Herramientas Computacionales para Ciencias
Homework 3

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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_sort())
```

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!!.

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,

$[\mathbf{8}, \mathbf{5}, 1]$	exchange the 8 and the 5	$[\mathbf{5}, \mathbf{8}, 1]$
$[5, \mathbf{8}, \mathbf{1}]$	exchange the 8 and the 1	$[5, \mathbf{1}, \mathbf{8}]$
$[\mathbf{5}, \mathbf{1}, 8]$	exchange the 5 and the 1	$[\mathbf{1}, \mathbf{5}, 8]$

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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