- Calculate average of each column in a 2D Array.

```c
int main() {
    int rows, columns;
    printf("Enter the number of rows and column: ");
    scanf("%d %d", &rows,&columns);
    int array[rows][columns];
    printf("Enter elements of the array:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < columns; j++) {
            scanf("%d", &array[i][j]);
        }
    }
    int columnSum[columns];
    for (int j = 0; j < columns; j++) {
        columnSum[j] = 0;
        for (int i = 0; i < rows; i++) {
            columnSum[j] += array[i][j];
        }
    }
    printf("Average of each column:\n");
    for (int j = 0; j < columns; j++) {
        double columnAverage = (double)columnSum[j] / rows;
        printf("Column %d: %lf\n", j + 1, columnAverage);
    }

    return 0;
}
```

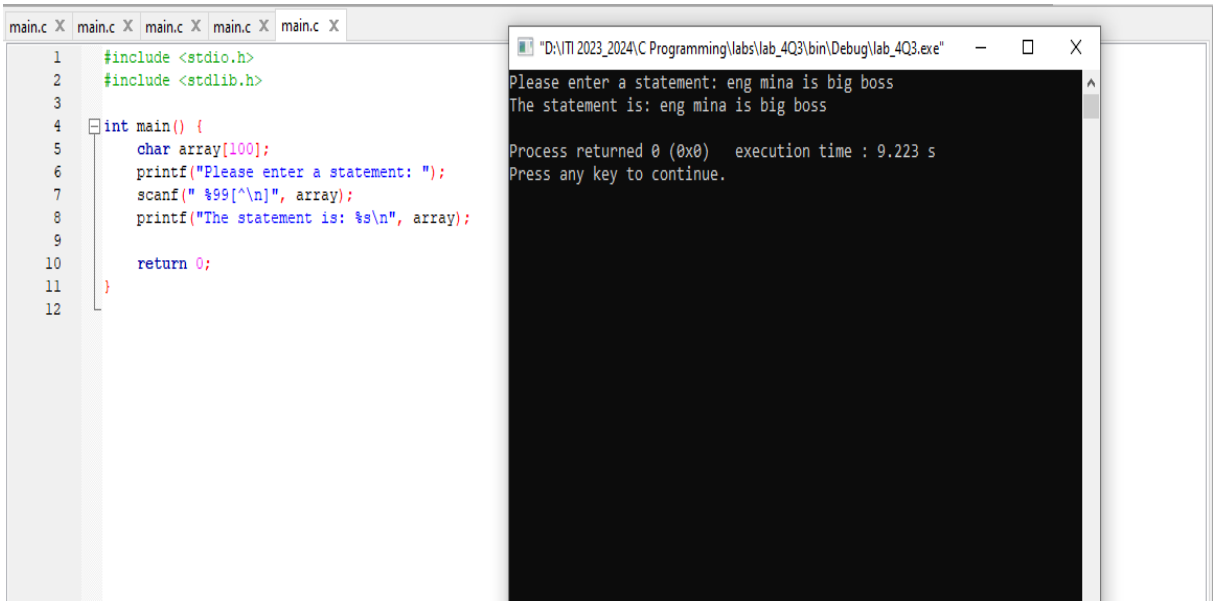
```
"D:\ITI 2023_2024\C Programming\labs\lab_4\bin\Debug\lab_4.exe"
Enter the number of rows and column: 2 3
Enter elements of the array:
2
4
6
2
2
2
Average of each column:
Column 1: 2.000000
Column 2: 3.000000
Column 3: 4.000000

Process returned 0 (0x0)   execution time : 8.307 s
Press any key to continue.
```

- C Program to add two matrix and put the result in a third one, then print the result.

