

# Herramientas Computacionales para Ciencias

## Homework 3

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18/02/2019

This week we are going to concentrate on strings and lists on **python**.

One of the most useful methods on **python**, is **sort**, it can be used as follows,

```
list_test=[1,3,8,1.2,6,2,9,3,8,5,10]
list_test.sort()
print(list_test())
```

getting as a result

[1, 1.2, 2, 3, 3, 5, 6, 8, 8, 9, 10]

But look that what the method does, is replace the list for its sorted version!!.

## Rules

You only have 2 opportunity to upload files, save your solution on a file named with your email user name plus **Hw3** and extension **.py**, for example **j.sevillamHw3.py**.

## Problem

We are going to program one of the most famous methods to sort lists **Bubble sort**. It works comparing pairs and exchanging them if they are not sorted. You have to proceed as follows

- Take the first pair of numbers, compare them and select:
  - If the right hand side number is smaller than the left hand side one, exchange them.
  - Continue otherwise.
  - Repeat until the last pair is compared.
- Repeat until the list is sorted.

For example,

[8,5,1]	exchange the 8 and the 5	[5,8,1]
[5,8,1]	exchange the 8 and the 1	[5,1,8]
[5,1,8]	exchange the 5 and the 1	[1,5,8]

The PseudoCode for this problem is:

```
bubbleSort( list)
loop = length of list;
for i = 0 to loop-1 :
    swapped = False
    for j = 0 to loop-1 :
        if list[j] > list[j+1]: # compare the adjacent elements
            swap( list[j], list[j+1] ) # swap them
            swapped = true
        end if
    end for
    #if no number was swapped that means array is sorted now, break the loop.
    if(not swapped)
        break
    end if
end for
```

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