CCC 204 Data Structures and Algorithms LABORATORY
REPORT :
LAB 5# - Strings

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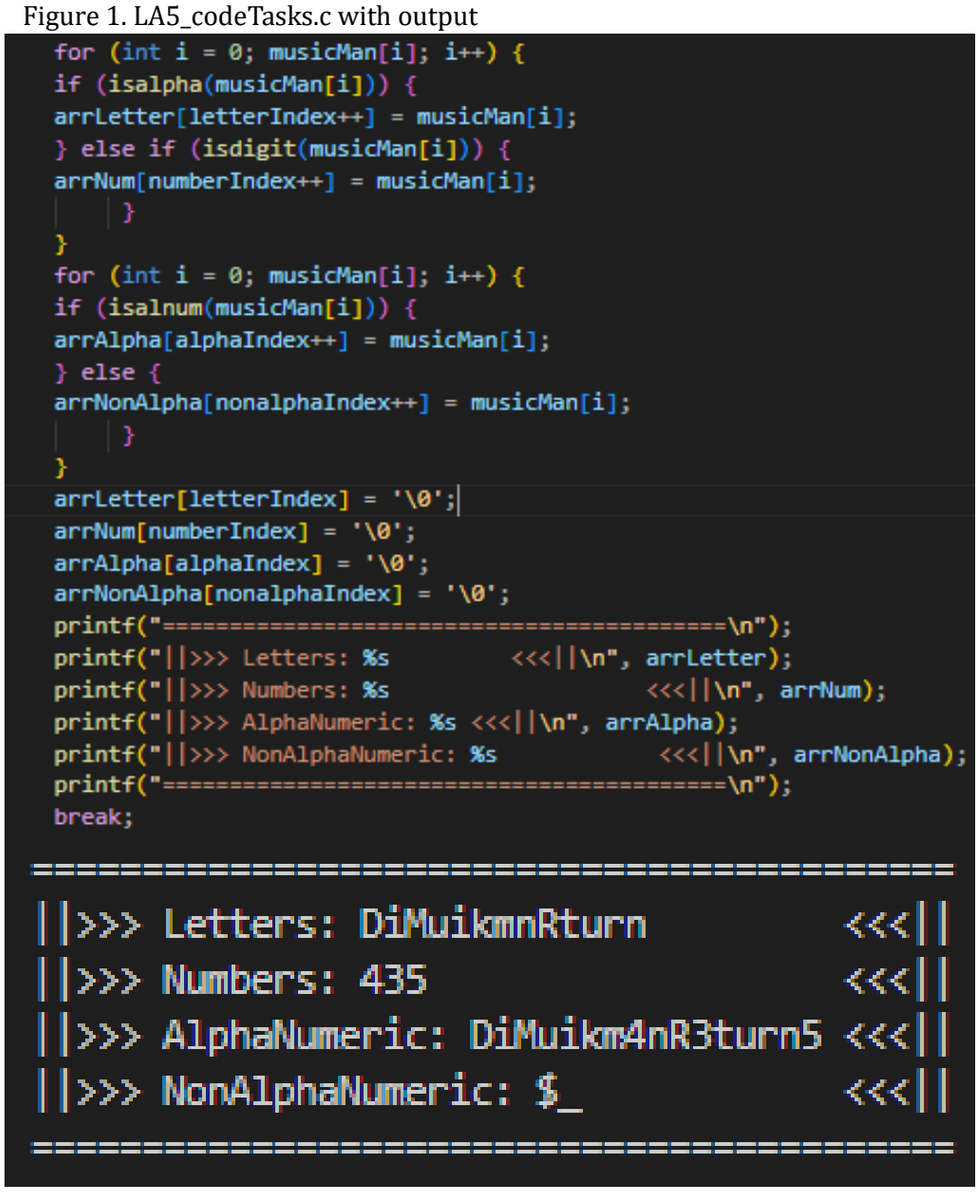
I. INTRODUCTION

For Laboratory Activity Number five is to follow the objectives of the exercises and answer questions. The Three main objectives as follows:

- Use character operators and operations in code.
- Use string operators and operations in code.
- Use string processing functions and string conversion functions.

