



25

It's Dangerous to Go Alone

A Game Developer Tutorial

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Cppcon
The C++ Conference

20
25



September 13 - 19

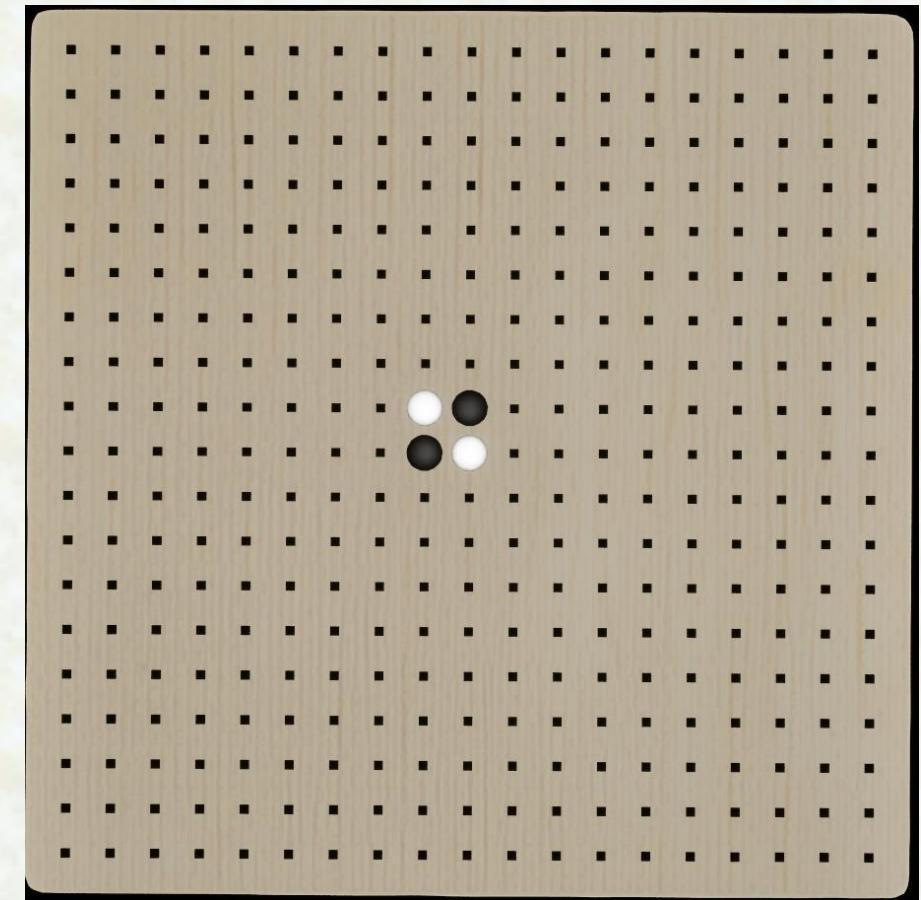
Microsoft @ CppCon

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IT'S DANGEROUS

Your journey as a game developer will be arduous, with many challenging fiends to face down. Take heed of the lessons and achieve your dreams of becoming *The Game Developer*.

Objective: Add a graphical interface on top of your existing game logic for the classic tabletop game, Go.



<https://github.com/michaelbprice/go-cpp>

<https://github.com/michaelbprice/go-unreal>

*I am the corruption in your render thread...
the flicker in your framerate...
the heat behind your throttled core.*

COUNT LAGULA

Your world will blur, your actions will stagger, and your triumphs will crawl.

I do not simply drain energy; I unravel performance itself.

Poor performance is one of the first things users will notice

- Dropped frames
- Lagging input
- Glitchy audio
- Heat and sound

LOR3W!PE

History is a vulnerability. I am the patch.

Games with complex goals need checkpoints, so does your work

- Large binary files
- Often working with non-programmers
- Avoid losing work, especially as you experiment

NULL

*You reach for inspiration but find only emptiness.
I am that void, and I've always been here.*

Creativity is key to making a good game. It doesn't have to be difficult.

- 3-D modeling tools
- LLMs are lowering the barrier
- Practice makes perfect

HEISENBUG

*Your logs lie. Your breakpoints betray you.
I am the bug that watches you back.*

Debugging your game is going to be harder than other projects

- Optimized code ruins debugging
- Non-optimized code may not exhibit bug
- Long build-test-fix cycles

Tools you'll find on your journey

Developer Environments



Visual Studio



Rider



Unreal Engine Editor

Content Tools



Blender



Autodesk Maya



Audacity



Houdini

Source Control



git



Perforce



GitHub

More tools you'll find on your journey

Libraries & SDKs



Microsoft GDK & GDKX



PS4 & PS5 SDK



Nintendo Development Kit



Eigen



Bullet Physics

Game Engines



Custom, in-house engines



Unreal Engine



CryEngine

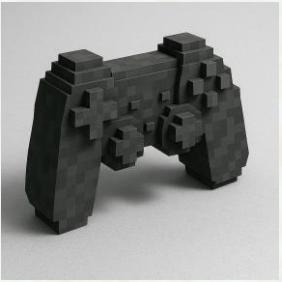


Source & Source 2



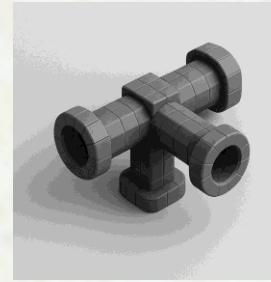
OGRE

The Game Engine (with Unreal Engine examples)



