Worksheet 11

Multi Dimensional Array and String

Objectives

After completing this worksheet, you should be able to

- Declare multi dimensional array of elements and string variables

- Understand the usage of multi dimensional array

- Use the concept of array and string to solve complicated problem

1. Open a new project, write program 11.1.

```c
#include <stdio.h>
#include <stdlib.h>
int main(int argc, char *argv[ ])
{
  int a[3][3];              // Declare variable a as a 2- dimensional array  containing 3 rows and 3 columns
  int i, j;                              // 2-dimensional array looks like a matrix in Mathematics
  printf("Please enter value of Matrix A[ ].\n");
  for(i = 0; i < 3; i++) {
    for(j = 0; j < 3; j++) {
      printf("a[%d][%d] : ", i, j);            // Accept the integer values from the users and store in array a
      scanf("%d",&a[i][j]);
    }
  }


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

  for(i = 0; i < 3; i++) {
    for(j = 0; j < 3; j++) {
      printf("A[%d][%d] = %d\t", i, j, a[i][j]);        // Display the values in array a
    }
    printf("\n");
  }


    return  0;
}
```

Program 11.1

Run the program and enter each value of the integer as follows:

1, 3, 5, 7, 9, 11, 13, 15, 17. **Then record the results.**

_____

_____

2. Open a new project, write program 11.2.

```c
#include <stdio.h>
#include <stdlib.h>
main()
{
  int x[2][2] = { 3, 5,               // Declare and initialize a 2-dimensional array, the variable x
              7, 9 };                 // x[0][0] = 3, x[0][1] = 5, x[1][0] = 7, x[1][1] = 9
  int y[2][2] = { 2, 4,               // Declare and initialize a 2-dimensional array, the variable y
              6, 8 };                 // y[0][0] = 2, y[0][1] = 4, y[1][0] = 6, y[1][1] = 8
  int z[2][2], i, j;
  clrscr();
  for(i = 0; i < 2; i++)
    for(j = 0; j < 2; j++)           // add [x] and [y] together then store the results in [z]
      z[i][j] = x[i][j] + y[i][j];                    -----------------------( 13 )
  for(i = 0; i < 2; i++)
    printf("%5d %5d\n",z[i][0],z[i][1]);      // Display the results from [z]

  return  0;
}
```

Program 11.2

Run the program and record the results.

_____

_____

What does the program do?

_____

_____

3. From Program 11.2, replace the statement in （**13**） with

$$z[i][j] = (x[i][0] * y[0][j]) + (x[i][1] * y[1][j]);$$

// 0 (zero) and 1 (one).

Run the program and record the results.

_____

_____

What does the program do?

_____

_____

4. Open a new project, write program 11.3.

```
#include <stdio.h>
#include <stdlib.h>
int main(int argc, char *argv[ ])
{
char  Name[25] = "Computer Programming.";
printf("The first character is %c\n",Name[0]);
printf("The twentieth character is %c\n",Name[19]);

return  0;

}
```

Program 11.3

Run the program and record the results.

_____

_____

If we want to display the whole data in the variable *Name*, what statement will do the task?

_____

_____

5. Open a new project, write program 11.4.

```c
#include <stdio.h>
#include <stdlib.h>
int main(int argc, char *argv[ ])
{
    int  length,  Addr;
    char str[50];
    printf("Please enter string : ");
    gets(str);
    length = strlen(str);
    printf("\nAddress of character \'a\' in the string.\n\n");
    for(Addr = 0; Addr <= length; Addr++) {
        if (str[Addr] == 'a')
            printf("%5d",Addr+1);
    }

    return  0;
}
```

Program 11.4

Run the program and enter the string in Table 11.1 to the program. Then record the results.

Input String	Output
C is a powerful programming language.	___ ___ ___ ___
A book is necessary for a student.	___ ___ ___ ___

Table 11.1

If we need to display the position of both letter 'A' and 'a' in the input string, which part of the program must be modify?

_____

_____

6. Open a new project, write program 11.5.

```c
#include <stdio.h>
#include <stdlib.h>
int main(int argc, char *argv[ ])
{
  char book[3][20];   int x;
  printf("Please enter name of books.\n");
  for(x = 0; x < 3; x++) {
     printf("%d. ",x+1);
     gets(book[x]);
  }
  printf("\nPlease select book : ");    scanf("%d",&x);
  printf("You selected %s\n",book[x-1]);

  return  0;
}                                    Program 11.5
```
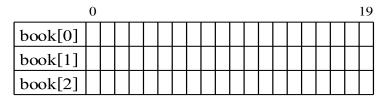
Run the program and enter the input as follows: (type only the string underlined)

1. C Programming.   Press *Enter*

2. Computer Networks.   Press *Enter*

3. Microcontroller.   Press *Enter*

Please Select book : 2   Press *Enter*

_____ (Output of the program)

The structure of variable **book** can be shown on the right. From program 11.5, fill in the data stored in this variable.

	0																			19
book[0]																				
book[1]																				
book[2]																				

If we want to display only the tenth character of **book[1]**, what statement complete the task?

_____

_____

Name: _____   Student ID: _____   Date: _____

Homework 11

1. Write a program that accepts a string from a keyboard. Then the program will display the string in a reverse order. The output of the program should display as follows:

   Please enter a string: **College of Industrial Technology**

   Your string in reverse order is: **ygolonhceT lairtsudnI fo egelloC**

2. Write a program that accepts interger numbers from a keyboard to form two 3 x 3 Matrices. Then multiply these two matrices together, as you do in Mathematic, and display the results.

3. Write a program that accepts a string from a keyboard. Then the program will show the number of word containing in your string as follows:

Please enter string -> **This is a book.**   (Suppose that it is your string)

Your String has **4** words.