

Programming with Python

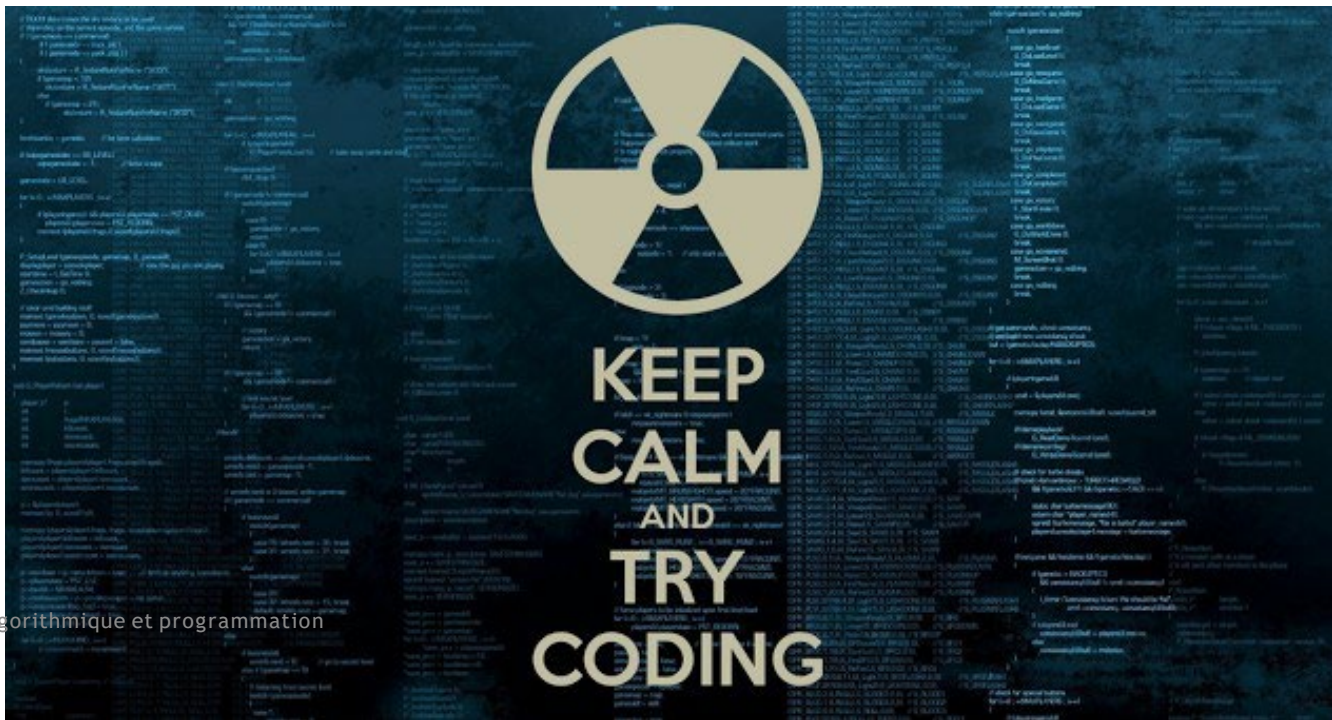


2023-2024

A. BOURKARA

NHSM sid abdellah - Algiers

▶ Discover the basis of computer programming...



Algorithmique et programmation

▶ ...that will be reused in the future

Machine Learning

- Classification
- Regression
- Reinforcement Learning
- Deep Learning
- Clustering
- Dimensionally reduction

