CS61A

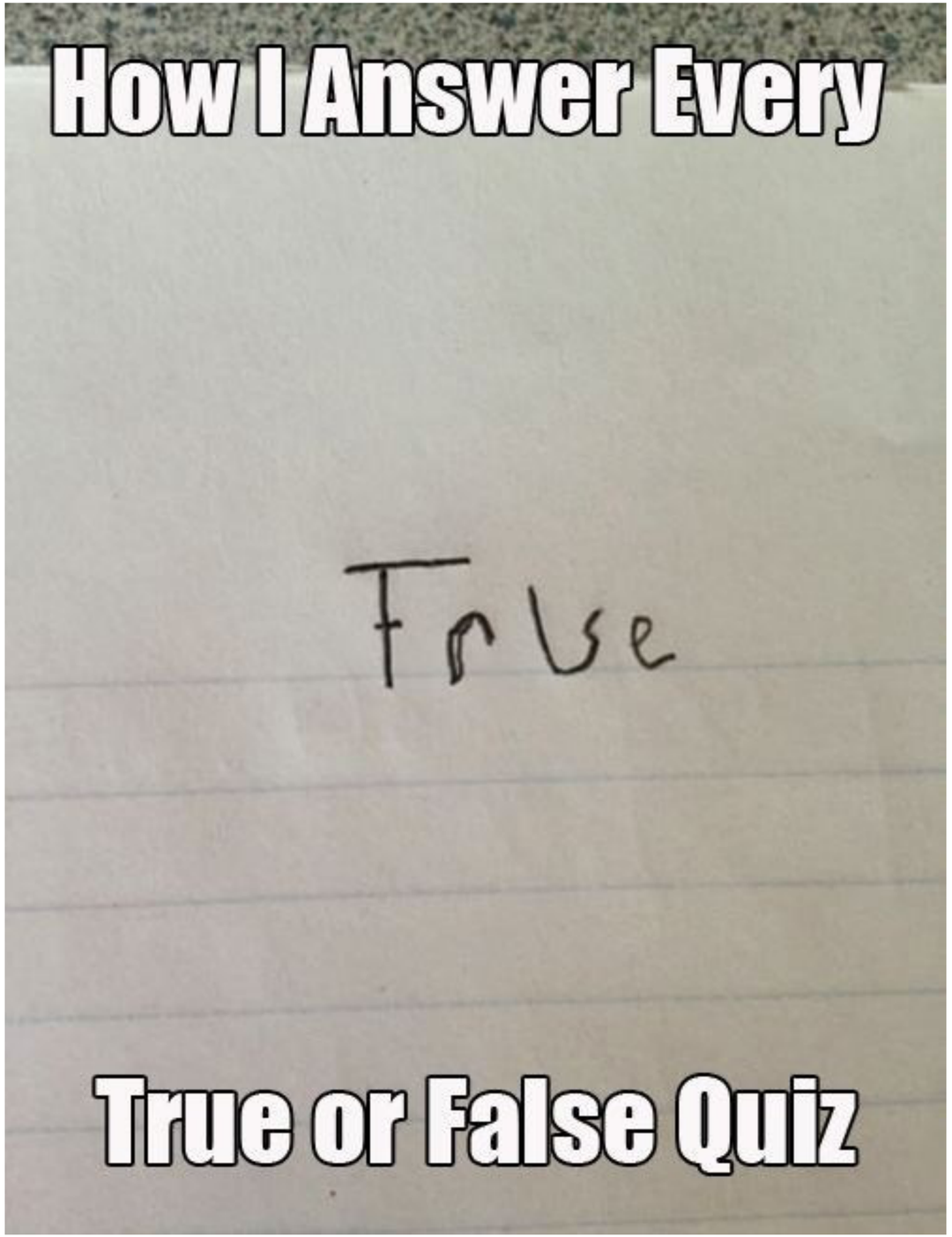
section 1

attendance

http://links.cs61a.org/jasonxu

upcoming

lab 0
lab 1
hw 1
hog



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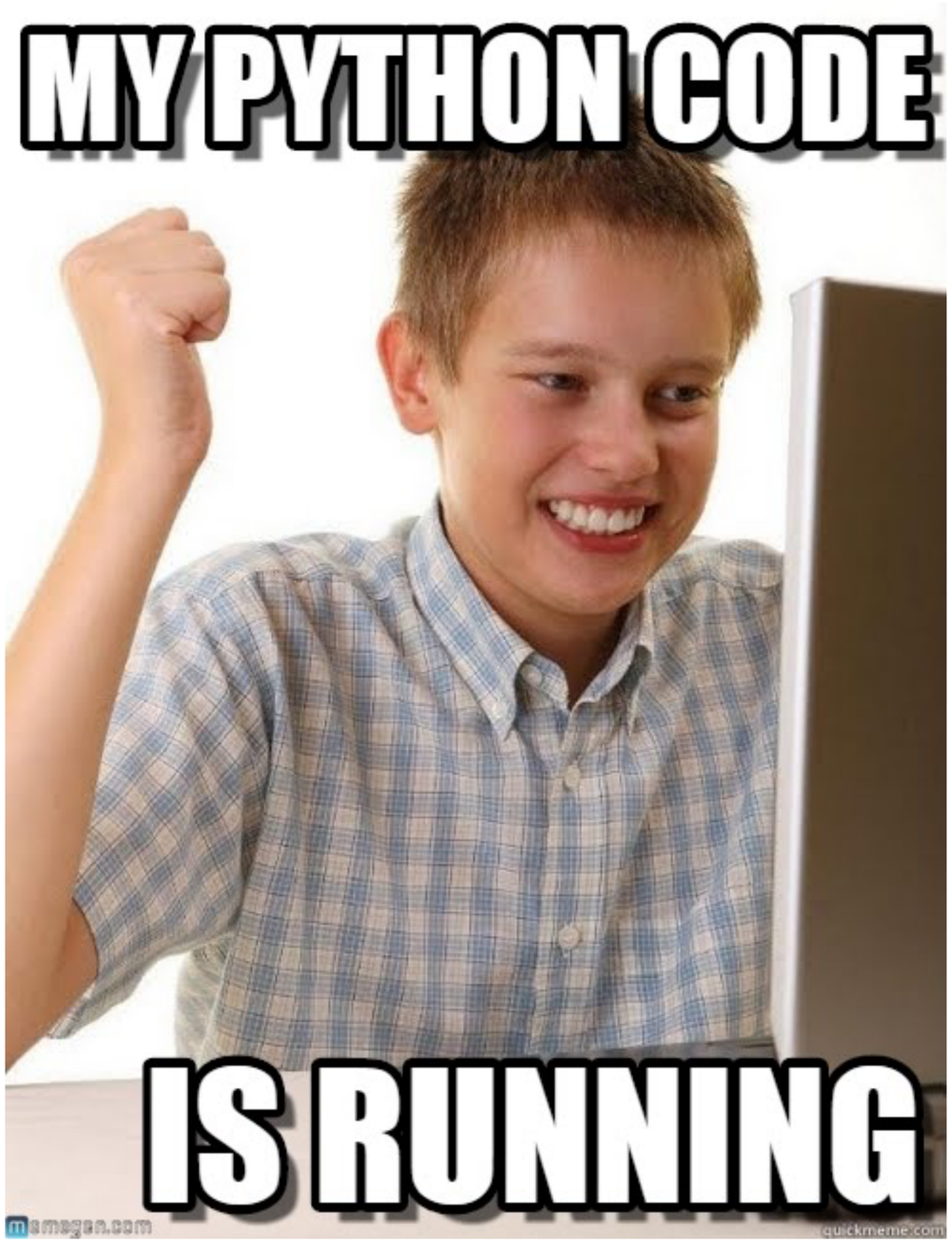
lab 0



