



**University of British Columbia**  
**CPSC 414 Computer Graphics**  
**Scan Conversion**  
Week 5, Fri 3 Oct 2003

- recap: shading
- scan conversion: lines

© Tamara Munzner

1

## News

- demos
  - be 10 minutes early
  - bring hardcopy
    - to conserve paper: mpage p1.cpp > p1.ps
  - show TA timestamps

Week 5, Wed 1 Oct 03

© Tamara Munzner

2

## Shading Models recap

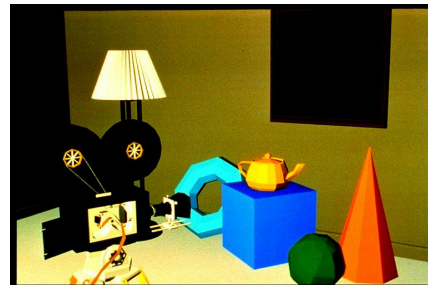
- flat shading
  - compute Phong lighting once for entire polygon
- Gouraud shading
  - compute Phong lighting at the vertices and interpolate lighting values across polygon
- Phong shading
  - compute averaged vertex normals
  - interpolate normals across polygon and perform Phong lighting across polygon

Week 5, Wed 1 Oct 03

© Tamara Munzner

3

## Shutterbug: Flat Shading

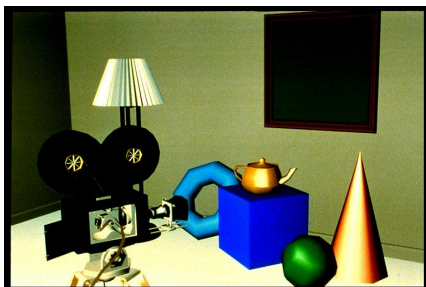


Week 5, Wed 1 Oct 03

© Tamara Munzner

4

## Shutterbug: Gouraud Shading

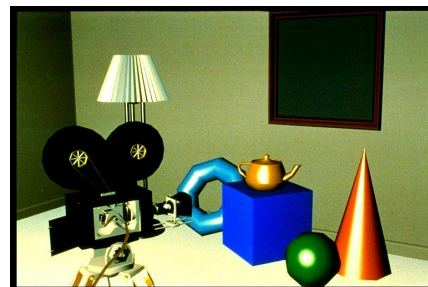


Week 5, Wed 1 Oct 03

© Tamara Munzner

5

## Shutterbug: Phong Shading



Week 5, Wed 1 Oct 03

© Tamara Munzner

6

## Shading Models Summary

- flat shading
  - compute Phong lighting once for entire polygon
- Gouraud shading
  - compute Phong lighting at the vertices and interpolate lighting values across polygon
- Phong shading
  - compute averaged vertex normals
  - interpolate normals across polygon and perform Phong lighting across polygon

Week 5, Wed 1 Oct 03

© Tamara Munzner

7



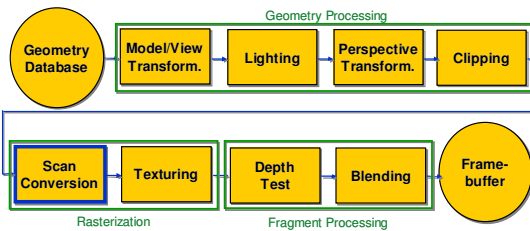
University of British Columbia  
CPSC 414 Computer Graphics

## Scan Conversion

© Tamara Munzner

8

## The Rendering Pipeline



Week 5, Wed 1 Oct 03

© Tamara Munzner

9

## Scan Conversion

- objective: scan conversion
  - convert continuous rendering primitives to discrete fragments/pixels
- pixel definition
  - a digital image is composed of a regular grid of picture elements: pixels
  - every pixel describes the color of the image at **one discrete point**

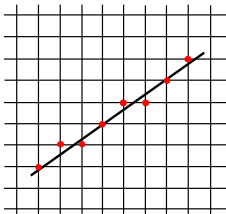
Week 5, Wed 1 Oct 03

© Tamara Munzner

10

## Scan Conversion of Lines

- task
  - determine pixels closest to line
  - endpoints of line are given in *subpixel precision*



Week 5, Wed 1 Oct 03

© Tamara Munzner

11

## Deriving Line Scan Conversion

- <http://graphics.lcs.mit.edu/classes/6.837/F98/Lecture5/homepage.html>

Week 5, Wed 1 Oct 03

© Tamara Munzner

12