

Arch 463  
ECS  
Fall 2020

Name \_\_\_\_\_

## Quiz #1

# "Duke of York for All Seasons"

For this problem you are the site and climate analyst for the Duke of York Restaurant. Londoners fancy eating al fresco in all seasons. Your task is to suggest appropriate strategies for manipulating the retractable windows to provide passive comfort for diners in a near outdoor environment. **Try to maximize the openness to the square!**

**Climate Context.** London.

**Architect's Intent.** In creating a restaurant for all seasons we sought a dynamic relationship between the interior of the restaurant and Duke of York Square. It is the windows that give the restaurant this sense of performance: three large, curved panels, 3.2m high and 9.5m wide, glide into the basement on a counterweight, like a sash window. Our materials selection balanced a desire for refined transparency with structural requirements and stringent environmental standards. A perimeter frame for the glazing is powder-coated mild steel section, which can withstand the high stresses induced by the large moving units. The panels within the three wider openings are retractable, completely opening up the ground-floor space during fine weather and allowing the restaurant to spill onto the surrounding Duke of York Square, while the roof continues to provide shade.

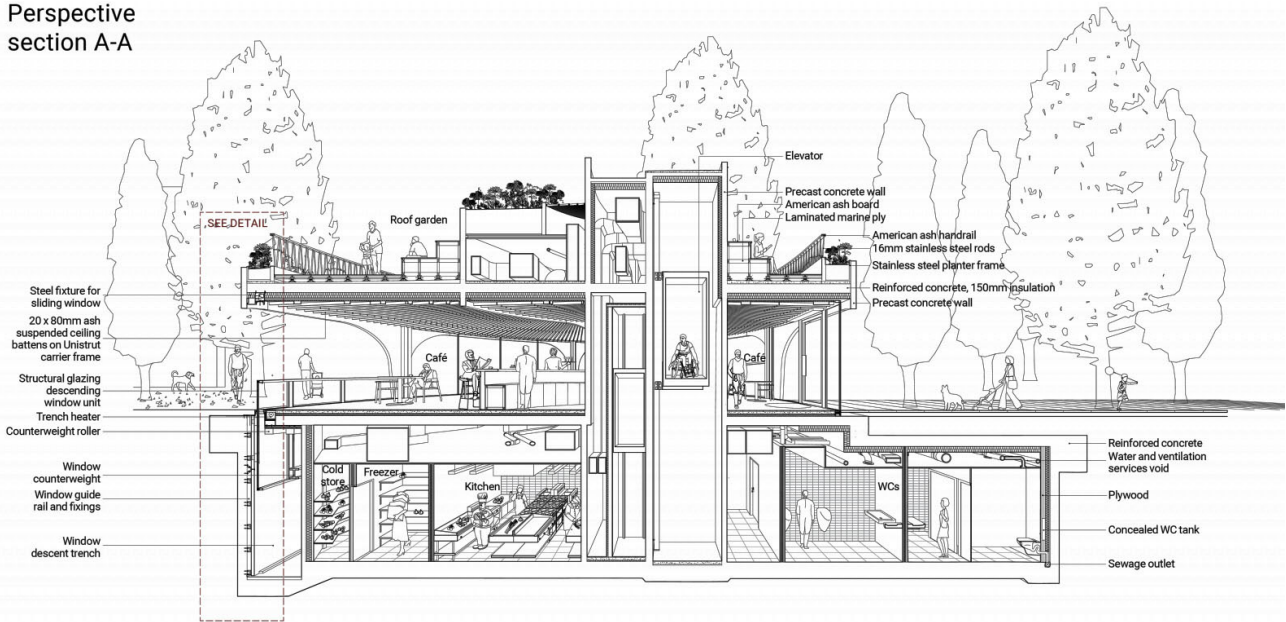
Although similar retraction systems have been installed outside the UK, all have used straight panels. This makes the restaurant the world's first example of a retractable curved glass system, while celebrating a mechanism that is as strikingly simple as a weighted sash window, sliding down gracefully into a basement trench.

**Comfort Goal.** Maximize the use of passive strategies for comfort throughout the year. You may use Climate Consultant to further analyse the London (Gatwick) climate.



