

Python Programming for non-Programmers

Lecture 2

2022-10-31

Introduction into Python



What is programming?

Programming is a way to instruct the computer to perform various tasks. Ex - adding 2 numbers.

writing a sequence of definitions and commands in a logical order to reach a desired behaviour.

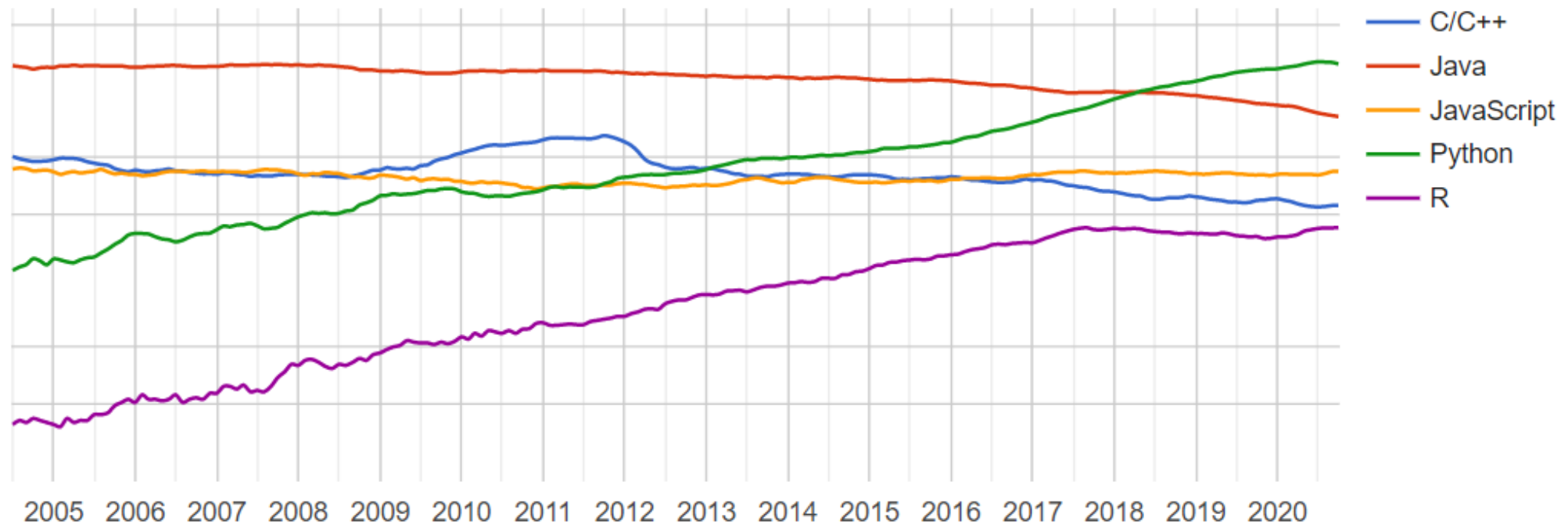
programming languages acts as an interface between the programmer and the computer.

can be typed and executed directly in a command line or stored in a file and executed afterwards.

learning by doing!

Programming languages

PYPL Popularity of Programming Language



From: <http://pypl.github.io/PYPL.html>

Programming Language - Python

highly productive, elegant, simple and powerful
designed

division of programs in modules

- Modules can be used in different Python-programs
- Large collection of standard modules

Fast to develop

- No compiling and no linking saves a lot of time during program development

From: <https://py-tutorial-de.readthedocs.io/de/python-3.3/appetite.html>

What is Python used for?

Data analysis and machine learning

Web development

Automation or scripting

Software testing and prototyping

Scalar objects

int

represents **integers**
ex. 7

float

represents real numbers
ex. 7.5

bool

represents **boolean** values
True and False

NoneType

special and has one value:
None

type()

to see the type of an object
type(7) → int
type(7.5) → float

Introduction into Python – Operations I (Arithmetic, Urinary, Assignment)

```
x = 5
```

= operator assigns variables (left) to values (right)
here: x is assigned to 5

```
x = x + 1  
x += 1
```

assigning the a variable with itself, but modified
here: x is assigned to 6

```
x = y = z = 1
```

assigning multiple variables to one value
here: x, y and z are assigned to 1

```
x, y = 5, 4
```

multiple assignments
here: x is assigned to 5 and y to 4

```
x = 5 + 3
```

+ operator adds two expressions
here: x is assigned to 8

Introduction into Python – Operations II (Arithmetic)

```
x = 5 - 3
```

- operator subtracts two expressions
here: x is assigned to 2

```
x = 5 * 3
```

* operator multiplies two expressions
here: x is assigned to 15

```
x = 5 ** 2
```

** operator exponentiates two expressions
here: x is assigned to 25

```
x = 5 / 3
```

/ operator divides two expressions
here: x is assigned to 1.6⁶

```
x = 5 // 3
```

// operator divides two expressions and rounds off
here: x is assigned to 1

print-function

- prints the value inside the brackets to the console
- `print('Hello')`
`print(5)`

%-operator

- Allows to format values into a String
- Important for changing values
- `%s` string conversion
- `%i` signed decimal integer
- `%f` floating point real number

Introduction into Python – Strings I



```
1 w = 'hello'
```

assigning word to the String 'hello'



```
1 print(("My name is %s and I am %d years old!" % ('Max', 21)))
```

• print a String using the %-operator to insert values into it

```
My name is Max and I am 21 years old!
```



```
1 s = 'Hello,\nmy name is Max!'
```

• \n creates a new line inside the String

```
Hello,  
my name is Max!
```



```
1 s = 'Hello,\tmy name is Max!'
```

• \t creates a tab inside the String

```
Hello,    my name is Max!
```

Introduction into Python – Strings II

```
1 w = 'hello'+'!'  
2 print(w)
```

+ is connecting Strings

hello!

```
1 w = 'hello' * 3  
2 print(w)
```

* repeats the String

hellohellohello

```
1 c = w[4]  
2 print(c)
```

accessing character at index 4

o

```
1 c = w[0:2]  
2 print(c)
```

accessing the characters from index 0 to 2

he1

Introduction into Python – Strings III



```
1 c = w[2:4]
2 print(c)
```

accessing the characters from index 2 to 4

```
llo
```



```
1 c = w[:3]
2 print(c)
```

accessing the characters first three characters

```
hel
```



```
1 c = w[2:]
2 print(c)
```

accessing all characters except the first two

```
llo
```



```
1 w[0] = 't'
```

causes an error (Strings are immutable)

Introduction into Python – Strings IV

String	H	E	L	L	O	!
Index	0	1	2	3	4	5
Negative index	-6	-5	-4	-3	-2	-1

input-function

let you type to the console and assigns the variable you typed

```
x = input('Type your name:')
```

convert-function

convert between types

```
int('123') → 123  
float(15) → 15.0  
float('15') → 15.0  
str(1000) → "1000"
```

```
int('hi') → TypeError
```

The variable to convert must be a viable instance



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Thanks for your attention!

Next lecture: 2022-11-07