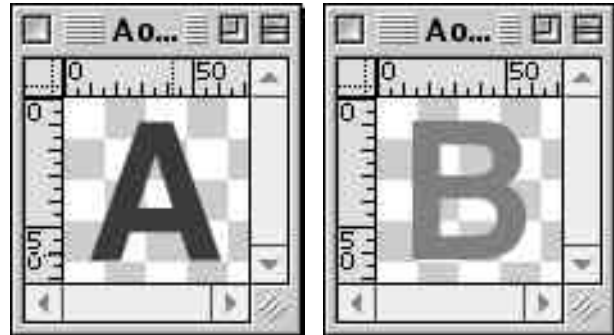


## Basic Compositing Operations in Photoshop

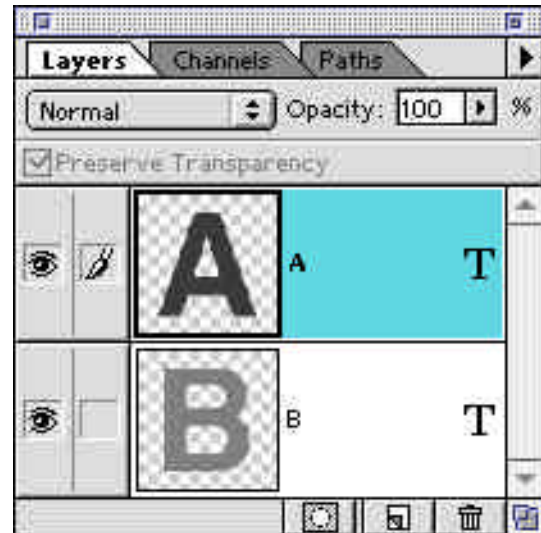
Take two images, call them A and B. They have alpha channels (mattes) coincident with their intensities. Namely, where the letter “A” appears in image A is where image A is opaque. Otherwise it is transparent. The same for B.



The operation “A over B” is a simple application of the formula we have seen in class (using the book’s notation):

$$O_{\text{rgba}} = A_{\text{rgba}} + [(1 - A_a) * B_{\text{rgba}}]$$

“Over” is easily performed in real-time by Photoshop by putting A in a layer above the layer containing B (in the layer window – see image at right). Dragging layer A to be below layer B will produce B over A.



“A over B” as seen in the main document window.



## Basic Compositing Operations in Photoshop

The operation “A inside B” appears mathematically as:

$$O = A * B_a$$

This can be thought of as clipping A to lie within the matte of B. Similarly, “A outside B,” which appears as:

$$O = A * (1 - B_a)$$

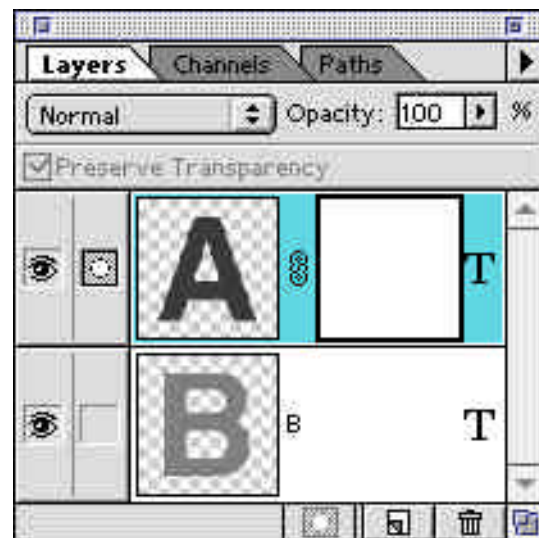
can be thought of as clipping A with the inverted matte of B. It is a way to make A appear wherever B isn't.

One easy way of performing “A inside B” using Photoshop is to use the “layer mask” feature. A layer mask is an extra mask (in addition to the layer's own transparency mask) that is used to clip the layer.

What makes layer masks nice is that you don't have to actually erase the contents of A – they are clipped away by the mask and can therefore be easily recovered by re-painting the mask (instead of repainting A, which might be a very complex image).