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

int main() {
    int rows, columns;
    printf("enter the number of rows and columns for the matrices: ");
    scanf("%d %d", &rows, &columns);
    int matrix1[rows][columns], matrix2[rows][columns], result[rows][columns];
    printf("enter elements of the first matrix:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < columns; j++) {
            scanf("%d", &matrix1[i][j]);
        }
    }
    printf("enter elements of the second matrix:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < columns; j++) {
            scanf("%d", &matrix2[i][j]);
        }
    }
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < columns; j++) {
            result[i][j] = matrix1[i][j] + matrix2[i][j];
        }
    }
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < columns; j++) {
            printf("%d ", result[i][j]);
        }
        printf("\n");
    }
```

```
"D:\ITI 2023_2024\C Programming\labs\lab_4Q2\bin\Debug\l...
enter the number of rows and columns for the matrices: 2 3
enter elements of the first matrix:
2
3
2
6
4
1
enter elements of the second matrix:
1
2
3
4
2
1
3 5 5
10 6 2

Process returned 0 (0x0)   execution time : 16.089 s
Press any key to continue.
```

- Receive character by character and then place the string terminator upon pressing enter, then display the string.

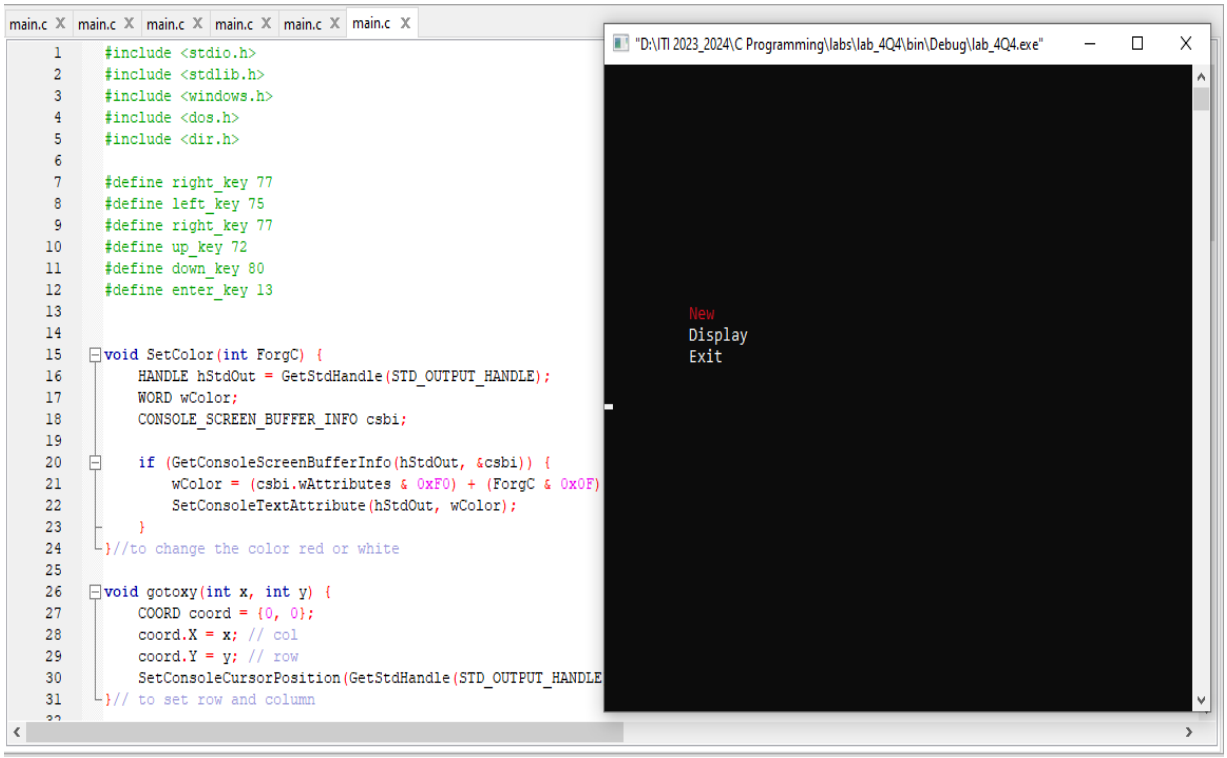


