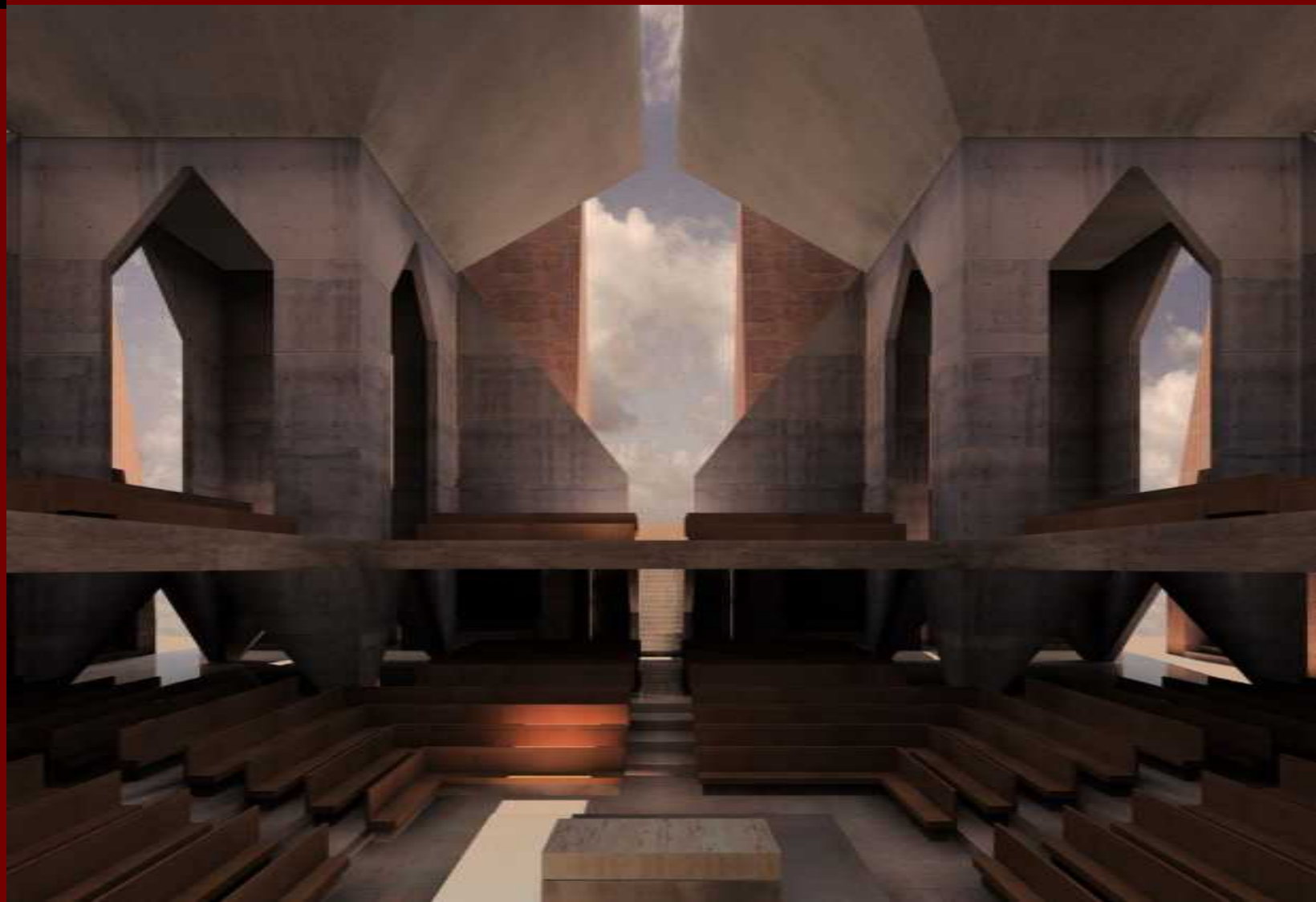
Lecture 5

4.206/4.291
VISUALIZATION

Spring 2003

RADIOSITY AND DESIGN



Rendering – Today's Class

- **Lighting – Day Light**
- **Radiosity Modeling**
- **Louis Kahn**
- **Design Options with Radiosity**

