
Loops

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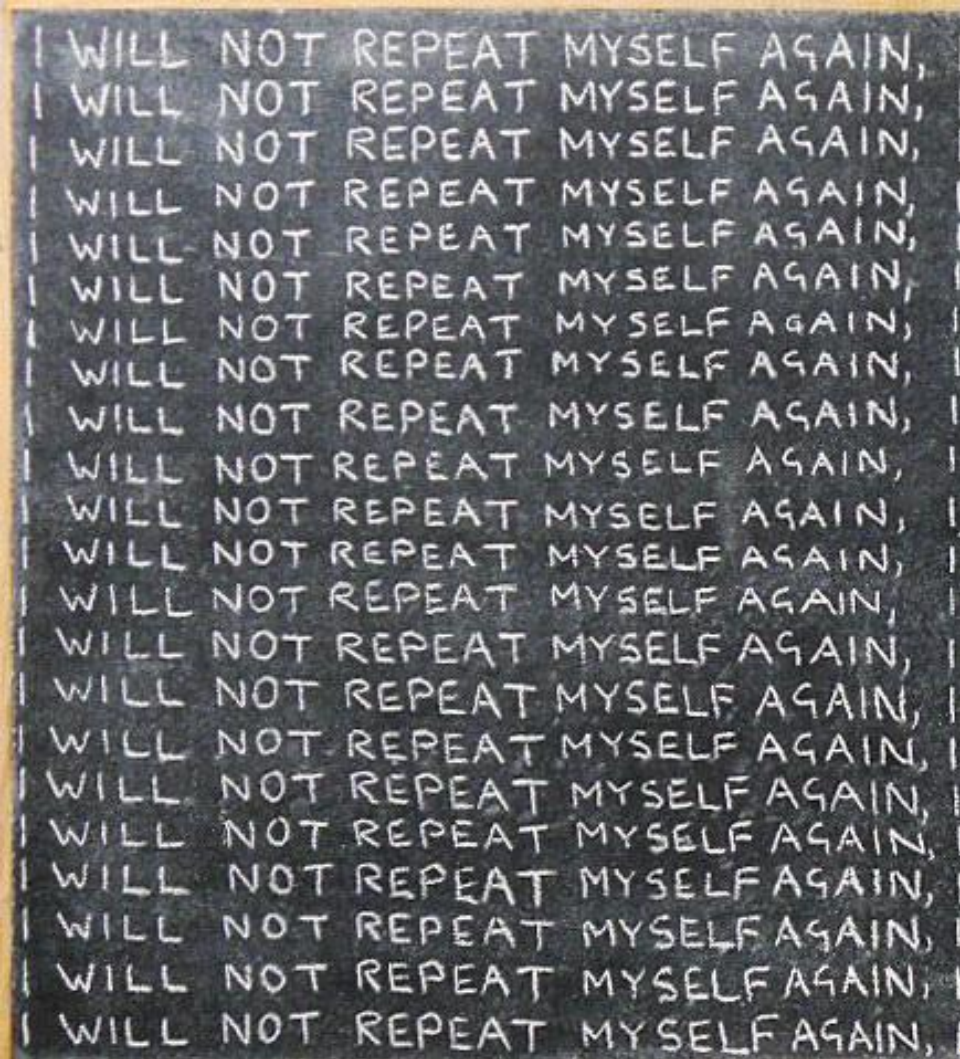
Help

Python's documentation:

<https://docs.python.org/3/>

GOOGLE in general!!!





Do not repeat yourself

Do not copy/paste the same piece of code once and again

—

Let's say, we want to
print the name
character by character

Strings

You can access a specific character

You can access it with it's position

- Index between []
- First character
 - `print(name[0])`
- Last character
 - `print(name[-1])`

Be careful! Indices start at 0

3.01. Exercise: Print first and last character

Ask for a word and print it's first and last characters

Let's try it

03-01-stringCharacter.py

—

To **not** repeat the code...

