

Graphics: blending

Some read-modify-write operations

BACKGROUND

- OpenGL and Direct3D define a set of fixed function blending operations
- Basic formula:
 - $Out = in * A + out * B$

where A and B may be one of:

- Zero, one
- src color, (1 - src color), dest color, (1 - dest color)
- src alpha, (1 - src alpha), dst alpha, (1 - dest alpha)
- (and bunch of others, depending on extensions)

COMMON BLEND MODES

- Saturated add
- Multiplicative
- Alpha blend

SATURATED ADD

- Source: one, Destination: one

$$\text{Out} = \text{in} * 1 + \text{out} * 1$$

- $0.7 * 1 + 0.4 * 1 = 1.0$ (saturation – max is 1.0)
- $0.3 * 1 + 0.5 * 1 = 0.8$
- $0.5 * 1 + 0.0 * 1 = 0.5$
- Useful in: glowing things, explosions, etc.

MULTIPLICATIVE

- Source: dest, Destination: zero

$$\text{Out} = \text{in} * \text{dest} + \text{out} * 0$$

- $0.7 * 0.5 + 0.4 * 0 = 0.35$
- $0.3 * 0.5 + 0.5 * 0 = 0.15$
- $0.5 * 0.5 + 0.0 * 0 = 0.25$
- Useful in: shadows, darkening of areas

ALPHA BLEND

- Source: src alpha, Destination: (1 - src alpha)

$$\text{Out} = \text{in} * \text{src alpha} + \text{out} * (1 - \text{src alpha})$$

- $0.7 * 0.4 + 0.4 * 0.6 = 0.52$

- $0.3 * 0.4 + 0.5 * 0.6 = 0.42$

- $0.5 * 0.4 + 0.0 * 0.6 = 0.2$

- Useful in: transparencies, antialiasing