Report Of CPT205 3D Project

1. Basic Information

Module Title	Computer Graphics
Module Code	CPT205
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1.1 Background information of the 3D project

This 3D work draws an "ideal home", which consists of two main parts, one is the facade of the whole building and the other is the rooms inside the building. Initially, the viewpoint is placed outside the building, and in this viewpoint. When we click on "Take the elevator (Z)", the project takes us to the rooms inside the building.

2. Design

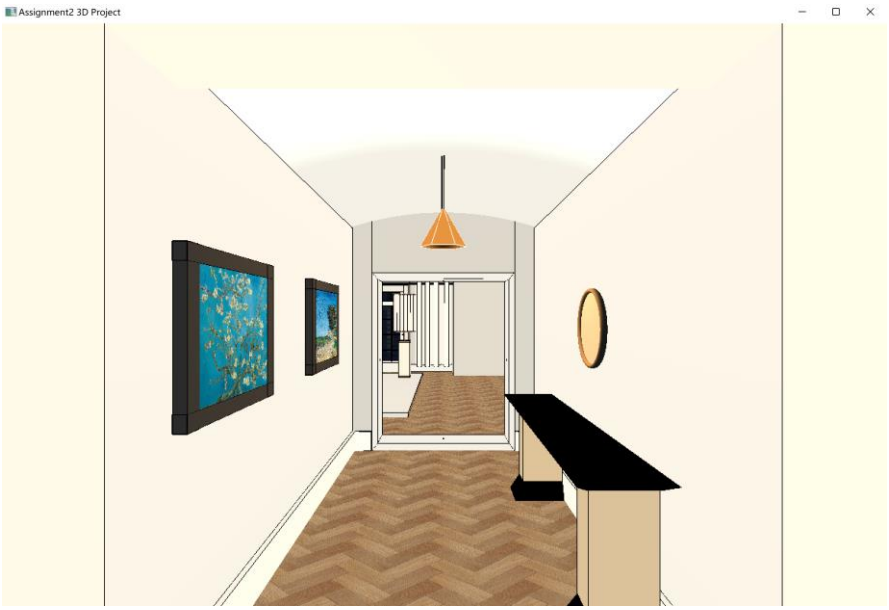
2.1 Overall building façade

Graphical technique: The building is achieved by polygon function, cube function, texture function, translation function, and scaling function together.

Building shape: The whole building is formed by drawing a combination of many cubes located in different positions. In addition, special shapes, such as trapezoids, are formed by drawing polygons in different positions. In particular, the red brick surface of the building is obtained by texture mapping.

Further function: When the "Elevator (z)" button is pressed, an animation of the building's exterior entering the room will be shown. At this point, the perspective will automatically move closer to the building, and the elevator doors will automatically open, leading us to the third floor of the building (i.e. the location of the room), ,which is controlled by the keyboard input

2.2 Entrance hall



Graphics technique: The entrance is achieved by polygon function, cube function, cone function, cylinder function, texture function, surface function, translation function, and scaling function together.

Graphical elements: The roof of the entrance is formed by drawing a secondary surface, the floor is formed by texture mapping, and the wall of the entrance are formed by drawing cubes. The entire entrance consists of two paintings, a desk, and a circular mirror. The painting is mapped with texture, while the desk is formed by combining cubes and trapezoids. In addition, the mirror is formed by a combination of circles and cylinders, and in particular, the material of the mirror adds specular light which gives it a " light reflecting " effect.

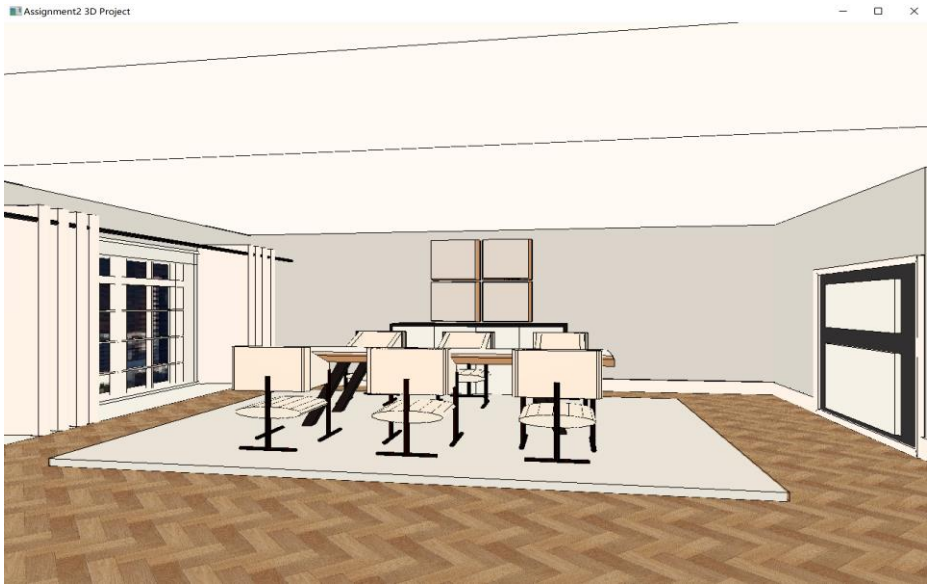
Lights: When located inside the entrance, the entire entrance is illuminated by the orange light from the top.

