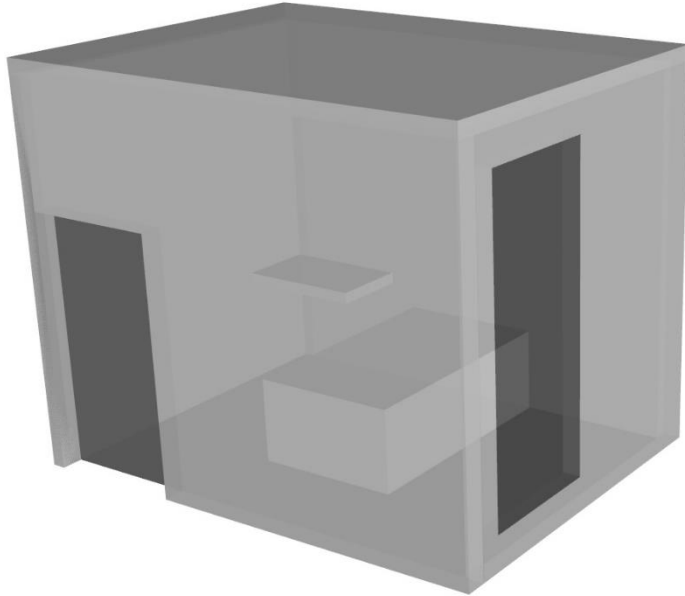


# DAYLIGHTING ANALYSIS

Building Performance &  
Simulation  
Fall 2016

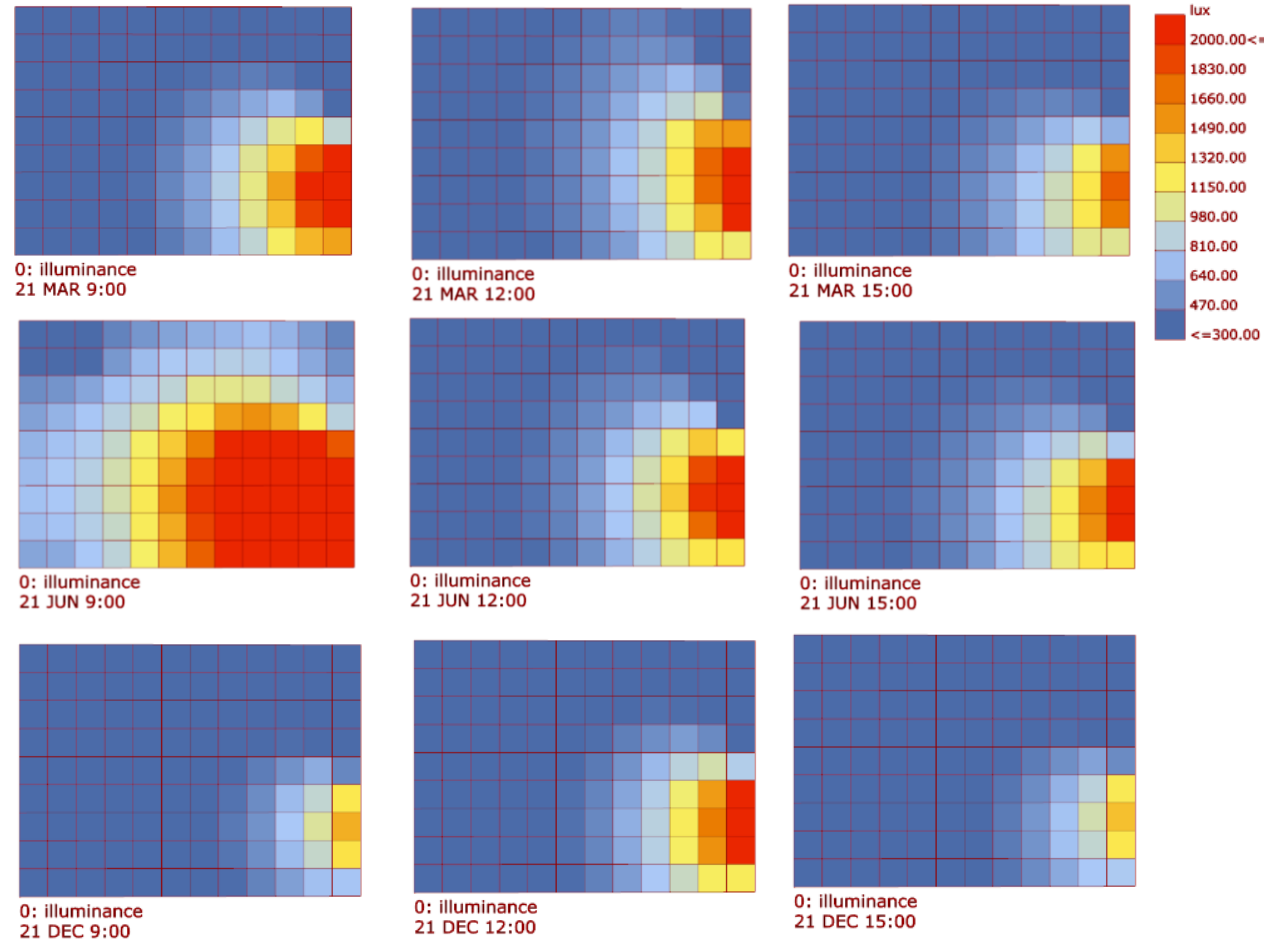
Bhakti Kothari

# Base Case



## Findings:

- Room with a single East facing window.
- What is seen here, as can be noted in the results below, the study desk does not receive enough daylighting.
- Excess glare seen in June.
