Department of Information Systems and Technologies

CTIS 152 – Data Structures and Algorithms

Spring 2024 - 2025

Lab Guide #9 – Week 5-2

OBJECTIVE : String Operations

Instructors : Serpil TIN
Assistants : Berk ÖNDER, Hatice Zehra YILMAZ

<string.h> library functions are:

- `int strlen(const char *str)`
- `char *strcpy( char *dest, const char *src)`
- `char *strncpy(char *str1, const char *str2, size_t n)`
- `char *strcat( char *dest, const char *src)`
- `char * strncat ( char * destination, const char * source, size_t num );`
- `int strcmp(const char *str1, const char *str2)`
- `int strncmp(const char *str1, const char *str2, size_t n)`

Q1.

Write a C program that reads several words from the user until "**END**" is entered, counts the number of words, converts the lowercase letters of each word into the uppercase form, and generates a sentence with the given words. At the end, the program displays the number of words given and the sentence form of the words as in the example run.

Write the following function;

- **`convertToUpper`** that takes a string as a parameter, and converts all lowercase letters into the uppercase form without using any built-in functions.
  - `int strlen( char *str)`
  - `char *strcat( char *dest, char *src)`
  - `int strcmp(char *str1, char *str2)`

Project Name: LG9_Q1
File Name: Q1.cpp

Example Run#1:

```
Enter a word (or END to stop): we
Enter a word (or END to stop): remember
Enter a word (or END to stop): Prof.
Enter a word (or END to stop): Dogramaci
Enter a word (or END to stop): with
Enter a word (or END to stop): deep
Enter a word (or END to stop): respect.
Enter a word (or END to stop): END
You have entered 7 words

The sentence form in uppercase of the given words:
WE REMEMBER PROF. DOGRAMACI WITH DEEP RESPECT.
```

Q2.

Write a C program that inputs a sentence, finds and displays the indexes of all occurrences of the given **string** in the sentence. If the searched string is NOT found, display an appropriate message.

Write the following function;

- **`findAllOccur:`** takes a sentence and a string to be searched as input parameters, finds and returns the indexes of **all occurrences of the given string** in the sentence.

Example Run#1:

```
Enter a sentence: The diligent student studied hard for the exam and achieved excellent grades for the exam.

Enter a string: exam
All occurences of the str <exam>:
 42 85
```

Project Name: LG9_Q2
File Name: Q2.cpp

Example Run#2:

```
Enter a sentence: The busy bee buzzed around the colourful flowers in the garden.

Enter a string: the
All occurences of the str <the>:
 27 52
```

Example Run#3:

```
Enter a sentence: Sometimes a coffee solves all the problems such as in a time, so drink coffee.

Enter a string: coffee
All occurences of the str <coffee>:
 12 71
```

Q3.

Write a C program that **deletes all occurrences of a given WORD** in a sentence and displays the new sentence. if the word doesn't exist display an appropriate message for the user.

Write the following functions;

- **`findFirstOcc:`** takes a string and a sentence, and returns the necessary information.
- **`delAllOccur:`** takes a string and a sentence, and deletes all occurrences of the given WORD if it exists.

Example Run#1:

```
Enter a sentence: the most important problem of the office there are lots of people
Enter a word: the
Final format of the sentence :  most important problem of  office there are lots of people
```

Example Run#2:

```
Enter a sentence: To take high grades from 152 course learn string matching well.
Enter a word: matching
Final format of the sentence : To take high grades from 152 course learn string  well.
```

Project Name: LG9_Q3
File Name: Q3.cpp

ADDITIONAL QUESTIONS

AQ1.

The last two characters represent the country code (.tr means this website belongs to the Turkish Republic).
The extension of the Website URL states the type of the website. Extensions are before the country code (**.tr**).

Write a C program that reads the URL of a website and displays the type of the website according to the domain name extension. If the extension is NOT in the list, the program will display a warning message. (You may use the necessary string functions to find the URL extension.)

The list of domain name *extensions* and their *descriptions* are given **ascendingly sorted** by extensions in the **extensions.txt** file (e.g.: the description of "net" is "network organizations").

Use a structure array for the extension information. That is an extension and description.

Write the following functions;

- **read:** reads the extension information from the file, stores them in the structure array, and returns the number of extensions.
- **search:** takes the structure array and the extension name to be searched and returns the index of the specified extension. If the extension is NOT found in the list the function returns -1.

Project Name: LG9_AQ1
File Name: AQ1.cpp

extensions.txt
```
biz small business web sites
com commercial business
edu educational institutions
gov government entities
info informative business
k12 Turkish primary and secondary schools
mil military
mobi mobile products and services
net network organizations
```

Example Run#1:
```
Enter a website URL: www.atilim.edu.tr
edu extension is used for educational institutions
```

Example Run#2:
```
Enter a website URL: www.mayaportal.k12.tr
k12 extension is used for Turkish primary and secondary schools
```

Example Run#3:
```
Enter a website URL: www.ankara.pol.tr
The searched extension is NOT in the list
```

AQ2.

A Shopping Mall organized a lottery for their customers. The customers filled out coupons writing their **name, the shopping date,** and **the name of the store** where they made the shopping. The list of award-winning customers is stored in the **customers.txt**.

Write a C program that gets customer information from the file named **customers.txt**. The file contains **customer's name**, **date,** and **store_name**, each separated by **--** characters as shown in the file below. Then the program creates a report to announce the customer list in the following format:

- Date without the year information. For example; when the date info is "**29/01/2022**", the program displays "**29/01**".
- Name and surname column, if the total size of the name and the surname is greater than **12**, then the program displays "the first letter of the first name + dot + surname".

  For example;
  - if the name is **Ahmet Ali Cinar,** it will be shown as **A.Ali Cinar** in the coupon.
  - if the name is **Mert Lacinkaya**, it will be shown as **M.Lacinkaya** in the coupon.
- Name of the Store.

Project Name: LG9_AQ2
File Name: AQ2.cpp

Create the given report format for the given file as in the example run.

customers.txt

```
Ahmet Ali Cinar--11/02/2022--MARK AND SPENCER
Mert Lacinkaya--24/04/2022--VAKKO
Firuze Sever--13/05/2022--TEKIN ACAR
Rahmiye Tekeli--12/07/2022--SIEMENS
Attila Sengul--15/06/2022--OFFICE 1 SUPERSTORE
Fusun Lale Guler--12/04/2022--GLORIA JEAN'S COFFEES
```

Example Run:

```
AWARD WINNING CUSTOMERS
----------------------------------------
11/02 A.Ali Cinar     MARK AND SPENCER
24/04 M.Lacinkaya     VAKKO
13/05 Firuze Sever    TEKIN ACAR
12/07 R.Tekeli        SIEMENS
15/06 A.Sengul        OFFICE 1 SUPERSTORE
12/04 F.Lale Guler    GLORIA JEAN'S COFFEES
```