

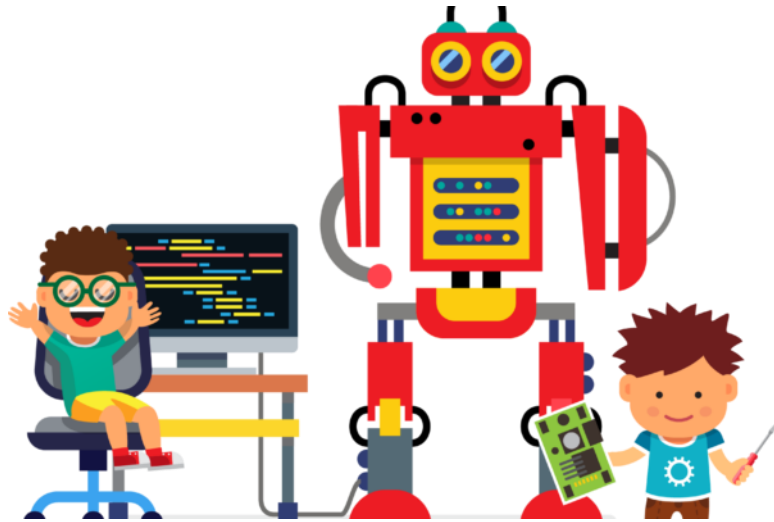
# Machine Learning Beginner Course

2. Python



2. بايثون

دورة تعليم الالة للمبتدئين



# Hello again!

In the last we did an overview about ML, it's types and applications, today we will dive in the python programming language to use it to develop ML models. Get your machine ready .



*“Talk is cheap. Show me the code.”*

*- Linus Torvalds*



1.

# Syntax

Python Programming Language

# Hello world

The way to print something in python is  
straight forward here it is:

```
print("Hello world")
```

Notice no semicolon;

# Comments

One line comment:

```
# this is a comment
```

Multiline comment:

```
""" This is a multiline comment  
that describe something """
```

# Types

What are the types in python?



# String

String can be declared as following:

```
name = "Charfaoui Younes"
```

This is also the same thing:

```
status = 'Kirak dayer'
```

This is concatenation

```
phrase = status + name
```



# Number

## Integer numbers

```
year = 2018  
year = int("2019")
```

## Floating numbers

```
pi = 3.141592  
pi = float("3.141592")
```

You can also convert  
from number to string

```
number = str(12.5)
```

To Check the type of  
variable use type()

```
n_type = type(number)
```

# Null

Null in python is None

```
something = None  
print(something)
```

# Boolean

```
is_python = True
```

```
is_girl = False
```

```
something = bool("Hello world")  
# True
```

# List (Arrays)

In Python List can be heterogenous

```
favorites = []
```

Adding things in List

```
favorites.append(21)
```

```
favorites.append("MLBC")
```

```
favorites.append(True)
```

Equivalent to

```
favorites = [21, "MLBC", True]
```

# List (Arrays)

```
numbers = [1,2,3,4,5]
```

```
len(numbers)  
# 5
```

```
numbers[0:2]  
# [1,2]
```

```
numbers[0]  
# 1
```

```
numbers[2:]  
# [3,4,5]
```

# Operators

Arithmetical and logical ?



# Arithmetic

a = 10	# 10
a += 1	# 11
a -= 2	# 9
b = a + 1	# 10
c = b - 3	# 7
d = a * 2	# 18
e = d / 2	# 9
f = e % 2	# 1
g = e ** 2	# 81
i = g // 2	# 40

# Arithmetic Comparison

## # Ordering

**$a < b$**

**$a \leq b$**

**$a > b$**

**$a \geq b$**

## # Equality/Difference

**$c == d$**

**$c != d$**



# Logical Comparison

# Logical And

**a and b**

# Logical or

**a or b**

# Logical Negation

**not a**

# Compound

**(a and not (b or c))**

# Identity Comparison

# Identity

**1 is 1 # True**

# Non identity

**1 is not '1' # True**

# Examples

**bool(1) # True**

**bool(True) # True**

**1 and True # True**

**1 is True # False**

# Control Flow

The conditional and loops?



