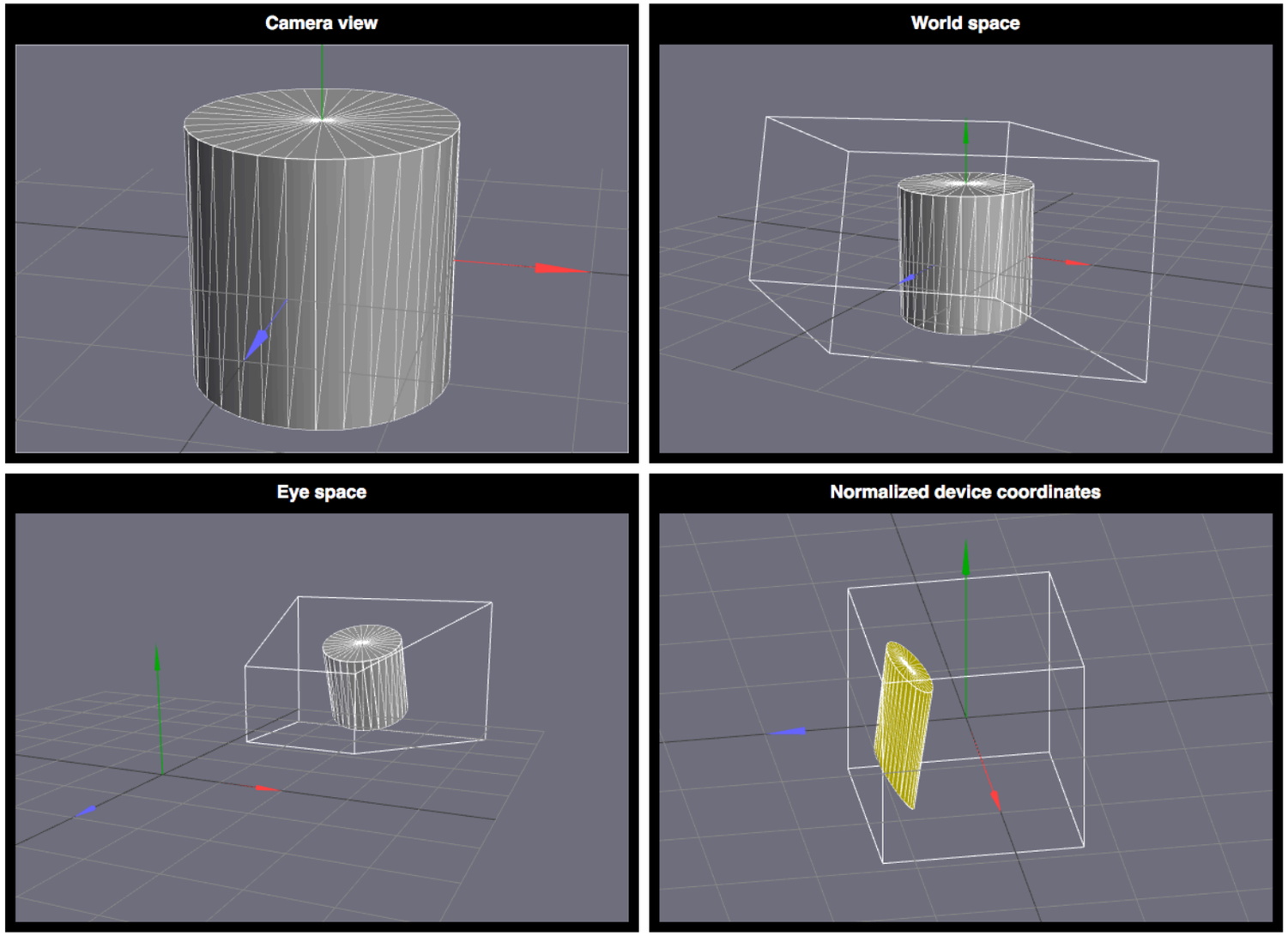


Computer Graphics

Lecture 18

Object Order Rendering

Viewing Transformations - 1

Announcements

Object Order Rendering

```
for each object:
    for each pixel:
        if object affects pixel:
            update pixel's color
```

