



```
Console.WriteLine("Hello, world!");
```

# Introduction to C#

C# Fundamentals – .NET Development

# Agenda

C# Background

What Is C#?

Compilation

History

Design Principles

C# Design

Language Type

Why Static Types?

C# Project Structure



C# Background

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- Compiled code is super efficient due to compiler optimizations
- Compiled code is typically not human-readable

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- System independent, and code can be analyzed and changed at runtime

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Variables have fixed data types which must be known at compile-time



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- Some query-language features

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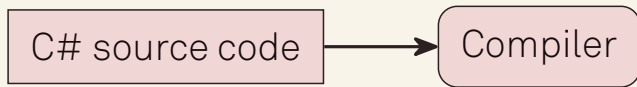
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- *.NET*'s bytecode is called *common-intermediate-language (CIL) code*
- The virtual machine used to execute *.NET* applications is known as the *common language runtime (CLR)*

# C# Compilation

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C# source code

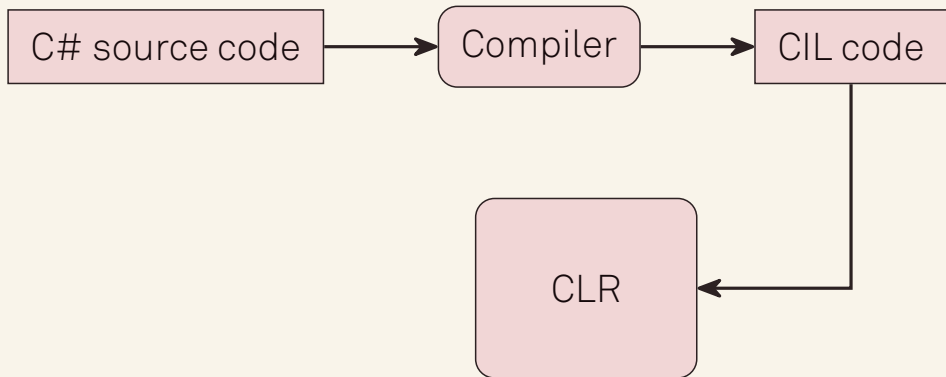
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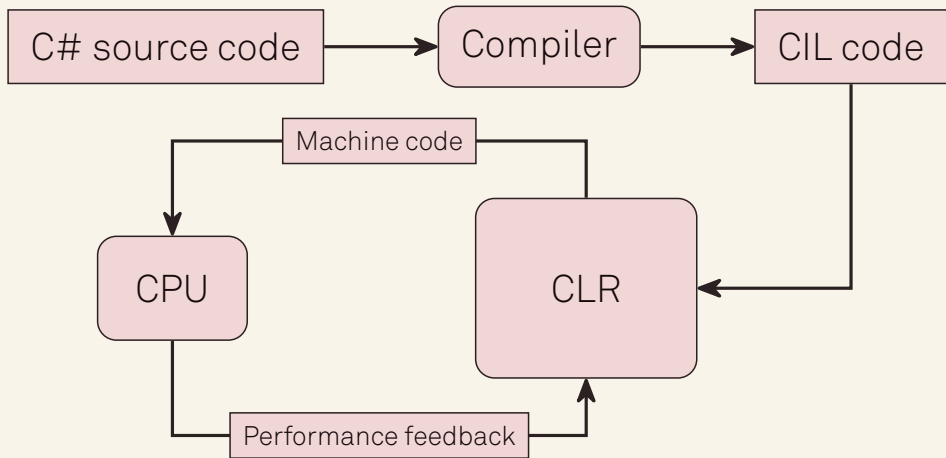


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- Heavily influenced by Java and previous Microsoft Java imitations (J++, J#)
- Current versions of C# are significantly different from Java
- C# is ECMA-standardized (ECMA-334)

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- The language is intended to be a simple, modern, general-purpose programming language
- The language, and implementations thereof, should provide support for software engineering principles such as strong type checking, array bounds checking, detection of attempts to use uninitialized variables, and automatic garbage collection. Software robustness, durability, and programmer productivity are important.

