

Introduction to Python - Python I

1 Getting Started

This is a short recap what you have learned the previous days.

1.1 Connecting to UPPMAX

Open a terminal and start a ssh connection to UPPMAX as you learned on Monday.

```
$ ssh -X <username>@rackham.uppmax.uu.se
```

Note: <username> is replaced by your own UPPMAX username.

1.2 Create new directory

Before you start with the following assignments, please create a directory `PythonLab1` in your home directory (`~/`). In this directory save all the files you create during this assignment.

1.3 Assignments

For the first assignment you should get familiar with the Python-interpreter. In the second assignment you write your first Python program using an editor. More instructions are given in the following how to use both, the Python-interpreter and an editor. Good luck!

2 Assignmet - Python

Load the module for Python 3 with the command `module load python3/3.6.0`.

Open the Python-interpreter with the command `python3`.

You should then see at the beginning of the line: `>>>`. In this exercise we use only the Python-interpreter.

You can leave the Python-interpreter when you type `quit()`.

1. Type in the Python-interpreter the following command:

```
print("Assignment7")
```

What happens?

2. Enter now `i = 10` in the Python-interpreter and then (in a new line) `print(i)`.
After that (in a new line) enter `j = i/2` and (in a new line) `print(j)`.

Which values are displayed and why?

Hint: With `type()` the type of a variable can be determined. For example, `type("hello")` returns `<class 'str'>` which means that "hello" is of type string.

3. Assign to variable `7Assignment` the string `black magic`. Don't forget to put the string in quotation marks (" ").
Which error occurs and why?
4. Assign to variable `A` a sequence `AGCTA` (don't forget to put the sequence in quotation marks). Use the built-in function `len()` to determine the length of the sequence `A` and assign the length of `A` to variable `i`. Print `A` and `i`.

5. Concatenate `A` and `i` and print the result.
What happens and why?
6. Enter now `print(A + str(i))`.
What happens now and why?
Hint: What might the built-in function `str()` do? There are also other built-in functions, e.g., to convert a string or number to an integer: `int()`, or to convert a string or number to a floating point: `float()`.
7. Print the substring of `A` from position 2 to 4.
The output should be: `GCT`.
8. Print the prefix (beginning of a string) of length 2 and the suffix (end of a string) of length 2 of the sequence stored in `A`.
The output should be `AG` and `TA`.
9. Write a for-loop with the loop variable `i`, which runs from 0 to `len(A)` and prints out `i`.
Hint: Don't forget to indent the body of the for-loop.
Execute the same for-loop a second time and print out the character at each position of string `A` using `A[i]` as well.
10. Add now an if-condition inside the for-loop, which checks if `i < len(A)/2`.
Only print `i` and `A[i]` if this condition is true.
11. Write a while-loop, which produces the same output as the for-loop and if-condition together.
12. Print the variable `A` again. What happens?
13. Leave the interactive mode of Python with `quit()`.
14. Now return to the interactive mode of Python and print the variable `A`. What happens now and why?

3 First small program

Open your favorite editor (nano, gedit, etc.) and write in the file named `compare.py` your first Python program.

Hint: When you type

```
$ gedit compare.py&
```

in the terminal, a new line in the terminal should appear

(if not press `<ctrl C>`). Then you can run your program in the same terminal window:

```
$ python3 compare.py
```

The advantage is that you can edit your program and switch easily between the editor and terminal window.

1. Write a short program which compares two variables `i` and `j`. It should print the value 1, if `i` and `j` are equal, and otherwise the value 0.
2. Within the program assign different numbers to `i` and `j`, e.g.:
 - a) `i = 3` and `j = 4` and
 - b) `i = 10` and `j = 10`

Does your program work?