



Oregon State
University

Project #6: The snake Menagerie Project

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1 Description

1.1 Set up

GLSL and glman are used to create a flat crystal snake that avoids a jumping elephant in the project #6.

1.2 Program Description

For the project, some techniques are used:

- Timer
- Flat surface norm
- Cube-mapping
- Reflection & Weak Refraction
- Equation for snake's body shape

The timer is defined for the upward movement of snake and elephant, taking 1 second. Designing a flat surface normal is simple by defining a "flat" for each variable. Cube-mapping technique is quite similar to NVIDIA one in the class note, and Reflection & Refraction are used to show crystal effect, but refraction is weaker since the program does not display the background consisting of 6 NVIDIA images.

For snake's body shape, some equations are used to depict hemisphere shape and movement. The equations are below:

$$\text{float sphereShape} = \text{sqrt}(\text{radius}^2 - ((\text{gl_Vertex.x})^2 + (\text{gl_Vertex.z})^2));$$

$$\text{float newY} = \text{base} + \text{sphereShape} + \text{bulgeFactor};$$

$$\text{vert.y} = \text{max}(\text{newY} + \text{elephantY}, \text{base});$$

The first equation above is for sphere shape, but it has base, which is over the elephant's height, leading to displaying hemisphere. The second equation is to calculate the height that is always higher than the one of the elephant. The last equation is a constraint to limit the maximum height and minimum height. The variable "elephantY" is the primary equation of the movement, which is:

$$\text{float elephantY} = \sin(2.0 * \text{PI} * \text{Timer}) * 1.0;$$

, where PI is 3.141592.

Thus, a flat crystal snake and a jumping elephant move up-down according to the Timer.

1.3 URL

Video Link(bitly): <https://bit.ly/4gXlV5e>

Video Link(original):

<https://oregonstate.zoom.us/rec/share/JD2XNngIvcxRwtjNQcfqZGaJdfx8fEqZDfzDgeNQBuJdouStu6mfEDMfLHLs.f2MAONkvneVNHEXC>

1.4 Test Result

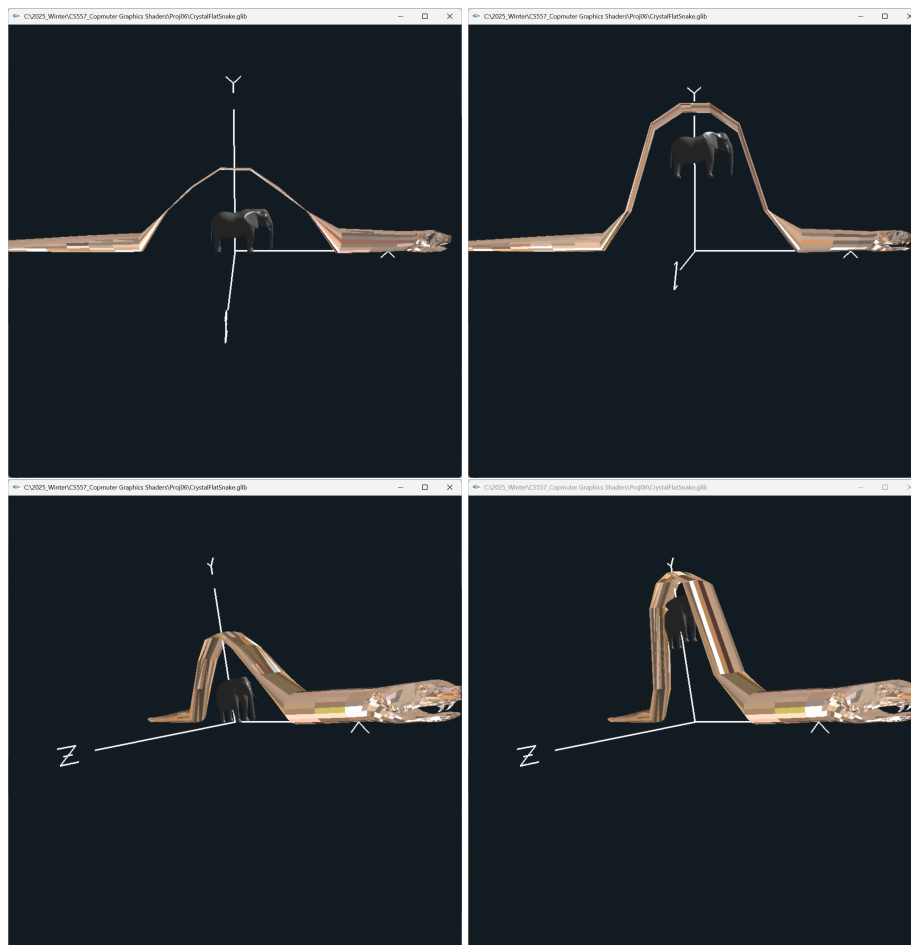


Figure 1: A flat crystal snake and a jumping elephant