

# Laboratory Work #4 - Character and string operations

Due Date: Friday, October 20, 2023

Handover Date: Saturday, September 23, 2023

## 1 Introduction

Strings and characters are fundamental elements in computer programming, often used to represent and manipulate text-based data. While a single character can be seen as the smallest unit of text, a string is a sequence of characters, forming a textual structure.

In programming, characters are typically represented using characters from the ASCII or Unicode character sets, where each character is associated with a numeric code. These codes allow computers to understand and process text-based information.

Strings are collections of characters arranged in a linear, sequential fashion. Each character within a string has a specific position or index, starting from the first character at index 0 and increasing incrementally. This indexing system enables easy access to individual characters within the string.

## 2 Input

Each task will have its specific input.

## 3 Task

Choose one/multiple tasks from the list below and build up your mark. Each task should be in form of function and the input for each task should be inside the corresponding function.

### 3.1 Easy - each of them is worth 1 point

- Implement a function that reads a string and checks if it's a palindrome (reads the same forwards and backwards).
- Implement a function that reads a string and converts it to uppercase.
- Implement a function that reads a string and counts the number of vowels (a, e, i, o, u) in it.
- Implement a function that reads a string and counts the number of words in it.

### 3.2 Medium - each of them is worth 2 points

- Implement a function that takes two strings as input and checks if the second string is a rotation of the first string. For example, "abcde" is a rotation of "cdeab."
- Implement a function that reads a sentence from the user and counts the number of punctuation marks (e.g., periods, commas, question marks) in the sentence.
- Implement a function that reads a string from the user and checks if it is a valid palindrome when only alphanumeric characters are considered. Ignore spaces and punctuation.
- Implement a function that reads a string from the user and checks if it is a valid email address based on simple criteria (e.g., contains "@" and "." symbols in the right places).
- Implement a function that takes a sentence as input and returns the sentence with words sorted alphabetically.

### 3.3 Hard - Text editor(worth 10 points)

Implement a simple text editor program in C that allows users to enter, edit, search, and manipulate text within a buffer. The program should provide a menu-based interface with the following functionalities:

- Enter Text: it will append the entered text to the existing text
- Search for Word: it will display the number of occurrences
- Replace Word
- Delete: it should delete the entire buffer
- Save to File(optional)
- Load from File(optional)
- Exit

Task Requirements:

- Use appropriate data structures (e.g. arrays or linked lists) to manage the text in the buffer, handle search and replace operations, and store search results.
- Ensure proper memory management and error handling, including file I/O errors(if you will implement files functionality) and buffer overflow protection.
- Provide clear and user-friendly prompts and messages to guide users through the menu options and operations.

If you feel like adding more functionalities, feel free to do so, it will only benefit you:)

## 4 Grading

In order to get a mark for the rest of difficulties, you will have first of all to implement the task from Kulev\_PC\_SDA.pdf matching your variant(your number in the list). The base task is worth 5 points, so if you do only it, you will be marked only with 5.

You have the freedom of choice to build up your mark, however you must choose at least one medium problem.

If you choose the hardest difficulty, you will have 10 by default(no need for base task).

PS: No codeforces bonus for this one

PS2: For any questions, don't be shy to reach out to me or your colleagues

## 5 Reporting

IMPORTANT!!! As i specified on else, you have to use latex to create/format your report