CSCI 550 (Fall 2017)

Homework #1

Handout: Wednesday, August 30, 2017
Due: 11:59 pm, Wednesday, September 13, 2017
Total points: 50

All assignments will be submitted through Canvas. Written assignment can be in any format: Word, PDF, plain text, or scanned hand-written. Images need to be in jpeg format.

1. What is the difference between calling glutPostRedisplay and calling the display function directly? Which one is preferred? Why.

2. Suppose an RGB raster system is to be designed using a 20-in by 15-in screen with a resolution of 100 pixels per inch in each direction. If we want to store 24 bits per pixel in the frame buffer:
   (a) How much storage (in bytes) do we need for the frame buffer?
   (b) How many distinct colors can be represented using this frame buffer? How many different colors can be displayed in one frame buffer (i.e. in one image frame)?
   (c) If a 120 Hz frame refreshing rate is required, what is the minimum memory access speed (bytes per second) for the frame buffer?

3. Any polygon can be subdivided into triangles. Therefore, to draw a filled polygon, we need only know how to draw filled triangles. Then why does OpenGL have primitives for quadrilaterals and general polygons?

4. Draw the graphical output if the following points were given, in the that order, to the primitives (1) GL_LINES, (2) GL_LINE_STRIPS, (3) GL_TRIANGLES, and (4) GL_TRIANGLE_STRIP:

   \[ P_1 = (0, 0); P_2 = (0, 1); P_3 = (1, 0); P_4 = (1, 1); P_5 = (2, 0); P_6 = (2, 1) \]