Projective Rendering Pipeline

- NDC to Device Transformation
  - general formulation
  - reflect in y for upper vs. lower left origin
  - scale by width, height, ... for pixel centers at (0.5, 0.5) instead of (0, 0)

- Device vs. Screen Coordinates
  - NDC range is -1 to 1
  - viewport/window location wrt actual display not available within GL
    - usually don’t care
    - use relative information when handling mouse events, not absolute coordinates
    - could get actual display height/width, window offsets from OS

- Perspective Example
  - tracks in VCS:
    - left x=-1, y=-1
    - right x=1, y=-1
  - view volume:
    - left = -1, right = 1
    - bot = -1, top = 1
    - near = 1, far = 4

- OpenGL Example
  - go back from end of pipeline to beginning: coord frame POV!

- Perspective Example
  - read down: transforming between coordinate frames, from frame A to frame B coords

- OpenGL Example
  - read up: transforming points, up from frame B coords to frame A coords
Questions?