Object Order Rendering: The Secret Sauce

$$\mathbf{p}_{pixel} = M\mathbf{p}_{object}$$

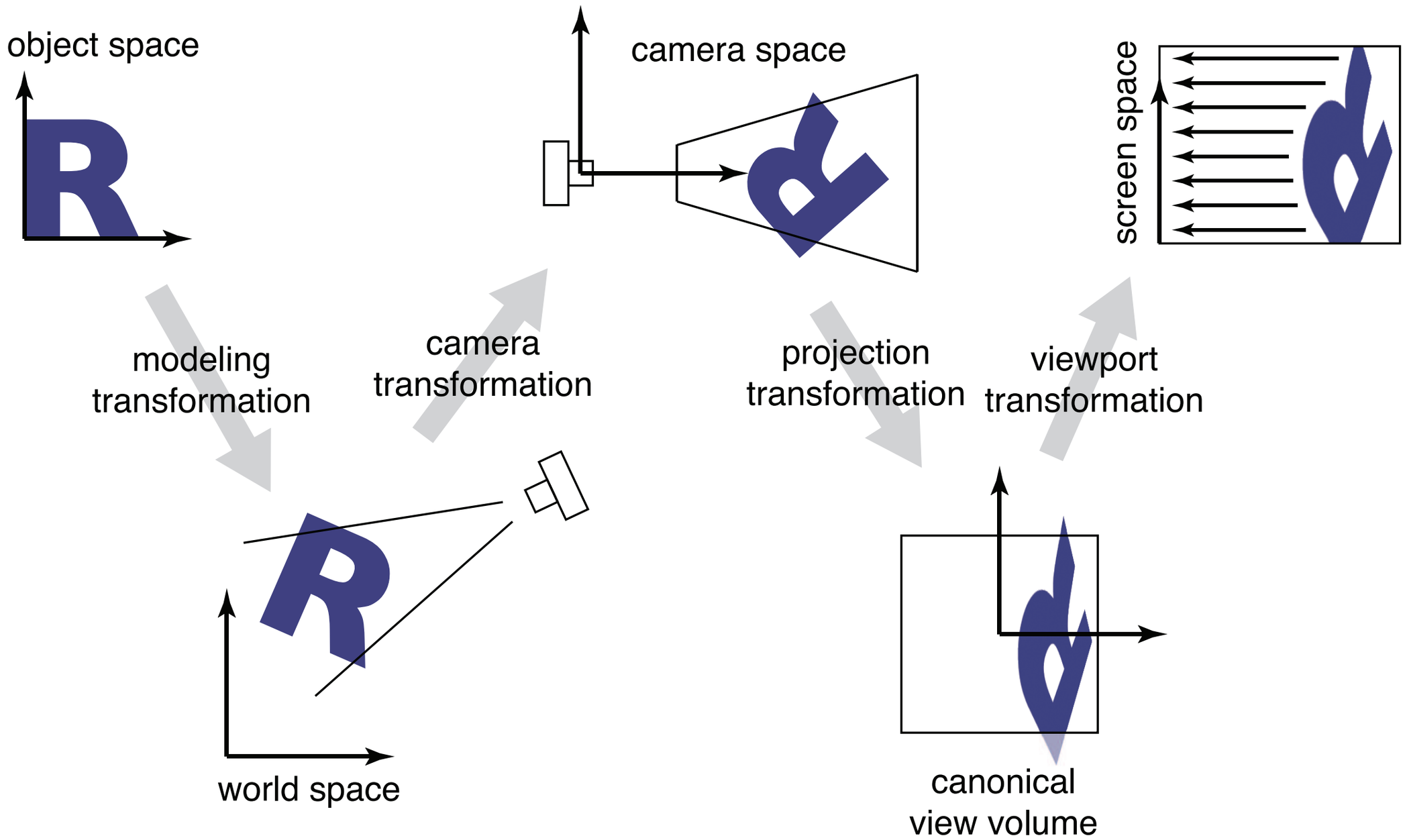
Viewing Transformations

A standard sequence of transforms to go from
object (model) space to **screen (image) space**

whiteboard!
see Scott attempt to draw in 3d!

