

Arch 463
ECS
Fall 2015

Name _____

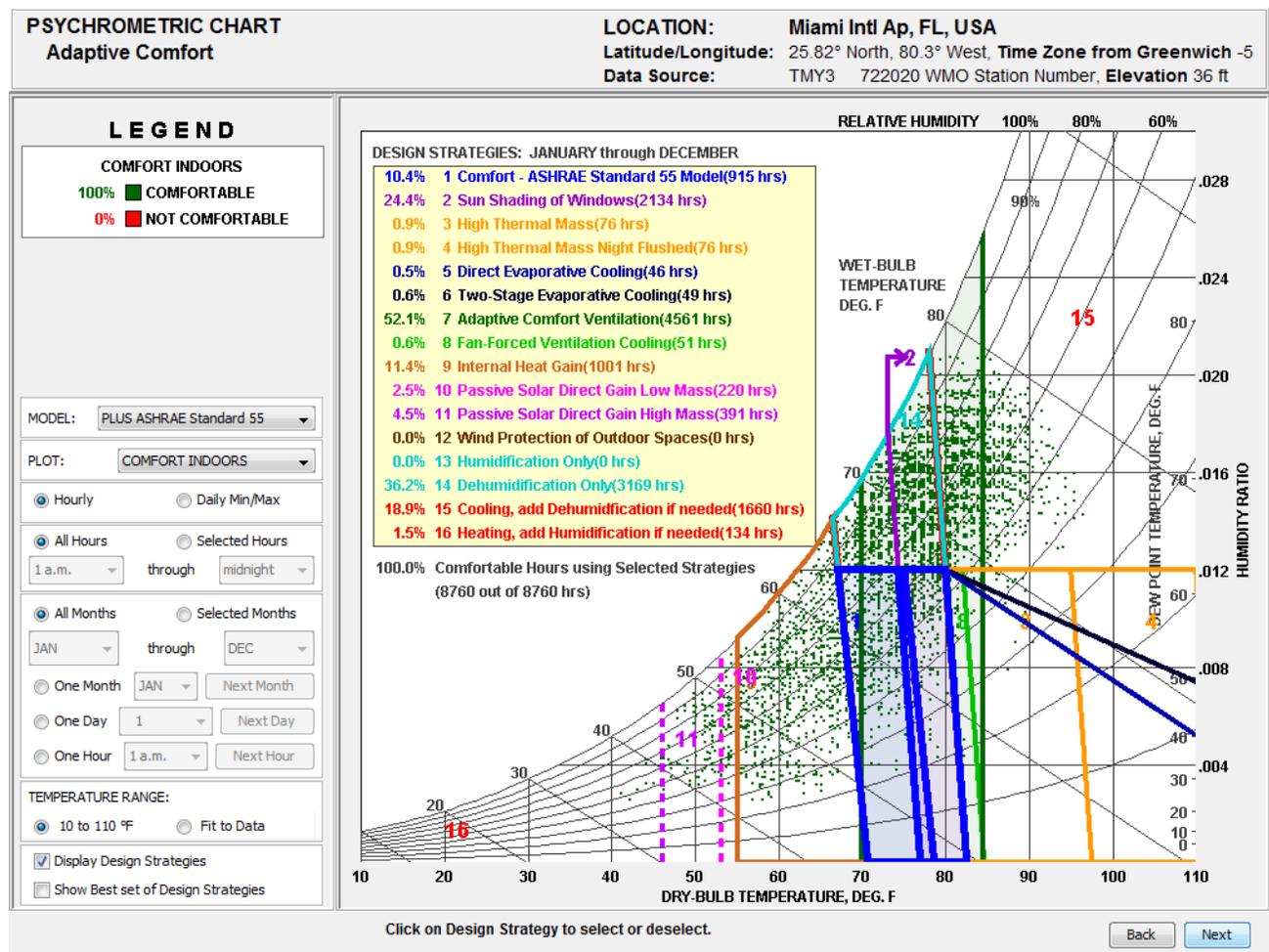
Quiz #2

"Passive Home in Miami"

For this problem you are the passive design consultant for a family that wants to build a new home in suburban Miami. They are fascinated with the new Miami home designed by Brillhart Architecture, described on page 2, and want one just like it. Your role is to analyze Brillhart's home and to suggest subtle changes to improve its passive performance.

