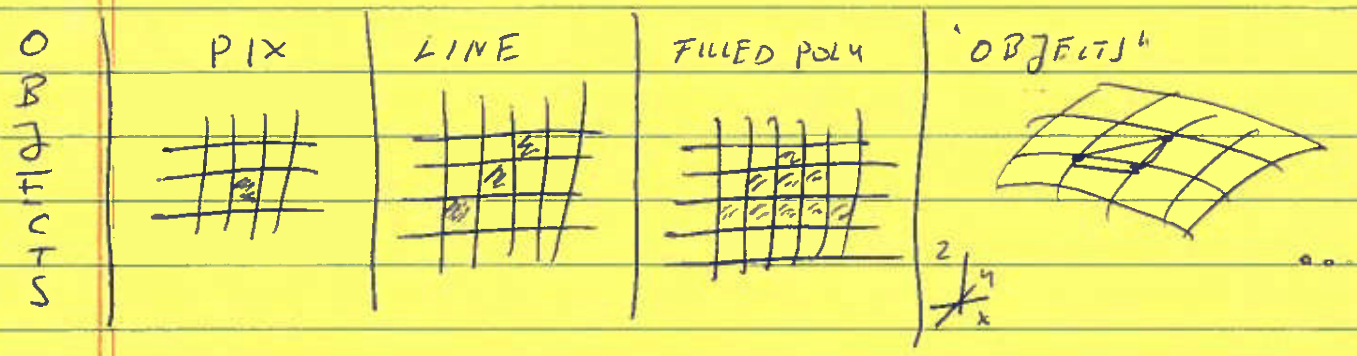
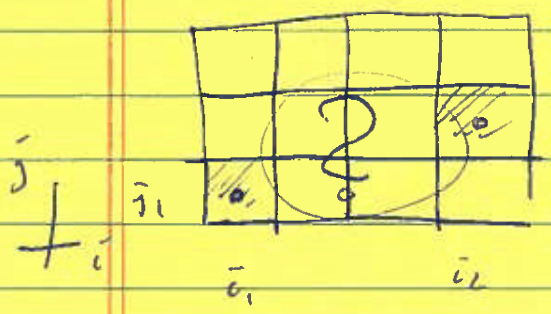
WQ 2015 — Lec 1 —

- Overview



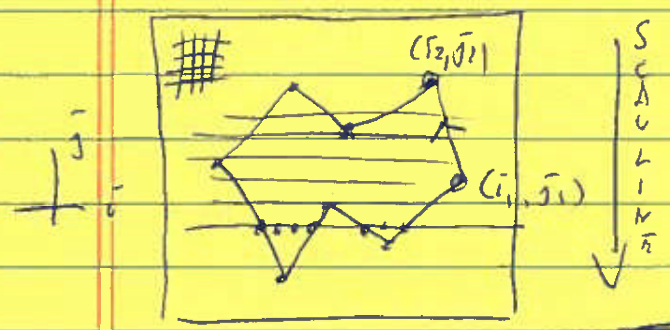
- LINE



IN $(\bar{i}_1, \bar{j}_1)$, $(\bar{i}_2, \bar{j}_2)$

OUT: PIX SEQUENCE $(\bar{i}_1, \bar{j}_1)$, ?, ..., $(\bar{i}_2, \bar{j}_2)$

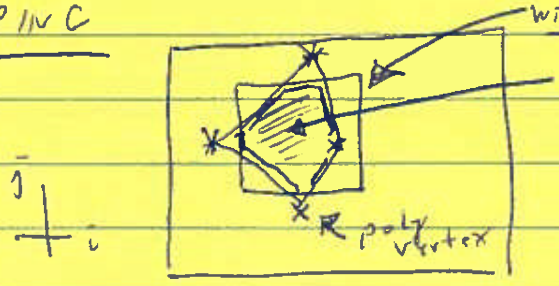
- POLY / RASTERIZATION



IN $(\bar{i}_1, \bar{j}_1), \ldots, (\bar{i}_N, \bar{j}_N)$

OUT: "PIX ON BOUND. & INSIDE POLY"

