



Course Introduction

An introduction to game development and Unity



Course Overview

Practical course information and a road map for the semester

Introduction to Game Design

Before we start programming we need to learn what a game is

Introduction to Unity

An overview of the primary game engine we are going to use

Exercises

Get started with your game development adventure!

Who's teaching?



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Course Overview



Who are you?

Course Overview



Your Expectations

Course Overview



Why did you pick this course?

What do you think is going to happen?

What do you expect to learn?



Course at a Glance

Course Overview

Developing games

Once a week

New topic(s) each class

Class exercises and course project

Blog as part of project

No oral exam - grading based on project

Course literature on itslearning

Learning by doing



Road Map

Course Overview

-  Course Introduction
-  Scripting
-  Vectors & Input
-  Physics
-  User Interface
-  Animation
-  Game Architecture
-  Game AI
-  3D Content & Audio
-  Optimization



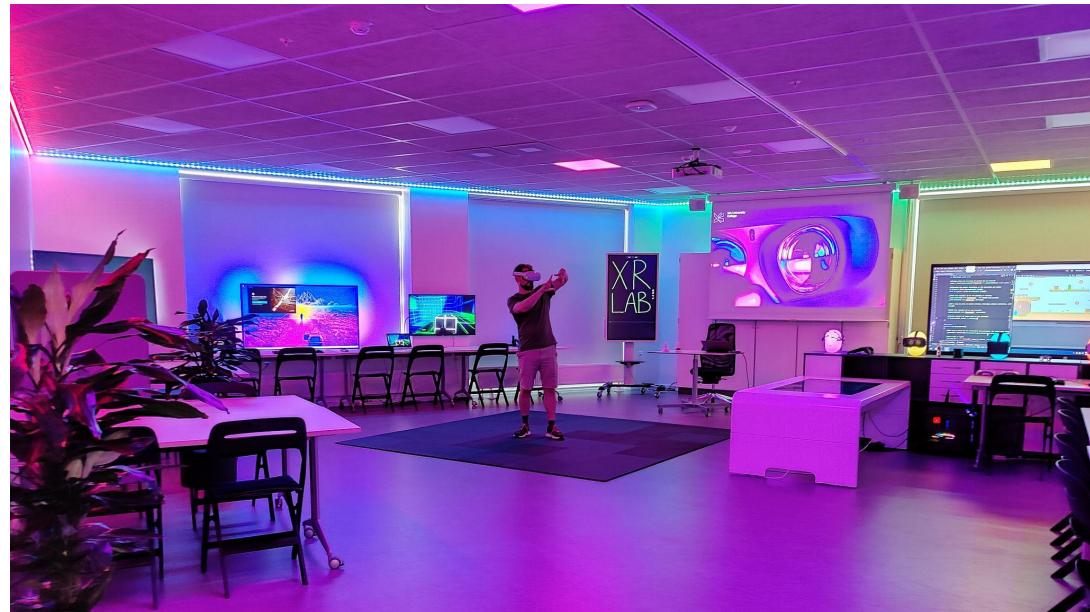
XR Lab

Course Overview

Everyone will get access Soon™

Rules...

[Booking System](#)



The Course Project

Course Overview

You must develop a game in pairs or individually

Details later today...

Protip: Work on
your project every
week!



Deadline: 7th of June

- For hand-in requirements, see itslearning

The Course Project

Course Overview

The project must include elements from the following topics:

Scripting (e.g. monobehaviours, coroutines, events)

Input & Vectors (e.g. input systems, manipulating transforms)

Physics (e.g. rigidbodies, colliders, triggers)

Graphics & Audio (e.g. models, shaders, audio clips)

Animation (e.g. animators, animations)

Game Architecture (e.g. game managers, ScriptableObjects, SOLID principles)

Game AI (e.g. finite-state machines, navmesh agents, pathfinding algorithms)

User Interface (e.g. menus and HUD)

Let's do this!



Write Your Own Code...

Course Overview

It's okay to rely on tutorials, but make your own game



The Exam

Course Overview

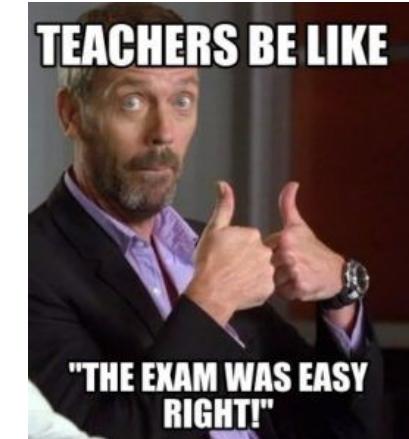


There is no oral examination. Your GMD grade is based on the course project.

Additionally, you must hand in 1-2 pages (per group member) of individual reflections on your contributions to the project.



