Department of Information Systems and Technologies

CTIS 152 – Data Structures and Algorithms

Fall 2024 - 2025

Lab Guide #7 – Week 5 – 2

OBJECTIVES : Nested Structures and String Operations

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Q1. In an Advertisement Agency System, there is a competition between the companies who has the maximum monitored number in YOUTUBE channel. Agency system has following information; **Agency Name**, **Product Type** and **Company Info** consisting of **Company Name**, **Foundation Year** and **Number Of Monitored** on YOUTUBE.

Write a C program that reads agency information from the file named **"adCompanies.txt"** to a **dynamically** created nested structure array. (The number of lines of the file in the first row) Then, it displays all advertisements' information as a report in the given format, according to the below rules;

- If the views less than 1000, shows only number of views, **ex;** 569 is 569 views
- If the views less than a billion, shows the number of views with K shortcut, **ex;** 500.000 is 500 K
- If the view more than a billion, shows the number of views with M, **ex;** 3.500.000 is 3.5 M

Also, the program displays the maximum monitored advertisement.

Write the following functions;

- **`readFromFile`** that reads the company information from the file into an array of structures..
- **`displayAllViews`** that gets the structure array and its size and display the advertisement, in a given format.
- **`findMaxMonitoredIndex`** that gets the structure array and its size, then finds the maximum monitored advertisement and returns its index value.

Project Name: LG7_Q1
File Name: Q1.cpp

Example Run:

```
From the Agency WPP, Mercedes-Benz (Car) founded in 1926
Views 2.6 M

From the Agency Deloitte, Turkcell (Operator) founded in 1994
Views 3.5 M

From the Agency Bestimage, EnzaHome (Furniture) founded in 2000
Views 500.0 K

From the Agency Idemania, ArkoNem (Cosmetics) founded in 1965
Views 623.0 K

From the Agency ElizYazilim, YapiKredi (Banks) founded in 1944
Views 569

The winner of the competition is -> Turkcell
```

adCompanies.txt

```
5
WPP Car Mercedes-Benz 1926 2600000
Deloitte Operator Turkcell 1994 3500000
Bestimage Furniture EnzaHome 2000 500000
Idemania Cosmetics ArkoNem 1965 623000
ElizYazilim Banks YapiKredi 1944 569
```

Q2. 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 : Regional Director of Medical Affairs.
The sentence is  : Regional
```

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

```
Enter a sentence : Regional Director of Medical Affairs.
The sentence is  : Regional Director of Medical Affairs.
```

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

```
Enter a sentence : By the time the new site is completed and opens in 2021.
The sentence is  : By the time the new site is completed and opens in
```

Project Name: LG7_Q2
File Name: Q2.cpp

Q3. Write a C program that reads the capital cities to visit from the **places.txt** file, finds the length of each place using the **myStrLen** Function, and writes the place and its size into a new text file named **result.txt**.

Write the following function;

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

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

places.txt

```
Washington
Canberra
Santo Domingo
Dublin
Ottawa
Nairobi
Suva
Nassau
```

result.txt

```
Washington-10
Canberra-8
Santo-5
Domingo-7
Dublin-6
Ottawa-6
Nairobi-7
Suva-4
Nassau-6
```

Project Name: LG7_Q3
File Name: Q3.cpp

Q4. 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 occurence of letters in the words (two letter words, three letter words, etc). appearing in sentence.
(***Do not print the word lengths with zero!***)

NOTE: MAKE USE OF STRLEN(…)

Project Name: LG7_Q4
File Name: Q4.cpp

input.txt

```
We increasingly want satisfying food choices we can feel good about and that better fit a healthy
lifestyle.
```

output.txt

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

Additional Question

AQ. NBA basketball team needs software to keep the players' information: **name, age, length, points** consisting **average score** and **average rebound**. USE NESTED STRUCTURE ARRAY. Maximum number of player is **20**.

(***Rebound**: In basketball, the ball is successfully caught by a player after it has bounced off the basket.)*

Write the following functions;

- **`readFromFile`** that reads the players' information from the file "**players.txt**" into an array of structures and return the number of players.
- **`displayPlayer`** that the information of all players as in the example run.
- **`findBestRebound`** that finds and returns the index of the player who has the **maximum** average rebound score.

Write a main program that reads and displays the players' information. The program will also do the followings;

- that displays the information of the best rebound player,

Please examine the given example runs, and test your programs.

EXAMPLE RUN#1:

```
NAME       Age  Length  Avg_Score  Avg_Rebound
-------------------------------------------
Brandon     28    2.03      18.40        10.40
Avery       23    1.88      27.30        14.40
Jordan      25    1.93      16.10         9.70
Kevin       37    2.11      28.60        15.80
Jeff        27    2.06      15.80        11.30
Courtney    28    1.96      28.40        14.60
Jason       36    1.88      16.80         6.90
Chris       31    2.08      17.40        12.70
Nikola      24    2.01      16.70        13.20

The Best rebound player:
Kevin       37    2.11      28.60        15.80
```

players.txt

```
Brandon 28 2.03 18.4 10.4
Avery 23 1.88 27.3 14.4
Jordan 25 1.93 16.1 9.7
Kevin 37 2.11 28.6 15.8
Jeff 27 2.06 15.8 11.3
Courtney 28 1.96 28.4 14.6
Jason 36 1.88 16.8 6.9
Chris 31 2.08 17.4 12.7
Nikola 24 2.01 16.7 13.2
```

Project Name: LG7_AQ
File Name: AQ.cpp