

## Exercise 01: Python Basics

The content of this exercise is the basic data types and control structures in Python. Helpful is the file [01\\_addition\\_overview\\_Python\\_Types\\_Syntax.pdf](#)

### Task 1: Python Basics

1. Write a program that prints "Hello World" to the screen and run it (without an IDE). Note: This program will be extended successively in the following.
2. Introduce a boolean variable with any value and output its type and value.
3. Create a list, a tuple, a dictionary and a string with at least three arbitrary elements each.
4. Import the embedded shell `IPShell` from the module `IPython` and call it at the end of your program. Display the variables created so far from the IPython prompt. Get an overview of the attributes and methods of the objects of the objects by means of `<TAB>` and `<?>`.  
**Hint:** Calling the embedded IPython shell can be very helpful for debugging more complex programs. Use the syntax: `from IPython import IPShell`. The shell can be terminated with CTRL+D.
5. Import the function `activate_ipshell_on_exception` from the module `IPython` and call this function immediately afterwards. Then deliberately build an error into the program, e.g. by dividing by zero: `x = 1; y = 0; z = 1/0`. What do you notice when you run the program?
6. For each of the sequence objects created above (list, tuple, ...), write out its length. Also write a `for` loop in which the respective contents are output (one element per line).  
**Note:** Avoid counting variables; in the case of the dictionary, unpack the "item tuples" already in the loop header.
7. Read two inputs from the user using `input` and convert them to floating point numbers. While doing this, check if the numbers are in the interval  $[-10, 10]$ .
8. Determine the sum and mean of these numbers and output both.
9. Extend the functionality to `N` inputs, where `N` is specified in the code (positive, integer).