And to avoid the previous problem,
we can make use of **loops**



Python

There are two kinds of
loops: **for** and **while**



Previous example with loops

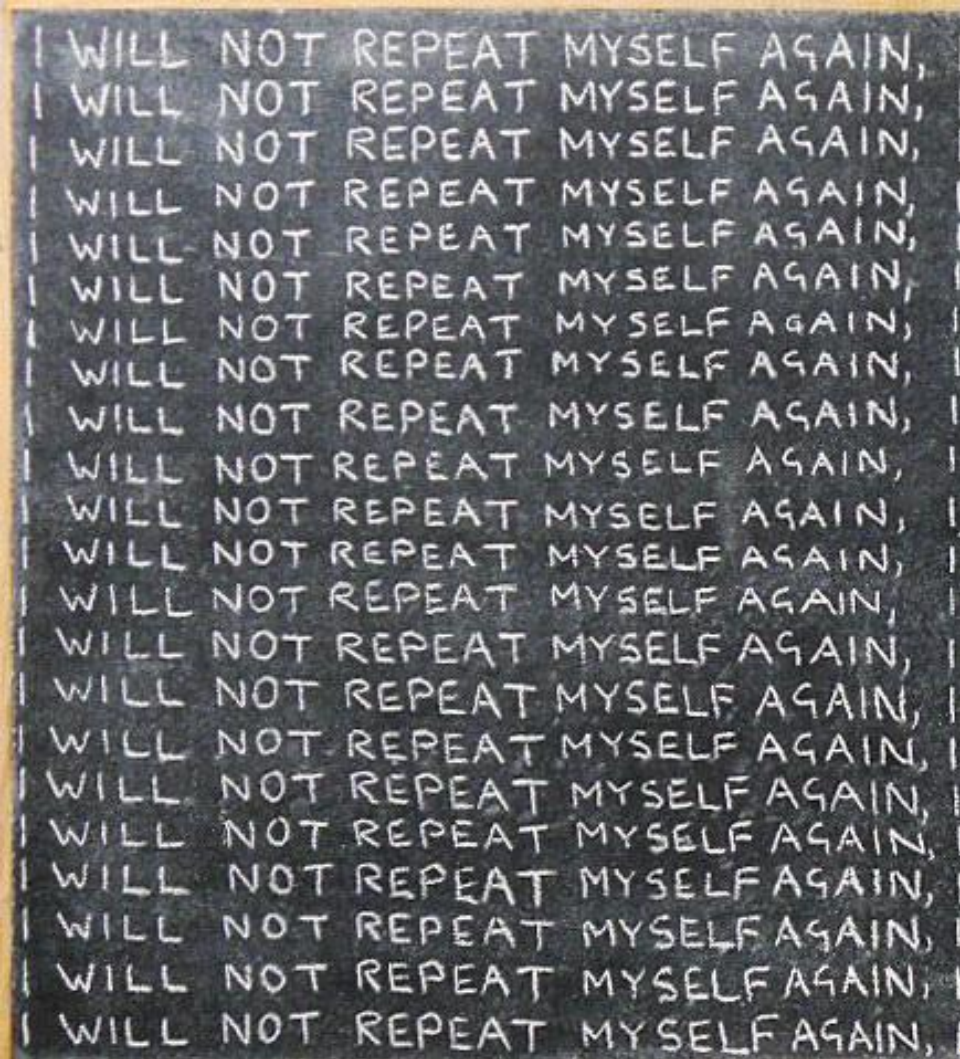
```
name = "Olatz"
```

```
for character in name:  
    print(character)
```

```
name = "Olatz"
```

```
for i in range(len(name)):  
    print(name[i])
```

Loops with a fixed number of repetitions



Often, it is known the number of loops

Suppose we have to write the same
message 100 times

Range function

It is useful to get a list of numbers

```
for i in range(3):  
    print(i)
```

Output:

0

1

2

Range function: begin/end

Two parameters

```
for i in range(5,8):  
    print(i)
```

Output

5
6
7

Be careful!!!!

It will never reach the last number!

If the first value is not set, it will be 0 by default

`range(0,10) == range(10)`

Range function: steps

Suppose we want to print the even numbers between 0 and 10...

The third parameter indicates the incrementation

If it is not set, it will be 1 by default

`range(5,10) == range(5,10,1)`

`range(10) == range(0,10,1)`

Three parameters

```
for i in range(0,10,2):  
    print(i)
```

Output

0
2
4
6
8

Let's try it

03-02-range.py

In the same way, backwards...

If the value of the third parameter is negative, it will decrease the counting

Be careful!

First parameter, start

Second parameter, end

Third negative

```
for i in range(3,0,-1):  
    print(i)
```

Output

3
2
1

Let's try it

03-03-rangeBackwards.py

3.02. Exercise: Cheerleader

Create a program that will sing as a Cheerleader

Given a word, it will print it character by character.



