Computer graphics and human–computer interaction Laboratory

Final project. Recreation of a space

Technical manual

Goals

The student must apply and demonstrate the knowledge acquired during the entire course.

Recreate a cladding (at the student's choice) as well as seven objects within it using modeling software (Maya) and draw it into an OpenGL program.

Apply two complex and two simple animations to some of these objects.

Gantt diagram

Activity	21/03/22 - 25/03/22 Week 1	14/03/22 - 18/03/22 Week 2	28/03/22 - 01/04/22 Week 3	04/04/22 - 08/04/22 Week 4	11/04/22 - 15/04/22 Week 5	18/04/22 - 22/04/22 Week 6	25/04/22 - 29/04/22 Week 7	02/05/22 - 06/05/22 Week 8	09/05/22 - 12/05/22 Week 9
Cladding planning and objects	■	■							
Items building			■	■	■	■	■	■	■
Cladding building						■	■		
OpenGL implementation			■	■	■	■	■	■	■
Learning GitHub				■					
Animations creation							■	■	■
Documentation		■	■	■	■	■	■	■	■
User manual								■	■
Delivery									■

Scope

As the time provided in order to finish this project is short, it is expected to deliver at least 90% of all the requirements. It means that it is expected to deliver a project with all the required features but with some details on issues such as texturing, lighting and even realism.

Summary of the obtained scope

05/12/2022. It was possible to cover all the requirements of the project: animations, textures, modeling, lighting, etc.

A limitation for the development of this project may be the lack of complex knowledge in modeling software. This may incur some shortcomings in the realism section.

Risk factors

Administrative contingencies

Some events not contemplated during the semester, such as stoppage of activities, may imply the loss of certain sections of the syllabus, so that all the necessary knowledge to develop a complete project would not be available.

Setbacks

The fact of having to carry out other projects simultaneously with this one may imply the need to cut back on the time spent on it. This risk factor is very likely since there are three more projects being carried out simultaneously.
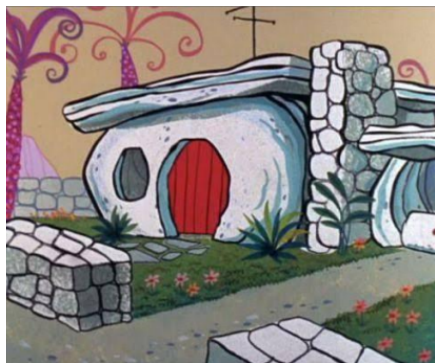
Documentation

Requirements

1. **A cladding and 7 objects within it must be recreated, all at the student's choice.**

Cladding to recreate: House of the Flintstones

Concept	Result

Item 1: Wall clock

Concept	Result

Item 2: Oven and **Item 3:** Bowl with water
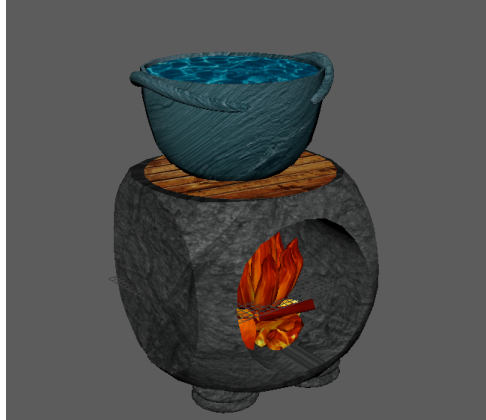
Item 4. Dishwasher
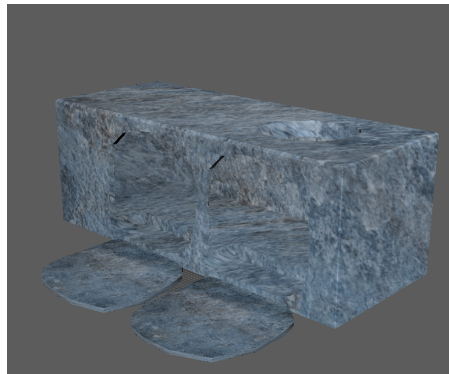
Item 5: Movie projector