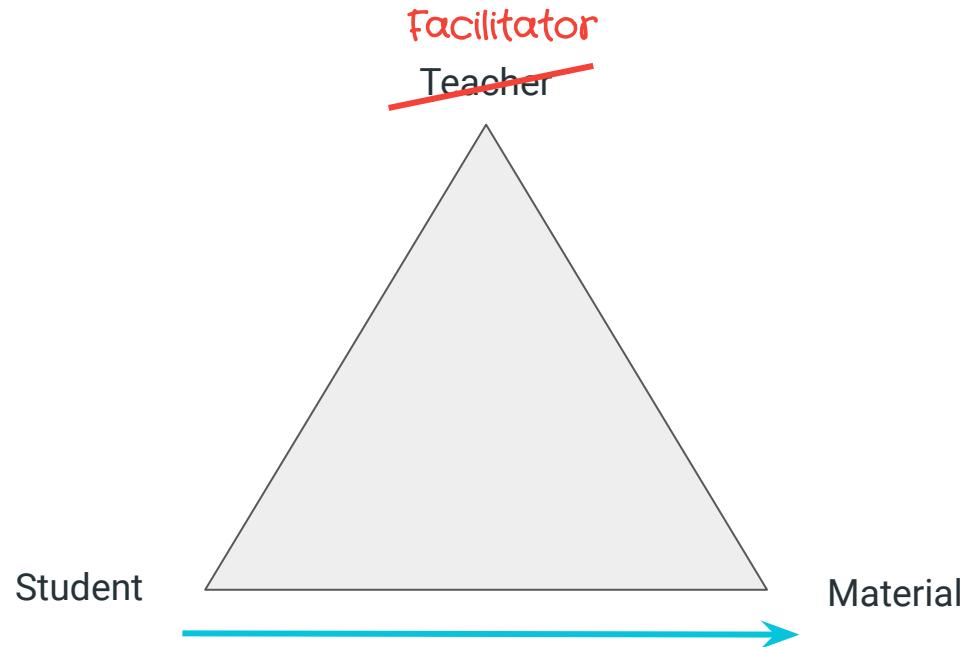
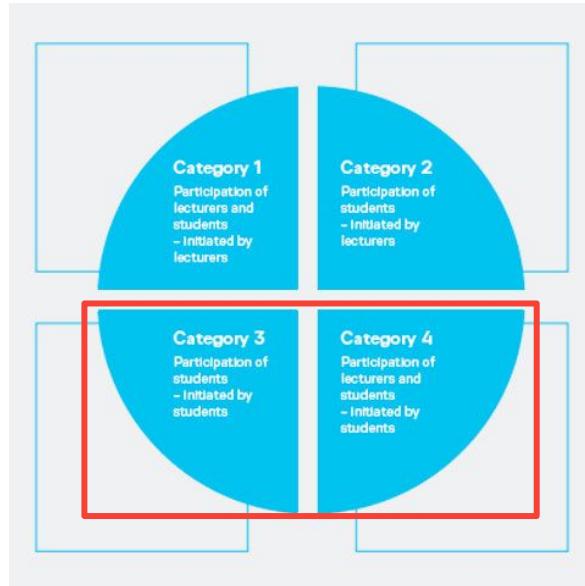
Remember to mark
clearly who made what!



My Expectations

Course Overview

5 ECTS = ~140h of the student's time = ~**9h/week outside of scheduled sessions**



My Expectations

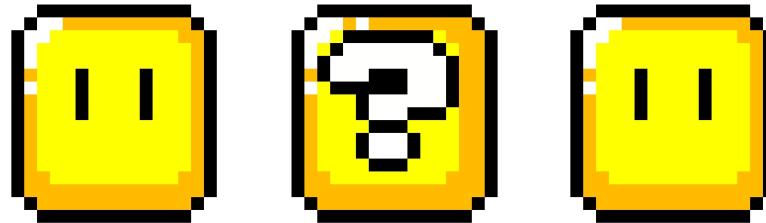
Course Overview

Engaged students
who build cool stuff
and learn at the same time

Defining “Game”

Introduction to Game Design

What is a game?



What is a game?

Introduction to Game Design

Core elements? Rules? Win/lose conditions?

Interactive experiences?



Game Genres

Introduction to Game Design

Can you give examples on game genres?

What games belong to each genre?

Is this a good way to categorize games?



A question about perspective



Mechanics are the base components of the game - its rules, every basic action the player can take in the game, the algorithms and data structures in the game engine etc.

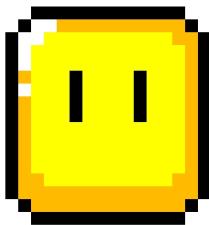
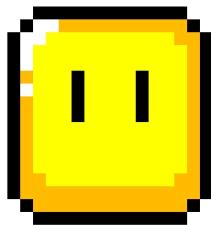
Dynamics are the run-time behavior of the mechanics acting on player input and "cooperating" with other mechanics.

Aesthetics are the emotional responses evoked in the player.

A question about perspective

Introduction to Game Design

What makes a game fun?



The Aesthetics of Play



1. Sensation

- Game as sense-pleasure

6. Discovery

Introduction to Game Design

2. Fantasy

- Game as make-believe

7. Expression

- Game as self-discovery

3. Narrative

- Game as drama

8. Submission

- Game as pastime

4. Challenge

- Game as obstacle course

9. Competition

- Game as domination

5. Fellowship

- Game as social framework

10. Mastery

- Game as self-improvement

What Does it Take to Develop a Game?

