Homework - 5

CS594

Texture mapping

Texture mapping is a powerful and ubiquitous method by which polygonal models, i.e., meshes, are given life-like appearance. This is done by wrapping images around the models (meshes). Texture mapping is widely used in video games, CGI for movies, among other places. Click on the links below to follow the tutorials, then do the corresponding exercises.

1. Texture mapping in Blender: This video tutorial introduces UV-unwrapping and texture mapping in Blender. Length: 26:07 minutes.

   Exercise: Pick a polygonal model of your choice. You may download this in `.blend` format from the internet, or use one of the in-built meshes in Blender, or create one of your own. Next, create a simple bitmap image with your name written in it. For this purpose, you may use the "Paint" application in Windows or a similar application on other platforms. Apply this image as a texture over the polygonal model. Submit the final `.blend` file. Your image must be embedded into the `.blend` file that you submit. A quick google search should reveal how to do this.

2. Texture mapping in OpenGL: Shows how to apply textures, i.e., images onto polygons in OpenGL. Here the polygons and their uv-maps are hard-coded in C++ source code.

   Exercise: Edit the code of "Tutorial 5: A Textured Cube" as follows. Create a square with corners $\{(-0.5, -0.5, 0), (0.5, 0.5, 0)\}$. You may do this as a single polygon or as two triangles. Create the corresponding uv-coordinates as required. Create a simple bitmap image and write your name in it, keeping the background yellow. Apply this image as

the texture to the square. You will have to convert the image from `.png/.jpg/.bmp` to `.dds` format. Use one of the many online tools. Next, the program must read the keyboard and respond as follows. On pressing the left/right cursor key once, the square rotates anti-clockwise/clockwise by 1° about the z-axis, however, the text displayed on the square always stays horizontal. See for instance, the Figure 1. Submit your C++ code (a single file) as well as the image texture.

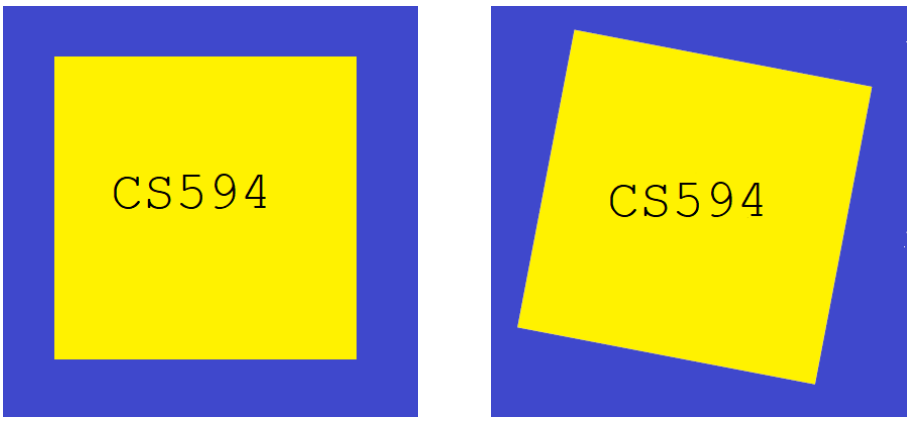

Figure 1: (a) The square in its initial position. The background of the OpenGL window is shown in blue (b) The square after undergoing rotation by 10° in clockwise direction. The text stays horizontal.