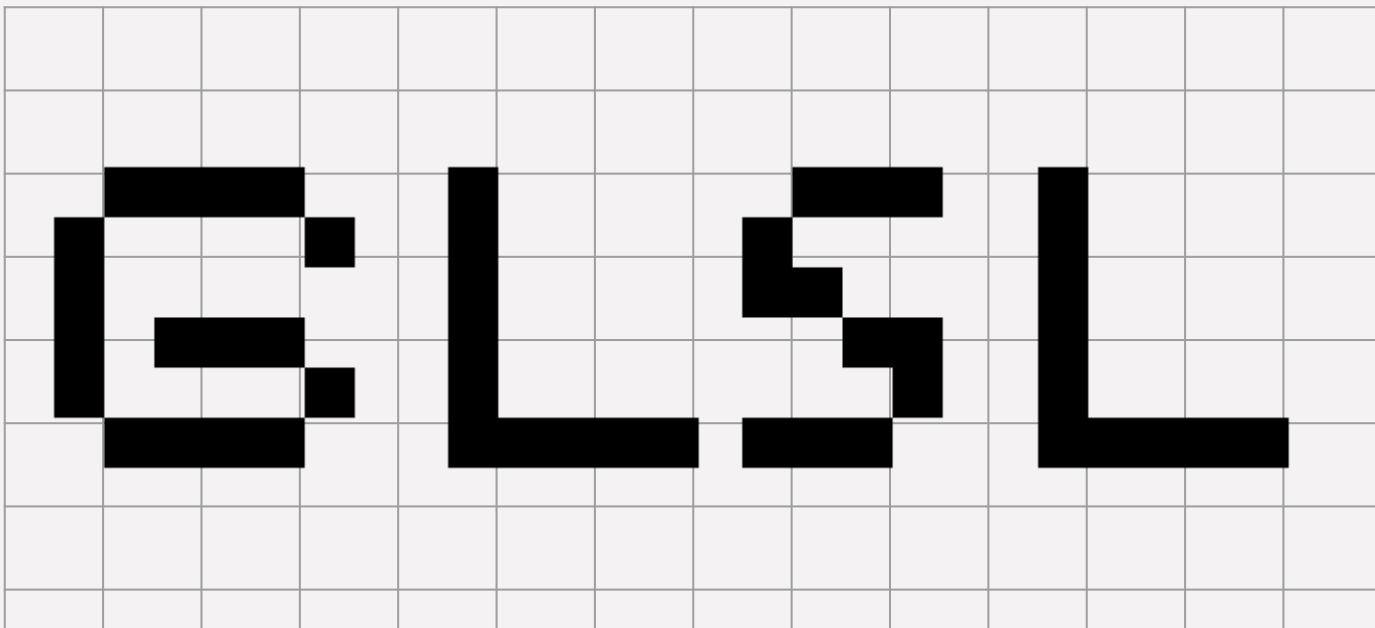


OpenGL Programming

By Julius Colby



What Is It?

- OpenGL Shading Language
- Similar to C++
- Cross-platform API



How Is It Different?

- Real-Time rendering
- Built-in functions and data values
- Lots of abstraction
- Easy to replicate results for consistency

