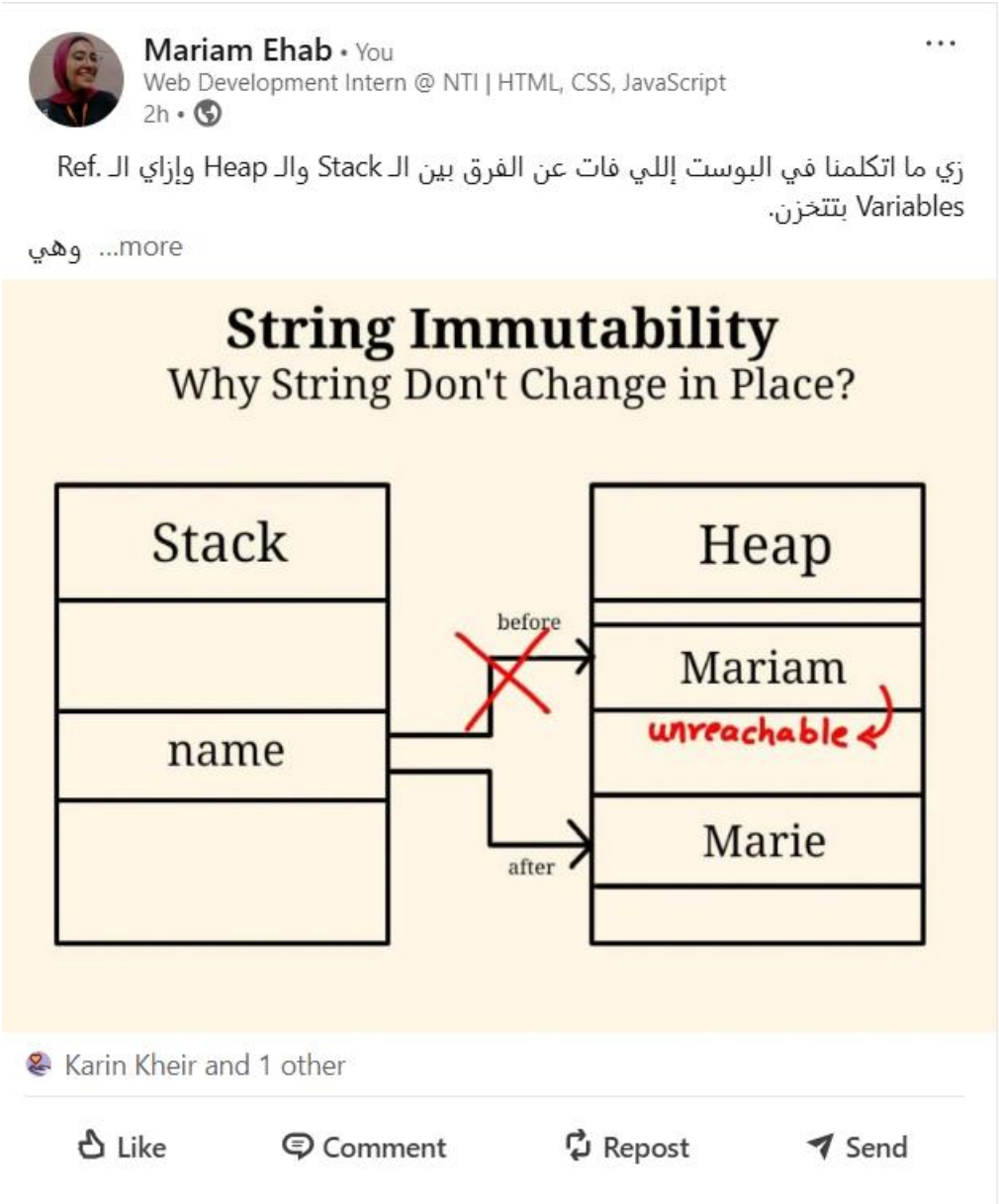
Part02

1. [LinkedIn article about string immutability]



2. What's Enum data type, when is it used? And name three common built_in enums used frequently?

Enum (Enumeration) is a special value type in C# that represents a set of named integer constants. It provides a way to assign meaningful names to integral values, making code more readable and maintainable.

Characteristics

- **Type**: Value type (stored on stack)
- **Underlying Type**: Default is int, but can be byte, short, long and other value types.
- **Values**: Auto incremented (starting from 0) unless explicitly specified

We use it for things that have fixed set of options like

- Days of week
- Months
- Colors
- Status codes

They replace magic numbers/strings with meaningful names, provide compile-time checking, and improve code documentation. The built-in enums like DayOfWeek, ConsoleColor, and FileMode demonstrate practical applications in everyday programming scenarios that we face.

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3. what are scenarios to use string Vs StringBuilder?

We use String When:

1) **Storing Fixed/Constant Text**
   - Configuration values (connection strings, file paths)
   - Error messages, labels, UI text
   - Any text that won't change after creation because Strings are safe, predictable, and memory-efficient for static text.
2) **Doing Single Operations**
   - One concatenation: fullName = firstName + " " + lastName
   - One transformation: email.ToLower() or text.Trim()
   - Simple formatting or replacement because One operation doesn't need StringBuilder's complexity.
3) **Using it as Dictionary Keys**

- Keys in Dictionary or HashSet
- Cache keys or lookup identifiers because Strings keep the same hash code, which collections need for finding items.

4) **Small, Known Content**
   - Because the performance difference is too small to matter for tiny text.

And we use StringBuilder When:

1) **Building Text in Loops**
   - Any text construction inside a for or foreach loop
   - Generating reports with multiple rows
   - Because StringBuilder avoids creating a lot of temporary string objects.
2) **Creating Large Documents**

- Because StringBuilder is much more memory-efficient for big content (no need for GC like the String).

3) **Dynamic Query Building**

- Constructing SQL queries with variable conditions
- Building search filters dynamically
- Because it handles conditional text building efficiently.

4) **Multiple Modifications**
   - A lot of operations on the same text
   - Chain of operations like on the assignment append then insert then replace then remove
   - Because each String operation creates a new object but StringBuilder doesn't.

5. Performance-Critical Code

- StringBuilder is designed for fast text building.