



Structure within Structure in C++

Lecture 7

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What is a Nested Structure?

Definition

A nested structure is when a structure contains another structure as a member.

Purpose

Why use it? To model complex entities with multiple levels of details.

Syntax of Nested Structures

```
#include
using namespace std;
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struct Date {
     int day;
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     int month;
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     int year;
                                                                                                        I carbind);
};
struct Student {
     int id;
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     string name;
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     Date dob; // Nested structure
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};
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Here, Date is used inside Student.

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Initializing and Accessing Nested Structures

Create the object

Student s1;

Initialize main structure members

- s1.id = 101;
- s1.name = "Ali";

Initialize nested structure members

- s1.dob.day = 15;
- s1.dob.month = 3;
- s1.dob.year = 2002;

Access the data

cout << "Name: " << s1.name << endl;</pre> cout << "DOB: " << s1.dob.day << "/" << s1.dob.month << "/" << s1.dob.year << endl;

K Access format: object.nestedStruct.member



Another Example: Employee and Address

Structure Definition

```
struct Address {
    string city;
    string street;
    int zipcode;
};
```

```
struct Employee {
    int empID;
    string empName;
    Address empAddress;
};
```

Accessing Members

Employee e1; e1.empAddress.city = "Baghdad";

This shows how to access and assign values to nested structure members.

Real-World Example: Hospital Patient Record System



Personal Info

Name, age, gender



Phone, address



Admission Info

Date, doctor

Goal: We want to store information about a patient, including these details. We'll use nested structures to organize this data.



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C++ Code for Patient Record System

Date Structure

struct Date {
int day;
int month;
int year;

};

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Address Structure

struct Address {
 string city;
 string street;
 int zipcode;

};

Patient Structure

struct Patient {
string name;
int age;
char gender;
string phone;
Address address; // Nested structure
Date admissionDate; // Nested structure
string doctorName;
};

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Implementing the Patient Record System

//Initialize Patient Object

Patient p1;

//Assign Basic Values

p1.name = "Zainab Ali"; p1.age = 32; p1.gender = 'F'; p1.phone = "07701234567";

//Assign Address Values

p1.address.city = "Baghdad"; p1.address.street = "Al-Rashid"; p1.address.zipcode = 10001;

//Assign Date Values

p1.admissionDate.day = 3; p1.admissionDate.month = 5; p1.admissionDate.year = 2025; p1.doctorName = "Dr. Ahmed Kareem";