Python Basics

0

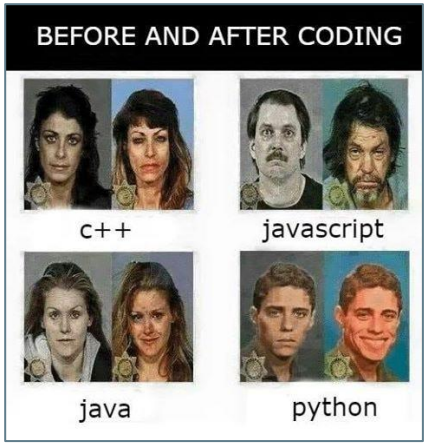
Introduction

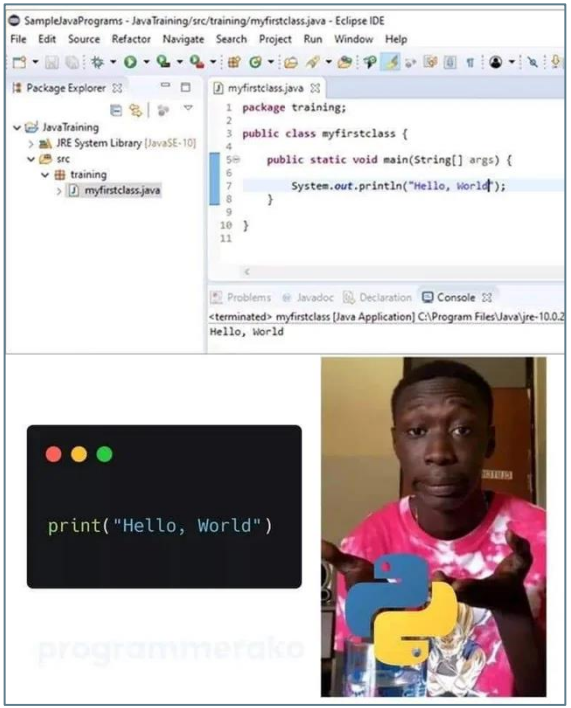
What is Python?

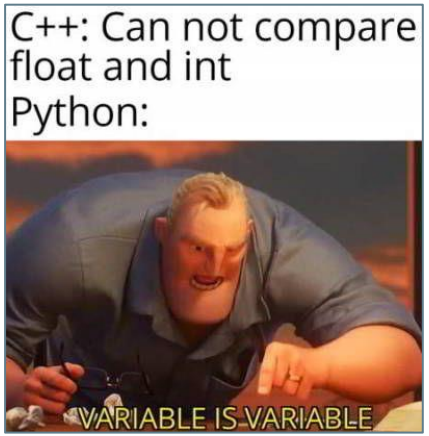
Python is a popular programming language which was created by Guido van Rossum, and released in 1991.

It is used for web development, software development, mathematics, Statistics, system scripting, etc.

Why Python?


BEFORE AND AFTER CODING
c++
javascript
java
python


SampleJavaPrograms - JavaTraining/src/training/myfirstclass.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
JavaTraining
JRE System Library [JavaSE-10]
src
training
myfirstclass.java
myfirstclass.java
1 package training;
3 public class myfirstclass {
5 public static void main(String[] args) {
7 System.out.println("Hello, World");
8 }
10 }
Problems Javadoc Declaration Console
<terminated> myfirstclass [Java Application] C:\Program Files\Java\jre-10.0.2
Hello, World
print("Hello, World")


C++: Can not compare float and int
Python:
VARIABLE IS VARIABLE

Syntax

Variables

```
x = 5
y = 'Hello World!'
```

Comments

```
# This is a comment.
```

Indentation

```
if 5 > 2:
    print('Five is greater than two!')
```

Output and Input

Display output on the screen

```
print('Hello World!')
print('Hello' + 'World!')
print('Hello', 'World!')
print('Hello', 'World', sep = '-', end = '!')
```

Take input from user

```
name = input('Enter your name: ')
print('Hello', name)
```

