

Arch 463
ECS
Fall 2000

Name _____

Quiz #1

"Orchard Square Transit Shelter"

For this problem you are the designer of a new transit shelter to be located at the edge of an old English walnut orchard that has become a neighborhood square. The walnut trees are maintained at about 25' to 30' high. The square is 200' on each side with one-way streets surrounding it. The shelter may be located at the midpoint of any of its edges. You have chosen a modular design for the 4' x 8' shelter. Each corner is marked by a spaced column of four 2" L-shaped steel posts, the wall modules fit snugly between the posts. There are no utilities on the site, neither water nor electricity. The transit is scheduled to operate from 10 a.m. to 10 p.m. every day. Your task is to wisely choose the wall modules and roof type to complete the structure and offer optimal comfort to the passengers in waiting.

Climate Context. The site is north of Houston, Texas. A bioclimatic timetable is given for Houston. Diurnal winds are typically from the northeast in the morning, calm around noon, and from the southwest in the afternoon. Generally, the climate is quite humid, fluctuating between 60 and 80% relative humidity eleven months of the year. An average RH chart is given.

Kit-of-Parts. You must choose your wall and roof modules from a restricted kit-of-parts.

Wall or Roof choices (4' x 6' modules)

(Use 6 different modules, 4 for the walls, 2 for the roof)

Concrete block, 4" thick

Stress-skin panel, 2" rigid insulation

Cedar lattice

Glass block, 12"x12" vision block

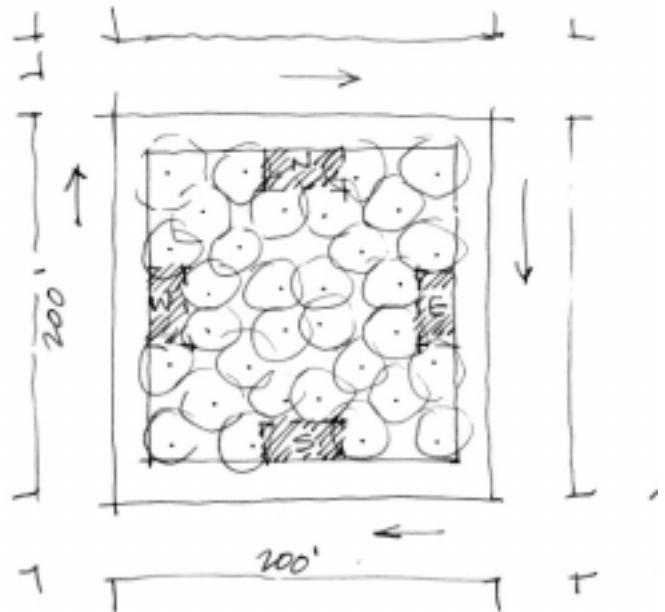
Perforated steel, 80% opaque

Sliding glass window

Wheatboard panel, 3/4" thick

Insulated roll-up door

Egg-crate shading device made of 1 x 4 fir, with 4" x 4" cells.

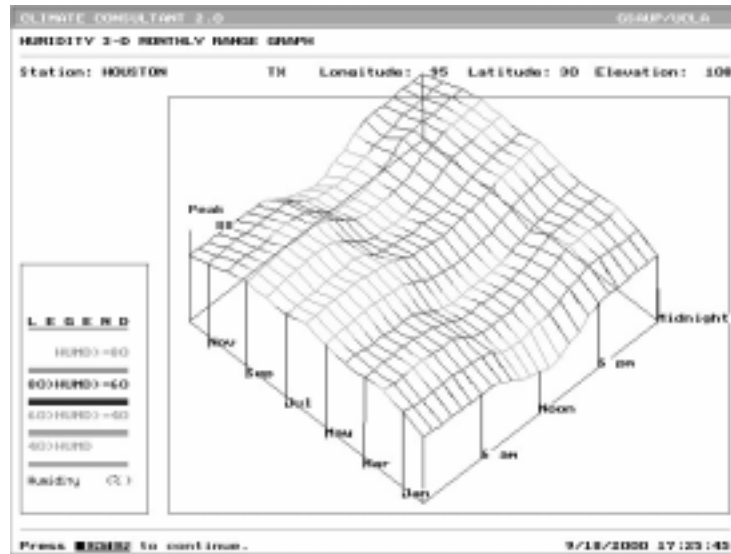
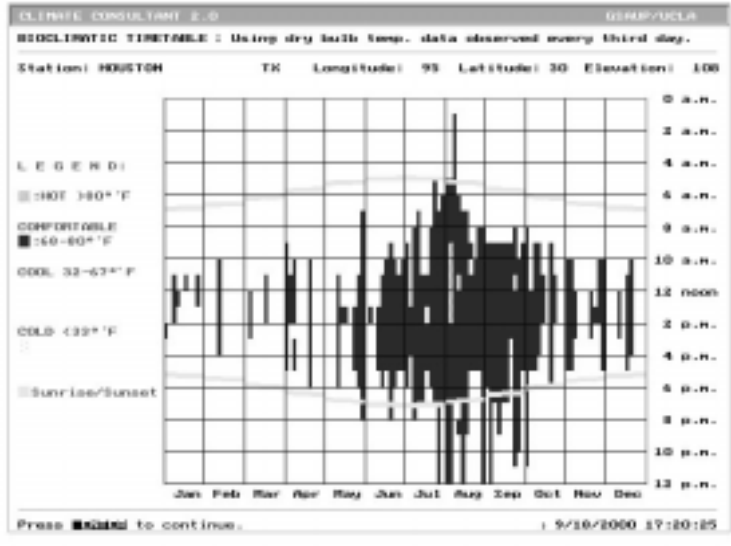


