

## Raytracing Fundamentals

By the time we are in kindergarten almost all of us can draw simple shapes like circles, squares, and lines. We would then be able to possibly combine these shapes to create things such as stick figures. And perhaps some of us would continue on and draw more realistically. Finally a selected few of us might become true artists, using shading and imitating light. Even the most gifted artists spend a considerable amount of time concentrating on how light and shadow effects their artwork. When light and shadow are interpreted well by an artist, the results of his work can be very realistic. Throughout the years man has been fascinated with art, but the skill of actually being a great artist was limited to only a few gifted people. The advent of the computer has changed all of this.

In the 1960's when computers were invented, the makers of these machines saw them as number crunchers that could not deal with other media. Even though this was true, I am sure people realized that there were other possibilities, As Havelock Ellis once said "It is here in mathematics that the artist has the full scope of his imagination"

As time went on computers gained artistic capabilities, at the same time they kept their mathematical ones. This led to raytracing, which is the use of a computer to imitate the behavior of light. The computer and raytracing software use the laws of physics and then interprets them into mathematical equations to best resemble the path that light takes. Doing this takes a considerable amount of time because the computer makes thousands upon thousands of floating point calculations, and on even today's fastest computers a complex scene with many light sources may take around an hour. But this does not limit us, because we still can create the same effects on a personal computer, it may take a while longer but the results are definitely worth the wait.

Raytraced scenes are noted for their extremely realistic appearance and are often mistaken for photographs. Almost anything is possible with raytracing, from creating a perfect model of something as simple as a cola bottle, to something as complicated as a preview of the inside of a building. Animation is also possible with raytracing, and is used today a lot in commercials and movies.

With all these possibilities and power of raytracing one might expect raytracing software to be too expensive for the average joe, but the truth is your expectation is totally wrong. With an IBM PC or compatible you can create professional Raytraced images with extremely sophisticated software that is absolutely FREE! The reason is that people in the PC world finally got fed up with the high prices of software, and started a marketing technique that has revolutionized home computing. It is a concept where the author of some type of software decides to distribute his software as free. This concept is called "ShareWare", and it will make your life a whole lot easier if you are a IBM and compatible PC user. The lack of many shareware programs for the Macintosh makes it very hard to find in the mac format, but you might find something, just keep your eyes open.