4.206 Visualization

Massachusetts Institute of Technology

Professor Larry Sass

Recitation 6

March 13 &14, 2003

Introduction to Rendering

Recitation Schedule

1) Points from the lecture & preview of Recitation 6.

2) Open your **Design option** **DWG file** **& 4_206_Recitation_06.PDF** tutorial from StudioMIT.

3) Go through the tutorial.

4) Discuss Assignment 6.

5) Questions.

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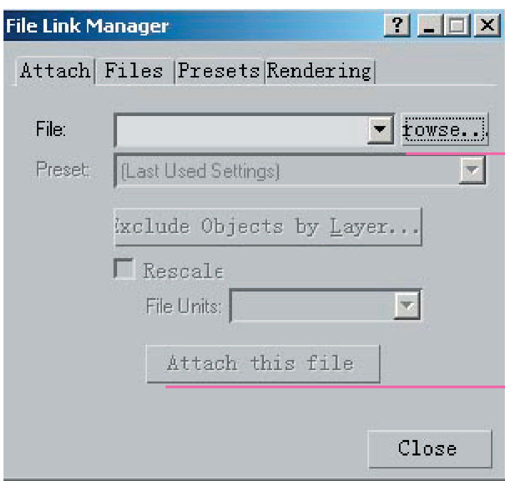
1. Check your DWG file.
- The wall should be solid
- The ceiling and gound are surface.
- Keep three options into three different layers.

2. Transfer file to VIZ.

2.1) set up your units in 3D vize

2.2) Import your model

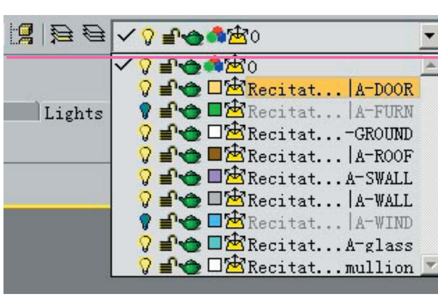
go to **File>File Link Manager**



browse your DWG file

Attach the file

3) Check the layers imported.



Similar Layer manager , Turn On/Off,

4) Save as .Max file.

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1. Set up lights

Before you run an accurate radiosity solution file, you need to set up lights correctly.
There are two different light sources can be simulated in Radiosity: natural sun with sky, and artificial lights.

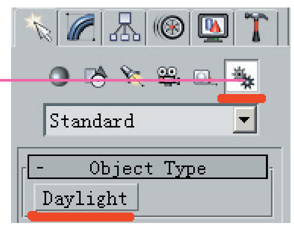
1.1*)* Natual lighting

You can set up a daylight sun based on a certain location, date and time.

a) **Create SunLight**

Open the "Create" tab on the command panel and click on the "Utilities" icon on the right.

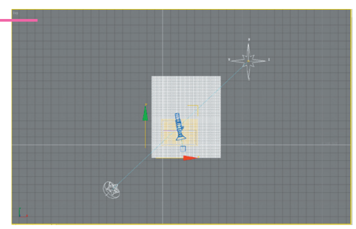
Click on the "Daylight" button



b) **Locate the sun**

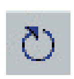
On the TOP viewport, click anywhere and drag to set the size of the compass.
Release the button and move the mouse to specify the distance of the sun to the model.
Click once to set the distance.

(Note:the size of the compass and the distance of the sun are not important as long as the sun covers all your model.)



c) **Adjust Lighting**

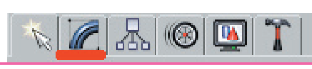
Adjust the north direction of your model .
Click on the compass and use rotate



Adjust the appropriate date and time and location of your model.

Click on the daylight to highlight it.

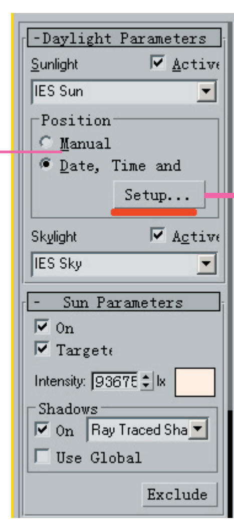
Go to **Modify**



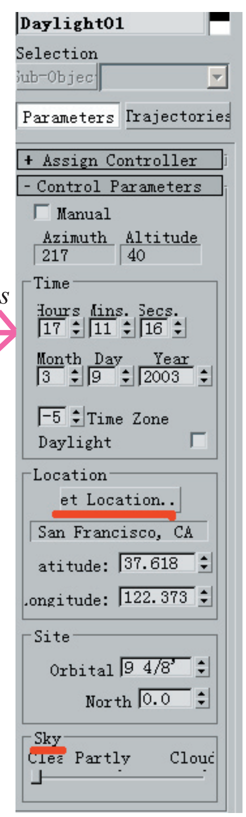
Click on **Date, Time and Location ,** and click on **Setup.**
Then you can type the appropriate time and date.