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today

a lot of mechanical details

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today

a lot of mechanical details

not much why, just is today

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today

a lot of mechanical details

not much why, just is today

“setting up the rules of the game”

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functions

There are 2 things to consider for a function

1. Input/Output of function

2. Body of function

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functions

There are 2 things to consider for a function

1. Input/Output of function

2. Body of function

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function calls

$f(3 \times 2) =$

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function calls

$f(3 \times 2) =$ **?**

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function calls

$f(x) = 2x$ general formula, i can put in any x that is a number

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function calls

$f(x) = 2x$ general formula, i can put in any x that is a number

$x = 3 \times 2$

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function calls

$f(x) = 2x$ general formula, i can put in any x that is a number

$x = 3 \times 2$

$f(x) = 12$ i know f, x, can solve!

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function calls

$f(x) = 2x$ $\qquad$ $double(z) = 2z$

$x = 3 \times 2$ $\qquad$ $x = 3 \times 2$

$f(x) = 12$ $\qquad$ $double(x) = 12$

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function calls

$$f(x) = 2x \qquad double(z) = 2z \qquad double(z) = 2z$$

$$x = 3 \times 2 \qquad x = 3 \times 2 \qquad double(3 \times 2)$$

$$f(x) = 12 \qquad double(x) = 12 \qquad = 12$$

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black boxes

we’re going to use these to see an abstract picture of functions

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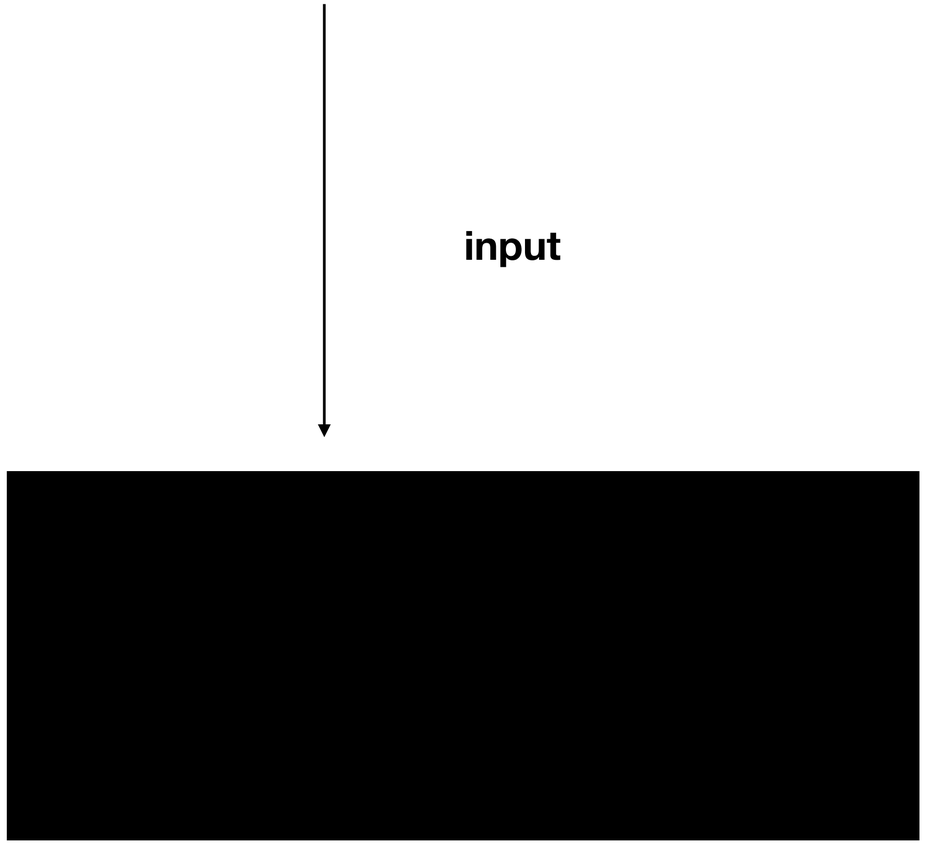

