



## LM Software Workshop 1 (34153, 34182, 34168, 36990)

### Lab Exercise Sheet

#### Week 3 Chapter 4 (Strings and Text Files)

- A. Apply (copy/paste) all the examples of ppt slides into the Jupyter Notebook, remove errors (if any) and run the programs
- B. Write a snippet of code that counts how many vowels are in a string, remove the vowels and output the string without the vowels (do NOT make use of any string methods to achieve this)
- C. **The following 4 questions are mandatory for all students:**
1. Write a script that inputs a line of plaintext and a distance value and outputs an encrypted text using a Caesar cipher. The script should work for any printable characters.
  2. Write a script that inputs a line of encrypted text and a distance value and outputs plaintext using a Caesar cipher. The script should work for any printable characters.
  3. Modify the scripts of Projects 1 and 2 to encrypt and decrypt entire files of text.
  4. **(Question 8 of the book)** Write a script named `copyfile.py`. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.
- D. **(Challenge Questions) The following 2 questions are optional.**
5. A **bit shift** is a procedure whereby the bits in a bit string are moved to the left or to the right. For example, we can shift the bits in the string **1011** two places to the left to produce the string **1110**. Note that the leftmost two bits are wrapped around to the right side of the string in this operation. Define two scripts, **shiftLeft.py** and **shiftRight.py**, that expect a bit string as an input. The script **shiftLeft** shifts the bits in its input one place to the left, wrapping the leftmost bit to the rightmost position. The script **shiftRight** performs the inverse operation. Each script prints the resulting string.
  6. Use the strategy of the decimal to binary conversion and the bit shift left operation defined in Project 5 to code a new encryption algorithm. The algorithm should add 1 to each character's numeric ASCII value, convert it to a bit string, and shift the bits of this string one place to the left. A single-space character in the encrypted string separates the resulting bit strings.