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- Portability is very important for source code and programmers, especially those already familiar with C and C++.
- Support for internationalization is very important.

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- Although C# applications are intended to be economical with regard to memory and processing power requirements, the language was not intended to compete directly on performance and size with C or assembly language.



# C# Design

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- C# is an application programming language
  - Console apps
  - Games (Unity)
  - Web apps (Blazer)
  - Desktop and mobile apps (.NET MAUI)
- It's a *high-level* language compared to C and a very *high-level* language compared to Assembly language

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    - Add many abstractions
    - Remove details about hardware control

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  - High level (Java, Python, C#)
    - Many abstractions
    - Automated memory management (garbage collector)

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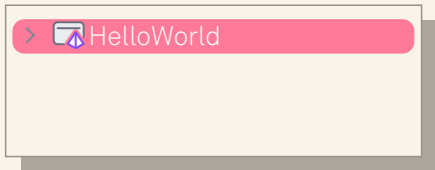
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- What do Python and JavaScript do?
  - mypy
  - TypeScript/JSDoc comments

# C# Project Structure

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C# solution



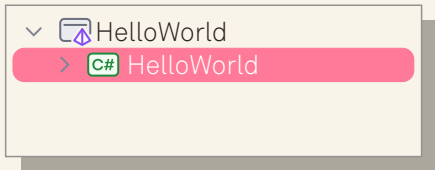
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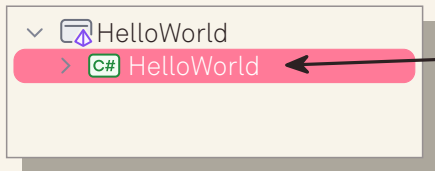
C# solution

- Solutions are containers for one or more related projects

# Project Structure

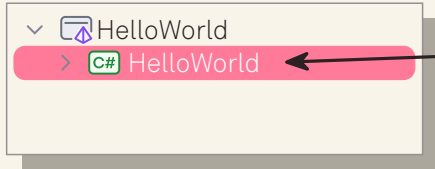


# Project Structure



C# project

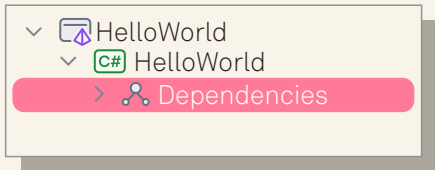
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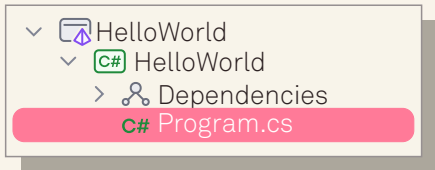
C# project

- Projects contain all code compiled into an executable, library, or website

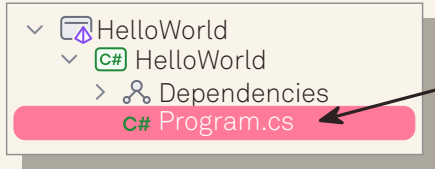
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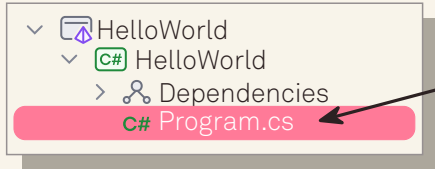


# Project Structure



C# Program class

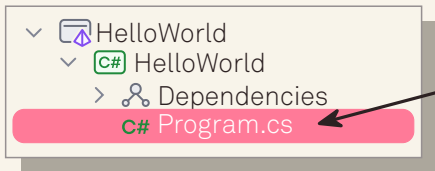
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- C# **Program** class
- This is the main class for a basic console application



# Project Structure



## C# **Program** class

- This is the main class for a basic console application
- This is where the code from the title slide goes

Any Questions?