- CLIPPING



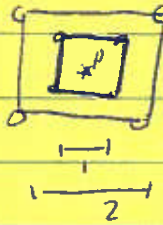
IN: POLY, WINDOW

OUT: CLIPPED POLY

Lec 1

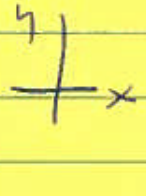
• 2D TRANSFORM

scale



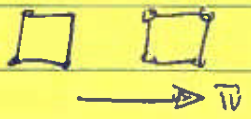
"scale (p, 2)"

rot



"rot (p, 45°)"

trans



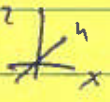
"trans (v)"

• 3D TRANSFORM

scale

"scale (p, α)"

rot

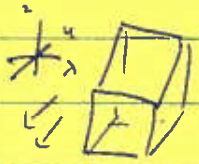


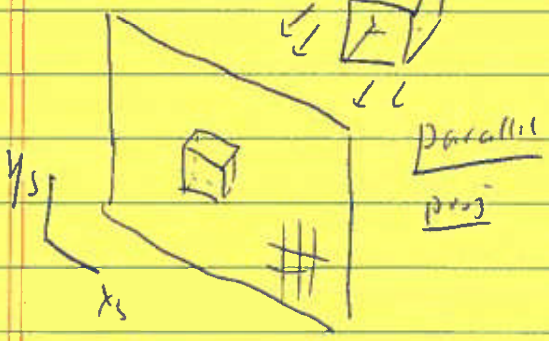
"rot (z, α)"

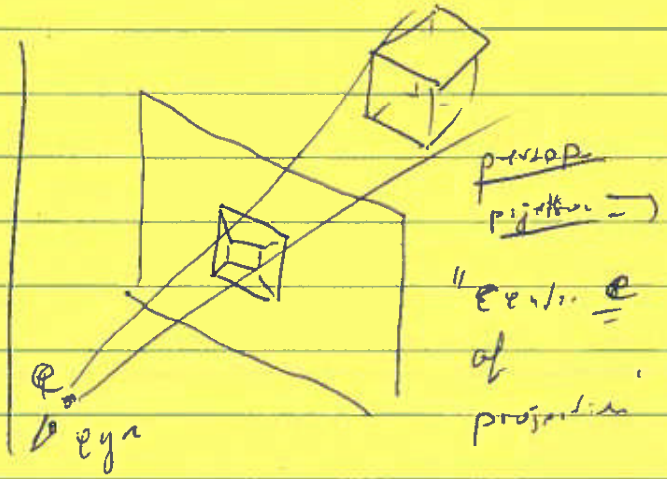
trans

"trans (v)"