DESIGN COMPUTING

- **Design**

  Problem Setting

  Problem Solving

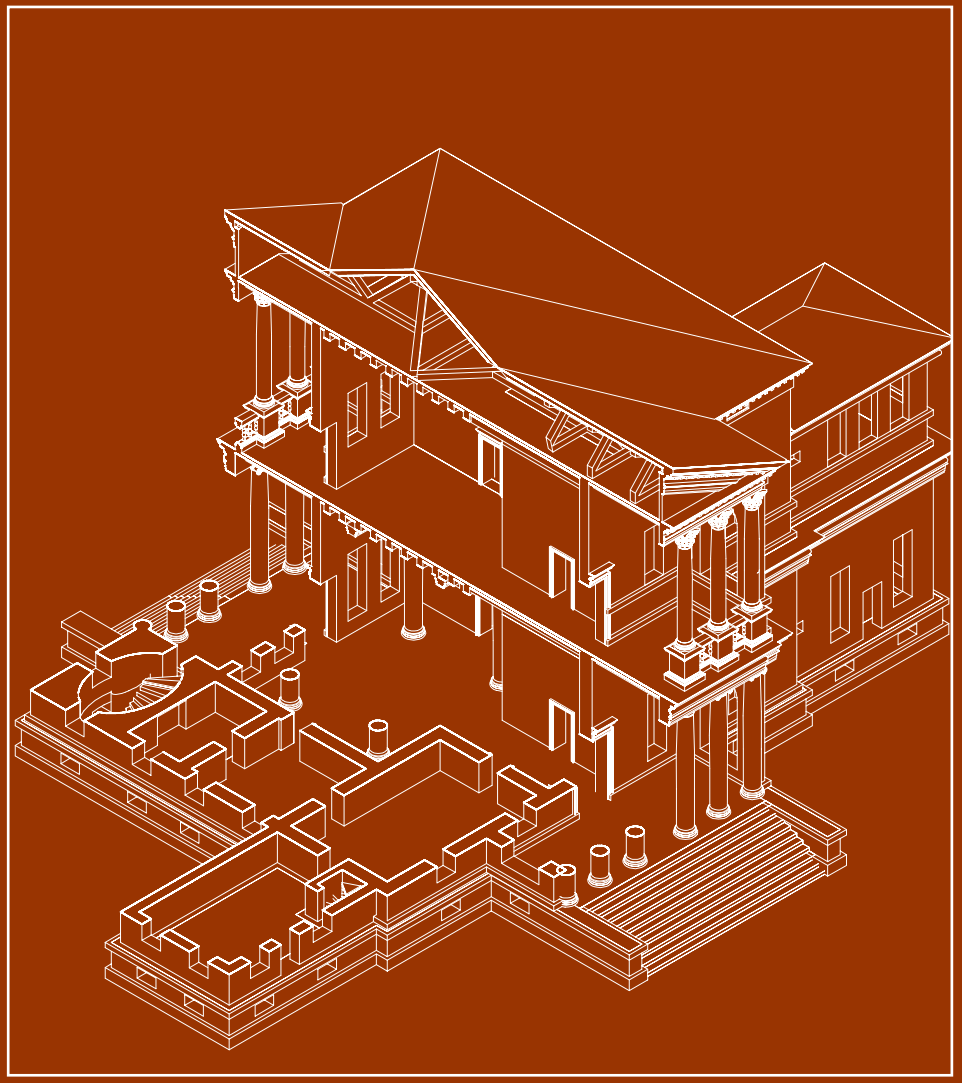
  Evaluate – Quality

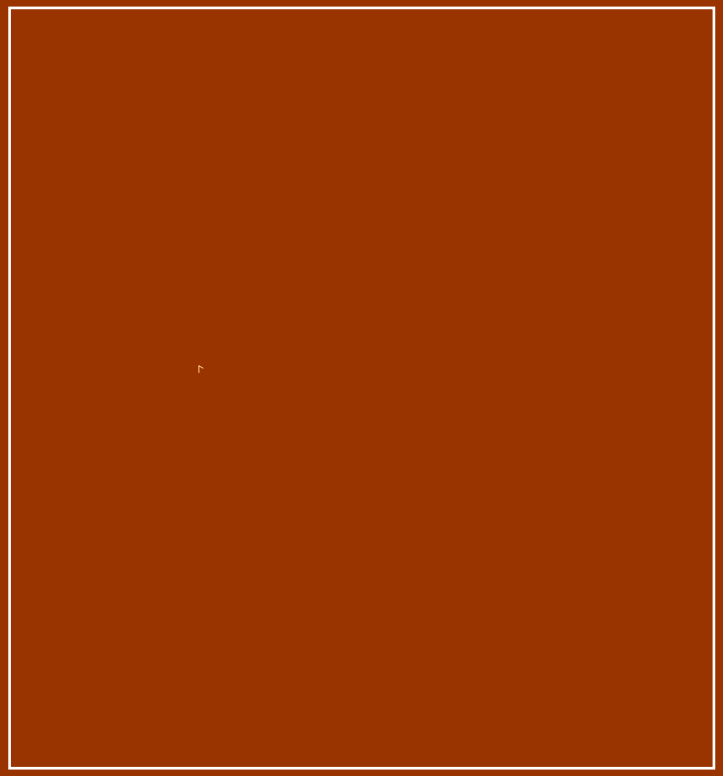
  Evaluate – Quantity

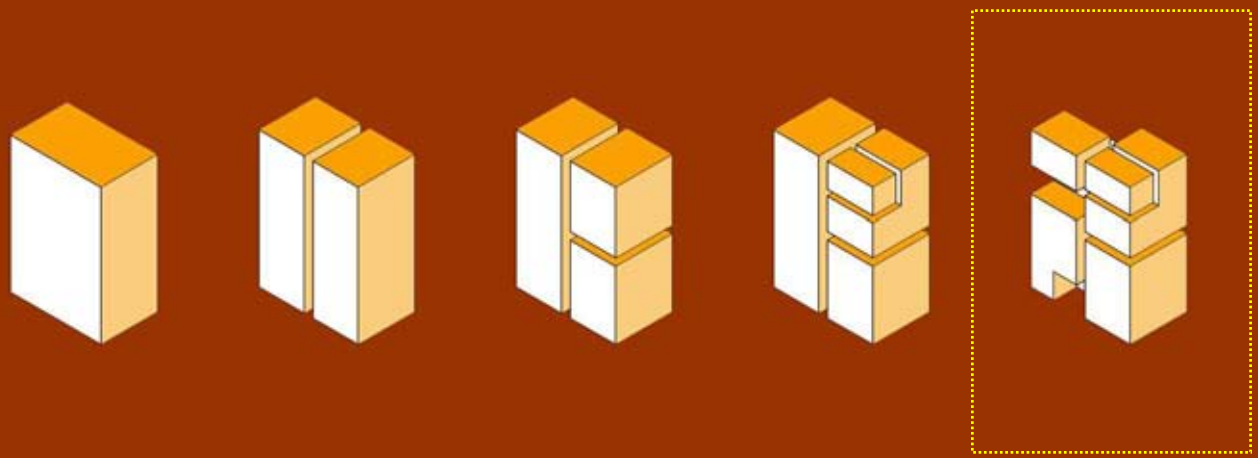
  Truth - Experience

COMPUTING AND ARCHITECTURE

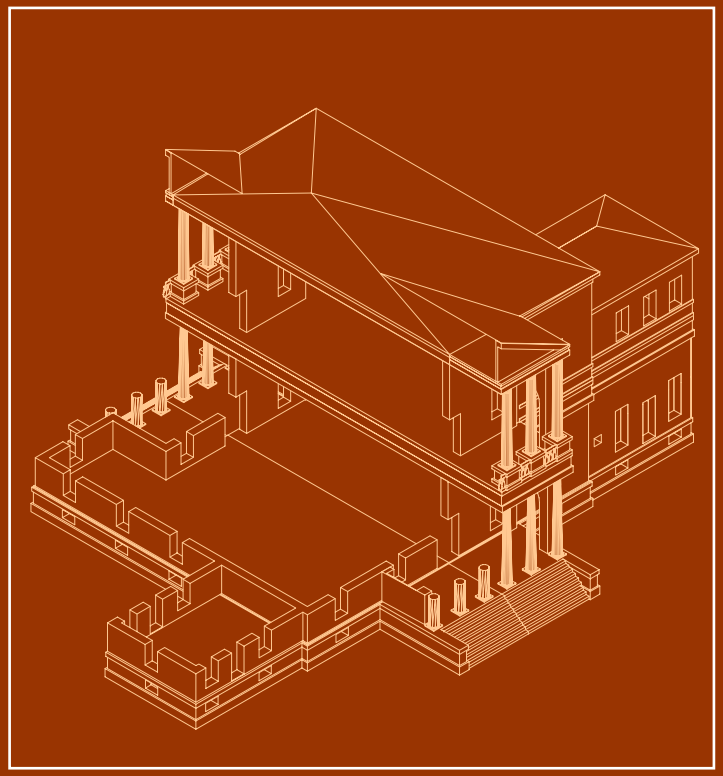
- Design
  - Problem Setting
  - Problem Solving
  - Evaluate – Quality
  - Evaluate – Quantity
  - Truth – Experience
- Computer Modeling
  - Detail – Resolution
  - Detail - Purpose