# Conditionals

The Indentation is considered to be replacement of brackets here in python, so be careful for your spaces

```
grade = 82
if grade >= 90:
    if grade == 100:
        print ("A+")
    else:
        print ("A")
elif grade >= 80:
    print ("B")
elif grade >= 70:
    print ("C")
else:
    print ("F")
```

# For Loop

```
for x in range(10):  
    print(x)
```

```
persons = ["Zoubir" , "Younes"]  
for x in persons :  
    print(x)
```

# While Loop

```
x = 0  
while x < 100:  
    print(x)  
    x += 1
```

# Functions

The functional side of python



# Basic Function

```
def my_function():  
    print("Hello MLBC")
```



# Function Arguments

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

```
print(add(4 , 3))
```

```
def name(x = "Kadour"):  
    print(x)
```

```
print_name()  
print_name("Abc")
```

# Fibonacci Example

```
def fib(n):  
    a, b = 0 , 1  
    while a < n:  
        a , b = b , a+ b  
    return a
```

# Imports

The way to integrated others code



# Imports

```
import datetime  
datetime.date.today()
```

```
from datetime import date  
date.today()
```

```
from datetime import date as d  
d.today()
```

# ML Example

```
import pandas as pd
data = pd.read_csv('data.csv' , header = None)
x_values = data.iloc[:, :-1].values
y_values = data.iloc[:, -1].values

from sklearn.model_selection import train_test_split
x_tr, x_ts, y_tr, y_ts = train_test_split(x_values , y_values, test_size = 0.2)

import matplotlib.pyplot as plt

plt.scatter(x_values[:, 0] , x_values[:, 1] , c = y_values)
plt.show()
```



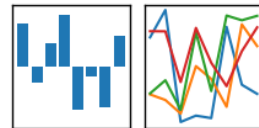
## 2. Tools

# We will be using



pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



matplotlib



# Anaconda

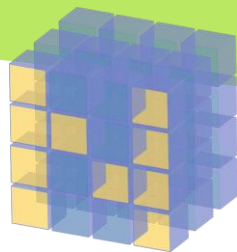


The open-source Anaconda Distribution is the easiest way to perform Python/R data science and machine learning on Linux, Windows, and Mac OS X.

*<https://www.anaconda.com/distribution/>*



# Numpy



# NumPy

NumPy is the fundamental package for scientific computing with Python. It contains among other things:

- a powerful N-dimensional array object
- sophisticated (broadcasting) functions
- useful linear algebra, Fourier transform, and random number capabilities

<http://www.numpy.org/>

# Scikit-Learn



For Machine Learning in Python

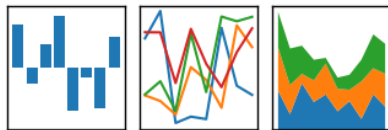
- Simple and efficient tools for data mining and data analysis
- Accessible to everybody, and reusable in various contexts
- Built on NumPy, SciPy, and matplotlib

<https://scikit-learn.org/stable/>

# Pandas

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



Pandas is an open source, BSD-licensed library providing high-performance, easy-to-use data structures and data analysis tools for the Python programming language.

<https://pandas.pydata.org/>

# Matplotlib



Matplotlib is a Python 2D plotting library which produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms. Matplotlib can be used in Python scripts, the Python and IPython shells, the Jupyter notebook, web application servers, and four graphical user interface toolkits.

<https://matplotlib.org/>

# Popular IDE



# Practical Time

*Open up your PC, launch your anaconda and let's write some python code.*



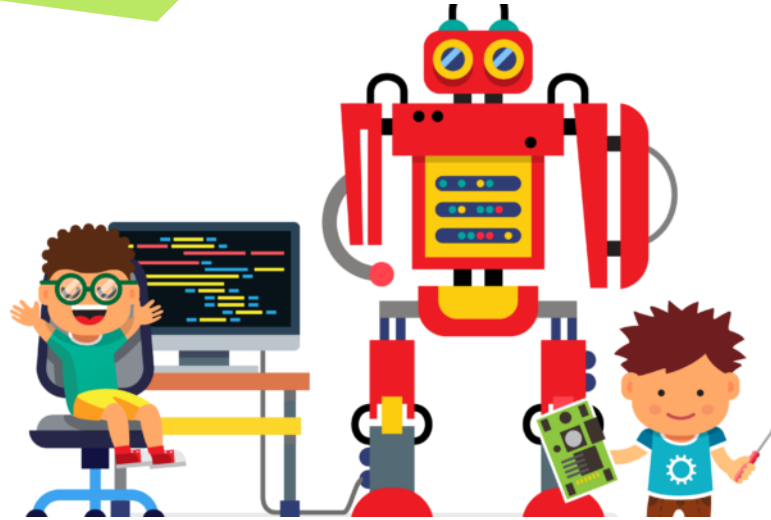
# Coding Interview



## Snapchat

Given an array of time intervals (start, end) for classroom lectures (possibly overlapping), find the minimum number of rooms required.

For example, given  $[(30, 75), (0, 50), (60, 150)]$ , you should return 2.



شكرا لحضوركم

Thanks for Assisting!