2.3 Left part of the living room

Graphics technique: The living room is achieved by polygon function, cube function, cylinder function, texture function, translation function and scaling function together.

Graphic elements: The ceiling, walls and floor of the living room were all formed by drawing cubes, where the floor uses texture mapping to give it the texture of wood panels.
The left part of the living room contains a sofa, a bench, two lamps, a painting, a mirror, a bookcase, and a coffee table. Most of the objects in this room are formed using a combination of cubes and columns.
Special things: The painting uses texture mapping. Additionally, when entering the living room, the lamp located at the top emits a red light.

2.4 Right part of the living room (Restaurant)



Graphic technique: The restaurant is achieved by cube function, cylinder function, texture function, rotate function, translation function and scaling function together.
Graphic elements: The dining room includes a dining table and six chairs, as well as a dining cabinet and decorations on the far left wall. Most of the objects in this room are formed using a combination of cubes and columns.
Special things: The chair is formed by combining several cubes and several columns, where the some of the columns are scaled using the scaling function, which makes them look like the cushions of a chair.

2.5 Windows and Curtains

Graphics technology: The windows and curtains is achieved by cube function, cylinder function, t translation function and scaling function together.
Implementation method: Windows are formed by combining rectangles in different positions and sizes, while curtains are formed by combining many rectangles and columns.
Further functions: The curtain can interact with the keyboard, press the “L” key the curtain will expand, press the “J” key the curtain will contract

2.6 Background

Implementation method: The background sky and ground are formed by texture mapping using two images.

2.7 Lights

Explanation: For the overall building façade, only ambient light is used to present the color of the object itself. When located in the entrance hall, all things in the room are illuminated by orange light, when the diffuse light is orange. When located in the living room, everything in the room will be illuminated by red light, and the diffuse light will be red.

Special Function: When entering the living room from the foyer, the light will first turn off and then light up, when the light will turn from orange to red again.

3. Instruction

1. “Z” or “z”: Taking the elevator
2. “T” or “t”: Moving towards the direction of looking

(Notice: The range that this key allows you to go forward is different between outside the whole building and inside the room)

3. “G” or “g”: Backward

(Notice: The range that this key allows you to go forward is different between outside the whole building and inside the room)

4. "U" or "u": Turn up the camera position and look at point
5. "D" or "d": Turn down the camera position and look at point
6. "Q" or "q": Turn your head to the left

(Notice: This key can only be used after you enter the living room, even in the entrance hall it can not be used)

7. "E" or "e": Turn your head to the right

(Notice: This key can only be used after you enter the living room, even in the entrance hall it can not be used)

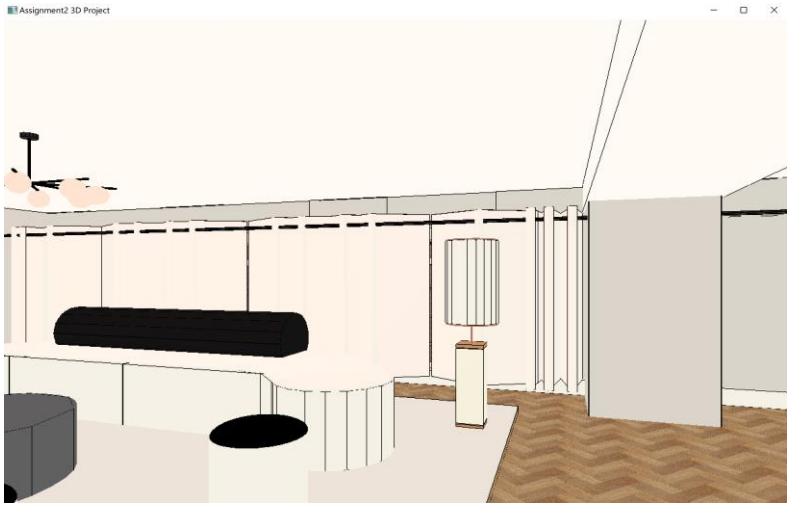
8. "J" or "j": Close the curtains
8. "L" or "l": Open the curtains

4. Screenshots

4.1. The initial state of the project

4.2 Taking the elevator

4.3 Open the curtains



4.4 Close the curtains