• PROJECTION : from 3D to 2D space / screen

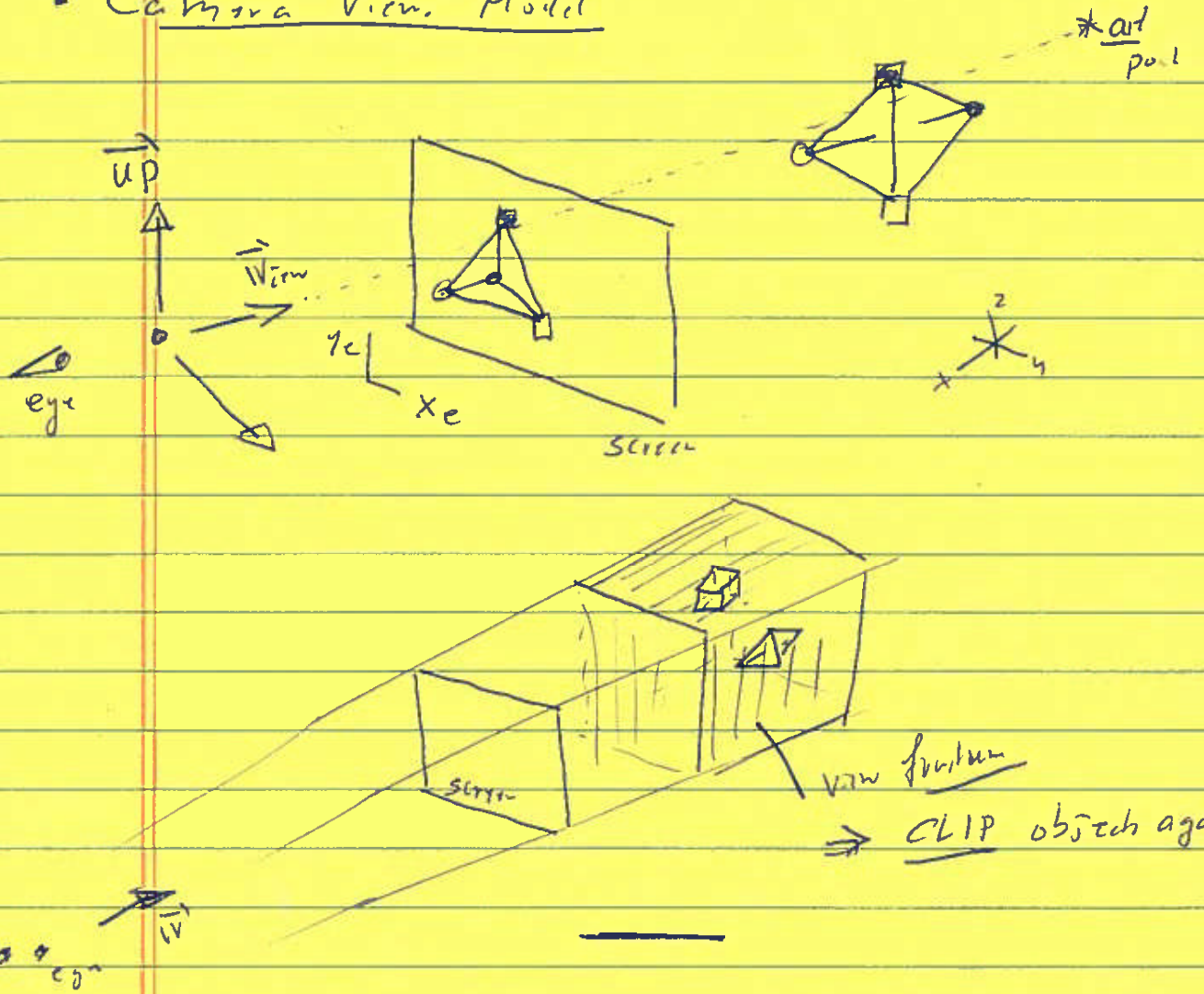






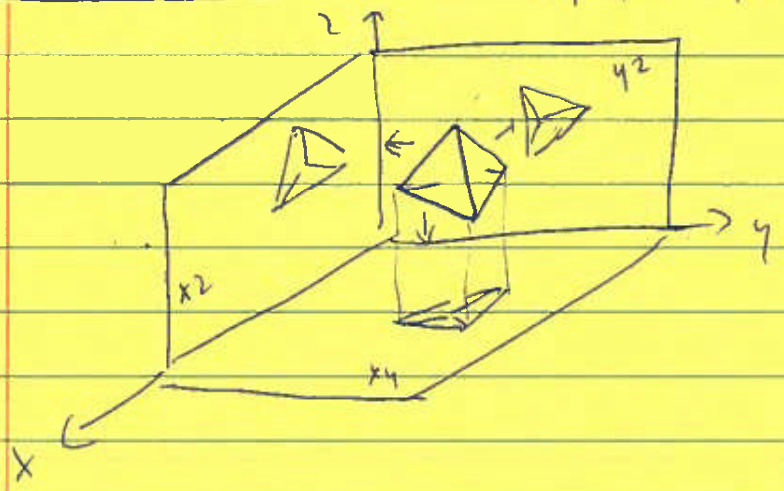
Lec 1

- Camera View Model



⇒ CLIP objects against it

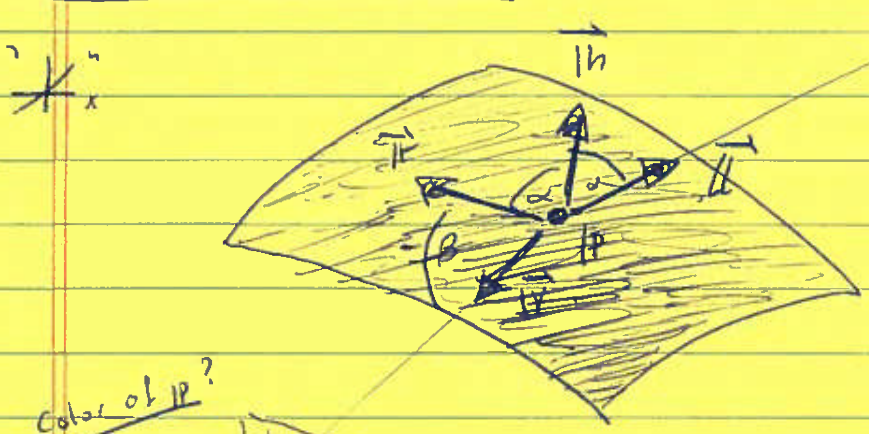
- ORTHO PROJ.: onto xy-/xz-/yz-plane



3 "natural" ortho proj. onto coord. sys. planes

Lec 1

• LIGHT / ILLUMINATION



VARS:

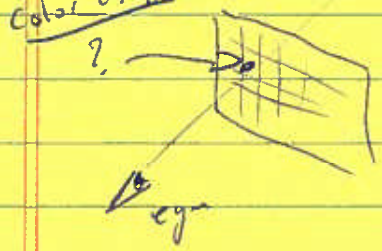
