The Islamic University of Diwaniya

Computer Technique Engineering Department

Structure

Lecture:3

Date: 30-10-2024

C++ Structures

A structure is a collection of variables of different data types and member functions under a single name.

It is similar to a class as both hold a collection of data of different data types.

How to Declare a Structure in C++ Programming?

The struct keyword defines a structure type followed by an identifier (name of the structure).

Then, inside the curly braces, you can declare one or more members (declare variables inside curly braces) of that structure. For example:

```
struct Person
{
   string first_name;
   string last_name;
   int age;
   float salary;
};
```

Here, the structure Person is defined which has four members: **first_name, last_name, age, and salary.** When a structure is defined, no memory is allocated.

The structure definition is only the blueprint for the creation of variables. You can imagine it as a data type.

When you define an integer as below: **int foo;**

The int specifies that variable foo can hold integer elements only.

How to Define a Structure Variable?

Once you declare a structure Person as above, you can define a structure variable as:

```
Person bill;
```

Here, a structure variable bill is defined, which is of type structure Person.

Only when the structure variable is declared is the required memory allocated by the compiler.

How to Access Members of a Structure?

The members of a structure variable are accessed using a **dot (.)** operator.

Suppose you want to access the age of the structure variable bill and assign **50** to it. You can perform this task by using the following code:

```
bill.age = 50;
```

Example: C++ Structure

Write Program to assign data to members of a structure variable

Example: Write a program in C++ to print employee information (name-age-salary) using structure?

```
#include <iostream>
using namespace std;
struct Person
{
   string first_name;
   string last_name;
   int age;
   float salary;
};
int main()
{
   Person p1;
   cout << "Enter first name: ";
   cin >> p1.first_name;
   cout << "Enter last name: ";
   cin >> p1.last_name;
   cout << "Enter age: ";
   cin >> p1.age;
   cout << "Enter salary: ";
   cin >> p1.salary;

   cout << "\nDisplaying Information." << endl;
   cout << "First Name: " << p1.first_name << endl;
   cout << "Last Name: " << p1.last_name << endl;
   cout << "Age: " << p1.age << endl;
   cout << "Salary: " << p1.salary;
   return 0;
}
```

Output

```
Enter first name: Jane
Enter last name: Smith
Enter age: 27
Enter salary: 10000

Displaying Information.
First Name: Jane
Last Name: Smith
Age: 27
Salary: 10000
```

Example: Write a program in C++ to print student information (name-age-grade) using structure?

```
#include <iostream>
using namespace std;
// Define a structure to store student information
struct Student {
    string name;
    int age;
    float grade;
};
int main() {
    // Create a student structure variable
    Student student1;
    // Get student information from the user
    cout << "Enter student's name: ";
    cin>>student1.name;
    cout << "Enter student's age: ";
    cin >> student1.age;
    cout << "Enter student's grade: ";
    cin >> student1.grade;
    // Display the student information
```

```
    cout << "\nDisplaying Student Information:" << endl;
    cout << "Student Name: " << student1.name << endl;
    cout << "Age: " << student1.age << endl;
    cout << "Grade: " << student1.grade << endl;
    return 0;
}
```

Example Input and Output

Input:

```
Enter student's name: Alice Smith
Enter student's age: 19
Enter student's grade: 90.5
```

Output:

```
Displaying Student Information:
Student Name: Alice Smith
Age: 19
Grade: 90.5
```