



**Let's pretend we're a
Python**

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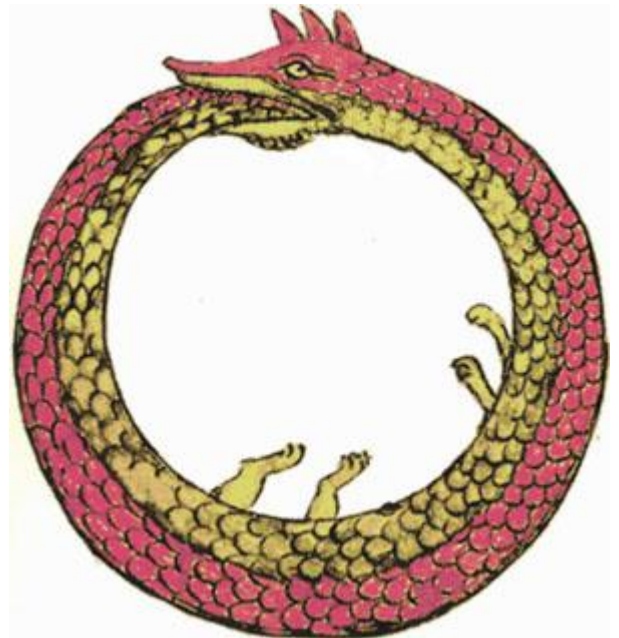
Order of operations

- `()`, making lists, making dictionaries
- `lst[4]`, `lst[2:5]`
- `function(x, y, z)`
- `-x`
- `x*y`, `x/y`, `x%y`
- `x+y`, `x-y`
- `x < y`, `x > y`, `x <= y`, `x >= y`
- `x == y`, `x != y`
- `x = 13`
- `x in [1, 2, 3]`, `x not in [1, 2, 3]`
- `not a`
- `a and b`
- `a or b`

How to evaluate things

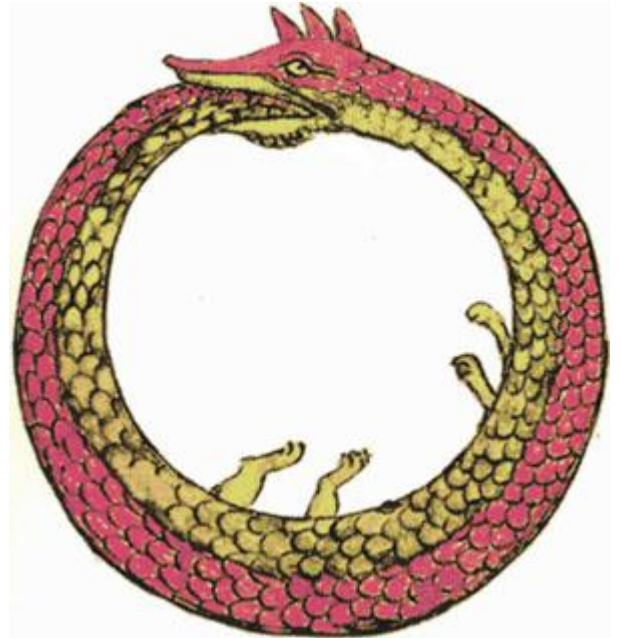
- Pick the thing that's lowest on the order of operations but don't do it yet
- Evaluate the arguments, and substitute in the results*
- Do the operation

* Some operators are special and don't evaluate all the sides -- go for the left side first



How to evaluate things

- Note that this procedure results in you actually **doing** the things higher in the order of operations first.