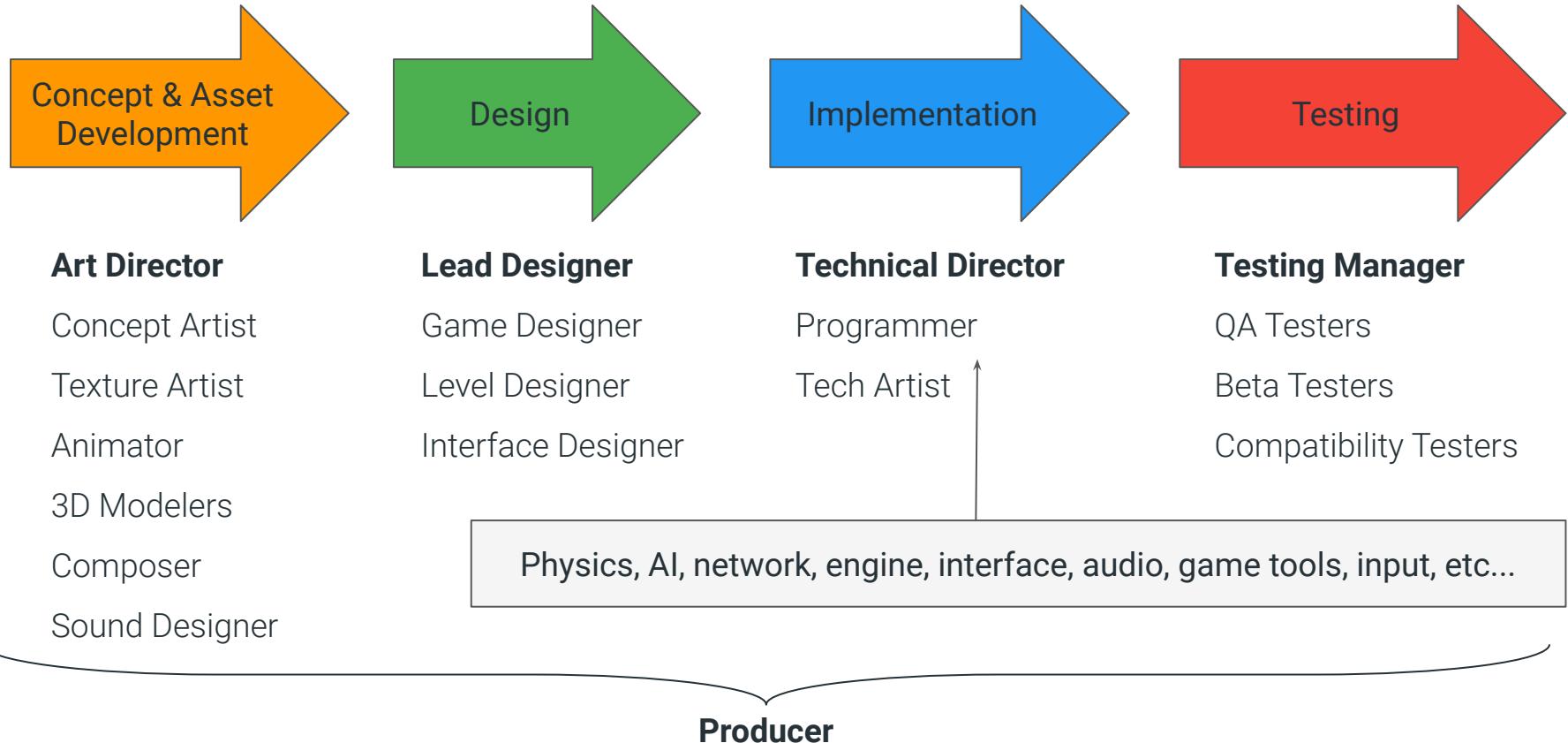
Introduction to Game Design

It's hard work to make a game. It's even harder to make a fun game!



Team Structure & Production Pipeline

Introduction to Game Design



Why did the engineer get fired?

Introduction to Game Design

"A young aerospace engineer is at his first day of work. He goes into the boss's office with a gleam in his eye, and declares, "I've got the greatest idea for a new kind of airplane."

The boss is intrigued. "Explain," he says.

The young engineer takes on a visionary expression and stares into the distance. "The passengers board hassle-free in five minutes. Then the plane takes off, silently, with barely a bump, as the passengers enjoy martinis in their private booths. As they soar over the Atlantic, a young couple enjoys the view in one of the plane's many bubble canopies, and a cute kid gets a tour of the cockpit. The captain chuckles as the kid asks why they can't fly to the moon. By the time they touch down, love has been found, lessons have been learned, and everybody is ready for whatever awaits them at their destination."

The boss leans back in his chair and takes a long drag on his cigar. "You're fired," he says."

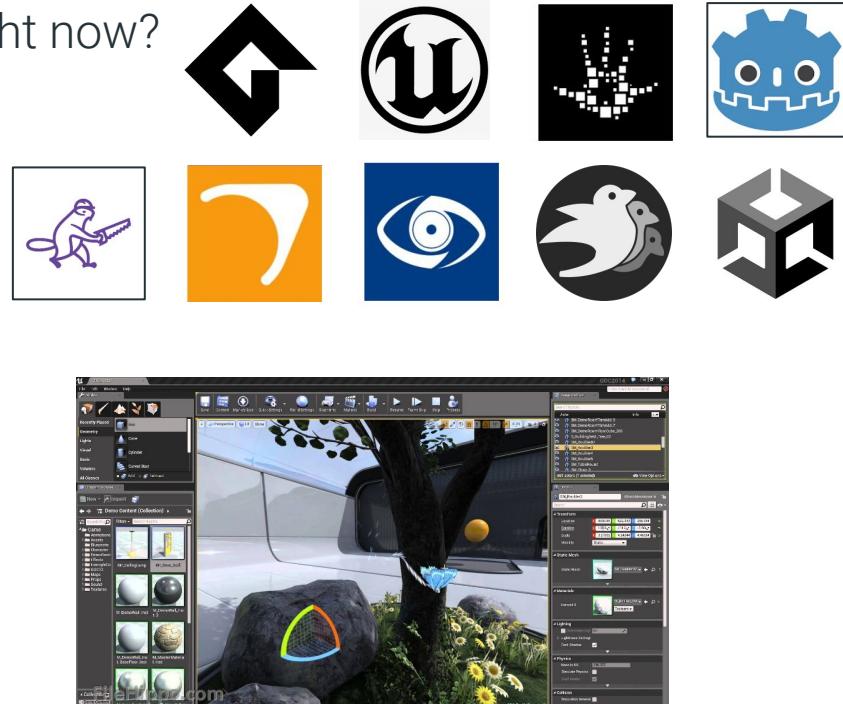
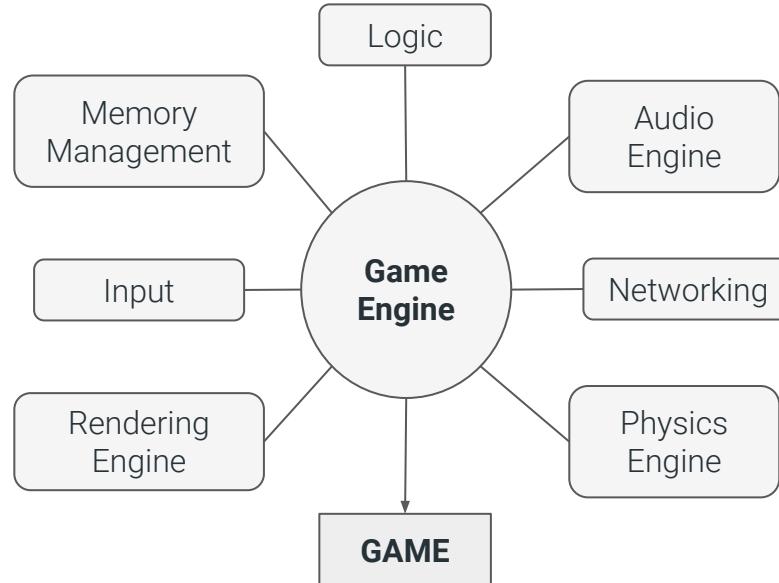
"Designing Games: A Guide to Engineering Experiences" by Tynan Sylvester

Game Engines

Introduction to Unity

What is a game engine?