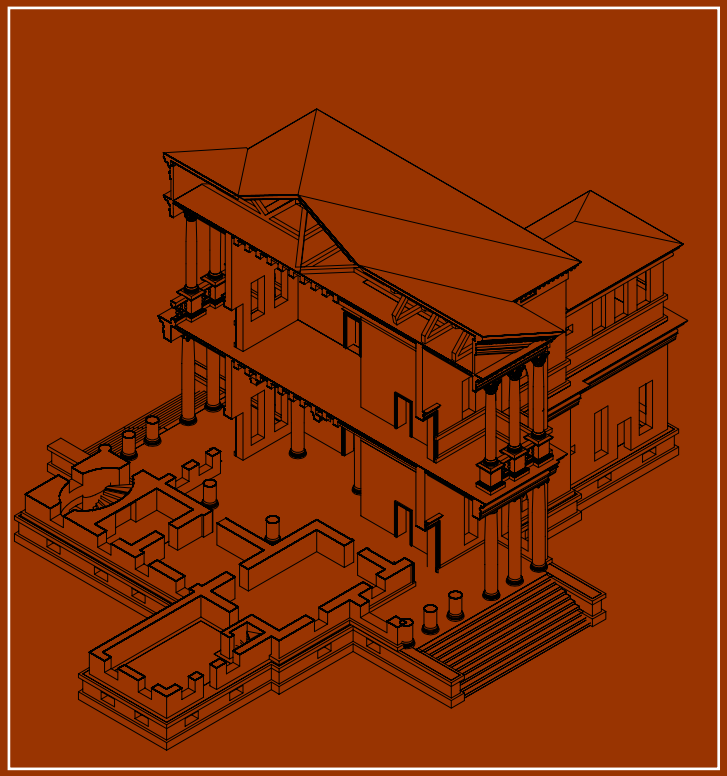


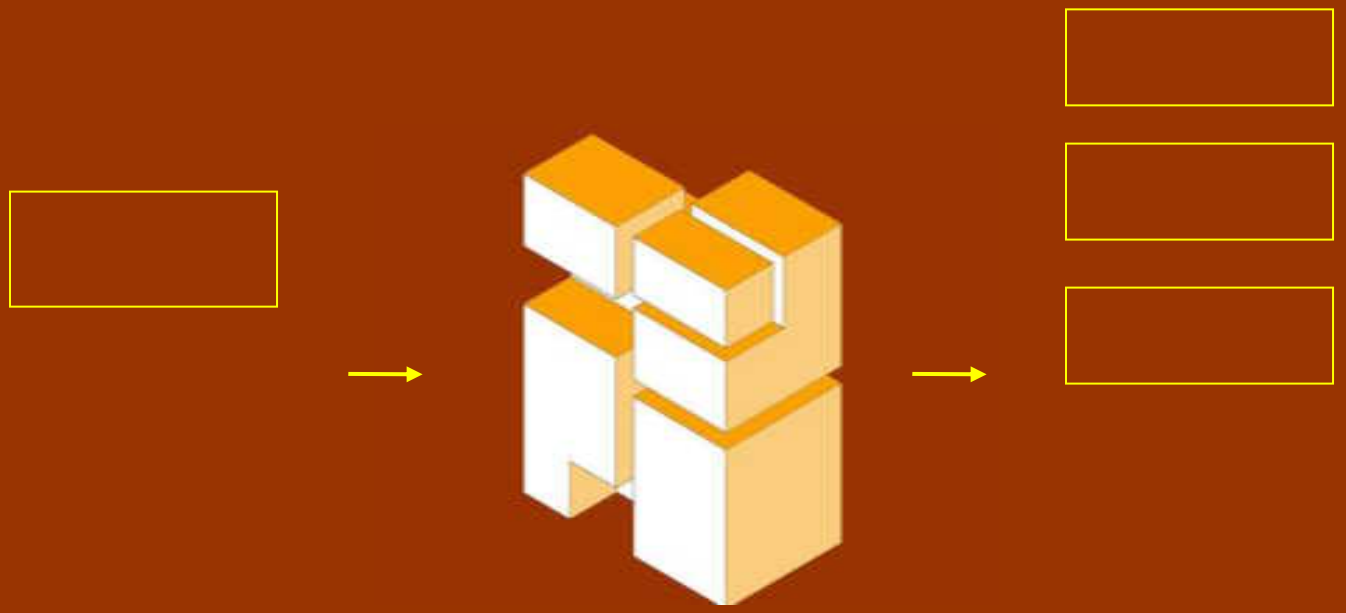




MODELING PROCESS



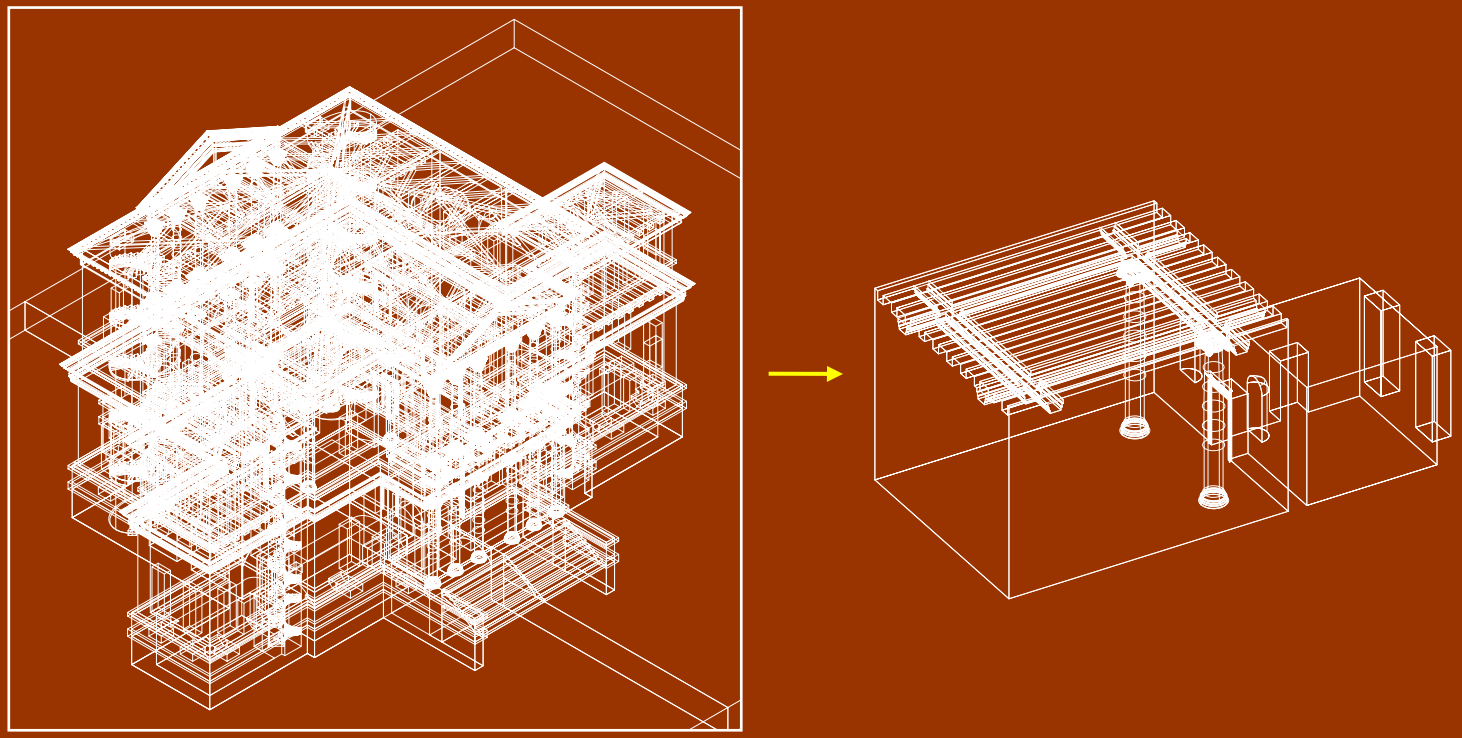




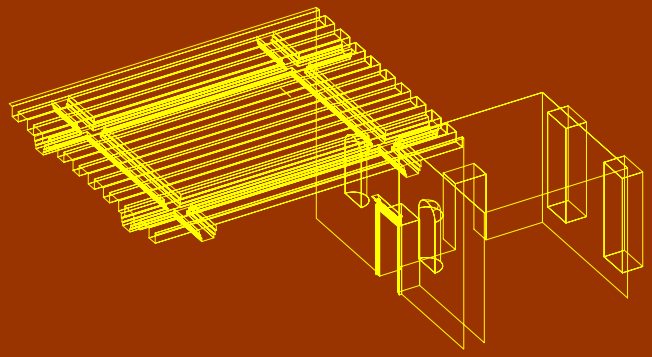
COMPUTING AND ARCHITECTURE

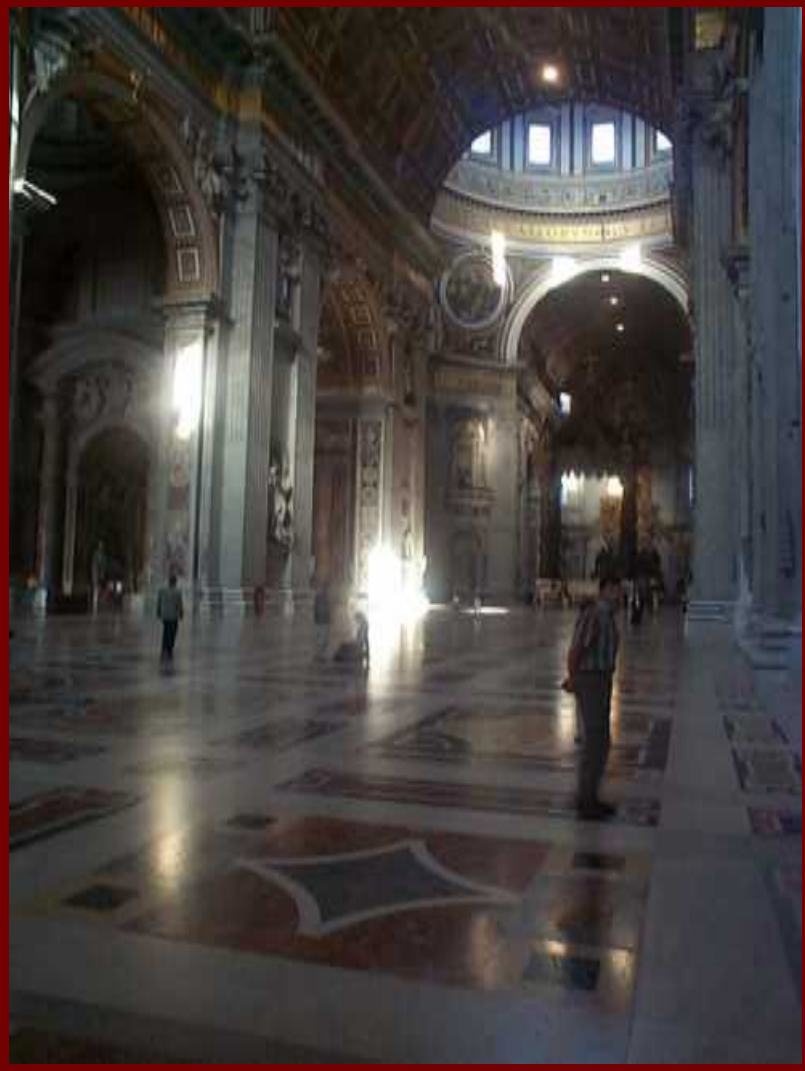
- Design
  - Problem Setting
  - Problem Solving
  - Evaluate – Quality
  - Evaluate – Quantity
  - Truth – Experience
- Computer Modeling
  - Detail – Resolution