```c
#include <stdio.h>
#include <stdlib.h>

int main() {
    char array[100];
    printf("Please enter a statement: ");
    scanf(" %99[^\n]", array);
    printf("The statement is: %s\n", array);

    return 0;
}
```

```
"D:\ITI 2023_2024\C Programming\labs\lab_4Q3\bin\Debug\lab_4Q3.exe"
Please enter a statement: eng mina is big boss
The statement is: eng mina is big boss

Process returned 0 (0x0)   execution time : 9.223 s
Press any key to continue.
```

- C Program to take char and displays if it is "Normal or Extended key" along with its Ascii value.

- Highlight Menu: New Colored Menu "with Arrows"



```c
#include <stdio.h>
#include <stdlib.h>
#include <windows.h>
#include <dos.h>
#include <dir.h>

#define right_key 77
#define left_key 75
#define right_key 77
#define up_key 72
#define down_key 80
#define enter_key 13


void SetColor(int ForgC) {
    HANDLE hStdOut = GetStdHandle(STD_OUTPUT_HANDLE);
    WORD wColor;
    CONSOLE_SCREEN_BUFFER_INFO csbi;

    if (GetConsoleScreenBufferInfo(hStdOut, &csbi)) {
        wColor = (csbi.wAttributes & 0xF0) + (ForgC & 0x0F)
        SetConsoleTextAttribute(hStdOut, wColor);
    }
}//to change the color red or white

void gotoxy(int x, int y) {
    COORD coord = {0, 0};
    coord.X = x; // col
    coord.Y = y; // row
    SetConsoleCursorPosition(GetStdHandle(STD_OUTPUT_HANDLE
}// to set row and column
```

```
"D:\ITI 2023_2024\C Programming\labs\lab_4Q4\bin\Debug\lab_4Q4.exe"
New
Display
Exit
```

```c
int main() {
    char character;
    int position = 1; // my start position
    int totalOptions = 3; // three items that i put in minu

    while (1) {
        for (int i = 1; i <= totalOptions; i++) { // to print options
            gotoxy(10, 10 + i);// to put them one below other 10 col 11 row
            if (i == position) { //check position to color text
                SetColor(4); // Red
            } else {
                SetColor(15); // White
            }

            switch (i) { //display minu items
                case 1:
                    printf("New \n \n ");
                    break;
                case 2:
                    printf("Display \n \n ");
                    break;
                case 3:
                    printf("Exit \n \n ");
                    break;
            }
        }

        character = getch(); // to know the extended characters up down and so on
        if (character ==-32) {
            char character1 = getch();
            switch (character1) {
```

```
"D:\ITI 2023_2024\C Programming\labs\lab_4Q4\bin\Debug\lab_4Q4.

New
Display
Exit
```

```c
        character = getch(); // to know the extended characters up down and so on
        if (character ==-32) {
            char character1 = getch();
            switch (character1) {
                case up_key:
                    if (position > 1) {// to go up we will decrement the position c
                        position--;
                    }
                    break;
                case down_key:
                    if (position < totalOptions) { // to go down we will increment
                        position++;
                    }
                    break;
            }
        } else if (character == enter_key) { // to go to another screen
            system("cls");
            switch (position) {
                case 1:
                    gotoxy(5, 10 );
                    printf("New");
                    break;
                case 2:
                    gotoxy(5, 10 );
                    printf("Display");
                    break;
                case 3:
                    gotoxy(5, 10 );
                    printf("Exit");
                    break;
            }
```

```
"D:\ITI 2023_2024\C Programming\labs\lab_4Q4\bin\Debug\lab_4Q4

    Display

Process returned 0 (0x0)   execution time : 74.46
Press any key to continue.
```

- C Program to take firstName and lastName from user, then displays fullName.

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

int main()
{
    char firstname[10];
    char lastname[10];

    printf("enter your first name: ");
    scanf("%s",firstname);
    printf("enter your last name: ");
    scanf("%s",lastname);
    printf("the full name is %s %s.\n",firstname,lastname);
    return(0);
}
```

```
"D:\ITI 2023_2024\C Programming\labs\lab_4Q5\bin\Debug\lab_4Q5.exe"
enter your first name: nouran
enter your last name: tarek
the full name is nouran tarek.

Process returned 0 (0x0)   execution time : 6.598 s
Press any key to continue.
```