What engines are used in the industry right now?



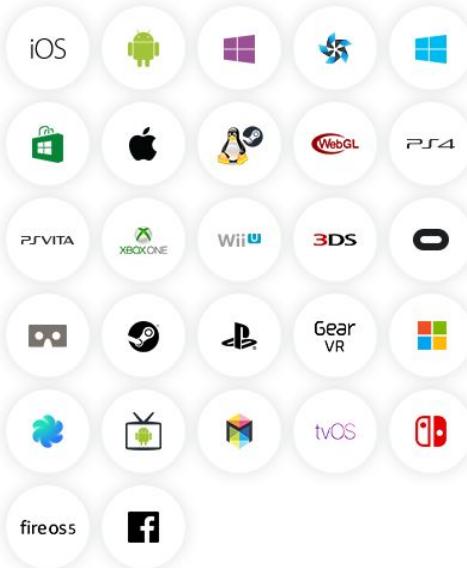
The Unity Engine



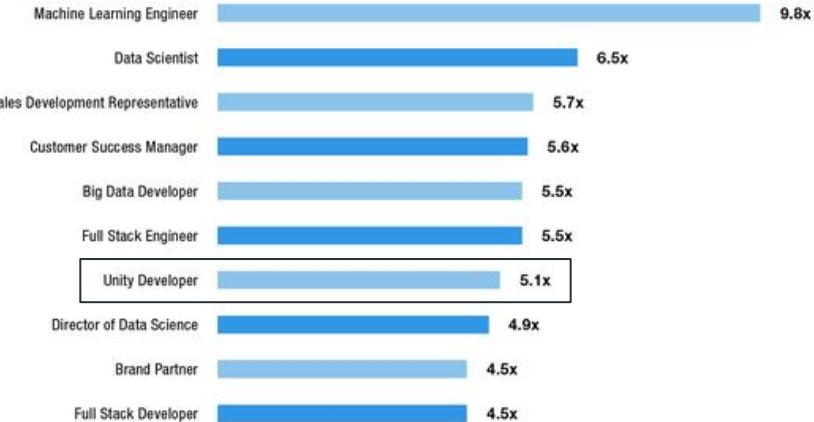
Introduction to Unity

What is Unity?

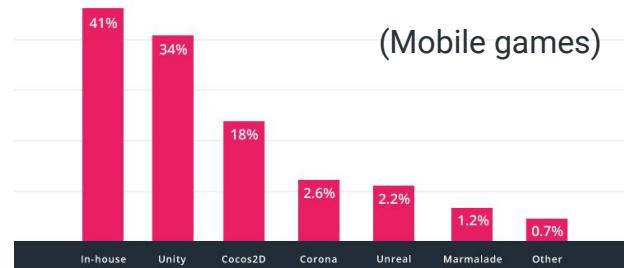
Why use it?



Top emerging Jobs (US)



(Mobile games)



Made With Unity



Introduction to Unity

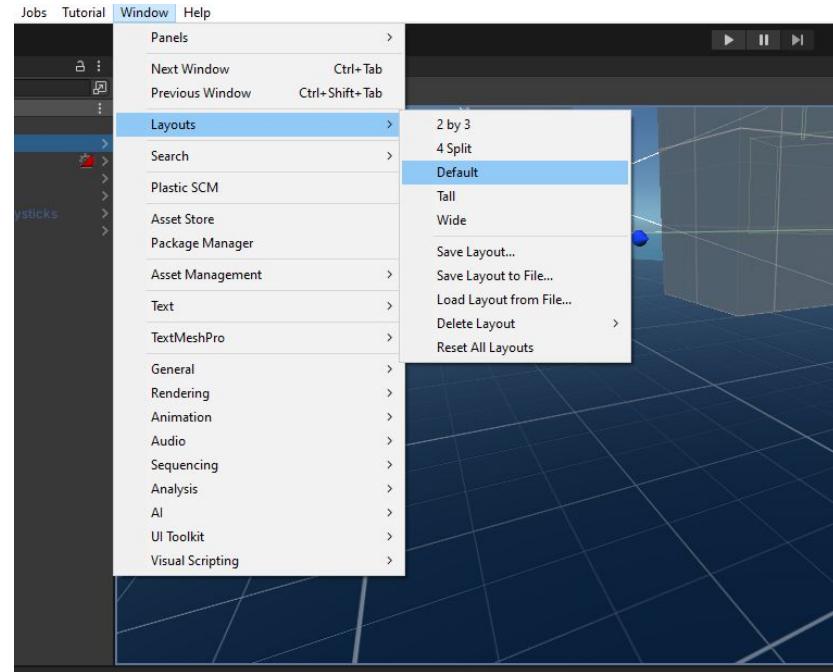
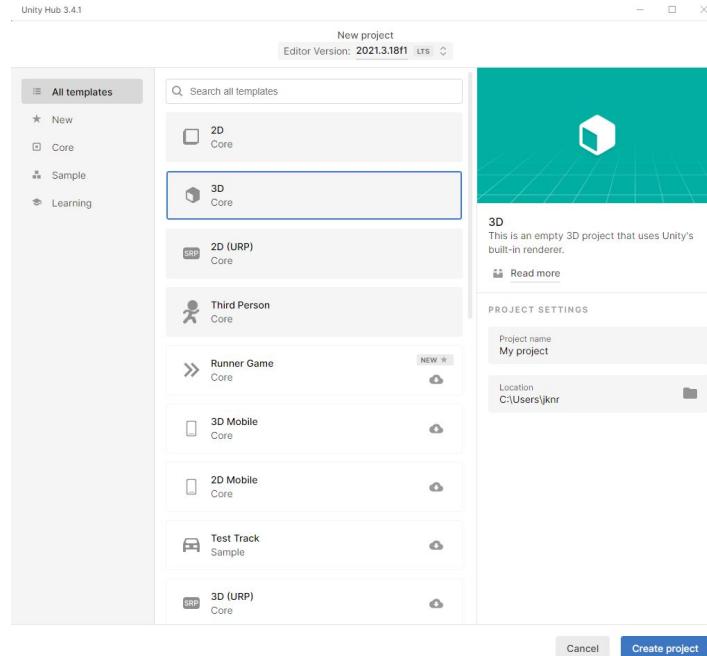


