

Arch 464  
ECS  
Spring 2005

Name \_\_\_\_\_

### Quiz #1

## "Lighting the Coach House"

For this problem you are the daylighting consultant for John Ronan, architect, who, about 5 years ago, remodeled the Coach House, located on an alley on the north side of Chicago. The 2-story Coach House is approximately 50' x 19.5'. It features a large open multipurpose room on the second floor above the ground floor garage and office. This open space is to become a design studio for four graphic designers.

The architect has asked you to critique the existing conditions and to recommend a scheme for improving the daylighting in the space by adding a skylight(s). The upper floor has unshaded windows on each facade and two narrow skylights—one 2'x5' above one of the south-facing windows and one 2'x33' above the stairway and bathroom. Chicago is at 42 degrees north latitude and has a humid climate with cold winters and hot summers.



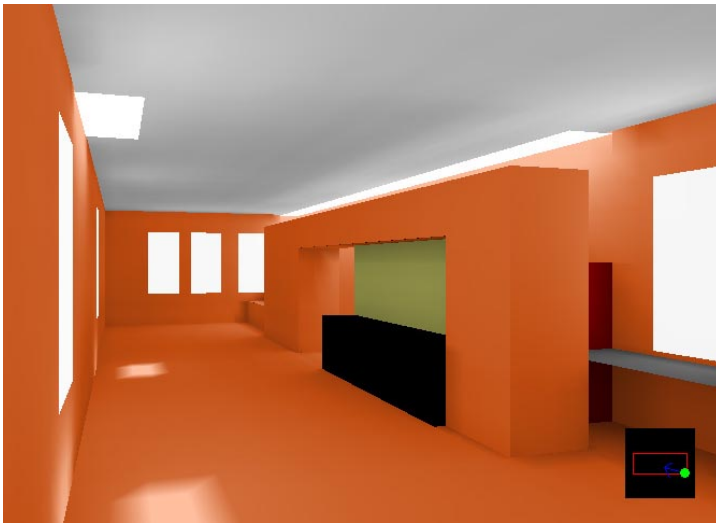
*The Coach House in context, a view from the alley to its east facade.*



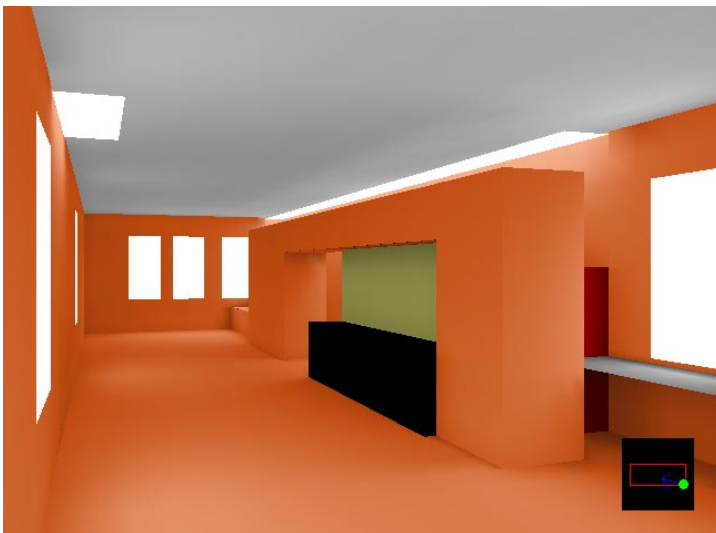
*Coach House second-floor interior looking toward the alley (East).*



The multipurpose room viewed from Southeast corner. Time and sky conditions unknown.



Lumen-Micro rendering for June 21 at noon with a clear sky.

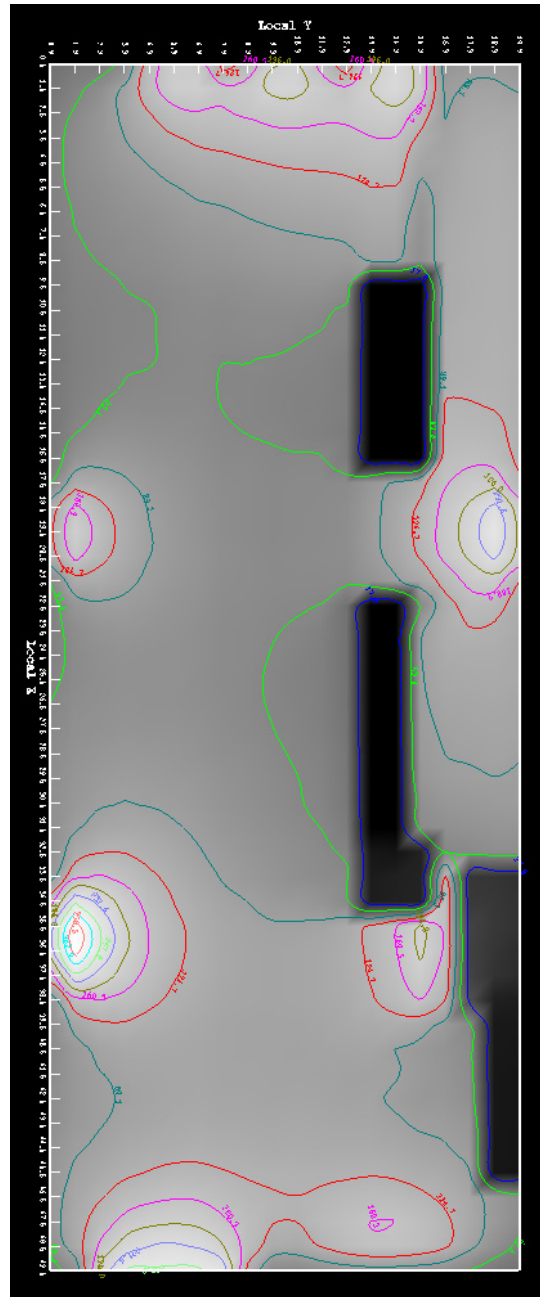


Lumen-Micro rendering for December 21 at noon with a cloudy sky.

