Practical 5. Working with Numbers

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5.1 Objectives

- Practice python coding with numbers
- Learn to program with the help of online references

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In this practical, you will write python codes for two problems. You may need to look for online references to complete this assignment, which is also a good practice on how to ask right questions. You are expected to use version control systems (e.g. git) to store your codes. After this practical, the tutorial session may give you an opportunity to share your codes to your peers and receive critical reviews for improvement of your codes. You may continue to make them better.

In class, your instructors are there to help. Please don't be shy about asking them. Once you have completed the assignment, you are free to leave.

5.3 Problems to solve

5.3.1 Counting DNA Nucleotides

Problem: An example of a length 21 DNA string (whose alphabet contains the symbols 'A', 'C', 'G', and 'T') is "ATGCTTCAGAAAGGTCTTACG." Count the frequency table of the four nucleotides and construct a pie from the data.

Tips: pyplot.pie

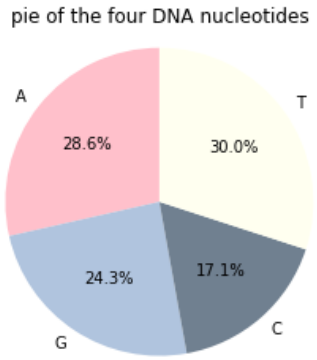
Given: A DNA string s of length at most 1000 nt.

Return: Four integers (separated by spaces) counting the respective number of times that the symbols 'A', 'C', 'G', and 'T' occur in s. (Create a frequency dictionary mapping `str:int`). A pie from the frequency table.

You may explore different styles of the plot if you finish early.

Example:

```
>>>give me a sequence of DNA :
>>>AGCTTTTCATTCTGACTGCAACGGGCAATATGTCTCTGTGTGGATTAAAAAAAGAGTGTCTGATAGCAGC
>>>{'A': 20, 'G': 17, 'C': 12, 'T': 21}
```



5.3.2 String reverse and list sorting

Problem: Suppose you have a list of words, and you need to sort them in their reverse string order.

Tips: use split() to get words from a string: check online python documents for its usage

Given: A string

Return: A list of reversed and sorted words

Example:

```
>>>give me a string of words :
>>>but soft what light in yonder window breaks
>>>['wodniw', 'tub', 'thgil', 'tfos', 'tahw', 'skaerb', 'rednoy', 'ni']
```