Data Analysis

- Feature Engineering
- Data Wrangling
- EDA

Math

- Statistics
- Linear Algebra
- Differential Calculus

Programming Language

- Python
- R
- Java

Data Visualization

- Tableau
- Power BI
- Matplotlib
- GG Plot
- Seaborn

IDE

- Pycharm
- Jupyter
- Colaboratory
- Spyder
- R-Studio

Web Scraping

- BeautifulSoup
- Scrapy
- URLLIB

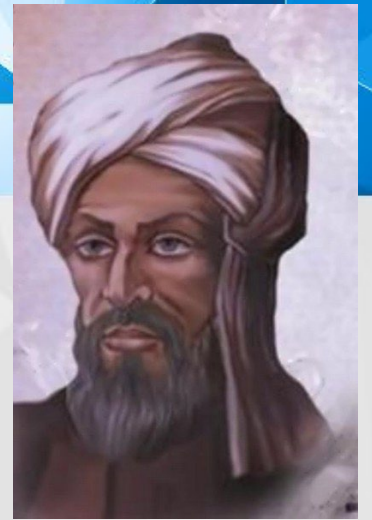
Deploy

- AWS
- AZURE

Data Science

@PythonLearning

What is an algorithm?

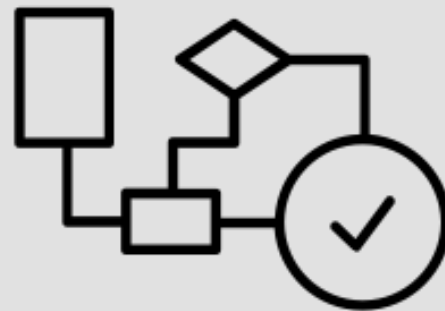


Al-Khwârizmî
(780-850)

Problem



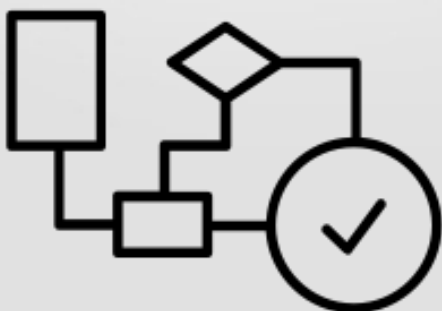
Data



Sequence of operations



Example of algorithm



1
2
3
4

Steps / Tasks

Caramel.

végétal à la sauce soja.

INGRÉDIENTS :
POUR UN POT D'ENVIRON 20 CL.

- 150G SUCRE CASSONNADE
- 10 CL LAIT DE SOJA TIÉDI
- 5 CL EAU
- 1 C. À SOUPE SAUCE SOJA (15 ML)

1 DANS UNE CASSEROLE SUR FEU MOYEN, PORTER À ÉBULLITION LE SUCRE ET L'EAU. LAISSER BOUILLONNER JUSQU'À CE QUE LE MÉLANGE PRENNE UNE TEINTE DORÉE.

2 DÈS QUE LE CARAMEL EST BLOND CLAIR (FONCÉ, IL DEVIENT AMER), POSER LA CASSEROLE DANS L'ÉVIER ET VERSER D'UN COUP LE LAIT TIÉDI ET LA SAUCE SOJA. GARE AUX ÉCLABOUSSURES, LE MÉLANGE VA MOUSSER ET PÉTILLER.

3 REMETTRE SUR FEU DOUX ET FOUETTER VIVEMENT POUR DISSOUDRE TOUS LES MORCEAUX DE CARAMEL.

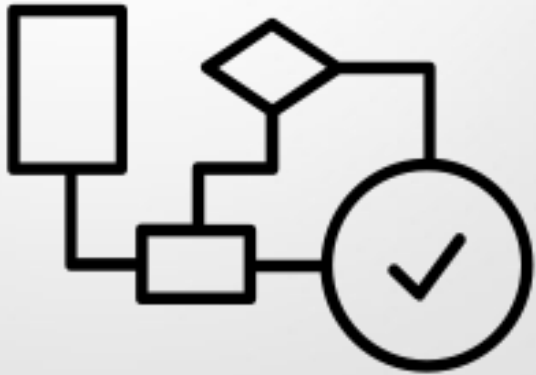
4 VERSER LE CARAMEL À LA SAUCE SOJA DANS UN POT EN VERRE. SE CONSERVE À TEMPÉRATURE AMBIANTE PLUSIEURS MOIS.

ATTENTION, NE SURTOUT PAS TOUCHER AU MÉLANGE, MAIS REMUER LA CASSEROLE PAR DES MOUVEMENTS CIRCULAIRES.