1

Variables

Variables

Containers for storing data values

```
x = 4
x = 'Sally'
print(x)
```

Assign multiple values

```
x, y, z = 'Orange', 'Banana', 'Cherry'
```

One value to multiple variables

```
x = y = z = 'Orange'
```

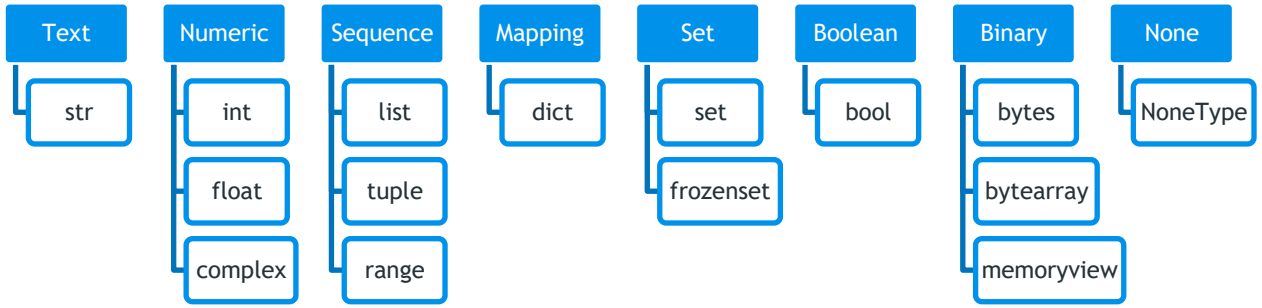
Data Types

Get the type

```
x = -5j
print(type(x))
```

Casting

```
a = str(3)
b = int(3)
c = float(3)
d = bool(3)
```



Numbers

Three numeric types

```
a = 1    # int
b = 2.8  # float
c = 1j   # complex
```

Functions

```
min()  max()  abs()
```

Operators

```
+  -  *  /  %  **  //
```

Strings

Single line and multiline string

```
a = 'Hello!'
b = '''Hello!
How are you?'''
```

F-strings

```
name, age = 'Alireza' , 24
message = f'Hello {name}, you are {age} years old!'
```

Operators

```
+   *
```

Booleans

True or False

```
a = True
b = False
c = 10 >= 9
d = 10 == 9
e = 10 > 9 and 2 + 2 == 5
e = 10 > 9 or 2 + 2 == 5
f = not 2 + 2 == 5
```

Operators

```
<  <=  >  >=  ==  !=  and  or  not
```

Collections

Lists

```
fruits = ['apple', 'banana', 'cherry']
```

Tuples

```
fruits = ('apple', 'banana', 'cherry')
```

Sets

```
fruits = {'apple', 'banana', 'cherry’}
```

Dictionaries

```
fruits = {'apple': 'green', 'banana': 'yellow', 'cherry': 'red'}
```

Lists

Ordered, changeable, and allow duplicate values

```
fruits = ['apple', 'banana', 'cherry', 'apple', 'cherry']
print(fruits[0], fruits[-3], fruits[1:3], fruits[:-1], fruits[0:-1:2], fruits[::-1])
print('orange' in fruits)
print(len(fruits))
```

Update Lists

```
fruits[3] = 'orange'
fruits.append('kiwi')
fruits.remove('banana')
fruits.pop(3)
```

Tuples

Ordered, unchangeable, and allow duplicate values

```
fruits = ('apple', 'banana', 'cherry', 'apple', 'cherry')
print(fruits[0], fruits[-3], fruits[1:3], fruits[:-1], fruits[0:-1:2], fruits[::-1])
print('orange' in fruits)
print(len(fruits))
```

Update tuples

```
fruitsList = list(fruits)
fruitsList[3] = 'orange'
fruitsList.remove('banana')
fruits = tuple(fruitsList)
```

Sets

Unordered, unchangeable, and no duplicate values

```
fruits = {'apple', 'banana', 'cherry'}
print('orange' in fruits)
print(len(fruits))
```

Update sets

```
fruits.add('orange')
fruits.remove('banana')
fruits.pop()
```

Join Sets

Join Sets

```
students = {'Ali', 'Zahra', 'Bahram'}
workers = {'Zahra', 'Bahram', 'Nahid'}
allMembers = students.union(workers)
wortudents = students.intersection(workers)
notWortudents = students.symmetric_difference(workers)
nonworkingStudents = students - workers
nonstudentWorkers = workers - students
```