II. IMPLEMENTATION / APPROACH

Figure 1. LA5_codeTasks.c with output



```
for (int i = 0; musicMan[i]; i++) {
if (isalpha(musicMan[i])) {
arrLetter[letterIndex++] = musicMan[i];
} else if (isdigit(musicMan[i])) {
arrNum[numberIndex++] = musicMan[i];
    }
}
for (int i = 0; musicMan[i]; i++) {
if (isalnum(musicMan[i])) {
arrAlpha[alphaIndex++] = musicMan[i];
} else {
arrNonAlpha[nonalphaIndex++] = musicMan[i];
    }
}
arrLetter[letterIndex] = '\0';
arrNum[numberIndex] = '\0';
arrAlpha[alphaIndex] = '\0';
arrNonAlpha[nonalphaIndex] = '\0';
printf("=========================================\n");
printf("||>>> Letters: %s         <<<||\n", arrLetter);
printf("||>>> Numbers: %s                  <<<||\n", arrNum);
printf("||>>> AlphaNumeric: %s <<<||\n", arrAlpha);
printf("||>>> NonAlphaNumeric: %s            <<<||\n", arrNonAlpha);
printf("=========================================\n");
break;
```

```
=============================================
||>>> Letters: DiMuikmnRturn          <<<||
||>>> Numbers: 435                    <<<||
||>>> AlphaNumeric: DiMuikm4nR3turn5 <<<||
||>>> NonAlphaNumeric: $_             <<<||
=============================================
```

The task was to "**Use the string "DiMu$ikm4n_R3turn5", print the result as follows: .**

1. **Display letters contained of the string .**
2. **Display numbers contained of the string.**
3. **Display alphanumeric characters of the string .**
4. **Display non-alphanumeric characters of the string**.

My approach towards the task was to use the code that was showed to me while explaining on what to do for task number 1 as a sort of guide on what we are supposed to do.

Figure 2. LA5_codeTasks.c with output

```c
void displayAlphaNum(const char *musicMan) {
    char arrAlpha[20];
    int alphaIndex = 0;

    for(int i = 0; [i]; i++){
        if(isalnum(musicMan[i])){
            arrAlpha[alphaIndex] = musicMan[i];
            alphaIndex++;

        }
    }
    arrAlpha[alphaIndex] = '\0';
     printf("========================================\n");
     printf("||>>> AlphaNumeric: %s <<<||\n", arrAlpha);
     printf("========================================\n");
}
void displayNotAlphaNum(const char *musicMan) {
    char arrNonAlpha[20];
    int nonalphaIndex = 0;

    for(int i = 0; musicMan[i]; i++){
        if(!isalnum(musicMan[i])){
        arrNonAlpha[nonalphaIndex] = musicMan[i];
        nonalphaIndex++;
        }
    }
    arrNonAlpha[nonalphaIndex] = '\0';
     printf("========================================\n");
     printf("||>>> NonAlphaNumeric: %s            <<<||\n", arrNonAlpha);
     printf("========================================\n");
}
void displayLetters(const char *musicMan) {
    char arrLetter[20];
    int letterIndex = 0;

    for(int i = 0; musicMan[i]; i++){
        if(isalpha(musicMan[i])){
            arrLetter[letterIndex] = musicMan[i];
            letterIndex++;
        }
    }
    arrLetter[letterIndex] = '\0';
     printf("========================================\n");
     printf("||>>> Letters: %s         <<<||\n", arrLetter);
     printf("========================================\n");
}
void displayNum(const char *musicMan) {
    char arrNum[20];
    int numberIndex = 0;

    for(int i = 0; musicMan[i]; i++){
        if(isdigit(musicMan[i])){
            arrNum[numberIndex] = musicMan[i];
            numberIndex++;
        }
    }
     arrNum[numberIndex] = '\0';
     printf("========================================\n");
     printf("||>>> Numbers: %s                  <<<||\n", arrNum);
     printf("========================================\n");
}
```

