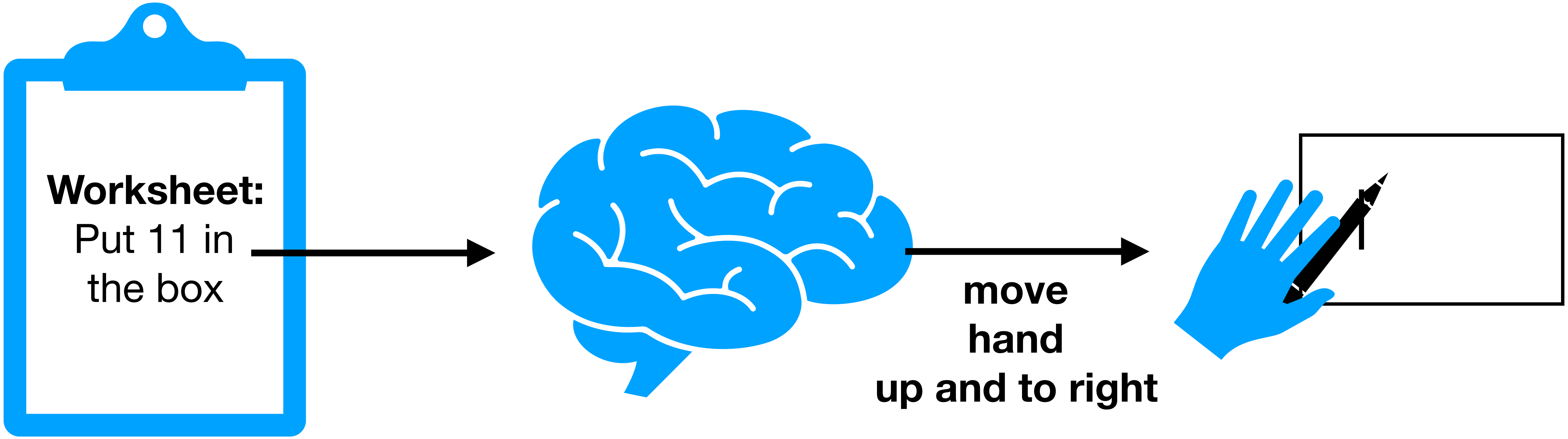

Worksheet:
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the box

**move
hand
up and to right**

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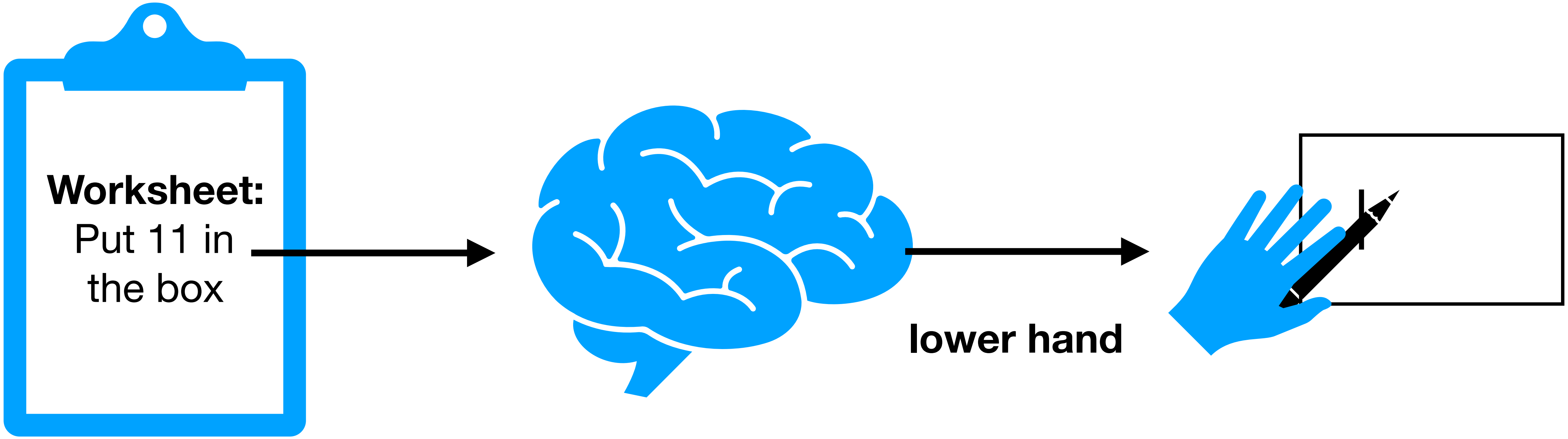

