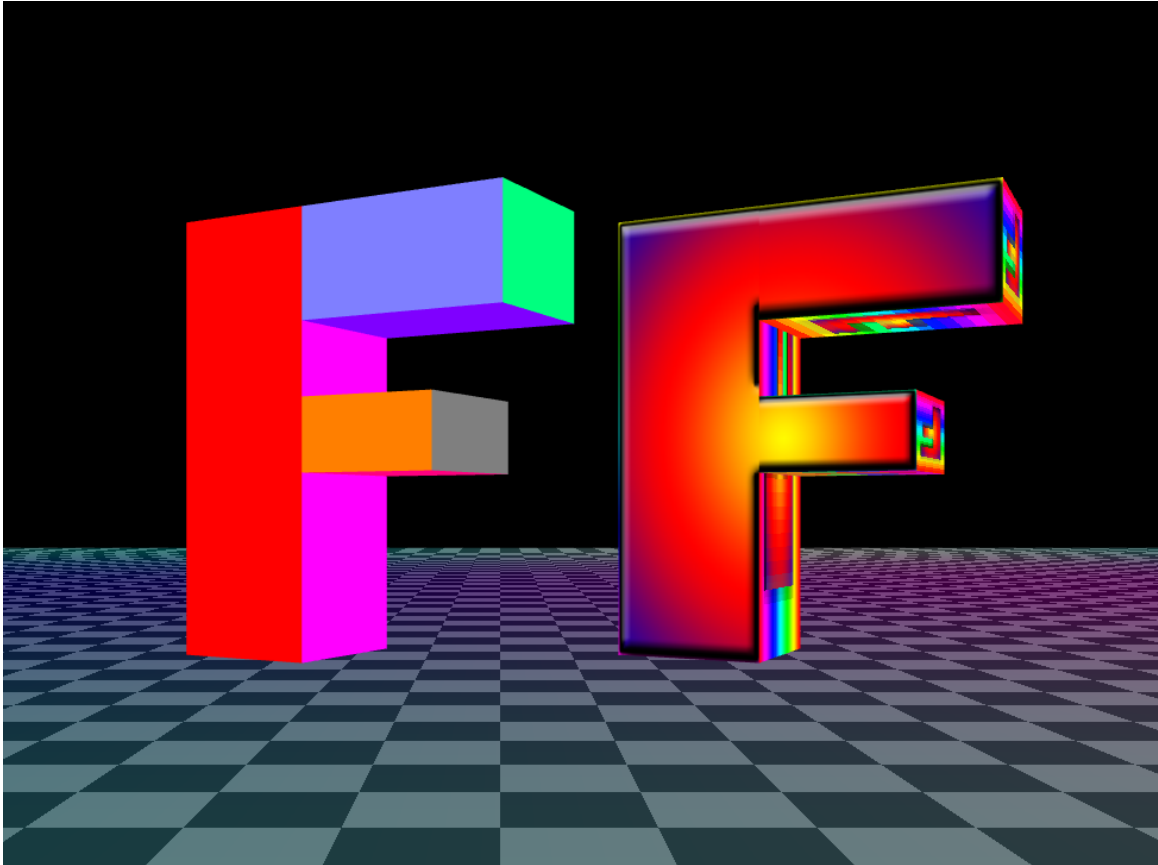


Visual Computing

CG Exercise 8- Geometry and Texture

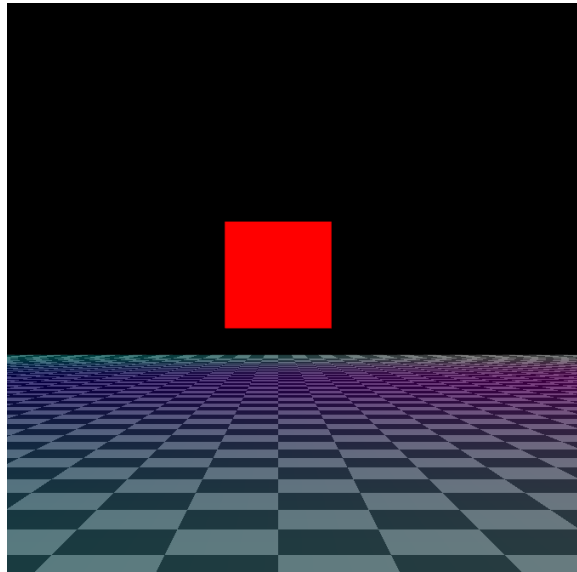


This exercise includes 5 different files:

- *tut8ex.html*: Used to start the scripts. Open this file in your browser.
- *gl-matrix.js*: Contains auxiliary functions.
- *tut8ex.js*: Script in charge of running and rendering.

You can have a peek at all the files (and change them if you want), but you can fully solve the exercise just by editing *tut8ex.js*.

Open the file *tut8ex.html* in a web browser. You should see a cube, like this:



When you look at line 212 and following, you can see how you can control the camera and the object's orientation.

8.1 Triangle meshes

In this task you are going to modify and create a triangle mesh. Triangle meshes are the most common way to represent geometry in computer graphics. Look at the code in *tut8ex.js*, line 322 and following. Right now, the arrays `vertices` and `indices` describe a cube.

- a) Modify the cube's vertices, so that it becomes a tall rectangle. (*tut8ex.js*:322)
- b) To further edit the geometry, let's add some vertices and faces. Edit the object `Fshape` to create the geometry of the letter F. (*tut8ex.js*:382)

8.2 Applying textures

Now that we have created a geometry, we will add some texture to it. We will use the image *f-texture.png* as a texture. The shader needs to know for each vertex its corresponding point on the texture image. This is called *uv-mapping*. In our code, this mapping is defined in the array `texture_coords`.

- a) Start a simple *python** server in the exercise folder: `python3 -m http.server` and then go to `http://localhost:8000/tut8ex.html`
*You can get python from: <https://www.python.org/downloads/release/python-390/>
- b) Map the image *f-texture.png* onto each rectangle (resp. pair of triangles) of the F-shape.
- c) For the front and the back of the F-shape, map the texture such that the geometry aligns with the texture image (just as in the picture at the very top right).

The key coordinates are annotated in the image below. Note that the image is of size 255 by 255 pixels.

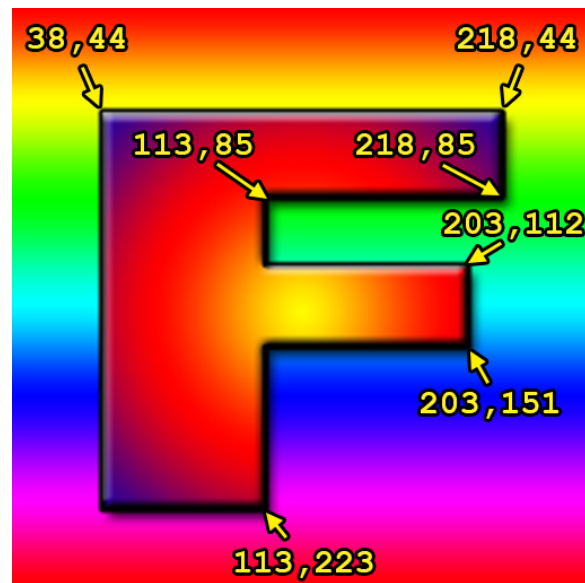


Image credits: <https://webglfundamentals.org/webgl/lessons/webgl-3d-textures.html>