Steps

Prerequisites

- Any operating system can be used
- Install latest Chrome/Firefox
- Install shader-school. Instructions are given here

Phase 1 (3 weeks)

- whatis of rendering: either from online sources or from "GLSL Essentials" by Jacobo Rodriguez
    - Vertex, Fragment, Viewport, Camera, Clipping
    - Rasterization, Antialiasing, Vertex Shading, Fragment Shading, Textures
    - Linear Transformations: translation, rotation, scaling, skewing
    - Transformations using 4-vectors (x,y,z,w) and projection to 2d before rasterization
    - Reflection models: Ambient, Diffuse, Specular, and their equations
    - Shading models: Flat, Gourard, Phong, Blinn-Phong
    - Bilinear Interpolation, and its use in Smooth/Interpolative Shading models
- Complete shader-school. You can also work on this while reading the above

Phase 2 (2 weeks)

At this stage, we have understood how to write rendering pipelines on GLSL run by GPU. Now we will learn how to bind them with general CPU programs. Almost all programming languages contains GLSL API bindings. We will use WebGL on Javascript, as it can be run in any browser on any modern hardware platform and OS

- Learn Javascript from w3schools and MDN. If you need an alternate material, let me know.
- (optional) Learn WebGL API from MDN
- (optional) Learn three.js from threejs.org

Phase 3 (3 weeks)

- Create an image of this
- Make The black hole lensing simulation with objects at infinity

Helping hands

- Discuss if you need anything / find anything confusing
- We can give boilerplate/sample WebGL/Three.js code if you are stuck somewhere