Worksheet: Put 11 in the box

lower hand

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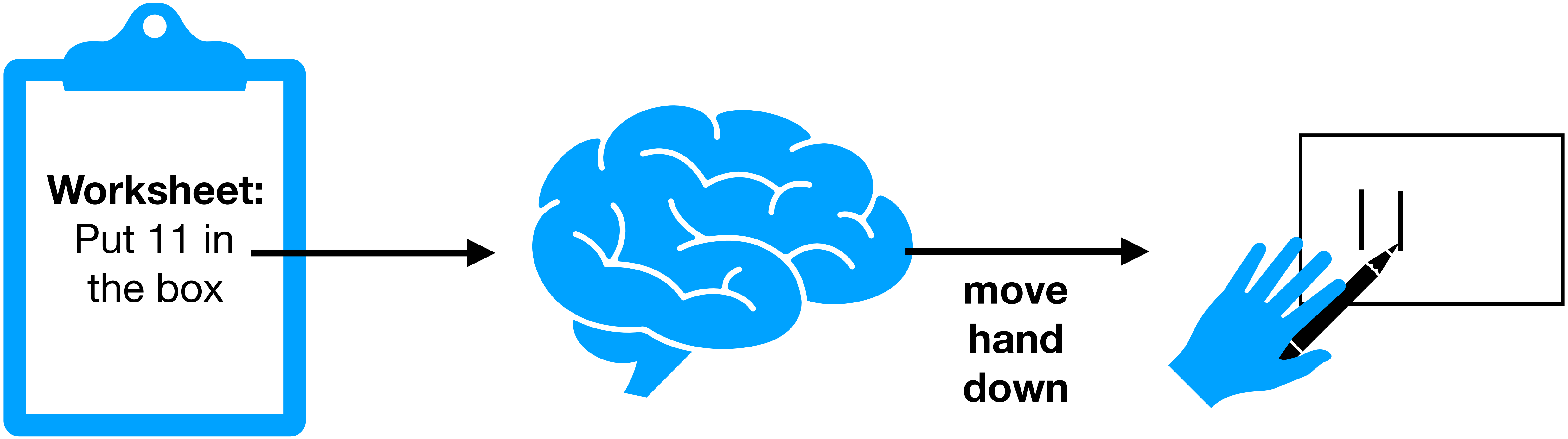

