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.

```
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.

```
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.

```
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.

Submit your code to Moodle for participation credit.

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).

`http://rosalind.info/`

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/`)