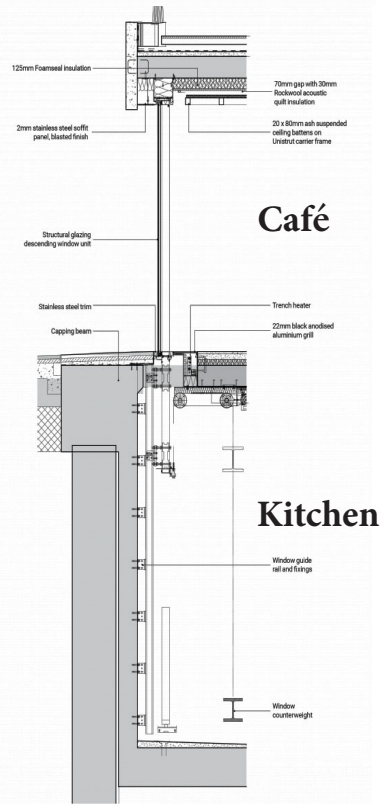
*The Duke of York peering in the NW window, retracted. And it has a roof garden!*

Perspective section A-A



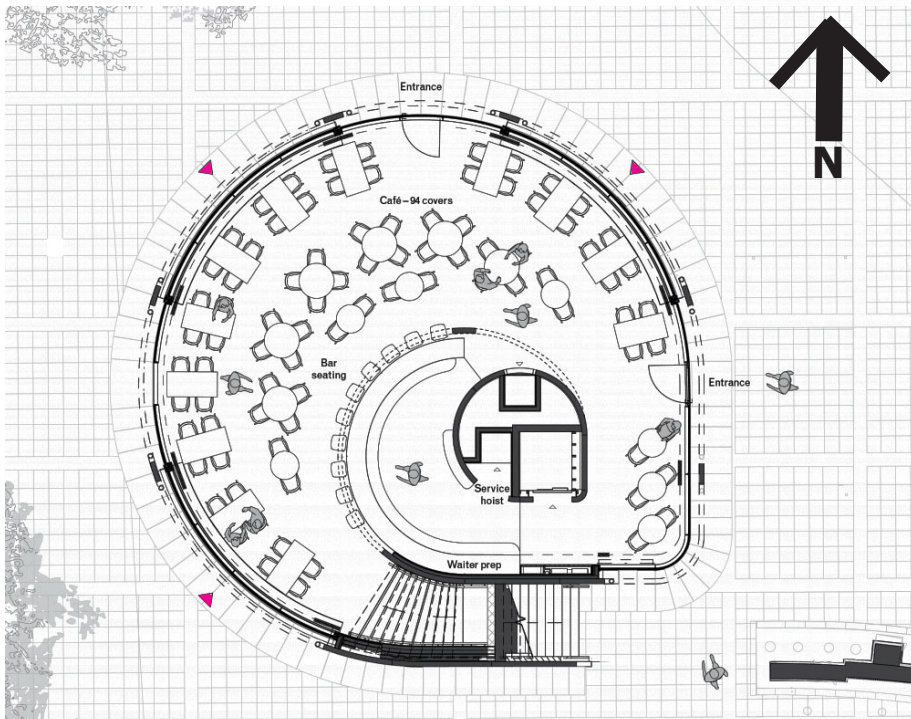
The section perspective show the roof garden, the café, and the basement kitchen and loo.

Retractable glazing detail section



Café

Kitchen



Duke of York Café plan. The magenta arrows indicate the three retractable windows, which face SW, NW, and NE..

Here's the Duke of York Cafe under construction in its context in London.



