Name: Chih Hsuan Huang

ID: 934554197

Email: huanchih@oregonstate.edu

Video link: https://media.oregonstate.edu/media/t/1_5l04ycmb

CS 450/550 -- Fall Quarter 2024

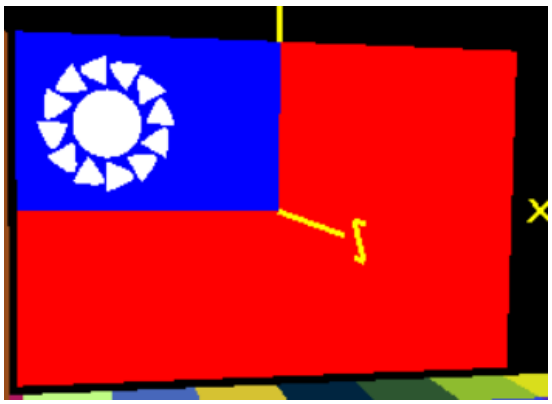
Project #1 Draw Something Cool in 3D!

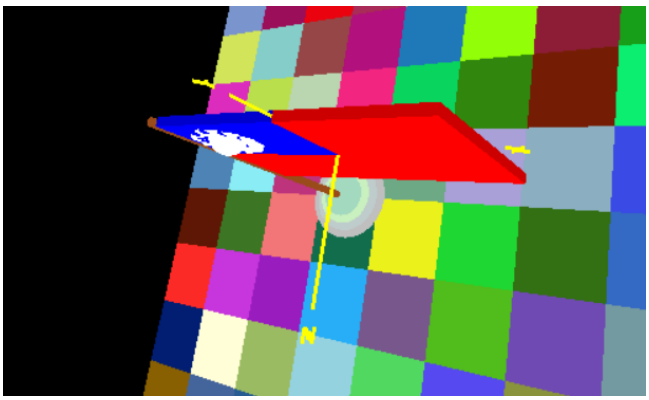
Description.

In this project, I used OpenGL to create a 3D scene with a flag, a flagpole, a stepped platform, a sun, and land. The scene incorporates a variety of 3D shapes, such as a flagpole made of quadrilaterals and cylinders. The cubes in the terrain are randomly applied with different colors, adding visual variety. In addition, the scene supports 3D rotation and scaling functions.

Implemented functions.

The flag is constructed using three cuboids and uses two different colors to differentiate the flag's sections. The front and back sides of the flag are drawn using GL_QUADS, an operation that draws quadrilaterals. And set colors for them with glColor3f().

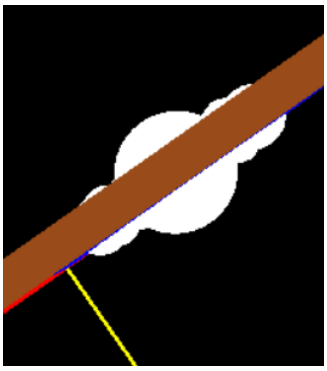




Sun and Rays.

The sun in the scene is represented by a small white sphere. Use gluSphere

to draw a sphere to simulate the sun. I created an effect to simulate sun rays. By calculating the angle, I determined the position of each ray and used trigonometric functions (cos and sin) to compute the x and y offsets for each ray around the circumference. Then, I drew cone-shaped rays, using rotation and translation to distribute the rays according to the calculated angles around the circle. Finally, I used the gluCylinder function to generate cone-shaped rays.



Flagpole.

I draw the flagpole via gluCylinder. gluCylinder() function is used here to generate a cylinder as a flagpole.

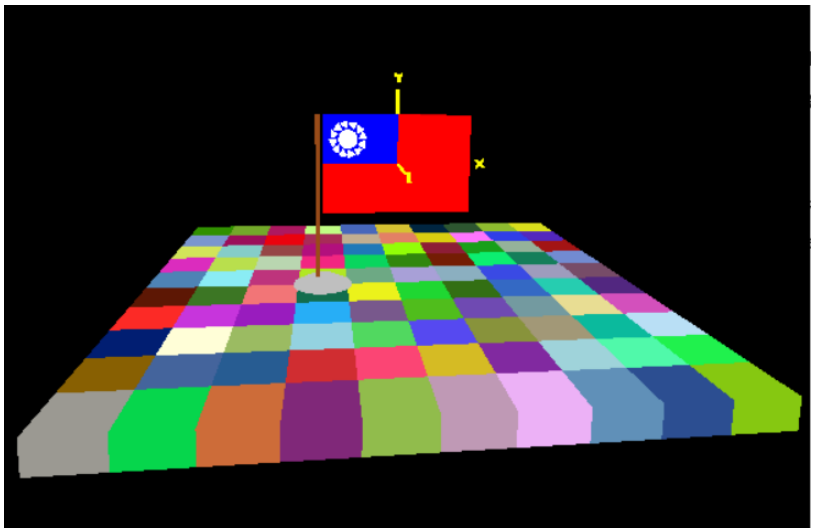
Staircase platform.

I designed a multi-level stepped platform with 4 levels, each with a different

height and width. The platform is built using polygons for the top and bottom, and the sides using quadrilateral strips.

Terrain (cube).

A 10x10 cube grid with random colors was drawn in 3D space. Each cube has a top face height of 0.5, and its width and depth are both 1.0. The colors are randomly generated.



Video link.

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