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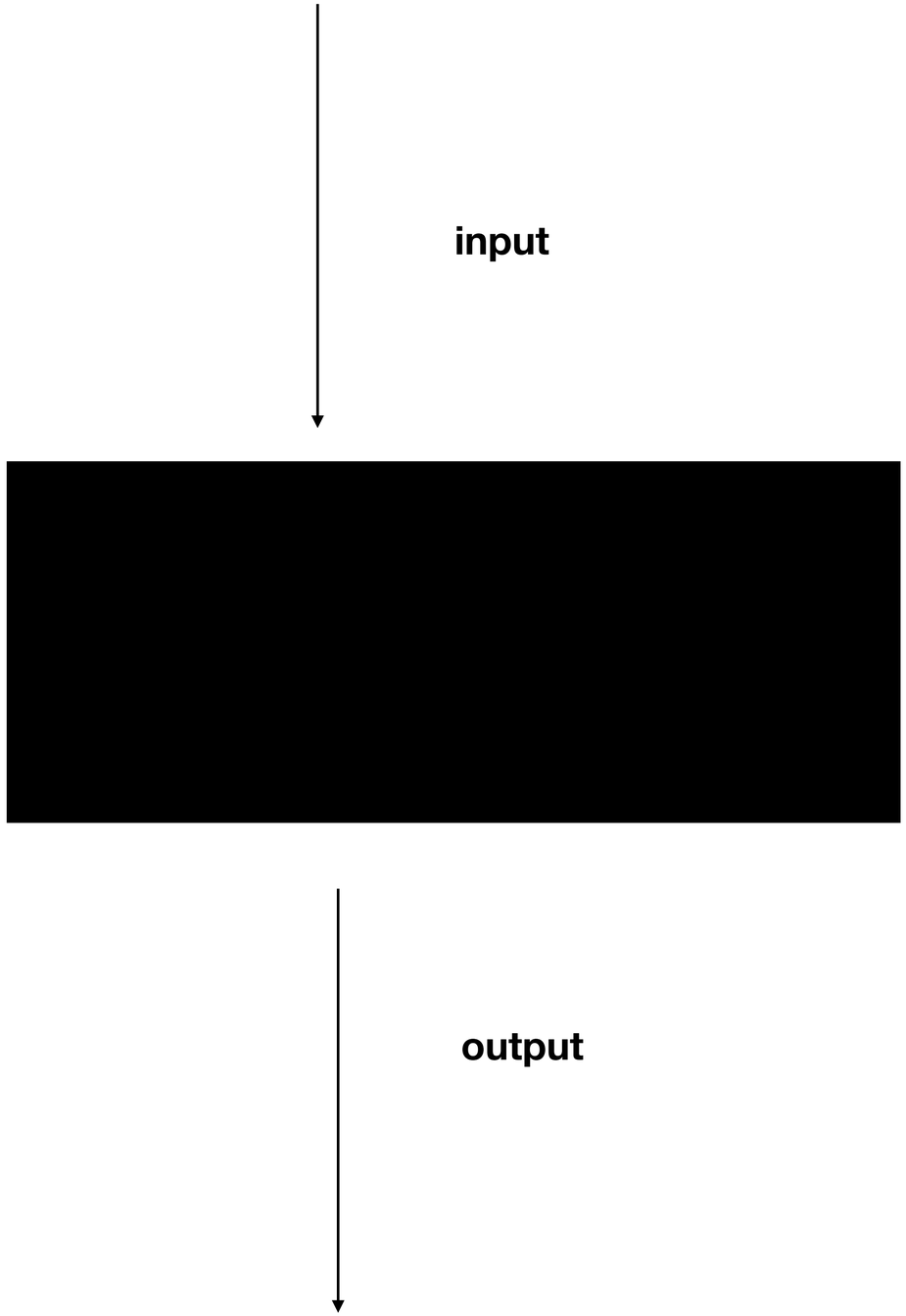

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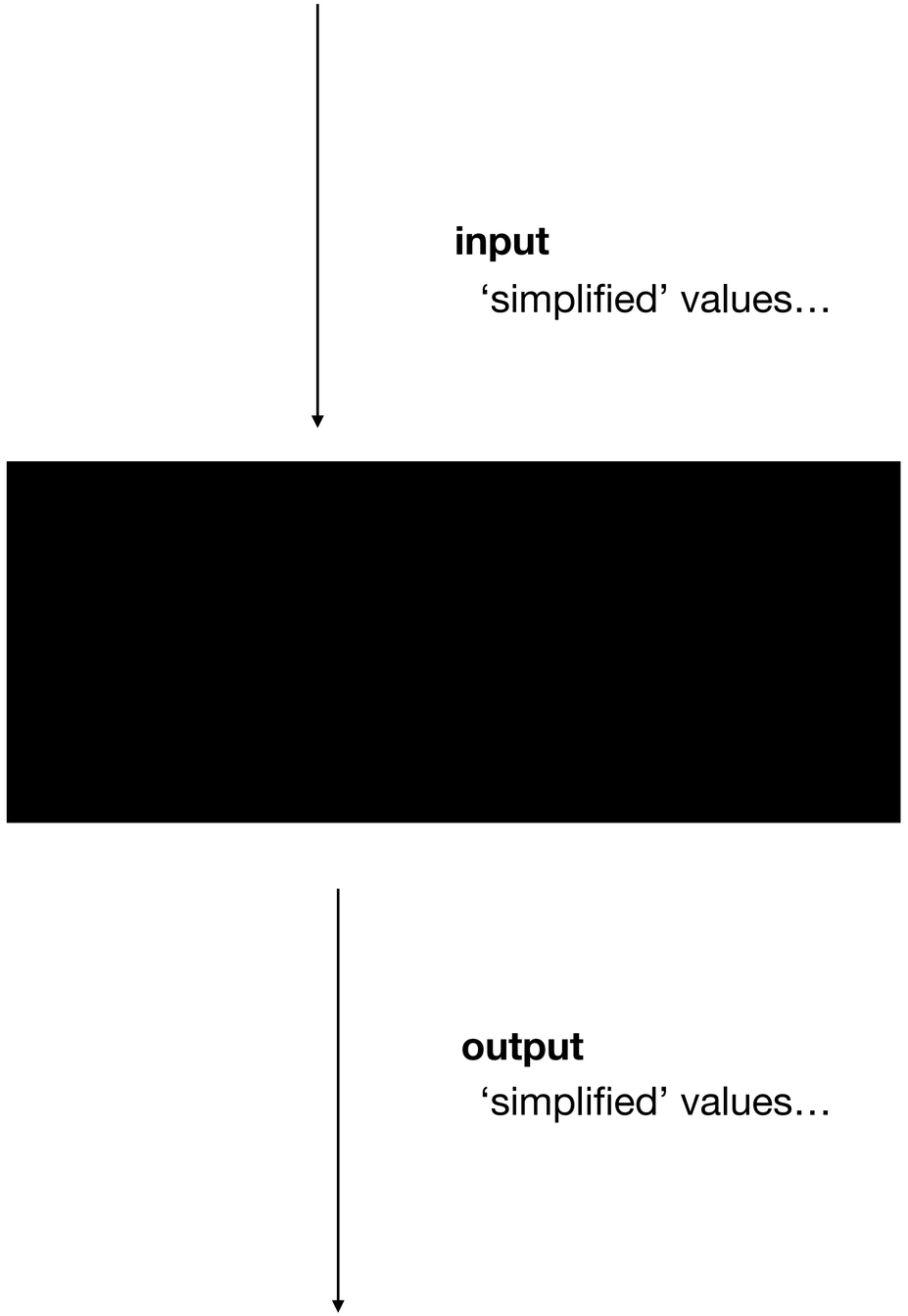

