Programming with Python

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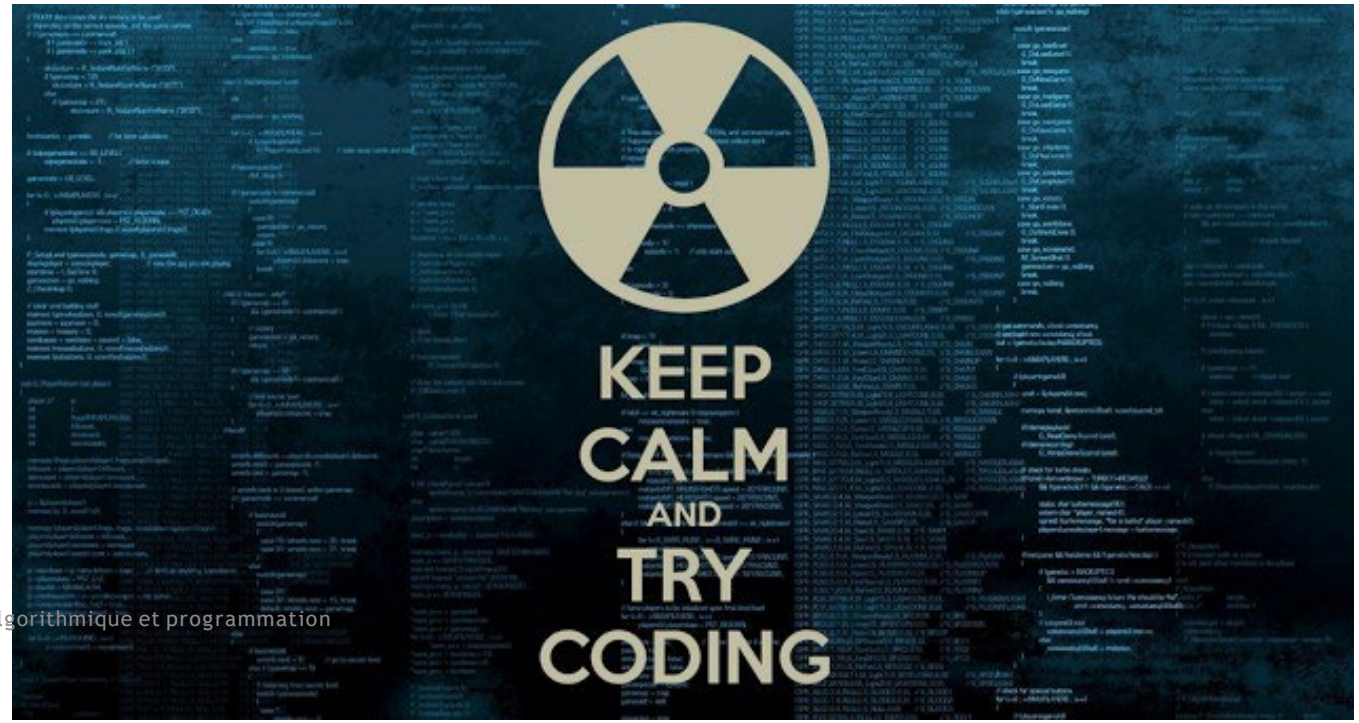
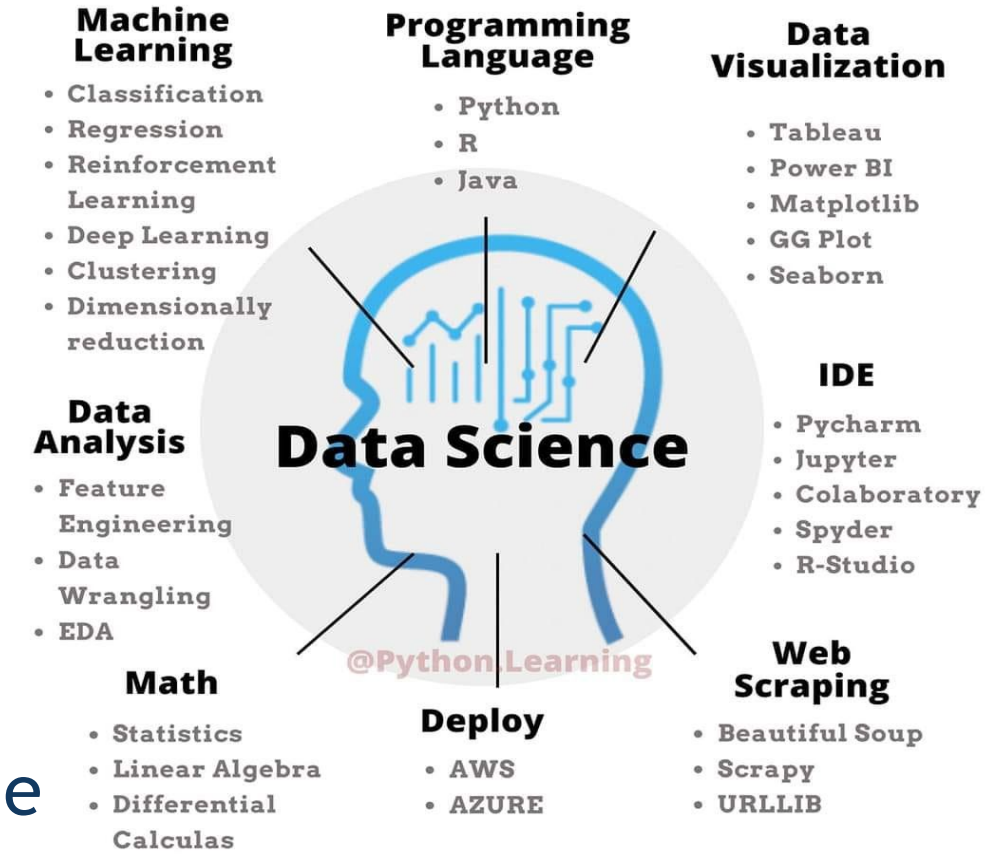
A. BOURKARA

