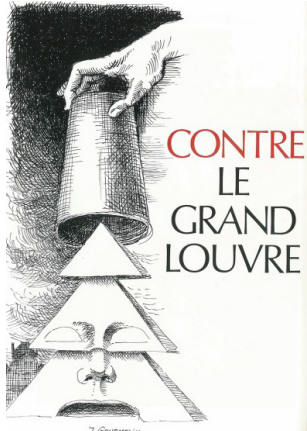


Arch 463
ECS
Fall 2021

Name _____

Quiz #2

"Contre le Grand Louvre"



For this problem you are the glazing and shading guru for a post-professional architectural research group that wants to demonstrate that I. M. Pei's Grand Louvre pyramid can be used as a showcase for new glazing and shading techniques. They intend to build two exact replicas (except for the new glazing technologies and shading devices that you specify) on a site on the MIT campus in Boston. Your role is to analyze the pyramid-climate interaction and to suggest appropriate changes to improve its passive performance in this new, but similar climate.

MIT Context. A flat, barren site between playing fields at Briggs Field on the MIT Campus, where the pyramids will be oriented about 30° off true cardinal directions to replicate the original pyramid's orientation. The site is right across the street from Steven Holl's Simmons Hall dorm (see page 8).

READ EVERYTHING FIRST!



Looking toward the NW at the ESE façade of Pei's entry pyramid.

All illustration from Architecture magazine 19 April 2017 except as noted.

Background: 2017 AIA HONOR AWARDS

Louvre Pyramid: The Folly that Became a Triumph

In 1983, when I.M. Pei, FAIA, received one of the most illustrious commissions of his career—the modernization of the Louvre—he kept the project a secret from his firm. For four months, Pei did not tell his team in New York that François Mitterrand, the French president, had personally asked him to overhaul one of the world’s most celebrated art museums. Pei wanted time to consider the project’s scope before agreeing to take it on.

The uproar began even before Pei unveiled the design of his infamous 71-foot-tall glass-and-metal pyramid.

Then Pei unveiled his design. The international response was swift and it was brutal. Dubbed the “Battle of the Pyramid,” Pei and Mitterrand were roundly chastised, with one 1985 New York Times story rounding up the criticisms: The pyramid was “an architectural joke, an eyesore, an anachronistic intrusion of Egyptian death symbolism in the middle of Paris, and a megalomaniacal folly imposed by Mr. Mitterrand.”

I.M. wanted the structure of the pyramid to have a certain delicacy and not be a muscle-bound structure. He wanted transparency. At the outset, he was interested in a lightly reflective glass, so models were made to allow him and the team to view that at different angles. He wasn’t satisfied. He decided to make the glass as transparent as possible. The reason wasn’t just the delicacy of the pyramid itself, but also the fact that any color strengthened the perception of form and he didn’t want that. He wanted no color. Also key to I.M. was that when you stood outside and looked through this transparent pyramid, or when you were down below and looked up, the glass should not alter your perception of the color of the existing buildings.

We spent a fair amount of time on selecting the right glass. Normal glass that’s used in buildings, that’s called clear glass, has a greenish tinge to it because of the way it’s manufactured. So if you want it to be clearer, you have to get rid of the green. You have to find a factory that has the ability to do that. Today clear glass is a no-brainer, but at that time it was less in demand. It was a lot of legwork. We used a glass that is similar to what people call “low-iron glass” today. It wasn’t quite the same, but it doesn’t have any color. It was the clearest glass we could find at that time and in that place. We doubled the weight of the glass to put more load on the pyramid structure to keep it stable. It’s like putting salt on a bird’s tail. You need to do something to keep it down.

Today, the pyramid at the Louvre rivals the Eiffel Tower (itself a project borne amidst controversy) in defining the Parisian landscape.

—Elizabeth Evitts Dickinson, *Architect Magazine*, April 19, 2017

Full article at <https://www.architectmagazine.com/awards/aia-awards/louvre-pyramid-the-folly-that-became-a-triumph_o>



François Mitterrand at the pyramid.



Google Earth reveals the orientation of the Louvre pyramid in Paris, twisted about 30° clockwise from true East-West.



