CS1037A 2019

Lab 07

The purpose of this lab is to demonstrate the use of pointers and memory allocation. This lab will also provide more experience with triple pointer and some built in functions.

PREPARATION:

Review the class slides on Pointers and Function Memory.

LAB 07:

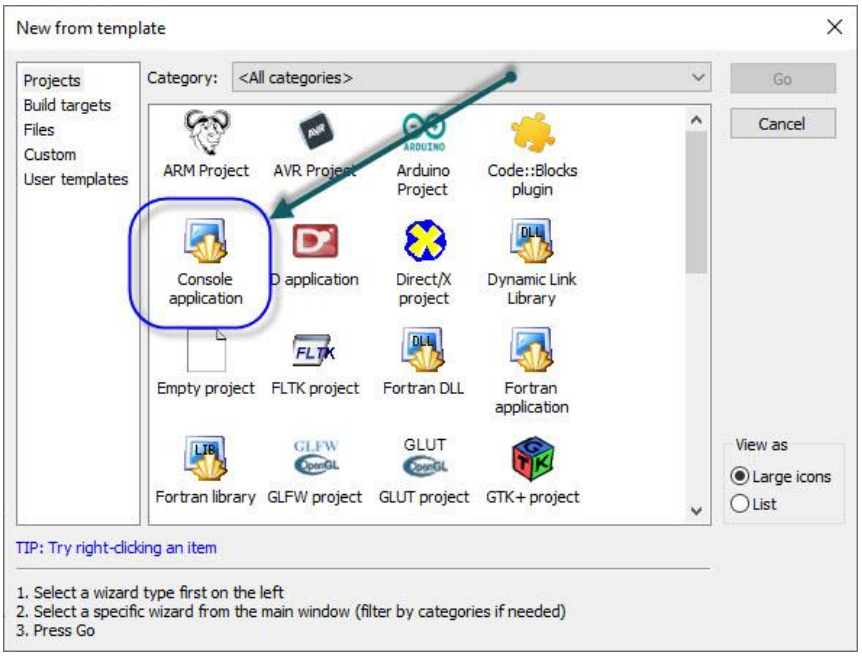
Create a C library

XX-> Last two digit of student number

The goal is to create a file with name splitString_XX.c . Create a new project in Code::Blocks.

File->New->Project.

1.) Select the <Console Application> option from the [New from Template] screen.
2.) Select the C (NOT the C++) language
3.) Name the Project Title: Lab**07**
4.) Use the default compiler by clinking on the <Finish> button.



Program-1

Type in code, exactly shown below:

Start here | *splitString.c | PointerSplitAString (3).c | splittingAstring (2).c

```c
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
char *my_strchr(char * string_ptr, char find)
{
 while (*string_ptr != find) {
 /* Check for end */
 if (*string_ptr == '\0')
 return (NULL); /* not found */
 ++string_ptr;
 }
 return (string_ptr); /* Found */
}

int main()
{
 char content[80]; /* The input content */
 char *first_ptr; /* pointer to the first name */
 char *last_ptr; /* pointer to the last name */
 fgets(content, sizeof(content), stdin);
 /* Get rid of trailing newcontent */
 content[strlen(content)-1] = '\0';
 last_ptr = content; /* last name is at beginning of content */
 first_ptr = my_strchr(content, '/'); /* Find slash */
 /* Check for an error */
 if (first_ptr == NULL) {
 fprintf(stderr,
 "Error: Unable to find slash in %s\n", content);
 exit (8);
 }
 *first_ptr = '\0'; /* Zero out the slash */


 ++first_ptr; /* Move to first character of name */
 printf("First:%s Last:%s\n", first_ptr, last_ptr);
 return (0);
}
```

INSTRUCTIONS:

1) Compile and Run the code.

Output:

3) After you have completed second step. Make sure you must know these built-in function fgets(), strlen, and fprintf.

4) Try the code with invalid input, like space in between the string. What is the error you are getting. Why or which line has produced the error. State the answer to TA while reviewing your lab.

Program-2

Get familiar with triple pointer and memory allocation. TA will go through triple pointer concepts.

1) Create a file with name memoryWithTriple.c. Also, type the code as shown below.

```c
#include <stdio.h>
#include <stdlib.h>

// M x N x O matrix
#define Mindex 2
#define Nindex 3
#define Oindex 4

// Dynamically Allocate Memory for 3D Array
int main()
{
    int*** A = (int***)malloc(Mindex * sizeof(int**));

    if (A == NULL) {
        fprintf(stderr, "Out of memory");
        exit(0);
    }

    for (int i = 0; i < Mindex; i++)
    {
        A[i] = (int**)malloc(Nindex * sizeof(int*));
```

```
        if (A[i] == NULL) {
            fprintf(stderr, "Out of memory");
            exit(0);
        }

        for (int j = 0; j < Nindex; j++)
        {
            A[i][j] = (int*)malloc(Oindex * sizeof(int));
                if (A[i][j] == NULL) {
                fprintf(stderr, "Out of memory");
                exit(0);
            }
        }
    }

    // assign values to allocated memory
    for (int i = 0; i < Mindex; i++)
        for (int j = 0; j < Nindex; j++)
            for (int k = 0; k < Oindex; k++)
                A[i][j][k] = rand() % 100;
```

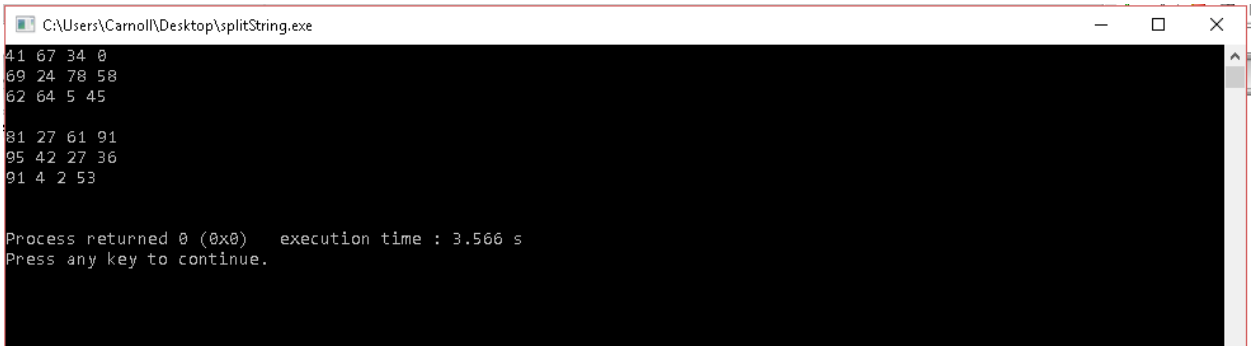
```
    for (int i = 0; i < Mindex; i++)
    {
        for (int j = 0; j < Nindex; j++)
        {
            for (int k = 0; k < Oindex; k++)
                printf("%d ", A[i][j][k]);

            printf("\n");
            }
        printf("\n");
    }

    // deallocate memory
    for (int i = 0; i < Mindex; i++)
    {
        for (int j = 0; j < Nindex; j++)
            free(A[i][j]);

        free(A[i]);
    }
    free(A);
```

Output:



2) It is necessary to free the memory after use. TA will explain you, why it is “Out of Memory” condition is mentioned. Get familiarize with rand() function. Note: You may not have same output as stated above.

Finish:

Demonstrate the work to TA and make sure you get marked for your attendance.