Miami Context. A similar wooded site near the Miami River has been purchased for the new home. The new site is 100' x 100' with site boundaries running true N-S and E-W.

Climate Context. For a naturally ventilated house in Miami indoor comfort can be attained 100% of the time by using the proper passive strategies described below:



READ EVERYTHING FIRST!

Brillhart House

Brillhart Architecture

Miami, Florida

Architectural Record September 2015

For a house in a lush Miami precinct, Brillhart Architecture explores a vernacular modernist idiom.

By Suzanne Stephens

Regional variations on International Style architecture helped evolve a subtly rich Midcentury Modernism in the United States. From William Wurster in San Francisco to Paul Rudolph in Sarasota, Florida, young postwar architects inventively adapted residential designs to particular climates and materials.

Jacob Brillhart, an architect and teacher, and his wife, Melissa, a trained architect, continue to improve on that legacy in Miami. The energy-efficient, one-story, 1,500-square-foot house that they built for themselves in the city's downtown sits on a narrow lot amid towering oak and palm trees. Because the property is close to the Miami River, the firm, Brillhart Architecture, elevated the single story 5 feet off the ground to meet flood regulations.

The most distinctive feature of the simple, pristine house is the 7.5 foot deep front porch, where folding louvered shutters screen a 50-foot-long glass East wall (repeated on the West, but without the shutters). The steel and glass structure incorporates a robust variety of woods: ipé for the exterior siding, fascia, and columns; red cedar for the shutters; and white oak and cypress for floors and decking—plus dimensional lumber for short structural spans. Instead of resorting to reinforced concrete, as is popular in hurricane-prone South Florida, the couple decided to address building-code requirements and climate concerns in other ways. For example, they specified 9/16-inch thermal glass, much safer in high winds than the typical 1/16-inch glass used back in the heyday of Miesian pavilions. Icynene spray foam and rigid insulation prevent moisture buildup in the walls and the roof: even the elevated floor is formed of plywood, insulation, and plywood deck on top of 2-by-8-inch wood joists and steel beams.

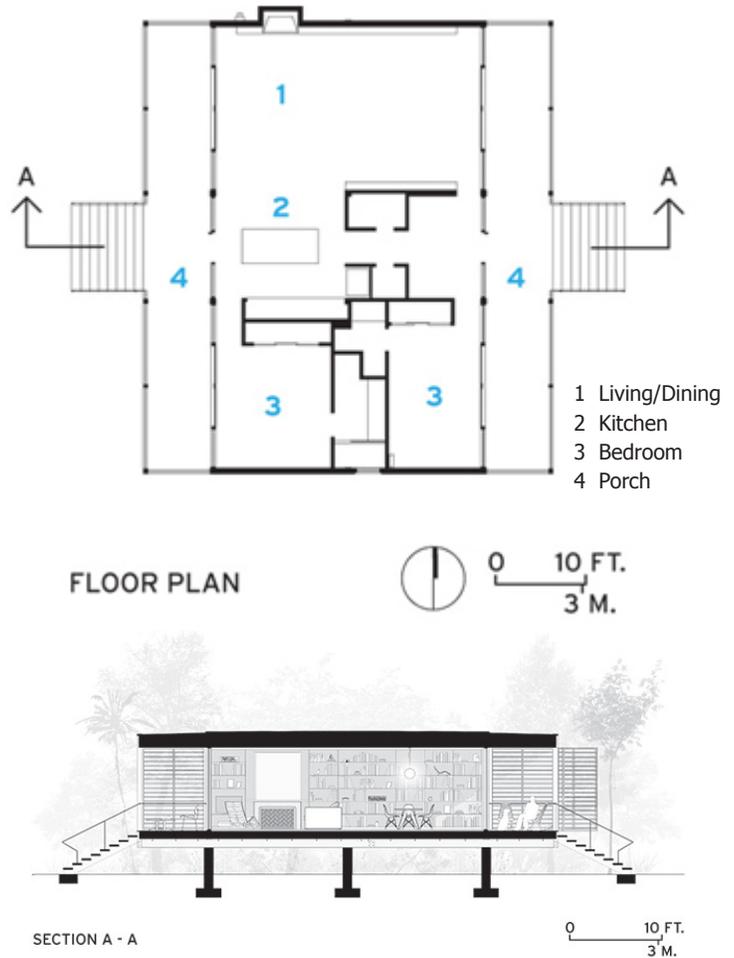
Working with the technically improved materials for the one-story cottage, the couple not only stayed true to the nature of materials and vernacular architecture but also advanced the cause of Regional Modernism. And living in the jungle-like growth appeals to the couple. "It just gets better and better," says Melissa.



