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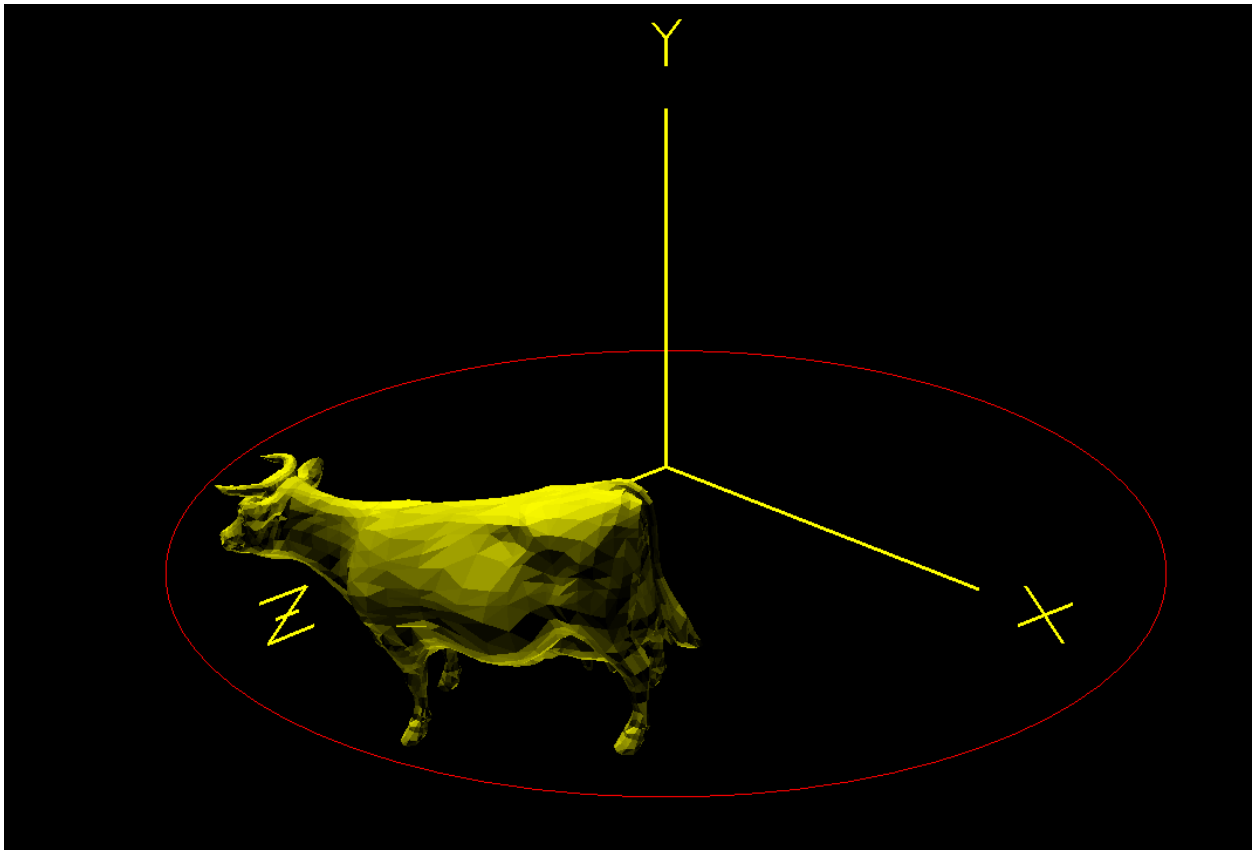
Project #2 - Using Transformations to Animate a Carousel Horse (Cow for me)!

What I did:
First off, I added the cow.550 (I thought the cow would be more fun to watch go-around) file to my project folder, included it in sample.cpp, and used the example code in the project instructions to draw and display him. After that, I use a for loop to create an outline of a circle using line segments with a radius of 2. Then I scaled my cow to be a reasonable size compared to the circle outline and transitioned him to be on the outside of the circle with his feet roughly at y=0. After that, I created an outside and inside view variable and set the default view to be the outside one. Then, in the display function, I used gluLookAt to place a “camera” in the upper outside area looking inwards and in the middle looking outwards. After that, I set keyboard shortcuts in the keyboard function to swap between the two POVs using 1 and 2. Then I finally started working on the animations in the display function. I began by calculating the cow’s position along the circular path using cos and sin functions to update its x and z coordinates over time, creating a smooth circular motion. I then rotated the cow so that it always faces the direction it’s moving by applying rotation based on the current angle of motion.