Input and Output

- *UInputComponent*
- *AAudioVolume*



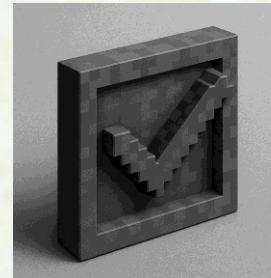
Plumbing

- *FAllocArena*
- *TMemoryView*



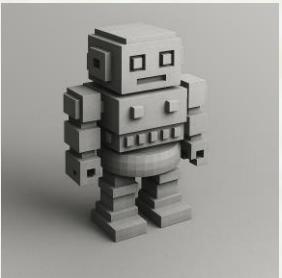
Game Interface

- *AHUD*
- *SWidget*
- *IToolTip*



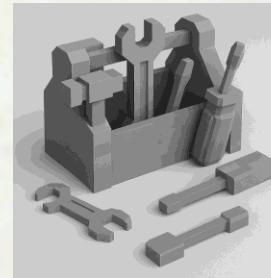
Game State & Management

- *AGameState*
- *APlayerState*
- *USaveGame*



Behavior & Game AI

- *UBehaviorTree*
- *UEnvQuery*



Tools and Designers

- *Unreal Engine Editor*
- *Unreal Build Tool (UBT)*
- *Unreal Build Accelerator (UBA)*

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PRESS START TO CONTINUE

PROLOGUE

THE SMITH'S WORKSHOP

Getting the right tools for success

OBLIGATORY CUT SCENE

<https://aka.ms/cppcon2025/game-demos>

- Git
 - `winget install Git.Git`
- Blender
 - `winget install BlenderFoundation.Blender.LTS.3.6`
- Visual Studio Community 2026 Insiders (w/ Epic Games Launcher)
 - https://aka.ms/vs/18/insiders/vs_Community.exe
- Install Unreal Engine
 - Install via Epic Games Launcher
 - Include Debug binaries
 - OR <https://github.com/EpicGames/UnrealEngine>



PROLOGUE

THE SMITH'S WORKSHOP

ACHIEVEMENTS UNLOCKED

Apprentice Smith – Installing the necessary tools isn't so hard

Aura Farmer – Automate with command line installation

PRESS START TO CONTINUE

CHAPTER 1

THE FIRST BATTLE – CREATION’S EDGE

Laying the groundwork by creating projects and making sure all of the plumbing works

↑ ↑ ↓ ↓ ← → ← → B A Start

CHEAT CODE!!!!

(Konami Code)

<https://aka.ms/cppcon2025/game-demos>

- Getting the “right” .gitignore (or equivalent) is a good idea
- The first run of Unreal Engine Editor can take a surprising amount of time due to shader compilation
- Blueprints or C++? Why not both?
- The default Unreal Engine new project is immediately “playable”
- Native .uproject support in Visual Studio 2022 and later
- **Unreal Editor vs Your Game**
- Cook your content in order to run the game from Visual Studio



CHAPTER 1

THE FIRST BATTLE – CREATION’S EDGE

ACHIEVEMENTS UNLOCKED

Apprentice Architect – Creating your project is a small, first step

Lord of Order – Unreal Engine Editor THEN
Visual Studio -> Unreal Engine Editor -> Game

Noclip Novice – You ain’t got time for that!

PRESS START TO CONTINUE

CHAPTER 2

THE ARCHITECT'S PUZZLE

Flesh out your game using Blender and Unreal Engine Blueprints

I D D Q D

CHEAT CODE!!!!

(Doom God Mode)

<https://aka.ms/cppcon2025/game-demos>

- Starting with a fresh level
- Prototyping model assets with Copilot Create and Copilot 3D
- Generating a clickable grid system with Blueprints
- **Making Black and White stones with Blender and Unreal Engine**
- Placing the stones



CHAPTER 2

THE ARCHITECT'S PUZZLE

ACHIEVEMENTS UNLOCKED

Journeyman Architect – Blueprints are not so scary

Clay Harvester – 3-D modeling is FUN!

Sequence Breaker – Pass Go. Collect 200.

PRESS START TO CONTINUE

CHAPTER 3

INTEGRATION CONFLAGRATION

Hooking up the game interface to the game logic library

CHAPTER 3

INTEGRATION CONFLAGRATION

ACHIEVEMENTS UNLOCKED

Village Planner – Everything is starting to come together

Peanut Butter Chocolatier – You've got C++ in my Unreal! You've got Unreal in my C++!

Master of Ceremonies – Let's Go!

PRESS START TO CONTINUE

CHAPTER 4

THE VARIABLE IS OPTIMIZED AWAY

Effectively debugging your game

CHAPTER 4

THE VARIABLE IS OPTIMIZED AWAY

ACHIEVEMENTS UNLOCKED

Bug Smasher – No bug is safe; even in an optimized build

Multi-Modal Trainee – Blueprints, C++; you debug it all

PRESS START TO CONTINUE

The End...

Or is it???

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Revenge of the storefronts



PRESS START TO CONTINUE

LOOK, THE ARCANE GAOLER

Support for multiple platforms is non-trivial

- Start early **if** you are able
- Different processors may need different code
- Often different compiler toolchains and libraries
- Different packaging and distribution mechanisms

Platform choice is a myth. You were always meant to walk a single path. I merely enforce the truth your code denies.

THE GATEKEEPER

*You're not a hero. You're a user.
And I'm the system.*

Getting your game to as many users
as possible

- Different pricing models (some very expensive)
- Store requirements vary
- Varied publishing tools

Registering



SteamDirect

<https://partner.steamgames.com/steamdirect>



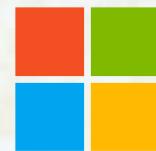
Nintendo Developer Portal

<https://developer.nintendo.com/>



Playstation Partners

<https://partners.playstation.net>



Creators Program
ID@Xbox

<https://developer.microsoft.com/en-us/games/publish/>

The End

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