

CPSC 314

Computer Graphics

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Lecture 17: Shading 2 and PBR 1
(Textbook Chapter 14)

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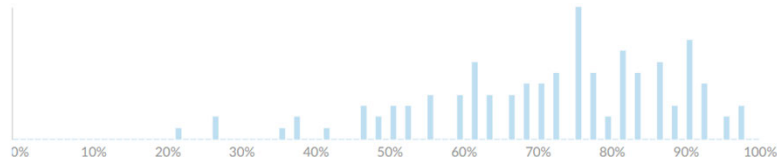
Preliminaries

- Today
 - Midterm analysis
 - Assignment 3 discussion
 - Note: typo in Part 1(b). “Section 1.3” -> “Section 14.3”
 - Non-photorealistic rendering (NPR)
 - Basic Toon Shading
 - Physically Based Rendering (PBR)
 - Motivation
 - Blinn-Phong and the “halfway vector”
- Next class: Physically Based Rendering continued, File Formats

Midterm analysis

☺ Average Score **72%**
 ☺ High Score **98%**
 ☹ Low Score **22%**
 ☺ Standard Deviation **7.4**
 ☹ Average Time **46:55**

Median = 76%, 45 people got A



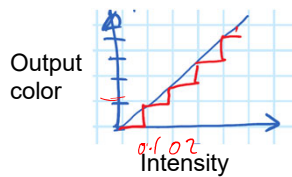
- One question regraded manually due to error in default setting
 - “Which matrix represents a 90 degree rotation in 2 dimensions?”

Answer:

$$D: \begin{pmatrix} 0 & -1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

Basic Toon Shading

- Small palette of colors



- Draw silhouette edges

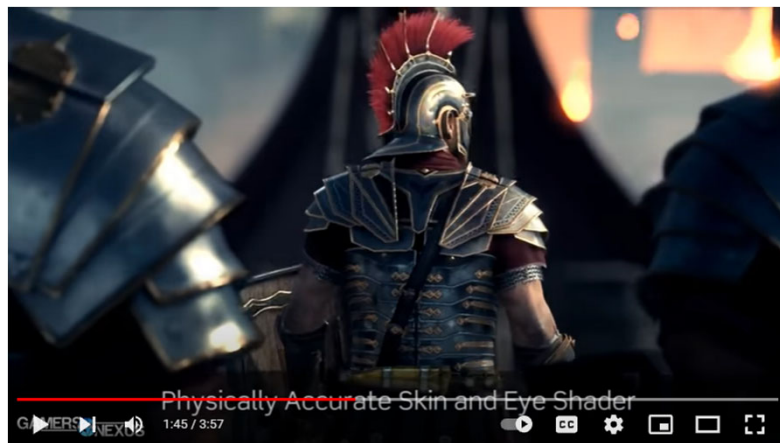
$$\vec{n} \cdot \vec{v} \approx 0$$



Physically Based Rendering (PBR)

PBR Motivation from CryEngine

<https://www.youtube.com/watch?v=7NjGETJMZvY>

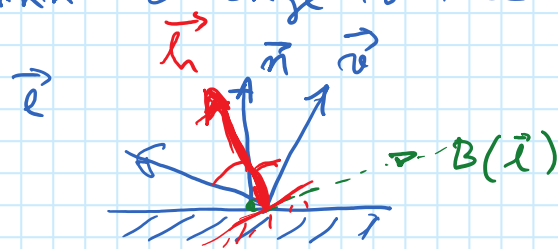


What is PBR? Physically-Based Rendering Explained

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§ Blinn's change to the Phong Reflection



\vec{h} half-way vector
 $= \text{normalize}(\vec{l} + \vec{v})$

Phong $I \propto \vec{B}(\vec{l}) \cdot \vec{v}$

Blinn $I \propto \vec{h} \cdot \vec{n}$

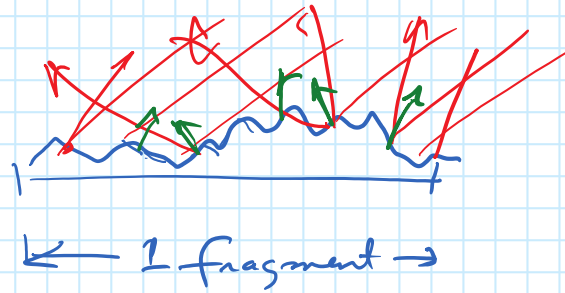
In full

Intensity $I = k_s \left(\max(\vec{h} \cdot \vec{n}, 0) \right)^{\alpha}$

Physically Based Rendering.

February 28, 2022 10:45 AM

(1) Account for microgeometry



"Roughness"