After that, I started to work on the rocking motion. I implemented this by using a sin function to calculate an up-and-down rotation angle around the cow’s z-axis. Then the amplitude and speed of the rocking motion were calculated using the rockingAmplitude and rockingSpeed variables to make the final result of the back-and-forth tilt. Lastly, I added the up-and-down bobbing motion. I did this by computing a yOffset value based on a sin function that oscillates over time. The amplitude variable, bobbingAmplitude, controls how high the cow rises and falls, while the speed variable, bobbingSpeed, controls how frequently the bobbing repeats per rotation. After fine-tuning this and the other animations, the final animation produces a fun-to-watch jumping and rocking cow that moves in a circle.

Screenshots: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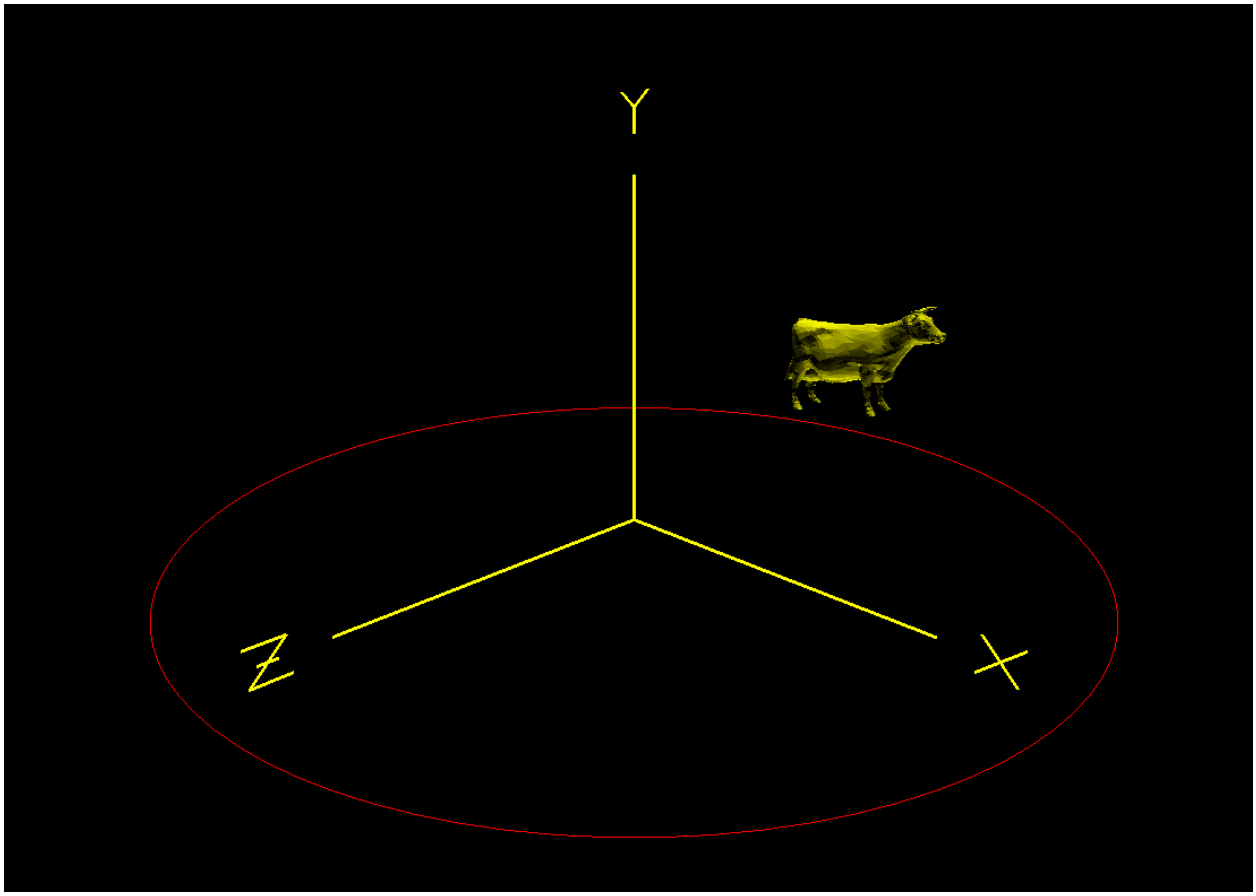
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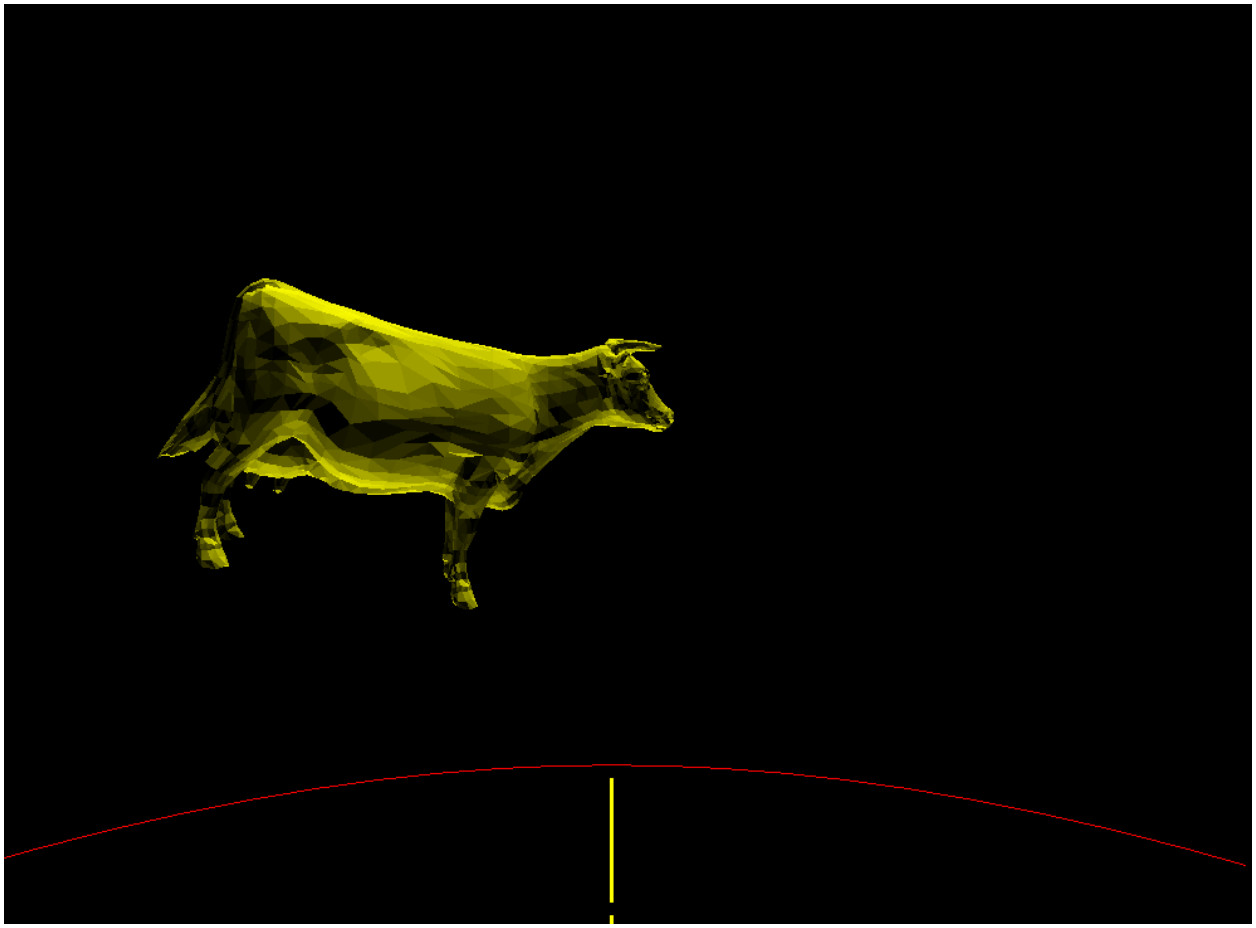

Video:
https://media.oregonstate.edu/media/t/1_tii5jkbg