A stencil buffer contains per-pixel integer data which is used to add more control over which pixels are rendered. A stencil buffer can also be used in combination with a depth buffer to do more complex rendering such as simple shadows or outlines.

每个像素都对应着一个存放着整型数据的模板缓冲区，它被用来控制那些像素将被渲染。模板缓冲区还可以同深度缓冲区结合，用来做一些更复杂的渲染，比如简单阴影或者轮廓。

A stencil buffer operates similarly to a [depth buffer](http://msdn.microsoft.com/en-us/library/bb976071.aspx). So similarly, that stencil data is stored in a depth buffer. While depth data determines which pixel is closest to the camera, stencil data can be used as a more general purpose per-pixel mask for saving or discarding pixels. To create the mask, use a stencil function to compare a reference stencil value -- a global value -- to the value in the stencil buffer each time a pixel is rendered.

模板缓冲区的作用类似于深度缓冲区。相似到模板数据也是存放在深度缓冲区中的。深度数据被用来确定哪个像素距离相机最近，而模板数据则被应用到更广泛的目的：像素级遮罩，以此来达到选取或者剔除像素的目的。为了创建一个遮罩，我们用一个模板函数来比较一个全局的模板参考数据和存放在模板缓冲中的数据，像素每渲染一次就比较一次。

For example, to remove an object from a scene, fill a stencil buffer with a cut out pattern (using zeros) for each pixel where the object is visible. This is done by setting the reference stencil value to 0, clearing the stencil buffer, and rendering the object. Then set the reference stencil value to 1, set the compare function to [CompareFunction.LessEqual](http://msdn.microsoft.com/en-us/library/microsoft.xna.framework.graphics.comparefunction.aspx), and render again. The stencil data masks those pixels whose value is non zero but less than 1, resulting in drawing over (or removing) the object.

比如，如果想要将一个对象从场景中移除，那么可以为对象不可见部分的每个像素的模板缓冲中填入消减模式的数据（用0值）。为了达到这个目的我们首先设置参考模板数据为0，清除模板缓冲，渲染对象。接着设置模板数据值为1，将比较函数设为[CompareFunction.LessEqual](http://msdn.microsoft.com/en-us/library/microsoft.xna.framework.graphics.comparefunction.aspx)，然后再次渲染。模板缓冲将那些非零的像素但是小于一的数据遮掉，从而达到覆盖或者移除对象的目的。

A stencil buffer can be used in more sophisticated ways such as specifying [StencilOperations](http://msdn.microsoft.com/en-us/library/microsoft.xna.framework.graphics.stenciloperation.aspx) that go beyond replace or discard and increment or decrement the stencil buffer during a stencil test. Then combine this with a [StencilMask](http://msdn.microsoft.com/en-us/library/microsoft.xna.framework.graphics.depthstencilstate.stencilmask.aspx) to mask the portion of the stencil buffer that is updated.

模板缓冲

To use a stencil buffer, the [DepthFormat](http://msdn.microsoft.com/en-us/library/microsoft.xna.framework.graphics.depthformat.aspx) of the depth buffer must reserve some bits for the stencil data; the [DepthFormat.Depth24Stencil8](http://msdn.microsoft.com/en-us/library/microsoft.xna.framework.graphics.depthformat.aspx#DepthFormat.Depth24Stencil8) format uses 8 bits for a stencil buffer as an example. Combining stencil data with an 8 bit [DepthStencilState.StencilMask Property](http://msdn.microsoft.com/en-us/library/microsoft.xna.framework.graphics.depthstencilstate.stencilmask.aspx) provide up to eight different stencil buffers.