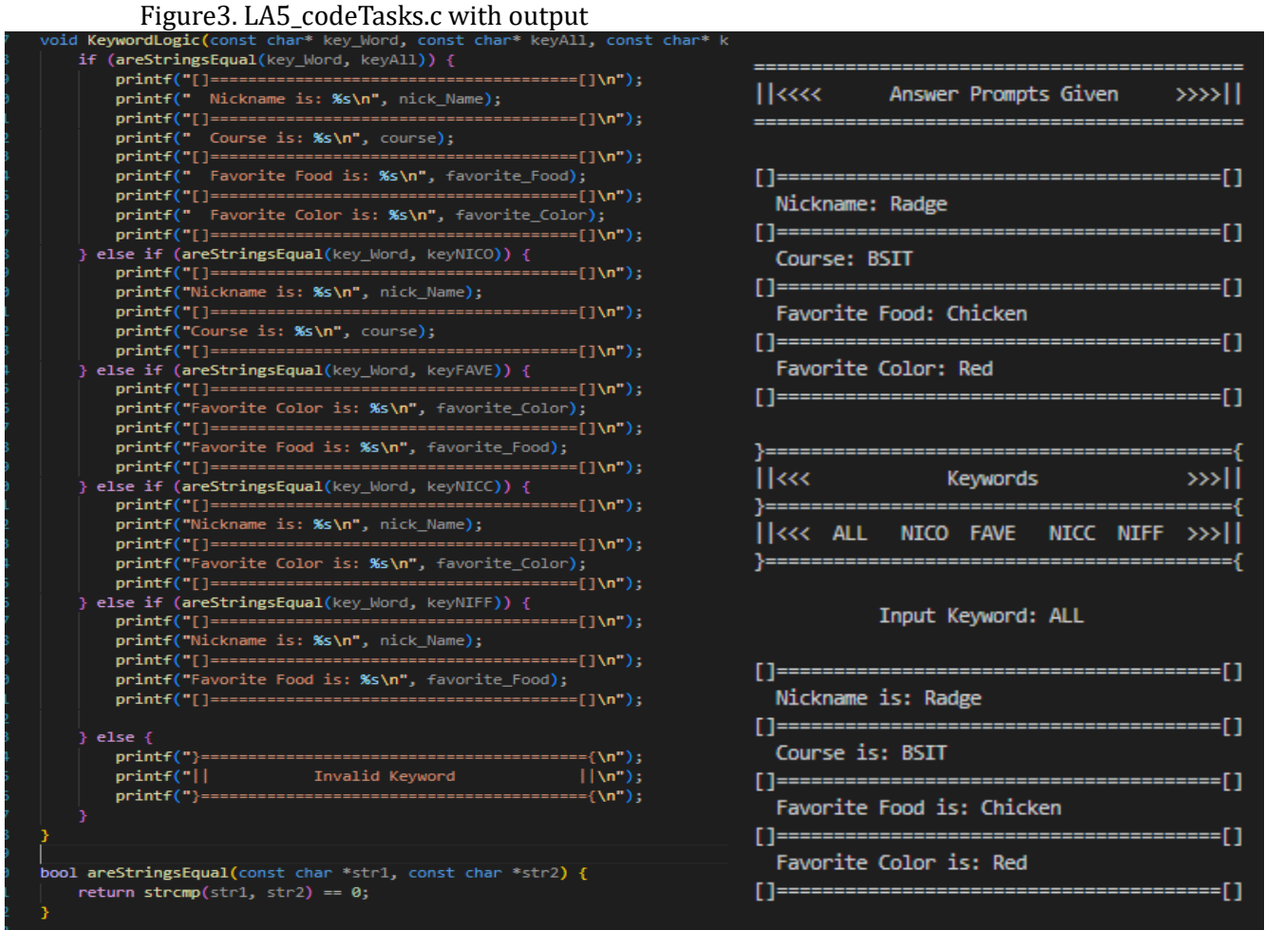
```
==========================================
||>>> Letters: DiMuikmnRturn          <<<||
==========================================
==========================================
||>>> Numbers: 435                    <<<||
==========================================
==========================================
||>>> AlphaNumeric: DiMuikm4nR3turn5 <<<||
==========================================
==========================================
||>>> NonAlphaNumeric: $_             <<<||
==========================================
```

The task was to "**Improve Problem 1 by using the following functions:**

- **displayLetters(string)**
- **displayNum(string)**
- **displayAlphaNum(string)**
- **displayNotAlphaNum(string)**

My approach to this was copying the code from main and made a function that has an cons *musicMan array as a parameter then I copied the codes that are used to loop through the array to check the string.