# Typical Retractable Window Positions:

Fully Closed —>



Half Open —>



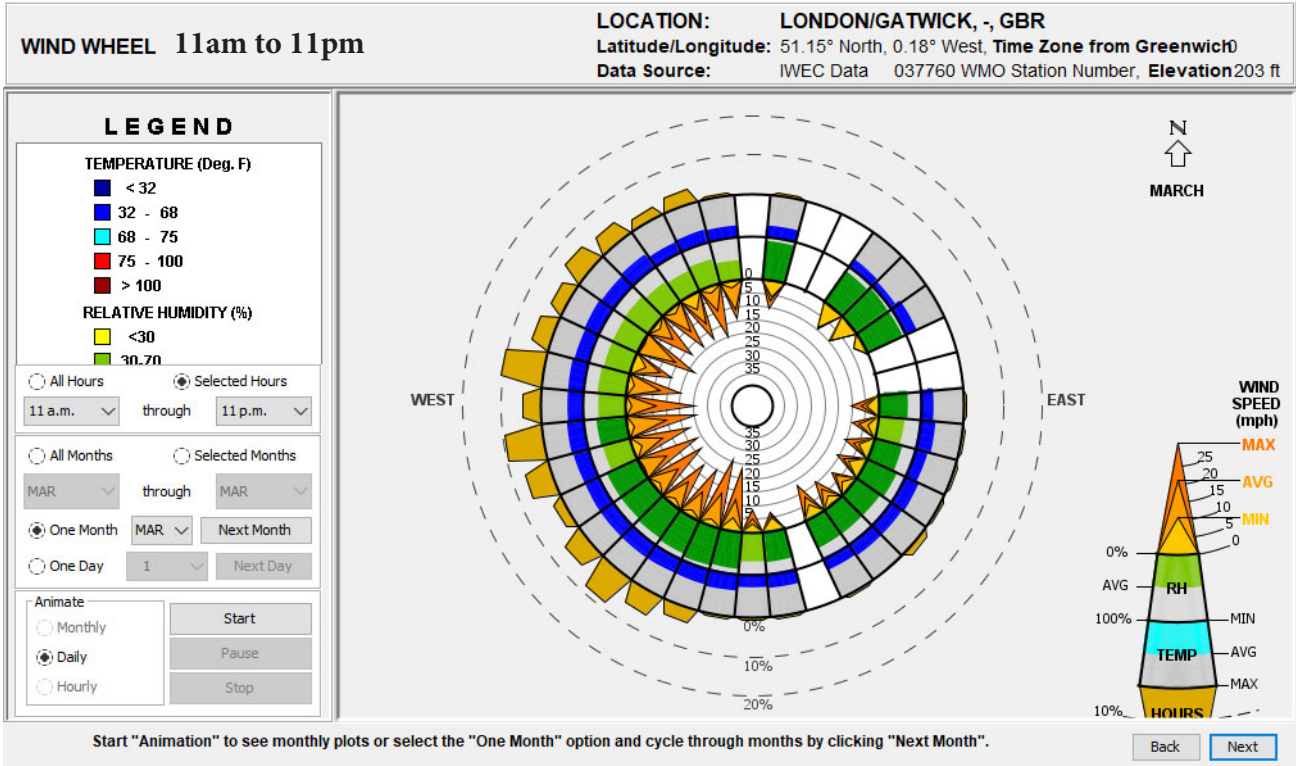
Fully Open —>



2 points

# March (also see psychrometric charts on p. 8)

1. Describe the position for two of the three retractable windows for passive comfort on a sunny March day and explain how your passive strategies will be effective. Use barrier, filter, connector, switch terminology in your explanation. Comment on the diner's clo and met levels.



