

Async In C

Async/await

version 2.0 in 2007. This influenced the async/await mechanism added to C#. Microsoft first released a version of C# with async/await in the Async CTP (2011)

In computer programming, the async/await pattern is a syntactic feature of many programming languages that allows an asynchronous, non-blocking function to be structured in a way similar to an ordinary synchronous function. It is semantically related to the concept of a coroutine and is often implemented using similar techniques, and is primarily intended to provide opportunities for the program to execute other code while waiting for a long-running, asynchronous task to complete, usually represented by promises or similar data structures. The feature is found in C#, C++, Python, F#, Hack, Julia, Dart, Kotlin, Rust, Nim, JavaScript, and Swift.

Comparison of C Sharp and Java

```
}); } } var t = SomeAsyncCode.GetContentAsync().ContinueWith((task) => { var xmlDocument = task.Result; }); t.Start();
```

In C# 5 a set of language and

This article compares two programming languages: C# with Java. While the focus of this article is mainly the languages and their features, such a comparison will necessarily also consider some features of platforms and libraries.

C# and Java are similar languages that are typed statically, strongly, and manifestly. Both are object-oriented, and designed with semi-interpretation or runtime just-in-time compilation, and both are curly brace languages, like C and C++.

C Sharp (programming language)

Turbo C# Microsoft Visual Studio Express Xamarin Studio for async By convention, a number sign is used for the second character in normal text; in artistic

C# (see SHARP) is a general-purpose high-level programming language supporting multiple paradigms. C# encompasses static typing, strong typing, lexically scoped, imperative, declarative, functional, generic, object-oriented (class-based), and component-oriented programming disciplines.

The principal inventors of the C# programming language were Anders Hejlsberg, Scott Wiltamuth, and Peter Golde from Microsoft. It was first widely distributed in July 2000 and was later approved as an international standard by Ecma (ECMA-334) in 2002 and ISO/IEC (ISO/IEC 23270 and 20619) in 2003. Microsoft introduced C# along with .NET Framework and Microsoft Visual Studio, both of which are technically speaking, closed-source. At the time, Microsoft had no open-source products. Four years later, in 2004, a free and open-source project called Microsoft Mono began, providing a cross-platform compiler and runtime environment for the C# programming language. A decade later, Microsoft released Visual Studio Code (code editor), Roslyn (compiler), and the unified .NET platform (software framework), all of which support C# and are free, open-source, and cross-platform. Mono also joined Microsoft but was not merged into .NET.

As of January 2025, the most recent stable version of the language is C# 13.0, which was released in 2024 in .NET 9.0

C Sharp syntax

meanings in multiple contexts. The following C# keywords are contextual: *add* allows alias and ascending *args* *async* *await* by descending *dynamic* *equals* *from*

This article describes the syntax of the C# programming language. The features described are compatible with .NET Framework and Mono.

Asynchrony (computer programming)

portal Asynchronous system Asynchronous circuit Davies, Alex (2012). Async in C# 5.0. O'Reilly. pp. 1–2. ISBN 9781449337124. McCool, Michael; Reinders

Asynchrony, in computer programming, refers to the occurrence of events independent of the main program flow and ways to deal with such events. These may be "outside" events such as the arrival of signals, or actions instigated by a program that take place concurrently with program execution, without the program hanging to wait for results. Asynchronous input/output is an example of the latter case of asynchrony, and lets programs issue commands to storage or network devices that service these requests while the processor continues executing the program. Doing so provides a degree of concurrency.

A common way for dealing with asynchrony in a programming interface is to provide subroutines that return a future or promise that represents the ongoing operation, and a synchronizing operation that blocks until the future or promise is completed. Some programming languages, such as Cilk, have special syntax for expressing an asynchronous procedure call.

Examples of asynchrony include the following:

Asynchronous procedure call, a method to run a procedure concurrently, a lightweight alternative to threads.

Ajax is a set of client-side web technologies used by the client to create asynchronous I/O web applications.

Asynchronous method dispatch (AMD), a data communication method used when there is a need for the server side to handle a large number of long lasting client requests. Using synchronous method dispatch (SMD), this scenario may turn the server into an unavailable busy state resulting in a connection failure response caused by a network connection request timeout. The servicing of a client request is immediately dispatched to an available thread from a pool of threads and the client is put in a blocking state. Upon the completion of the task, the server is notified by a callback. The server unblocks the client and transmits the response back to the client. In case of thread starvation, clients are blocked waiting for threads to become available.

