Ray Tracing One Weekend

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1 Week 0: Ray Tracing Class

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- course link
- shoutout to **TODO** add x user that pointed me to this (shoutout ml btw (for you page))
- this is my very first c or cpp project (op says it's c flavored cpp) beyond hello worlds and basic basic robotics stuff
- i love rust but i am not cracked at all so i would probably not be able to follow along in rust
- i will, however, follow op's advice to not copy pasta (besides most of makefile compiler flags hehehe) and build it up slowly by typing along
- going to try my best to thug this out by Sunday
- test bib [1]
- bib working lets go
- important setup for fresh arch install (not in order, and just off the dome, i likely am forgetting tons of things)
  - install unzip (will need for nvim clangd Mason lsp stuff)
  - install cmake, clangd, gcc stuff
  - setup debugger for nvim using dap, dap-ui, etc.
  - **build, compile, run:** (i think lol)
    1. `cmake -B build/Debug -DCMAKE_BUILD_TYPE=Debug`
    2. `cmake --build build/Debug`
    3. `build/rayTracing > image.ppm`
- op claims that if we can build project correctly in the beginning, then we are golden for rest of tutorial
- i hope this is true since the provided cmake file is cash money and really easy to get working with my setup (Figure **??**)
- make `rtrace` aliase for build, compile, run, then open image in feh, probably terrible idea but whatever
- got color header file with a `write_color` util function
- now working on a `ray` class which will use our `vec3` class.
- refresher on rays: think of them as functions (Equation 1):

$$\mathbf{P}(t) = \mathbf{A} + t\mathbf{b} \tag{1}$$

- here $\mathbf{P}$ is a 3D position along a line in 3D. $\mathbf{A}$ is the ray origin and $\mathbf{b}$ is the ray direction. The ray parameter t is a real number (`double` in the code). Plug in a different t and $\mathbf{P}(t)$ moves the point along the ray. Add in negative t values and you can go anywhere on the 3D line. For positive t, you get only the parts in front of $\mathbf{A}$, and this is what is often called a half-line or a ray. (Figure 1)

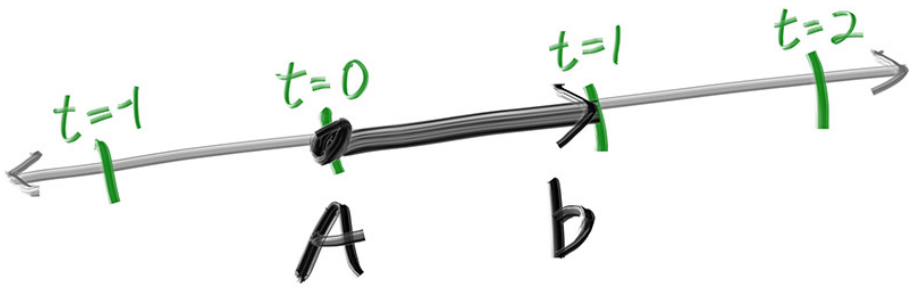

Figure 1: *linear interpolation*

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References

[1] S. H. Peter Shirley, Trevor David Black, “Ray tracing in one weekend,” April 2024.