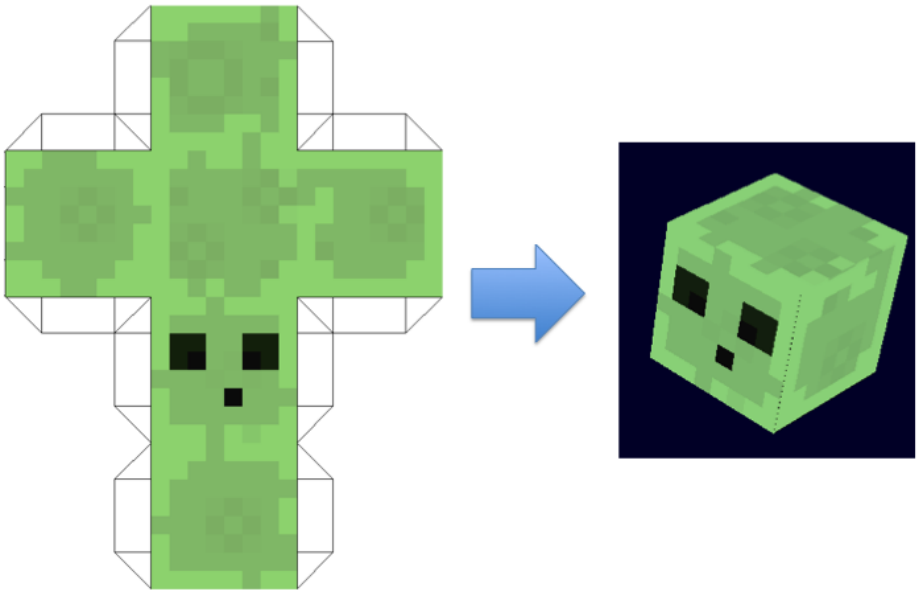
COSE436 Interactive Visualization (Fall 2024)
Instructor: Prof. Won-Ki Jeong
Due date: Nov 24, 2024, 11:59 pm.

Assignment 3: Texture Mapping

In this assignment, you will learn how to use texture mapping. Using the provided papercraft images, write a code to render 3D models as shown below Mob character example (this is the simplest example, and you can create more complicated models):

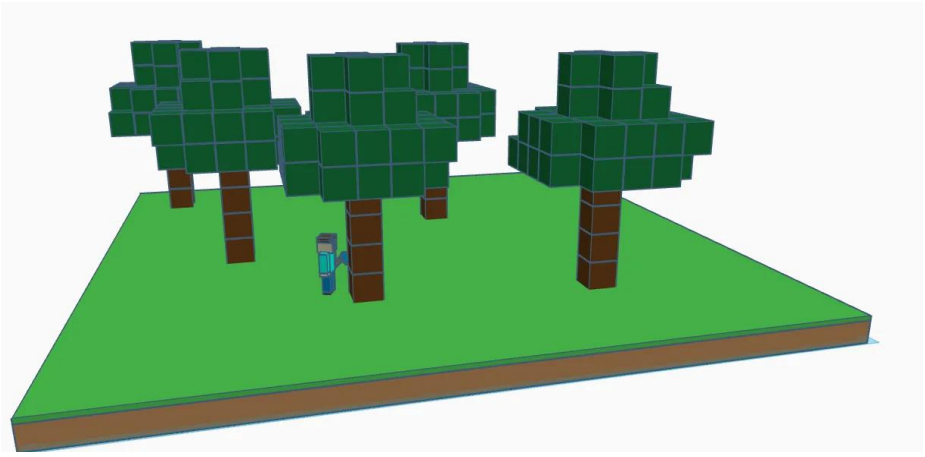


Mob character

In order to do this, you need to load the image, create a 2D texture, and assign per-vertex texture coordinate. Since the texture coordinates are not provided, you need to find the pixel location of each corner (vertex) of a cube manually. You also need to design the 3D model's geometry manually (mostly collection of cubes). Use the I/O functions in bmploader.cpp to load the BMP images (see init() function in main.cpp for an example usage of LoadBMPFile()).

Once textured 3D characters are generated, you should create a 3D scene with multiple characters and make them move (animation). Use your own texture maps to creatively decorate your 3D scene (the grass and stone textures are provided, but you can find more interesting textures from internet for your scene). You can use "idle" callback of glut to change posture and location of each character over time.

Grading (100 pts):
- Render at least one correctly texture-mapped minecraft character (20 pts).
- Create at least three textured full-body (i.e., with a head, a body, arms, and legs) 3D characters. You may use texture images from internet (20 pts).
- Create your own 3D scene with textured 3D characters and extra objects, such as stones, grass, etc (20 pts).
- Implement animation of 3D characters (20 pts).
- Virtual trackball to translate/rotate/zoom the entire scene (10 pts).
- Submit a report describing your work (10 pts).



Steve character and an example 3D scene
(https://www.printables.com/model/604084-minecraft-scene/files)

Good luck and have fun!!!

Extra point (50 pts): Render glossy (like mirror) objects using environment mapping. An example can be found here (https://learnopengl.com/Advanced-OpenGL/Cubemaps)