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CSCI 4229

Homework 1: Gears

1. The framerates recorded are displayed in a list below. I would predict the high framerate from the 1x1 resolution would come from the fact that most of the gears are out of the frame, as it only gets one pixel. This would significantly reduce the amount of work needed to render the object, as only one pixel will ultimately make it into the frame. As for the other results, in spite of the high resolution difference between 300x300 and fullscreen, the results stayed about the same, though slightly higher with fullscreen. The gears get resized according to the window, so even though more individual pixels have to be rendered by the fullscreen mode, less of the gears actually make it in frame and have to be rendered. I also tested a wide but small resolution of about 500x300, in which case the framerate again went just above 3500 fps. It would seem as though the leading bottleneck in framerate comes from how much of the gears make it into frame, rather than the actual size of the window.
    a. 1x1: About 5400 fps, varied by about 100 fps either way
    b. 300x300: 3400 to 3500 fps
    c. Fullscreen: About 3500 to 3600 fps
2. Originally when I ran the gears program, it would run at 165 fps for all cases. My monitor is rated for 165 Hz. When moved to my other monitor, which is rated at 75 Hz, the program would run at 75 fps. When placed in between, it would also run at 75 fps. I am running on an Nvidia GPU, and after some research I found that Nvidia automatically applies Vsync in OpenGL, so I went to Nvidia control panel to disable Vsync, at which

point my framerate shot up into the thousands. I can conclude that the framerate would be small if limited to the monitor refresh rate, which may or may not happen automatically according to the hardware. It can however, as in my case, be changed on some systems, but changed externally from the gears program itself.

3. This assignment took about two hours to complete, most of that time spent trying to figure out how to uncap the framerate in gears.