

# Projections & Cameras

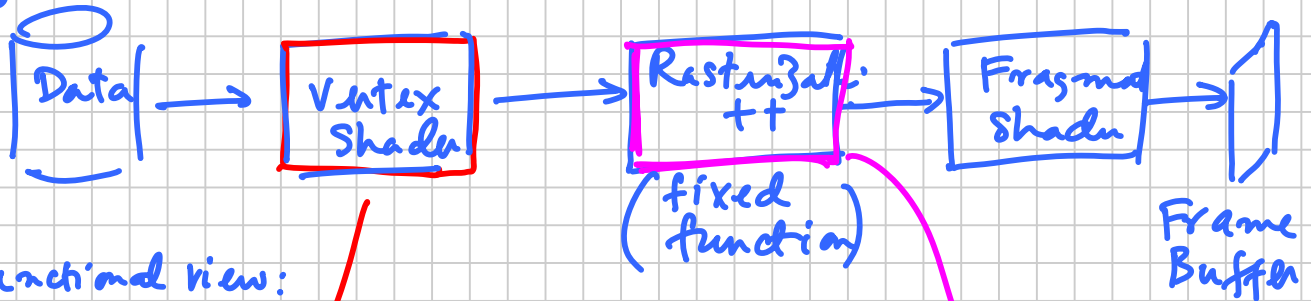
Announcements:

Both A1 and Quiz 1 have been graded  
Available later today

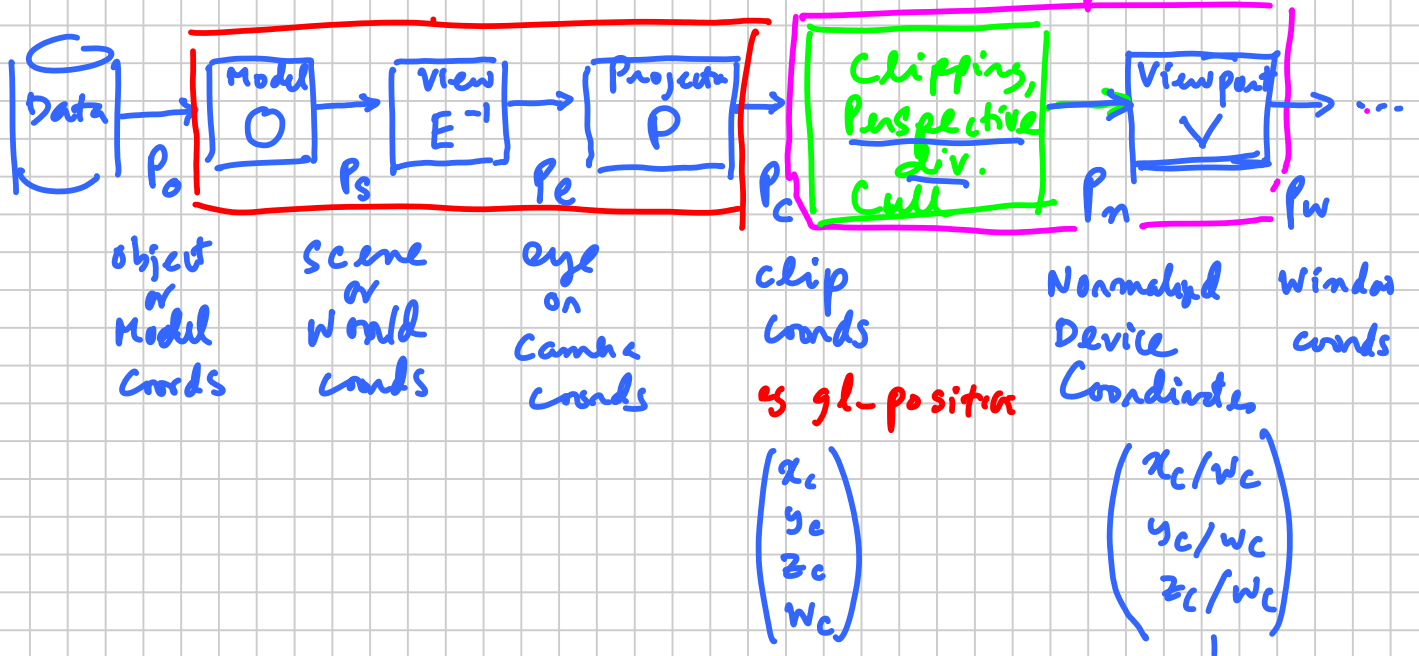
Text book: Ch 10

## Review of the Graphics Pipeline

High-level view:



Functional view:



Today: P projection

## § Approximate a "real" camera

\* position and orient the camera

\* projection (from 3D to 2D)

lens, iris

\* field of view, in all 3 dimensions.  
(FOV)

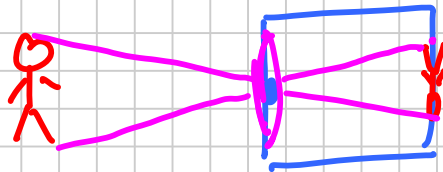
Can do with what we already know. E.g. LookAt()

Perspective

Parallel ← Orthographic  
Proj

...

Aside: Pin hole camera



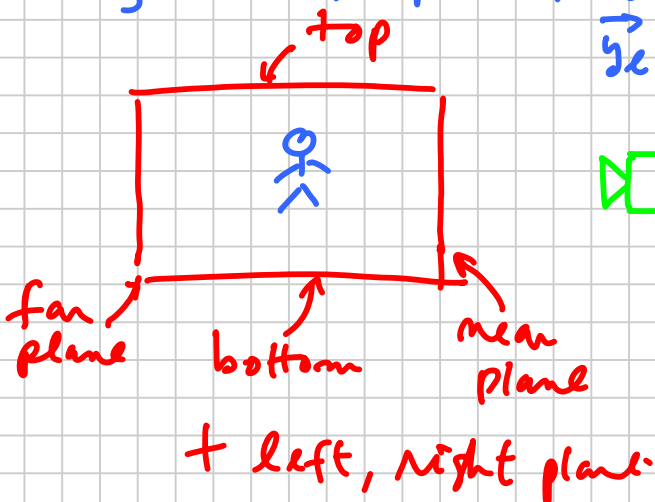
Modern cameras have lenses

This means only a limited depth is in focus.

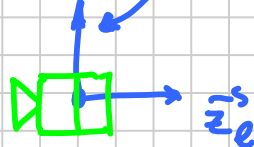
We'll ignore real lens effects.

Can set a lot of mileage assuming pin hole

## § Orthographic projection, with simplified FOV



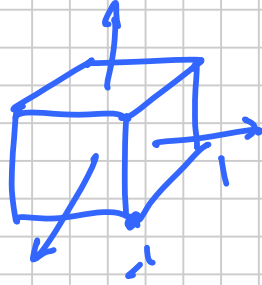
$\vec{y}_e$  Camera or Eye frame



⊛ Convention:  
Camera looks in the  $-\vec{z}_e$  dirn.

FOV approximated as an axis-aligned box in eye-coords.

"Normalize" this box to lie in a cube of unit (half) size ie  $(-1,1) \times (-1,1) \times (-1,1)$



set: Normalized  
Device  
Coordinates

Demo: use of THREE.OrthographicCamera

