



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Level of Detail Algorithm

Ethan Randell

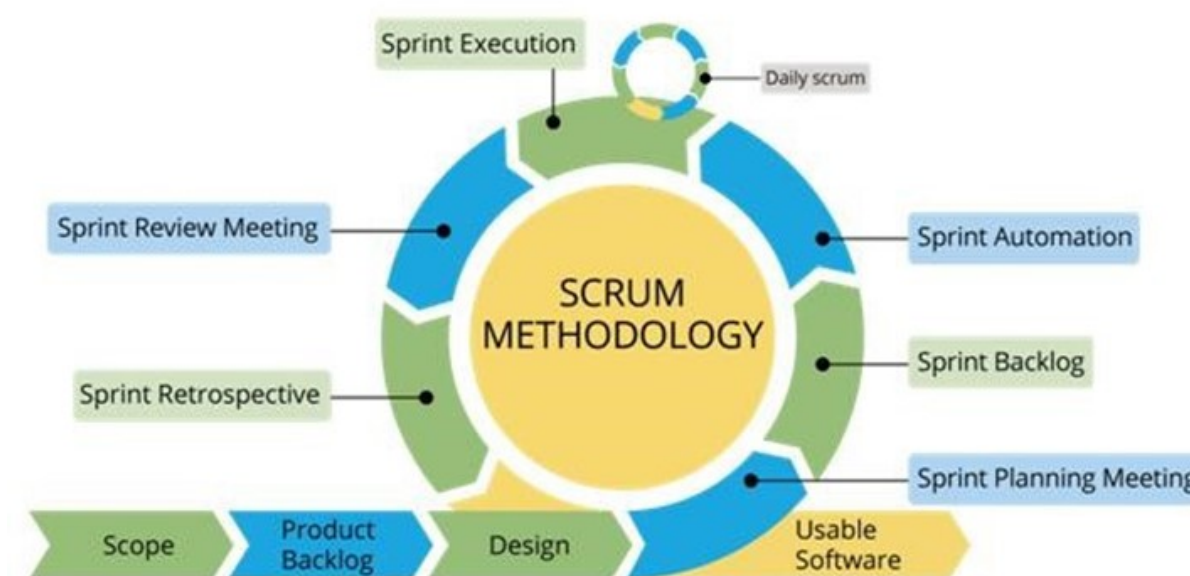
Email: ethanrandell.150496@student.uwtsd.ac.uk

Introduction

This project is being undertaken to try and investigate and to develop a level of detail algorithm in an Integrated Development Environment (Which will be implemented into a basic unity game to change the output of the game the desired output is when a game object e.g. a game character or a building or a piece of scenery in the background of the game will change based on the distance between the object and the camera.

Development Methodology

The methodology that was chosen for this projects was the agile methodology using the SCRUM framework.



Project Design

Project requirements.

- Creating 3D models in Autodesk Maya for each model that's generated the amount of polygons the model has is reduced.
- Get the objects into Unity.
- Create a camera object in Unity.
- Have an object in the game world.
- Get the 3D models to move in the game world.
- Get the 3D models to change the Level of Detail based on Distance

Aim and Objectives

The aims of this project:

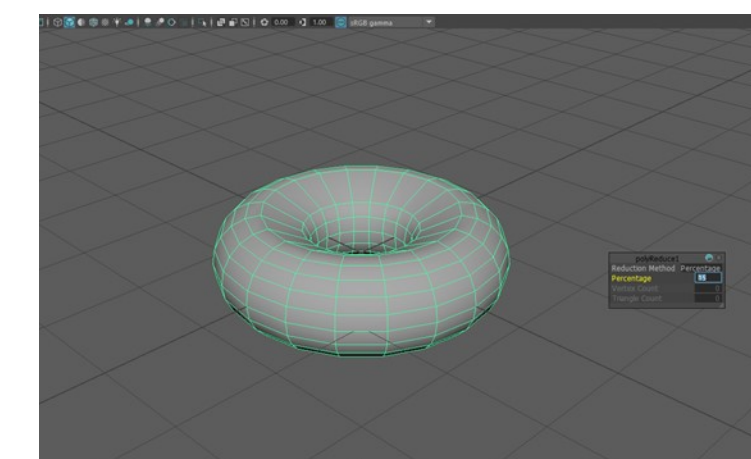
- Research the field of Level of Detail (e.g. LoD frameworks, frameworks that are suitable for games etc)
- Create a Level of Detail algorithm using a Integrated Development Environment (e.g. Microsoft Visual Studio).
- Run the Level of Detail algorithm in a game engine.

