Lab 6: Sort

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GitHub Classroom

Lab 6 – Sort

Miroslav Klose

Do you know **Miroslav Klose**?

Short bio: Miroslav Klose is a retired German professional footballer who is widely regarded as one of the **greatest goal-scorers** in the history of the FIFA World Cup. Born on June 9, 1978, in Opole, Poland, Klose moved to Germany with his family when he was a child.

GOoooooAAALLL of this Lab?

Sort football players by number of goals

- You are a sports reporter and have to write an article about the top scorers in World Cup.
- You asked the intern to prepare the list of top world cup scorers, but he gave you a completely shuffled list!!!!??
- **Your job is to put things in order such that you only consider the top-5 best world cup scorers in the history**

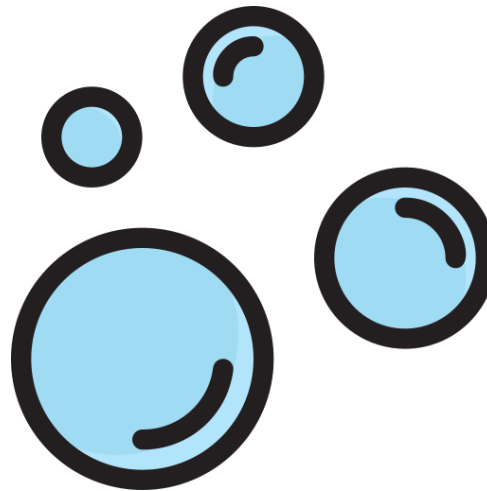## Here is how the list looks like in python

```python
footballers = [ ["Rivaldo", 8, "Brazil"],
    ["Jürgen Klinsmann", 11, "Germany"],
    ["Pelé", 12, "Brazil"],
    ["Gary Lineker", 10, "England"],
    ["Miroslav Klose", 16, "Germany"],
    ["Just Fontaine", 13, "France"],
    ["Thomas Müller", 10, "Germany"],
    ["David Villa", 9, "Spain"],
    ["Iván Zamorano", 7, "Chile"]]
```

Except that you have 35 of them!
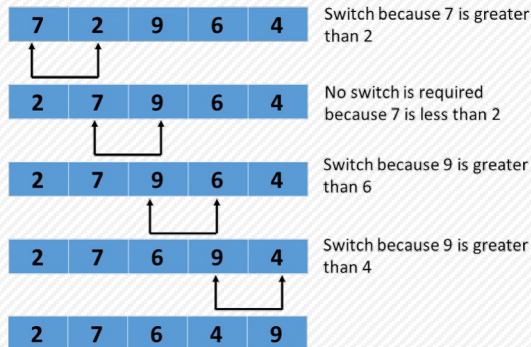
How to sort that list?

Bubble sort

- In this class, we have already seen Insertion sort and selection sort. Today we will implement bubble sort!
- Simplest sorting algorithm possible but is relatively ineffective as it admits an n^2 complexity
- The method works by examining each set of adjacent elements in the list, from left to right, switching their positions if they are out of order. The algorithm then repeats this process until it can run through the entire string and find no two elements that need to be **swapped**.

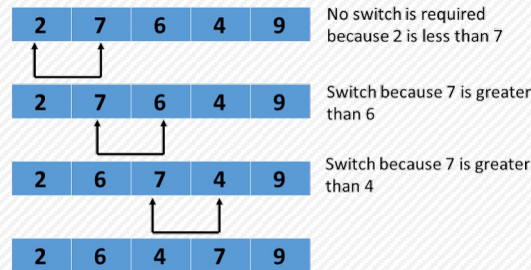Let's look at the next page to see how it really work
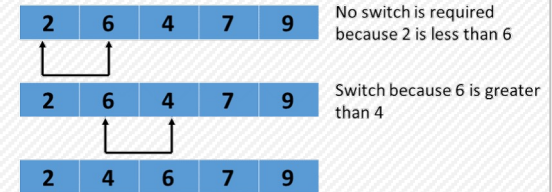
Task 1: Bubble sort

Pass 1

| 7 | 2 | 9 | 6 | 4 |

Switch because 7 is greater than 2

| 2 | 7 | 9 | 6 | 4 |

No switch is required because 7 is less than 2

| 2 | 7 | 9 | 6 | 4 |

Switch because 9 is greater than 6

| 2 | 7 | 6 | 9 | 4 |

Switch because 9 is greater than 4

| 2 | 7 | 6 | 4 | 9 |

• Compare the first and second elements, starting with the first index.
• They are swapped if the first element is greater than the second.
• Compare the second and third elements now. If they are not in the correct order, swap them.
• The preceding procedure is repeated until it reaches the final element.

Pass 2

| 2 | 7 | 6 | 4 | 9 |

No switch is required because 2 is less than 7

| 2 | 7 | 6 | 4 | 9 |

Switch because 7 is greater than 6

| 2 | 6 | 7 | 4 | 9 |

Switch because 7 is greater than 4

| 2 | 6 | 4 | 7 | 9 |

• The process is repeated for the remaining iterations.
• The most significant element among the unsorted elements is placed at the end of each iteration.

Pass 3

| 2 | 6 | 4 | 7 | 9 |

No switch is required because 2 is less than 6

| 2 | 6 | 4 | 7 | 9 |

Switch because 6 is greater than 4

| 2 | 4 | 6 | 7 | 9 |

The comparison is performed up to the last unsorted element in each iteration.

Pass 4

| 2 | 4 | 6 | 7 | 9 |

When all of the unsorted elements are placed in their correct positions, the array is sorted.

TODO: to sort the footballers by number of goals, implement Bubble sort in the function: `BubbleSort()`

Task 2: TOP-5 best scorers

TOP5

Now you want only to return the top-5 best world cup scorers in history to write your article about them!

| Miroslav Klose | Ronaldo | Gerd Müller | Just Fontaine | Pele (aka the king) |

TODO: Implement the function returnTopFive() returning the list of the top 5 footballers