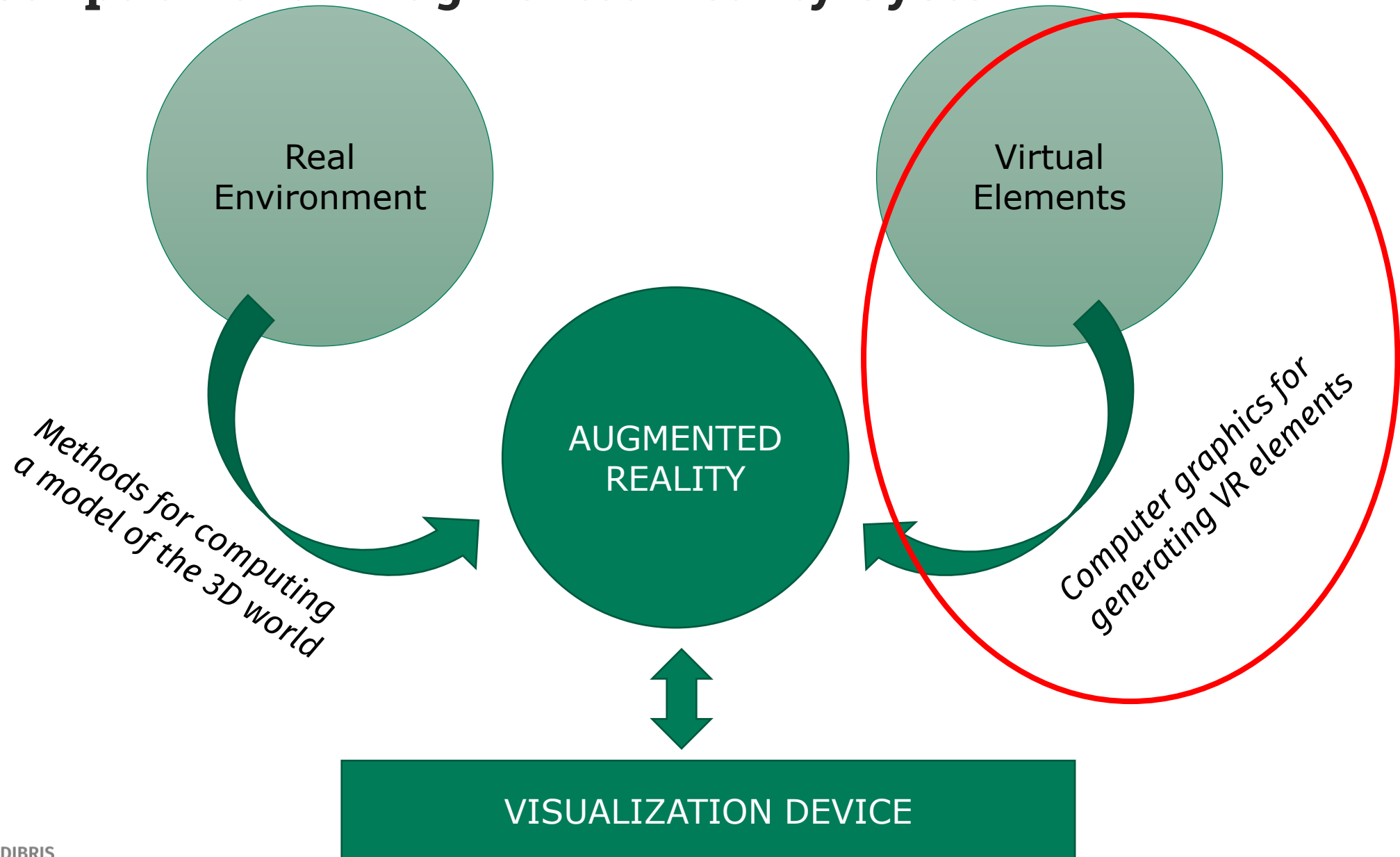# Augmented Reality

Lecture 5 - Introduction to Unity3D

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Description of an Augmented Reality System

