

03 Introduction to Unity

Tvorba a dizajn počítačových hier (FMFI)

Návrh a vývoj počítačových hier (FIIT)

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6. 10. 2022

Game Engines

- Unity
- Unreal

- CryEngine
- GameMaker
- Godot
- Lots of other players
 - Construct, RPG Maker, Frostbite, Source, id Tech...

<https://www.gamedeveloper.com/business/game-engines-on-steam-the-definitive-breakdown>

Unity	Unreal Engine	CryEngine	Game Maker
<p><i>"50% of games across devices are made with Unity" – Unity</i></p> <p>Twelve Minutes Valheim Hearthstone Cuphead Ori and the Blind Forest Monument Valley 1 & 2 Cities: Skylines Inside Hollow Knight Alto's Adventure Pokemon Go Superhot Firewatch Gwent Beat Saber Overcooked Untitled Goose Game Fall Guys ...</p>	<p>Fortnite Sea of Thieves Batman Arkham games PUBG Shenmue III Star Wars Jedi: Fallen Order Tekken 7 The Outer Worlds BioShock Deus Ex Kingdom Hearts III A Way Out Hellblade: Senua's Sacrifice Mortal Kombat X Borderlands Biomutant Mirror's Edge ...</p>	<p>Far Cry series Crisis series Kingdom Come: Deliverance Prey Evolve ...</p>	<p>Undertale Hotline Miami Hyper Light Drifter Nuclear Throne Spelunky Swords of Ditto Katana Zero Downwell ...</p>

Unity

- Free: Forced Unity splash screen
 - cannot earn/raise more than \$100k/year
- Plus: Get rid of Unity splash screen, **\$399/year**
 - cannot earn/raise more than \$200k/year
- Pro: Access to Pro Analytics, Team tools... **\$1800/year**
- Asset store: full of interesting models/scripts/tools
- Source code access: **EXPENSIVE** (Pro/Enterprise license)
- Scripting in C# (or visual scripting in Bolt)

<https://store.unity.com/compare-plans>

Unity platforms

iOS

android 



PS4



XBOX ONE



androidtv

tvOS



ARCore



Microsoft
HoloLens



Unreal

- Free to use
- 5% royalties to Epic Games
 - For everything you earn above \$1.000.000
- Source code access: **YES** (for most parts of the engine)
- Marketplace
- Scripting
 - C++, Blueprints (visual scripting)
 - Has bindings for other languages
- Unreal 5 is still very new, not many games on it

Unreal platforms

What platforms does UE5 support?

Unreal Engine 5 enables you to deploy projects to Windows PC, PlayStation 5, PlayStation 4, Xbox Series X, Xbox Series S, Xbox One, Nintendo Switch, ~~Google Stadia~~, macOS, iOS, Android, ARKit, ARCore, OpenXR, SteamVR, Oculus, Linux, and SteamDeck. You can run the Unreal Editor on Windows, macOS, and Linux.

PlayStation 5, PlayStation 4, Xbox Series X, Xbox Series S, Xbox One, Nintendo Switch, and ~~Google Stadia~~ console tools and code are available at no additional cost to developers who are registered developers for their respective platform(s).

Unity

Interface overview

- Scene View
- Hierarchy
- Game View
- Project Panel
- Inspector
- Toolbar

Basic Concepts

- Game Objects
- Components
- Prefabs
- Importing assets
- Project Preferences
 - Other project settings
- Build

Scripting

- Adding, naming, renaming, removing C# scripts
- Visual Studio
- GetComponent<Type>() -> LOW PERFORMANCE!
- Input.GetKey()
- Renderer component -> material color
- Private and public variables, linking with editor
 - Assigning prefabs/existing game objects to variables
- Awake() and Start()
- Update() and FixedUpdate()

Scripting (2)

- Vector3 class and utility functions -> magnitude, Dot, Cross, ...
- Component.enabled and checkboxes in editor
- Light component -> enabled
- Adding mesh filters, renderers and materials
 - Example with light
- GameObject.SetActive() and checkboxes in editor
 - GameObject.activeSelf, GameObject.activeInHierarchy
- Visual Studio debugging
- Transform component -> Translate, Scale, Rotate
 - Why not use with colliders
 - And only kinematic rigidbodies

Scripting (3)

- `Vector3.forward`, `Vector3.right`, `Vector3.up`
- `Time.deltaTime` in `Update()`
 - Running bot example
- `Vector3.Lerp`
 - Moving light example with changing color
- `GameObject.Destroy(GameObject[, time])`
- `GameObject.Destroy(Component[, time])`
- `Input.GetButton...`
- Access scripts of other Game Objects
- `Instantiate()`
- Value vs. Reference types

References

- <http://unity3d.com/learn>