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values

Type	Values	Literals (Denotations)
Integers	$0 \quad -1 \quad 16 \quad 13$	`0 -1 0o20 0b1101`
	36893488147419103232	`0x20000000000000000`
Boolean (truth) values	true, false	`True False`
"Null"		`None`
Functions		`operator.add, operator.mul, operator.lt, operator.eq`
Strings	Say "Hello"	`"Say \"Hello\""`

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black boxes

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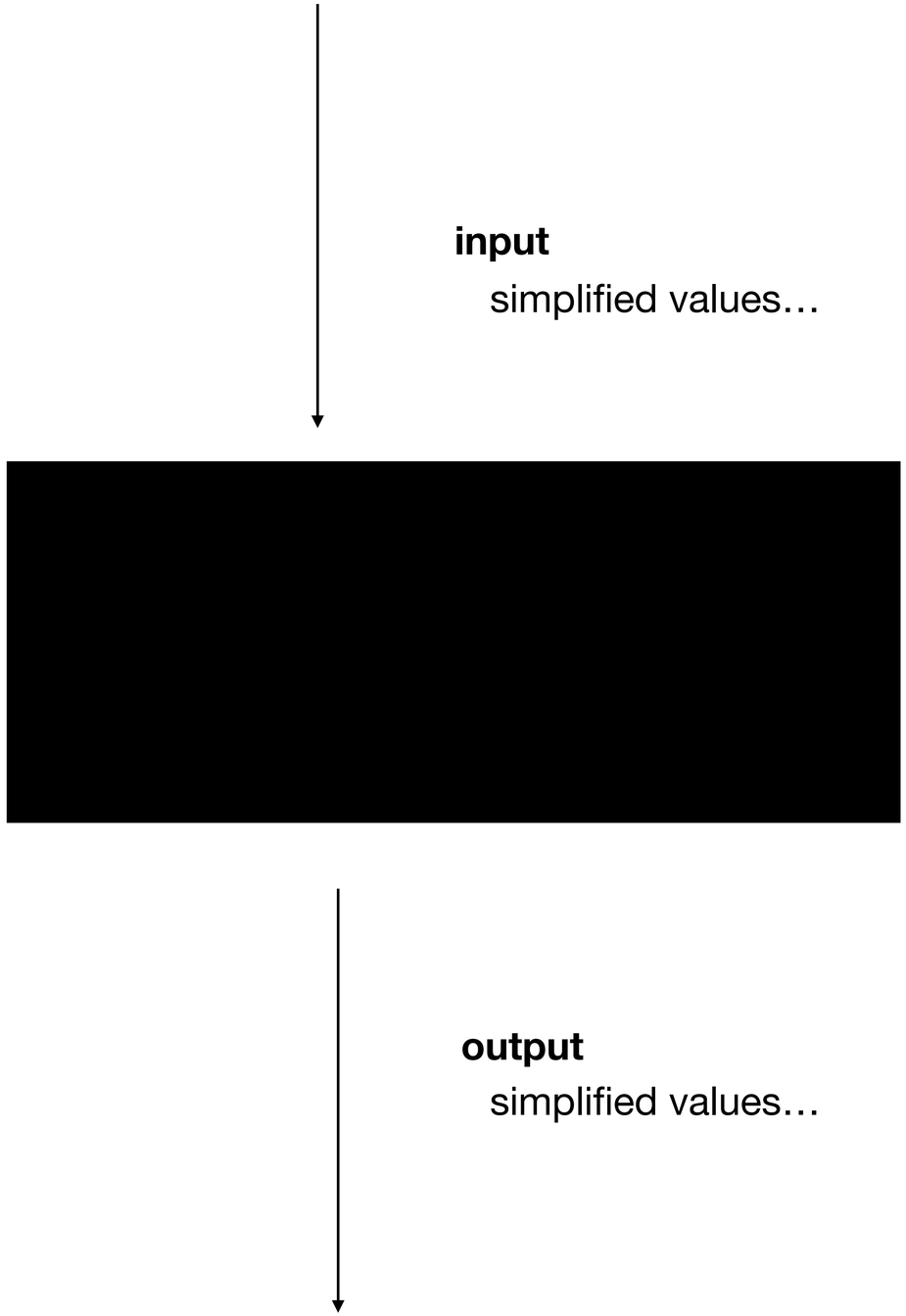

