Exception Handling

The objective of this exercise is to consolidate your understanding of exception handling and creating and throwing custom exceptions.

1	Open the **CarLibrary** solution in: **{installedFolder}\Labs\13_Exception_Handling\Begin**
2	Comment out the existing code in **Program.cs**
3	Open **Car.cs** and override the **ToString** method to display detailed car information: `return $"Car Make is {Make}, Model is {Model}, Colour is {Colour}, Speed is {Speed} MPH";`
4	Add a new auto-implemented property called **RoadSpeedLimit.**
5	You will change the logic of the Speed setter to account for the road's speed limit and whether or not the value that you are setting is a legal driving speed for the current road. • If it is, set the value • If it is not, you will raise a custom exception
6	In a separate file in the class library project, create an exception class called **SpeedingException.** Don't forget to use inheritance.
7	Within the new custom exception class, create an auto-implemented property called **ExcessSpeed** and set this value within the constructor.
8	In **Car.cs**, if the car is not travelling at a legal speed, throw a new instance of **SpeedingException**,ensuring you pass in the excess speed value.
9	In **Program.cs**, create two new car instances: **slowCar** and **fastCar**
10	Set the following values for **slowCar**:

```
Car slowCar = new Car("Renault", "Clio");
slowCar.Colour = "Black";

slowCar.RegistrationNumber = "CLIO 1";
slowCar.RoadSpeedLimit = 30;
slowCar.Speed = 30;
Console.WriteLine(slowCar.ToString());
```

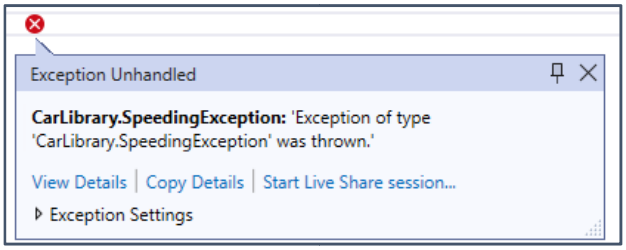
11 Set the following values for **fastCar**:

```
Car fastCar = new Car("BMW", "M5");
fastCar.Colour = "Silver";

fastCar.RegistrationNumber = "FAST 1";
fastCar.RoadSpeedLimit = 70;
fastCar.Speed = 80;
Console.WriteLine(fastCar.ToString());
```

12 Compile and run your application.

You should see an unhandled exception:



13 Uncomment the existing code in **Program.cs**.

Set the **RoadSpeedLimit** to **50** for Car **c2**.

Wrap the code in this file with **try**…**catch**…**finally** blocks to handle the exceptions that are thrown.

Add a catch block for **Exception** as well as for **SpeedingException**.

Utilise the properties of the exception class to display useful messages to the console:

```
Console.WriteLine($"A speeding exception occurred. The car is travelling {ex.ExcessSpeed} MPH above the lim
```

14 Compile and run your application.

Observe the exceptions that are thrown and caught.

15	Add a property to store the *Car instance* within the **SpeedingException** and use this to access information that can be output to the console to help identify the Car that is speeding:
	
	`catch (SpeedingException ex)`
	`{`
	`    Console.WriteLine($"A speeding exception occurred. The car is travelling {ex.ExcessSpeed} MPH above the limit");`
	`    Console.WriteLine($"A speeding exception occurred. Car {ex.Car.RegistrationNumber} is travelling {ex.ExcessSpeed} MPH above the limit");`
	`}`

If you have time

16	Create a list of valid colours within **Car.cs** and create a custom **InvalidColourException** that is thrown if the colour is not in the list.
17	Observehow this exception is caught by the generic Exception event handler.
18	Add a custom catch block to handle this specific type of exception.
19	A suggested solution is provided in the **End** folder for your reference.