

## 1 What is a record in C#?

هو نوع record (datatype) اتضاف في C# 9 ، هدفه الأساسي:

### ✓ Data containers

### ✓ القيمة ثابتة (Immutable by default)

### ✓ Built-in equality comparison based on value, not reference

يعني لو عندك object وظيفته يحمل بيانات بس ...  
هو الخيار المثالي بدل record class التقليدية.

### Example:

```
public record StudentRecord(int Id, string Name);
```

### Key features:

- Immutable (unless you use with keyword)
- لو عنصرین عندهم نفس القيمة يعتبروا Value equality →
- ممتاز للـ Read-only data models

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## العلاقة الـ DTO مع record ★

### DTO = Data Transfer Object

وظيفته: نقل البيانات بين API → Service → DB بدون logic. Layers

### العلاقة بينهم:

A **record** is perfect for DTOs because:

- Both are focused on *data only*
- No logic inside
- Records reduce code (less boilerplate)
- Immutability makes DTO safer during transfers
- Value-based equality is helpful for comparisons in tests
- So...

**Many developers now prefer using record to define DTOs**

Instead of writing a full class with properties.

#### **Example DTO as record:**

```
public record DepartmentDTO(int Id, string Name);
```

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## **2 What is a Tuple in C#?**

A **tuple** is a lightweight way to return **multiple values** from a method *without creating a class or DTO*.

#### **Example:**

```
(string Name, int Age) GetStudent()  
{  
    return ("Ahmed", 21);  
}
```

#### **Features:**

- Supports multiple values •
  - Small, temporary data container •
  - No custom type name •
  - Great for quick operations, local returns, temporary grouping •
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## **★ Relation of Tuple to Data Structure**

Tuple **IS** a data structure — a built-in one.

Because:

- It groups multiple values in one unit •
- Fixed size •
- Ordered •
- Can contain different data types •

BUT:

**Tuple is NOT a replacement for DTO**

Tuple = temporary

DTO = part of system architecture

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### Summary (in 20 seconds)

Concept	What it is	Use Case	Relation
<b>record</b>	Immutable data type	DTOs, models	Perfect for DTO design
<b>DTO</b>	Layer-to-layer data carrier	API responses, requests	record is a modern way to implement it
<b>tuple</b>	Small grouped values	Quick return values	A data structure, not for long-term models