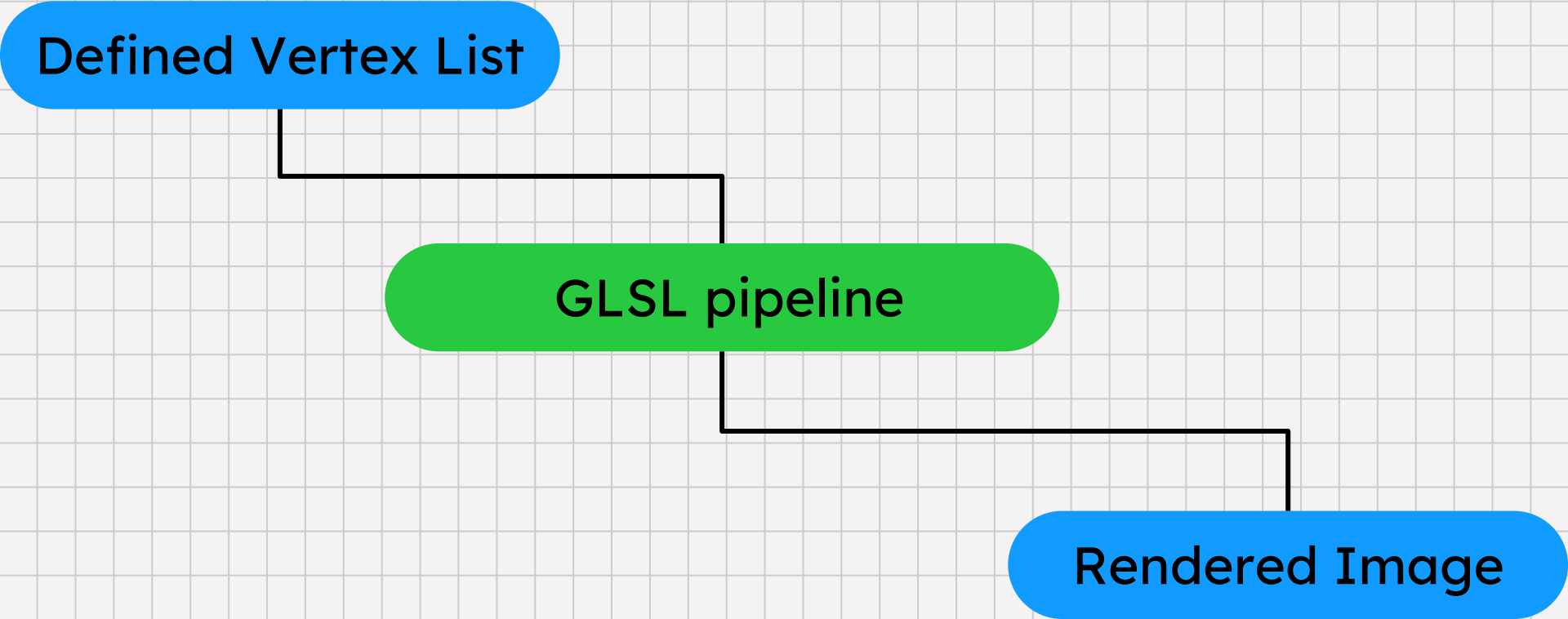
```
in vec4 gl_FragCoord;  
in bool gl_FrontFacing;  
in vec2 gl_PointCoord;
```

Process

Defined Vertex List

GLSL pipeline

Rendered Image



Deep Rabbit Hole




The image displays a collage of overlapping browser windows illustrating a 'Deep Rabbit Hole' of research into WebGL and OpenGL. The windows include:

- A Google Docs presentation titled "Graphics Final Project (GLSL Re...".
- A YouTube video player showing a video titled "anisotropic filtering glsl".
- A Google search for "webgl vs opengl".
- A YouTube video player showing a video titled "perspective correction glsl".
- A khronos.org/wiki/Built-in_Variable_(GLSL)#Fragment_shader_outputs page.
- A code editor showing C++ code for "openglcanvas.cpp".






The code editor shows the following code:

```
src > C:\cube.h M C:\openglcanvas.cpp M
src > C:\openglcanvas.cpp M InitializeOpenGL()
    wxLogDebug("OpenGL version: %s", reinterpret_cast<const char*>(glGetString(GL_VERSION)));
    return false;
}
wxLogDebug("OpenGL version: %s", reinterpret_cast<const char*>(glGetString(GL_VERSION)));
```

Yesterday (3)

 glew-2.1.0-win32.zip	12/13/2024 12:57 PM	Compressed (zipp...	2,374 KB
 glfw-3.4.zip	12/13/2024 12:55 PM	Compressed (zipp...	1,615 KB
 shader.frag	12/13/2024 12:32 PM	FRAG File	2 KB

Earlier this week (12)

 glslang-master-windows-Release.zip	12/12/2024 1:24 PM	Compressed (zipp...	13,592 KB
 SDL-release-2.30.10 (1).zip	12/11/2024 1:12 PM	Compressed (zipp...	8,847 KB
 glee-master.zip	12/11/2024 12:58 PM	Compressed (zipp...	1,108 KB
 SDL2-2.30.10-win32-x64.zip	12/11/2024 1:11 PM	Compressed (zipp...	591 KB
 glad.zip	12/11/2024 1:07 PM	Compressed (zipp...	502 KB

