Enum Data Type

An enum (enumeration) is a special data type that consists of a set of named constants representing a fixed collection of related values. Enums improve code readability, type safety, and maintainability by restricting variables to predefined values rather than using arbitrary integers or strings.

Enums are used when a variable should only hold one value from a small, fixed set of possible options. Common scenarios include representing days of the week, cardinal directions, status codes, priority levels, or any discrete categorical data where the complete set of valid values is known at compile time.

Three commonly used built-in enums include:

- `DayOfWeek` - Represents the seven days of the week (Monday through Sunday)
- `ConsoleColor` - Represents the available console colors for text display
- `StringComparison` - Specifies culture, case, and sort rules for string comparison operations

String vs StringBuilder

The choice between String and StringBuilder depends primarily on mutability and performance requirements.

Use **String** when working with immutable text that undergoes few or no modifications. Strings are ideal for fixed text values, simple concatenations (fewer than 5 operations), string literals, and scenarios where thread safety through immutability is beneficial. Since strings are immutable, each modification creates a new string object in memory, which is inefficient for repeated changes but perfectly acceptable for occasional operations.

Use **StringBuilder** when performing multiple string modifications, such as building strings in loops, extensive concatenation operations, or dynamic text construction. StringBuilder maintains a mutable character buffer that can be modified without creating new objects, making it significantly more efficient for scenarios involving numerous append, insert, replace, or remove operations. This is particularly important in performance-critical applications where repeated string manipulations would otherwise create excessive memory allocations and trigger frequent garbage collection.