  - Detail – Purpose
- **Computer Rendering**
  - **Stage Set**
  - **Lighting**
  - **Design Strategy**

RENDERING



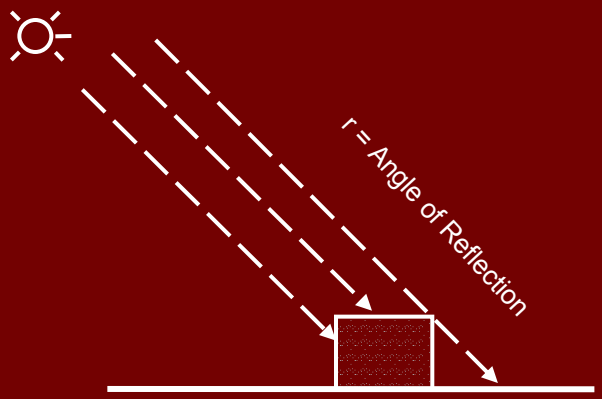
3D Computer Rendering



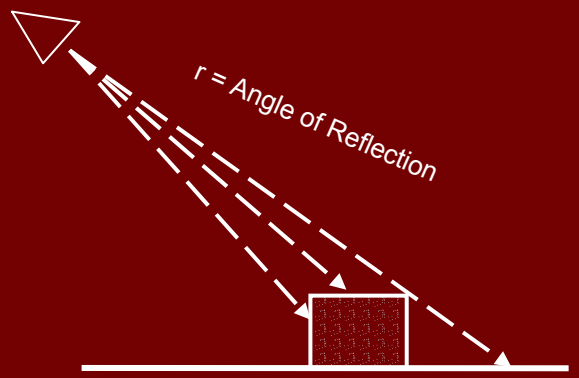


LIGHT

Day Light



Artificial Light

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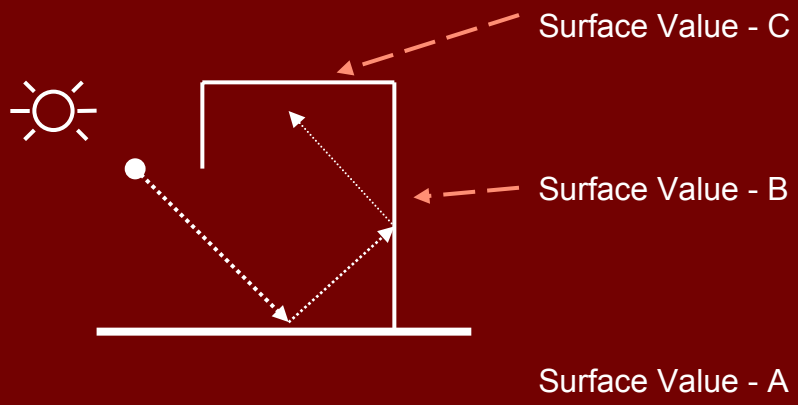
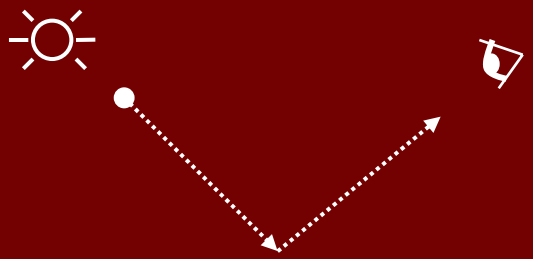
LIGHTING TYPES