[Learn more!](#)

Starting a new Project

Introduction to Unity

You decide the arrangement of the views in Unity!



Interface Overview

Introduction to Unity

Layouts and Overview

Views

Scene View

Hierarchy

Game View

Inspector

Project View

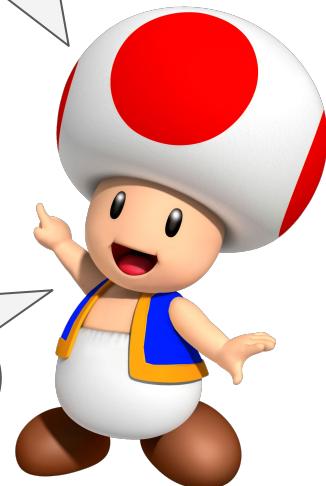
Console

Package Manager

Asset Store

... you will learn even more later!

Build and Player Settings



A 3D rendering of Toad, a small white mushroom-like character with a large red circle on its head, wearing a blue overalls and a yellow belt. He is smiling and pointing upwards towards the text in the speech bubble.

Let me show
you in Unity!

You can learn more
in the
[documentation](#).

Working with the Scene View

Navigating the Scene

Pan: Middle mouse

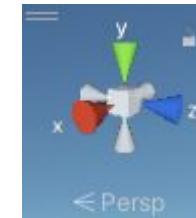
Zoom: Scroll wheel (or Right-click + Alt)

Free navigation: Right-click + WASD(QE)

Orbit: Left-click + Alt

Focus: F

Introduction to Unity



Gizmos

Changing tools - QWERT

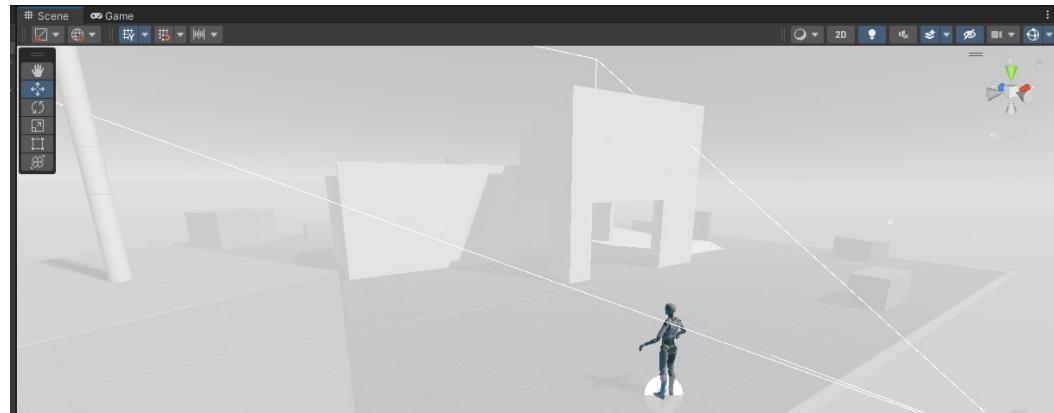
Searchable

Viewport configurations

Representation options

Perspective/isometric

Toggles



Hierarchy

Introduction to Unity

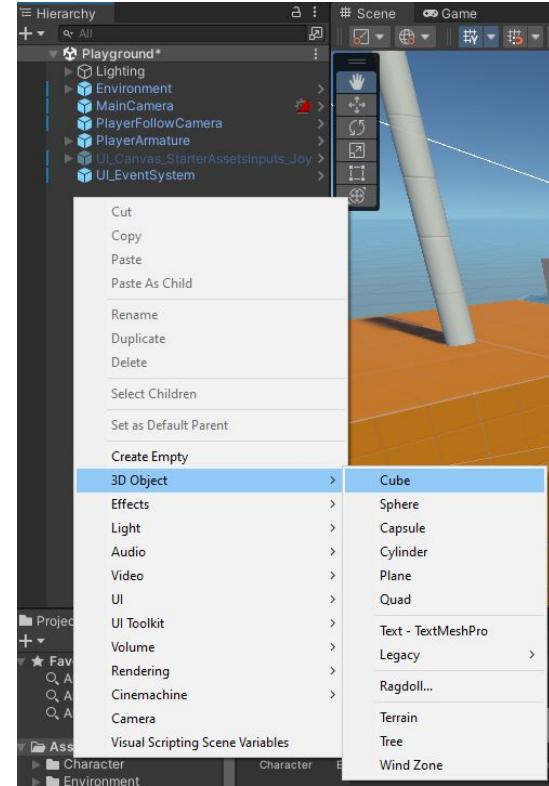
Listing all GameObjects in your Scene

Selecting in the Hierarchy also selects it in the Scene

Parenting (inheriting the transform)

Creating new GameObjects

Remember proper naming!