Click on **Get Location**, you can select the city.

You can experiment with other parameters of the Sun (such as **Sky** to be cloudy ot clear)



click set up, then a new dialogue window comes



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2. Assign Material

You need to assign material to your objects before you start to make a solution file for rendering.
Note: If you find your solution file has some black surface, it means that you have wrong surface normal direction. 3D Viz only render one side of a surface, so a surface is visible from when side when rendered.When you have this problem, you can flip the surface normal direction manually.

2.1*) Change Surface Normal*

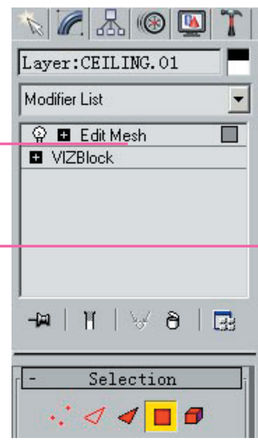
a) Select the surface, go to **Modify** 

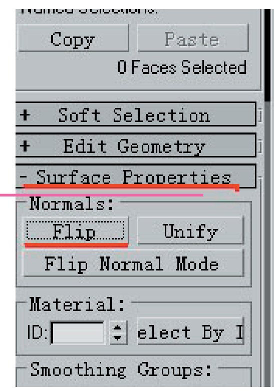
b) **Go to Modifier List>Edit Mesh**

c) **Go to Selection**, **Click Face Icon**

d) **Go to Surface Properities>Flip**

Note: Make sure unclick **Edit Mesh** and go to the nomal editing mode.





2.2*) Assign Material with simple color*

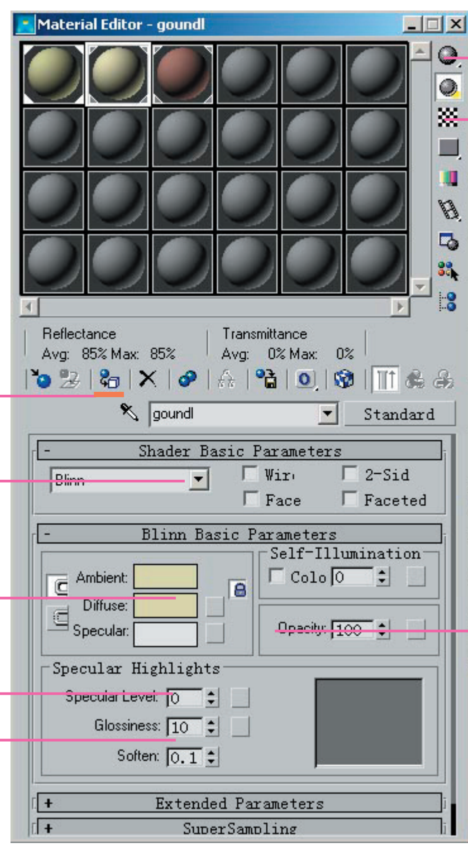
a)Click **Material Editor** 

b) Choose a material editor and adjust the color

c) select the object

d) Assign the material you selected to the object.
Click on 

Note: the reflectance of a surface is determined by the color described in HSV system(Hue, Saturation, Brightness). You should keep the value within 75-180. Check all the materails to have right reflectance level before you get solution file.