Malthilda.

www.cuisineenbandouliere.com

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



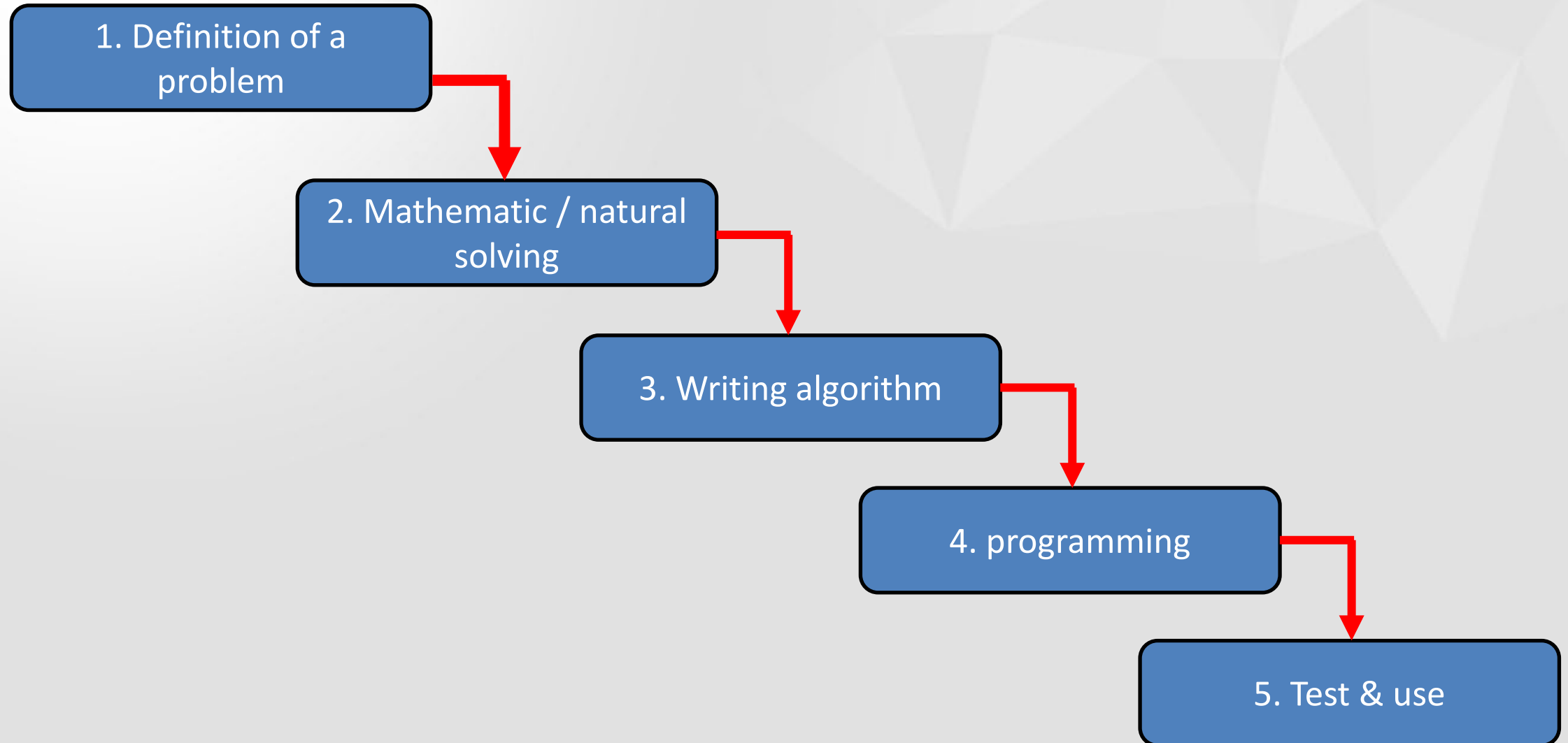
1. Independent of any programming language;
2. In English;
3. It is more rigorous.