4 points

Analysis

1. Here are plan and section of the Brillhart house. Identify three passive cooling strategies used in the design. Critique each one based on its effectiveness.

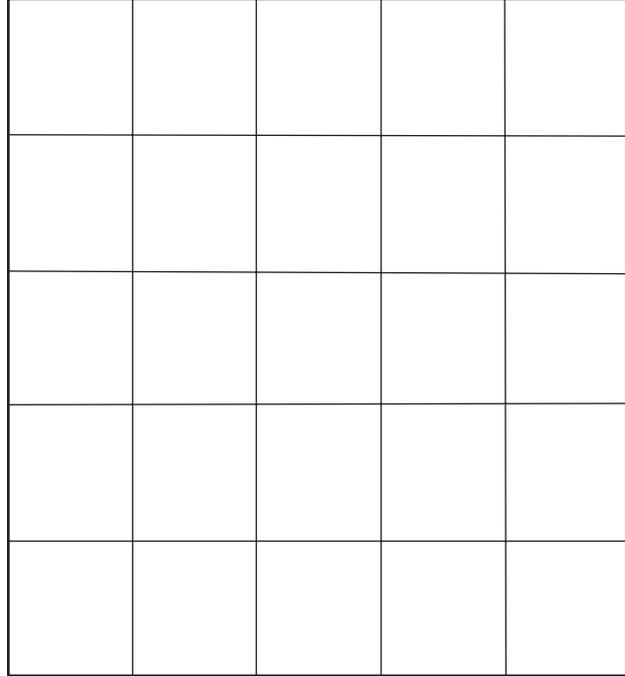


2. According to Climate Consultant, passive heating is required for only 7% of the hours of the year. Explain how this design can or cannot meet this need.

3 points

Site Design

3. The site is completely wooded with jungle-like deciduous trees. On the site plan below show where you'd place and orientate the 30' x 50' dwelling on the site and which trees you'd harvest which ones you'd keep to support your passive design goals. Explain your decisions!



100' x 100' site divided into 20' x 20' squares. North is up.

3 points

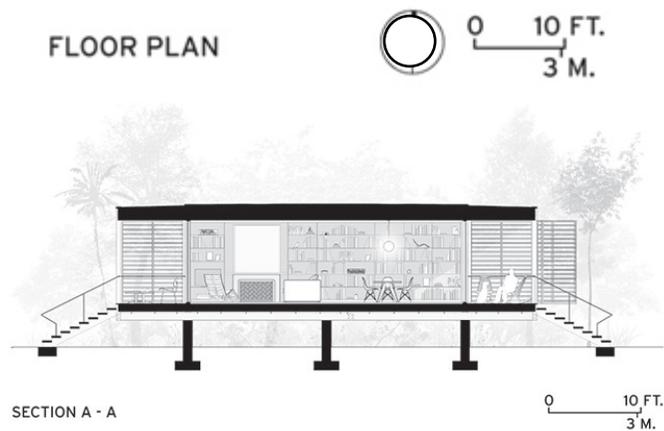
Building Design

4. Respond to these three questions on passive building design.

A. Draw the new north arrow and explain how the new north supports your passive strategies.



B. Design a stack ventilator to assist the cross-ventilation on calm days. Show it in plan and section. Explain how it works.



C. Explain your strategy for passive solar heating



The shaded porch and window wall.