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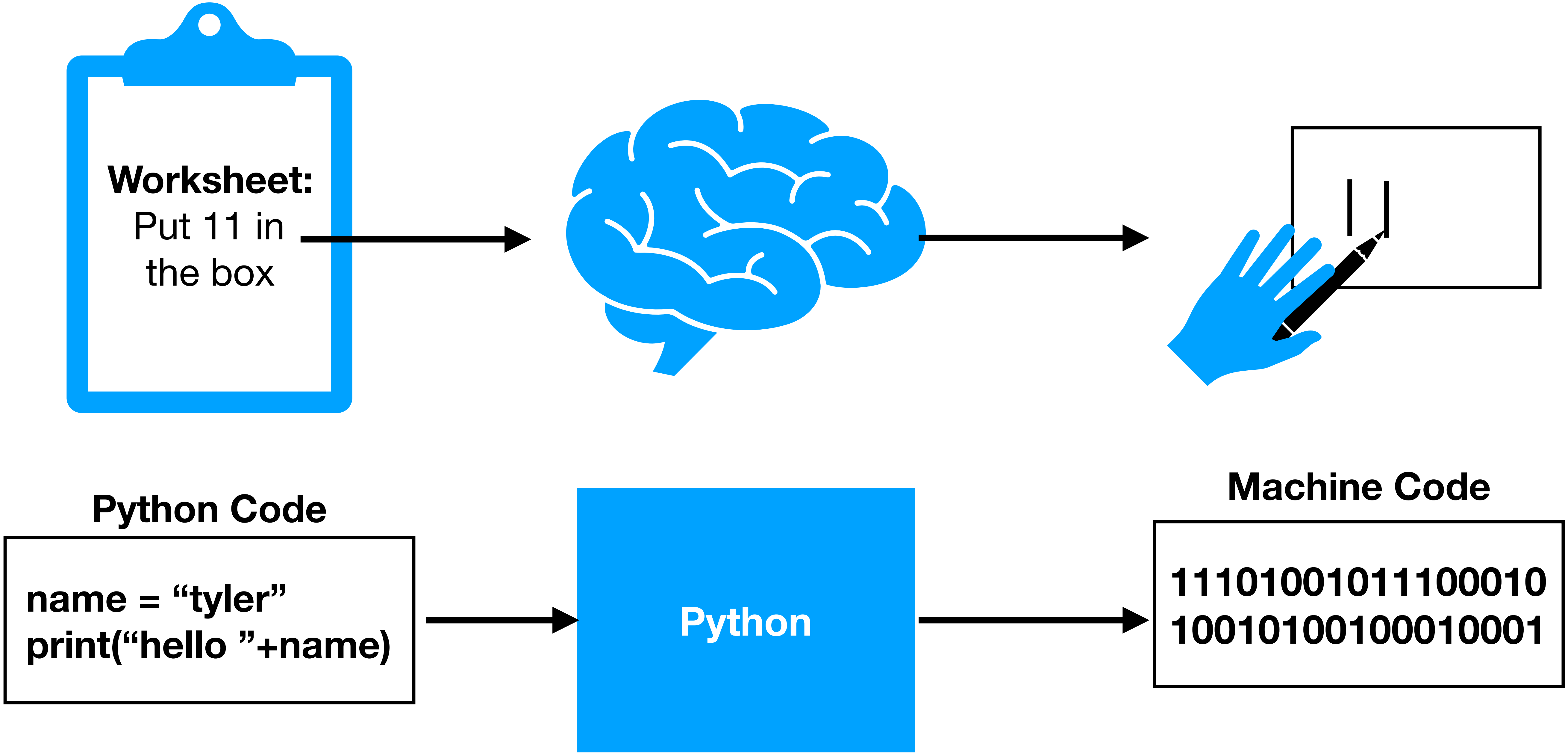

Worksheet:
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Python Code

```
name = “tyler”
print(“hello ”+name)
```