Assign material to the object you selected

Recommended for standard material

Chage the color of an object in light

Larger value makes the hotshot brighter

size of the specular highlight

geometry of material sample

Pattern of background

Change transparency

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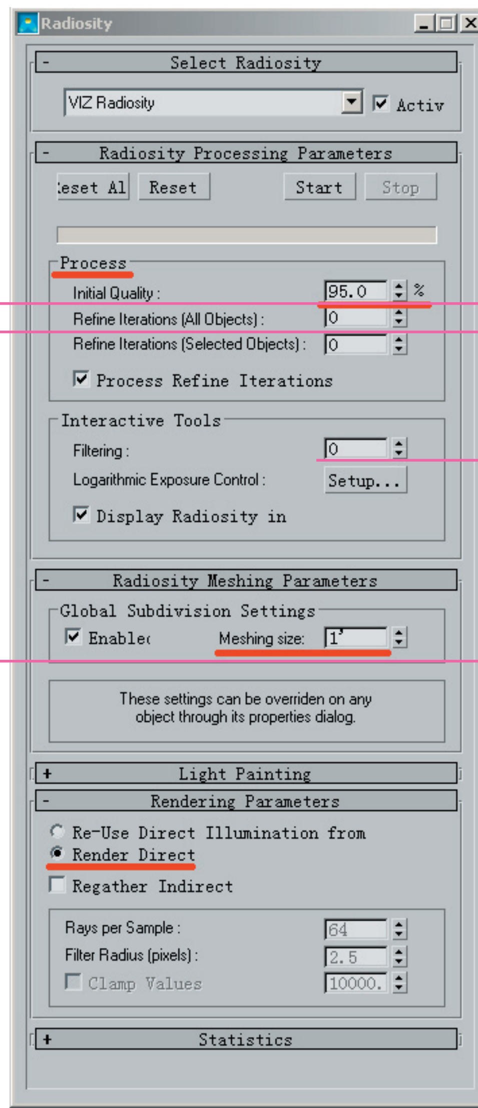
3. Create a Solution File
Once you have set up geometry, lights and materials in your model, you can prepare a solution file.
When the VIZ creates a solution file, it uses a radiosity algorithm to accurately distributes light on the surfaces of your model. This process might take a long time, depending on the complexity of your model and the parameters you specify. Radiosity parameters are used to control how accurate this lighting distribution will be.

Solution files are accurate to a specific situation. For instance, if you move the light source, then the light distribution needs to be recalculated. The same applies to geometry and materials: if you change the size of the openings, or if you change the color of your materials.

3.a) Excluding transparent objects from solution file computation
You are recommended to exclude transparent objects such as window glass from the computation of a solution file.
Select transparent objects , go to **Edit>properties>radiosity>Geometric Properties>**uncheck **By Layer> check exclude from radiosity processing**

3.b) Rendering> Radiocity , or click on 



Initial Quality
The basic parameter is a percentage of distributed light. It indicates how much light from the sources has been applied to the surfaces in your model. Normally, you *set this parameter to a low value£¨such as 50%), and increase it depending on how long it takes to reach the goal.For the final solution file, the quality of 90%-99% is ideal. Do not make it 100%*

Refine iterations
Use this parameter to force all object be calculated X number of times. This process is done after the initial quality is reached, and Initial Quality cannot be changed afterwards. Usually, 3-5 is enough

This is important for smaller objects, such as railings and mullions, because some of them might not be correctly calculated by the initial quality setting. Likewise, if the size of the patches is too large, then some small objects may not be subdivided.

Filtering
A value of 2-3 is good

Radiosity Meshing
This forces objects to be subdivided (only in the solution file, it doesn't affect geometry at all) into smaller patches that emit and receive light. *The smaller the subdivision, the more accurate the solution file* (at the expense of processing time and file size!)

you can select smaller object and force them to be subdivided with a smaller patches than the rest. (**Edit>Properties>Radiosity**) (*make sure the "By Layer" option is unchecked!)*

3.c) Press Start, once you checked all the parameters.

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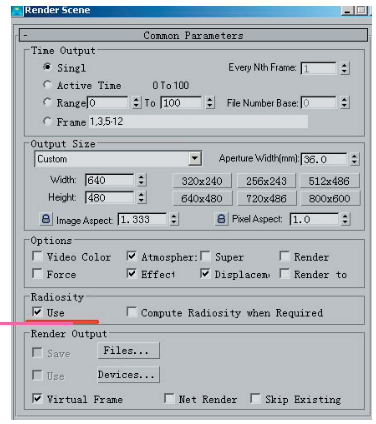
4. Rendering your model
To create a bitmap image from your model, you Render the scene. Rendering shades the scene's geometry using the lighting you've set up.

Turn Radiocity ON



5. Rendering>Environment, click on 

The image you rendered at first maybe look too bright or too dark. You can modify the exposure of the scence image.

change the background color

Use Brightness and Contrast value to to adjust your rendering image