**Simple Demo Scene**

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**Main Idea**

The objective of this project is to create a visually pleasing and interactive town scene that utilizes various animation techniques to create a dynamic and engaging experience for the user. The scene should include several moving components, such as a sun, boat, cloud, car, and the sky, which should all be seamlessly integrated into the environment.

The program should be designed to run indefinitely, meaning that once opened, the animation will never stop. This allows the user to observe the different movements and interactions between the components over an extended period of time, creating a sense of immersion and continuity.

One of the challenges encountered in this project is accurately positioning the objects within the scene. This requires adjusting the coordinates of each object, compiling the code, and running the program repeatedly until the object is positioned correctly. This process can be time-consuming and require a lot of trial and error, but it is essential to ensure that the objects are placed precisely where we want them in the scene.

**Intended Effect**

This project aims to create an immersive town view with dynamic components that bring the scene to life. The animation features a sun that gradually rises and sets, changing the colors of the sky from dawn to dusk. In the sky, the clouds move at varying speeds and sizes, providing a sense of depth and movement to the scene.

To add more diversity to the environment, there are several types of vehicles on the road, each moving at different speeds and looping back to their starting positions when they reach the end of the screen. Furthermore, the boat at the bottom left of the screen rocks up and down, giving the illusion of it floating on the water.

**Why is this interesting.**

The program is interesting to watch because it creates a dynamic and immersive environment. The moving components, such as the sun, boat, clouds, and cars, create a sense of motion and activity in the scene. Additionally, the use of colors, textures, and lighting enhances the visual appeal of the environment. The program's ability to create an infinite loop adds to its appeal, as the animation can be observed indefinitely without any interruption. Overall, the program offers a visually engaging experience that can capture and hold the viewer's attention. This town view can provide a relaxing and engaging experience for the viewer.

**Mathematical Concept**

The fundamental mathematical principles employed in the program involve the application of the cosine and sine functions to create a smooth back-and-forth motion, which is the key to the infinite loop of the project. These mathematical functions also facilitate the creation of an ease-in and ease-out effect, which enhances the overall visual appeal of the animation.

**Programming Implementation**

The program is implemented using the Opengl Glut library which simplifies rendering and communication with the GPU without the need to delve into lower-level programming. The use of namespaces in organizing the code structure is employed to enhance code organization. The use of for loops is also integrated to the rendering process, effectively minimizing repetitive code. For example, in drawing windows on buildings, nested For-loops are utilized to draw on both x and y coordinates. The road is also redrawn using a For-loop.

**Flowchart**

**Diagram

Description automatically generated**

**Screenshot**

**Graphical user interface

Description automatically generated**

**Short Video**

**References Document**

I did not use any document to help with this project.