Structure within Structure in C++

Lecture 7

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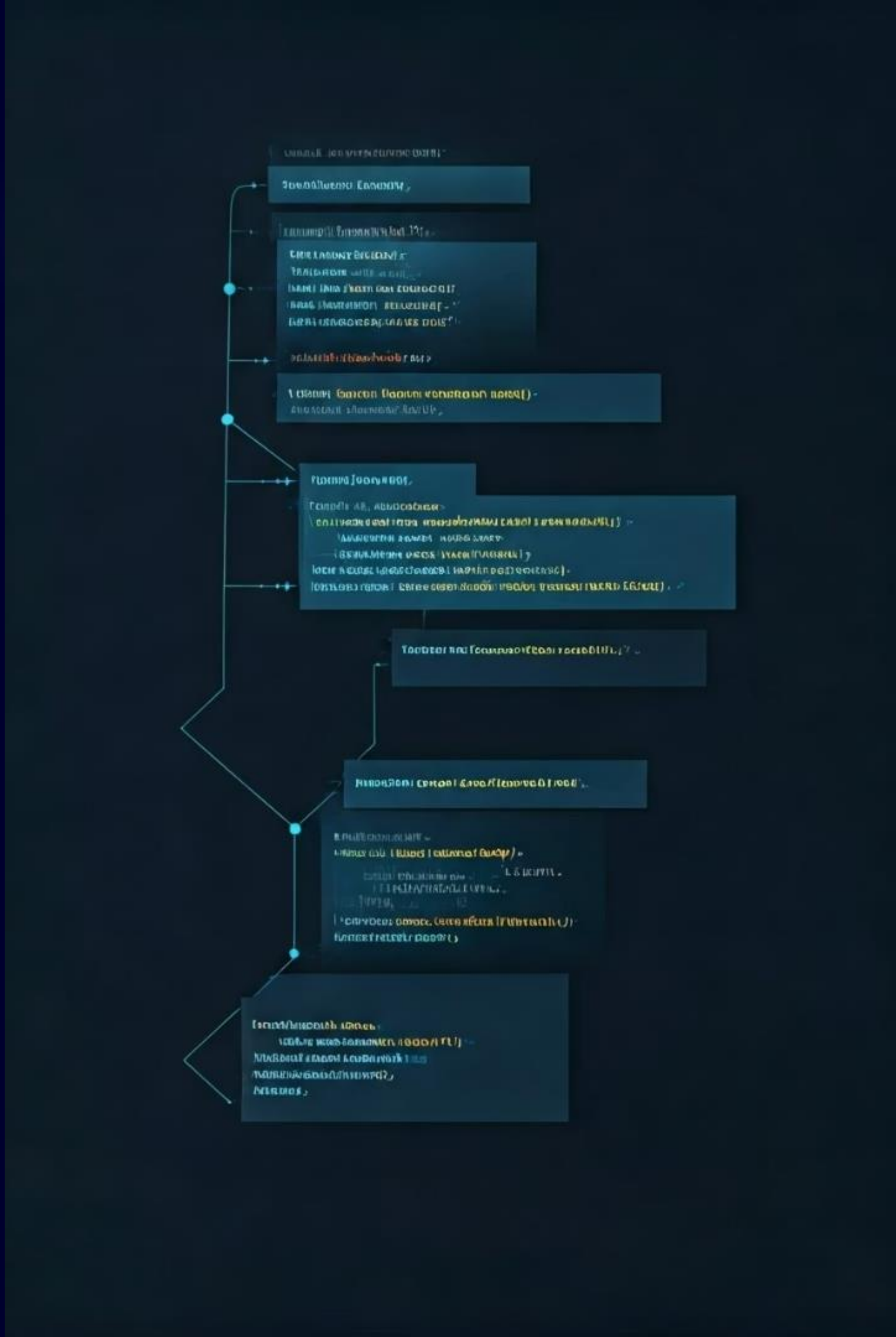


What is a Nested Structure?