The lobby space with access stairs and elevator beneath the pyramid.



Photo credit: Tisha Egashira

The Setup

Rules:

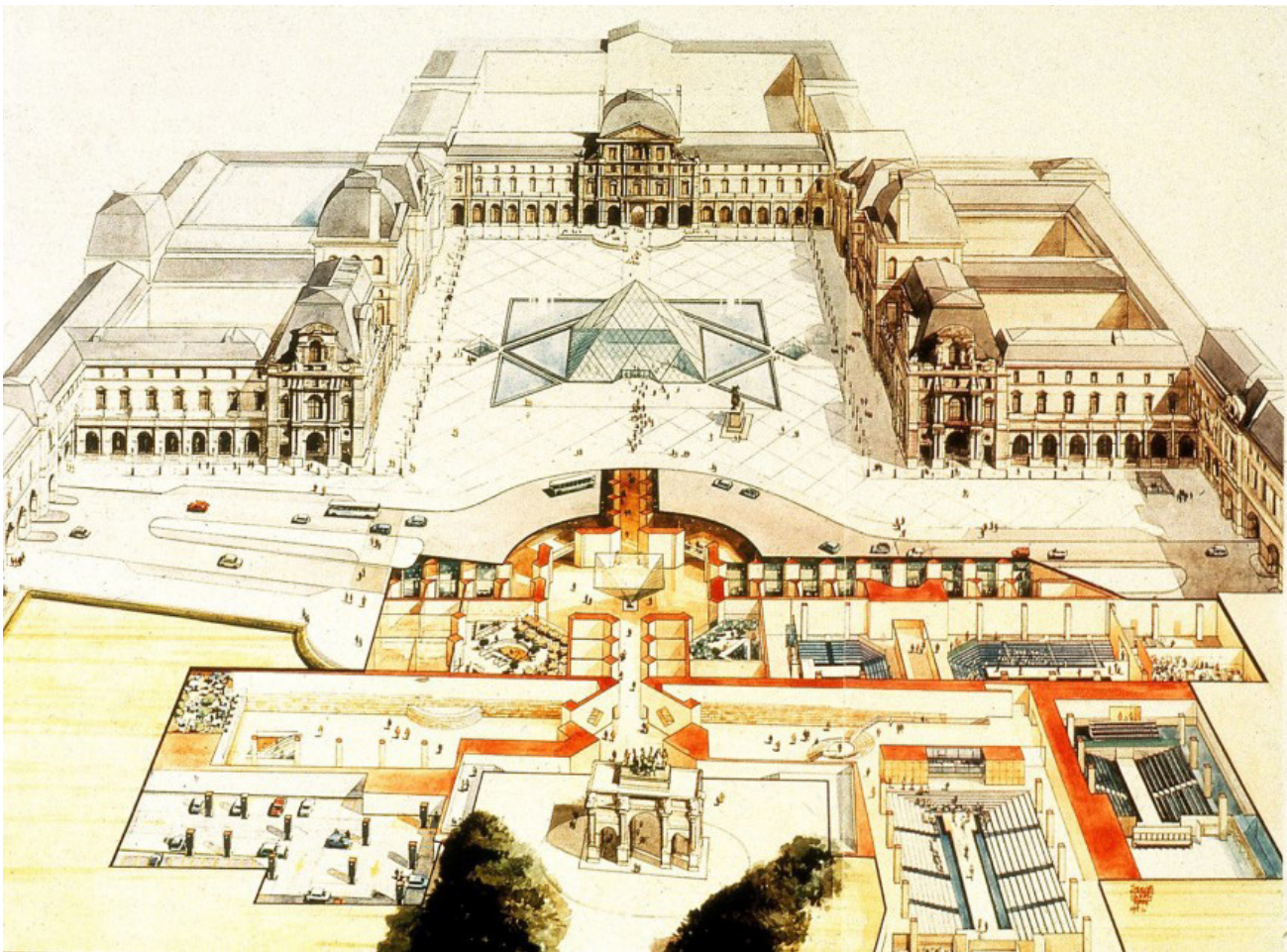
Pyramid 1 the glazed pyramid. Each side of this pyramid will use a different **glazing material**, only one glazing type per façade.