The objectives of this project:

- Researching a suitable 3D modelling software to create the game object e.g. Autodesk Maya, Blender.
- Research suitable Integrated Development Environments for the project e.g. Microsoft Visual Studio 2017.
- Research suitable software to display the project.
- Create an algorithm in a suitable programming language which can move an object in the game world.
- Create an algorithm in a suitable programming language which can change a 3D models Level of Detail.
- Research and implement a culling method into the algorithm.

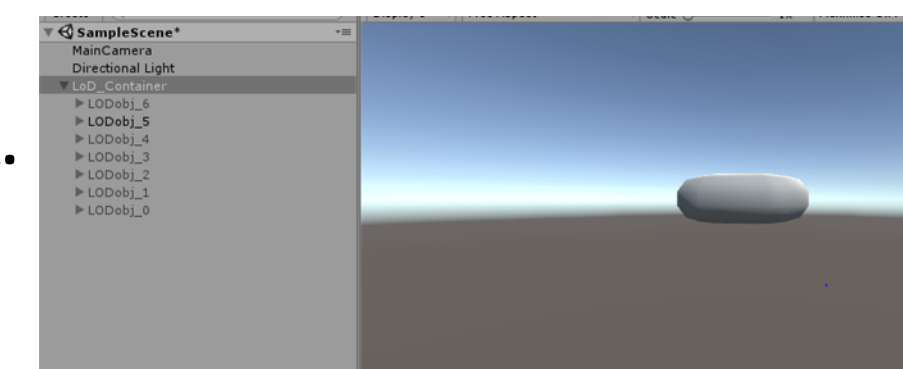
Implementation

- **Creating the 3D models in Autodesk Maya reducing the polygon count by 15 each model.**

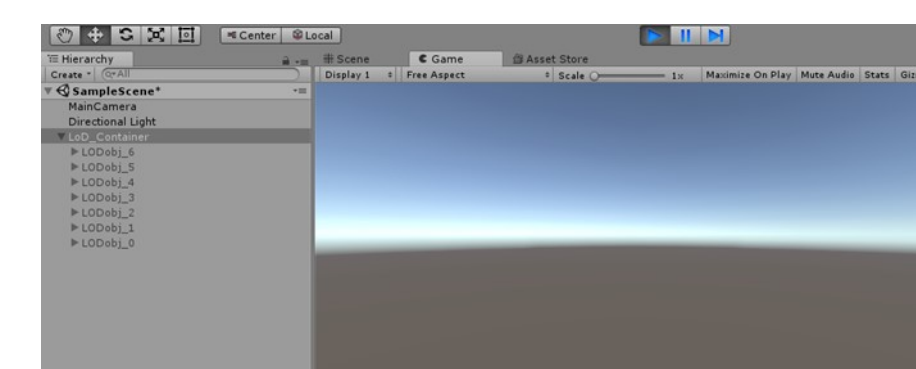


- **Allowing the objects to change level of detail based on distance from the camera.**

By using discrete framework.



- **Use the culling method (frustum culling).**



Conclusion

- The main conclusion is that the algorithm does work and can change the Level of Detail based on the distance.
- The projects aim and objectives were achieved by using the discrete Level of Detail framework.
- There are some little errors in the project it works but there are some performance problems.
- If this project was to be undertaken again the continuous Level of Detail framework and instead of unity being used OpenGL would be.

Reflections

- The creation of the projects was very enjoyable.
- The research was very interesting to read about.