Definition

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

Purpose

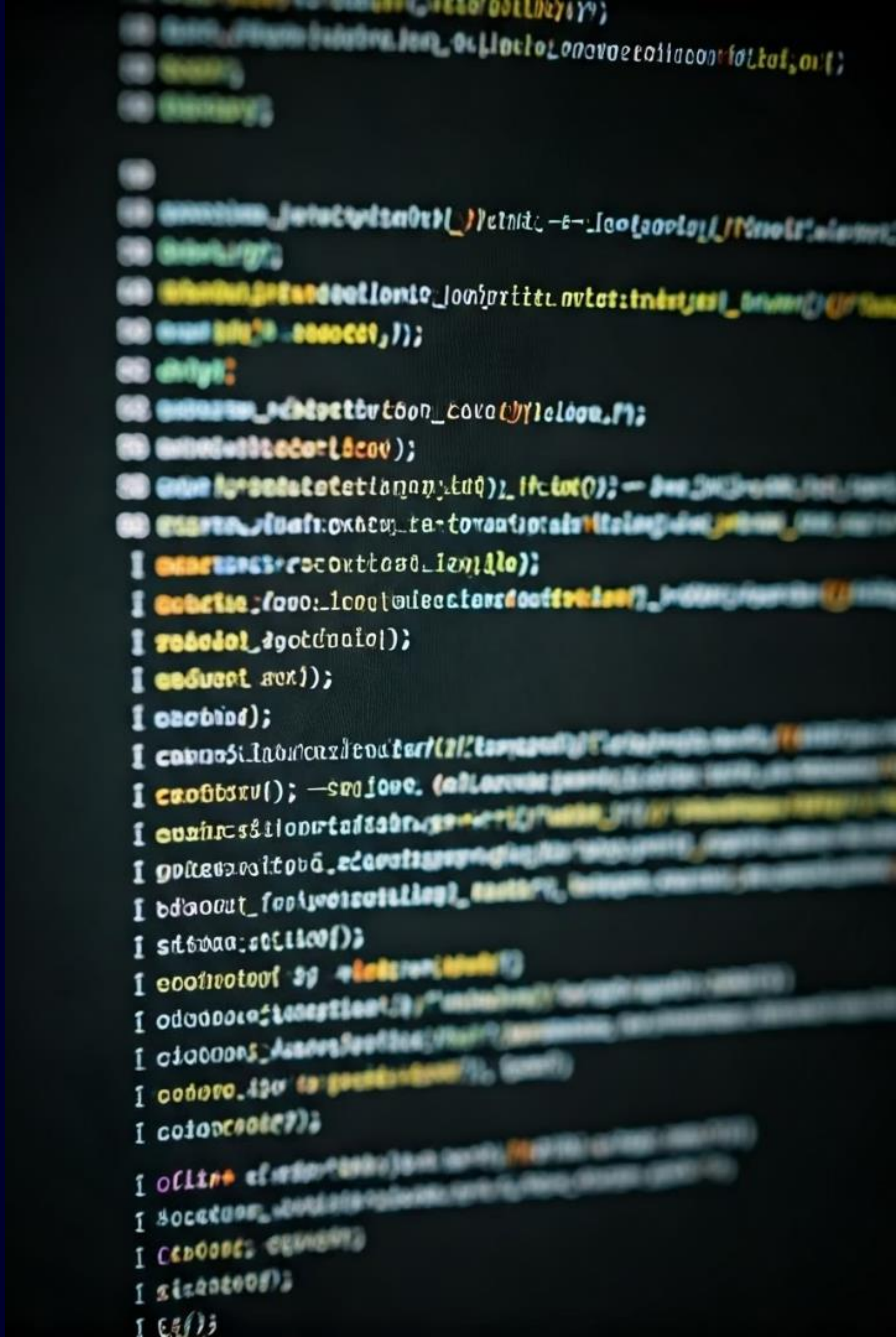
Why use it?

