Task 1: 2.503 First 3D Scene (Week 4)

Y​ou should use Unity to create a 3D graphics scene that achieves the following baseline and first two tasks. You can optionally also attempt one of the suggested extensions.

**Baseline:**a working Unity scene that includes at least one game object

**Task 1:**Create a 3D scene using basic graphics techniques, laying object out using transforms

**Task 2:** Create at least 1 moving object that uses user input (e.g. keyboard input) to move an object (or the camera) using transforms

**Extension task:** here are possible extensions:

* A computer graphics pioneer, Craig Reynolds, developed a series of “steering behaviours for controlling characters, which are quite easy to implement using transforms. Here is the description: <https://www.red3d.com/cwr/papers/1999/gdc99steer.html>
* Implement a third person camera that follows a moving object
* Create a hierarchical moving objects: a compound objects in which the different sub-objects move relative to each other, for example a stick person, or a mechanical machine.

O​nce you have created the scene, create a WebGL build and create a link using the previous "2.502 Unity Uploader: First 3D Scene" lab. You should submit this link.

Refer to "2.501 How to share a Unity project" for instructions on how to upload your Unity project and generate a link.

Y​ou should also submit a report in pdf format.

F​or each of the two or three tasks your report should:

* Explain the computer graphics and animation techniques used in the task, both in terms of their aims and the mathematical and theoretical principles of how they work
* Explain how and why the computer graphics and animation techniques were used in the task. This includes both an explanation of their use and an evaluation of the methods and why they were chosen over other methods to achieve the aesthetic effects

Your report should reference any external sources that you have used in your work (including Unity tutorials). If you use external sources without referencing them this would count as plagiarism and you would be subject to penalties.

Your report should be no more than 2 pages (minimum font size 11, minimum margins 2cm), you can include additional pages for images or references.

**Review criteria**

After you have submitted your assignment, it will be reviewed and graded by three of your peers on this course. You will also be asked review and grade other learners’ work!

Y​ou will get 10 marks for achieving the baseline and then e​ach of your three tasks will be graded out of 10 for each of these three criteria:

* Your implementation of the task applies techniques taught in this course to create a suitable aesthetic effect.
* Your report explains the computer graphics and animation techniques used in the task, both in terms of their aims and the mathematical and theoretical principles of how they work
* The report explains how and why the computer graphics and animation techniques were used in the task. This includes both an explanation of their use and an evaluation of the methods and why they were chosen over other methods to achieve the aesthetic effects

**N​B This is exactly the same set of criteria that the tutors will use for your courswork.**

**Task 2** An Interactive Physics Scene (Week 6)

Y​ou should use Unity to create a 3D graphics scene that achieves the following baseline and first two tasks. You can optionally also attempt one of the suggested extensions.

**Baseline:**a Unity scene with at least one rigid body in it

**Task 1:**Create a 3D scene including at least one object that acts under physics (e.g. a bouncing or rolling ball).

**Task 2:** Create a control scheme that controls the movement of an object using forces, based on user input (e.g. from keyboard input)

**Extension task:** here are possible extensions:

* Unity has a system of joints that link together rigid bodies, create a compound physics object using joints (<https://docs.unity3d.com/Manual/Joints.html>)
* Implement a basic physics game mechanic (e.g. a catapult like Angry Birds or the rolling ball in Super Monkey Ball)
* While simple character controllers just use transforms, many modern character controllers use physics and forces, research physics-based character controllers and implement one.

O​nce you have created the scene, create a WebGL build and create a link using the previous "3.501 Unity Uploader: An Interactive Physics Scene" lab. You should submit this link.

Refer to "2.501 How to share a Unity project" for instructions on how to upload your Unity project and generate a link.

Y​ou should also submit a report in pdf format

F​or each of the two or three tasks your report should:

* explain the computer graphics and animation techniques used in the task, both in terms of their aims and the mathematical and theoretical principles of how they work
* explain how and why the computer graphics and animation techniques were used in the task. This includes both an explanation of their use and an evaluation of the methods and why they were chosen over other methods to achieve the aesthetic effects.

Your report should reference any external sources that you have used in your work (including Unity tutorials). If you use external sources without referencing them this would count as plagiarism and you would be subject to penalties.

Your report should be no more than 2 pages (minimum font size 11, minimum margins 2cm), you can include additional pages for images or references.

If this link is broken, please let us know via the [Student Portal](https://my.london.ac.uk/).

**Review criteria**

After you have submitted your assignment, it will be reviewed and graded by three of your peers on this course. You will also be asked to review and grade other learners’ work!

Y​ou will get 10 marks for achieving the baseline and then e​ach of your three tasks will be graded out of 10 for each of these three criteria:

* Your implementation of the task applies techniques taught in this course to create a suitable aesthetic effect.
* Your report explains the computer graphics and animation techniques used in the task, both in terms of their aims and the mathematical and theoretical principles of how they work
* The report explains how and why the computer graphics and animation techniques were used in the task. This includes both an explanation of their use and an evaluation of the methods and why they were chosen over other methods to achieve the aesthetic effects

**N​B This is exactly the same set of criteria that the tutors will use for your courswork.**

**Task 3 :** Keyframe Animation (week 8)

Y​ou should use Unity to create a 3D graphics scene that achieves the following baseline and first two tasks. You can optionally also attempt one of the suggested extensions.

**Baseline:**A Unity scene with an animation

**Task 1:**Create a hand animation for an object

**Task 2:** Create an animation state machine for an object that is controlled by keyboard (or other input) or an animation timeline for a simple animated movie

**Extension task:** here are possible extensions:

* If you did the steering behaviours from topic 2 or the character controller from topic 3 integrate these with an animation state machine to create an animated character
* Animate a human like character (see topic 5)
* The Unity animation system is very flexible, it doesn’t just work on transforms, but can animate pretty much any property of any component. Create an animation that animates a number of different properties (e.g. colour, lighting, cameras)

Once you have created the scene, create a WebGL build and create a link using the previous "4.501 Unity Uploader: Key Frame Animation" lab. You should submit this link.

Refer to "2.501 How to share a Unity project" for instructions on how to upload your Unity project and generate a link.

Y​ou should also submit a report in pdf format.

F​or each of the two or three tasks your report should:

* explain the computer graphics and animation techniques used in the task, both in terms of their aims and the mathematical and theoretical principles of how they work
* explain how and why the computer graphics and animation techniques were used in the task. This includes both an explanation of their use and an evaluation of the methods and why they were chosen over other methods to achieve the aesthetic effects.

Your report should reference any external sources that you have used in your work (including Unity tutorials). If you use external sources without referencing them this would count as plagiarism and you would be subject to penalties.

Your report should be no more than 2 pages (minimum font size 11, minimum margins 2cm), you can include additional pages for images or references.

**Review criteria**

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After you have submitted your assignment, it will be reviewed and graded by three of your peers on this course. You will also be asked review and grade other learners’ work!

Y​ou will get 10 marks for achieving the baseline and then e​ach of your three tasks will be graded out of 10 for each of these three criteria:

* Your implementation of the task applies techniques taught in this course to create a suitable aesthetic effect.
* Your report explains the computer graphics and animation techniques used in the task, both in terms of their aims and the mathematical and theoretical principles of how they work
* The report explains how and why the computer graphics and animation techniques were used in the task. This includes both an explanation of their use and an evaluation of the methods and why they were chosen over other methods to achieve the aesthetic effects

**N​B This is exactly the same set of criteria that the tutors will use for your courswork.**