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# Physically Based Rendering

From Theory to Implementation



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## Introduction

Physically based rendering techniques attempt to simulate reality and utilize physics to model the interactions with light.

- Literate Programming
- Photorealistic Rendering and the Ray-Tracing Algorithm
- pbrt: System Overview
- Parallelization of pbrt
- How to Proceed through This Book
- Using and Understanding the Code
- A Brief History of Physically Based Rendering

## Literate Programming

Literate programming is a system where the documentation and the code are written in a single document, then a tool extracts and formats the documentation, and a different tool extracts and compiles the code.

Each function can be deconstructed into fragments of the form `<Fragment Name>`. Then these fragments can be referenced later in book.

```
1 <Function Definitions> ==  
2   void InitGlobals() {  
3       <Initialize Global Variables>  
4   }
```

Then later in the documentation, when the variables are defined, we can then write

```
1 <Initialize Global Variables> == size = 13;
```

Then when another variable is defined, we are able to append that variable into the fragment like so

```
1 <Initialize Global Variables> += value = true;
```

Most of the code in the book is decomposed in this way, to produce more readable documentation.

## Indexing and Cross-Referencing

Indices in the page margins give page numbers where the functions, variables and methods are defined. Indices at the end of the book collect all of these identifiers so that it is possible to find definitions by name.

## **Photorealistic Rendering the the Ray-Tracing Algorithm**

### **pbrt: System Overview**

### **Parallelization of pbrt**

### **How to Proceed through This Book**

### **Using and Understanding the Code**

### **A Brief History of Physically Based Rendering**