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Denkleiers • Leading Minds • Dikgopolo tša Dihlalefi

COS 344
Final Project
Deadline: 18 May 2016, 14h00
Total Marks: 100

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1 Introduction

This project provides students with the opportunity to demonstrate what they have learned throughout the course.

2 Task

Your task for this project is to do the following:

1. Choose one of the options discussed below for your scene.
2. Use your own creativity to decide what should be in the scene. You are allowed to model one object at a time using other software and then to import it into your scene. However, your are NOT allowed to model the whole scene using other software. You should use WebGL to set up the scene, i.e. positioning the objects and setting up the camera and lights, etc.
3. In your scene, you need to demonstrate the following:
   (a) An object being translated
   (b) An object being scaled

(c) An object being rotated
(d) An object being sheared
(e) Bump mapping applied to at least one object
(f) Environment mapping applied to at least one object
(g) One object changing colour when an event/interaction is triggered with some kind of input
(h) Changing the opaqueness/translucancy of at least one object with some kind of interaction
(i) Implementing a particle system in the scene
(j) Adding at least two types of lights in the scene
(k) Switching between two types of projections
(l) Applying the Phong lighting model to the scene
(m) Keyboard and/or mouse interaction to trigger an event, e.g. to switch between various types of light sources

4. Depending on the scene you have chosen, you will implement different ways of illustrating these techniques. Use your own creativity.

5. You are allowed to use external libraries that we have used in the practical sessions. However, if you implement your own functions for the following, you will receive a 15% bonus:

(a) Function to translate an object (1% bonus)
(b) Function to rotate an object (1% bonus)
(c) Function to scale an object (1% bonus)
(d) Function to shear an object (1% bonus)
(e) Function for at least one projection (1% bonus)
(f) Function for bump mapping (5% bonus)
(g) Function for the Phong lighting model (5% bonus)

3 Scene Options

This section discusses the options for your scene. Remember, you can be creative in how you implement it. You also do not have to use complex objects or models.

3.1 Option 1: A wizard's room / A witch's room

For this option, your scene will be a either a wizard's or witch's room.

In this room, you can place objects that you think will typically be in the room and that you can use for the tasks specified above. For example:

- To illustrate a change in colour, you can use a couldron or some kind of object (can be any shape) to pour potions in, and if you add something, the colour of the liquid in the couldron changes. Or if you touch an object, the colour changes.

- To illustrate the transformations, you can let an object move around in the room, rotating and moving and even changing size over time.

3.2 Option 2: A wizard bank

The scene of this option is a magical bank. Here you can have a bank that is filled with magical creatures and magical ways of opening a vault or a door. In the bank you can place objects that you think will be in a magical bank.

You can use objects in the bank for the tasks specified above. For example:

- To illustrate a change in colour, you can let the cashier change colour depending on his/her mood.
- To illustrate the transformations, you can let keys to the vault "float" in the air and change shape or size if the wrong person touches them.

3.3 Option 3: A magical forest

For this option, your scene is a magical forest. You can add funny looking trees or other kinds of plants. You can even add creatures if you want.

You then can use the objects for the tasks specified above, for example:

- You can change the colour of the leaves of the tree.
- For transformations, you can let an animal fly around, where it rotates and can even be scaled. It doesn't have to fly "realistically", e.g. wings flapping - just let it move around in a playful and hopping around manner.

3.4 Option 4: An unexplored planet

Here your scene is an unexplored planet and you are "shipwrecked". Your spaceship crashed and you need to find a way to survive, e.g. start a fire or build a shelter.

In this scene you can for example perform the tasks in the following way:

- Let the sky change colour from blue in the day to nice colours during sunset or to a sky filled with stars at night.
- You can use the sun for the transformations or you can move items around on the planet.

4 Marking

Remember, you can make the scene look nice with texture mapping and you do not have to create complex objects. Just be creative and have fun.

Mark allocation will be released in due course.