Example

Your team: baskonia
Give me a b, b!
Give me an a, a!
Give me an s, s!
Give me a k, k!
Give me an o, o!
Give me an n, n!
Give me an i, i!
Give me an a, a!
What's that spell?
baskonia! baskonia!

Loops for calculations

Loops for calculations

In the same way, we can also do math in loops

Factorial of a number:

```
result = 1
for i in range(1, number+1):
    result = result * i
print(result)
```

Let's try it

03-04-factorial.py

Unknown number of loops

Or, conditional loops

Conditional loops (while)

In general, we will use them in two scenarios:

- While a condition is reached
- Unknown number of loops

It is also useful for a fixed number of loops

```
i = 0
while i < 3:
    print(i)
    i = i + 1
```

Design of loops

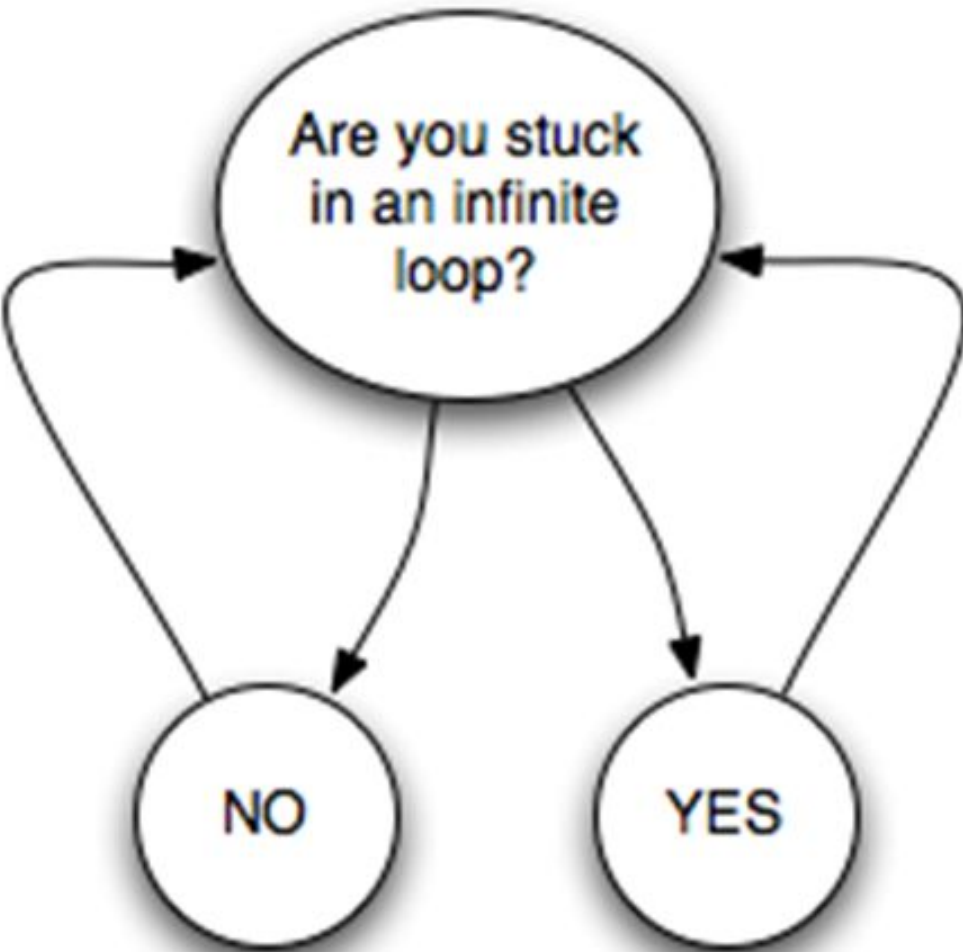
1. **Initialization:** before starting the loop, give the initial value to the variables to be used
 2. **End:** when should the loop stop? Think carefully about the condition to end the loop
 3. **Actions:** what does the loop have to do? What specific actions should it take?
 4. **Update:** how to update the variable(s) to meet the ending requirement?
-

as with **for** loops, we can do
the update as **we wish**

One by one, two by two, three by three or even in a
more complicated way (with the use of conditionals, for
example)

Let's try it

03-05-while.py



Be careful with infinite loops!

Always make sure that your condition will be true in same point!!!

```
i = 3  
while i < 3:  
    print(i)
```

It will never end!!!

