Visual C

Microsoft Visual C++

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Microsoft Visual C++ (MSVC) is a compiler for the C, C++, C++/CLI and C++/CX programming languages by Microsoft. MSVC is proprietary software; it was originally a standalone product but later became a part of Visual Studio and made available in both trialware and freeware forms. It features tools for developing and debugging C++ code, especially code written for the Windows API, DirectX and .NET.

Many applications require redistributable Visual C++ runtime library packages to function correctly. These packages are frequently installed separately from the applications they support, enabling multiple applications to use the package with only a single installation. These Visual C++ redistributable and runtime packages are mostly installed for standard libraries that many applications use.

Visual C

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Visual C Sharp, Microsoft's implementation of the C# specification, included in the Microsoft Visual Studio suite of product

Visual Studio

language-specific service exists. Built-in languages include C, C++, C++/CLI, Visual Basic .NET, C#, F#, JavaScript, TypeScript, XML, XSLT, HTML, and CSS.

Visual Studio is an integrated development environment (IDE) developed by Microsoft. It is used to develop computer programs including websites, web apps, web services and mobile apps. Visual Studio uses Microsoft software development platforms including Windows API, Windows Forms, Windows Presentation Foundation (WPF), Microsoft Store and Microsoft Silverlight. It can produce both native code and managed code.

Visual Studio includes a code editor supporting IntelliSense (the code completion component) as well as code refactoring. The integrated debugger works as both a source-level debugger and as a machine-level debugger. Other built-in tools include a code profiler, designer for building GUI applications, web designer, class designer, and database schema designer. It accepts plug-ins that expand the functionality at almost every level—including adding support for source control systems (like Subversion and Git) and adding new toolsets like editors and visual designers for domain-specific languages or toolsets for other aspects of the software development lifecycle (like the Azure DevOps client: Team Explorer).

Visual Studio supports 36 different programming languages and allows the code editor and debugger to support (to varying degrees) nearly any programming language, provided a language-specific service exists. Built-in languages include C, C++, C++/CLI, Visual Basic .NET, C#, F#, JavaScript, TypeScript, XML,

XSLT, HTML, and CSS. Support for other languages such as Python, Ruby, Node.js, and M among others is available via plug-ins. Java (and J#) were supported in the past.

The most basic edition of Visual Studio, the Community edition, is available free of charge. The slogan for Visual Studio Community edition is "Free, fully-featured IDE for students, open-source and individual developers". As of March 23, 2025, Visual Studio 2022 is a current production-ready version. Visual Studio 2015, 2017 and 2019 are on Extended Support.

C Sharp (programming language)

(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

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

Microsoft Visual Studio Express

language) Visual C++ Express (the Visual C++ language) Visual C# Express (the C# language) Visual J# Express (the ill-fated J# language, 2005 only) Visual Web

Microsoft Visual Studio Express was a set of integrated development environments (IDEs) that Microsoft developed and released free of charge. They are function-limited version of the non-free Visual Studio and require mandatory registration. Express editions started with Visual Studio 2005.

In 2013, Microsoft began supplanting Visual Studio Express with the more feature-rich Community edition of Visual Studio, which is available free of charge with a different license that disallow some scenarios in enterprise settings. The last version of the Express edition is the desktop-only 2017.

C (programming language)

Solaris Studio, and other C compilers now[when?] support many or all of the new features of C99. The C compiler in Microsoft Visual C++, however, implements

C is a general-purpose programming language. It was created in the 1970s by Dennis Ritchie and remains widely used and influential. By design, C gives the programmer relatively direct access to the features of the typical CPU architecture, customized for the target instruction set. It has been and continues to be used to implement operating systems (especially kernels), device drivers, and protocol stacks, but its use in application software has been decreasing. C is used on computers that range from the largest supercomputers to the smallest microcontrollers and embedded systems.

A successor to the programming language B, C was originally developed at Bell Labs by Ritchie between 1972 and 1973 to construct utilities running on Unix. It was applied to re-implementing the kernel of the Unix operating system. During the 1980s, C gradually gained popularity. It has become one of the most widely used programming languages, with C compilers available for practically all modern computer architectures and operating systems. The book The C Programming Language, co-authored by the original language designer, served for many years as the de facto standard for the language. C has been standardized since 1989 by the American National Standards Institute (ANSI) and, subsequently, jointly by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).

