Language Map for C#

Variable Declaration

Is this language strongly typed or dynamically typed? Provide an example of how variables are declared in this language.

C# is strongly typed, meaning that any errors in type will be caught by the compiler, instead of waiting until run time.

Variables are declared in C# the same way they are declared in Java.

Examples:
1) int myNum; 2) char myLetter = 'D'; 3) string myText = "Hello";

Data Types

List all of the data types (and ranges) supported by this language.

Data Type	Size	Range
int	4 bytes	Whole numbers from -2,147,483,648 to 2,147,483,648
long	8 bytes	Whole numbers from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,808
float	4 bytes	Fractional numbers with 6 to 7 decimal digits
double	8 bytes	Fractional numbers with 15 decimal digits
bool	1 bit	True or false
char	2 bytes	A single character/letter
string	2 bytes per character	A sequence of characters

Selection Structures

Provide examples of all selection structures supported by this language (if, if else, etc.)

Examples of IF

```
if (condition)
{
    //code to be executed if true
}
```

```
if (30 < 35)
{
    Console.WriteLine("30 is less than 35");
}
```

Examples of IF ELSE

```
if (condition)
{
    //code to be executed if true
}
else
{
    //code to be executed if false
}
```

```
if (result = 10)
{
    Console.WriteLine("Correct");
}
else
{
    Console.WriteLine("Incorrect");
}
```

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Examples of ELSE IF
<pre>
if (condition1)
{
    //code to be executed if 1 is true
}
else if (condition2)
{
    //code to be executed if 1 is false & 2 is true
}
else
{
    //code to be executed if 1 is false & 2 is false
}
</pre>
<pre>
if (result = 10)
{
    Console.WriteLine(“Normal”);
}
else if (result < 10)
{
    Console.WriteLine(“Low”);
}
else
{
    Console.WriteLine(“High”);
}

</pre>
Examples of SWITCH
<pre>
switch(expression)
{
    case x:
        //code to be executed if x
        break;
    case y:
        //code to be executed if y
        break;
    default:
        //code to be executed if not x or y
        break;
}
</pre>
<pre>
switch(position)
{
    case 1:
        Console.WriteLine(“Winner”);
        break;
    case 2:
        Console.WriteLine(“Runner Up”);
        break;
    default:
        Console.WriteLine(“Contestant”);
        break;
}
</pre>
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<td>Repetition Structures
Provide examples of all repetition structures supported by this language (loops, etc.)</td>
<td>
Examples of WHILE LOOP
<pre>
while (condition)
{
    //code to be executed if condition is true
}
</pre>
<pre>
while (i < 100)
{
    Console.WriteLine(i);
    i++;
}
</pre>
Examples of DO/WHILE LOOP
<pre>
do
{
    //code to be executed at least once
    //and while condition is true
}
while (condition);
</pre>
<pre>
do
{
    Console.WriteLine(i);
    i++;
}
while (i < 10)
</pre>
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Examples of FOR LOOP

```
for (statement1; statement 2; statement 3)
{
    //code to be executed
}
```

```
for (int i = 0; i < 4; i++)
{
    Console.WriteLine(i);
}
```

Examples of FOREACH LOOP

```
foreach (type variableName in arrayName)
{
    //code to be executed
}
```

```
foreach (string result in myArray)
{
    Console.WriteLine(result);
}
```

Arrays

If this language supports arrays, provide an example of creating an array with a primitive data type (e.g. float, int, etc.)

```
int[] myArray = new [5];
```

OR

```
int[] myArray = {1, 2, 3, 4, 5};
```

Data Structures

If this language provides a standard set of data structures, provide a list of the data structures and their Big-Oh complexity.

Data Structure	Add/Insert	Add Beyond Capacity	Queue/Push	Dequeue/ Pop/Peek	Remove/ RemoveAt	Item[index]/ ElementAt(index)	GetEnumerator	Contains/ IndexOf/Find
Dictionary	O(1), O(n) if collision	O(n)	-	-	O(1), O(n) if collision	O(1), O(n) if collision	O(1)	O(n)
List	O(1) to add, O(n) to insert	O(n)	-	-	O(n)	O(1)	O(1)	O(n)
Queue	O(1)	O(n)	O(1)	O(1)	-	-	O(1)	O(n)
Stack	O(1)	O(n)	O(1)	O(1)	-	-	O(1)	O(n)
LinkedList	O(1), before/after given node	O(1)	O(1)	O(1)	O(1), before/after given node	O(n)	O(1)	O(n)
SortedList	O(n), O(log n) if added to end of list	O(n)	-	-	O(n)	O(log n)	O(1)	O(n)
HashSet	O(1), O(n) if collision	O(n)	-	-	O(1), O(n) if collision	O(1), O(n) if collision	O(1)	-
Sorted Dictionary	O(log n)	O(log n)	-	-	O(log n)	O(log n)	O(log n)	O(n)
SortedSet	O(log n)	O(log n)	-	-	O(log n)	O(log n)	O(log n)	-

Objects *If this language supports object-orientation, provide an example of how to create a simple object with a default constructor.*	Animal bird = new Animal();
Runtime Environment *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?*	C# compiles to Common Language Runtime (CLR). Other languages also compile to CLR, such as Visual Basic, J#, and Visual C++.
Libraries/Frameworks *What are the popular libraries or frameworks used by programmers for this language? List at least three (3).*	A few popular libraries and frameworks used by programmers for C# are Windows Forms (WinForms), .NET, and Windows Presentation Foundation (WPF).
Domains *What industries or domains use this programming language? Provide specific examples of companies that use this language and what they use it for.*	C# is a general-purpose programming language that is used to build different types of applications and web-based services. C# is frequently used in backend services, Windows apps, website development, and game development. C# is used by the following companies: • Aristocrat: game development • Microsoft: web applications, web services, game development • City National Bank: cloud-based applications • Stack Overflow: web services, application development