Real Environment

Virtual Elements

AUGMENTED REALITY

Methods for computing a model of the 3D world

Computer graphics for generating VR elements

VISUALIZATION DEVICE

Introduction to Unity3D

Unity game engine

- https://unity.com/

Unity game engine

– Unity3D is free for Personal use, you can download it here:

  https://store.unity.com/#plans-individual

– The documentation of Unity3D is quite complete, and you can access it from:

  https://docs.unity3d.com/Manual/index.html?_ga=2.198809647.1675259443.1679475753-2044810871.1677599519&_gac=1.48692564.1678706197.Cj0KCQjwk7ugBhDIARIsAGuvgPaGn85GmbFhl1jUIHtzn0X2OZ-qh3gwE4YzF0ADLOrfMlW9DvSfoH0aAtG4EALw_wcB

– The learning resources are here:
  https://learn.unity.com/

Unity game engine

– **The programming language for Unity 3D is C#**
  (*we will consider it in the next lecture*)

– You can find the class documentation for Unity3D here:

  https://docs.unity3d.com/ScriptReference/

  On the left, follow *UnityEngine -> classes*

– The Unity3D scripting system and the Unity architecture are explained here:

 https://docs.unity3d.com/Manual/ScriptingSection.html

Unity game engine

| Feature	Universal Render Pipeline (URP)	High Definition Render Pipeline (HDRP)	Built-In Render Pipeline