What I Did

glslCanvas

GLSL file

Renderers

```
vec3 ambientcolor = vec3(0.1804, 0.1137, 0.1647);
vec3 diffusecolor = vec3(0.7373, 0.8118, 0.0392);
vec3 specularcolor = vec3(1.0,1.0,1.0);

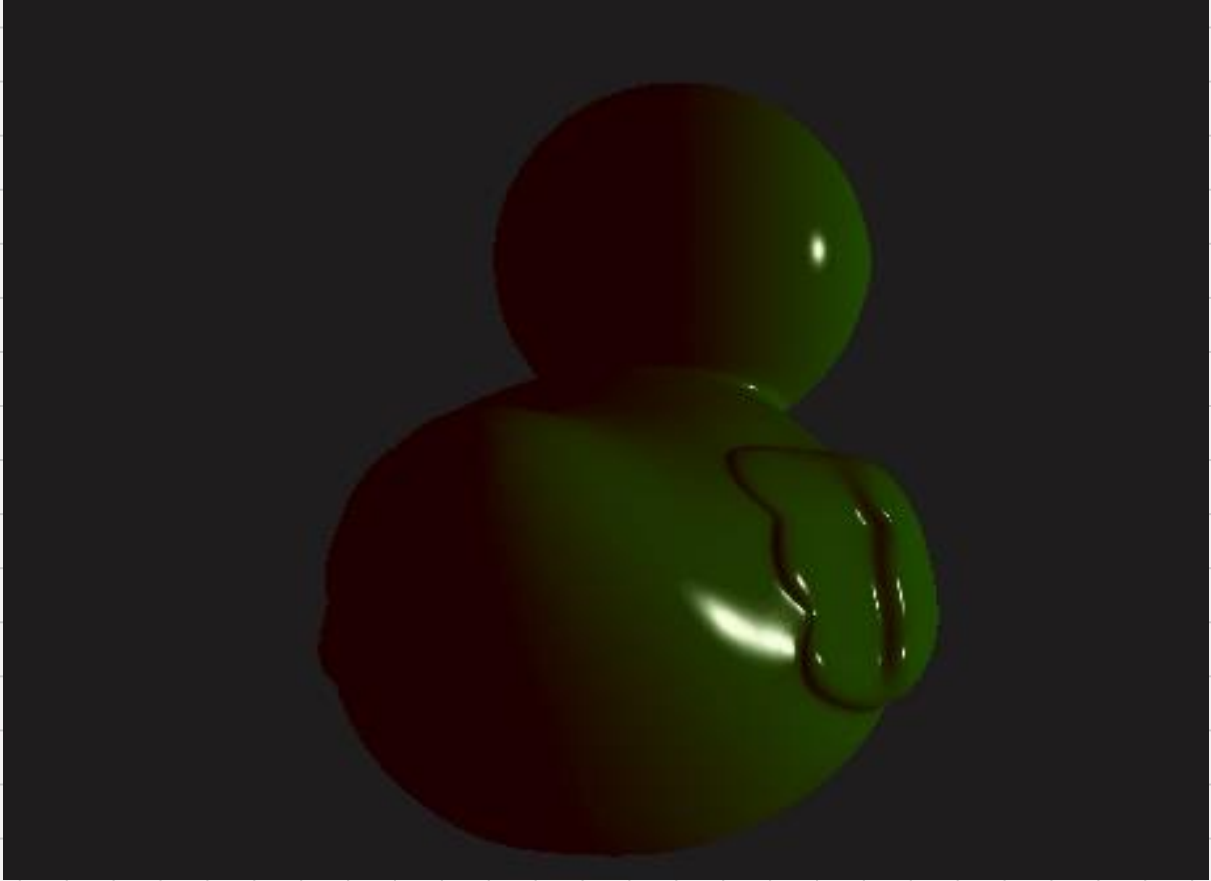
float ambientmag = 0.4;
vec3 ambient = ambientmag * ambientcolor;