Viewing Transformations

A standard sequence of transforms to go from
object (model) space to **screen (image) space**



A Wireframe Rendering Algorithm

Form matrices $M_{vp}, M_{proj}, M_{cam}, M_{model}$

$M \leftarrow M_{vp}M_{proj}M_{cam}M_{model}$

for each line segment $\mathbf{a}_i, \mathbf{b}_i$:

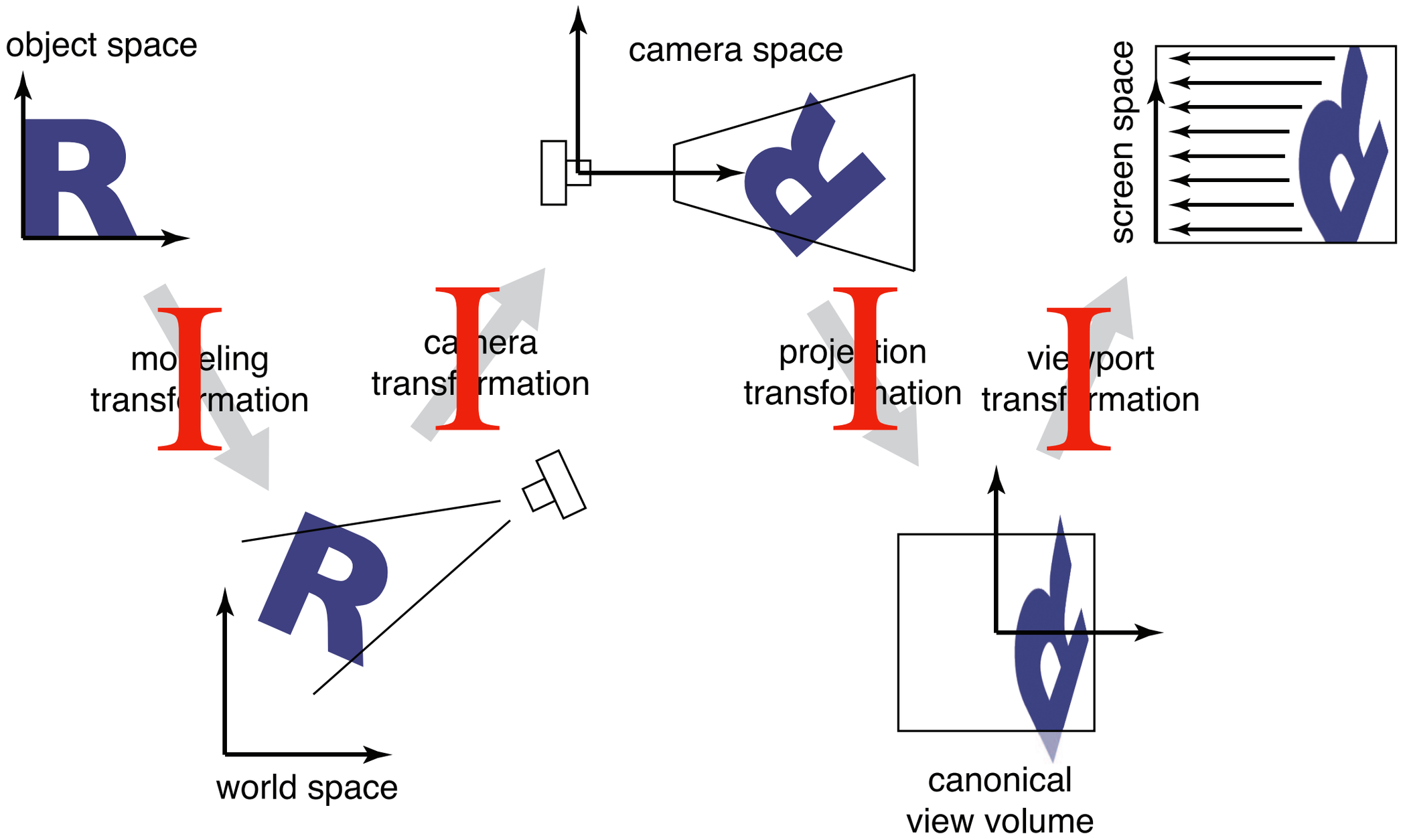
$\mathbf{p} \leftarrow M\mathbf{a}_i$

$\mathbf{q} \leftarrow M\mathbf{b}_i$

draw_line($\mathbf{p}, \mathbf{q}$)

