

Properties and Constructors

The objective of this exercise is to consolidate your understanding of C# properties and constructors.

1	Create a new Class Library project called CarLibrary . Rename Class1.cs to Car.cs
2	Add a Console Application project to the Solution called CarConsole . Set CarConsole as the start-up project. In CarConsole , add a project reference to the CarLibrary project.
3	In Car.cs , create a property of type <i>int</i> called Speed with a <i>backing field</i> speed . Validate that the speed set is above zero but under 100.
4	Add an auto-implemented property of type <i>string</i> called RegistrationNumber .
5	Add a calculated expression bodied property called SpeedInKilometres of type <i>double</i> . To calculate the speed in kilometres, multiply the speed by 1.609344
6	Add string properties for Make , Model , and Colour .
7	In CarConsole , in Program.cs : Delete the line of code that outputs 'Hello, World!' Instantiate a car object, c1 . Issue a using directive to bring the CarLibrary namespace into scope. Write the name of the instance to the console: Console.WriteLine(nameof(c1)); Build and run the console application to confirm the object can be successfully instantiated.

	<p>Set the make of c1 to be 'Ford'.</p> <p>Write the <i>make</i> of c1 to the console.</p> <p>Write the <i>model</i> of c1 to the console.</p> <p>What value is displayed?</p>
8	<p>In the Car class, create a constructor that accepts a <i>make</i> and a <i>model</i> only.</p> <p>Initialise these values within the constructor.</p>
9	<p>In CarConsole:</p> <p>Re-run the app. Does it build successfully?</p>
10	<p>Create a <i>parameterless</i> constructor</p> <p>Set the make and model to be Unknown and the colour to be Black.</p> <p>Confirm the console app builds and runs successfully.</p> <p>What value is displayed for the model?</p>
11	<p>In CarConsole:</p> <p>Instantiate a car object, c2, using the overloaded constructor. The make is Audi, the model is TT;</p> <p>Write the make and model of c2 to the console.</p> <p>Set the colour property to Red.</p> <p>Write c2's colour property to the console.</p> <p>Set the speed of c2 to 30 miles per hour.</p> <p>Display the speed in the console in both <i>miles per hour</i> and <i>kilometres per hour</i>.</p>
12	<p>In CarConsole:</p> <p>Instantiate a car object, c3, using the overloaded constructor (BMW, X5) and an object initialiser that sets the colour to Grey and the registration number to ABC 123.</p> <p>Write the property values of c3 to the console.</p>

13	<p>In Car.cs, chain the parameterless constructor to the overloaded constructor, passing Unknown Make and Unknown Model as the parameters.</p> <p>In the body of the parameterless constructor, remove the make and model and set the colour to be White.</p> <p>Confirm the console application still builds and runs successfully.</p>
14	<p>In CarConsole:</p> <p>Instantiate a car object, c4, using the parameterless constructor.</p> <p>Write the property values of c4 to the console.</p> <p>Confirm c4 is an unknown make and model that is white with an empty registration number.</p>