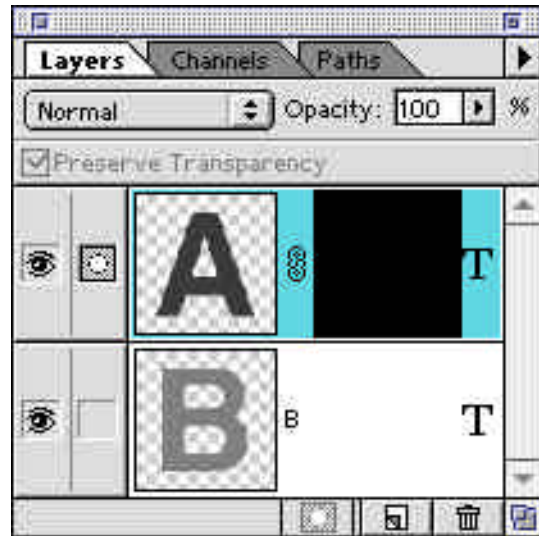
You can create a layer mask using the “Layer” menu from the main toolbar. Under “Add Layer Mask” there are four options. The two above the separator create completely white (1.0) or completely black (0.0) masks. These are useful as quick ways to create a layer mask that you can edit manually later on.

This image shows layer A with a “reveal all” layer mask added to it. Note that with a completely white mask, this effectively does nothing (hence the name “reveal all” – it reveals all of layer A).



## Basic Compositing Operations in Photoshop

This image shows layer A with a “hide all” layer mask added to it. Note that with a completely black mask, this effectively removes all traces of layer A in the final image (all pixels of A are multiplied by 0.0).

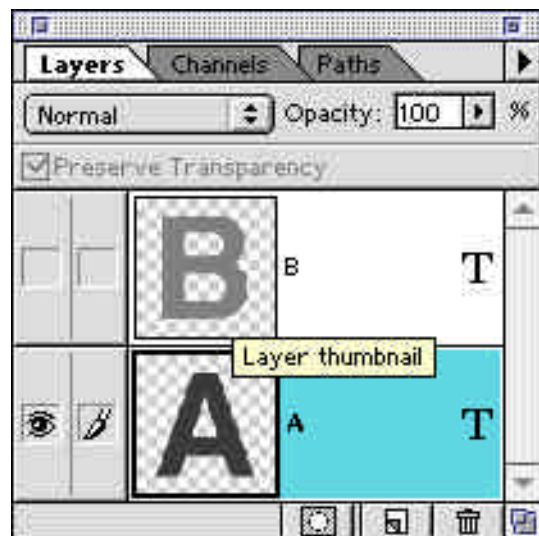


Obviously, to do something interesting with layer masks requires creating one that isn't completely black or white.

Besides painting a mask by hand, you can use the other layer mask creation options to make layer masks from selections (the other two layer mask options in the menu are enabled only when you have a current selection). As you recall, even though selections are represented by squiggly lines in Photoshop (sometimes called “marching ants”), they really are a kind of mask and can be thought of as full greyscale images.

I find that a good way of doing “inside” or “outside” using layer masks in Photoshop is to create a selection that represents the transparency (alpha) of the “cutting” layer and then use the selection-based layer mask creation tool to create a layer mask on the layer that is to be cut.

That's a mouthful. Let's look at the specific problem of A inside B. Step one is to get A and B onto different layers and to make layer B invisible (we're not doing “over” after all). Your layer window will look something like the one to the right, and your document window should show only A.

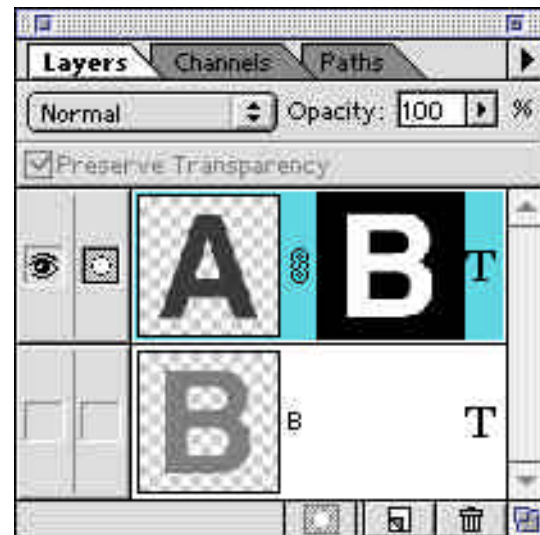


## Basic Compositing Operations in Photoshop

Step two is to get a selection that represents the matte of B (the “cutting” layer, since A is going to be inside B). The only way I know to do this is to pretzel-click on layer B inside the layer window. This is a Photoshop shortcut that does exactly what we want: it creates a selection based on the transparency of the layer you click on. With that selection made, your image should look like the image at the right.



The final step is to use the Layer/Add Layer Mask/Reveal Selection option to create a mask for A using the current selection. After doing that, you should see a B-shaped layer mask connected to layer A in the layer window.



Your final image should look like A “cookie-cut” by B. This is “A inside B”.



“A outside B” can be created using the same steps up to where you create the layer mask from the selection. For “outside,” you must choose to hide the selection instead of revealing it.

