Game-3111 Advanced Graphics Programming
Project

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1. Introduction

In this project, you will be implementing everything we learned so far in order to draw a castle in DirectX.

2. Overview

Castles have always been designed using simple geometrical shapes. A castle usually consists of at least 4 main towers in the corner with walls connecting each tower. There usually is one or more gates/entrances to the castle. A 3D labyrinth is one of the basic and oldest games. It can be very simple or very complex. The target of the game is to escape the labyrinth. Below is an image of what a typical 2D labyrinth looks like.
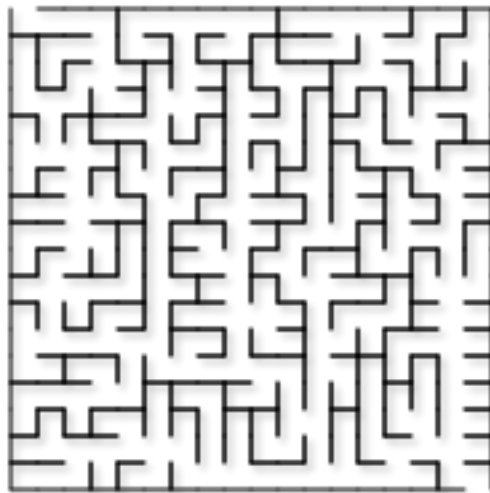
You are going to implement a 3D labyrinth using DirectX.

3. Logistics

For this project you are to work in a group of **THREE** students. There are multiple deadlines and multiple submissions for this assignment so make sure you are aware of them. All submissions for this assignment are

electronics. Only one submission is required for the whole group, make sure that all names are included in the submission.

4. Deliverables & Deadlines

Deliverable	Deadline
Parts 2, 3, 4, & 5	Before midnight on Friday the 12th of January 2017
Group member assessment	Before midnight on Friday the 12th of January 2017

5. What you need to do

Part 1: Build on from Assignment 1

Start off by reviewing the requirements for this assignment and review your assignment 1 submission.

Make sure that your castle is ready for the following requirements. If you need to do any alterations to your castle design, this is the right time to work on it.

- Your castle is generated correctly.
- Your castle has at least a wall, gate, 2-6 towers, and a main building with an entrance.

Deliverables:
A document with a list of changes to your design (if any).
Expected timeline:
Don't spend more than 1 day working on this part.
Points allocated:
None, this part is only in preparation for the actual assignment.

Part 2: Texturing

You are to expand on your previous Assignment submission. This time, you need to apply some textures to each of your objects. First off you

need to start thinking about what each of your objects represent as well as what this object would be made of.

- Columns could be made of wood, metal, marble, etc.
- Walls could be made of wood, stones, metal, etc.

Get creative and decide how you want your final castle to look like.
You can head on to http://opengameart.org in order to download some textures you can use.

A template project titled "Texturing" is provided and represents how an example of how to apply textures.

Deliverables:
A document listing your objects and what each object is made of.
Example:
ColumnA - stone
Front Wall - Wood
Main Building - Marble
A screenshot of your castle without textures and another with texture. Make sure that your screenshots are from an angle that illustrates the full shape of your castle (shows off all the parts of your castle).

Expected timeline:
Don't spend more than 3-4 days working on this part.

Points allocated:
42% of this assignment's grade.

Part 3: Lights, Camera, Action!

We discussed how to implement a light source, we also changed the light source colour in one of the labs. You would need to implement multiple light sources to your project, give them any colour you think would match your scene style. At least 2 types of light sources are to be implemented.
Example:
Red point light on each of the columns (representing fire maybe?)
Yellowish parallel light for the full scene.

Next you would need to implement a First Person Camera that can be controlled using the keyboard and mouse as discussed earlier in the course. You can refer to Lab #6 for implementing the Camera. The camera should allow the player to move and look around.

Deliverables:
   A screenshot of your castle with textures and lights. The view should be taken through the First Person Camera.
Expected timeline:
   Don't spend more than 3 days working on this part.
Points allocated:
   14% of this assignment's grade.

Part 4: Trees!!!

In week 8 we discussed the geometry shader and how it can be used to draw trees using billboards. You are to draw a few trees around your castle using billboards on the geometry shader. A template project is provided, titled "TreeBillboards". Use this project to get an idea of how trees can be implemented as billboards using the geometry shader.

Deliverables:
   A screenshot of your castle surrounded by trees.
Expected timeline:
   Don't spend more than 2-3 days working on this part.
Points allocated:
   14% of this assignment's grade.

Part 5: WWWWAAAATTTTEEEERRRRR!!!!

In week 6, we discussed blending. And one of the examples of blending was implementing transparency (eg. water). Use the project titled "Water" as a stepping stone in order to implement a water plan around your castle.

Deliverables:

A screenshot of your castle surrounded by trees, that are surrounded by water.

Expected timeline:
Don't spend more than 2-3 days working on this part.

Points allocated:
14% of this assignment's grade.

Part 6: MAZE!!!

Wouldn't it be aMAZing if the castle was hard to reach? Despite being on an island, let's add another level of defence. Create a labyrinth and put your castle at the end of the labyrinth. The labyrinth should then be surrounded by the billboard trees, that are surrounded by water. For bonus marks, have the labyrinth generated randomly in the compute shader.

Deliverables:
A screenshot of a top view of the labyrinth with your castle at the end of it surrounded by trees, that are surrounded by water.

Expected timeline:
Don't spend more than 2-3 days working on this part.

Points allocated:
14% of this assignment's grade.

Group Member Assessment

Fill out the questionnaire on blackboard for each of your team members.

6. To Hand In

Make sure that your project compiles correctly. Your project folder should be named "Ass2-YOURTEAMNAME", inside that folder there should be the project it self and the documents/screenshots in a folder named "Docs". Afterwards, compress the folder and upload it to blackboard.
Note: It might take some time to upload the folder so be patient.

7. Evaluation

This assignment will be graded using the following rubric.
It is advisable to review this rubric before submitting your work.

Part 2 (15 points in total):
- Your document lists all your objects and the material/texture each object is using.
- Your screenshots clearly show the castle with all the objects used to construct it.
- Your code to implement texturing is clear and well commented.

Part 3 (5 points in total):
- Your code to implement lighting is clear and well commented.
- Your screenshots clearly show the castle with textures and lit using your light sources.

Part 4 (5 points in total):
- Your screenshots clearly show the castle surrounded by trees.
- Your code to implement the trees used billboards in the geometry shader and is clear and well commented.

Part 5 (5 points in total):
- Your screenshots clearly show the castle surrounded by trees that are surrounded by water.
- Your code to implement water is clear and well commented.

Part 6 (5 points in total + 5 bonus):
- Your screenshots clearly show the labyrinth with the castle located at the end of it. Surrounded by trees that are surrounded by water.
- Your code to implement water is clear and well commented.