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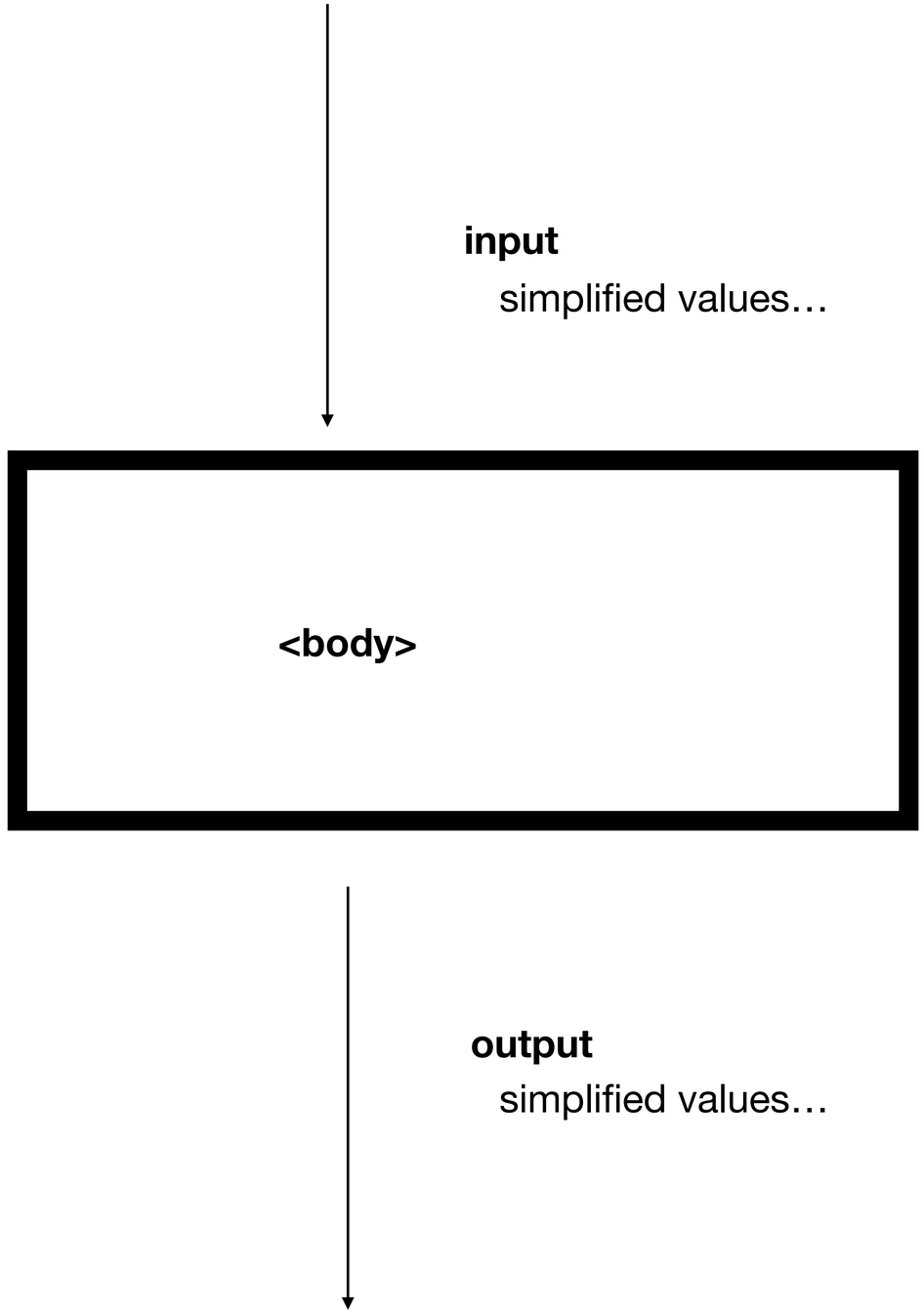

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function calls

```
> max(10 + 5, 9, double(18))
36
```

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function calls

```
> max(10 + 5, 9, double(18))
36
```

```
max
10 + 5 = 15
9 = 9
double(18) = 36
max(15, 9, 36)
= 36
```

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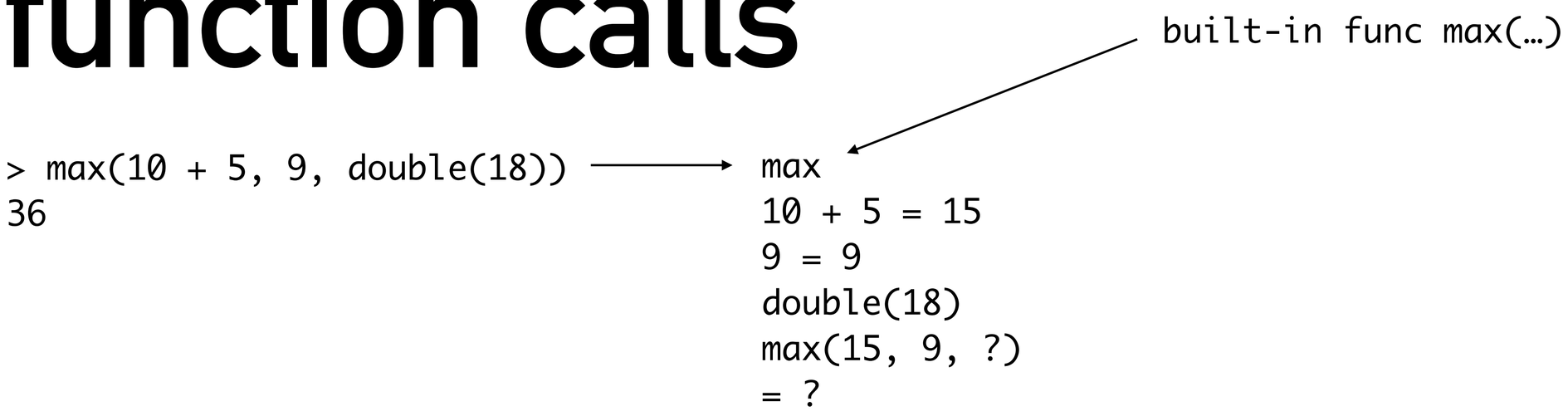
function calls