$IP, \vec{n}, \vec{L}, \vec{R}, \vec{V}$

Light color + intensity

object color

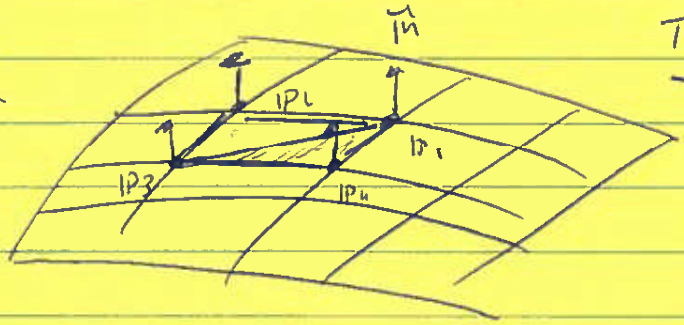
portion of vision

ou-



Continuous ⇐ discrete model

geometry is discretized



Triangulate!

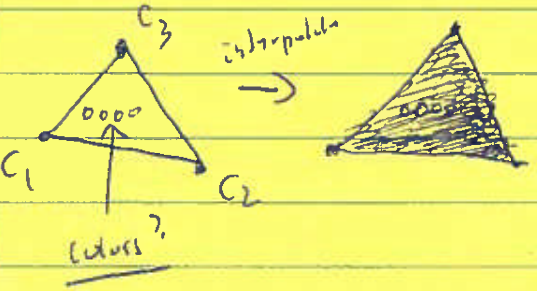
⇓

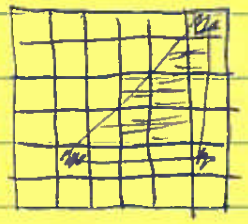
colors for IPi defining tri vertices

INTERIOR COLORS ? ⇒ INTERPOLATE!

• GOURAUD SHADING

DONE IN PIX / SCREEN SPACE.