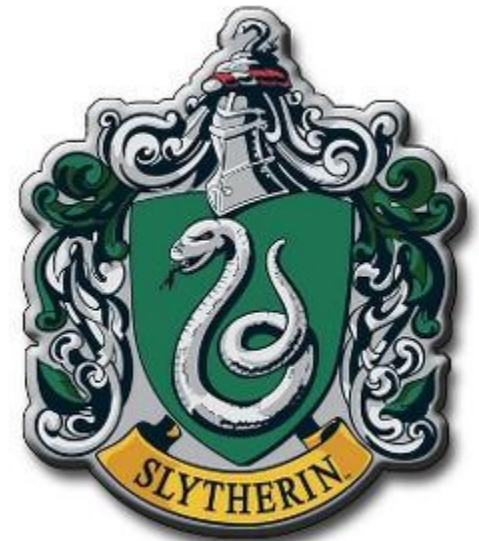


Example

$5 < 10$ and $3 + 4 * 2 \geq 15$

$5 < 10$

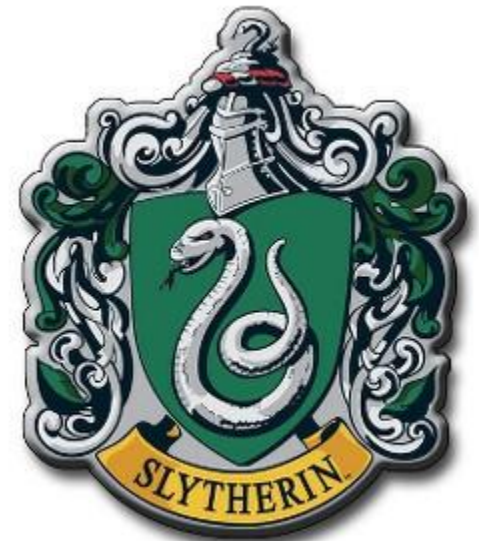
True



Example

$5 < 10$ and $3 + 4 * 2 \geq 15$

True



Example

True and $3 + 4 * 2 \geq 15$



Example

True and $3 + 4 * 2 \geq 15$

$3 + 4 * 2 \geq 15$

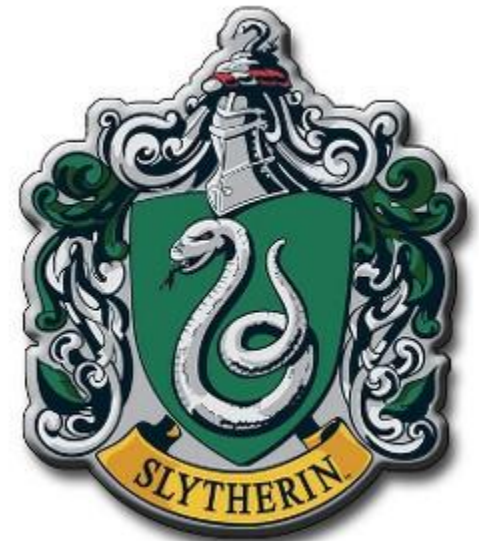


Example

True and $3 + 4 * 2 \geq 15$

$3 + 4 * 2 \geq 15$

$3 + 4 * 2$



Example

True and $3 + 4 * 2 \geq 15$

$3 + 4 * 2 \geq 15$

$3 + 4 * 2$

$4 * 2$



Example

True and $3 + 4 * 2 \geq 15$

$3 + 4 * 2 \geq 15$

$3 + 4 * 2$

8

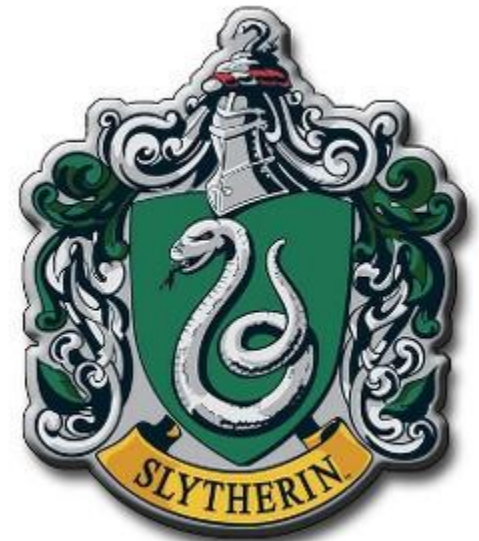


Example

True and $3 + 4 * 2 \geq 15$

$3 + 4 * 2 \geq 15$

$3 + 8$

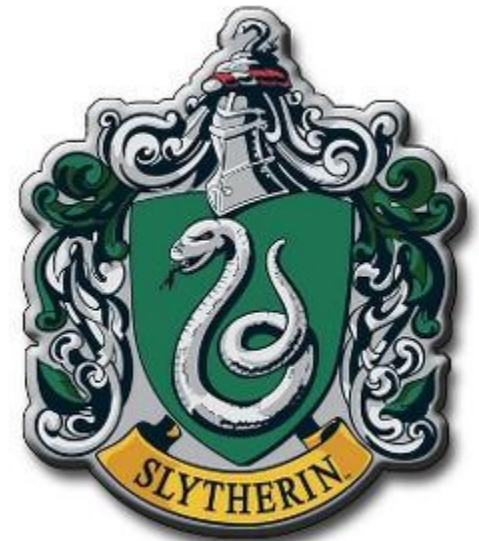


Example

True and $3 + 4 * 2 \geq 15$

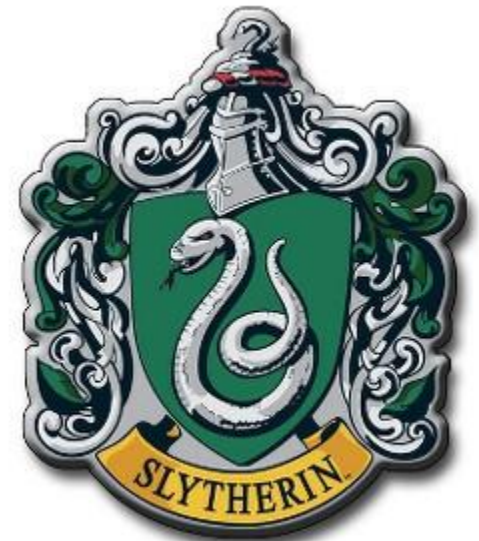
$3 + 4 * 2 \geq 15$

11



Example

True and $3 + 4 * 2 \geq 15$
11 ≥ 15



Example

True and $3 + 4 * 2 \geq 15$

False



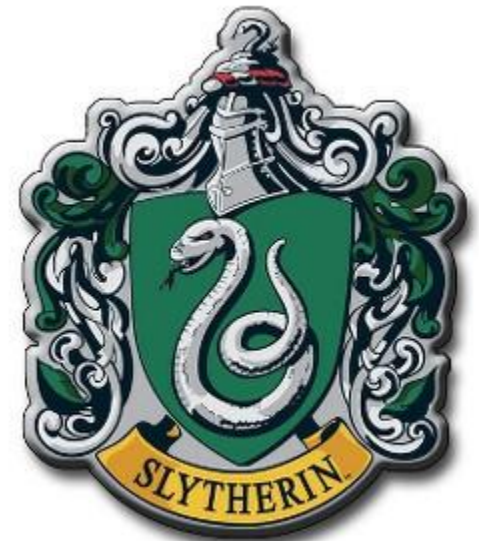
Example

True and False



Example

False



On looking up variables

- Every function call has its own table of variables called an **environment**
- Arguments to a function go in that function's environment
- Assignments within a function go in that function's environment
- If you can't find a variable in your local environment, you search the enclosing environment, until you get to variables that are defined in the file outside any function

Details of a function call

```
def fun(x, y):  
    return x + y
```

```
a = 3
```

```
b = 4
```

```
print fun(a, b)
```

```
