# **Structures in C++**

**What is a structure?**

A structure is a user-defined data type in C/C++. A structure creates a data type that can be used to group items of possibly different types into a single type.

Structures (also called structs) are a way to group several related variables into one place. Each variable in the structure is known as a member of the structure.

Unlike an [array](https://www.w3schools.com/cpp/cpp_arrays.asp), a structure can contain many different data types (int, string, bool, etc.).

**How to create a structure?**

**struct structureName{**

**member1;**

**member2;**

**member3;**

**.**

**.**

**.**

**memberN;**

**};**

**Structures in C++ can contain two types of members:**

* **Data Member: These members are normal C++ variables. We can create a structure with variables of different data types in C++.**
* **Member Functions: These members are normal C++ functions. Along with variables, we can also include functions inside a structure declaration.**

**How to declare structure variables?**

**// A variable declaration with structure declaration.**

**struct Point**

**{**

**int x, y;**

**} p1; // The variable p1 is declared with 'Point'**

**// A variable declaration like basic data types**

**struct Point**

**{**

**int x, y;**

**};**

**int main()**

**{**

**struct Point p1; // The variable p1 is declared like a normal variable**

**}**

**Program**

**// In C++ We can Initialize the Variables with Declaration in Structure.**

**#include <iostream>**

**using namespace std;**

**struct Point {**

**int x = 0; // It is Considered as Default Arguments and no Error is Raised**

**int y = 1;**

**};**

**int main()**

**{**

**struct Point p1;**

**// Accessing members of point p1**

**// No value is Initialized then the default value is considered. ie x=0 and y=1;**

**cout << "x = " << p1.x << ", y = " << p1.y<<endl;**

**// Initializing the value of y = 20;**

**p1.y = 20;**

**cout << "x = " << p1.x << ", y = " << p1.y;**

**return 0;**

**}**

**Array of Structures**

**#include <iostream>**

**using namespace std;**

**struct Point {**

**int x, y;**

**};**

**int main()**

**{**

**// Create an array of structures**

**struct Point arr[10];**

**// Access array members**

**arr[0].x = 10;**

**arr[0].y = 20;**

**cout << arr[0].x << " " << arr[0].y;**

**return 0;**

**}**

**// Declare a structure named "car"**

**struct car {**

**string brand;**

**string model;**

**int year;**

**};**

**int main() {**

**// Create a car structure and store it in myCar1;**

**car myCar1;**

**myCar1.brand = "BMW";**

**myCar1.model = "X5";**

**myCar1.year = 1999;**

**// Create another car structure and store it in myCar2;**

**car myCar2;**

**myCar2.brand = "Ford";**

**myCar2.model = "Mustang";**

**myCar2.year = 1969;**

**// Print the structure members**

**cout << myCar1.brand << " " << myCar1.model << " " << myCar1.year << "\n";**

**cout << myCar2.brand << " " << myCar2.model << " " << myCar2.year << "\n";**

**return 0;**

**}**