C is an imperative procedural language, supporting structured programming, lexical variable scope, and recursion, with a static type system. It was designed to be compiled to provide low-level access to memory and language constructs that map efficiently to machine instructions, all with minimal runtime support. Despite its low-level capabilities, the language was designed to encourage cross-platform programming. A standards-compliant C program written with portability in mind can be compiled for a wide variety of computer platforms and operating systems with few changes to its source code.

Although neither C nor its standard library provide some popular features found in other languages, it is flexible enough to support them. For example, object orientation and garbage collection are provided by external libraries GLib Object System and Boehm garbage collector, respectively.

Since 2000, C has consistently ranked among the top four languages in the TIOBE index, a measure of the popularity of programming languages.

Microsoft Foundation Class Library

April 7, 2008. "Visual C++ 2008 Feature Pack Released!". C++ Team Blog. Microsoft. April 7, 2008. "Visual C++ 2008 Feature Pack Refresh". C++ Team Blog.

Microsoft Foundation Class Library (MFC) is a C++ object-oriented library for developing desktop applications for Windows.

MFC was introduced by Microsoft in 1992 and quickly gained widespread use. While Microsoft has introduced alternative application frameworks since then, MFC remains widely used.

Inline (C and C++)

symbols). C and C++ (and dialects such as GNU C and Visual C++) resolve this in different ways. An inline function can be written in C or C++ like this:

In the C and C++ programming languages, an inline function is one qualified with the keyword inline; this serves two purposes:

It serves as a compiler directive that suggests (but does not require) that the compiler substitute the body of the function inline by performing inline expansion, i.e. by inserting the function code at the address of each function call, thereby saving the overhead of a function call. In this respect it is analogous to the register storage class specifier, which similarly provides an optimization hint.

The second purpose of inline is to change linkage behavior; the details of this are complicated. This is necessary due to the C/C++ separate compilation + linkage model, specifically because the definition (body) of the function must be duplicated in all translation units where it is used, to allow inlining during compiling, which, if the function has external linkage, causes a collision during linking (it violates uniqueness of external symbols). C and C++ (and dialects such as GNU C and Visual C++) resolve this in different ways.

X86 calling conventions

*Conventions – Assembly View". Steve Friedl's Unixwiz.net Tech Tips. "Visual Studio
2010 – Visual C++ Calling Convention". MSDN Library. Microsoft. 2010. Jonsson*

This article describes the calling conventions used when programming x86 architecture microprocessors.

Calling conventions describe the interface of called code:

The order in which atomic (scalar) parameters, or individual parts of a complex parameter, are allocated

How parameters are passed (pushed on the stack, placed in registers, or a mix of both)

Which registers the called function must preserve for the caller (also known as: callee-saved registers or non-volatile registers)

How the task of preparing the stack for, and restoring after, a function call is divided between the caller and the callee

This is intimately related with the assignment of sizes and formats to programming-language types.

Another closely related topic is name mangling, which determines how symbol names in the code are mapped to symbol names used by the linker. Calling conventions, type representations, and name mangling are all part of what is known as an application binary interface (ABI).

There are subtle differences in how various compilers implement these conventions, so it is often difficult to interface code which is compiled by different compilers. On the other hand, conventions which are used as an API standard (such as stdcall) are very uniformly implemented.

Visual Basic (.NET)

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Visual Basic (VB), originally called Visual Basic .NET (VB.NET), is a multi-paradigm, object-oriented programming language developed by Microsoft and implemented on .NET, Mono, and the .NET Framework. Microsoft launched VB.NET in 2002 as the successor to its original Visual Basic language, the last version of which was Visual Basic 6.0. Although the ".NET" portion of the name was dropped in 2005, this article uses "Visual Basic [.NET]" to refer to all Visual Basic languages released since 2002, in order to distinguish between them and the classic Visual Basic. Along with C# and F#, it is one of the three main languages targeting the .NET ecosystem. Microsoft updated its VB language strategy on 6 February 2023, stating that VB is a stable language now and Microsoft will keep maintaining it.

Microsoft's integrated development environment (IDE) for developing in Visual Basic is Visual Studio. Most Visual Studio editions are commercial; the only exceptions are Visual Studio Express and Visual Studio Community, which are freeware. In addition, the .NET Framework SDK includes a freeware command-line compiler called vbc.exe. Mono also includes a command-line VB.NET compiler.

Visual Basic is often used in conjunction with the Windows Forms GUI library to make desktop apps for Windows. Programming for Windows Forms with Visual Basic involves dragging and dropping controls on a form using a GUI designer and writing corresponding code for each control.

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