Figure3. LA5_codeTasks.c with output



```
void KeywordLogic(const char* key_Word, const char* keyAll, const char* k
    if (areStringsEqual(key_Word, keyAll)) {
        printf("[]=====================================[]\n");
        printf("  Nickname is: %s\n", nick_Name);
        printf("[]=====================================[]\n");
        printf("  Course is: %s\n", course);
        printf("[]=====================================[]\n");
        printf("  Favorite Food is: %s\n", favorite_Food);
        printf("[]=====================================[]\n");
        printf("  Favorite Color is: %s\n", favorite_Color);
        printf("[]=====================================[]\n");
    } else if (areStringsEqual(key_Word, keyNICO)) {
        printf("[]=====================================[]\n");
        printf("Nickname is: %s\n", nick_Name);
        printf("[]=====================================[]\n");
        printf("Course is: %s\n", course);
        printf("[]=====================================[]\n");
    } else if (areStringsEqual(key_Word, keyFAVE)) {
        printf("[]=====================================[]\n");
        printf("Favorite Color is: %s\n", favorite_Color);
        printf("[]=====================================[]\n");
        printf("Favorite Food is: %s\n", favorite_Food);
        printf("[]=====================================[]\n");
    } else if (areStringsEqual(key_Word, keyNICC)) {
        printf("[]=====================================[]\n");
        printf("Nickname is: %s\n", nick_Name);
        printf("[]=====================================[]\n");
        printf("Favorite Color is: %s\n", favorite_Color);
        printf("[]=====================================[]\n");
    } else if (areStringsEqual(key_Word, keyNIFF)) {
        printf("[]=====================================[]\n");
        printf("Nickname is: %s\n", nick_Name);
        printf("[]=====================================[]\n");
        printf("Favorite Food is: %s\n", favorite_Food);
        printf("[]=====================================[]\n");

    } else {
        printf("}======================================{\n");
        printf("||           Invalid Keyword           ||\n");
        printf("}======================================{\n");
    }
}

bool areStringsEqual(const char *str1, const char *str2) {
    return strcmp(str1, str2) == 0;
}
```

```
=========================================
||<<<<      Answer Prompts Given     >>>>||
=========================================

[]=====================================[]
  Nickname: Radge
[]=====================================[]
  Course: BSIT
[]=====================================[]
  Favorite Food: Chicken
[]=====================================[]
  Favorite Color: Red
[]=====================================[]

}======================================={
||<<<           Keywords              >>>||
}======================================={
||<<<  ALL   NICO  FAVE   NICC  NIFF  >>>||
}======================================={

          Input Keyword: ALL

[]=====================================[]
  Nickname is: Radge
[]=====================================[]
  Course is: BSIT
[]=====================================[]
  Favorite Food is: Chicken
[]=====================================[]
  Favorite Color is: Red
[]=====================================[]
```

The task was to **"Ask a user for nickname, course, favorite color and favorite food. Afterwards, ask the user what to display by entering a keyword:**

- **"ALL" displays all the information entered.**
- **"NICO" displays nickname and course**
- **"FAVE" displays favorite color and food**
- **"NICC" displays nickname and favorite color**
- **"NIFF" displays nickname and favorite food.**

Anything else displays the message, "Invalid keyword."" My approach to this was first making the variables that is going to store the users input after that I need it to compare so I searched online on how to compare strings it showed strcmp and I found a code from C++ where it is using a bool function with are string equal so I copied it and after doing trial and error for it to work I have it return a true value and after what I had played is for it to compare from one array but I got confused on what to do next so I made char arrays separately for each one of **"ALL","NICO","FAVE","NICC", and "NIFF"** after that I just used if else and have compared to the arrays and if they are equal then it would output.

