Subject: Re: Why are transforms 4 x 4?
Posted by Karl Schultz on Mon, 15 Dec 2003 15:41:29 GMT

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"Thomas Brueckner" <profxtjb@earthlink.net> wrote in message
news:52e94d00.0312141710.2a29c8f2@posting.google.com...
> My geometry knowledge is limited, so I am unsure why IDL uses 4 x 4
> transform matrices to rotate, translate and otherwise mess with
> three-dimensional vectors. Can someone please render an explanation?
> There must be a reason. Is it just that they like to be able to
> handle four-vectors and the ever-popular Lorentz xfm? :)

Affine transformations are made up of a linear transformation followed by a
translation. The linear part can be composed of scaling, shear and rotation
operations and can be applied to a 3D point with a 3x3 matrix. The
translation step can be added on later as a simple addition, but it would be
nice if it can be performed at the same time the matrix is applied to the
point. So, if you add an additional 4th coordinate to the 3D vector with
value 1, you can put the translation factors in the 4th row or column of the
matrix and perform the entire transformation with one matrix operation.

These vectors with the extra value are called homogeneous coordinates, if
you need a term to use to google for more information.

Karl

Subject: Re: Why are transforms 4 x 4?
Posted by profxtjb on Mon, 15 Dec 2003 18:18:07 GMT

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"Karl Schultz" <kschultz_no_spam@rsinc.com> wrote in message
news:<vtrldcr3j1gl7d@corp.supernews.com>...
> "Thomas Brueckner" <profxtjb@earthlink.net> wrote in message
> news:52e94d00.0312141710.2a29c8f2@posting.google.com...
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Well, shucky darn, Karl, that sounds like a nice, sneaky trick. I can
see how it works.
It must've been invented by a really LAZY programmer! I approve! :)

-Thomas