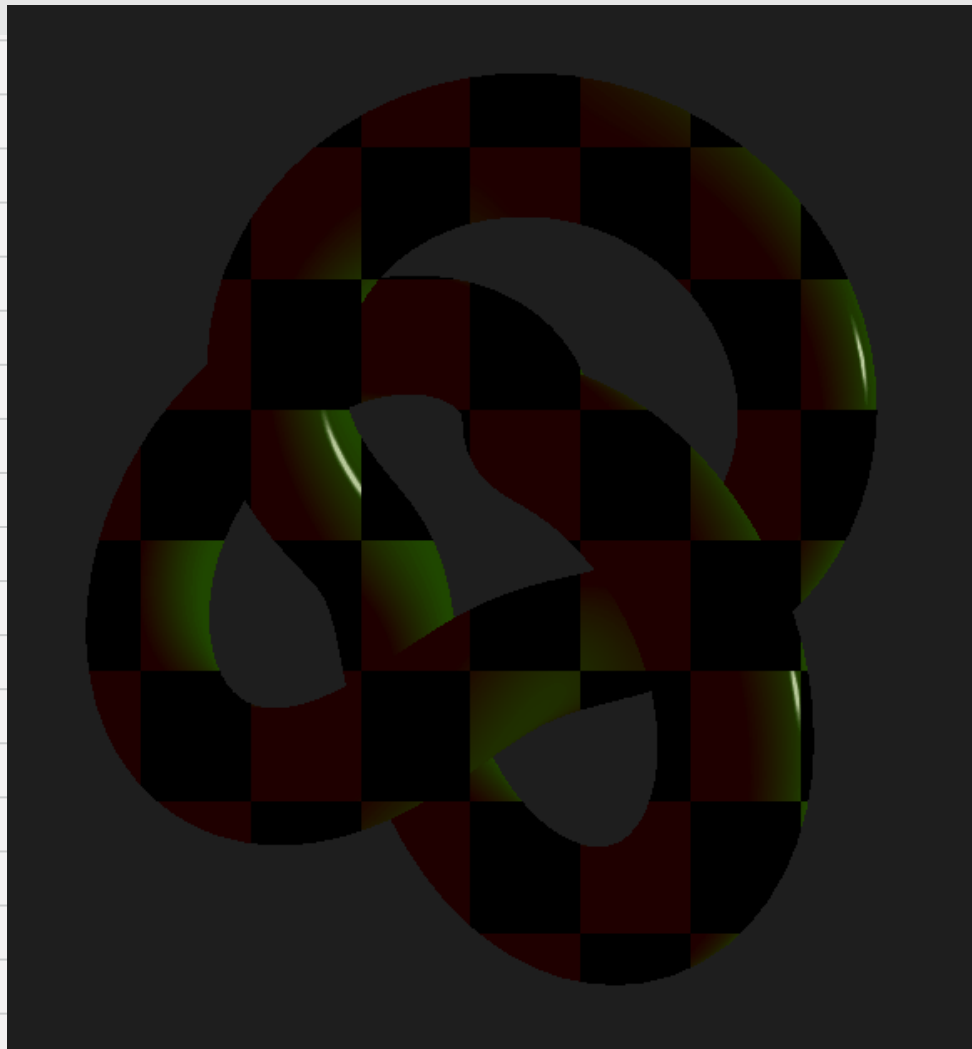
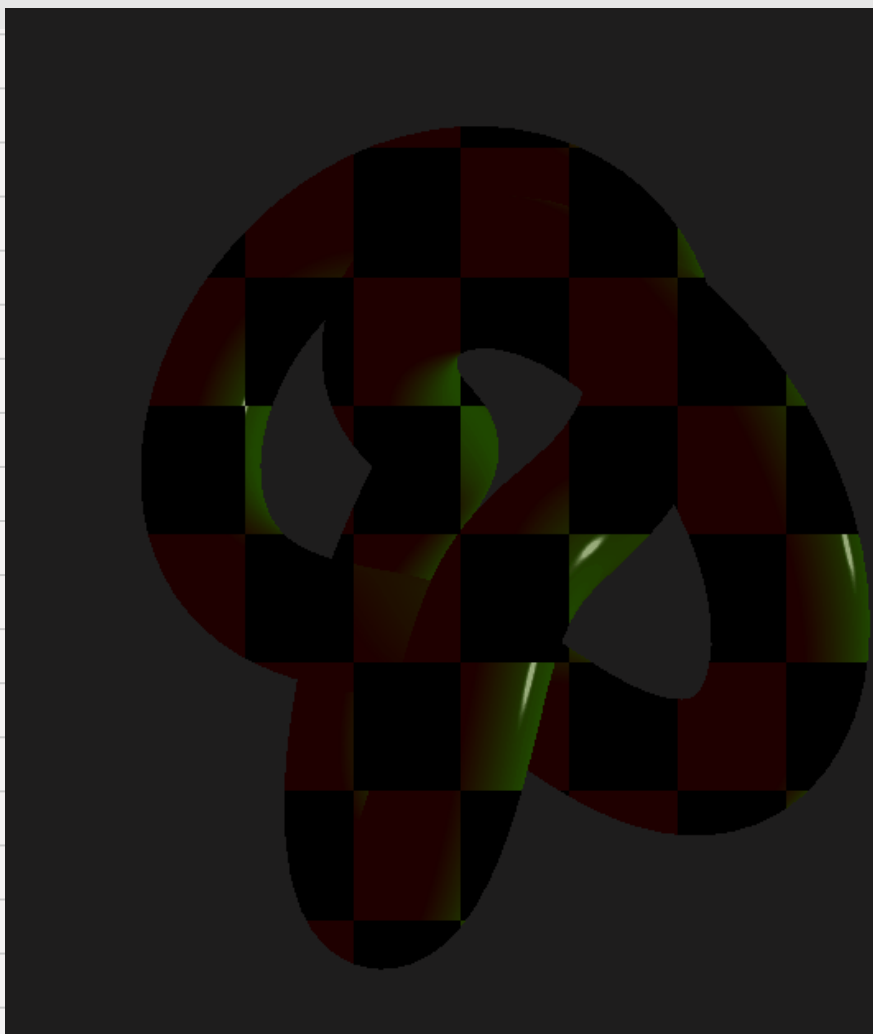
vec3 normal = normalize(v_normal.xyz);
vec3 light = vec3(1.0,0.0,0.0);
float diffusemag = max(0.0, dot(light, normal));
vec3 diffuse = diffusemag * diffusecolor;

vec3 camera = vec3(.0,.0,1.0);
vec3 view = normalize(camera);
vec3 reflect = normalize(reflect(-light, normal));
float specularmag = pow(max(0.0, dot(reflect, view)), 10.0);
vec3 specular = specularmag * specularcolor;

vec3 lighting = ambient + diffuse + specular;
vec3 color = vec3(.0,.0,.0);
gl_FragColor = vec4(lighting, 1.0);
```

```
uniform vec2 u_resolution;
varying vec4 v_normal;
```



