CMSI 371-01

COMPUTER GRAPHICS

Spring 2013

Assignment 0226

Our last assignment before we plunge into the third dimension involves some work on the opposite end of the spectrum, with pixel-level color manipulation and some exploration of graphics primitives.

Outcomes

This assignment will affect your proficiency measures for outcomes *1a*, *2c*, *3b*, *3c*, and *4a–4f*.

Not for Submission

If you have the Angel textbook, you can get deeper treatment of recent material and some future course content with the following readings.

- *Colors, graphics primitives:* Sections 2.5 (pages 67–73) and 6.8 to 6.10 (pages 323–331)
- *3D graphics overview and pipeline:* Sections 1.1–1.9 (pages 1–40)

For Submission

A Few Good Filters

Copy the *nanoshop* and *nanoshop-neighborhood* sample code and add two (2) new pixel filter functions *each* to the `Nanoshop` and `NanoshopNeighborhood` modules, for a total of four (4) such filters. Modify the accompanying demo pages to show them off. Feel free to change the base picture that gets filtered, especially with your own code from Assignment 0129. Be creative, have fun!

Commit and push your work to your repository under *homework/nanoshop-filters*.

Primitive Behavior

Copy the *primitives* sample code and make the following modifications to it:

- Modify the `lineBresenham` function so that it accepts a `dash` parameter. This parameter is expected to be an integer that draws a dashed line. A `dash` argument of 5, for example, would draw 5 pixels first, then skip a pixel, then another 5, then skip, etc. (like this: — — — —)
- Modify the `plotCirclePoints` function so that, instead of plotting the outline of a circle, it *fills* the circle with a *linear gradient* (left to right or top to bottom—your choice). You will need to modify the signatures of the circle drawing functions, of course.

Make sure to adjust the accompanying demo code so that they showcase your modifications in action. Commit and push your work to your repository under *homework/primitives-plus*.

"Extra" Credit: Neighborhood Speedup

This is in quotes because "extra credit" does not translate directly to standards-based grading. Instead of adding credit, this task serves as an extra data point—i.e., it supplies additional evidence for the applicable outcomes. Do this work if you feel that this additional information provides further support for your proficiency in those outcomes.

Accomplishing this work produces an additional column for outcomes *1a*, *3b*, and *4a–4f*.

Implement a faster version of the `applyFilter` function in *nanoshop-neighborhood*: use the kind of thinking seen in the graphics primitives to make the overall pixel scan faster. Show evidence of the speedup by installing timing code that empirically shows faster performance (*Hint:* `Date.now`).

Call this function `applyFilterFaster` within the `NanoshopNeighborhood` module. If you choose to do this additional task, simply include it among the changes committed to *homework/nanoshop-filters*.