

# Lab Python n°1

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## **Beginner Level :**

### **1. Hello World**

The « Hello World! » is the most known program to introduce a new programming language. We won't be breaking the tradition in this lab.

Write a python program which consists of getting python to print "Hello World" to the console.

### **2. Tic Tac Toe**

Write a python program which consists of getting python to print a Tic Tac Toe Board, as shown below, to the console.

```
| | |
-----
| | |
-----
| | |
```

### **3. Giant Tic Tac Toe**

Using loops and conditions, write a python program which consists of getting python to print a giant Tic Tac Toe Board, as shown below, to the console.

```
| | H | | H | |
--+-+--H--+-+--H--+-+--
| | H | | H | |
--+-+--H--+-+--H--+-+--
| | H | | H | |
=====+=====+=====
| | H | | H | |
--+-+--H--+-+--H--+-+--
| | H | | H | |
--+-+--H--+-+--H--+-+--
| | H | | H | |
=====+=====+=====
| | H | | H | |
--+-+--H--+-+--H--+-+--
| | H | | H | |
--+-+--H--+-+--H--+-+--
| | H | | H | |
```

## Advanced Level :

### 1. Collatz Sequence

The *Collatz sequence* is an iterative sequence defined on the positive integers by:

$$\begin{array}{ll} n \rightarrow n / 2 & \text{if } n \text{ is even} \\ n \rightarrow 3n + 1 & \text{if } n \text{ is odd} \end{array}$$

For example, using the rule above and starting with 13 yields the sequence:

13 -> 40 -> 20 -> 10 -> 5 -> 16 -> 8 -> 4 -> 2 -> 1

The sequence stops when 'n' reaches 1.

Choose a random number between 50 and 100 then write a python program that prints its relative *Collatz sequence*.

### 2. Pascal's Triangle

Write a python program that prints to the console the 10 first levels of the pascal's triangle.

As a reminder, each element in a row of Pascal's triangle is formed by summing the two elements in the previous row directly above (to the left and right) that elements. If there is only one element directly above, we only add that one. For example, the first 5 rows of Pascal's triangle look like:

```
    1
   1 1
  1 2 1
 1 3 3 1
1 4 6 4 1
```

### 3. Surpassing Words

Surpassing words are English words for which the gap between each adjacent pair of letters strictly increases. These gaps are computed without "wrapping around" from Z to A.

For example:

SUPERB  
SU / UP / PE / ER / RB  
2 / 5 / 11 / 13 / 16

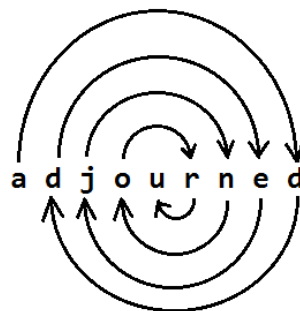
Write a python program that decides whether "Juridic" is a surpassing word or not.

### Bonus Level :

#### Cyclone Words

Cyclone words are English words that have a sequence of characters in alphabetical order when following a cyclic pattern.

For example:



Write a python script that determines whether a given word is a Cyclone word or not.