## CS 4554 - CG I: Lab 3: Illumination and Texture Map

## Lab Project Files

Keep working on the previous project.

## Upload to Blackboard

* A description of your project structure (short documentation);
* Source code with enough comments to make it clear what you are doing;
* Video/Gif/Images of your result (upload to the discussion board as well);

## Requirements

* In this lab, you will learn about OpenGL lighting, materials, and texture mapping.
* You are **required** to finish:
  + Setup lights; (1 point)
  + Create materials and apply on models; (1 point)
  + Calculate normal vector for each vertex; (1 point)
  + 1 model with Gouraud shading; (1 point)
  + 1 model with Flat shading; (1 point)
  + Load, setup and bind texture; (1 point)
  + Assign texture coordinate to model vertices; (1 point)
  + 1 Minecraft cube with NEAREST texture filter; (1 point)
  + 1 Minecraft cube with LINEAR texture filter; (1 point)
  + 1 Minecraft cube with transparent texture; (1 point)
* Extensions (Bonus):
  + Create a Minecraft tree;
  + Create terrain and cloud;
  + Allow player to add/remove cube in the environment;

## Additional Help Information

* In order to load texture from image files, you can use [stb\_image.h](https://github.com/nothings/stb/blob/master/stb_image.h) as a simple header-only library;
* To create better material, you can check the [material look-up-table](http://devernay.free.fr/cours/opengl/materials.html).
* You can use this 256x256 texture for Minecraft cubes;
* 