Arch 463
ECS
Fall 2004 Name_____

Quiz #3

"Remodeling Pei's Pyramid at the Louvre"

View of the entry pyramid from the west. The overcast sky is symbolic of Paris' humid temperate climate.

For this problem you are the glazing consultant for a Parisian architect who is trying to improve the thermal performance of I.M. Pei's famed pyramidal entry to the Louvre by changing the glazing. The existing glass is simply double-pane low-E panels on each side. The facades face the cardinal directions and slope 45º from true vertical. The pyramid sits over a subterranean circulation space that has concrete structural members and a masonry floor (terrazzo tiles over concrete).

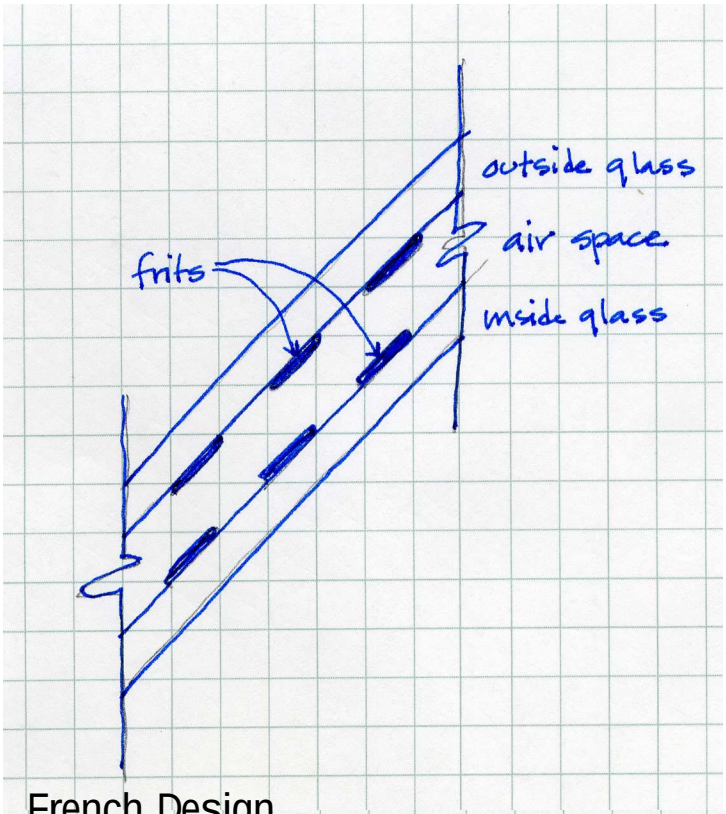
The Climate Context. Paris is at about the same lattitude as Moscow and has cool humid winters and hot humid summers (no mountain range between Paris and the sea). Prevailing winds are from the SW.

A view of the pyramid from the circulation space below.

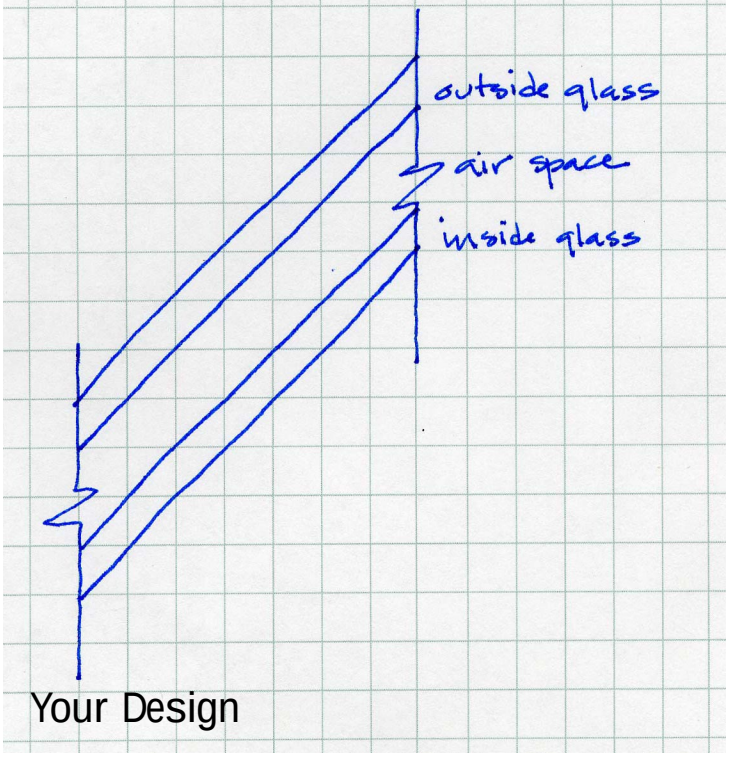
4 points

1. In order to reduce direct sun penetration and to control the glare and heat gain associated with it, the French architect has suggested using a double pane fritted glass system on the south-facing side of the pyramid. The horizontal stripes of ceramic frit will be applied to cavity-facing surfaces of the clear glass as shown in the drawing below.

Show which sun angles are blocked and which ones are not. Explain whether or not this is an effective strategy. Redesign the frit pattern to improve the design and explain why.



French Design



Your Design

3 points

2. The French architect has also proposed replacing the glazing in the west-facing side of the pyramid with photovoltaic glazing. Give three reasons why this is a good idea. Explain each reason with words and sketches as appropriate.

3 points

3. Recommend new glazing for the north-facing and east-facing sides of the pyramid. Explain your glazing choice (with words and sketches) for each side in terms of how it interacts with the environment to reduce sun penetration and to control heat gain and glare. Use two different glazing systems from the list below.

East-Facing Side

North-Facing Side

Glazing Choices. Each of these systems is available in sizes to fit the existing mullion pattern.
Evacuated glass
Kalwall, 3" thick insulating glazing
Thermopane w/blue-green exterior & clear interior panes
Thermopane w/gray exterior & interior panes
Bronze reflective glass, single pane
Electro-chromatic glass
Silica Aero-Gel glazing