Dictionaries

Ordered, changeable, and no duplicate values

```
fruits = {'apple': 'green', 'banana': 'yellow', 'cherry': 'red'}
print(fruits['apple'])
print('orange' in fruits)
print(len(fruits))
print(fruits.keys())
print(fruits.values())
```

Update Dictionaries

```
fruits['apple'] = 'red'
fruits['kiwi'] = 'green'
fruits.pop('banana')
```

2

Conditions

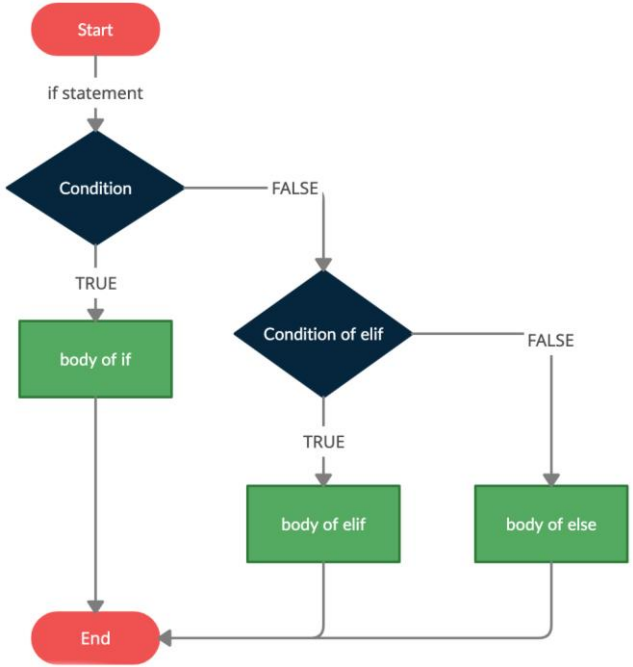
If Statements

If statement

```
a, b = 200, 100
if a > b:
    print('a')
elif a < b:
    print('b')
else:
    print('=')
```

Shorthand if statement

```
a, b = 200, 100
print('a') if a > b else print('b') if a < b else print('=')
```



Nested If Statements

Nested if

```
score = 18
if score >= 10:
    print('Pass')
    if score >= 18:
        print('with grade A!')
    elif score >= 15:
        print('with grade B!')
    elif score >= 12:
        print('with grade C!')
    else:
        print('with grade D!')
else:
    print('Fail!')
```

Match Case

Switch statement

```
language = input('What is the programming language you want to learn? ')
match language:
    case 'JavaScript':
        print('You can become a web developer.')
    case 'Python':
        print('You can become a Data Scientist.')
    case 'PHP':
        print('You can become a backend developer.')
    case 'Solidity':
        print('You can become a Blockchain developer.')
    case _:
        print('The language doesn't matter, what matters is solving problems.')
```

3

Loops

While Loops

Execute a set of statements as long as a condition is true

```
i = 1
while i < 10:
    print(i)
    i += 1
else:
    print(f'Finished after {i} loops')
```

For Loops

Iterating over a collection

```
for fruit in ['apple', 'banana', 'cherry']:
    print(fruit)
else:
    print('Finished!')
```

Iterating over a string

```
for letter in 'apple':
    print(letter)
```

Looping Through a Range

```
for number in range(20):
    print(number)
```

```
for number in range(5, 20):
    print(number)
```

```
for number in range(5, 20, 2):
    print(number)
```

Break and Continue

Break and continue

```
for i in range(10):
    if i == 2:
        continue
    if i == 5:
        break
    print(i)
else:
    print(f'Finished after {i} loops')
```

Nested Loops

Nested while and for loops

```
number = 2
adjectives = ['big', 'tasty']
fruits = ['apple', 'banana', 'orange']
while number < 5:
    for adjective in adjectives:
        for fruit in fruits:
            print(f'{number} {adjective} {fruit}s')
    number += 1
```

4

Functions

Functions

Blocks of code which only run when they are called

```
def greeter():
    print('Hello!')
greeter()
```

Arguments and return

```
def greeter(firstName, lastName):
    greeting = f'Hello {name}!'
    return greeting
message = greeter('Alireza', 'Nezhadshamsi')
print(message)
```

