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:

   ```python
   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`
   b) `i = 10` and `j = 10`

Does your program work?