- C Program to Find the Frequency of Characters in a String

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


int main() {
    char string[100];
    int count[128] = {0};

    printf("enter a string: ");
    scanf(" %s", string);
    for (int i = 0; string[i] != '\0'; i++) {
        count[(int)string[i]]++; // input the ascii of the character and increment when it appear
    }
    for (int i = 0; i < 128; i++) {
        if (count[i] > 0) {
            printf("'%c' appear %d times\n", (char)i, count[i]);
        }
    }

    return 0;
}
```

```
"D:\ITI 2023_2024\C Programming\labs\lab_4Q6\bin\Debug\lab_4Q6.exe"
enter a string: noor
'n' appear 1 times
'o' appear 2 times
'r' appear 1 times

Process returned 0 (0x0)   execution time : 3.192 s
Press any key to continue.
```

- C Program to Copy String Without Using strcpy()

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


int main()
{
    char string1[100],string2[100],i;
    printf("Enter string one:\n");
    scanf(" %100[^\n]", string1);
    printf("string in array two is %s \n", string2);
    for(i = 0; string1[i] != '\0'; i++)
    {
        string2[i] = string1[i];
    }
    printf("string in array two is %s", string2);
    return 0;
}
```

```
"D:\ITI 2023_2024\C Programming\labs\lab_4Q7\bin\Debug\lab_4Q7.exe"
Enter string one:
eng mina
string in array two is `<p
string in array two is eng mina
Process returned 0 (0x0)   execution time : 7.615 s
Press any key to continue.
```

- C Program to Find the Length of a String without Using strlen()

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

int main()
{
    char string[100];
    int i, length = 0;
    printf("Enter the string: \n");
    scanf(" %100[^\n]", string);
    for (i = 0; string[i] != '\0'; i++)
    {
        length++;
    }
    printf("the length of %s is %d\n", string, length);
    return 0;
}
```

```
"D:\ITI 2023_2024\C Programming\labs\lab_4Q8\bin\Debug\lab_4Q8.exe"
Enter the string:
hello
the length of hello is 5

Process returned 0 (0x0)   execution time : 4.244 s
Press any key to continue.
```

- C Program to Remove all Characters in a String Except Alphabet.

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

int main()
{
  char string[100];
  int i , length=0;
  printf("enter s string ");
  scanf(" %100[^\n]", string);
    for (i=0;string[i] != '\0';i++) //calculate length
    {
        length++;
    }
  for (int i=0;i< length;i++)
  {
    if (!(string[i]>='a'&& string[i]<= 'z')||(string[i]>='A'&&string[i]<= 'Z')) //insure that it not contains only alphabitic
    {
      for (int j=i;j<length;j++)
      {
        string[j]=string[j+1]; //shift letter to the left as if i remove the strange character
      }
      length--; //bcs we remove the strange character
      i--; //to re check that we get letter
    }
  }
  printf("the alphabetic string is  = %s\n", string);
}
```

```
"D:\ITI 2023_2024\C Programming\labs\lab_4Q9\bin\Debug\lab_4Q9.exe"
enter s string hel**lo
the alphabetic string is  = hello

Process returned 0 (0x0)   execution time : 5.182 s
Press any key to continue.
```

- C Program to Covert all Characters in a String to Capital Case.

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

int main() {
    char string[100];
    printf("Enter a string: ");
    scanf(" %100[^\n]", string);
    for (int i = 0; string[i] != '\0'; i++) {
        if (string[i] >= 'a' && string[i] <= 'z') {
            string[i] = string[i] - ('a' - 'A'); //difference between any lower and upper is 32 so this to get uppercase
        }
    }
    printf("the string in upper is : %s\n", string);

    return 0;
}
```

```
"D:\ITI 2023_2024\C Programming\labs\lab_4Q10\bin\Debug\lab_4Q10.exe"
Enter a string: eng mina
the string in upper is : ENG MINA

Process returned 0 (0x0)   execution time : 6.168 s
Press any key to continue.
```