NHSM sid abdellah - Algiers

Discover the basis of computer programing…



Algorithmique et programmation



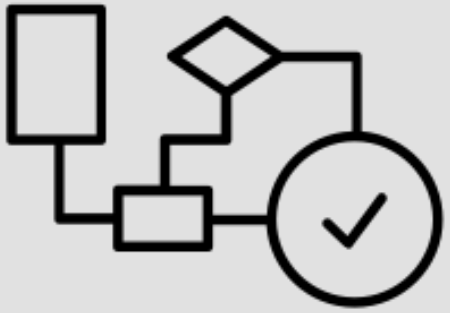
…that will be reused in the future

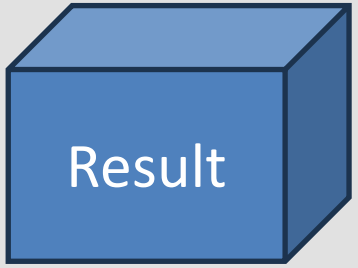
What is an algorithm?

Al-Khwârizmî
(780-850)

Problem

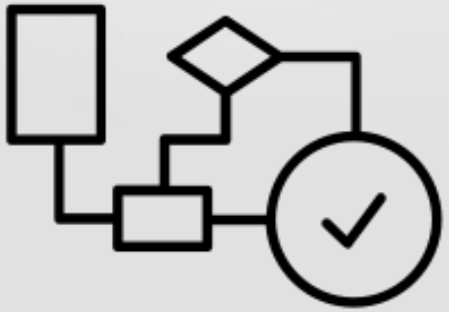
Data





Sequence of operations

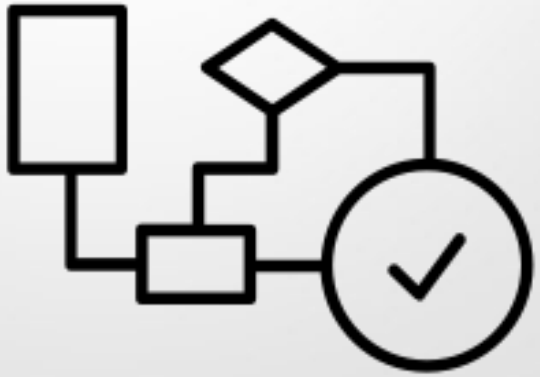
Example of algorithm



1
2
3
4

Steps / Tasks

What is a program?



The program is the translation of an algorithm into a language that the computer understands. We call this Language: the ***programming language***.