Site plan. Potential shelter locations are indicated by the symbols N, E, S & W. North is up.

2 points

1. Analysis

The Greater Houston Transit Authority (GHTA) wants to place the shelter on the site in the middle of the western edge of the square. Explain why this choice is not the best for providing comfort to the waiting riders in Houston's climate. Propose an alternative site and defend your proposal.



The darkest lines indicate 60-80% RH.

5 points

2. Design

Specify your choice of the module for each wall and the roof by labeling the axo below. Each panel must be different from the others. At least one barrier, one connector, one filter, and one switch must be included.

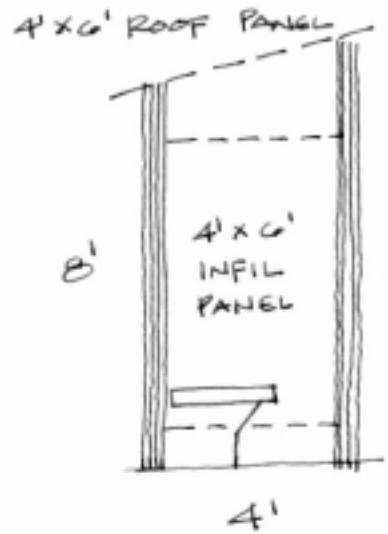
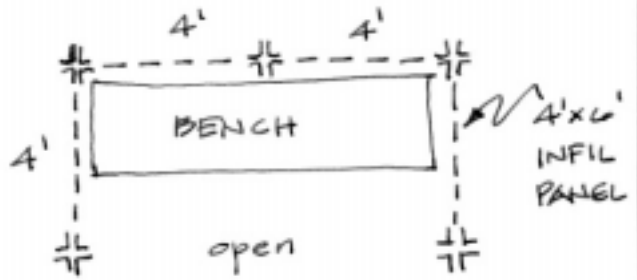
Explain the role of each module in responding to the climate. Use Norberg-Schulz' source-path-receiver language to describe the modules.

barrier(s)

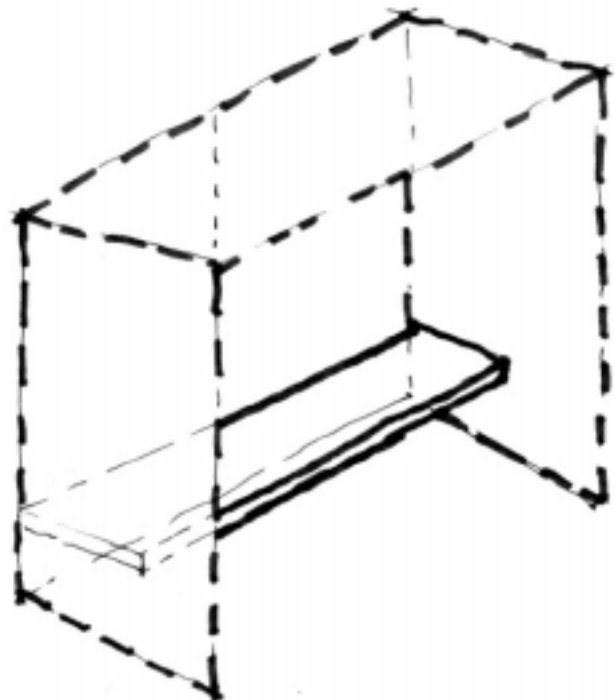
connector(s)

filter(s)

switch(es)



Shelter plan and section.



Shelter axonometric. Side opposite bench is open. Label each panel with your module choice.

3 points

3. Scenarios

Explain how an occupant of the shelter can achieve comfort waiting for the bus at three critical times of year. Base your argument on your design, the bioclimatic timetable, and Olgyay's assumptions about the comfort zone. You may need to make drawings to explain your rationale.

10 a.m on December 21

1 p.m. on April 2

4 p.m. on August 5