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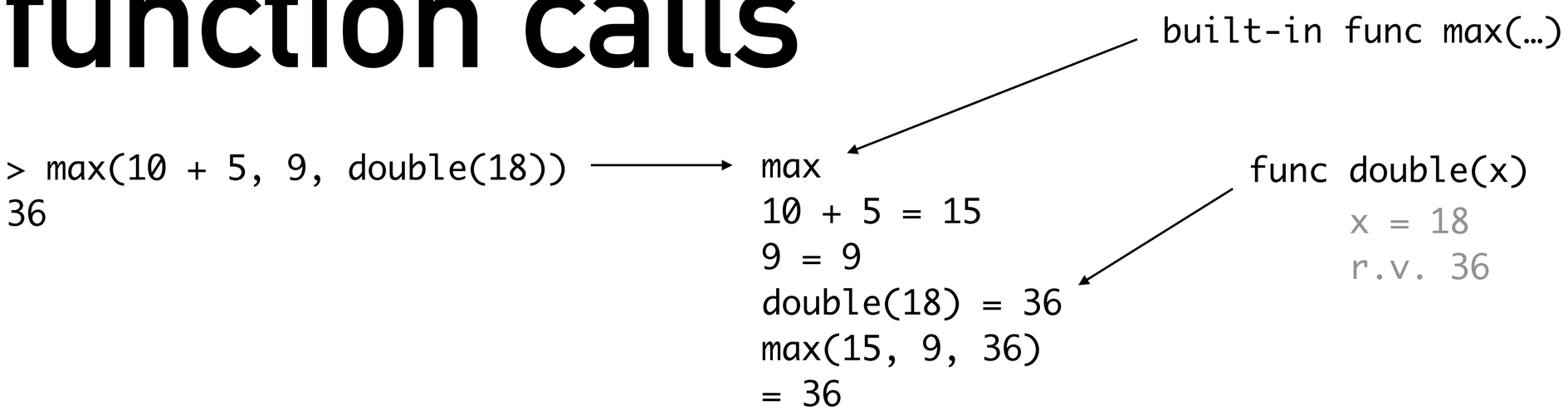
function calls



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function calls

```
> max(10 + 5, 9, double(18))
36
```



```
max
10 + 5 = 15
9 = 9
double(18) = 36
max(15, 9, 36)
= 36
```

if any part of this breaks,
you get an error and stops

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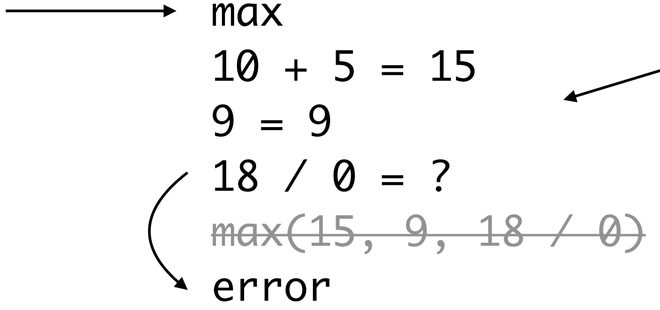
function calls

```
> max(10 + 5, 9, 18 / 0)
error
```



if any part of this breaks,
you get an error and stops

typing an error != will error

EVALULATE OPERATOR
EVALUATE OPERANDS
APPLY OPERATOR

```
double(2 + 3)
double(...)
2 + 3
5
double(5)
10
```

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returning

return stops procedure and outputs something

print is an action, function

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returning

return stops procedure and outputs something

print is an action, function

```
def showFivePrint():
    x = 2 + 3
    print(x)
```

```
def showFiveReturn():
    x = 2 + 3
    return x
```

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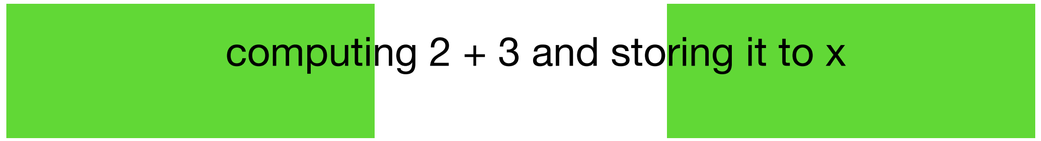

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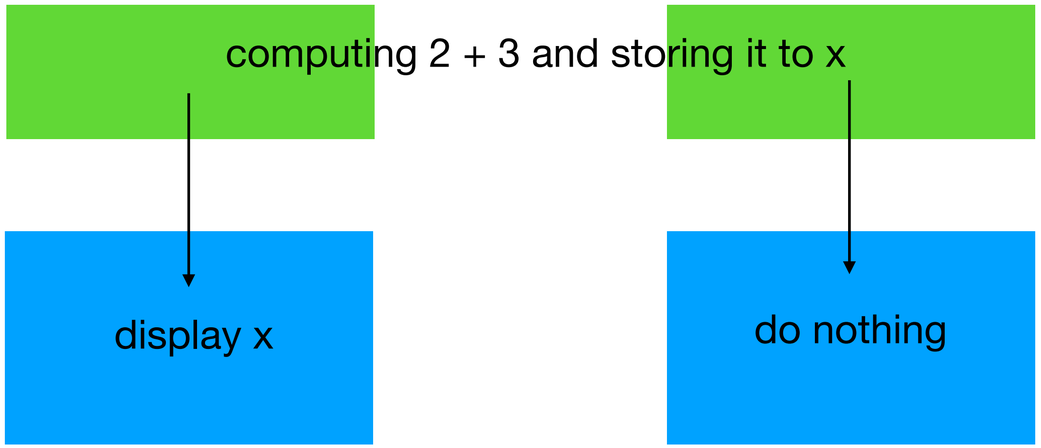