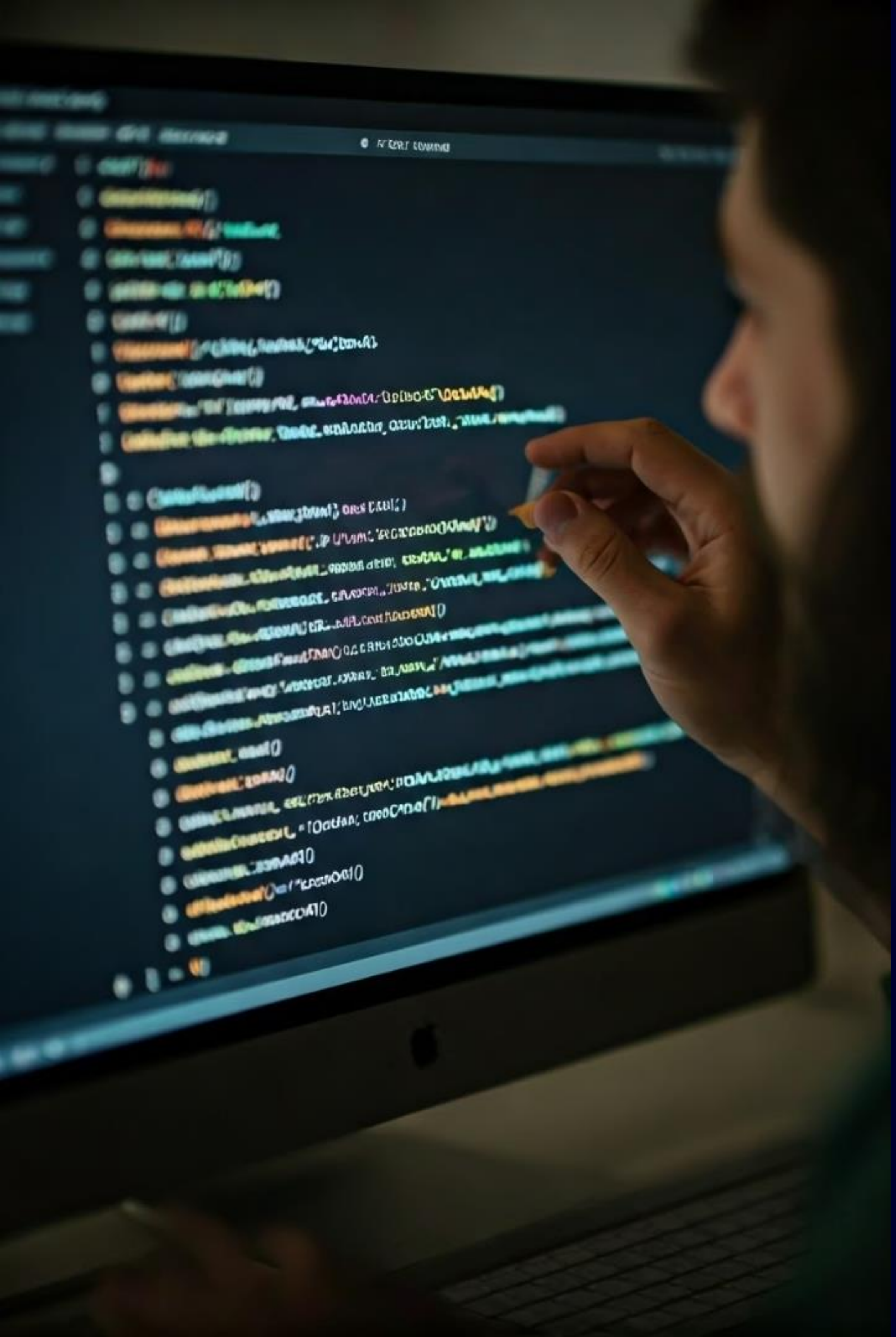
To model complex entities with multiple levels of details.

Syntax of Nested Structures

```
#include

using namespace std;

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

struct Student {
    int id;
    string name;
    Date dob; // Nested structure
};
```

Here, Date is used inside Student.





