SOFTWARE 1 PRACTICAL

ITERATION

Week 3 – Practical 2

We have seen that Python **list** are iterables that can be modified. We can access an element from the list using its position. We can also add an element at the end of the list by using the method **append**. We have already used another iterable without knowing it, Python **string**. A string can be seen as a collection of characters. In the same way as list, we can access one of its character by using its position as shown below on lines [2] and [4]. However, as opposed to list, strings cannot be modified. To add characters at the end of a string, we need to concatenate a string at the end of the original string using the + operator, and reassign the newly built string to the variable as shown below on line [6].

```
[1] >>> word = 'Flying'
[2] >>> print(word[0])
[3] F
[4] >>> print(word[2])
[5] y
[6] >>> word = word + ' Circus'
[7] >>> print(word)
[8] Flying Circus
```

Exercise 1: Palindrome

A palindrome is a word, phrase, number, or other sequence of units that may be read the same way in either direction, `'radar'` and `'Delia saw I was ailed'` are palindromes, whereas `'reader'` is not. Write a program that take a sentence or a word as an input and print if it is a palindrome or not.

The advanced bit

`'Dammit, I'm mad!'` is also considered a palindrome when neither punctuation nor spaces are taken into account. Change your program so it can recognise these palindromes too.

Exercise 2:

1. Write a script that takes a sentence from the user without any punctuation and prints the sentence without any white spaces. Note a white space is represented by `' '`, and an empty string is represented by `''`.

```
>>> enter a sentence: this is a SHORT sentence
thisisaSHORTsentence
```

2. Same as above except that each word in the output should start with a upper case letter and all other letter should be lower case (also known as CamelCase).

```
>>> enter a sentence: this is a SHORT sentence
ThisIsAShortSentence
```

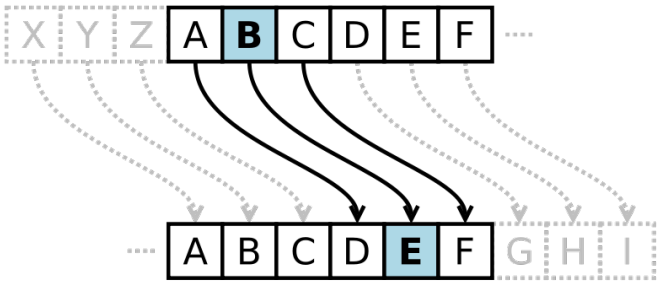
3. Write a script that takes a sentence from a user written in CamelCase (without any blank spaces), creates the list of words from that sentence, and then prints that list.

```
>>> enter a sentence in CamelCase: ThisIsAShortSentence
['This','Is','A','Short','Sentence']
```

Exercise 3: Cryptography, Caesar Cipher

In cryptography, a **Caesar cipher**, also known as the shift cipher, is one of the simplest and most widely known encryption techniques. It is a type of substitution cipher in which each letter in the plain text is replaced by a letter some fixed number of positions down the alphabet.

For example, with a shift of 3, A would be replaced by D, B would become E, and so on. The method is named after Julius Caesar, who used it to communicate with his generals.



Mathematically, a Caesar cipher can be expressed by the following equation:

$$c = (p + a) \bmod 26$$

Here, 'mod 26' means that you use clock arithmetics for values greater than 26, i.e., 0=26 mod 26, 1=27 mod 26, 2=28 mod 26, …, 0=52 mod 26, 1=53 mod 26, …, 10=62 mod 26, and so on.

1. Write a script that encrypts a plain text into a cypher text using the Caesar Cipher algorithm.
2. Write a script that decrypts a cipher text into a plain text using the Caesar Cipher algorithm.