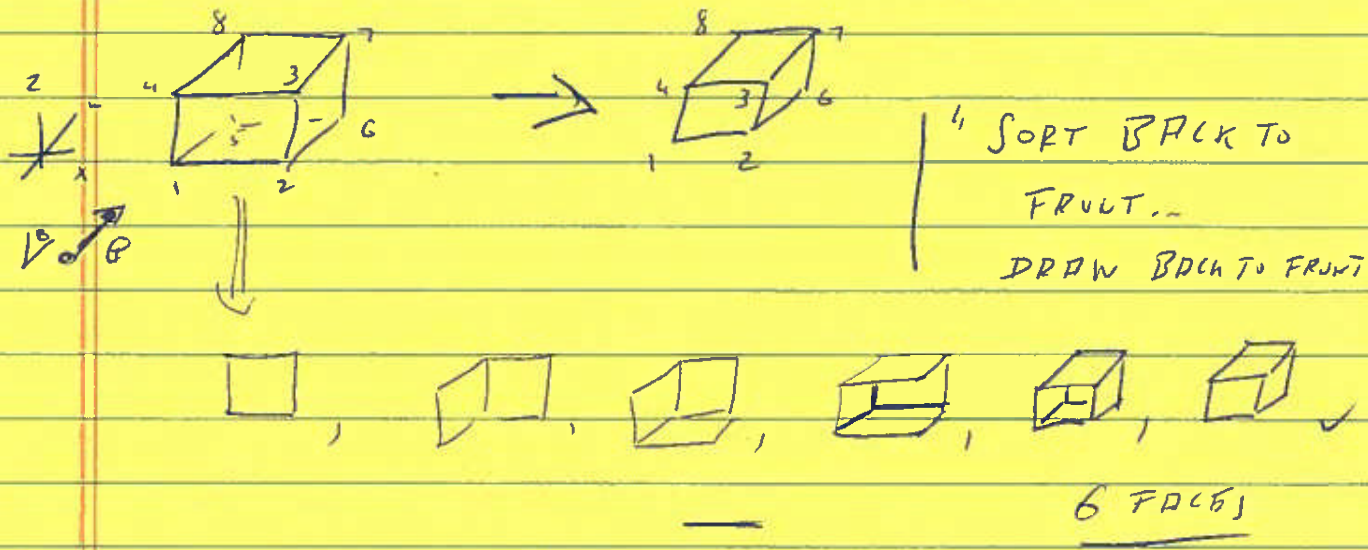


3 corner pix + col.

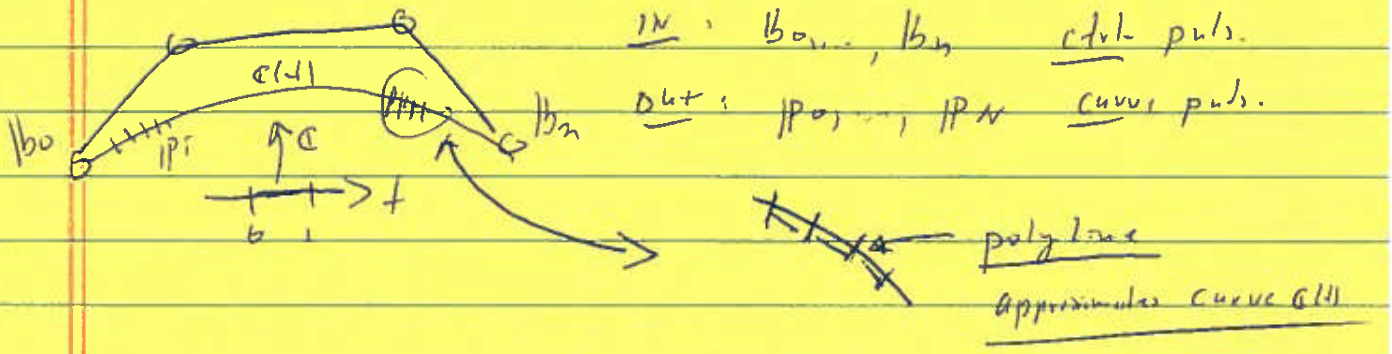
⇒ interpolate vertex colors

Lec 1

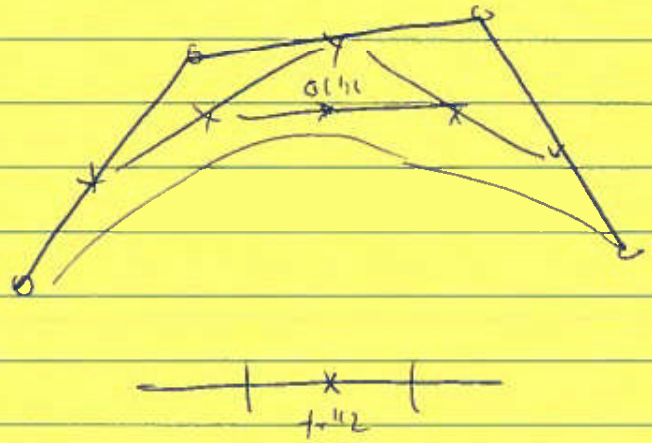
- Hidden Surface Removal "Painter's Alg"