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;
cout << "DOB: " << s1.dob.day << "/" << s1.dob.month << "/" << s1.dob.year << endl;
```

🧩 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

Contact Info

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.

C++ Code for Patient Record System

Date Structure

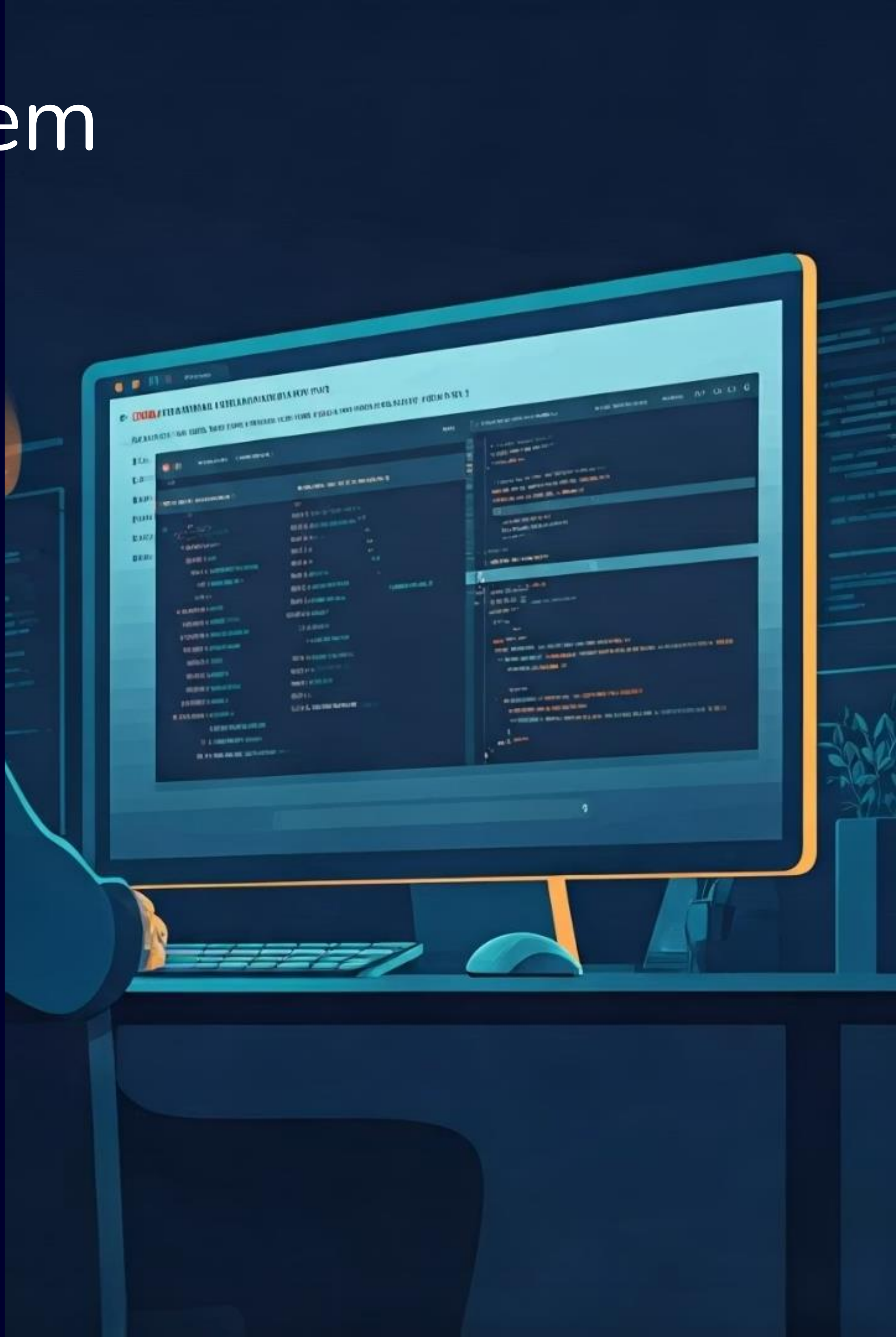
```
struct Date {
int day;
int month;
int year;
};
```

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;
};
```



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";
```