Functions

Keyword arguments

```
def greeter(firstName, lastName):
    return f'Hello {firstName} {lastName}!'
print(greeter(lastName = 'Nezhadshamsi', firstName = 'Alireza'))
```

Default parameter value

```
def greeter(firstName = 'dear', lastName = 'user'):
    return f'Hello {firstName} {lastName}!'
print(greeter('Alireza', 'Nezhadshamsi'))
```

Functions

Type Annotations

```
def fullName(firstName: str, lastName: str) -> str:
    return f'{firstName.title()} {lastName.title()}'
print(fullName('Alireza', 'Nezhadshamsi'))
```

Recursion

```
def factorial(number):
    return number * factorial(number - 1) if number > 1 else 1
print(factorial(4))
```

Lambda

Small anonymous functions

```
greeter = lambda: print('Hello')
print(greeter())
```

Arguments

```
greeter = (lambda name = 'dear user': f'Hello {name}!')
print(greeter(name = 'Alireza'))
```

Lambda

Single Expression

```
(lambda x: (x % 2 and 'odd' or 'even'))(7)
```

Nested lambda

```
funcPlus = lambda x, func: x + func(x)
print(funcPlus(5, lambda x: x * x))
```

5
Errors

Try Except

Test a block of code for errors and handle the error

```
try:
    print(x)
except NameError:
    print('Variable x is not defined')
except:
    print('Something else went wrong')
else:
    print('Nothing went wrong')
```

Exceptions

Handle the error

```
try:
    print(x)
except Exception as e:
    print(e)
```

Raise an error

```
x = -1
if x < 0:
    raise Exception('Please enter a positive number')
```

6

Modules

Modules

A module is a file containing a set of functions you want to include in your application.

To create a module just save the code you want in a file with the file extension .py.

Python module index: https://docs.python.org/3/py-modindex.html

Using a module

```
import myModule as m
m.greeter('Alireza')   # Functions
importedName = m.name  # Variables
```

Import from a module

```
from mymodule import greeter, name
```

Packages

A package contains all the files you need for a module.

PIP is a package manager for Python packages, or modules if you like.

Python package index: https://pypi.org/

Download a package

```
pip install numpy
```

Remove a package

```
pip uninstall numpy
```

List packages

```
pip list
```

Datetime

Import and use datetime

```
import datetime
now = datetime.datetime.now()
print(now)
myBirthday = datetime.datetime(1999, 1, 5)
print(myBirthday.strftime('%x'))
print(myBirthday.strftime('%A'))
print((now - myBirthday).days)
```

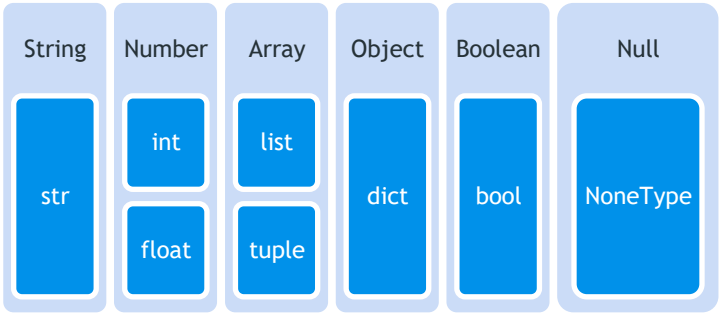
Math

Import and use math

```
import math
print(math.sqrt(64))
print(math.ceil(1.4))
print(math.floor(1.4))
print(math.exp(5))
print(math.factorial(5))
print(math.log(5))
print(math.pi)
print(math.e)
```

JSON

JSON is a syntax for storing and exchanging data.



Import and use math

```
import json
myJson = '{ "name": "Alireza", "age": 24 }'
myDict = json.loads(x)
myDict['age'] = 29
anotherJson = json.dumps(x)
```

Requests

Import and use math

```
import requests
response = requests.get('https://fipiran.com', timeout = 1)
print(response)
print(response.status_code)
print(response.encoding)
print(response.text)
```

Thanks!

You can find me at:

github.com/AleeRezaa

t.me/Alee_Rezaa

alee_rezaa@outlook.com