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CS 311-ON

Basic Structures of the C# Programming Language

## Language Map for C#

<b>Variable Declaration</b> <i>Is this language strongly typed or dynamically typed? Provide an example of how variables are declared in this language.</i>	C# is a strongly typed language. string name;
<b>Data Types</b> <i>List all of the data types (and ranges) supported by this language.</i>	sbyte (-128, 127) byte (0, 255) short (-32768, 32767) ushort (0, 65535) int (-2147483648, 2147483647) uint (0, 4294967295) long (-9223372036854775808, 9223372036854775807) ulong (0, 18446744073709551615) float ( $\pm 1.5 * 10^{-45}$ , $\pm 3.4 * 10^{38}$ ) double ( $\pm 5.0 * 10^{-324}$ , $\pm 1.7 * 10^{308}$ ) decimal ( $\pm 1.0 * 10^{-28}$ , $\pm 7.9 * 10^{28}$ ) bool (true    false) char (U+0000 to U+FFFF) object
<b>Selection Structures</b> <i>Provide examples of all selection structures supported by this language (if, if else, etc.)</i>	<b>Single-Selection Statement</b> if (obj != null) Console.WriteLine(\$"{obj}");  <b>Double-Selection Statement</b> if (obj != null) Console.WriteLine(\$"{obj}"); else obj = new Object();  <b>Multiple-Selection Statement</b> switch (name) {

	<pre> case "Carl":     name = "first name";     break; case "Planel":     name = "middle name";     break; case "Archemètre":     name = "last name";     break; default:     Console.WriteLine(\$"none of the cases matched {name}.");     break; } </pre>
<b>Repetition Structures</b> <i>Provide examples of all repetition structures supported by this language (loops, etc.)</i>	<p><b>while Iteration Statement</b></p> <pre> while (i &lt; 10)     i++; </pre> <p><b>for Iteration Statement</b></p> <pre> for (int i = 0; i &lt; 10; i++)     Console.WriteLine(i); </pre> <p><b>foreach Iteration Statement</b></p> <pre> foreach (string name in names)     Console.WriteLine(\$" {name}"); </pre> <p><b>do...while Iteration Statement</b></p> <pre> do {     Console.WriteLine(i);     i++; } while (i &lt; 10); </pre>
<b>Arrays</b> <i>If this language supports arrays, provide an example of creating an array with a primitive data type (e.g. float, int, etc.)</i>	<pre> int[] numbers = new int[10]; </pre>
<b>Data Structures</b> <i>If this language provides a standard set of data structures, provide a list of the data structures and their Big-Oh complexity.</i>	<p><b>Generic Collections</b> [<i>Access, Search, Insertion, Deletion</i>]</p> <ul style="list-style-type: none"> <li>Stack&lt;T&gt; [(O(n), O(n), O(1), O(1))]</li> <li>Queue&lt;T&gt; [(O(n), O(n), O(1), O(1))]</li> <li>SortedList&lt;K,V&gt;, [(O(n), O(log n), O(n), O(n))]</li> </ul>

	<ul style="list-style-type: none"> <li>• Dictionary&lt;K, V&gt;, [(O(n), O(1), O(1), O(1))]</li> <li>• List&lt;T&gt;, [(O(n), O(n), O(n), O(n))]</li> <li>• SortedDictionary&lt;K, V&gt;, [(O(n), O(log n), O(log n), O(log n))]</li> </ul> <b>Legacy Collections</b> <ul style="list-style-type: none"> <li>• ArrayList [(O(n), O(n), O(n), O(n))]</li> <li>• BitArray</li> <li>• Hashtable [(O(n), O(1), O(1), O(1))]</li> <li>• Queue [(O(n), O(n), O(1), O(1))]</li> <li>• SortedList [(O(n), O(log n), O(n), O(n))]</li> <li>• Stack [(O(n), O(n), O(1), O(1))]</li> </ul>
<b>Objects</b> <i>If this language support object-orientation, provide an example of how to create a simple object with a default constructor.</i>	object obj = new Object();
<b>Runtime Environment</b> <i>What runtime environment does this language compile to? For example, Java compiles to the Java Virtual Machine. Do other languages also compile to this runtime?</i>	The Common Language Runtime (CLR) executes .NET programs.
<b>Libraries/Frameworks</b> <i>What are the popular libraries or frameworks used by programmers for this language? List at least three (3).</i>	AutoMapper, FluentValidation, ImageProcessor
<b>Domains</b> <i>What industries or domains use this programming language? Provide specific examples of companies that use this language and what they use it for.</i>	Microsoft's Windows is the most widely use personal-computer desktop operation in the world, so to develop apps that run on their system it's a good practice to be familiar with the language of Microsoft C#. Like all general-purpose programming languages, it can be used to create desktop apps, cloud-based services, websites, mobile apps, enterprise software and games. Microsoft uses its language to write some of its application such as Windows installer XML and Microsoft Visual Studio. C# is also one of the best programming languages for gaming, for example Rimworld developed by Unity Technologies is written in C#.