Game Programming: Developing With Unity In C

Unity (game engine)

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Unity is a cross-platform game engine developed by Unity Technologies, first announced and released in June 2005 at Apple Worldwide Developers Conference as a Mac OS X game engine. The engine has since been gradually extended to support a variety of desktop, mobile, console, augmented reality, and virtual reality platforms. It is particularly popular for iOS and Android mobile game development, is considered easy to use for beginner developers, and is popular for indie game development.

The engine can be used to create three-dimensional (3D) and two-dimensional (2D) games, as well as interactive simulations. The engine has been adopted by industries outside video gaming including film, automotive, architecture, engineering, construction, and the United States Armed Forces.

C Sharp (programming language)

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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

Video game programming

Game programming, a subset of game development, is the software development of video games. Game programming requires substantial skill in software engineering

Game programming, a subset of game development, is the software development of video games. Game programming requires substantial skill in software engineering and computer programming in a given language, as well as specialization in one or more of the following areas: simulation, computer graphics, artificial intelligence, physics, audio programming, and input. For multiplayer games, knowledge of network programming is required (the resultant code, in addition to its performance characteristics, is commonly referred to as the game's netcode by players and programmers alike). In some genres, e.g. fighting games, advanced network programming is often demanded, as the netcode and its properties (e.g. latency) are considered by players and critics to be some of the most important metrics of the game's quality. For

massively multiplayer online games (MMOGs), even further knowledge of database programming and advanced networking programming are required. Though often engaged in by professional game programmers, there is a thriving scene of independent developers who lack a relationship with a publishing company.

Vuforia Augmented Reality SDK

Application Programming Interfaces (API) in C++, Java, Objective-C++, and the .NET languages through an extension to the Unity game engine. In this way,

Vuforia is an augmented reality software development kit (SDK) for mobile devices that enables the creation of augmented reality applications. It uses computer vision technology to recognize and track planar images and 3D objects in real time. This image registration capability enables developers to position and orient virtual objects, such as 3D models and other media, in relation to real world objects when they are viewed through the camera of a mobile device. The virtual object then tracks the position and orientation of the image in real-time so that the viewer's perspective on the object corresponds with the perspective on the target. It thus appears that the virtual object is a part of the real-world scene.

The Vuforia SDK supports a variety of 2D and 3D target types including ‘markerless’ Image Targets, 3D Model Target, and a form of addressable Fiducial Marker, known as a VuMark. Additional features of the SDK include 6 degrees of freedom device localization in space, localized Occlusion Detection using ‘Virtual Buttons’, runtime image target selection, and the ability to create and reconfigure target sets programmatically at runtime.

Vuforia provides Application Programming Interfaces (API) in C++, Java, Objective-C++, and the .NET languages through an extension to the Unity game engine. In this way, the SDK supports both native development for iOS, Android, and UWP while it also enables the development of AR applications in Unity that are easily portable to both platforms.

Vuforia has been acquired by PTC Inc. in November 2015.

Visual programming language

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In computing, a visual programming language (visual programming system, VPL, or, VPS), also known as diagrammatic programming, graphical programming or block coding, is a programming language that lets users create programs by manipulating program elements graphically rather than by specifying them textually. A VPL allows programming with visual expressions, spatial arrangements of text and graphic symbols, used either as elements of syntax or secondary notation. For example, many VPLs are based on the idea of "boxes and arrows", where boxes or other screen objects are treated as entities, connected by arrows, lines or arcs which represent relations. VPLs are generally the basis of low-code development platforms.

Unreal Engine 4

Engine developed by Epic Games. UE4 began development in 2003 and was released in March 2014, with the first game using UE4 being released in April 2014

Unreal Engine 4 (UE4) is the fourth version of Unreal Engine developed by Epic Games. UE4 began development in 2003 and was released in March 2014, with the first game using UE4 being released in April 2014. UE4 introduced support for physically based materials and a new visual programming language called "Blueprints". It was succeeded by Unreal Engine 5.

List of game engines

19, 2015. "LÖVE

Free 2D Game Engine". Retrieved December 6, 2016. Akinlaja, Damilare (2013). LÖVE2d for Lua Game Programming. Packt Publishing, Limited - Game engines are tools available to implement video games without building everything from the ground up. Whether they are 2D or 3D based, they offer tools to aid in asset creation and placement.

Mathematical software

| Unity Asset Store". "Math Equation Writer | GUI Tools | Unity Asset Store". assetstore.unity.com. Retrieved 2025-08-06. "MathPlus Library | Game Toolkits

Mathematical software is software used to model, analyze or calculate numeric, symbolic or geometric data.

Spatial (platform)

Spatial focuses on games developed using the Unity game engine and the C# programming language. The company is headquartered in New York. Spatial was co-founded

Spatial is a Unity-powered UGC gaming platform that enables developers to publish and monetize multiplayer games across web, mobile, and VR. Spatial focuses on games developed using the Unity game engine and the C# programming language. The company is headquartered in New York.

MonoDevelop

C# 2.0, C# 3.0, C# 4.0, C# 5.0, and C# 6.0. A customized version of MonoDevelop formerly shipped with Windows and Mac versions of Unity, the game engine

MonoDevelop (also known as Xamarin Studio) is a discontinued open-source integrated development environment for Linux, macOS, and Windows. Its primary focus is development of projects that use Mono and .NET Framework. MonoDevelop integrates features similar to those of NetBeans and Microsoft Visual Studio, such as automatic code completion, source control, a graphical user interface (GUI), and Web designer. MonoDevelop integrates a Gtk# GUI designer called Stetic. It supports Boo, C, C++, C#, CIL, D, F#, Java, Oxygene, Vala, JavaScript, TypeScript, and Visual Basic.NET. Although there is no word from the developers that it has been discontinued, nonetheless, it hasn't been updated in 4 years and is no longer installable on major operating systems, such as Ubuntu 22.04 and above.

MonoDevelop can be used on Windows, macOS, and Linux. Officially supported Linux distributions include CentOS, Debian, Fedora, openSUSE, SUSE Linux Enterprise, Red Hat Enterprise Linux, and Ubuntu, with many other distributions providing their own unofficial builds of MonoDevelop in their repositories. macOS and Windows have been officially supported since version 2.2.

MonoDevelop has included a C# compiler (an alternative to MSBuild and CSC) since its earliest versions. It currently includes a compiler that supports C# 1.0, C# 2.0, C# 3.0, C# 4.0, C# 5.0, and C# 6.0.

A customized version of MonoDevelop formerly shipped with Windows and Mac versions of Unity, the game engine by Unity Technologies. It enabled advanced C# scripting, which was used to compile cross-platform video games by the Unity compiler. It has since been replaced by Visual Studio Community, except on Linux versions.

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