Introduction to RenderMan

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1977: Star Wars IV: A New Hope

1979: Ed Catmull, Alvy Ray Smith, and others leave NYIT to form the Computer Division of Lucasfilm

Image Processing
Digital Editing and Compositing
Effects
Image/Volume Rendering
Hardware

1984: John Lassiter leaves Disney Animation to join Pixar

1984

Pixar Image Computer
REYES
RenderMan
 Pixar Animation Studios

RIB
Shade Trees

prman

History of RenderMan, I

Pixar Animation Studios

1986: Steve Jobs buys Pixar for $10M
Steve Jobs adds another $60M to keep Pixar running

1988: Tin Toy – won Academy Award for Best Animated Short

1993: RenderMan wins a Technical Academy Award

1995: Toy Story

1995: Pixar IPO -- Steve Jobs's stake is now worth $1.2B

2004: Pixar bought by Disney for $7B, making Steve Jobs's stake now worth $3.5B
Steve Jobs is now Disney's largest shareholder (7%) – way ahead of even Roy Disney (1%)

History of RenderMan, II

Image/Volume Rendering
Hardware

Pixar Image Computer
REYES
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History of RenderMan, III

RenderMan Software Rendering Pipeline

RIB File
Bounding Box Analysis
Split
Dice into Microfacets
Call the Shaders
Do Front-to-Back Compositing
Assemble the Pixels
Final Image
First, let's think about it back-to-front:

\[ \text{color}_1 = \alpha_1 \text{color}_2 + (1 - \alpha_1) \text{black}, \]
\[ \text{color}_0 = \alpha_2 \text{color}_1 + (1 - \alpha_2) \text{color}_2, \]
\[ \text{color}^* = \alpha_2 \text{color}_0 + (1 - \alpha_2) \text{color}^*. \]

Substituting gives us the front-to-back equation:

\[ \text{color}^* = \alpha_1 \text{color}_0 + (1 - \alpha_1) \text{color}^* + (1 - \alpha_2) \text{color}_2, \]
\[ \text{color}^* = \alpha_1 \text{color}_0 + (1 - \alpha_1) \text{color}^* + (1 - \alpha_2) \text{color}_2 + (1 - \alpha_2)(1 - \alpha_1) \text{black}. \]