Lumen-Micro numerical results:

June 21 @ noon, sunny:  
 Max = 11,249 fc, Ave = 621 fc

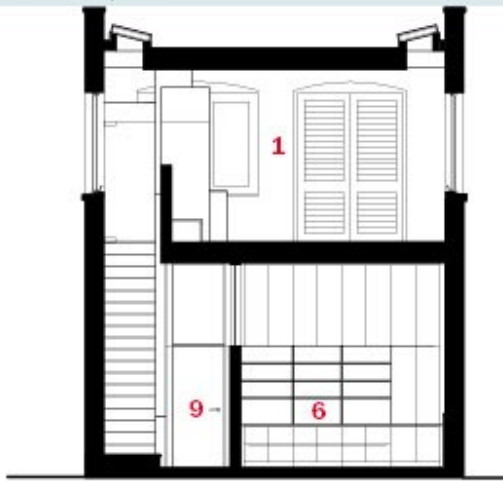
Dec 21 @ noon, cloudy:  
 Max = 356 fc, Ave = 89 fc



Lumen-Micro rendered 30" high workplane for December 21 at noon with a cloudy sky.

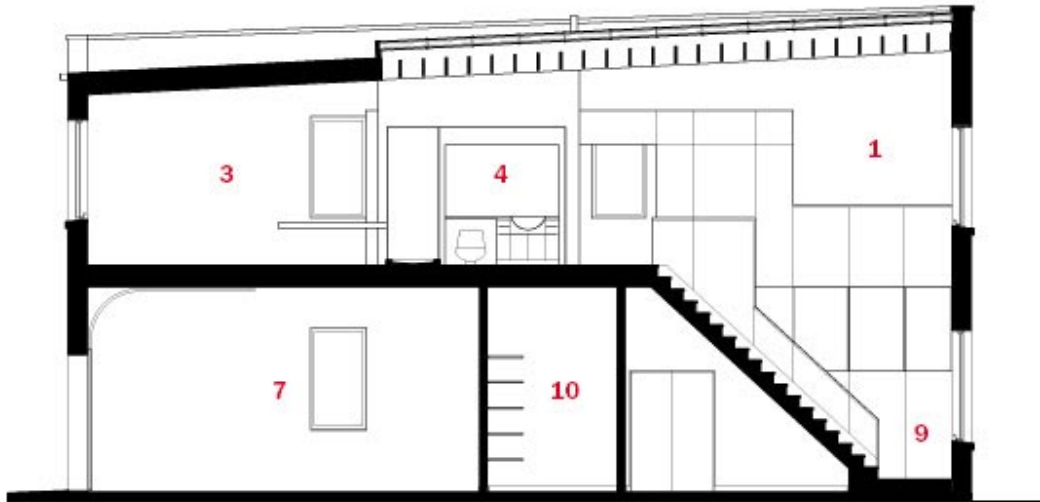
3 pts 1. You've modeled the multipurpose room with Lumen-Micro (See page 2 results). Critique the current daylighting scheme. Describe **two** of its weaknesses and **one** strength.

1 pt 2. Critique your Lumen-Micro model of the space. **Explain** why you do or do not have confidence in its results.



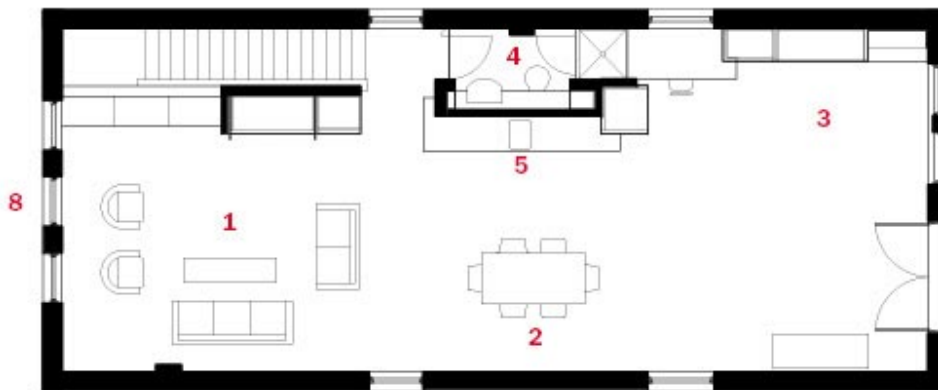
- 1. Living/conference area
- 2. Dining/crafts area
- 3. Guest quarters
- 4. Bath
- 5. Kitchen
- 6. Office
- 7. Garage
- 8. Garden
- 9. Entry
- 10. Gardening room

NORTH-SOUTH SECTION



EAST-WEST SECTION

0 3 FT.  
1 M.



SECOND FLOOR

N  
0 3 FT.  
1 M.

3. You may not change the size or location of any of the windows and you may add skylights. Propose a scheme with improved toplighting. **Locate** the new daylighting aperture(s) on the plan and section on page 4. **Show** how it (they) will change daylight distribution in the space. **Explain** why your scheme improves the daylighting in the room.

6 pts