Diffuse Light - Bouncing Rays



Direct Light - Vectors



LIGHTING TYPES

Diffuse

LIGHTING TYPES

Direct

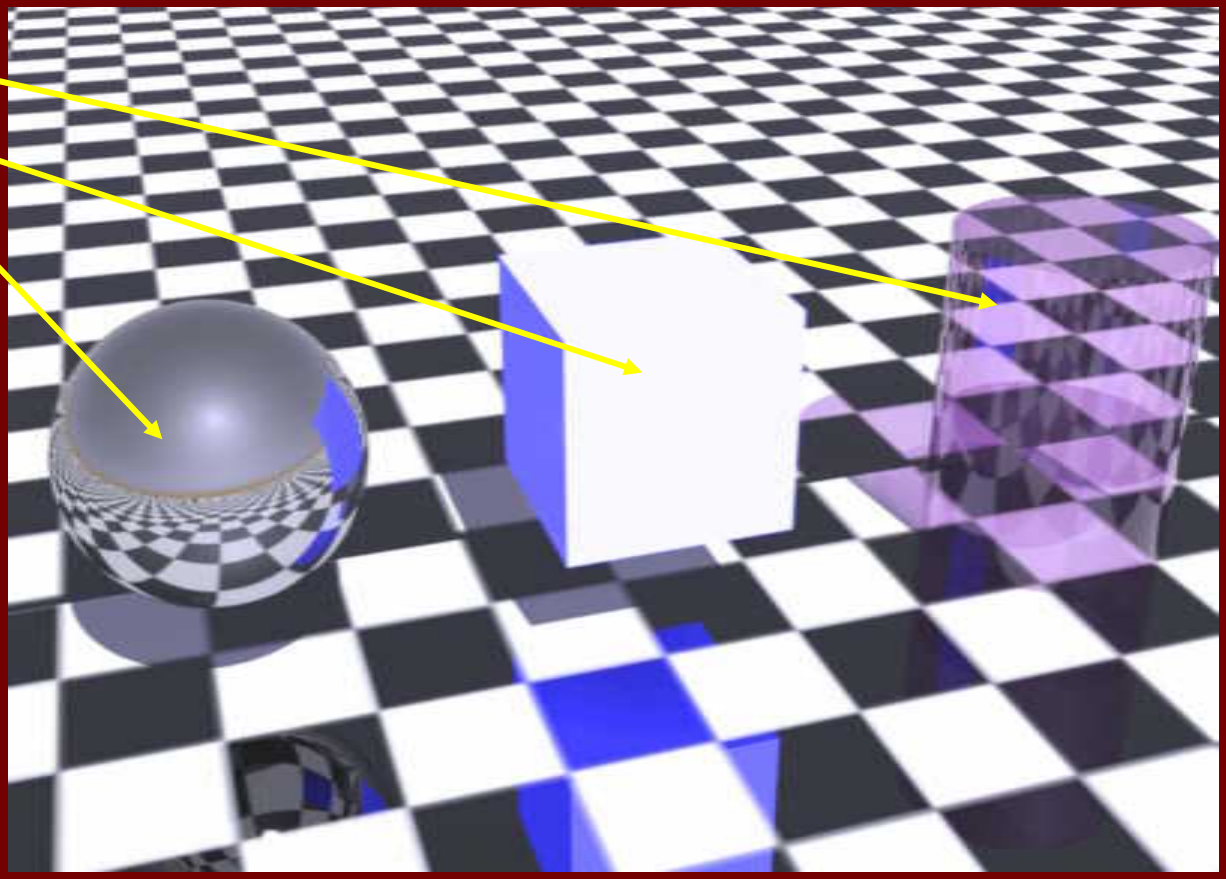
SURFACES

Direct Light - Reflections – View Dependent

Transparency

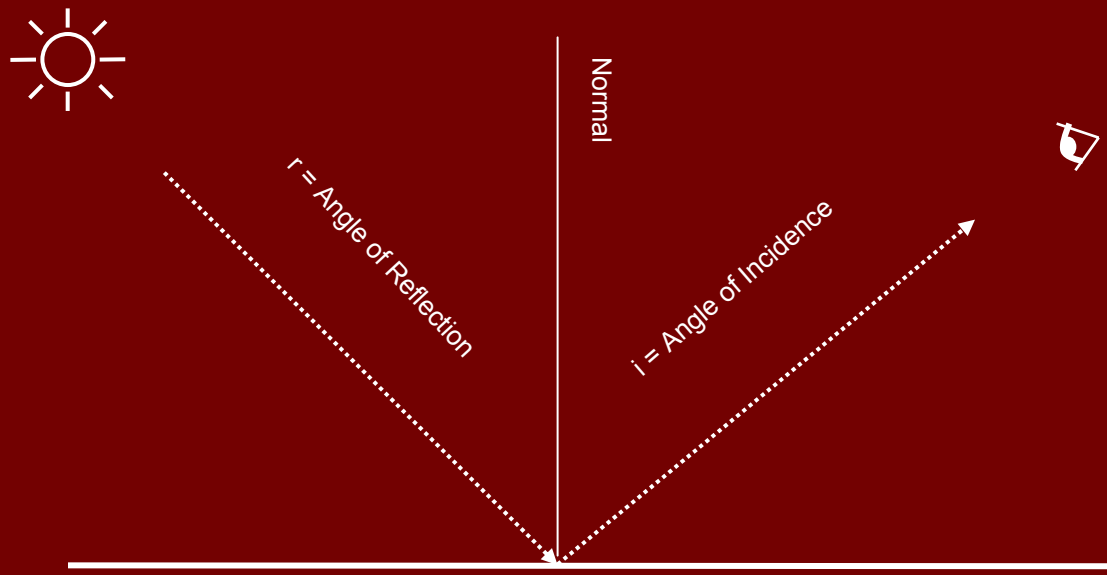
Spread

Reflection



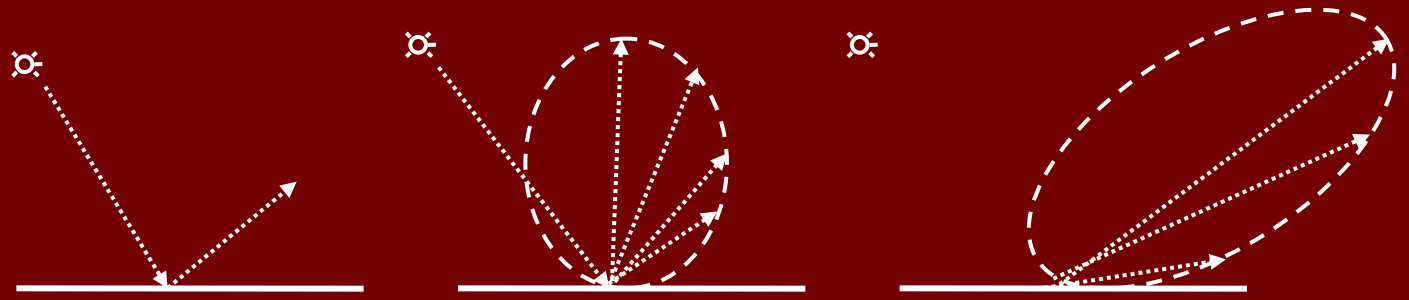
