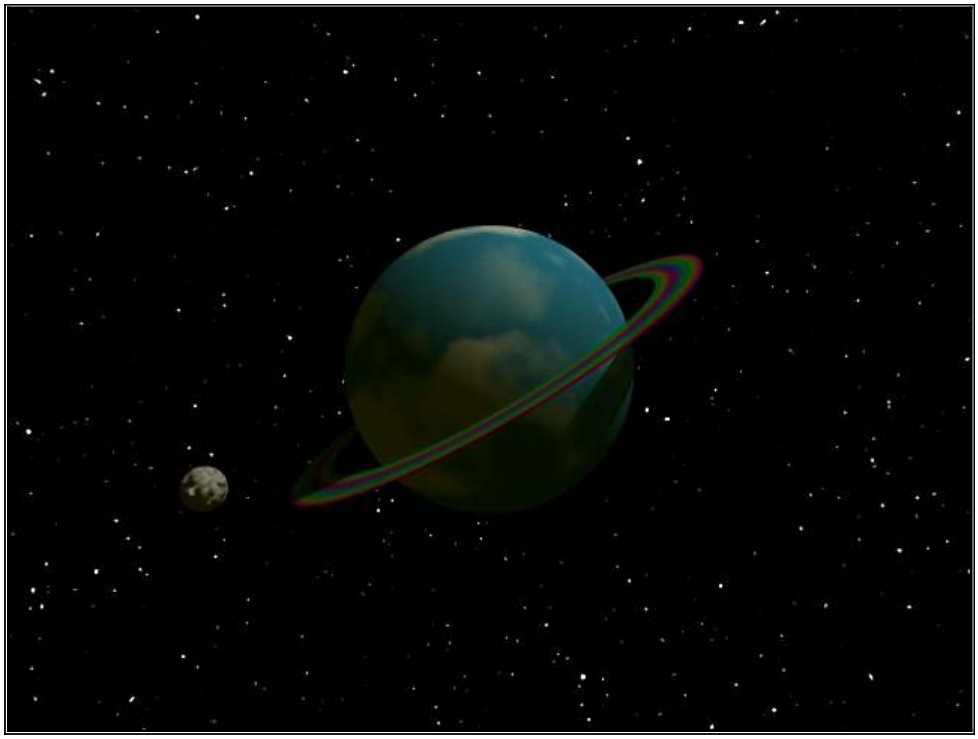
SIMPLE PHOTOREALISM USING PERSISTENCE OF VISION



A tutorial on making 3-D images for people who can't draw to save their life.

http://www.hoboes.com/NetLife/POV_Simple/

July 10, 2011

PERSISTENCE OF VISION

The Persistence of Vision Raytracer, or POV-Ray, is 3-dimensional raytracing software that uses text files to tell it where to put objects and effects in a scene. Unlike most raytracing software, POV-Ray does not require you to be skilled at drawing. At its most basic, you tell POV that you want one shape here, another shape there, and you'd like to combine these two simple shapes into a more complex shape, and put it over there. But you do not have to draw the shapes yourself, and you don't have to draw them in perspective, draw their shadows, draw the light on them, or any of that stuff. The raytracer handles this for you.

You can download POV-Ray, and see the kinds of images it can produce, at the official website: *http://www.povray.org/*.

MORE INFORMATION

The Persistence of Vision web site at *http://www.povray.org/* has documentation, tips, tricks, and links to several wonderful resources. The POV-Ray Book Project at *http://book.povworld.org/* has a series of projects that guide you to more and more advanced use of POV-Ray. My own Persistence of Text at *http://www.hoboes.com/NetLife/POV/* has a handful of detailed projects that guide you through understanding specific concepts in POV-Ray.

If you want to be inspired by what raytracing can do, go to the Internet Raytracing Competition at *http://www.irtc.org/*. They hold several competitions every year, and keep an archive of past contests going back to 1996. Many of the images there were created using Persistence of Vision. Go there if you are easily inspired, but not if you are easily discouraged.

YOUR FIRST SCENE

LIGHTS, CAMERA, ACTION!

Your most basic scenes will consist of a light source, a camera, and an object. Raytracers such as POV-Ray work by sending "rays" from the camera and following the "rays" through reflection, refraction, and absorption until the rays reach a light source or are lost in shadow. See *http://en.wikipedia.org/wiki/Raytracing* for a more detailed explanation of what raytracing is. Now, let's create our first simple scene.

You should have already downloaded POV-Ray for your computer, and started it up. You will most likely have a blank document waiting for you to type your scene description. Scene descriptions in POV-Ray use a very formal "scene description language". I'll be using POV-Ray 3.6.1 for Mac OS X in the examples here. The location of menus and menu items will probably be slightly different if you are not using Mac OS X, but the scene description text will be exactly the same no matter what platform you are using.

Location, location, location!

Just about everything you put into a POV-Ray scene has to have a location. POV-Ray requires you to specify three numbers for each location. These numbers are the distance from an imaginary "origin" which might be thought of as the center of the universe.

A location of "5, 3, 6", for example, would be a distance of five to the right of the center, a distance of three above the center, and a distance of six behind the center.