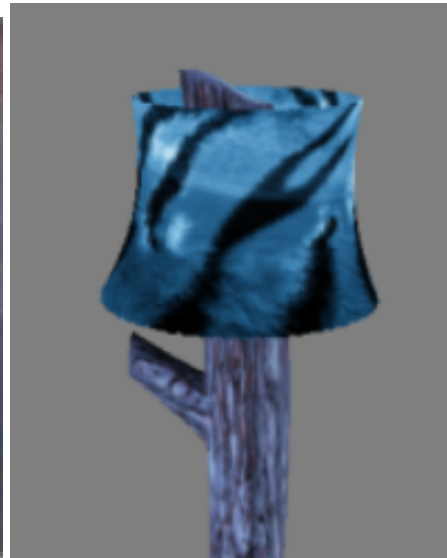**Item 6:** Lamp
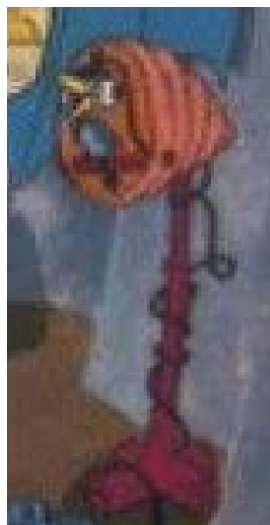
Concept   Result

Item 7: Telephone

Concept   Result

2. Two complex animations and three simple ones must be performed

– *Simple animations*

1. Clock pendulum movement

This movement is performed with a simple rotation on the X axis.

model = glm::rotate(model, glm::radians(rotPendulo), glm::vec3(1.0f, 0.0f, 0.0));

where rotPendulum is a float type variable which increases until it reaches $45°$ and then decreases when it reaches $-45°$.

2. Furnace fire motion

This movement works in a similar way to the previous one, but in this case it is the scale that varies. When the flame grows to a certain point, it begins to decrease, when it reaches a minimum point, it grows again, and so on infinitely.

3. Clock bird circuit

The clock's bird goes towards the tip. When it leaves the tip a little, it makes a circular flight until it reaches the original position. The flight can occur in both directions: left or right. The direction is determined randomly.

- *Complex animations*

1. Movie projector motion

The movement of the projector implies a uniform acceleration, that is, a quadratic factor for the rotation of the disk, coupled with the movement of the bird's legs that makes it work.

The movement begins with the movement of the legs and the constant acceleration of the disk. When the acceleration reaches its maximum point, the bird's legs stop moving, and the disk's acceleration begins to decrease until it reaches zero. When this happens, the movement of the legs and the disk start again.

2. Telephone bird circuit

This motion is a path made from the tip of the phone to the dishwasher and back to the phone. The bird starts descending to the ground; once there, it flies to land on the dishwasher. Then, it rotates $180°$ to fly back to the tip of the phone.

Additional animations / interactions

Door opening: When the O key is pressed, the door will open. When the C key is pressed, the door will close.

User manual

Welcome to the user manual for the Computer Graphics and Human–Computer Interaction Laboratory's final project. To view the virtual space that was recreated during the semester, follow the next steps:

1. If you are reading this manual, it's because you have already downloaded the project from the GitHub repository. So, the first step is to open the executable file that you can find in the "Release" folder.
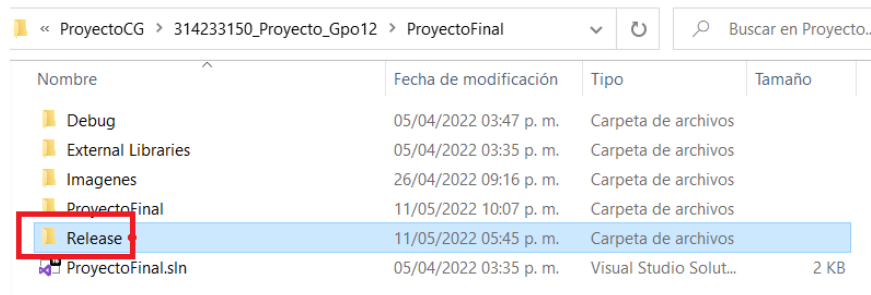
2. Be patient, the project takes a while to open. Once opened, you should know how to move within the environment. Use the mouse to move the direction of the camera.

   - "W" or "↑" to advance
   - "S" or "↓" to go back
   - "A" or "←" to move left
   - "D" or "→" to move right
   - Use "O" to open the door and "C" to close it.

The other movements are automatic, so you don't have to worry about anything, just enjoy the animations.

To exit the program, press the "ESC" key.

That's all, thanks for your attention!