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;

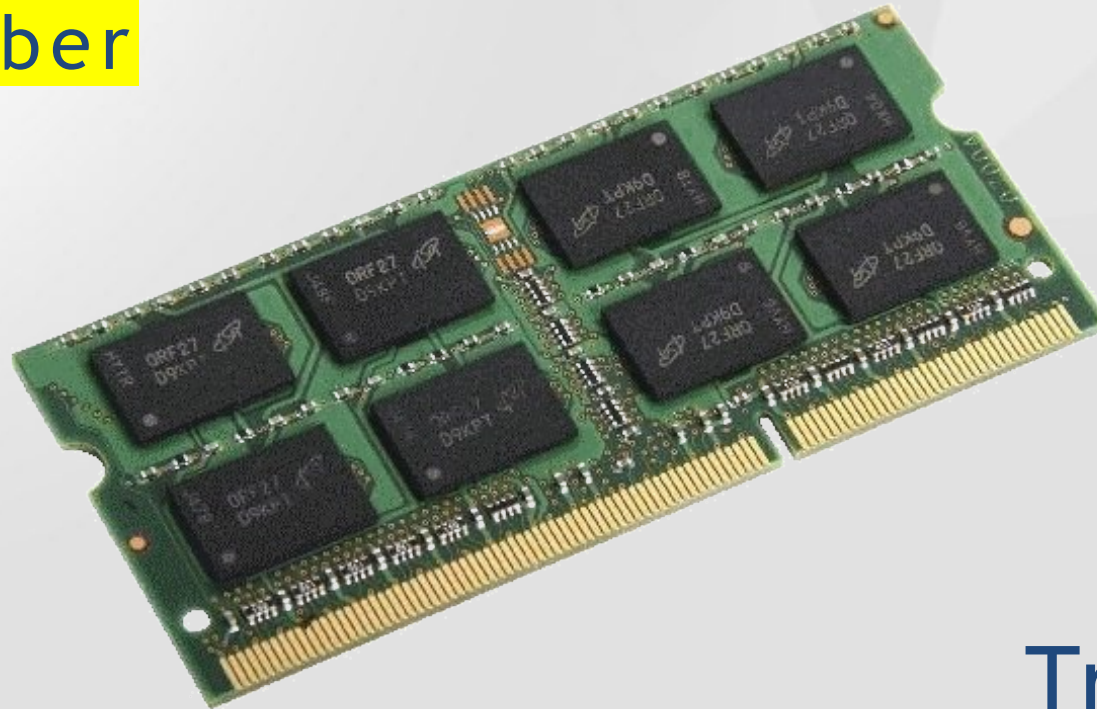
To Store and manipulate data in memory...

44 years

Integer Number

Jérôme

String



1466,62 €

Float/real
number

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

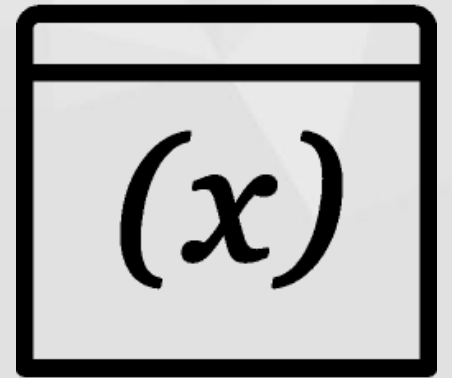
Const MONNAIE ← "Euro"



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

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
$age \leftarrow 44 + 1$ $age \leftarrow \hat{age} + 1$ $salary \leftarrow salaire \times 1,05$ $quotient \leftarrow a \div b$ $name \leftarrow name \ \& \ " \text{Salah} "$		<code>age = 44 + 1</code> <code>age = age + 1</code> <code>age += 1</code> <code>salaire = salaire * 1.05</code> <code>quotient = a / b</code> <code>nom = nom + " Salah"</code>

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
<code>output("Age ", age, "Salary ", salary)</code>	<code>print("Age", age, "Salary", salary)</code>

Structure d'un algorithme/programme

Algorithme

```
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
```

Python

```
# 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)
```



Write an algorithm the its
program of a simplified
calculator.



Q & A