Working with Nulls in C#

WORKING WITH NULLABLE VALUE TYPES AND STRINGS

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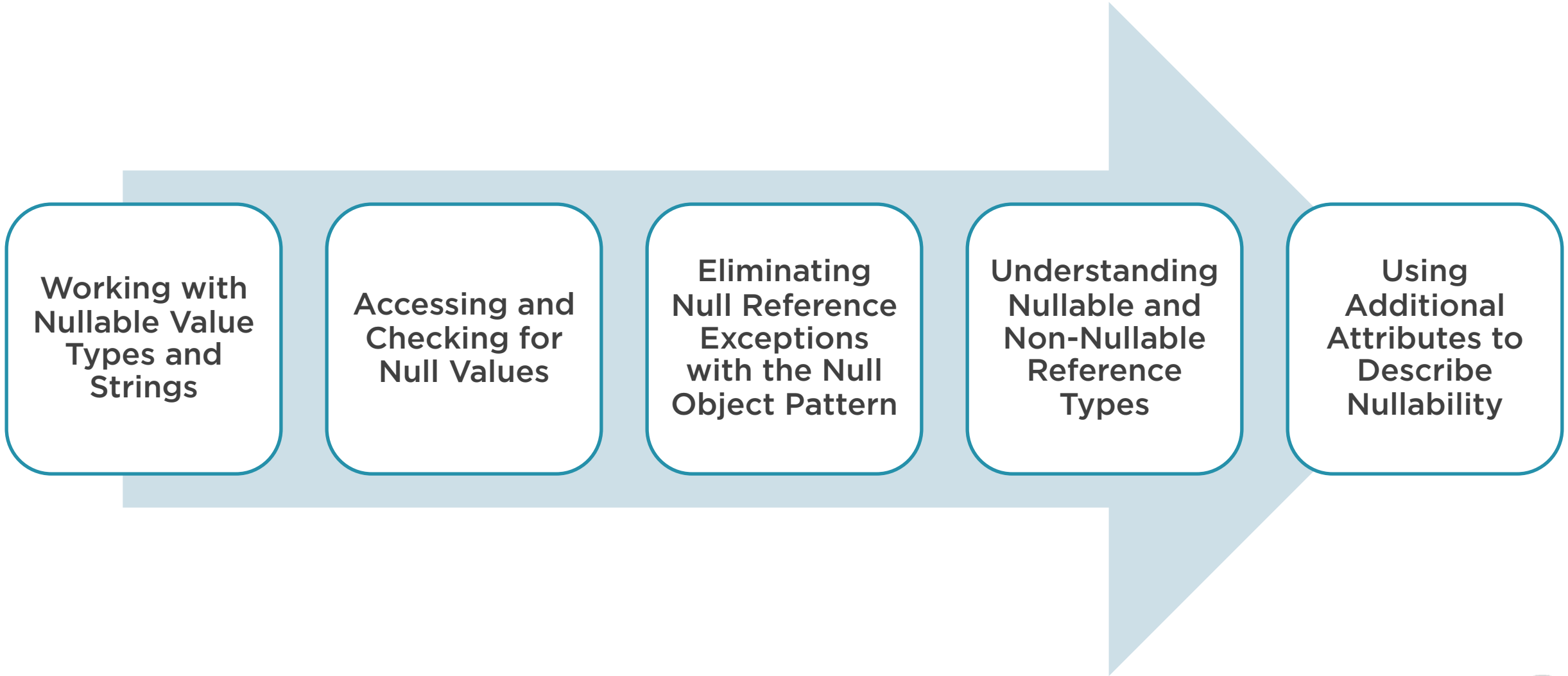
Course Outline



Overview

Reference and value types overview

Using magic numbers for null value types

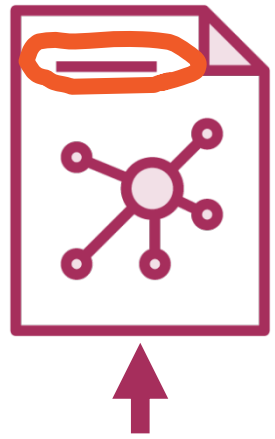
Nullable value types with Nullable<T>

C# shorthand for nullable value types

Nullable Boolean values

Null, empty, and whitespace strings

Reference and Value Types Overview



http://dontcodetired.com/ebook.html

Value

Reference

Reference and Value Types Overview

Value	Reference
C# struct	C# class
Independent instances/copies	Single shared instance
Value change doesn't affect other copies	Value change affects people (references) pointing to it
The value **is** the information	The reference **points to** the information
No reference, cannot be null	Reference may point to "nothing" (null)
No need to check for nulls	Null checking code may be required

NullReferenceException

"A NullReferenceException exception is thrown when you try to access a member on a type whose value is null"

https://docs.microsoft.com/en-us/dotnet/api/system.nullreferenceexception?view=net-5.0

Examples of NullReferenceException Causes

Get / set property

Call a method

Get / set field

```
string sarah = "Sarah"; // reference type string
int length = sarah.Length; // property
string upperName = sarah.ToUpperInvariant(); // method

string amrit = null;
length = amrit.Length; // NullReferenceException
upperName = amrit.ToUpperInvariant(); // NullReferenceException

string name = amrit; // no exception, name is null
length = name.Length; // NullReferenceException
```

Checking for a Null Reference

```
if (amrit == null) { }
if (amrit != null) { }

if (amrit is null) { }
if (amrit is not null) { }
```

A value type may sometimes need to represent a null value.

"Magic numbers"

Nullable<T>

Nullable Value Types

A nullable value type is an instance of the System.Nullable<T> struct. A nullable value type can represent all the values of the value type T, plus an additional null value.

Undefined / missing value

Introduction to Nullable Value Types with Nullable<T>

Null and Empty Strings

```
string name = "Sarah"; // reference type

string name = null;

string name = ""; // empty string

string name = "    "; // whitespace string


if (name == null) {...}

if (string.IsNullOrEmpty(name)) {...}

if (string.IsNullOrWhiteSpace(name)) {...} // Also empty
```

Summary

Reference and value types overview

Value types independent copies

References point to the information

Using magic numbers for null value types

-1 & DateTime.MinValue

Nullable value types with Nullable<T>

Nullable<int> & Nullable<DateTime>

C# shorthand: int? & DateTime?

Nullable Boolean values

string.IsNullOrWhiteSpace(player.Name)

Next:

Accessing and Checking for Null Values