Examples of programming languages

Top 7 Programming Languages and Their Uses

1. Python — Artificial Intelligence & Machine Learning.
2. JavaScript — Rich Interactive Web Development. ...
3. Java — Enterprise Application Development. ...
4. R — Data Analysis. ...
5. C/C++ — Operating Systems and System Tools. ...
6. Golang — Server-Side Programming. ...
7. C# — Application & Web Development Using .

Tool 1 : Text-based algorithmic language

1. Independent of any programming language;
2. In English;
3. It is more rigorous.

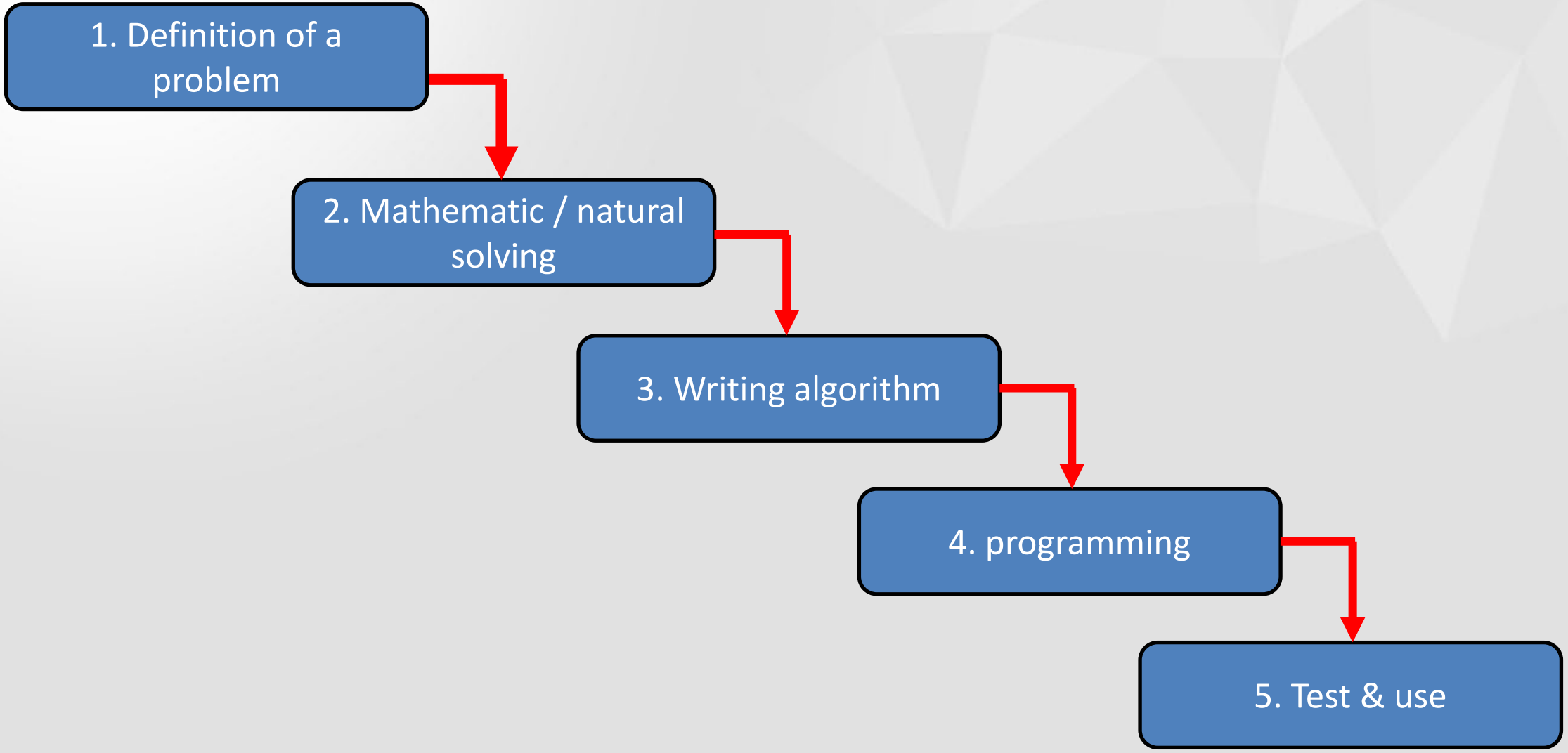
Tool 3: Programming Language (Python)