Target uses	Projects that need rendering scalability across all platforms, especially tile-based deferred rendering (TBDR) platforms, and untethered VR platforms. Projects that need to extend and customize the rendering pipeline. 2D and 3D projects.	Projects that need photorealism and high-fidelity rendering on high-end platforms 3D projects	Projects that need rendering scalability across all platforms. 2D and 3D projects.
Platform support	Supports all Unity-supported platforms Focuses on efficiency on tile-based deferred rendering (TBDR) platforms, and untethered VR platforms	Supports desktop, Xbox and PlayStation platforms Focuses on efficiently using advanced GPU hardware capabilities such as async compute shaders, and ray tracing if the hardware supports it.	Supports all Unity-supported platforms
Source code access	Mostly C# Public access to the URP source code on GitHub ⧉. You can also create a custom pipeline using URP as a base	Mostly C# Public access to the HDRP source code on GitHub⧉. You can also create a custom pipeline using HDRP as a	Mostly C++ Private access by purchasing source code access ⧉
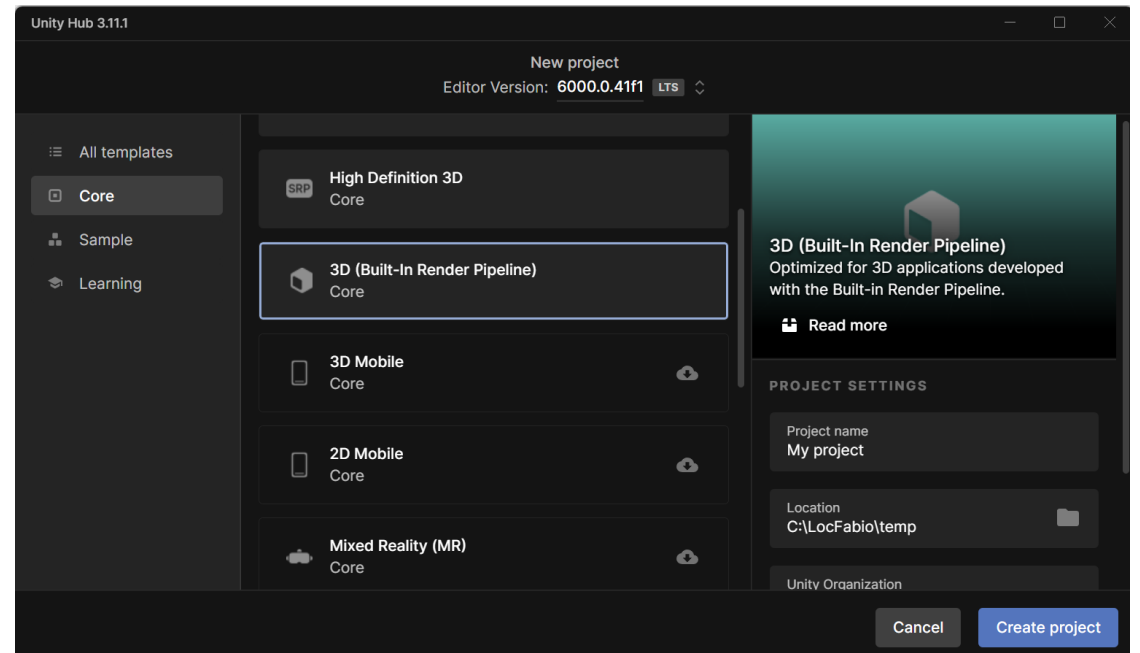
Unity game engine
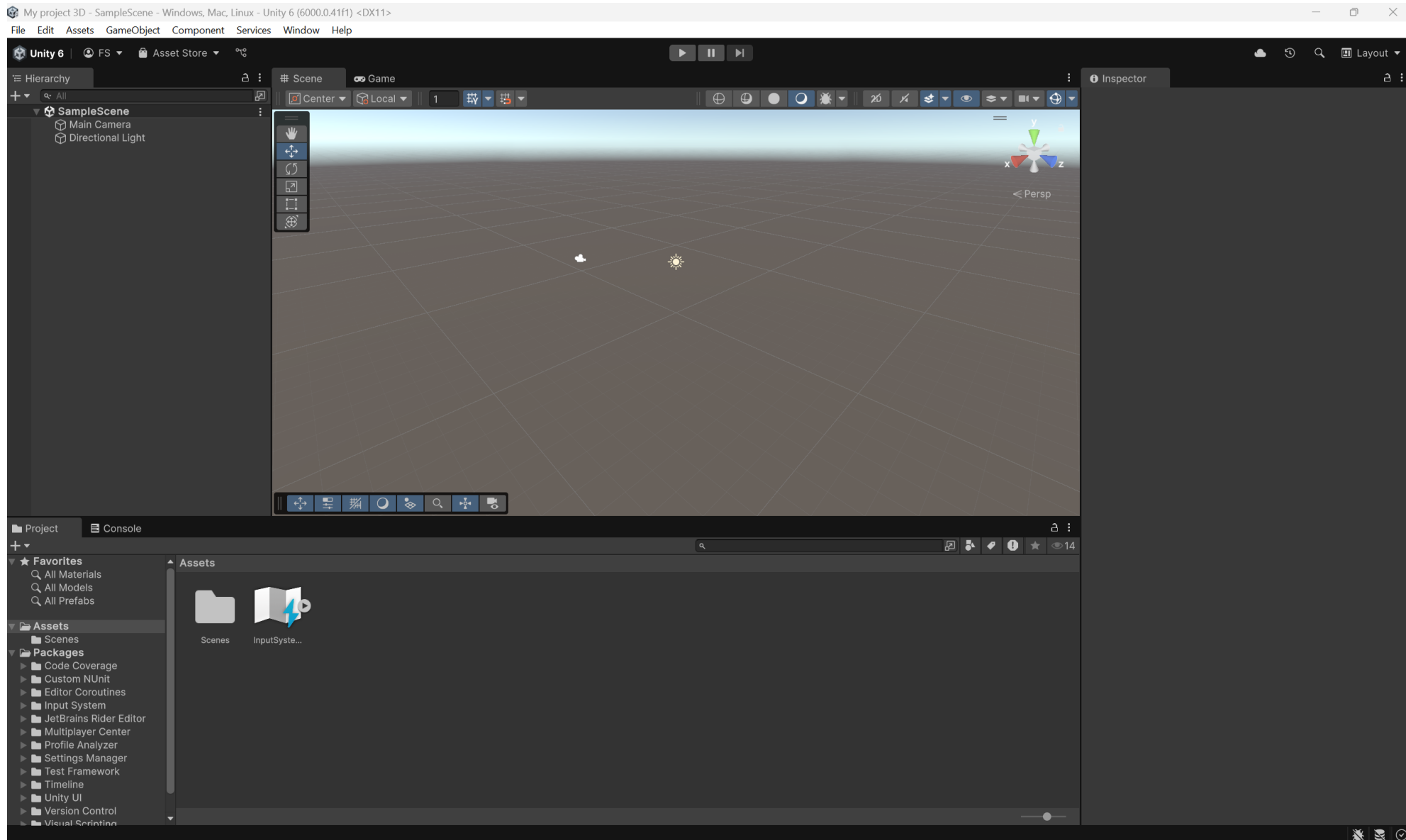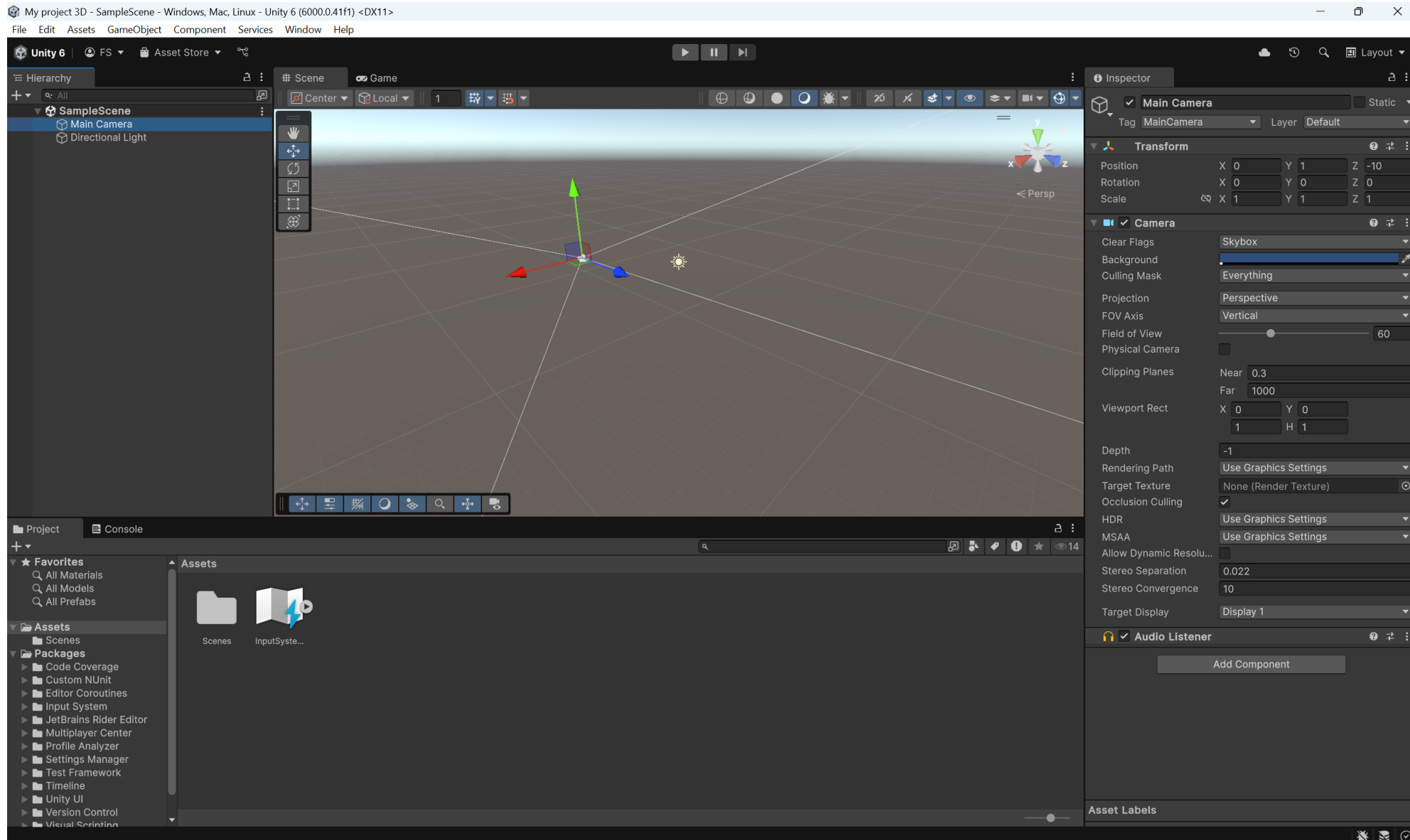
Unity game engine
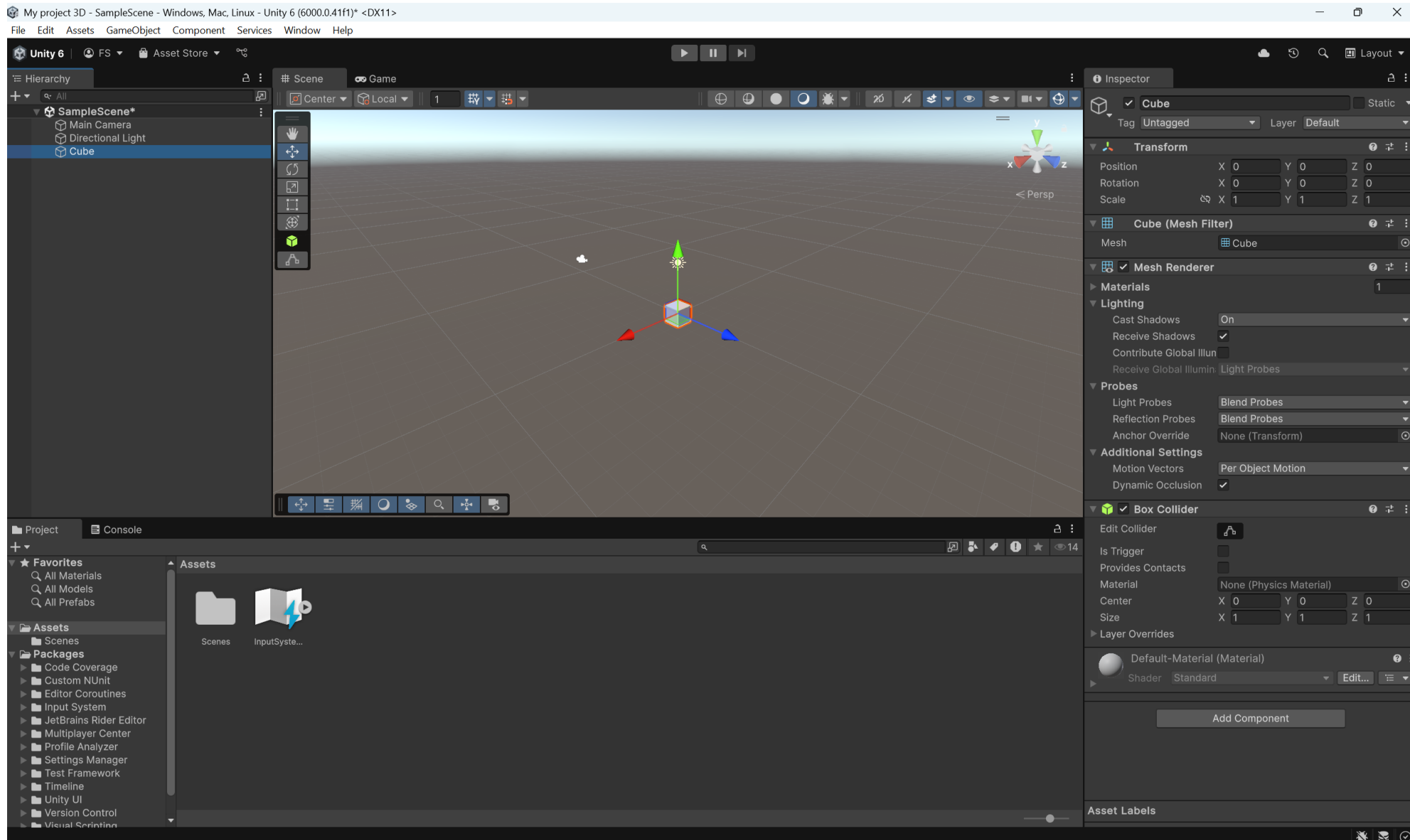
Unity game engine