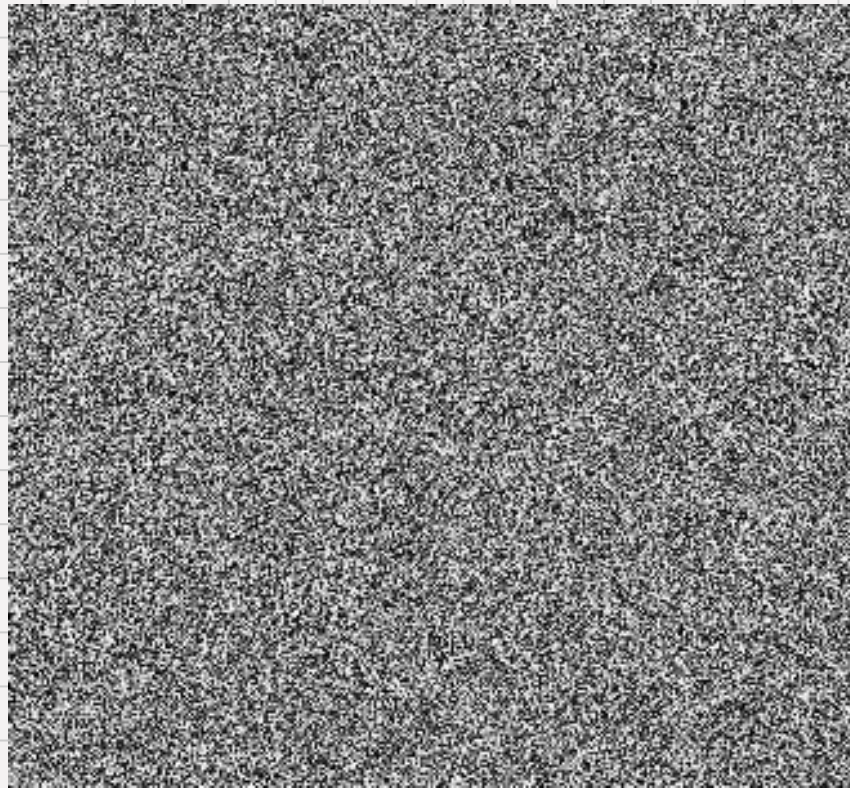
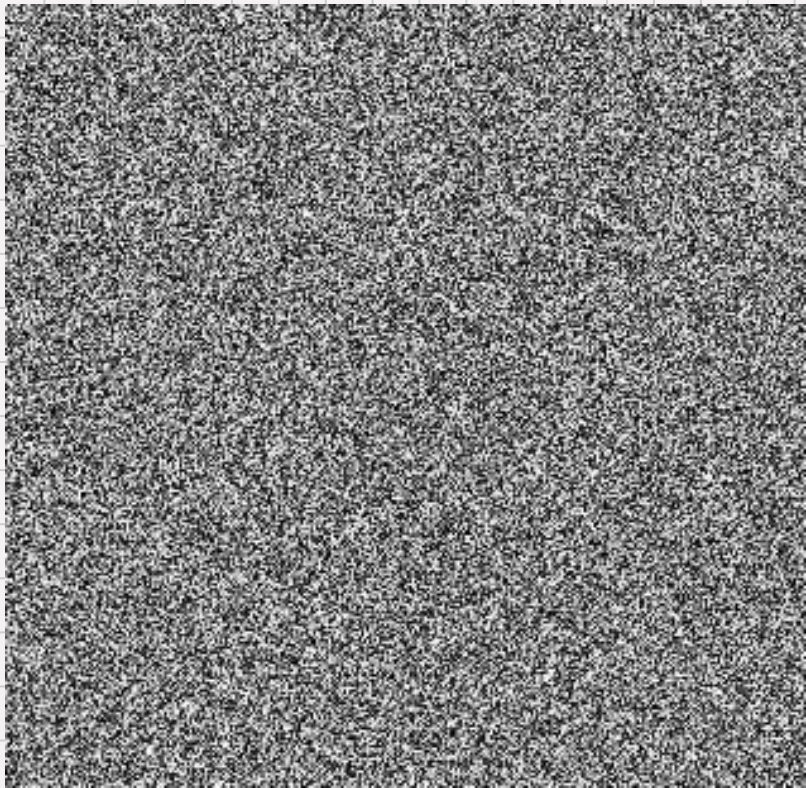
```
10)
```

```
1.0, 0.0, 1.0]),\
```