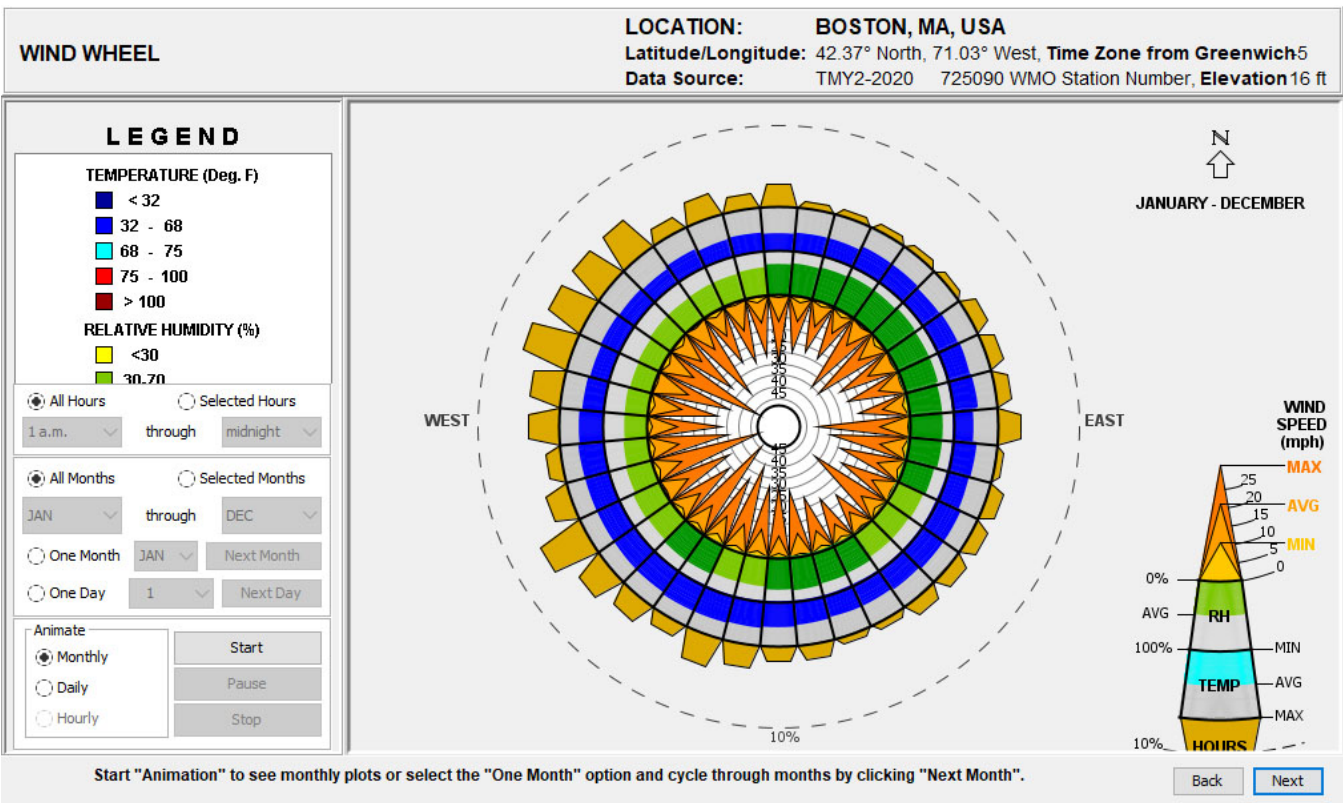
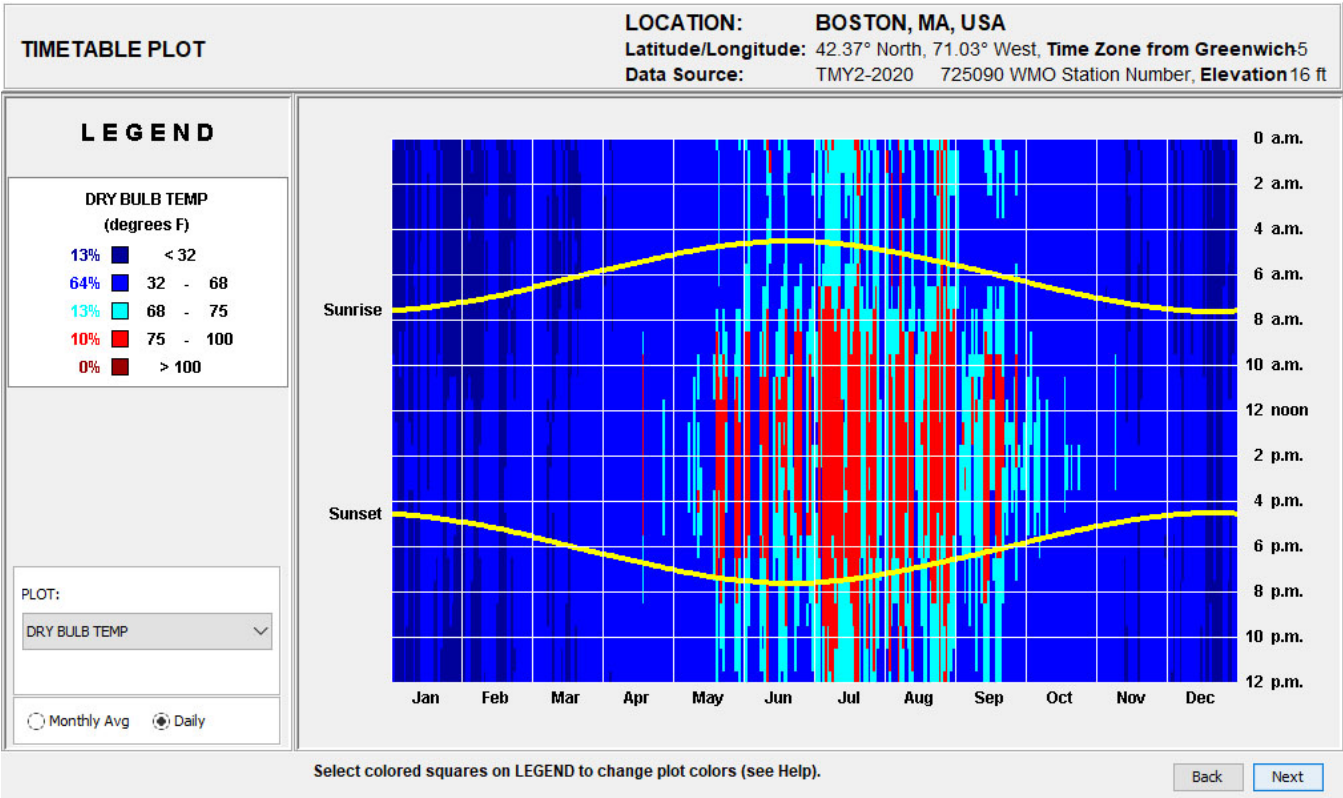
Your choices are a) Triple pane super glazing, b) Evacuated glass, c) Nano Wall with silica aerogel R-20 insulation, d) Kalwall with R-20 insulation, e) Pilkington Profilit with silica aerogel, f) ETFE glazing, g) Sage electrochromatic glazing, h) Blue-Green commercial low-E glazing, i) Traditional single pane glazing, j) Bronze reflective glass.