SURFACES

Reflections – View Dependent



SURFACES

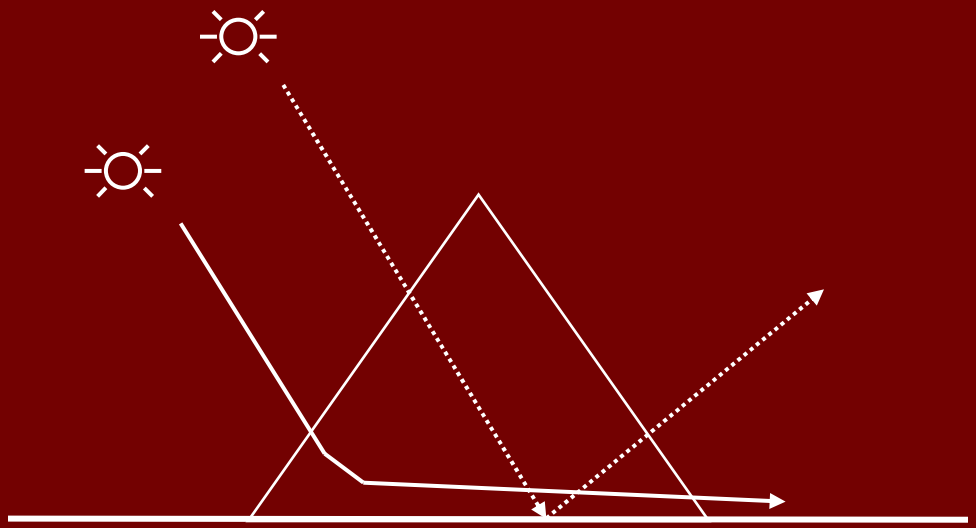
Types of Reflections



Specular Diffuse Spread

SURFACES

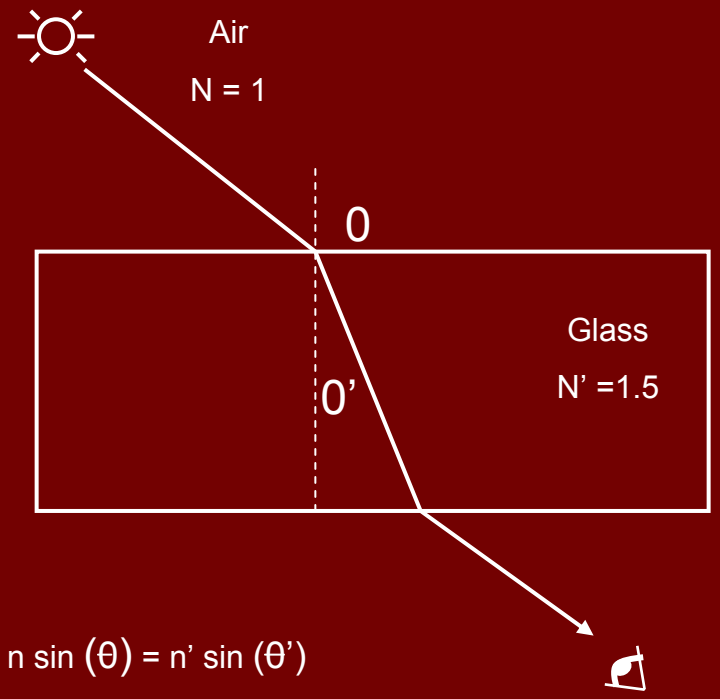
Transparency - Refraction



Refraction

SURFACES

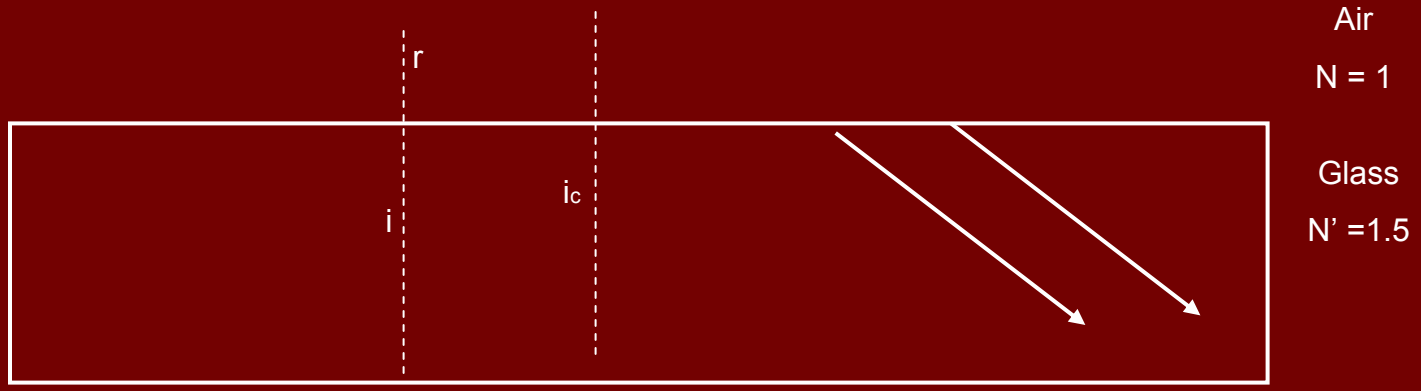
Transparency - Refraction