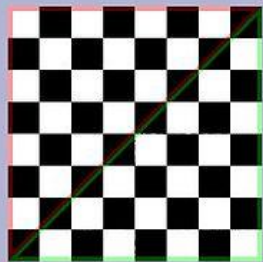
```
])
```



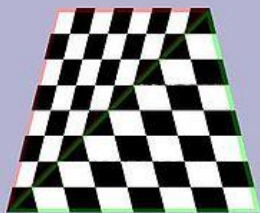
```
float rand1 = fract(sin(dot(uv, vec2( 12.9898, 78.233))) * 43758.5453);
```



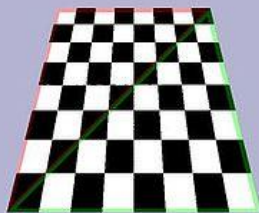
What Did Not Work



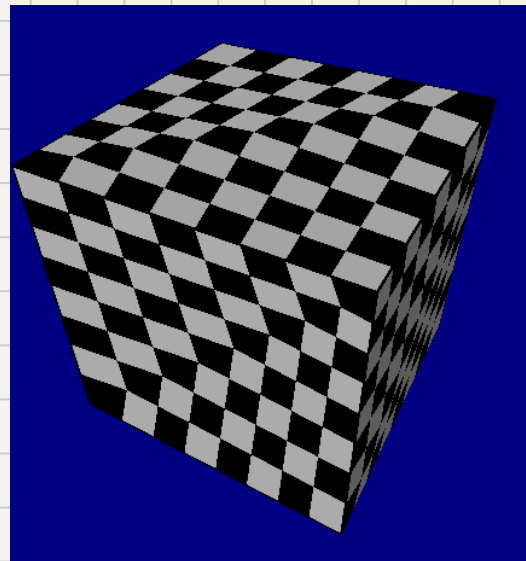
Flat

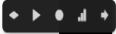
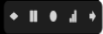
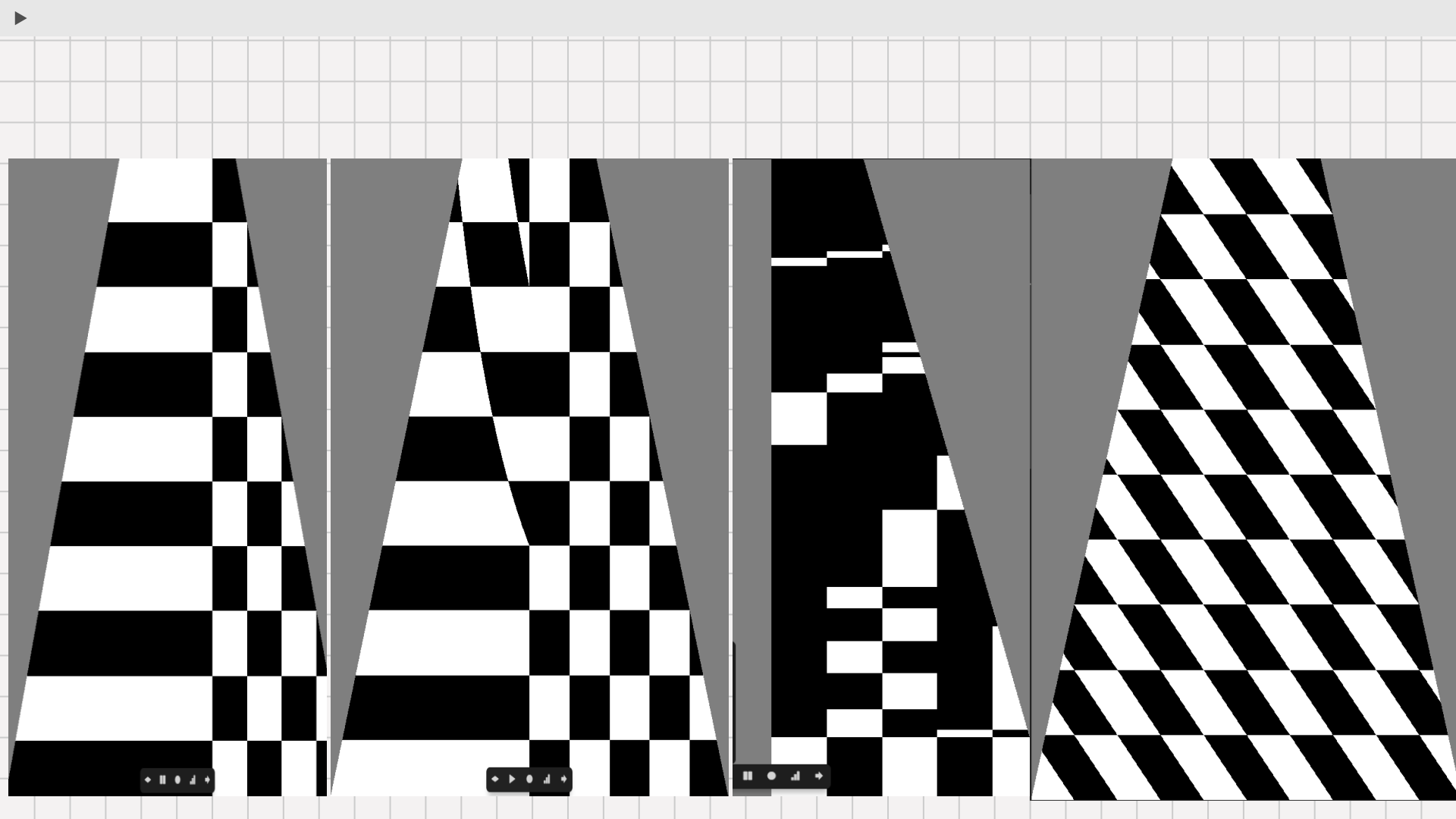


Affine



Correct







Q&A?