fun : <function>  
a : 3  
b : 4
```

Details of a function call

```
def fun(x, y):  
    return x + y
```

```
a = 3
```

```
b = 4
```

```
print fun(a, b)
```



```
fun : <function>  
a : 3  
b : 4
```

```
x : 3  
y : 4
```

Details of a function call

```
def fun(x, y):  
    return x + y
```

```
a = 3
```

```
b = 4
```

```
print fun(a, b)
```

```
fun : <function>  
a : 3  
b : 4
```

7

```
x = 3
```

```
def print1():  
    print x
```

```
def print2(x):  
    print x
```

```
def print3():  
    x = 5  
    print x
```


New operator: in

- 3 in [1, 2, 3, 4]
- 5 in [1, 2, 3, 4]
- "a" in "pants"
- "a" in "syzygy"
- d={"torso":"shirt","legs":"pants","foot":"shoe"}
- "legs" in d
- "pants" in d
- "a" in d

New operator: not in

- 3 not in [1, 2, 3, 4]
- 5 not in [1, 2, 3, 4]
- "a" not in "pants"
- "a" not in "syzygy"
- d={"torso":"shirt","legs":"pants","foot":"shoe"}
- "legs" not in d
- "pants" not in d
- "a" not in d

Some things you can do with strings

- **s.isalpha()** Return true if all characters in s are letters, and there is at least one character. Return false otherwise.
- **s.isalnum()** Return true if all characters in s are letters or numbers, and there is at least one character. Return false otherwise.

Some things you can do with strings

- **s.lower()** Return a copy of s with all letters lowercase
- **s.upper()** Return a copy of s with all letters uppercase
- **s.replace(old, new)** Return a copy of s with every occurrence of the substring old replaced with the substring new

More Practice

Hangman