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returning

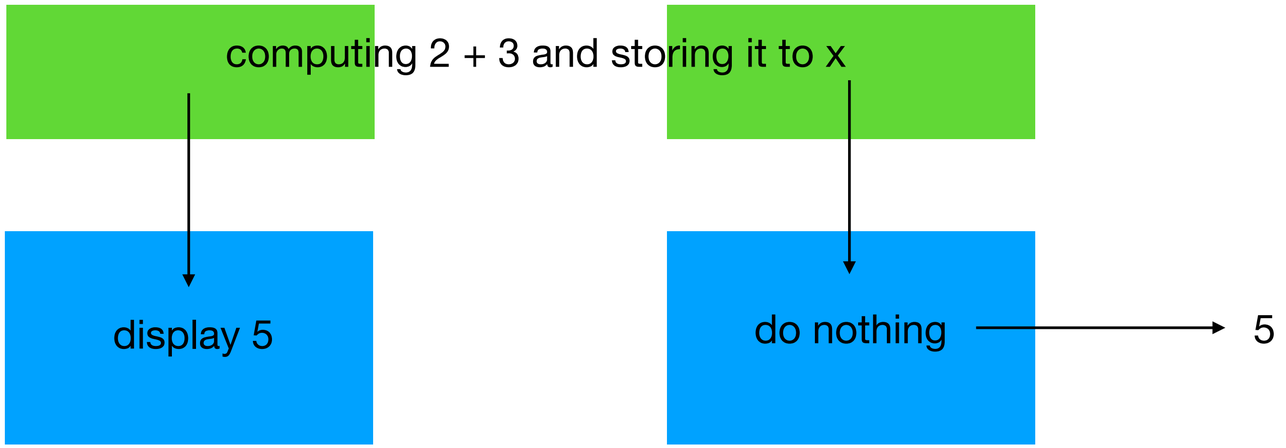
return stops procedure and outputs something

print is an action, function

every function has a return at end of None

```
def showFivePrint():
    x = 2 + 3
    print(x)
```

```
def showFiveReturn():
    x = 2 + 3
    return x
```



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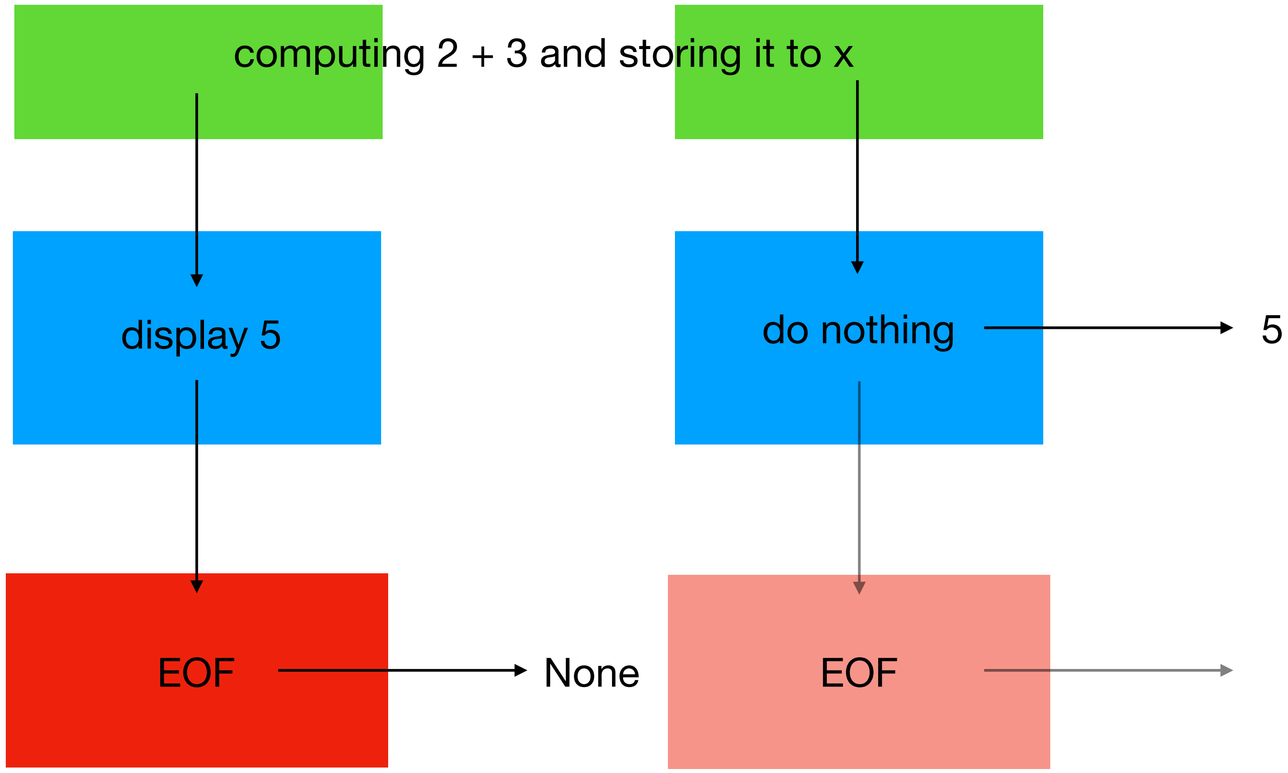
returning

return stops procedure and outputs something

print is an action, function

```
def showFivePrint():
    x = 2 + 3
    print(x)
    return
```

```
def showFiveReturn():
    x = 2 + 3
    return x
```



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returning

return stops procedure and outputs something

print is an action, function

return only 1 thing but can also return tuples (pair structures)

```
def showFivePrint():
    x = 2 + 3
    print(x)
```

```
> val = showFivePrint()
5
> val
> val is None
True
```

```
def showFiveReturn():
    x = 2 + 3
    return x
```

```
> val = showFiveReturn()
> val
5
```