- Curves & Surfaces / Bézier

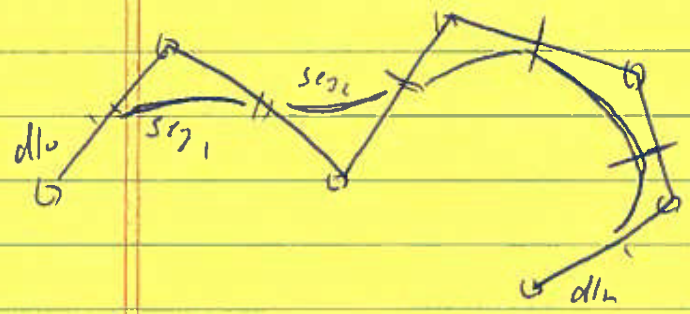


"de Casteljau alg"



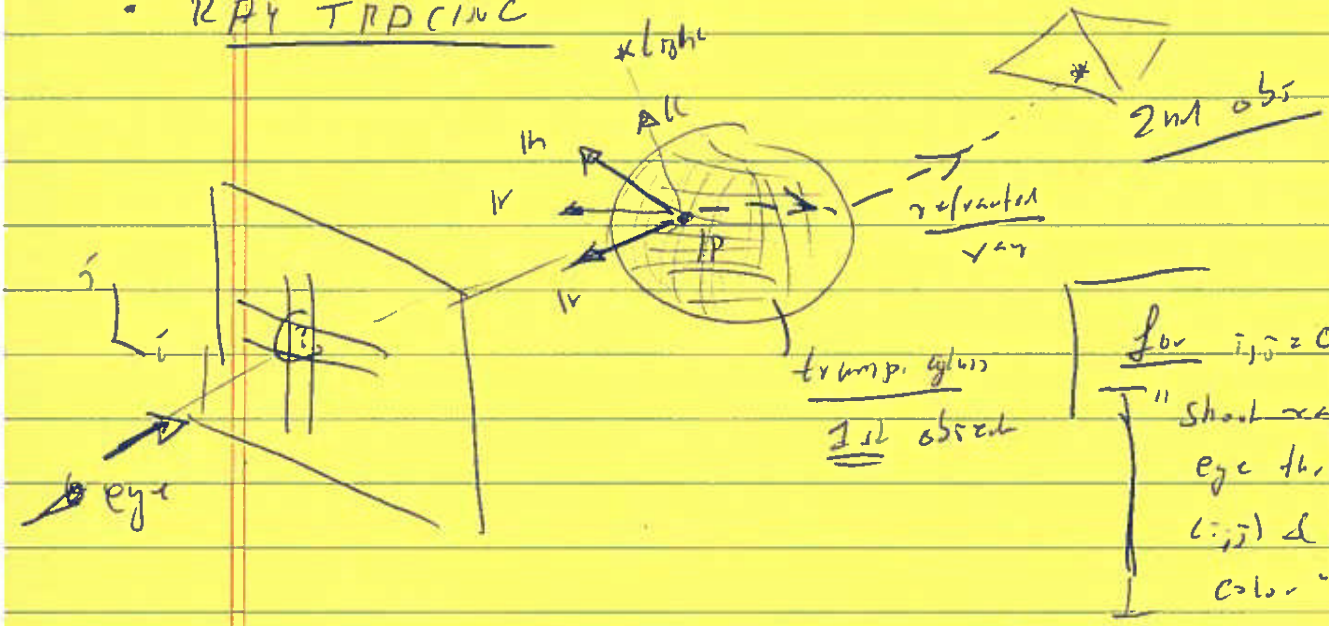
Lec 1

- **B-spline Curve**



piecewise poly curve, consists of multiple segment

- **RAY TRACING**



for $i,j = 0,\dots,m(n)$ do
" shoot ray from eye through pix (i,j) & determine color "

⇒ Reflection, Refraction / Transparency etc.