

Introduction to Unity

CAP 6121 – 3D User Interfaces for Games and Virtual Reality

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What is Unity3D

- Game Development Tool
 - Download at www.unity3d.com
- Useful Features
 - Imports 3D models easily*
 - Terrain Modeling Tool
 - Integrated Physics Engine (NVidia PhysX)
 - Audio
 - Networking
 - Highly scriptable (C#, Boo and Javascript)
 - Very easy to prototype games
- Free and Pro versions
 - Pro version has more features, e.g. ability to play videos

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Why use Unity?

Unity

- High Level
- Little programming
- Components already available
- Highly visual

OpenGL, DirectX, XNA

- Low level
- Lots of Programming
- Start from scratch
- Result isn't immediately visible

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Concepts in today's Lecture

- Unity's Editor
- Prefabs
- Scripting
- Creating a small-scale FPS
 - Camera Setup
 - Terrain Modeling and Lighting
 - Importing/using Assets (Models, Textures, Sounds, particles)
 - Basic Player State Management
 - Collision Detection
 - Simple Enemy AI
- Using the Kinect with Unity3D

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The Unity Editor

- Scene View
 - Positioning/manipulation of objects in the environment
- Inspector
 - Alter properties of game objects
- Project
 - Shows everything in current project
- Hierarchy
 - Contains objects in currently loaded scene

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Parenting and Prefabs

- Parenting
 - Construct complicated objects by arranging elements in hierarchical manner
- Prefabs = “Templates”
 - Suppose you need an enemy in your game
 - Load a 3D model
 - Position point lights to light the model properly
 - Attach some particle effects to make it menacing
 - What if you want 10 enemies?
 - Solution: Create a template (prefab) and clone it

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Components of a Unity Project

- **Scenes**
 - Initial Menu, Game Level(s), High Scores, ...
- **Game Objects**
 - Geometry, Particles, Camera(s), ...
- **Scripts**
 - Behavior for Player, Enemies, Collisions, ...
- **Other Resources**
 - Sounds, fonts, images, prefabs ...

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Physics

- **RigidBody Component**
 - Forces, velocity, ...
- **Collider Component**
 - Box
 - Sphere
 - Capsule
 - Mesh
- **Trigger**
 - Ignored by the physics engine
 - Can be used to trigger game events, cut scenes, etc

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Scripting

- Change behavior of Game objects
 - Only form of programming required in unity
 - Most important aspect of a game
 - Can be written in C#, JavaScript, or Boo

- Important functions

• Start	Called when a script is instantiated
• Update	Called once every frame
• FixedUpdate	Physics update
• OnGUI	Used to display GUI (score, health,...)
• OnCollisionEnter	Collision Detection
• OnTriggerEnter	Collision with a Trigger

- Online Manual
[\[http://unity3d.com/support/documentation/ScriptReference/index.html\]](http://unity3d.com/support/documentation/ScriptReference/index.html)

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Scripting : Important Classes

- Mathematics
 - Vector3, Quaternion, Mathf, Ray, ...
- Audio Related
 - AudioClip, audio, ...
- Physics Related
 - Rigidbody, Collider, Physics, ...
- GUI Related
 - Texture2D, GUI, ...
- Others
 - GameObject, Input, Application, ...

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Scripting : Fine Print

- A script can be applied to multiple game objects
 - Each game object gets own copy
 - Public variables visible in Inspector
 - modifiable at runtime
 - Can drap and drop
- Be careful with parenting and tags
 - Components referenced in script may be within children
- Make use of Debug.Log for debugging
- Be Cautious: Build incrementally

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Important Links for Unity

- Models
 - Google Sketchup warehouse
- Manual
 - <http://unity3d.com/support/documentation/Manual/index.html>
- Script Reference
 - <http://unity3d.com/support/documentation/ScriptReference/index.html>
- Unity Tutorial Videos
 - <http://unity3d.com/support/documentation/video/>
- Resources
 - <http://unity3d.com/support/resources/>
 - http://www.unifycommunity.com/wiki/index.php?title=Main_Page

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Setting up the Kinect on a PC

- Use the Microsoft Kinect SDK
 - <http://www.microsoft.com/en-us/kinectforwindows/download/>
- Pre-requisites
 - Speech Platform, DirectX, .NET 4.0, etc
 - Instructions available on the link above.

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Interfacing Kinect with Unity

- Instructions to get DLL.
 - <http://eecs.ucf.edu/isuelab/unity.php>
- C# wrapper around the DLL
- Key Components
 - KUInterfaceCPP.dll
 - Put it above the “Assets” folder in your project
- Example

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Here Endeth the Lesson

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