If you need to place something to the left of center, below the center, or in front of the center, you'll use negative numbers: "-3, -9, -6", for example.

What do those numbers mean in actual distance? It's an important question, and one you'll want to think about before you start placing things in your scene. You can decide that the numbers mean meters, feet, inches, miles, or even light-years. I always try to place a note at the top of my scenes reminding me of what the numbers mean.

Because you can move the camera wherever you want, the "center of the universe" is usually not the center of your image.

Let there be light!

We need a light, a camera, and an object. Let's do the light first. The first line of our scene will be

our reminder about what the numbers for locations mean. Let's go with meters. If you don't have an open blank document in POV-Ray, pull down the "File" menu and choose "New".

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//units are in meters
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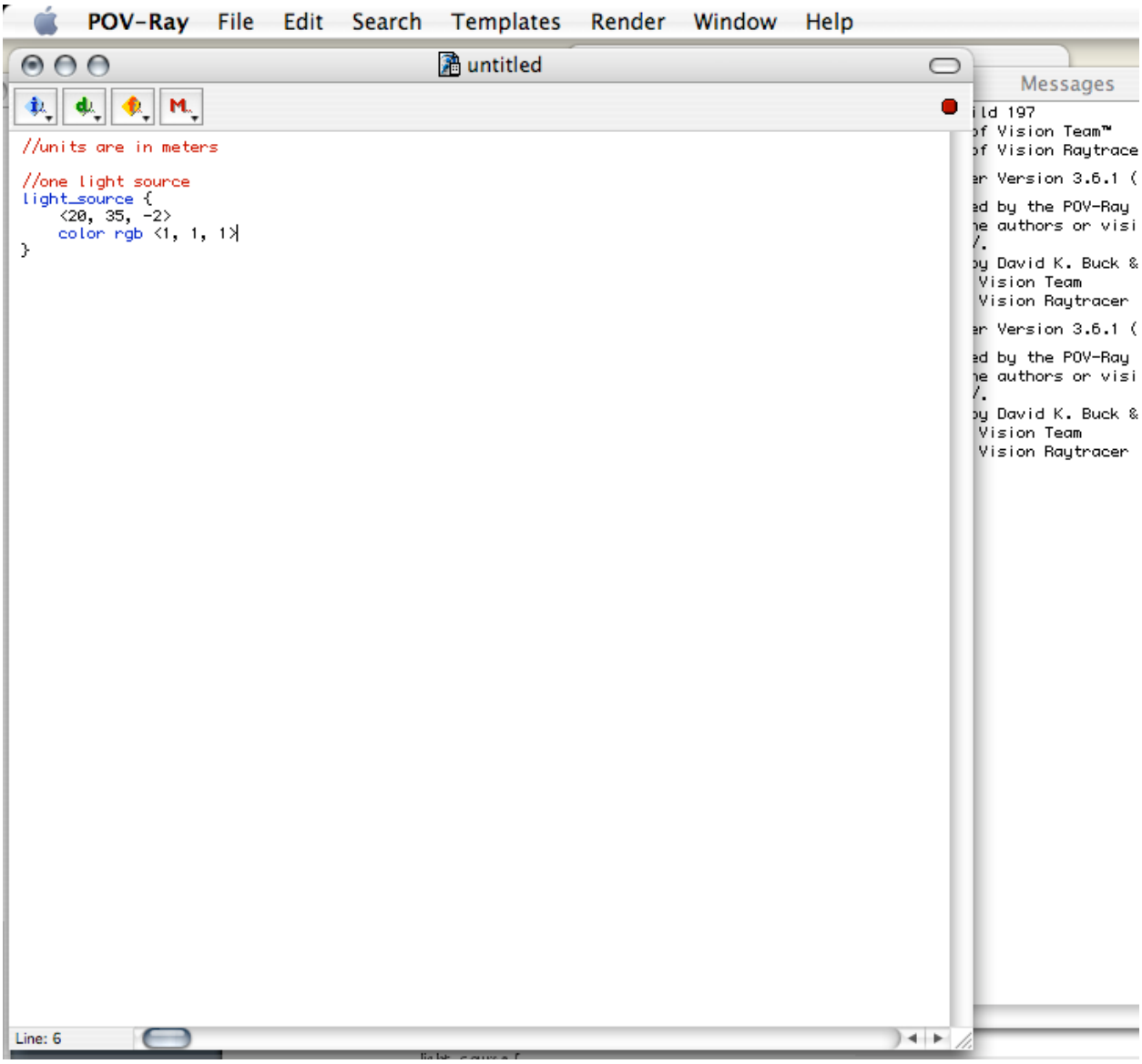
Reminders and notes can be placed anywhere in your text, but must begin with two slashes. The two slashes tell POV-Ray that this line is not an instruction for it to place something within the scene.



You will usually want to put a note or reminder in front of every object, to remind of what their purpose is later.

Our light source is going to need a location and a color. You can have green lights, blue lights, chartreuse lights, if you want. Often, you'll be using white lights. Colors in POV-Ray are usually specified with specific amounts of red, green, and blue.