Game View

Introduction to Unity

Quick testing - play your game in the editor

Play-, pause- and next frame button



While in play mode, **any changes you make are temporary**

Shortcut: CTRL + P (CTRL + SHIFT + P for pause)

Various configurations and information on the top bar



Inspector

Introduction to Unity

Detailed information about your selection

GameObject

Active/Inactive

Name

Static

Tags & Layers

Components and exposed variables

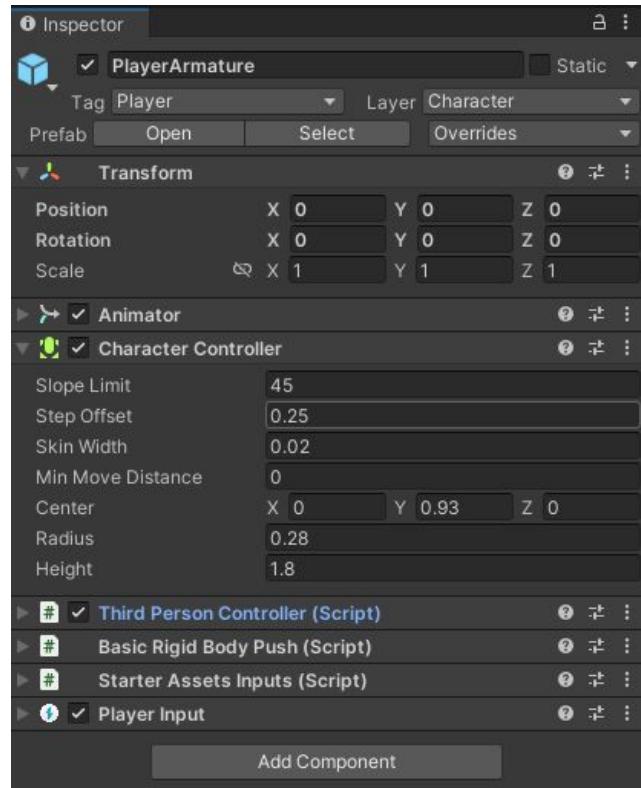
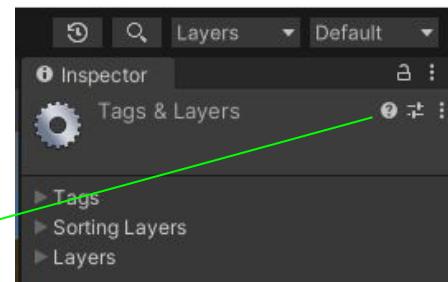
Assets

Project Settings

Locking

Asset preview

Click to access
documentation!