Python

Machine Code

```
11101001011100010
10010100100010001
```

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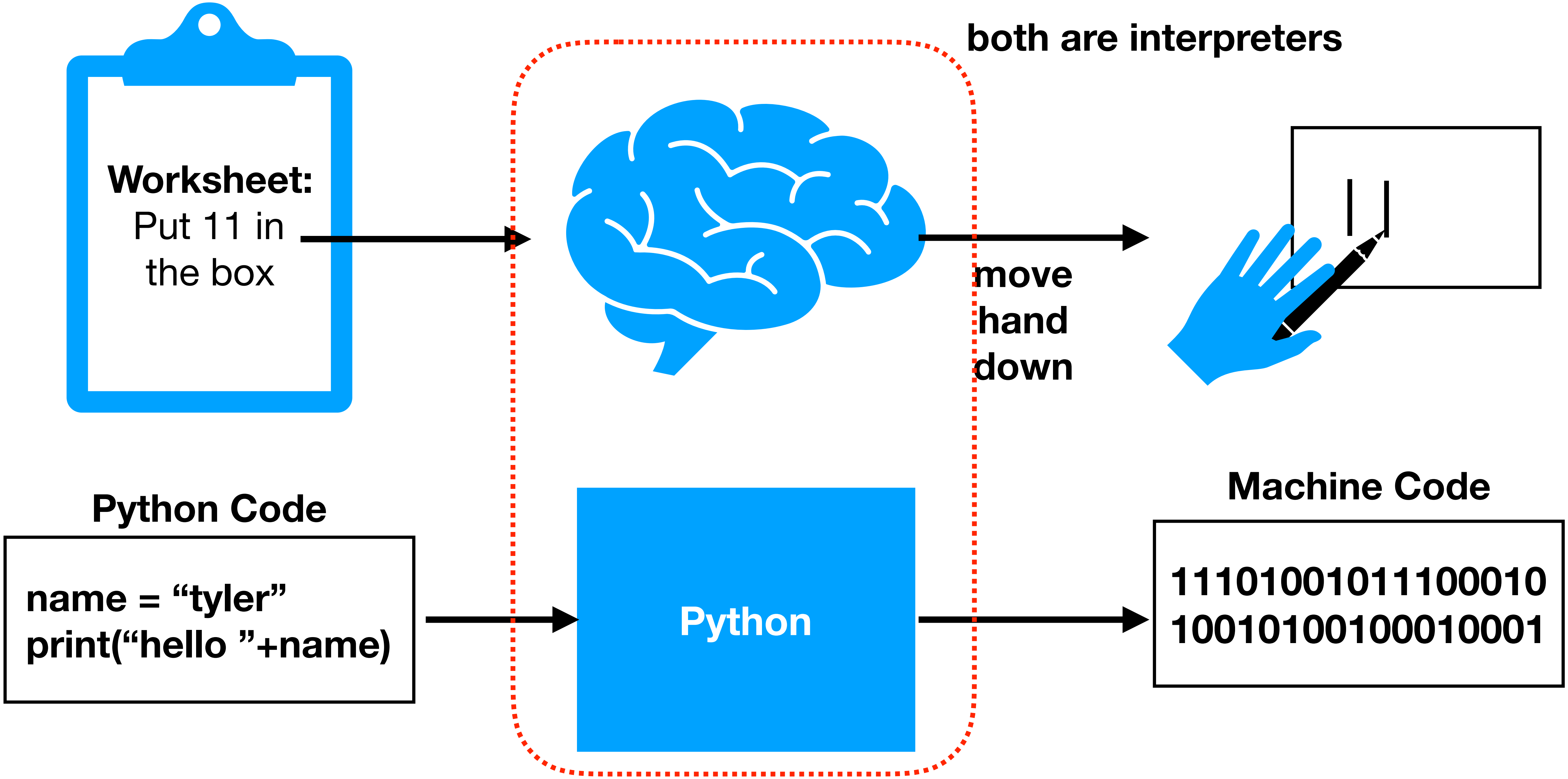

Worksheet:
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both are interpreters

move hand down

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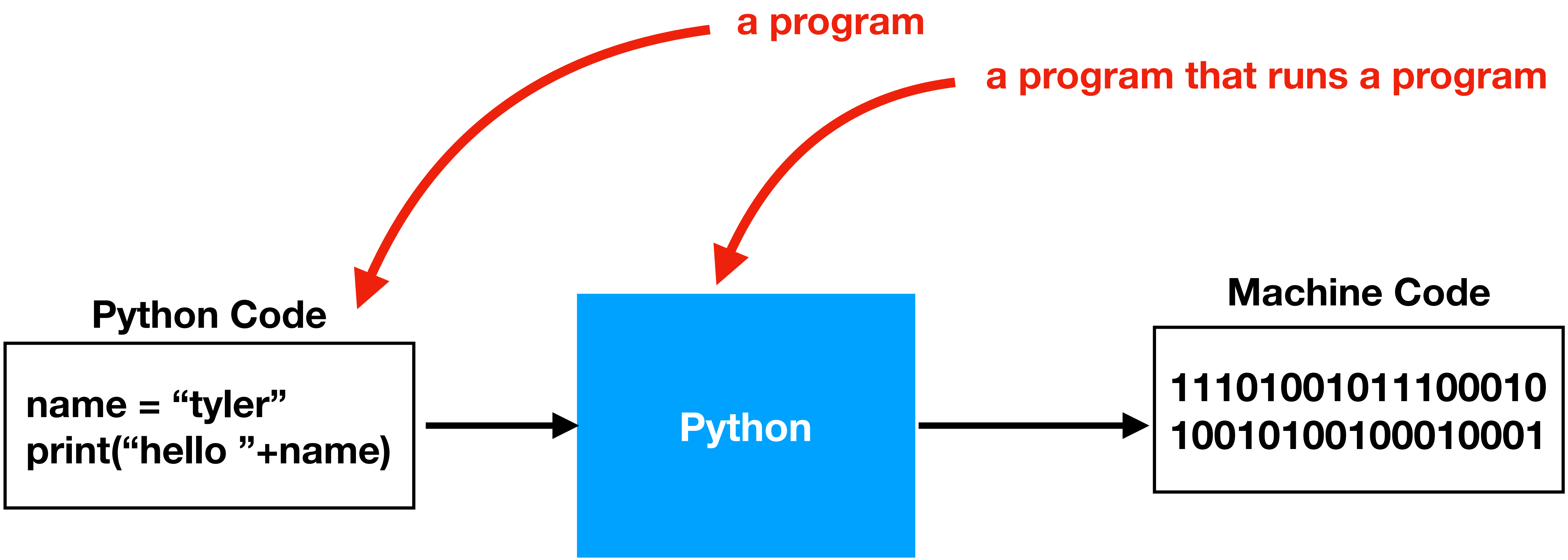

