

## Part01

**Problem:** Add both single-line and multi-line comments in the following code segment explaining its purpose:

```
int x = 10;
int y = 20;
int sum = x + y;
Console.WriteLine(sum);
```

**Question:** What is the shortcut to comment and uncomment a selected block of code in Visual Studio?

**Problem:** Identify and fix the errors in this code snippet:

```
int x = "10";
console.WriteLine(x + y);
```

**Question:** Explain the difference between a runtime error and a logical error **with examples**.

**Problem:** Declare variables using proper naming conventions to store:

- Your full name.
- Your age.
- Your monthly salary.
- Whether you are a student.

**Question:** Why is it important to follow naming conventions such as PascalCase in C#?

**Problem:** Write a program to demonstrate that changing the value of a reference type affects all references pointing to that object.

**Question:** Explain the difference between value types and reference types in terms of memory allocation.

**Problem:** Create a program that calculates the following using variables  $x = 15$  and  $y = 4$ :

- Sum
- Difference
- Product
- Division result
- Remainder

**Question:** What will be the output of the following code? Explain why:

```
int a = 2, b = 7;
Console.WriteLine(a % b);
```

**Problem:** Write a program that checks if a given number is both:

- Greater than 10.
- Even.

**Question:** How does the `&&` (logical AND) operator differ from the `&` (bitwise AND) operator?

**Problem:** Implement a program that takes a `double` input from the user and casts it to an `int`. Use both implicit and explicit casting, then print the results.

**Question:** Why is explicit casting required when converting a `double` to an `int`?

**Problem:** Write a program that: (G01 Bonus, G02 mandatory)

- Prompts the user for their age as a string.
- Converts the string to an integer using `Parse`
- Checks if the age is valid (e.g., greater than 0).

**Question:** What exception might occur if the input is invalid and how can you handle it

**Problem:** Write a program that demonstrates the difference between prefix and postfix increment operators using a variable `x`.

**Question:** Given the code below, what is the value of `x` after execution? Explain why

```
int x = 5;
int y = ++x + x++;
```

## Part02

- 1- LinkedIn article about variables allocation in stack and heap for both value and ref types
- 2- what's the difference between compiled and interpreted languages and in this way what about Csharp?

3- Compare between implicit, explicit, Convert and parse casting

## **Part03 Bonus**

4- self study report

5- what meant by Csharp is managed code

6- what meant by struct is considered like class before