

ARRAYS AND STRINGS

1D and 2D Arrays in C

Definition:

An array is a collection of elements of the same data type stored at contiguous memory locations. Arrays can be one-dimensional (1D) or multi-dimensional (2D, 3D, etc.).

1D Array

- A 1D array is a list of elements that can be accessed using a single index.

Example of Declaration:

```
int arr[5]; // An array of 5 integers
```

Program:

```
#include <stdio.h>

int main() {
    int arr[5], i;
    printf("Enter 5 elements: \n");
    for(i = 0; i < 5; i++) {
        scanf("%d", &arr[i]);
    }
    printf("The array elements are: ");
    for(i = 0; i < 5; i++) {
        printf("%d ", arr[i]);
    }
    return 0;
}
```

2D Array

- A 2D array is a grid or matrix that can be accessed using two indices: one for rows and one for columns.

Example of Declaration:

```
int matrix[3][3];
```

Program:

```
#include <stdio.h>

int main() {
    int matrix[3][3], i, j;
    printf("Enter 9 elements for the 3x3 matrix: \n");
    for(i = 0; i < 3; i++) {
        for(j = 0; j < 3; j++) {
            scanf("%d", &matrix[i][j]);
        }
    }
    printf("The 3x3 matrix is: \n");
    for(i = 0; i < 3; i++) {
        for(j = 0; j < 3; j++) {
            printf("%d ", matrix[i][j]);
        }
        printf("\n");
    }
    return 0;
}
```

Strings in C**Definition:**

A string is a sequence of characters terminated by a null character \0. Strings are represented as arrays of characters in C.

String Handling Functions

1. ***strlen()*:** Calculates the length of a string.
2. ***strcpy()*:** Copies one string to another.
3. ***strcmp()*:** Compares two strings.
4. ***strcat()*:** Concatenates two strings.

Program for strlen():

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

```
#include <string.h>

int main() {
    char str[50];
    printf("Enter a string: ");
    gets(str);
    printf("Length of the string: %ld", strlen(str));
    return 0;
}
```

Program for strcpy():

```
#include <stdio.h>
#include <string.h>

int main() {
    char str1[20], str2[20];
    printf("Enter the first string: ");
    gets(str1);
    strcpy(str2, str1);
    printf("Copied string: %s", str2);
    return 0;
}
```

Program for strcmp():

```
#include <stdio.h>
#include <string.h>

int main() {
    char str1[20], str2[20];
    printf("Enter first string: ");
    gets(str1);
    printf("Enter second string: ");
    gets(str2);
    if(strcmp(str1, str2) == 0) {
        printf("Strings are equal.");
    } else {
```

```
    printf("Strings are not equal.");  
}  
return 0;  
}
```