Github link for coding

<https://github.com/EvaDoudou/Antra-CSharp/tree/main/day5>

Test your Knowledge

1. What type would you choose for the following “numbers”?

A person’s telephone number - string

A person’s height - float

A person’s age - int

A person’s gender (Male, Female, Prefer Not To Answer) - enum

A person’s salary - decimal

A book’s ISBN - string

A book’s price - decimal

A book’s shipping weight - float

A country’s population - long

The number of stars in the universe - BigInteger

The number of employees in each of the small or medium businesses in the

United Kingdom (up to about 50,000 employees per business) - ushort

2. What are the difference between value type and reference type variables? What is

boxing and unboxing?

Value type is created by enum or struct, reference type is class or interface.

Value type stores value, reference type stores memory location.

Value type cannot accept null, reference type can be null

Value type is removed automatically once not being used, reference type is removed by garbage collection

Boxing is the process of converting a value type (e.g., int, float, struct) into a reference type (an object). When a value type is boxed, it is wrapped inside an object and stored on the managed heap.

Unboxing is the reverse process of boxing, where a boxed object is converted back to its original value type. This requires explicit casting.

3. What is meant by the terms managed resource and unmanaged resource in .NET

Managed resources are resources that are handled by the .NET runtime's garbage collector (GC). These are typically .NET objects that reside in the managed heap, such as strings, arrays, and instances of classes.

Unmanaged resources are resources that are not controlled by the .NET garbage collector. These include system resources such as file handles, database connections, sockets, and memory allocated via interop with native code.

4. What’s the purpose of Garbage Collector in .NET?

The Garbage Collector (GC) in .NET is an automatic memory management system that manages the allocation and deallocation of memory for managed objects. Its primary purpose is to free developers from the need to manually manage memory, reducing common programming errors such as memory leaks and invalid memory access.

Test your Knowledge

1. What happens when you divide an int variable by 0?

Compile time error “Division by constant zero”

Run time error “Throws System.DivideByZeroException”

2. What happens when you divide a double variable by 0?

Positive: Infinity

Negative: -Infinity

Zero: NaN

3. What happens when you overflow an int variable, that is, set it to a value beyond its

range?

 In an unchecked context, if an integer overflows, it wraps around to the opposite end of its range.

In a checked context, an OverflowException is thrown if an integer operation overflows.

4. What is the difference between x = y++; and x = ++y;?

x=y++: assign y to x first then increase y

x=++y: increase y then assign y to x

5. What is the difference between break, continue, and return when used inside a loop

statement?

Break will break the entire loop, continue will break current loop and go to next value, return will break both loop and the method

6. What are the three parts of a for statement and which of them are required?

All optional.

7. What is the difference between the = and == operators?

=(Assignment operator) is to assign the right value to the left

==(Equality operator ) is to compare left and right value, return true if they are equal, false if not.

8. Does the following statement compile? for ( ; true; ) ;

the loop becomes an infinite loop

9. What does the underscore \_ represent in a switch expression?

In C#, the underscore (\_) in a switch expression is a discard pattern. It represents a catch-all case that matches any value not explicitly handled by other patterns. It serves as the default case in a switch expression.

10. What interface must an object implement to be enumerated over by using the foreach

statement?

IEnumerable or IEnumerable<T> for generics

Test your Knowledge

1. When to use String vs. StringBuilder in C# ?

String is immutable but StringBuilder is mutable

2. What is the base class for all arrays in C#?

System.Array

3. How do you sort an array in C#?

Array.sort()

4. What property of an array object can be used to get the total number of elements in

an array?

Length

5. Can you store multiple data types in System.Array?

Yes, you can create an object array, this requires boxing and unboxing.

6. What’s the difference between the System.Array.CopyTo() and System.Array.Clone()?

Array.CopyTo takes target array as parameter but Array.Clone return the target array

Array.CopyTo takes index as parameter so we can copy part of array but Array.Clone will copy the entire array.