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Editor

Program for writing code and other simple files

- Many different editors could be used to write the same code, just like many different web browsers could access the same site

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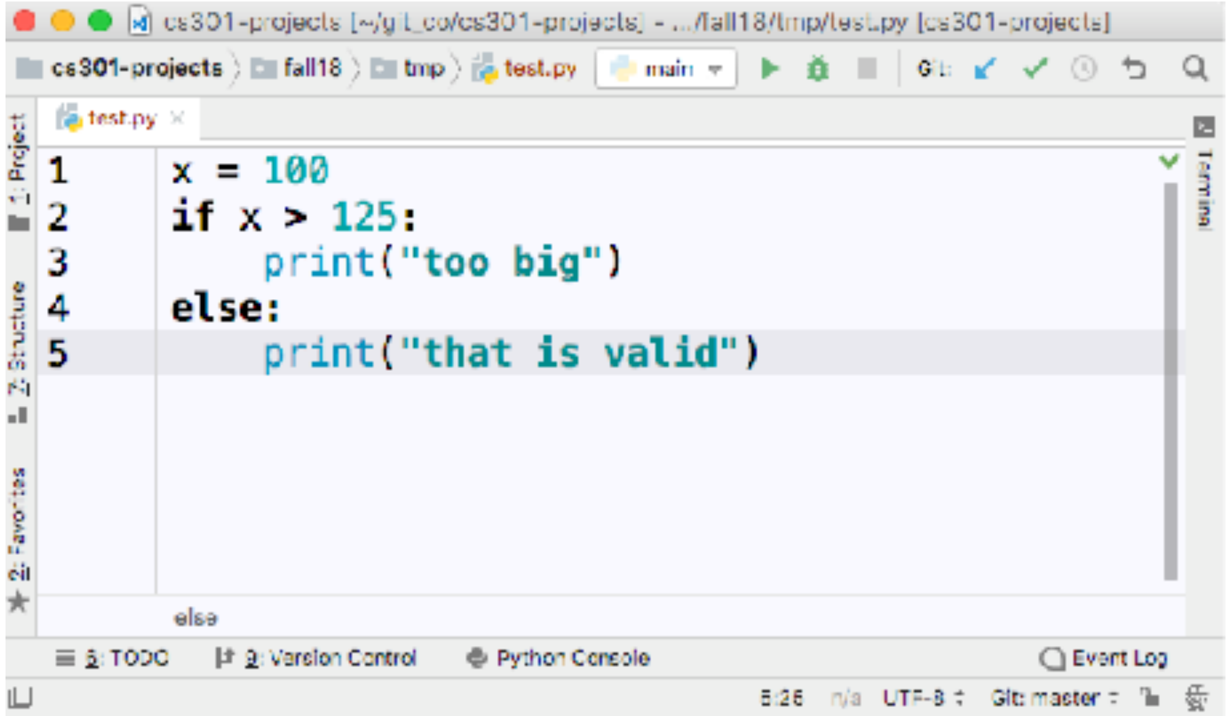
Program for writing code and other simple files

- Many different editors could be used to write the same code, just like many different web browsers could access the same site
- Why does it matter what you use?
    1. Some have a builtin terminal
    2. They add helpful color to your code