1. It is functioning on any operating system;

2. It is widely used to learn programming;

3 Has many library.

Methodology of the programmer



Outline of the course

1. Store and manipulate data in memory;
2. Alternative structures
3. Iterative structures;
4. Subroutines;
5. Advanced Data Structures;
6. Store persistent data.

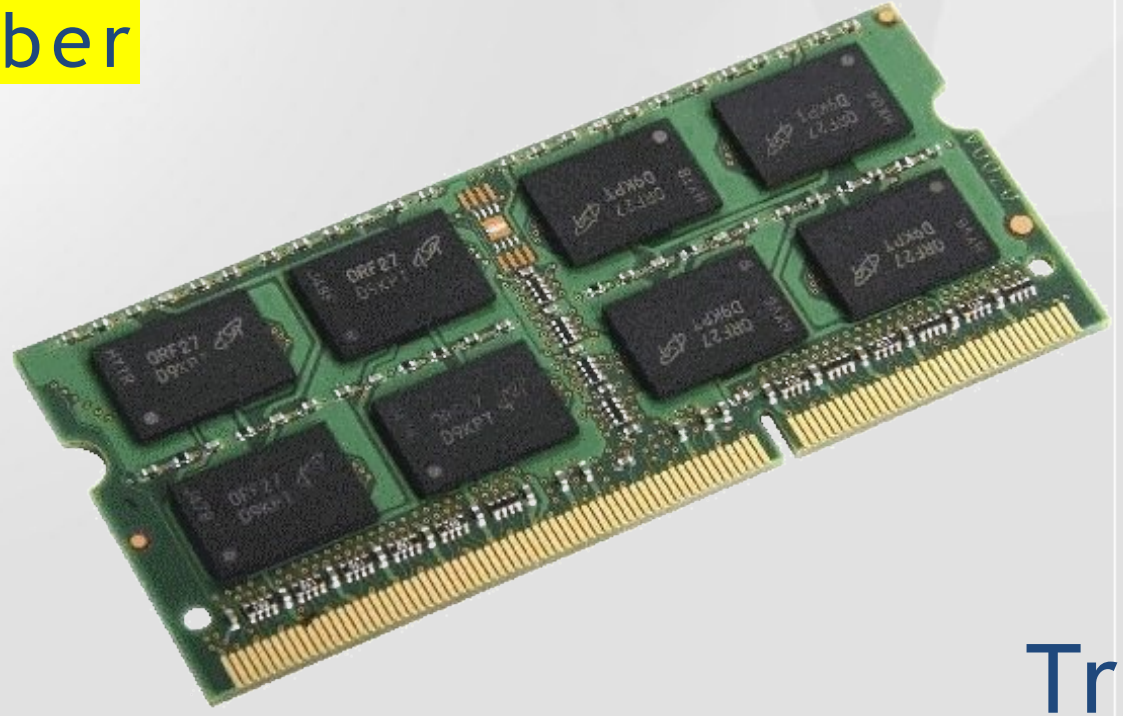
Part 1

Store and manipulate data in memory;

