Tuple

Tuples are lightweight data structures that can group together multiple data elements. In C#, tuples are mutable value types from the **System.ValueTuple** struct. Starting with C#7, tuples gained language level support and changed to being value types, whereas before they were reference types. Tuples are created with parenthesis, ex. (“FirstElement”, “SecondElement”). The types of the tuple can be explicitly or implicitly defined. The elements of the tuple can be accessed via Item1, Item2, …, ItemN, or they can also be identified by their own name. Tuples are useful for returning more than one related values from a class without the use of the **out** keyword. Tuples can also be compared for equality, the “==” and “!=” operators are performed with short circuit evaluation.

Array

Arrays are data structures that can store multiple data elements of the same type. In C#, arrays are objects and reference types that inherit from the abstract base type **System.Array**. Arrays are created with the type followed by square brackets, which may contain values or commas to indicate the array size. Arrays can be either one-dimensional, rectangular, or jagged. Thus, arrays can have one or more dimensions of equal element size, or they can have elements of different dimension and size. Since arrays are objects in C#, **foreach** can be used to iterate through the array.

Resources:

Tuple

<https://docs.microsoft.com/en-us/dotnet/csharp/language-reference/builtin-types/value-tuples>

<https://visualstudiomagazine.com/articles/2017/01/01/tuples-csharp-7.aspx>

Patrick, Tim. “What's So Great About Tuples?” *Visual Studio Magazine*, 18 Jan. 2017, visualstudiomagazine.com/articles/2017/01/01/tuples-csharp-7.aspx.

“Tuple Types - C# Reference.” *Microsoft Docs*, 9 July 2020, docs.microsoft.com/en-us/dotnet/csharp/language-reference/builtin-types/value-tuples.

Array

<https://docs.microsoft.com/en-us/dotnet/csharp/programming-guide/arrays/>

<https://www.pluralsight.com/guides/multidimensional-arrays-csharp>

“Arrays - C# Programming Guide.” *Microsoft Docs*, 20 July 2015, docs.microsoft.com/en-us/dotnet/csharp/programming-guide/arrays/.

Singh, Pavneet. “Multi-Dimensional and Jagged Arrays.” *Pluralsight*, 15 Oct. 2018, [www.pluralsight.com/guides/multidimensional-arrays-csharp](http://www.pluralsight.com/guides/multidimensional-arrays-csharp).

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“Arrays - C# Programming Guide.” *Microsoft Docs*, 20 July 2015, docs.microsoft.com/en-us/dotnet/csharp/programming-guide/arrays/.

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