Project View

Introduction to Unity

Project View = Assets Folder

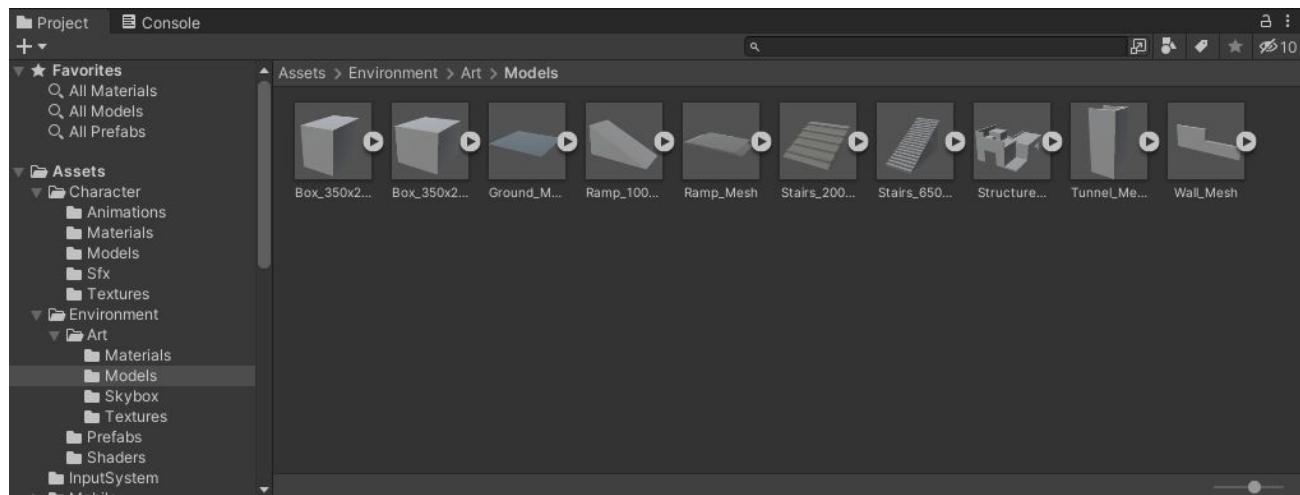
Labeling

Searching

Favorites

Importing

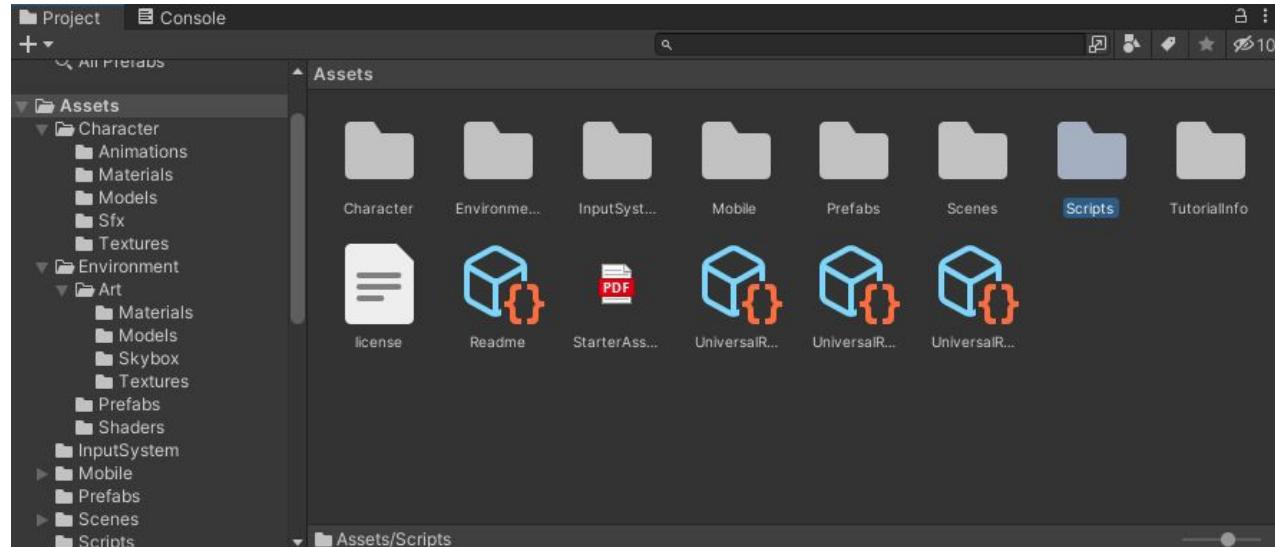
Creating new assets



Remember Structure

Introduction to Unity

Use descriptive names,
spaces, capitalization
and a folder structure



Asset Store

Introduction to Unity

Not part of the editor, it's a website

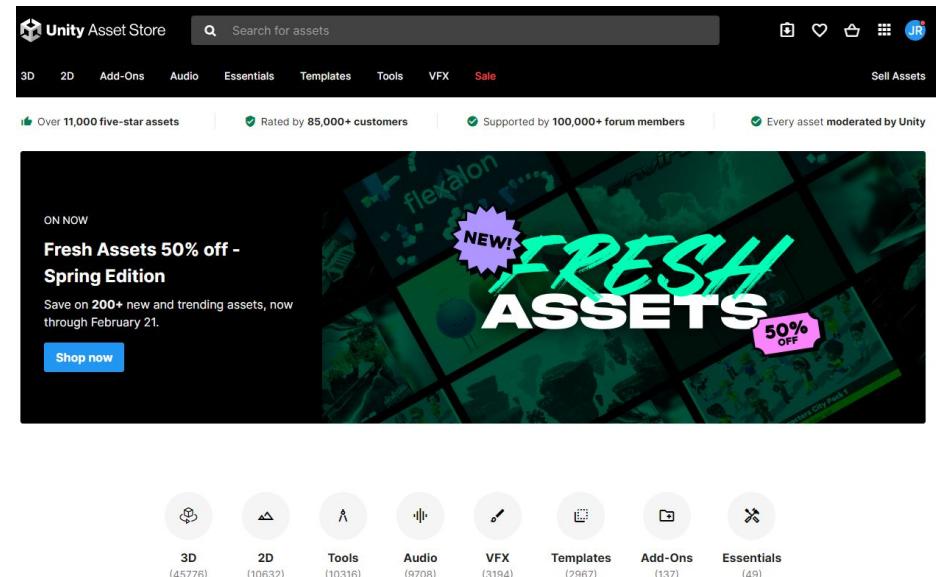
Free and paid assets

Scripts, 3D models, editor extensions, etc...

Good to get up and running fast

Integrated download

Often licensed per-team



Console

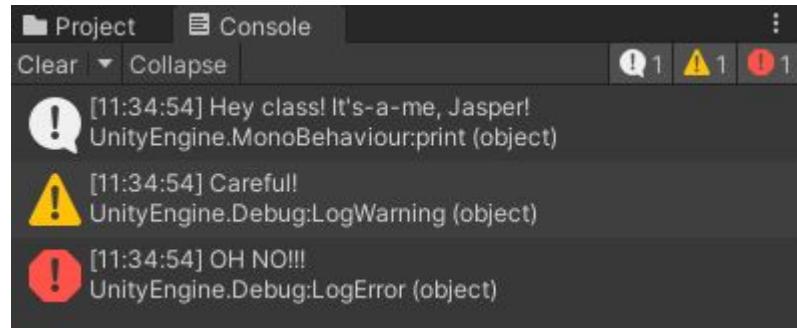
Introduction to Unity

Window displaying information, warnings and errors

Mainly used for fast debugging and displaying runtime/compiler errors

Left-click a message to get additional information

Double-click a message to go to the place it was invoked in the code

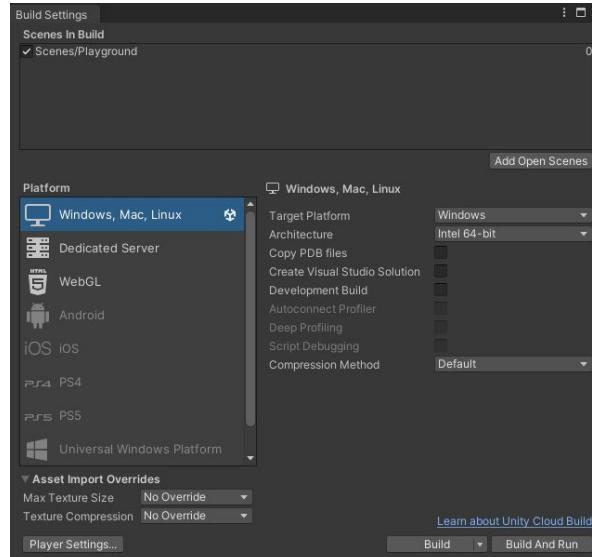


Build and Player Settings

Introduction to Unity

A build is an exported executable form of your project.

Since Unity supports multiple platforms, we have to specify what platform we want as our build target, and provide the necessary details in the player settings.



GameObjects

Introduction to Unity

Live in Scenes

GameObject categories:

3D Object

2D Object

Effects

Camera

Volumes

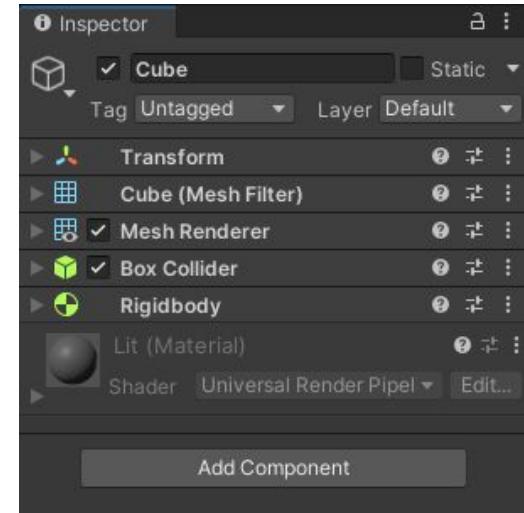
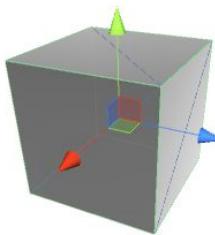
Light

Audio

Video

UI

Empty GameObjects



All GameObjects are essentially Empty GameObjects
with components attached!

