Department of Information Systems and Technologies

CTIS 152 – Data Structures and Algorithms
Spring 2024 - 2025

Lab Guide #7 - Week 4-2

OBJECTIVE : String Operations

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Q1. Write a C program that will **input** and **display** a sentence. Try entering the sentence first with **%s** and then **%[^\n]** to see the difference. Also, use **%[^0-9]** then display the sentence.

Example Run(using %s):

```
Enter a sentence : Google updates search algorithm for better accuracy.
The sentence is  : Google
```

Example Run(using %[^\n]):

```
Enter a sentence : Google updates search algorithm for better accuracy.
The sentence is  : Google updates search algorithm for better accuracy.
```

Example Run(using %[^0-9]):

```
Enter a sentence : Paris records 10 million visitors in January.
The sentence is  : Paris records
```

Project Name: LG7_Q1
File Name: Q1.cpp

Q2. Write a C program that reads the words from the **words.txt** file, finds the length of the word using the **myStrLen** function, and writes the word and its size into a new text file named **result.txt**.

Write the following function;

- **myStrLen:** takes a string as input parameter, finds and returns the number of characters in that string.

Hint: A string ends with a **'\0'** character.

words.txt	**Result.txt**
Cloud	Cloud-5
AI	AI-2
Algorithm	Algorithm-9
Cyber	Cyber-5
Quantum	Quantum-7
Network	Network-7
Data	Data-4
Firmware	Firmware-8

Project Name: LG7_Q2
File Name: Q2.cpp

<string.h> library functions are:

- `int strlen(const char *str)`
- `char *strcpy( char *dest, const char *src)`
- `int strcmp(const char *str1, const char *str2)`

Q3. Write a C program that reads the file named **"morning.txt"** and finds how many words there are in each line of the paragraph. Display the line numbers and the number of words on each line as in the example run.

morning.txt

```
Start by waking up early, EOL
giving yourself time to stretch and breathe deeply. EOL
A glass of water will hydrate you and kickstart your metabolism. EOL
Next, move your body with a quick workout or a brisk walk. EOL
This will get your blood flowing and energize you for the day ahead. EOL
Afterward, enjoy a healthy breakfast, like oatmeal or a smoothie. EOL
Plan out your priorities for the day, setting clear intentions. EOL
If you have time, engage in a quick mindfulness practice or journaling. EOL
By taking these simple steps, you'll set yourself up for a productive and focused day. EOL
Don't forget to set a positive tone with a moment of gratitude! EOL
```

HINT: Each line end with "EOL", means end of line as you can see in your text files.

Example Run:

```
 1. line contains 5 words
 2. line contains 8 words
 3. line contains 11 words
 4. line contains 12 words
 5. line contains 13 words
 6. line contains 10 words
 7. line contains 10 words
 8. line contains 12 words
 9. line contains 15 words
10. line contains 12 words
```

Project Name: LG7_Q3
File Name: Q3.cpp

Q4. Write a C program that takes several words from the user until the word "**END**" is entered, stores the words in the string array, finds the last longest word in the array, and displays it and its length on the screen.

Write the following function;

- **`longest:`** takes the string array and the number of words in the array as input parameters, finds and returns the index of the last **longest word** in the array.

Example Run#1:

```
Enter a word (or END): Dream
Enter a word (or END): Art
Enter a word (or END): Flower
Enter a word (or END): Quick
Enter a word (or END): Breeze
Enter a word (or END): Fresh
Enter a word (or END): END

Longest word: Breeze
Length: 6
```

Example Run#2:

```
Enter a word (or END): Dubai
Enter a word (or END): Barcelona
Enter a word (or END): Madrid
Enter a word (or END): Paris
Enter a word (or END): Singapore
Enter a word (or END): Istanbul
Enter a word (or END): END

Longest word: Singapore
Length: 9
```

Project Name: LG7_Q4
File Name: Q4.cpp

Q5. Write a C program that reads a sentence from **"input.txt"** and writes in an **"output.txt"** as a table indicating the frequency of the occurrence of letters in the words (two-letter words, three-letter words, etc.) appearing in a sentence.
(***Do not print the word lengths with zero!***)

NOTE: MAKE USE OF STRLEN(…)

Project Name: LG7_Q5
File Name: Q5.cpp

input.txt

```
Over the past year scientists have made significant discoveries in the deep ocean revealing new
species and ecosystems Innovative technologies such as remotely operated vehicles have allowed
researchers to explore previously inaccessible depths
```

output.txt

```
Word length     Occurrences
----------------------------
    2                3
    3                4
    4                8
    5                1
    6                1
    7                3
    8                3
    9                1
   10                4
   11                3
   12                2
```

Additional Question

Write a C program that reads a list of course codes (department name and the numeric code of the course) from a file named **course.txt**, converts course codes into optic codes, and displays both as in the example run. Define the necessary structure and make use of the following structure array.

```
codes_t codeList[MAX] = { {"CS","11"}, {"THM","61"}, {"CTIS","62"},
                          {"ECON","32"}, {"HIST","94"}, {"TURK","95"} };
```

Write the followıng function;

- **searchCrs**: that gets the code list and the code to be searched as parameters, searches for the given department code in the array, and returns the index of it. If the dept is not in the list returns -1.

Project Name: LG7_AQ
File Name: AQ.cpp

Example Run:

```
CTIS 165 -> 62165
THM  106 -> 61106
HIST 200 -> 94200
CTIS 221 -> 62221
TURK 102 -> 95102
CS   101 -> 11101
ECON 103 -> 32103
TMH  105 -> ERROR
HIST 209 -> 94209
```

course.txt

```
CTIS 165
THM 106
HIST 200
CTIS 221
TURK 102
CS 101
ECON 103
TMH 105
HIST 209
```