Part03 Bonus

**4- Self-Study (on CLR and Garbage Collector in C#)**

**Common Language Runtime (CLR)**

The CLR is .NET's runtime environment that executes code by converting Intermediate Language (IL) into native machine code via Just-In-Time (JIT) compilation. It also manages memory, ensures type safety, handles exceptions, and provides security for running code.

**Garbage Collector (GC)**

The GC is a CLR feature that automates memory management by:

1. Allocating memory for objects.
2. Reclaiming memory from unused objects.
3. Using generational collection to optimize performance:

* Gen 0: Short-lived objects.
* Gen 1: Mid-term objects.
* Gen 2: Long-lived objects.

**5- What meant by Csharp is managed code ?**

C# runs under the CLR, providing:

* Memory Management: Automatic garbage collection.
* Type Safety: Prevents unsafe memory access.
* Security: Enforces runtime security.

**6- What meant by struct is considered like class before?**

Structs share features with classes (fields, properties, methods, etc.) but differ:

* **Structs**: Value types, stack storage.
* **Classes**: Reference types, heap storage.

Differences:

* Inheritance: Structs can't inherit.
* Memory: Structs are efficient for small data.