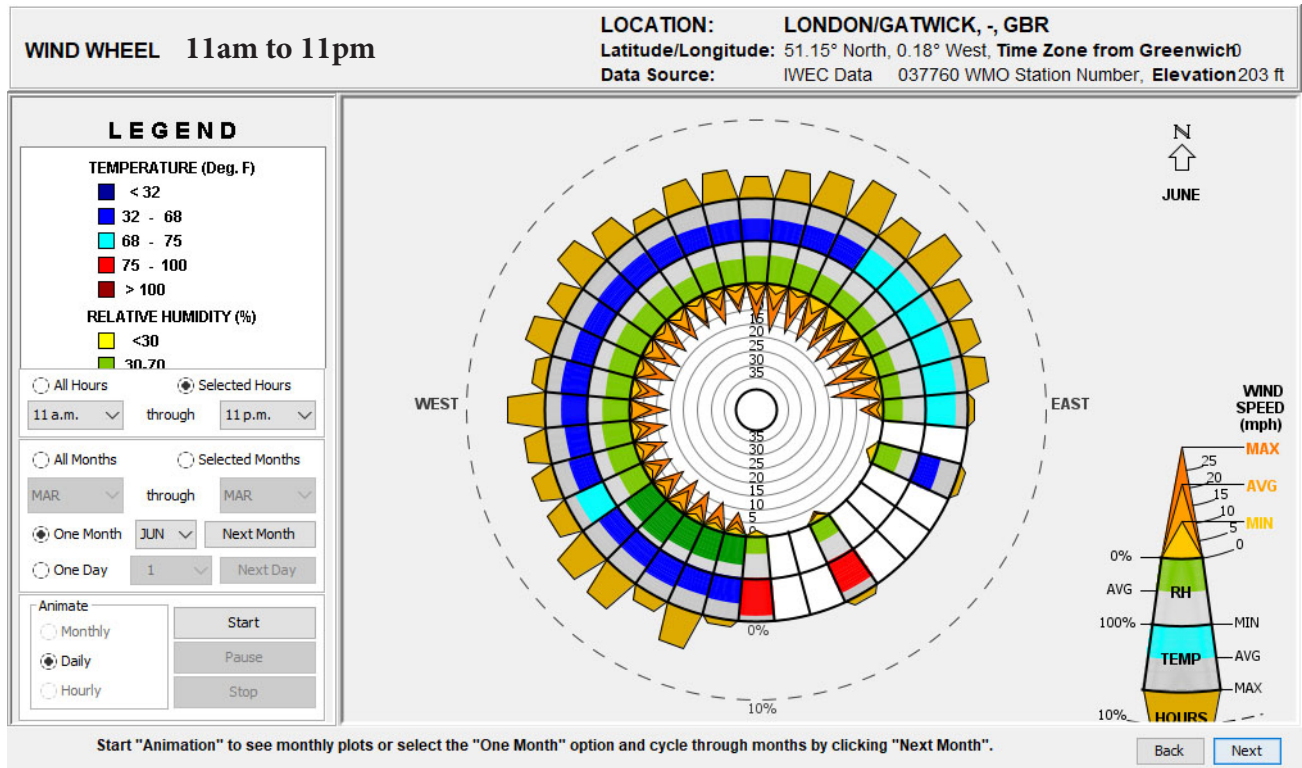
**SW Window**

**NW Window**

# June

3 points

2. Describe the position for each of the three retractable windows for passive comfort on a sunny June day and explain how your passive strategies will be effective. Use barrier, filter, connector, switch terminology in your explanation. Comment on the diner's clo and met levels.