III. EXPERIMENTAL FINDINGS / DISCUSSIONS

Figure 4. Exercise1

```c
#include <stdio.h>
#include <ctype.h>
#include <stdbool.h>
int main(void)
{
 char textdata[20] = "THis_is a j3j3moN";
 printf("Using character handling library functions.\n" );
 printf("Using char array: %s\n",textdata);
 printf("%d\n",isdigit(textdata[0]));
 printf("%d\n",isdigit(textdata[11]));
 printf("%d\n",isalpha(textdata[16]));
 printf("%d\n",isdigit(textdata[15]));
 printf("%d\n",islower(textdata[11]));
 printf("%d\n",islower(textdata[16]));
 printf("%d\n",isupper(textdata[16]));
 printf("%d\n",isalnum(textdata[3]));
 printf("%d\n",isalnum(textdata[4]));

 if (isupper(textdata[1]))
 {
 printf("The second letter of the message is uppercased.\n");
 }
 else
 {
 printf("The second letter of the message is lowercased.\n");
 }
}
```

1. What is the effect of changing textdata[1] to 'H' to the output message?
Ans: It would show the message the second letter of the message is uppercased. Due making textdata[1] it worked with as well making textdata[1] assigning it to' H'.

2. What other functions can be used in ctype.h?
Ans: Other functions found in ctype.h are:
•**isalnum()**This function identifies the alphanumeric characters.

•**isalpha()**This function identifies the alphabets from other characters.

•**isblank()**This function identifies the blank spaces from other characters.

•**iscntrl()**This function identifies the control characters(\n, \b, \t, \r).

•**isdigit()**This function identifies numbers in character.

•**islower()**This function identifies the lowercase alphabets.

•**isprint()**This function identifies the printable characters.

•**ispunct()**This function identifies punctuation characters (characters that are neither alphanumeric nor space).

•**isspace()**This function identifies white-space characters.

•**isupper()**This function identifies the uppercase alphabets.

•**isxdigit()**This function identifies the hexadecimal digit.

•**tolower()**This function converts uppercase alphabet to lowercase alphabet.

•**toupper()**This function converts lowercase alphabet to uppercase alphabet.

Figure 5. Exercise2

```c
#include <stdio.h>
#include <string.h>
int main ()
{
char str1[12] = "Get good,";
char str2[12] = "Scrub";
char str3[12];
int len ;
/* copy str1 into str3 */
strcpy(str3, str1);
printf("strcpy( str3, str1) : %s\n",str3 );
/* concatenates str1 and str2 */
strcat( str1, str2);
printf("strcat( str1, str2): %s\n",str1 );
/* total length of str1 after concatenation */
len = strlen(str1);
printf("strlen(str1) : %d\n",len);
return 0;
}
```

1. What is the purpose of:

- **strcpy**
- **strcat**
- **strlen**

ANS: The purpose of strcpy(), strcat(), and strlen()
strcpy() - This function is used store a value in a string variable.
strcat() – This function is used to combine values of two string variables .
strlen() – This function is used to count and return number of characters in a string value.

2. What function of string.h allows two strings to be compared?
ANS: The function strcmp() function is used to compare two string values. 0 is returned if the values of strings being compared are same.

3. What function can be used to obtain a substring from a string?
ANS: The function strcat() function is used due to it combining two strings and making a new one making it a substring.

Figure 6. Exercise3

```c
#include <stdio.h>
#include <string.h>
#define SIZE 60
int main(void)
{
int c; // variable to hold character input by user
char name[SIZE]; // create char array
char msg[SIZE];
printf("What is your name? ");
fgets(name,SIZE,stdin);
printf("Hello, %s",name);
name[strcspn(name, "\n")] = 0;
printf("What would you like to say?");
fgets(msg,SIZE,stdin);
msg[strcspn(msg, "\n")] = 0;
printf("%s wants to say, %s.\n",name, msg);
}
```

1. **What is the purpose of strcspn?**
   ANS: The purpose of the strcpsn() is finds the first occurrence of a character in string1 that belongs to the set of characters that is specified by string2. Null characters are not considered in the search. The strcspn() function operates on null-ended strings.

IV. CONCLUSIONS

I learned a lot from this laboratory activity as on how to use the functions of ctype.h and what they do and I already have an idea how to implement them when given the chance I should take things little by little to have a better understanding of it,

References:

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