

Ray Tracing

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Terminology

- Rendering – “The process of generating an image from a model, ... by means of a computer program.”

Shamelessly quoted from Wikipedia

- Ray – A line segment defined as $\vec{r} = \vec{o} + t\vec{d}, t > 0$
- Primitive – A shape with a simple mathematical representation that can be easily modelled by a computer.

Background

The Problem:

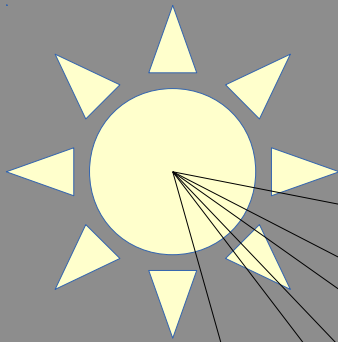
We want to find a way of taking a mathematical description of a three-dimensional scene and producing an approximation of what the scene would look like if we were to construct it in reality.

Objectives:

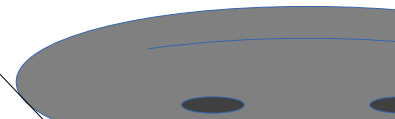
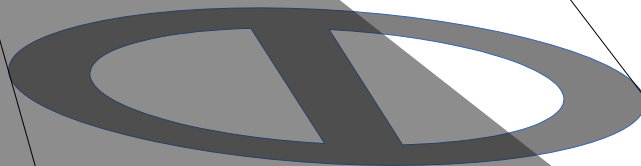
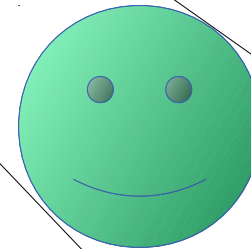
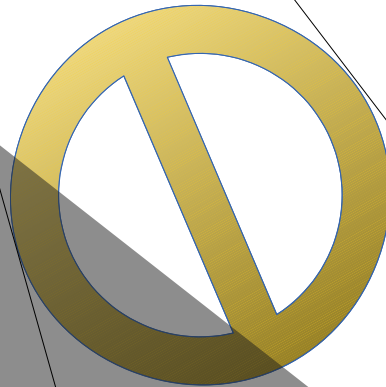
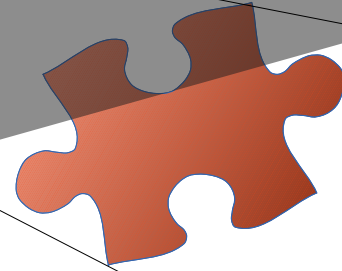
- Realism
- Appropriate computation time.

Constraints:

- Memory limits
- Processing power



Background



Alternatives to Ray Tracing

- Conventional Rasterisation*
- Scanline Rendering
- Ray Casting
- Voxel Rendering



* Rasterisation actually has a more general meaning, but in this context the word tends to refer specifically to the techniques implemented in libraries such as *OpenGL* and *DirectX*.

What is Ray Tracing?