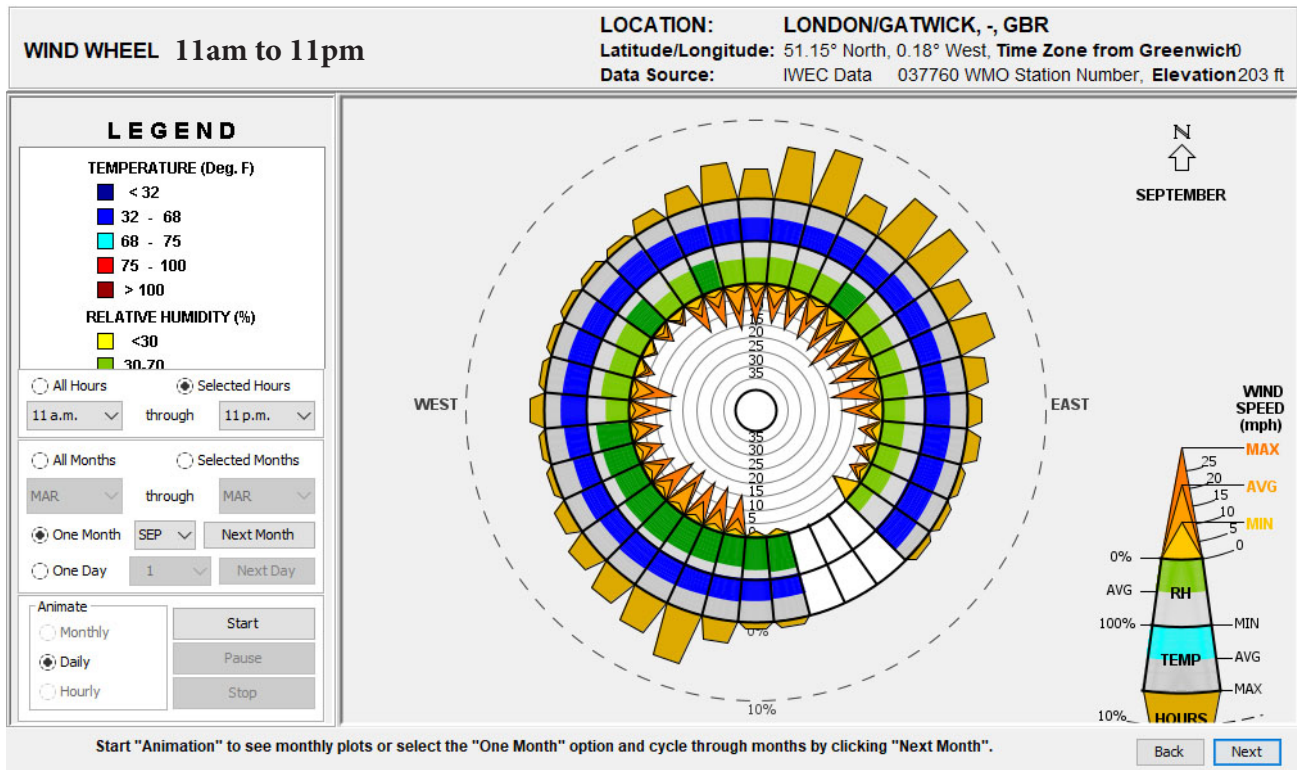
**SW Window**

**NW Window**

**NE Window**

# September

3 points  
3. Describe the position for each of the three retractable windows for passive comfort on a sunny September day and explain how your passive strategies will be effective. Use barrier, filter, connector, switch terminology in your explanation. Comment on the diner's clo and met levels.