Loops depending on strings

Let's say, we want to print
whatever the user inputs until
he/she writes "out"

```
text = input("Enter a text:")  
while text != "out":  
    print("Your text:",text)  
    text = input("Enter a text:")
```

Let's try it!

03-06-whileOut.py

While empty text is entered...

```
text = input("Enter a text:")  
while text:  
    print("Your text:",text)  
    text = input("Enter a text:")
```

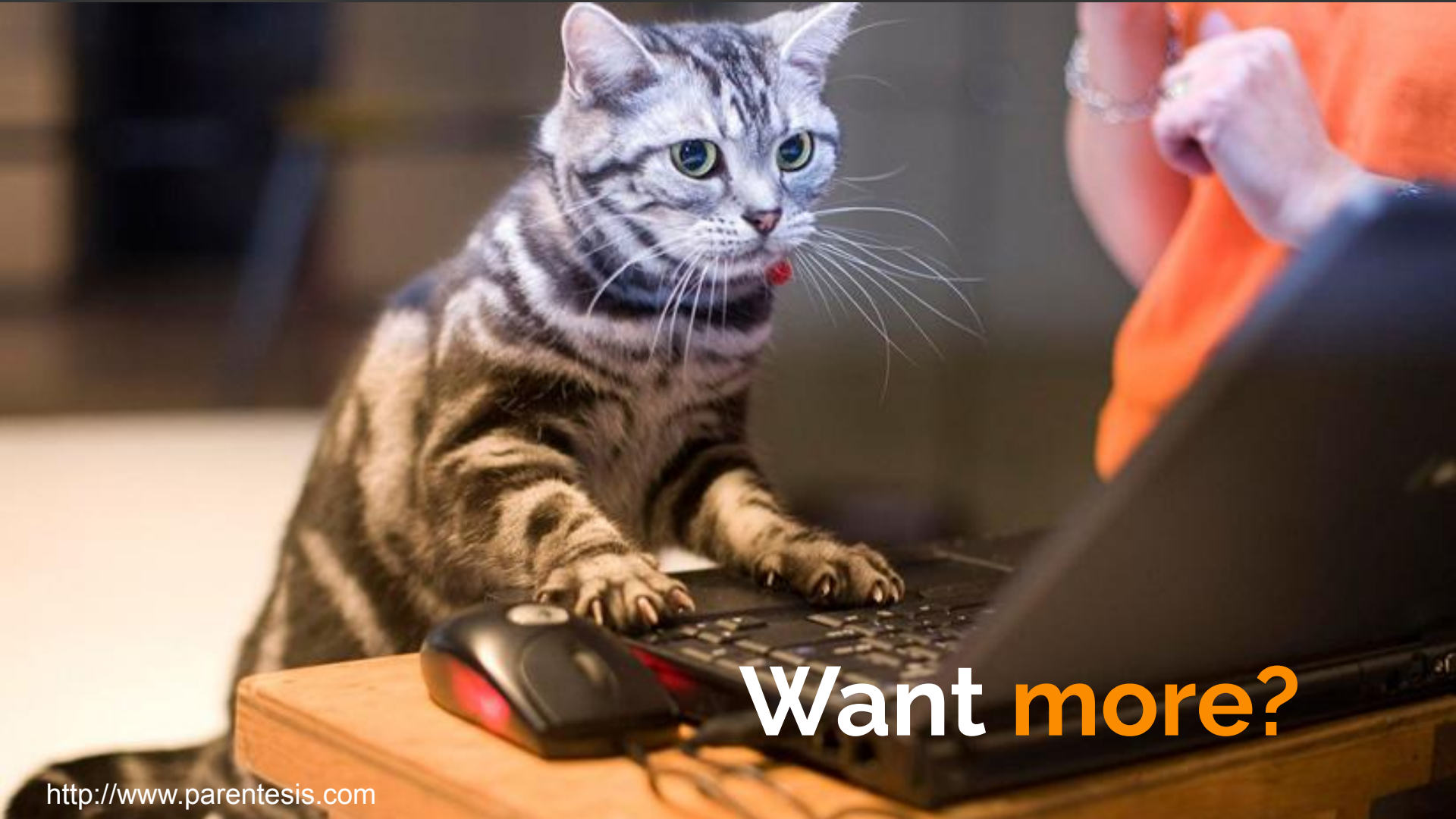
Remember:

Python will consider False:

- In numbers: 0 and 0.0
- In strings: ""
- In booleans: False
- In lists: []

Let's try it!

03-07-whileOutEmpty.py



Want more?