Computer Graphics

Lecture 18
Object Order Rendering
Viewing Transformations - 1
Announcements
for each object:
  for each pixel:
    if object affects pixel:
      update pixel's color
Object Order Rendering:  
The Secret Sauce

\[ p_{\text{pixel}} = M p_{\text{object}} \]
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 $a_i, b_i$:

$p \leftarrow Ma_i$

$q \leftarrow Mb_i$

`draw_line(p, q)`
Viewing Transformations: Minimalist Edition

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

object space

modeling transformation

I

camera transformation

R

camera space

projection transformation

I

viewport transformation

I

screen space

world space

canonical view volume
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.
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.