Transparency & Compositing

Alpha Compositing

- α-channel
- Transparency
- Porter-Duff rules
  - Linear combinations of the source and destination color and alpha values

$$\alpha \cdot C = F_s \cdot \alpha_s \cdot C_s + F_d \cdot \alpha_d \cdot C_d$$

$$\alpha = F_s \cdot \alpha_s + F_d \cdot \alpha_d$$

Porter-Duff Rules

- Clear
- SrcOver
- SrcIn
- SrcOut
- Src
- SrcAtop
- Xor
- DstOver
- DstIn
- DstOut
- Dst
- DstAtop

A Probabilistic Model

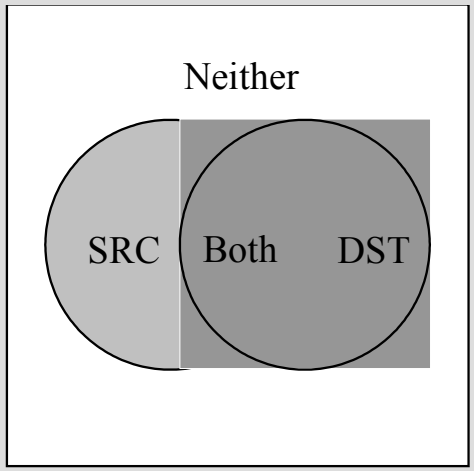
- α value as the probability of the color to be shown
- Or as proportion of pixel area covered by a color
- Four different events:
  - source color occurs only
  - destination color occurs only
  - both colors occur
  - neither color occurs.

$$\alpha_s(1-\alpha_d)$$

$$\alpha_d(1-\alpha_s)$$

$$\alpha_s\alpha_d$$

$$(1-\alpha_s)(1-\alpha_d)$$



Porter-Duff Rules

$$\alpha \cdot C = F_s \cdot \alpha_s \cdot C_s + F_d \cdot \alpha_d \cdot C_d$$

$$\alpha = F_s \cdot \alpha_s + F_d \cdot \alpha_d$$

RULE	F_s	F_d	RULE	F_s	F_d
Clear	0	0	DstOut	0	$1-\alpha_s$
SrcOver	1	$1-\alpha_s$	Src	1	0
DstOver	$1-\alpha_d$	1	Dst	0	1
SrcIn	α_d	0	SrcAtop	α_d	$1-\alpha_s$
DstIn	0	$\cdot \alpha_s$	DstAtop	$1-\alpha_d$	$\cdot \alpha_s$
SrcOut	$1-\alpha_d$	0	Xor	$1-\alpha_d$	$1-\alpha_s$