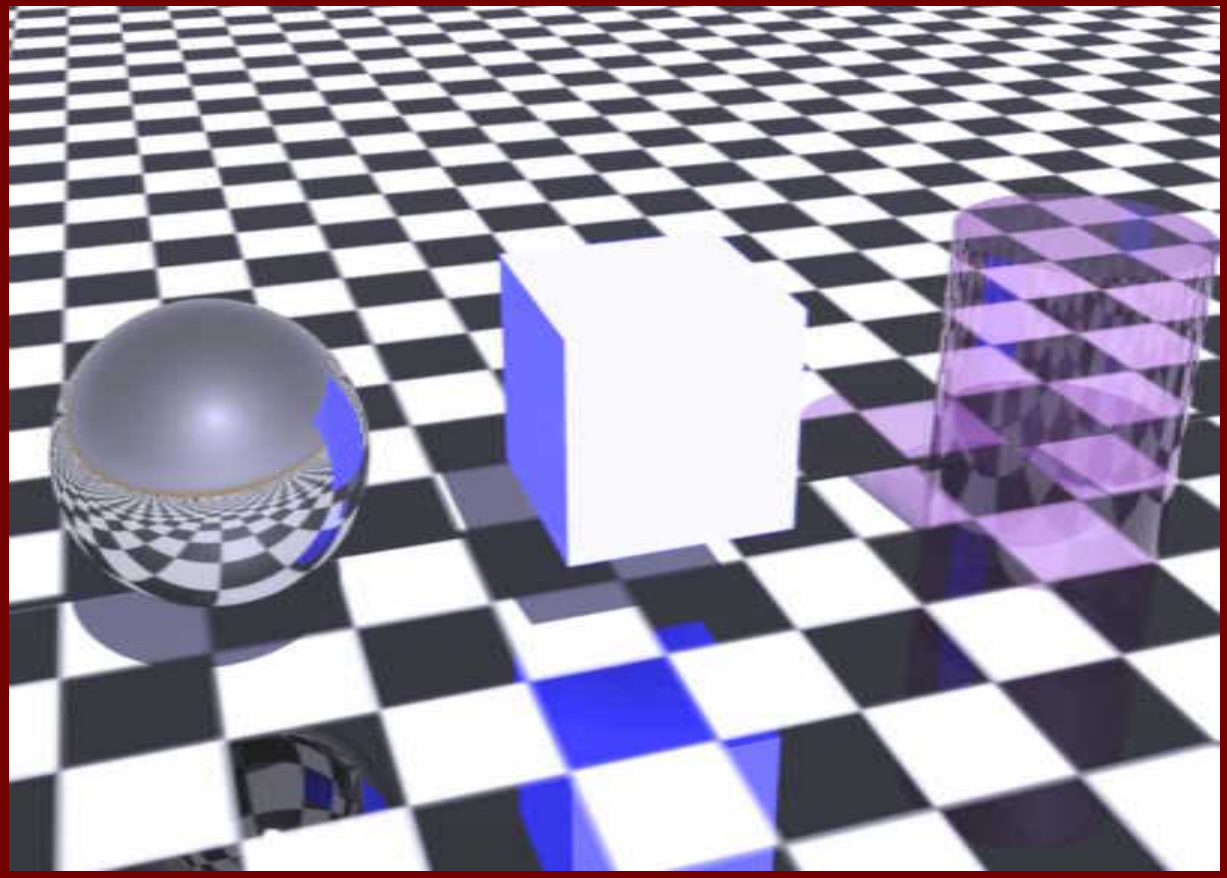
$n \sin(\theta) = n' \sin(\theta')$

SURFACES

Partial Transparency - Refraction

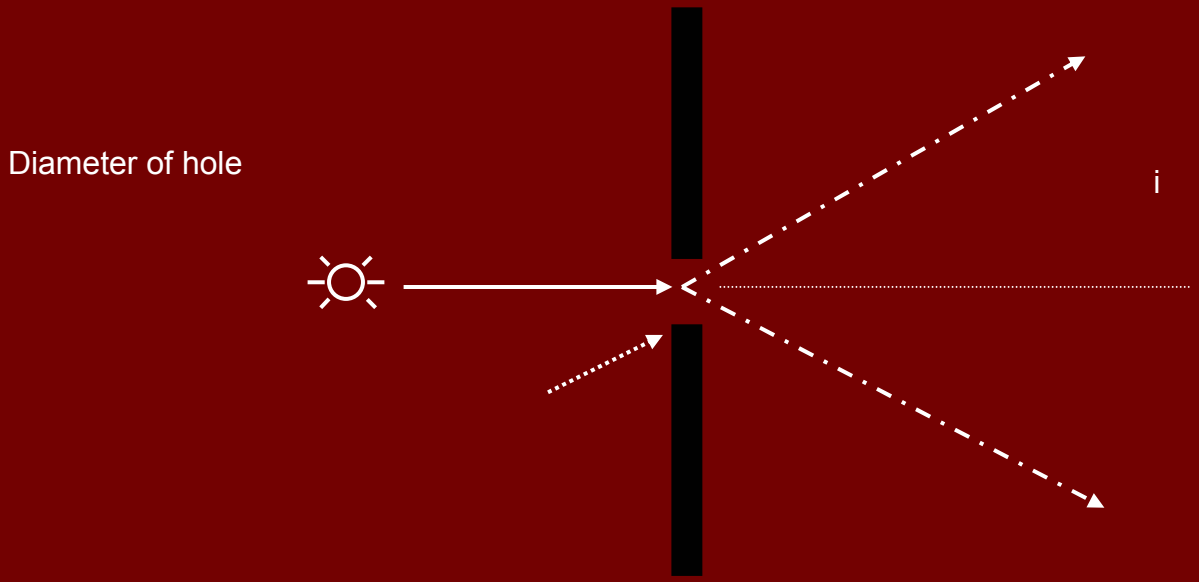


SURFACES



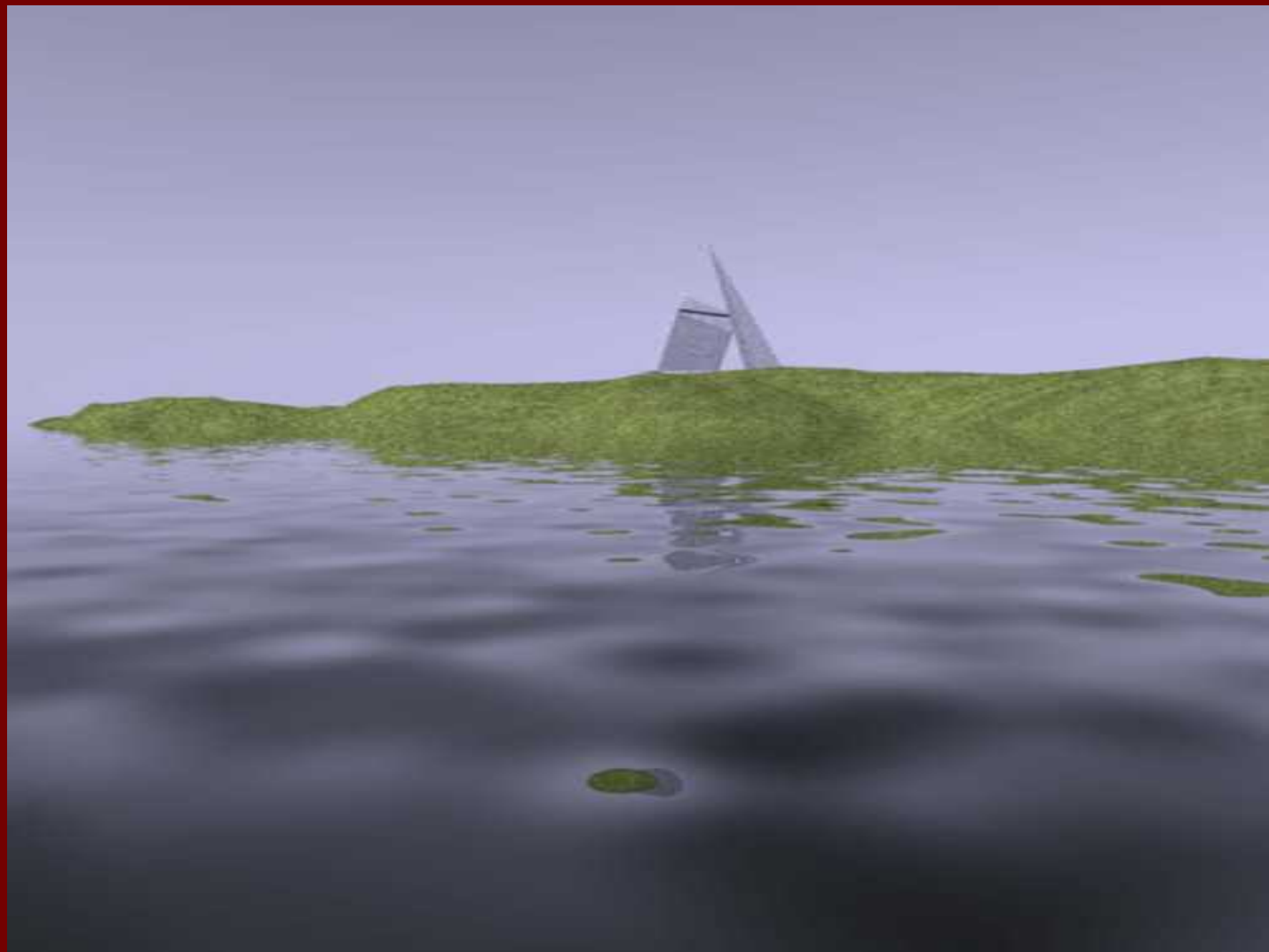
SURFACES

Diffraction



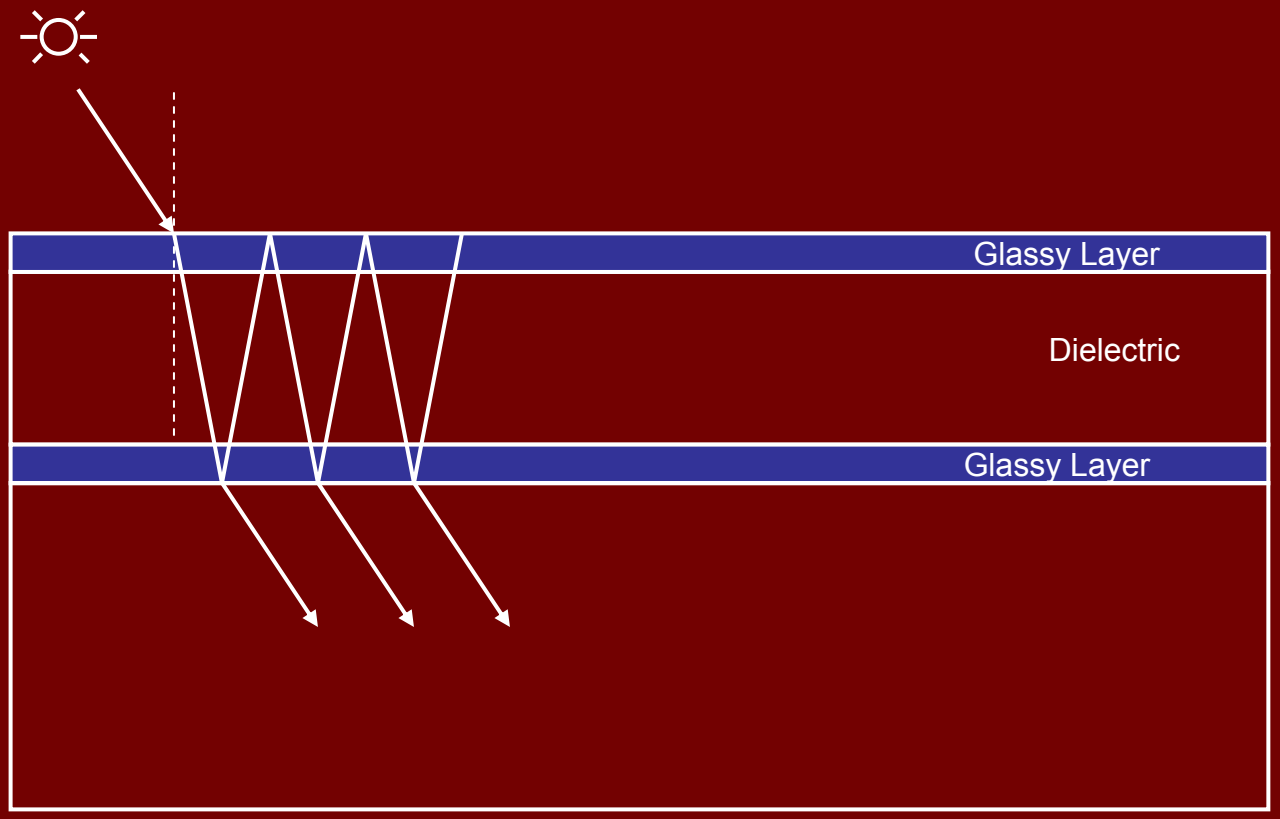
SURFACES

Interference



SURFACES

Interference