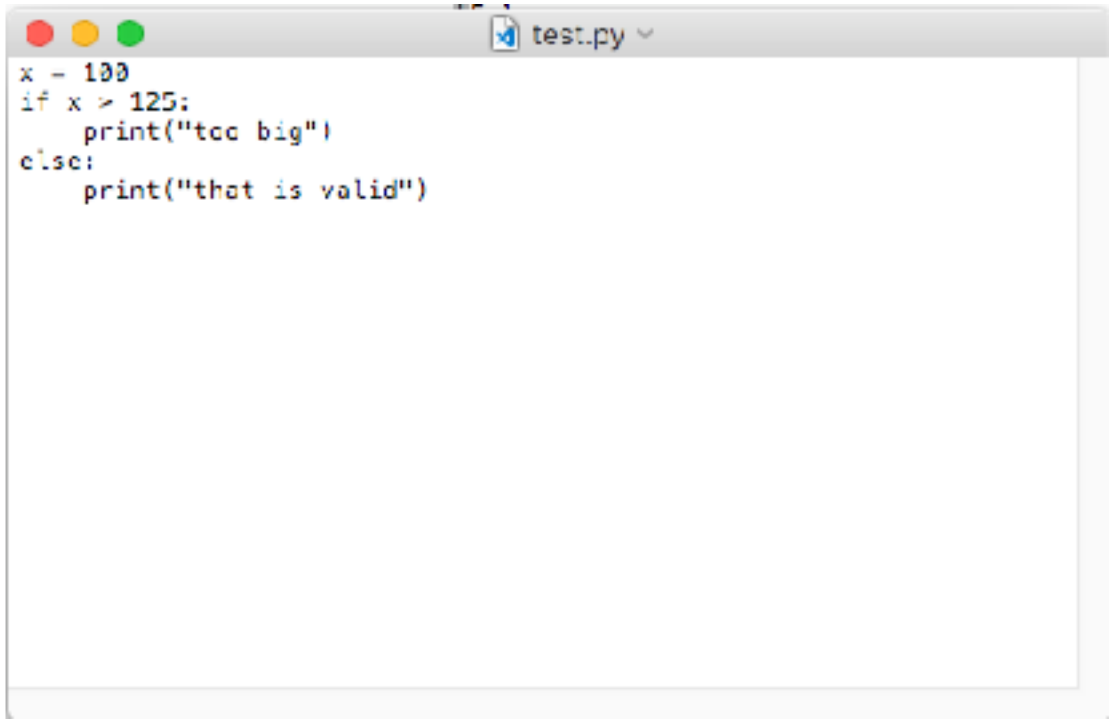
PyCharm



```
x = 100
if x > 125:
    print("too big")
else:
    print("that is valid")
```

else

TextEdit



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Order of Simplification

Python works by simplifying, applying one operator at a time

3 * 3 + 2 * 2 + 16 ** (1/2)

Rules

- First work within parentheses
- Do higher precedence first
- Break ties left to right

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3 * 3 + 2 * 2 + 16 ** (**0.5**)

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3 * 3 + 2 * 2 + ~~16 ** (0.5)~~

3 * 3 + 2 * 2 + **4**

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3 * 3 + 2 * 2 + 16 ** (1/2)
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3 * 3 + 2 * 2 + 16 ** (1/2)

3 * 3 + 2 * 2 + 16 ** (0.5)

~~3 * 3~~ + 2 * 2 + 4

9 + 2 * 2 + 4

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9 + 4 + 4
~~13 + 4~~

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9 + 2 * 2 + 4

9 + 4 + 4

~~13 + 4~~

17

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Operator Precendence

What is it?	Python Operator
exponents	**
signs	+x, -x
multiply/divide	*, /, //, %
add/subtract	+, -
comparison	==, !=, <, <=, >, >=
boolean stuff	not
…	and
…	or

simplify first

simplify last

these are the ones you should be learning at this point in the semester (there are a few more not covered now)

Operator Precendence

	What is it?	Python Operator	
Mathematical	exponents	**	simplify first
	signs	+x, -x	
	multiply/divide	*, /, //, %	
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	comparison	==, !=, <, <=, >, >=	
Logic	boolean stuff	not	
	…	and	
	…	or	simplify last

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