To Store and manipulate data in memory…

44 years

Integer Number



1466,62 €

Float/real number

Jérôme

String

True / False

Boolean

In Algorithm, we need to declare two types of data:

Variables
Var age : integer
Var salaire : real
Var nom : string
Var v_f : Boolean

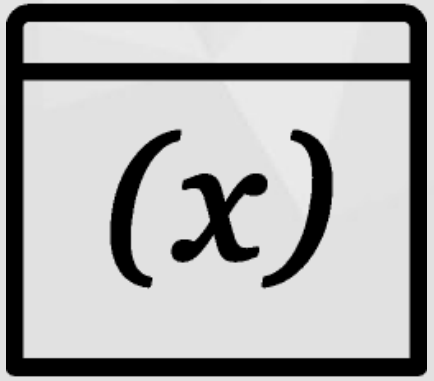
Constantes
Const N ← 10
Const PI ← 3,1416
Const MONNAIE ← "Euro"

No declaring in Python

The variable undergoes 3 processing steps

- To declare a variable or constant //
  To reserve a place/space/cell in memory;

- To initialize the variable;
  To make a value in the variable.



- To use the variable
  To use or update

Initialization of the variables

Algorithm		Python
age ← 44 salaire ←1466,62 nom ← "Mohamed"		age = 44 Salary = 1466.62 name = "Mohamed" name = 'Mohamed'
v_f ← True {opposite : False}		v_f = True # opposite: False
Comments	(it is not a run instruction)	a = b = 20 x, y = 30, 40

To know the le type of a variable

```
type(age)          #  int (entier)
type(salaire)      #   float (réel)
type(nom)          #  str (chaîne)
type(v_f)          #  bool (booléen)
```

Calculating

Algorithm		Python
age ← 44 + 1 age ← âge + 1 salary ← salaire x 1,05 quotient ← a ÷ b name ← name &" Salah"		age = 44 + 1 age = age + 1 age + = 1 salaire = salaire * 1.05 quotient = a / b nom = nom + " Salah"

Arithmetic operations		
+ - x ÷ ^ div mod	+ - x ÷ ^	+ - * / ** // %
^ ** : exposant	div // : division entière	mod % : modulo

Inputs/outputs (1/3)

Inputs

Enter a values/data

Outputs

Display

Inputs/outputs (2/3)

Algorithm	Python
read(nom)	name = input()
read(âge)	age = int(input())
read("Salaire :", salaire)	salary = float(input("Salary : "))
output("Hello world!")	print("Hello world!")
output(age)	print(age)

Inputs/outputs (3/3)

Algorithm	Python
output("Age ", **age**, "Salary ", salary)	print("Age", **age**, "Salary", salary)

Structure d'un algorithme/programme

Algorithme	Python

```
Algorithm Example;
  {Declaration of constants}
  Const money ← "dzd"
  {Declaration of variables}
  salary : Real
   Var name : string
   Start
   Read(name);
   Read(salary);
   salary ← salary × 1,1
   print("New salary", name, " : ",
                salary, " ", money)
end
```

```
# No declaration for the
variables

# The constant is an initialized
variable
money = “dzd“
```

```
name = input("Nom :")
salary = float(input("Salaire : ") )
salary = salaire * 1.1
print(“New salary of ", nom,
        " : ", salary, " ", money)
```

Applying example

Write an algorithm the its program of a simplified calculator.

Q & A