USES FOR DAYLIGHT

ISSUES

Computer Programs Allow For Control

Direct Lighting
- UV Rays
- Heat Gain

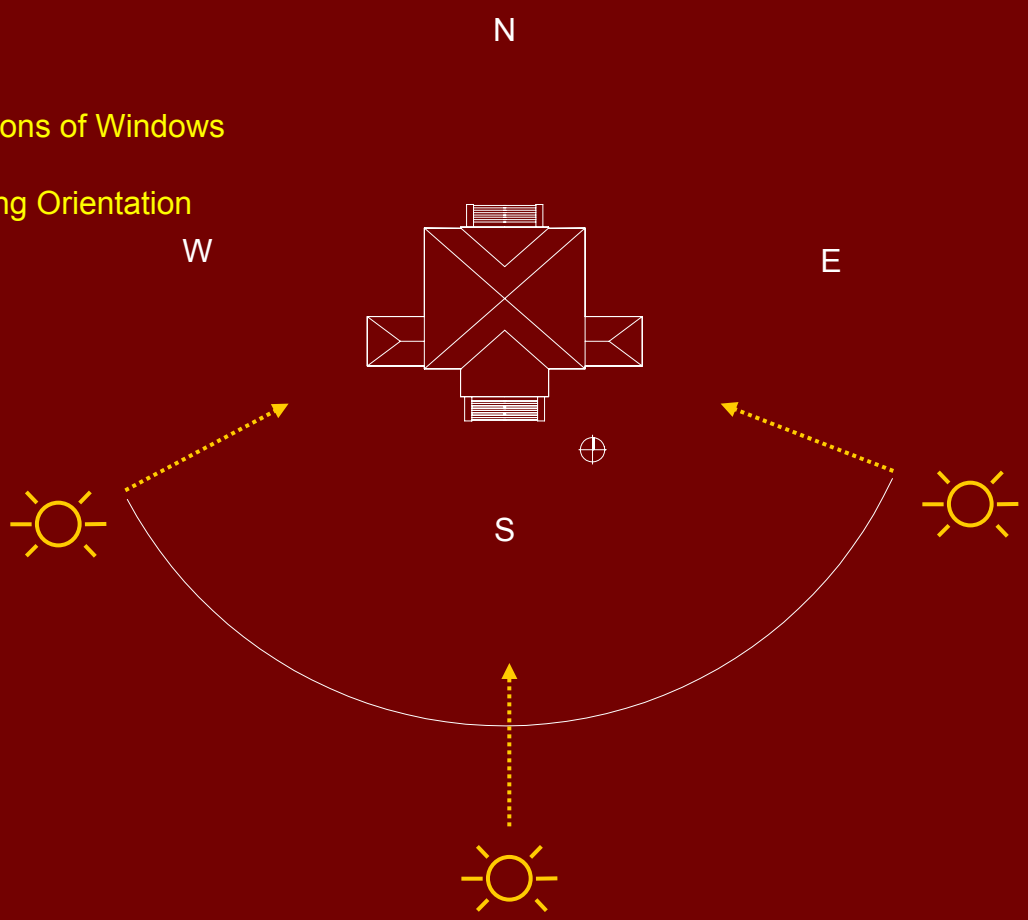
Diffuse Lighting –
- Quanitity on a Surface

BUILDING PLANNING

PLAN

Locations of Windows

Building Orientation



BUILDING PLANNING

SECTION

Openings

Height of Windows