1   Preliminaries

Follow the lecture slides for the following Python concepts:

1. Boolean variables and expressions.

2. Conditional (`IF`) statements.

3. User-defined functions.

2   Write a Reverse Complement Function

You will write a Python program that will compute the reverse complement of a string of DNA.

- Download `Lab3.py` and open it. Run it and observe the current output.
- **_Challenge:_** If you have programmed before, download with `Lab3_challenge.py`. Run it and observe the output.

2.1   Compute the Reverse and the Reverse Complement by Hand

The file already has a string variable `dna` with the sequence `'ATAGCATTGC'`. Compute by hand the reverse of the string and the reverse complement of the string. Save these strings as variables `compdna` and `revcompdna`, respectively. Print these three variables.

2.2   `complement()` Function

Write a function to return the complement of a string.

> `complement()`: _Compute the complement of a string of DNA._
> **Inputs:** `sequence` – string of A/CG/T.
> **Returns:** `comp` – string of the complement of `sequence`

In the `main()` method; write the following line and verify its output. Make sure it is indented appropriately.

```python
print('complement():',complement(dna))
```

2.3   `reverse()` Function

Write a function to return the reverse of a string.

> `reverse()`: _Compute the reverse of a string of DNA._
> **Inputs:** `sequence` – string of A/CG/T.
> **Returns:** `rev` – string of the reverse of `sequence`

In the `main()` method; write the following line and verify its output. Make sure it is indented appropriately.

```python
print('reverse():',reverse(dna))
```

2.4   `reverseComplement()` Function

Write a function to compute the reverse complement of a string. Return this string.

> `reverseComplement():` *Compute the reverse complement of a string of DNA.*
>   **Inputs:** `sequence` – string of A/CG/T.
>   **Returns:** `revcomp` – string of the reverse complement of `sequence`

Use your previously-defined functions within `reverseComplement()`. In the `main()` method; write the following lines and verify their output. Make sure they are indented appropriately.

```python
computedSequence = reverseComplement(dna)
print('reverseComplement():',computedSequence)
```

2.5   Check the Correct Answer

Use an `IF` statement to print `'Correct Answer!'` if the computed sequence and the hand-written sequence match and `'Incorrect Answer'` otherwise.

<center>Submit your code to Moodle for participation credit.</center>

3   Look Over HW3

Download and extract `HW3.zip`. Read through `HW3-instructions.pdf`, and run either `HW3.py` or `HW3_challenge.py`. Make sure it runs with no errors.

4   Rosalind Problems (Optional)

Make an account on **Rosalind** (you'll need this next week).

<center>http://rosalind.info/</center>

Solve the Python Village problems #1 – #4:

1. **INI1**: Installing Python (`http://rosalind.info/problems/ini1/`)

2. **INI2**: Variables and Some Arithmetic (`http://rosalind.info/problems/ini2/`)

3. **INI3**: Strings and Lists (`http://rosalind.info/problems/ini3/`)

4. **INI4**: Conditionals and Loops (`http://rosalind.info/problems/ini4/`)