Viewing Transformations: Minimalist Edition

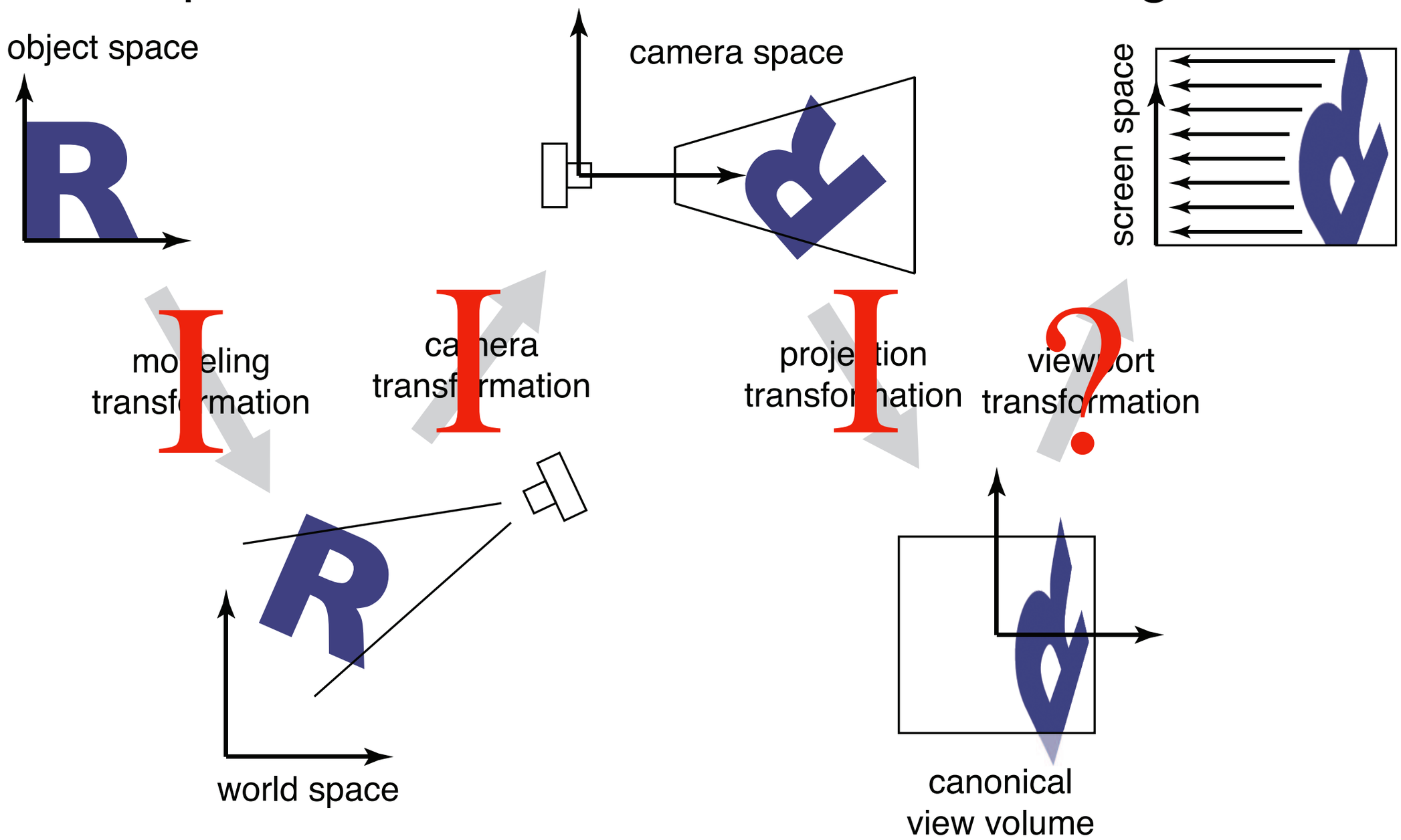
Let's do nothing and see how this works out...



A Wireframe Rendering Algorithm: Code

Viewing Transformations: Minimalist Edition

Task 1: Find a **viewport transformation** that puts the cube in the center of the image.



Viewing Transformations: Minimalist Edition

Task 2: Build a **model transformation** that centers a 40x40 cube at x=0, y=1, z=-4, rotated 30 degrees around the **y** axis.