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CS311-ON

Variable Declaration
Is this language strongly typed or dynamically typed? Provide at least three examples (with different data types or keywords) of how variables are declared in this language.
	C# is strongly typed
	
	bool isSaved = false;
	string title = “The Simpsons”;
	int speed = 10;

Data Types *List all of the data types (and ranges) supported by this language.*	• int: range of -2,147,483,648 to 2,147,438,648 • long: range of -9,223,372,036,854,775,808 to 9,223,372,036,854,775,808 • float: range of -3.402823e38 to 3.402823e38 • double: range of -1.79769313486232e308 to 1.79769313486232e308 • bool: true or false • char: any character • string: any sequence of characters • byte: range of 0-255 • sbyte: range of -128-127 • short: range of -32,768 to 32,767 • ushort: range of 0 to 65,535 • uint: range of 0 to 4,294,967,295 • ulong: range of 0 to 18,446,744,073,709,551,615 • decimal: range of (+ or -)1.0 x 10e-28 to 7.9 x 10e28 • DateTime: range of 0:00:00am 1/1/01 to 11:59:59pm 12/31/9999

Selection Structures
Provide examples of all selection structures supported by this language (if, if else, etc.) ***Don’t just list them, show code samples of how each would look in a real program.***
	If Statement:
	
	int ourValue = 10;
	
	if (ourValue == 10) {
	Console.WriteLine("Our value is 10!");
	}
	
	If-Else Statement:
	int ourValue = 10;
	
	if (ourValue == 10) {
	Console.WriteLine("Our value is 10!");

	}
	else {
	Console.WriteLine("Our value is not 10!);
	}
	
	Else-If Statement:
	if (string.Compare("1", ourState) == 0) {
	Console.WriteLine("You're going to be a Beaver!");
	}
	else if (string.Compare("2", ourState) == 0) {
	Console.WriteLine("You're going to be a Duck!");
	}
	else if (string.Compare("3", ourState) == 0) {
	Console.WriteLine("You're going to be a Huskie!");
	}
	
	Switch Statement:
	switch (ourState)
	{
	case "1":
	Console.WriteLine("You're going to be a Beaver!");
	break;
	
	case "2":
	Console.WriteLine("You're going to be a Duck");
	break;
	
	case "3":
	Console.WriteLine("You're going to be a Huskie!");
	break;
	
	default:
	Console.WriteLine("You must select options 1-3 only");
	break;
	}

Repetition Structures
Provide examples of all repetition structures supported by this language (loops, etc.) ***Don't just list them,***
	for Loop:
	for(int i = 0; i < 10; i++)
	{
	Console.WriteLine("Value of i: {0}", i);

show code samples of how each would look in a real program.	}
	
	for Loop w/ multiple expressions:
	for (int i = 0, j = 0; i+j < 5; i++, j++)
	{
	  Console.WriteLine("Value of i: {0}, J: {1} ", i,j);
	}
	
	while Loop:
	int i = 0;
	
	while (true)
	{
	  Console.WriteLine("i = {0}", i);
	
	  i++;
	
	  if (i > 10)
	  break;
	}
	
	Do-while Loop:
	int i = 0;
	
	do
	{
	  Console.WriteLine("i = {0}", i);
	  i++;
	
	} while (i < 5);

Arrays
*If this language supports arrays, provide **at least two examples** of creating an array with a primitive or String data types (e.g. float, int, String, etc.) If the language supports declaring arrays in multiple ways, provide an example of way.*
	Single-dimensional array:
	int[] evenNums = new int[5]{ 2, 4, 6, 8, 10 };
	string[] cities = new string[3]{ "Mumbai", "London", "New York" };
	
	Multi-dimensional array:
	int[,] arr2d = {
	  {1, 2},
	  {3, 4},

	{5, 6}
	};
	Jagged Array:
	int[][] jArray = new int[2][];
	
	jArray[0] = new int[3]{1, 2, 3};
	
	jArray[1] = new int[4]{4, 5, 6, 7 };

Data Structures *If this language provides a standard set of data structures, provide a list of the data structures and their Big-Oh complexity (identify what the complexity represents).*	• Array: O(1) to access, O(n) for everything else • Stack: O(1) to insert or delete, O(n) for everything else • Queue: O(1) to insert or delete, O(n) for everything else • Hashtable: O(1) best, O(n) worst • Dictionary: O(n) for ContainsValue, O(1) for everything else • Linked List: O(1) to insert or delete, O(n) for everything else

Objects
If this language support object-orientation, provide an example of how you would write a simple object with a default constructor and then how you would instantiate it.
	class Rectangle {
	
	public int length, breadth;
	
	// Parameterized Constructor
	public Rectangle(int l, int b) {
	length = l;
	breadth = b;
	}
	
	class Program {
	
	static void Main(string[] args)
	{
	// Creating an object using 'new'
	// Calling the parameterized constructor
	// With parameters 10 and 12
	Rectangle rect1 = new Rectangle(10, 12);
	}

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? If so, what these other languages?*	C# compiles to Common Language Runtime or CLR. Other .NET languages, such as VB.NET, F#, and PowerShell are executed by this.

Libraries/Frameworks *What are the popular libraries or frameworks used by programmers for this language? List at least three (3) and describe what they are used for.*	• Autofac: manages dependencies between classes, makes it easier for them to grow in size and complexity • AutoMapper: object-object mapper, maps objects to other objects • Entity Framework: provides tools for creating and updating databases in C#
Domains *What industries or domains use this programming language? Provide at least three specific examples of companies that use this language and what they use it for**. E.g. Company X uses C# for its line of business applications.***	• Microsoft uses C# for web and game development • City National Bank uses C# for creating cloud-based applications • ServiceTitan uses C# for Android app development and web services