Pyramid 2 the shaded pyramid. Each side of this pyramid will use a different **external shading strategy**, only one strategy per façade.

Your choices are a) Perforated metal panels, b) A simple egg-crate, c) Fritted glass panels, d) Fixed horizontal overhangs, e) Photovoltaic glazing panels, f) Movable vertical louvers, g) No shading device.

The floor plan (The original pyramid has a lobby space below with connections to all the galleries. The MIT site has no trees and simply a subterranean lobby below the pyramid.):





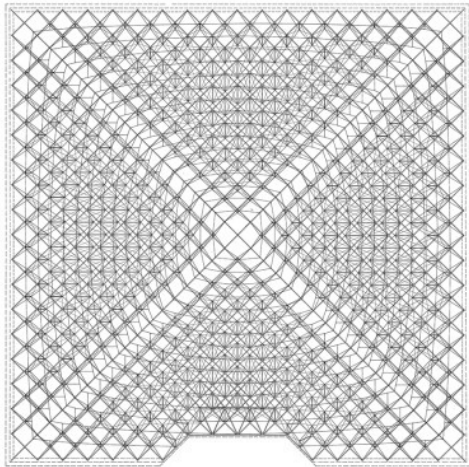
The Glazed Pyramid

10 points

1. Here's the roof plan and elevation. Indicate your glazing selections on the plan and label them on each side. Most importantly, explain why your selections are appropriate for your site at MIT and for the unadorned international style of Pei's pyramid.

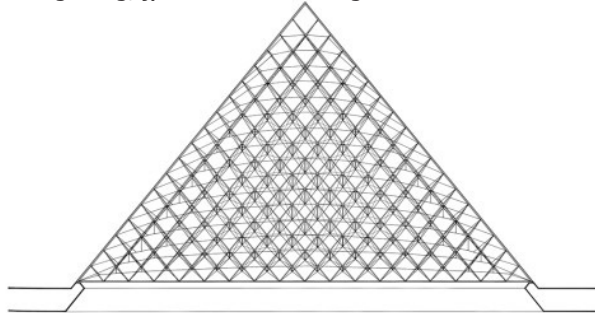
WNW Panel

NNE Panel



ESE Panel

Your choices are a) Triple pane super glazing, b) Evacuated glass, c) Nano Wall with silica aerogel R-20 insulation, d) Kalwall with R-20 insulation, e) Pilkington Profilit with silica aerogel, f) ETFE glazing, g) Sage electrochromatic glazing, h) Blue-Green commercial low-E glazing, i) Traditional single pane glazing, j) Bronze reflective glass.



SSW Panel

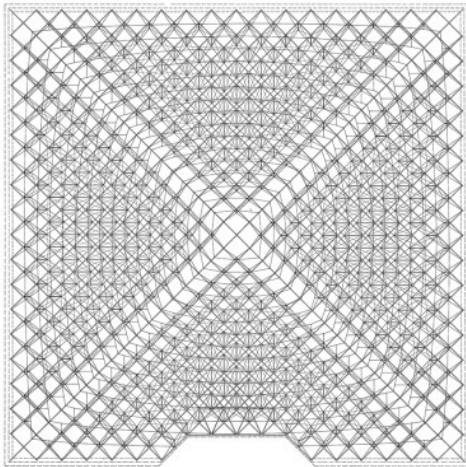
The Shaded Pyramid

10 points

2. Here's the roof plan and elevation. Indicate your shading selections on the plan and label them on each side. Most importantly, explain why your selections are appropriate for your site at MIT and for the unadorned international style of Pei's pyramid.

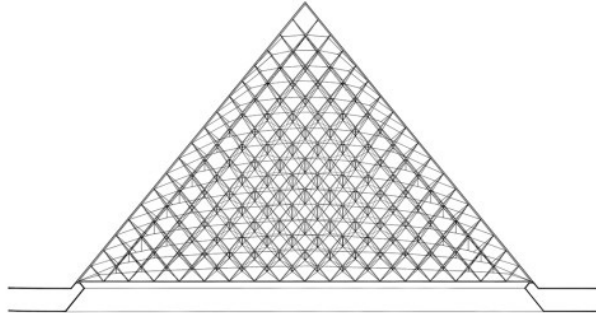
WNW Panel

NNE Panel



PLAN D'ENSEMBLE
VUE INTERIEURE

Your choices are a) Perforated metal panels, b) A simple egg-crate, c) Fritted glass panels, d) Fixed horizontal overhangs, e) Photovoltaic glazing panels, f) Movable vertical louvers, g) No shading device.



ESE Panel

SSW Panel

2 points

Extra Credit: If you could insert two operable windows, where would you locate them? Explain why, use a sketch if needed.



The MIT site at Briggs Field, where the pyramids will be oriented about 30° off true cardinal directions to replicate the original pyramid's orientation.