**SW Window**

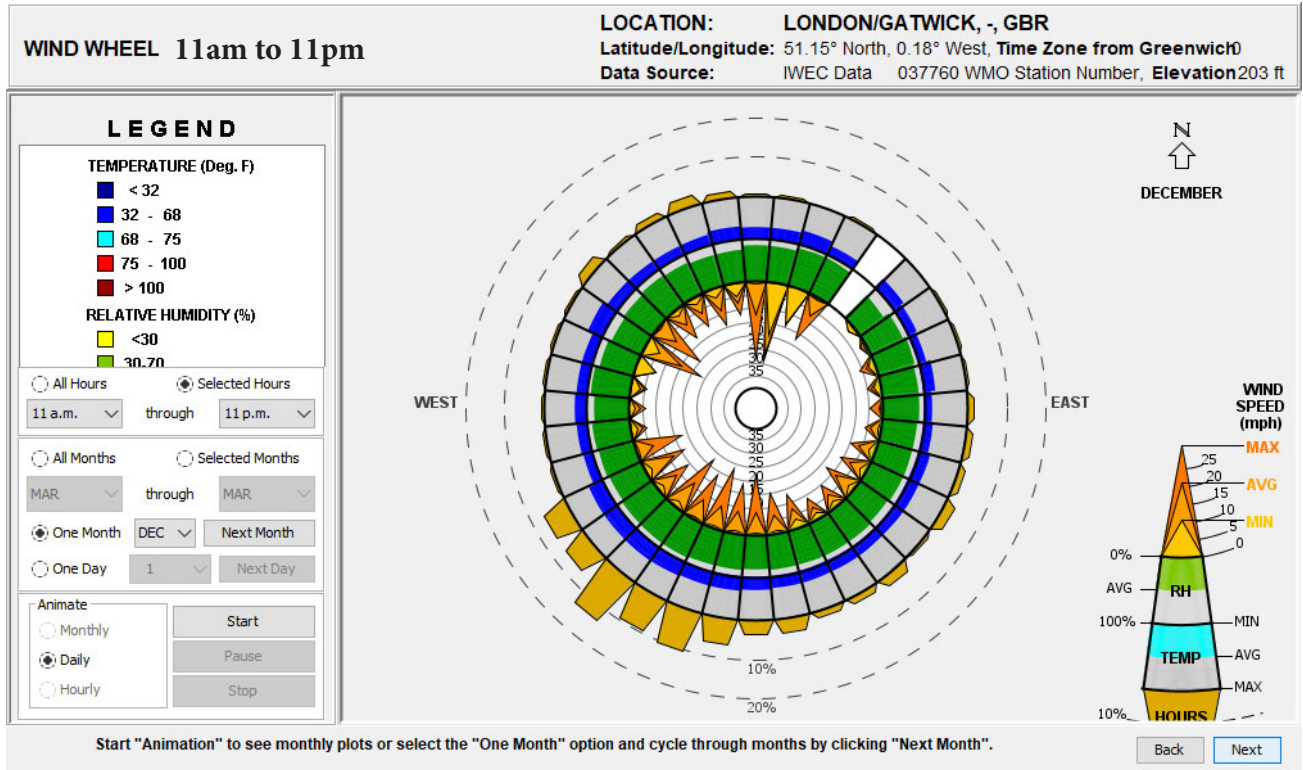
**NW Window**

**NE Window**

# December

2 points

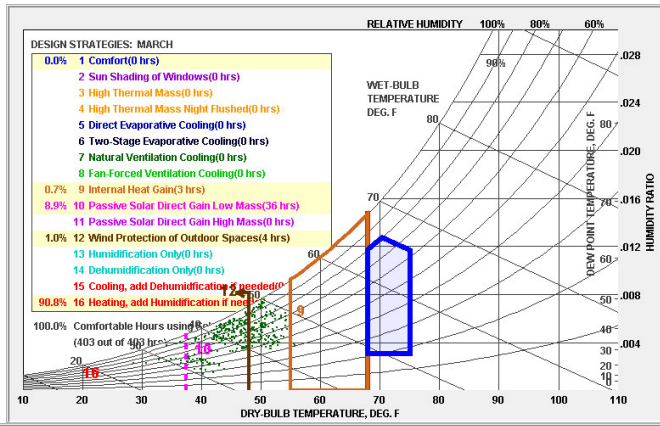
4. Describe the position for two of the three retractable windows for passive comfort on a sunny December day and explain how your passive strategies will be effective. Use barrier, filter, connector, switch terminology in your explanation. Comment on the diner's clo and met levels.



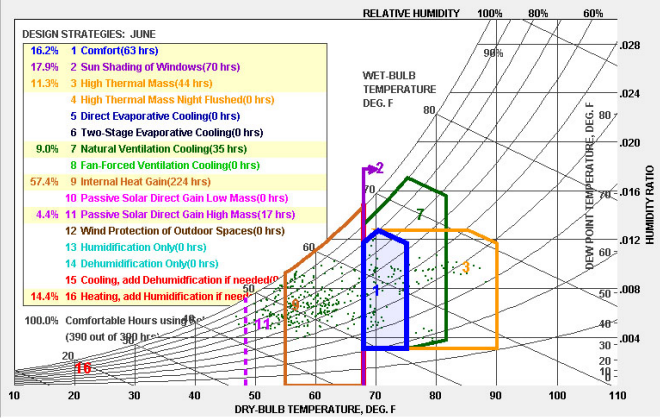
**SW Window**

**NW Window**

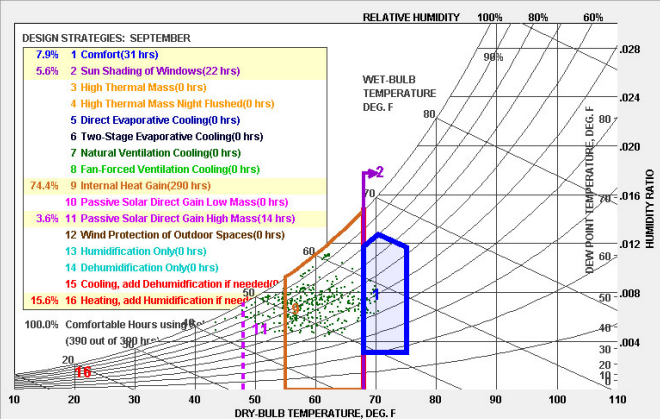
# March Psych Chart 11am - 11pm



# June Psych Chart 11am - 11pm



# September Psych Chart 11am - 11pm



# December Psych Chart 11am - 11pm