Asio (C++ library)

from basic usage to advanced features. C++ TR2 Networking Library Proposal "Asio C++ Library"; think-async.com. Retrieved 2024-08-01. Asio home page

Asio is a freely available, open-source, cross-platform C++ library for network programming. It provides developers with a consistent asynchronous I/O model using a modern C++ approach.

Boost.Asio was accepted into the Boost library on 30 December 2005 after a 20-day review. The library has been developed by Christopher M. Kohlhoff since 2003. A networking proposal based on Asio was submitted to the C++ standards committee in 2006 for possible inclusion in the second Technical Report on C++ Library Extensions (TR2).

As of 2024, Asio continues to evolve, with ongoing contributions from the community and enhancements to its functionality. The library is regularly updated to support the latest C++ standards and best practices in network programming. Developers are encouraged to explore the extensive documentation and tutorials

available on the official Asio website, which cover a wide range of topics, from basic usage to advanced features.

F Sharp (programming language)

available. The async block may be invoked using the Async.RunSynchronously function. Multiple async blocks can be executed in parallel using the Async.Parallel

F# (pronounced F sharp) is a general-purpose, high-level, strongly typed, multi-paradigm programming language that encompasses functional, imperative, and object-oriented programming methods. It is most often used as a cross-platform Common Language Infrastructure (CLI) language on .NET, but can also generate JavaScript and graphics processing unit (GPU) code.

F# is developed by the F# Software Foundation, Microsoft and open contributors. An open source, cross-platform compiler for F# is available from the F# Software Foundation. F# is a fully supported language in Visual Studio and JetBrains Rider. Plug-ins supporting F# exist for many widely used editors including Visual Studio Code, Vim, and Emacs.

F# is a member of the ML language family and originated as a .NET Framework implementation of a core of the programming language OCaml. It has also been influenced by C#,

Python, Haskell, Scala and Erlang.

C++11

to be built entirely on top of the thread library features. The new std::async facility provides a convenient method of running tasks and tying them to

C++11 is a version of a joint technical standard, ISO/IEC 14882, by the International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC), for the C++ programming language. C++11 replaced the prior version of the C++ standard, named C++03, and was later replaced by C++14. The name follows the tradition of naming language versions by the publication year of the specification, though it was formerly named C++0x because it was expected to be published before 2010.

Although one of the design goals was to prefer changes to the libraries over changes to the core language, C++11 does make several additions to the core language. Areas of the core language that were significantly improved include multithreading support, generic programming support, uniform initialization, and performance. Significant changes were also made to the C++ Standard Library, incorporating most of the C++ Technical Report 1 (TR1) libraries, except the library of mathematical special functions.

C++11 was published as ISO/IEC 14882:2011 in September 2011 and is available for a fee. The working draft most similar to the published C++11 standard is N3337, dated 16 January 2012; it has only editorial corrections from the C++11 standard.

C++11 was fully supported by Clang 3.3 and later. any by GNU Compiler Collection (GCC) 4.8.1 and later.

C++20

proposal Reflection Metaclasses Executors Networking extensions, including async, basic I/O services, timers, buffers and buffer-oriented streams, sockets

C++20 is a version of the ISO/IEC 14882 standard for the C++ programming language. C++20 replaced the prior version of the C++ standard, called C++17, and was later replaced by C++23. The standard was technically finalized by WG21 at the meeting in Prague in February 2020, had its final draft version

announced in March 2020, was approved on 4 September 2020, and published in December 2020.

Swift (programming language)

written using async/await syntax, and actors isolate shared mutable state in order to eliminate data races. Swift's syntax is similar to C-style languages

Swift is a high-level general-purpose, multi-paradigm, compiled programming language created by Chris Lattner in 2010 for Apple Inc. and maintained by the open-source community. Swift compiles to machine code and uses an LLVM-based compiler. Swift was first released in June 2014 and the Swift toolchain has shipped in Xcode since Xcode version 6, released in September 2014.

Apple intended Swift to support many core concepts associated with Objective-C, notably dynamic dispatch, widespread late binding, extensible programming, and similar features, but in a "safer" way, making it easier to catch software bugs; Swift has features addressing some common programming errors like null pointer dereferencing and provides syntactic sugar to help avoid the pyramid of doom. Swift supports the concept of protocol extensibility, an extensibility system that can be applied to types, structs and classes, which Apple promotes as a real change in programming paradigms they term "protocol-oriented programming" (similar to traits and type classes).

Swift was introduced at Apple's 2014 Worldwide Developers Conference (WWDC). It underwent an upgrade to version 1.2 during 2014 and a major upgrade to Swift 2 at WWDC 2015. It was initially a proprietary language, but version 2.2 was made open-source software under the Apache License 2.0 on December 3, 2015, for Apple's platforms and Linux.

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