Unity game engine
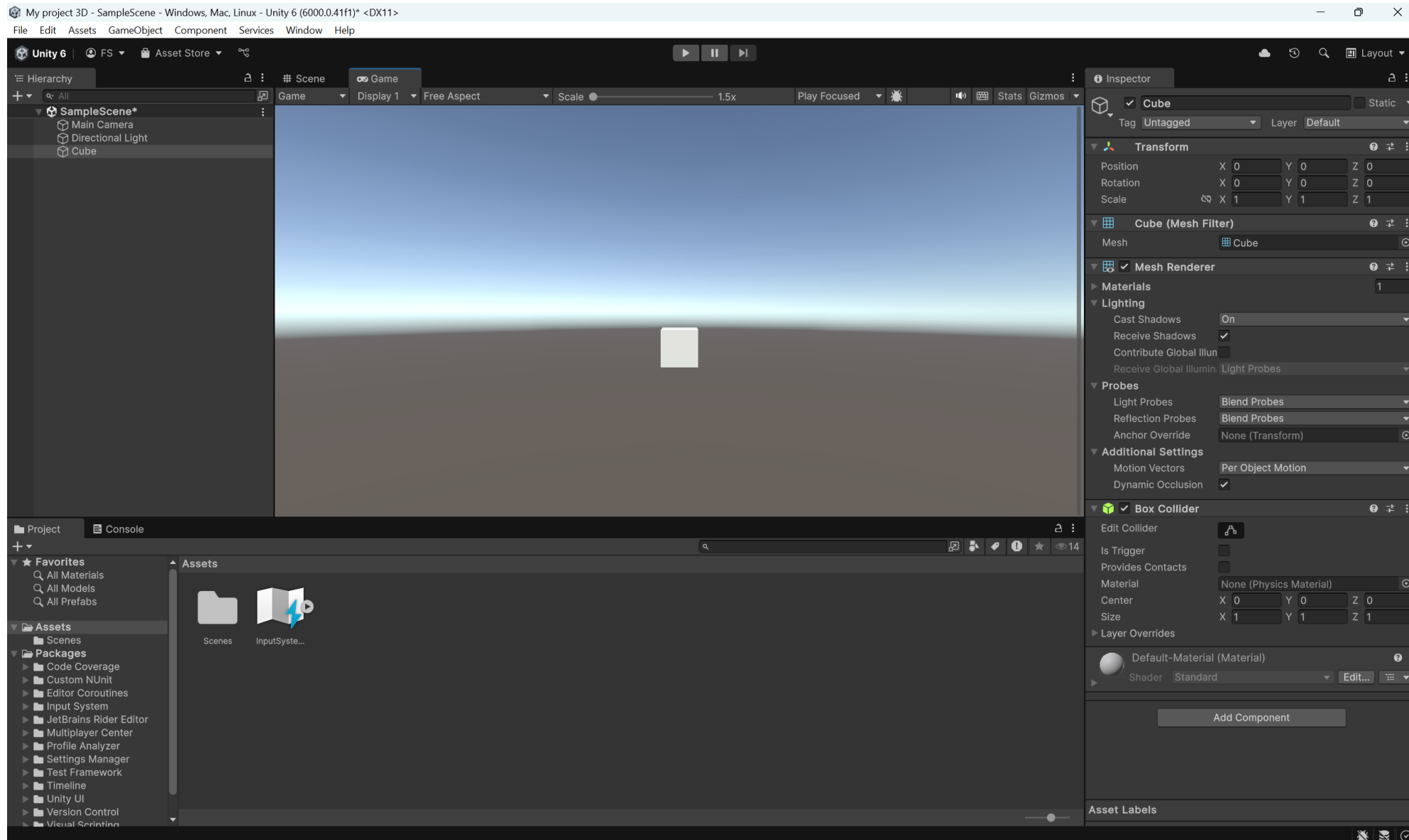
Examples

– Camera
– Light
– 3D objects
– Material
– Prefabs
– Rigid body
– Transform
– Hierarchy