Components

Introduction to Unity

Live on GameObjects

Components = Attaching behaviour to your GameObjects

Common examples

Transform

Collider

Mesh Renderer

Mesh Filter

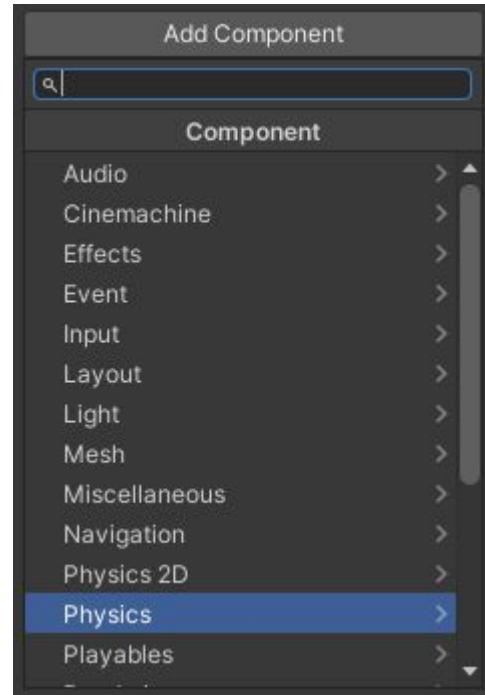
Camera

Audio Source, Audio Listener

Particle System

Custom scripts

How to add components?



Assets

Introduction to Unity

Live in your project folder

C# Script

Scene

Material

Sprite

Prefab

Animation

Texture

3D model

Audio Clip

... A LOT more! (you will learn some of them throughout the semester :))

You will be importing some of
these assets so that we can
focus on writing code!



Assets - Prefabs

Introduction to Unity

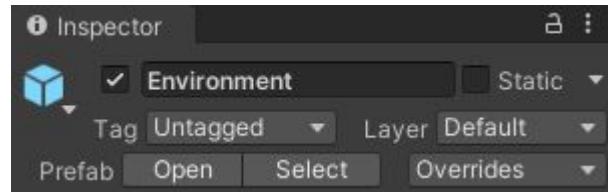
If a GameObject is set up exactly how we want it, we can save that GameObject and make copies of it

We call the saved file a Prefab (because it is prefabricated)

You can have multiple instances of the same Prefab in a Scene

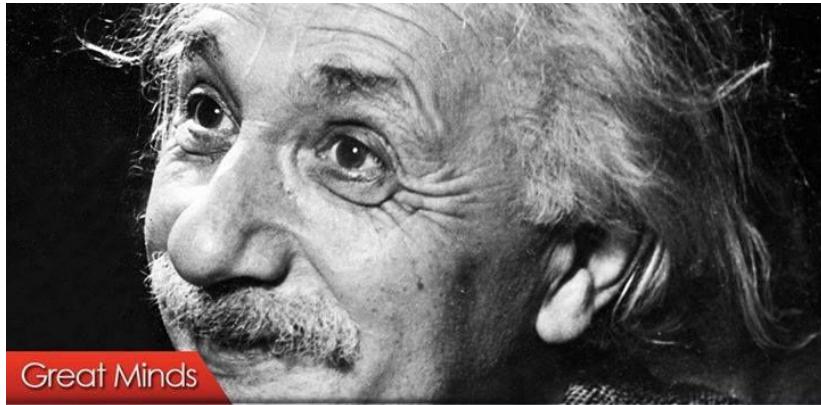
They can be instantiated or cloned, to create instances of them at runtime

Prefabs have all manners of usage: Rockets, enemies, procedural levels, etc...



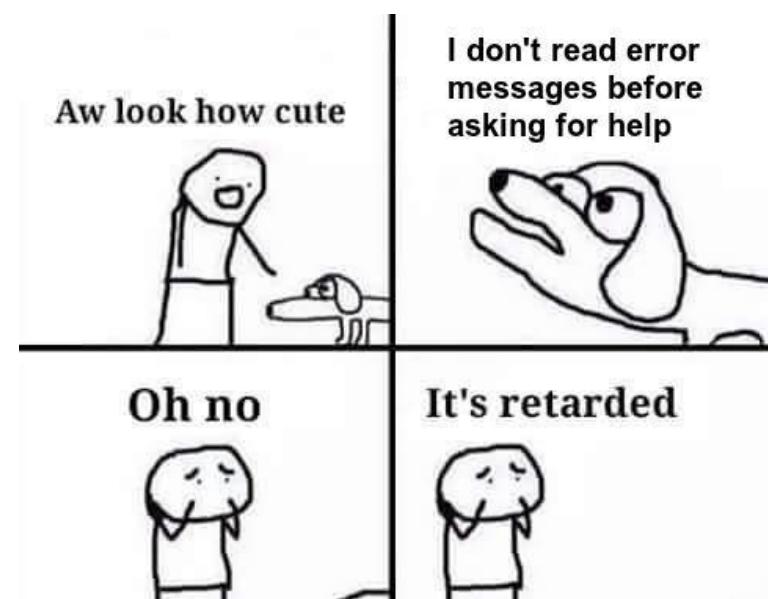
Exercise Tips

Exercises



Great Minds

When asked what was the speed of sound Albert Einstein said: "I do not carry such information in my mind since it is readily available in books. The value of a college education is not the learning of many facts but the training of the mind to think."



Exercise time!

Exercises



Set up your development environment

- Install Unity (**Personal Edition**)
- Install Rider (or VSCode/Visual Studio)

Get started on the Roll-a-ball exercise

Finish early? **EXTEND IT!**

GGWP!

