

LABORATORY 2

Animation in 2D

Introduction

The goal of this assignment is to have data-driven animations. This is achieved by having one text file that define each individual frame of an animation in a *sprite atlas*¹. A sprite atlas is an image that contains multiple smaller images². The other text file defines what sprite atlas to use and the playback of the animation, i.e which frame is played in what order and with what type of behaviour.

Pass Requirements

The *Pass* requirement for this assignment are:

- Three different types of animations
 - A looping animation
 - A ping pong animation
 - Animation that only plays once
- One or more files with sprite atlas definitions
- Three or more files with animation definitions

```
// File: assets/atlas/player-idle.txt
assets/image/player-idle.png
0 0 16 16
16 0 16 16
32 0 16 16
48 0 16 16
...
```

Example 1.1: Sprite atlas description.

¹ https://en.wikipedia.org/wiki/Texture_atlas

² The usage of atlases is an optimization when drawing with rendering APIs like OpenGL or DirectX™ to reduce the number of state changes that need to occur when drawing a lot of surfaces.

```
// File: assets/animation/player-idle.txt
assets/atlas/player-idle.txt
looping
0 1 2 3 4 5 4 5 6
```

Example 1.2: A animation file might look like this.

```
// File: assets/animation/player-death.txt
assets/atlas/player-death.txt
once
0 1 2 3
```

Example 1.3: .. or like this.

Pass with Distinction

For a *Pass with Distinction* on this assignment you have to implement, in addition to the requirements in the *Pass* section, *Skeletal animation*³.

Skeletal animation is a *hierarchical* set of interconnected bones and a surface representation of an object e.g a running character or a tree that is affected by wind. An object's vertices⁴ are associated with one or more bones using a scaling factor called *bone weight* which determine how much of a specific bone influences a transformation of said vertex. A skeleton is usually stored as a set of keyframes (or poses) that the animator interpolates between.

The requirements are:

- At least 10 bones in an hierarchy
- In the hierarchy two bones must have two or more children

External applications like Spine and DragonBones are allowed for creating and exporting skeletal animation data but not required.

Requirements

This is a individual assignment. Original code written by the student with C/C++. Example code and provided *external* code by course responsible can and should be used as a starting point for the laboratory.

³ https://en.wikipedia.org/wiki/Skeletal_animation

⁴ [https://en.wikipedia.org/wiki/Vertex_\(geometry\)](https://en.wikipedia.org/wiki/Vertex_(geometry))

Grading

This assignment has *Pass*, *Pass with Distinction* or *Fail*.

For a *Pass*, all the required features in the *Pass* section of this document must be implemented correctly. For a *Pass with Distinction* all the features for *Pass* must be implemented correctly in addition to all required features for *Pass with Distinction*. Failing the steps defined in the Requirements section and Hand-in section will lead to a *Fail*.

Hand-in

The hand-in deadline for this laboratory is **2019-03-31**.

Upload the project (the whole solution directory) to the course page on Studentportalen in a **zip**-file. The upload should contain a readme with project members and explanations if applicable. Please remember to remove all redundant files (specially the build files) from the project!

Failing to follow any step in the hand-in instructions can automatically result in a fail grade on the assignment. If there are any questions or uncertainty about the instructions please contact the course responsible for a clarification.

Plagiarism

At university, we are continuously engaged with other people's ideas - we read about them, we discuss them in class and we write about them in our assignments. It is therefore important that we acknowledge these people in our assignments/projects/papers that we submit for marks. If we do not adhere to these basic requirements, we are making ourselves guilty of a gross violation of the academic standard.

Academic dishonesty in any form including, but not limited to plagiarism and collusion, cheating in tests, examinations and assignments, theses and research papers, is regarded as a serious offence and will be dealt with in terms of the provisions of the University's Disciplinary Rules for Students.