

# Live Lecture Chat Window

## March 13, 2024

**12:20:23 When you are in a game and you see your avatar walk up to a mirror and the reflection moves when your character moves, does that effect use ray tracing?**

Could be. But oftentimes that is a cheat where they reverse the X coordinate of the avatar and draw it a second time at the plane of the mirror. Raytracing might be overkill for that.

**12:38:26 If Apple iMacs don't have modern OpenGL support, what do Macs make use of for graphics instead of OpenGL? Can Macs be used with modern Vulkan development?**

Vulkan can be made to run on Macs. Apple would prefer you use Metal, which then locks you into Apple-only.

**12:55:51 Would it be doable to approach your Vulkan class as a self study?**

Probably. The notes are in a very deliberate order. They start in the middle with what you already know (vertex-drawing) and then work out into what you don't know.

**13:08:51 I remember playing with POV-Ray back in, um, high school, and how it took hours to render a 1024x768 image of shapes made of glass, so all this real-time raytracing seems like magic to me :P**

Yes, the prospect of doing RT with hardware support is pretty exciting if you have ever tried doing it without hardware support.

**13:18:46 People can keep their smartphone on their belt.**

I agree. Cellphone only. No slide rules either. As much as I love this stuff, even I would not carry a rendering engine on my belt...

**13:20:19 I may be a nerd, but even I'm not nerdy enough to use a belt clip. That's what cargo shorts are for.**



**13:34:51 Did Pixar invent shaders?**

I give Pixar credit for shaders. Others might have had plug-ins, but it was Pixar that really formalized the whole shader setup with built-in variables, uniform variables, etc. It says a lot that about the quality of Pixar's vision with shaders that GLSL copied a lot of Pixar's ideas even 15+ years later.

**13:42:19 Did plugins include changing the geometry of the surface?**

That's what RenderMan would call a "displacement shader"/

**14:23:13 From Bailey, Mike to Everyone [how to get something to move from the side towards the origin]:**

```
float newx = gl_Vertex.x + 5.*(1.-Timer);
```