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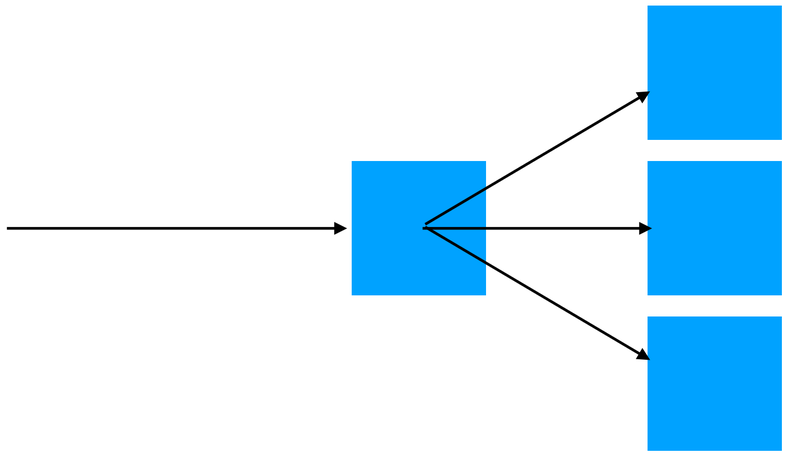
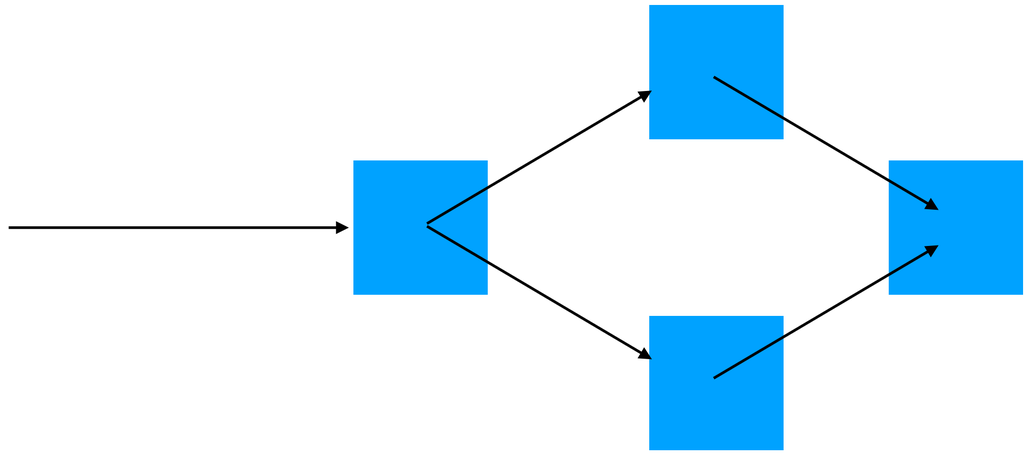
controls

```
if <predicate>:
  <do this>
elif <predicate>:
  <do this>
else:
  <do this>
```

```
if <predicate>:
  <do this>
elif <predicate>:
  <do this>
<do this>
```





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booleans

bools have rules

TRUE	FALSE
1	0
‘non-empty’ values	‘empty’ values
	None

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boolean operators

and	<a> and <b> …
or	<a> or <b> …
not	not <a>

a	b
1	0
1	1
0	0

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boolean operators

`and`	`<a> and <b> …`
`or`	`<a> or <b> …`
`not`	`not <a>`

a	b	
1	0	
1	1	**which 1?**
0	0	

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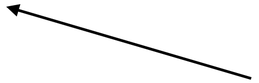
boolean operators another approach

if it’s sunny and not hot

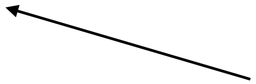
i will go for a run



only will do so when ‘<True> and <True>’

if it’s sunny or not hot

i will go for a run



will do so when either condition is true

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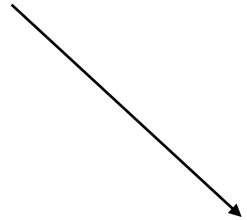
booleans

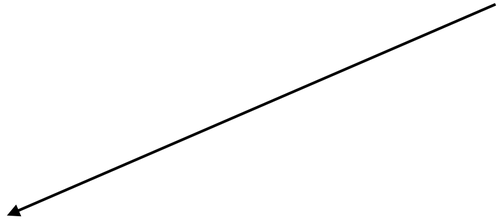
bools have rules

`and` looks for `False`

`or` looks for `True`



short circuit!



we can process faster

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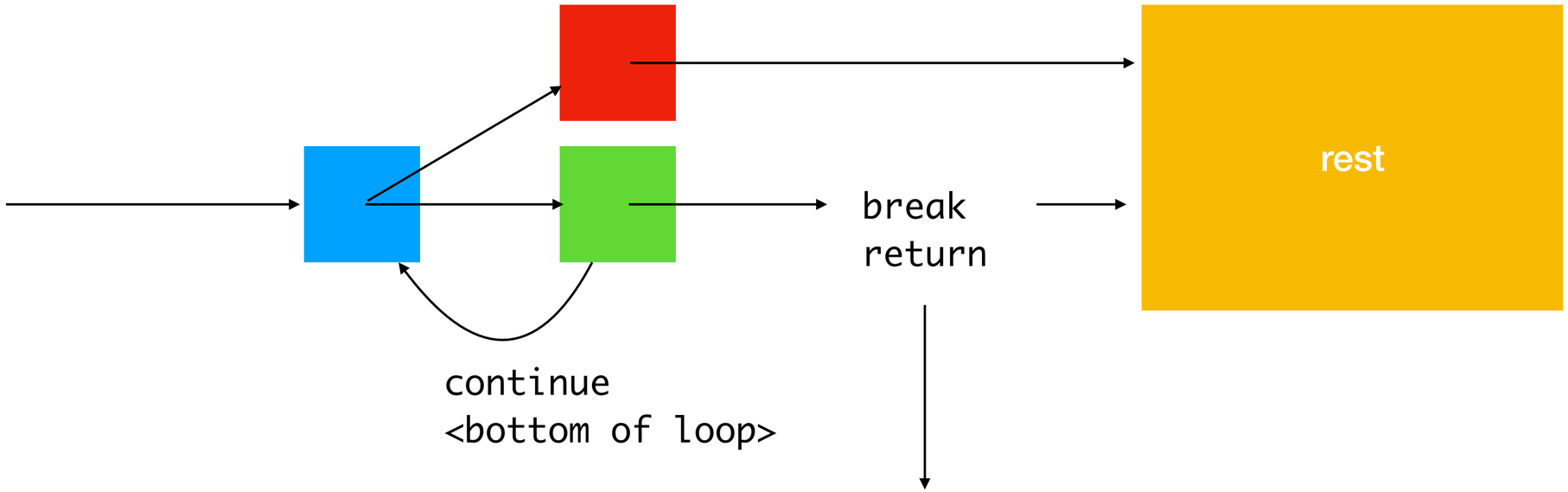
controls

```
while <this>:
  <do this>
```



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environment diagrams

worthwhile to learn

~ > 30% of MT1

all these slides… maybe too much but describe how to think in cs

which is what env diagrams do!

a lot of rules… but internalize them so they become intuitive