

## UNIT-4 (STRUCTURES) (RAM GOPAL GUPTA- <http://ramgopalgupta.com/>)

### PART-1

#### Definition:

In C programming, a struct (or structure) is a collection of variables (can be of different types) under a single name.

Or

To group variables of different types with a data type called structure. Structure is an example of heterogeneous data type.

#### *Let's take an example to understand the need of structure:*

Suppose we need to store the data of students like student name, age, address, rollno etc. One way of doing this would be creating a different variable for each attribute, however when we need to store the data of multiple students then in that case, we would need to create these several variables again for each student. This is such a big headache to store data in this way.

In such situations we can use structure.

#### Declaration:

We use *struct* keyword to create a structure in C. The *struct* keyword is a *short form of structured data type*.

```
struct struct_name {  
    DataType member1_name;  
    DataType member2_name;  
    DataType member3_name;  
    ...  
};
```

Here **struct\_name** can be anything of your choice. Member's data type can be same or different. Once we have declared the structure, we can use the struct name as a data type like int, char etc.

#### *Example:*

```
struct StudentData {  
    char stu_name[50];  
    int stu_roll;  
    int stu_age;  
};
```

#### How to declare variable of a structure?

```
struct struct_name var_name;
```

or

```
struct struct_name {  
    DataType member1_name;  
    DataType member2_name;  
    DataType member3_name;  
    ...  
} var_name;
```

#### *Example:*

```
struct StudentData stud;  
or  
struct StudentData {  
    char stu_name[50];  
    int stu_roll;  
    int stu_age;  
} stud;
```

#### How to access data members of a structure using a struct variable?

Using Dot(.) operator

```
var_name.member1_name;
```

```
var_name.member2_name;
```

...

#### *Example:*

```
printf ("%s\n", stud.stu_name);  
printf ("%d\n", stud.stu_roll);  
printf ("%d\n", stud.age);
```

## How to assign values to structure members?

There are three ways to do this.

1. Using Dot(.) operator

```
var_name.member_name = value;
```

*Example:*

```
stud.stu_name = "Hello";  
stud.stu_roll = 20;  
stud.age = 23;
```

2. All members assigned in one statement

```
struct struct_name var_name =  
{value for member1, value for member2 ...so on for all the members};
```

*Example:*

```
struct StudentData stud = {"Hello", 20, 23};
```

3. Designated initializers – We will discuss this later at the end of this post.

*Example:*

```
struct StudentData stud1 = {.stu_roll=20, .age=23};  
struct StudentData stud2 = {.stu_roll=21};
```

### *Complete Simple Code example:*

```
#include <stdio.h>  
#include <string.h>  
/* Created a structure here. The name of the structure is StudentData. */  
struct StudentData{  
    char stu_name[50];  
    int stu_roll;  
    int stu_age;  
};  
int main()  
{  
    /* student is the variable of structure StudentData*/  
    struct StudentData stud;  
    /*Assigning the values of each struct member here*/  
    strcpy(stud.stu_name, "Steve");  
    stud.stu_roll = 1234;  
    stud.stu_age = 30;  
    /* Displaying the values of struct members */  
    printf("Student Name is: %s", stud.stu_name);  
    printf("\nStudent Id is: %d", stud.stu_roll);  
    printf("\nStudent Age is: %d", stud.stu_age);  
    return 0;  
}
```

In next file, I will explain other sample code example of structure, nested structure, union etc.....