

# CSE 333/533: Computer Graphics

## Lab 6: Implementing Textures

Instructor: Ojaswa Sharma , TAs: Vishwesh Vhavle , Aadit Kant Jha

Due date: 23:59, 2 November 2023

### Introduction

Texturing in OpenGL enhances visual realism, adding detail to 3D models. It improves efficiency, reducing geometry complexity. In today's lab, we will look at how to apply texture from an image onto an object. In order to map a texture to a triangle we need to tell each vertex of the triangle which part of the texture it corresponds to. Each vertex should have a texture coordinate associated with it that specifies which part of the texture image to sample from.

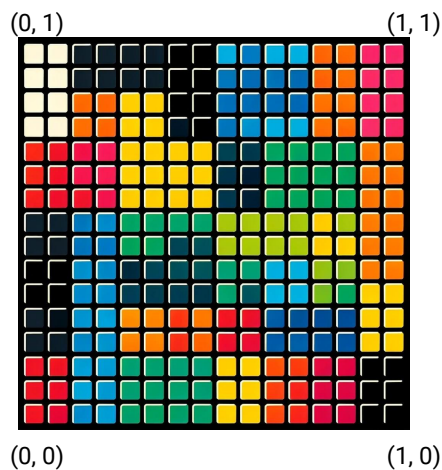


Fig. 1: Texture File

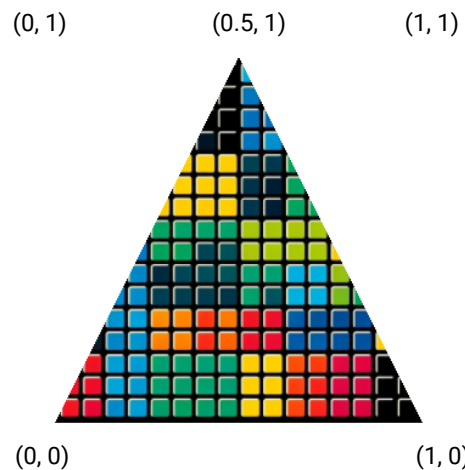


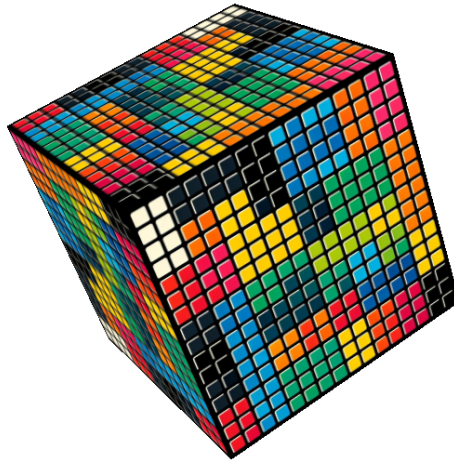
Fig. 2: Texture Mapped to UV Coordinates

Texture coordinates range from 0 to 1 on the x-axis and y-axis. The OpenGL texture mapping process is as follows:

- Firstly, we create a texture name using `glGenTextures` which takes in 2 parameters - the number of textures to be generated and the array where generated texture names will be stored.
- Post the binding you specify the two-dimensional texture image using `glTexImage2D` which takes in different parameters for the target, level, width, height, etc. Most importantly it takes in the pointer from where the texture data will be read (image).
- Then you generate the mipmaps for the texture object and set various texture parameters.

Run the given code to see how to set up texture mapping on a triangle.

## Deliverables



The task for the lab is to generate a textured cube. Reconfigure lines 160-165 of the given code to generate a cube (*similar to Lab 01*) and supply appropriate texture coordinates with it to create the above output. Additionally, comment line 246 and uncomment line 249 to make the cube rotate instead. Submit a screenshot of the output along with the code for evaluation.

Name the zip file as lab06\_<name>\_<roll number>.zip

*Example:* lab06\_vishwesh\_2020156.zip

---

## References

<https://www.opengl.org/documentation/>

[https://www.khronos.org/opengl/wiki/Rendering\\_Pipeline\\_Overview](https://www.khronos.org/opengl/wiki/Rendering_Pipeline_Overview)

<https://www.khronos.org/registry/OpenGL-Refpages>

<https://www.glfw.org/documentation.html>

<https://www.khronos.org/opengl/wiki/Framebuffer>

<https://learnopengl.com/Getting-started/Textures>

*Some Examples:* [https://github.com/fpaut/my\\_antons\\_opengl\\_tutorials\\_book](https://github.com/fpaut/my_antons_opengl_tutorials_book)

---

*Note: Your code should be written by you and be easy to read. You are NOT permitted to use any code that is not written by you. (Any code provided by the instructor/TA can be used with proper credits within your program). Theory questions need to be answered by you and not copied from other sources. Please refer to IIIT-Delhi's Policy on Academic Integrity [here](#).*