- Only 1 external surface where the size of the openings can be worked upon.

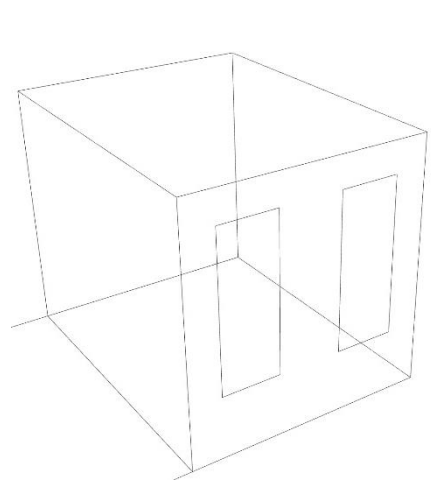


## Conclusion:

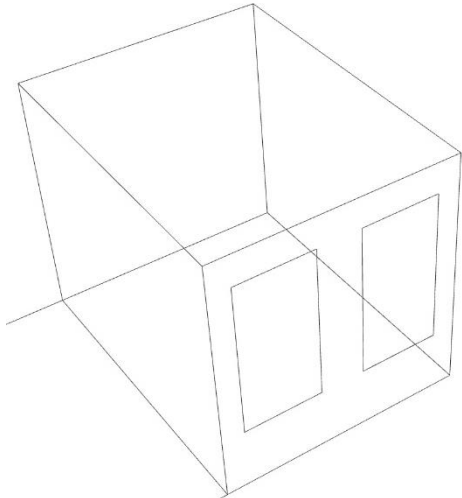
### Potential Problem:

1. Not enough Daylight throughout the year, so this can be worked upon.
2. Worst glare situations need to be worked upon.

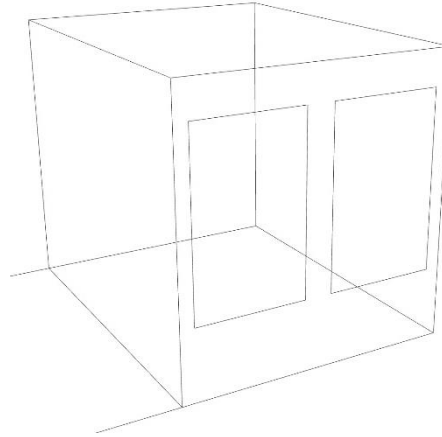
# Window Glazing Options



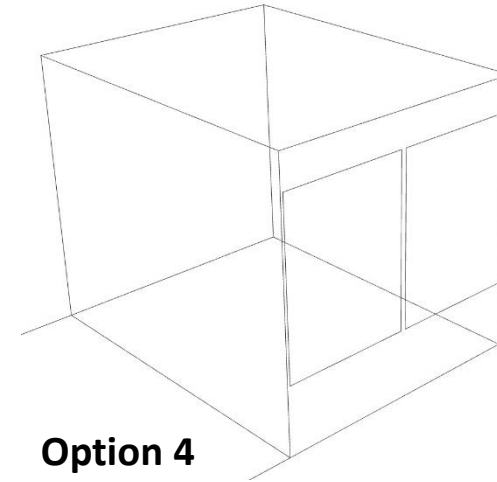
Option 1



Option 2

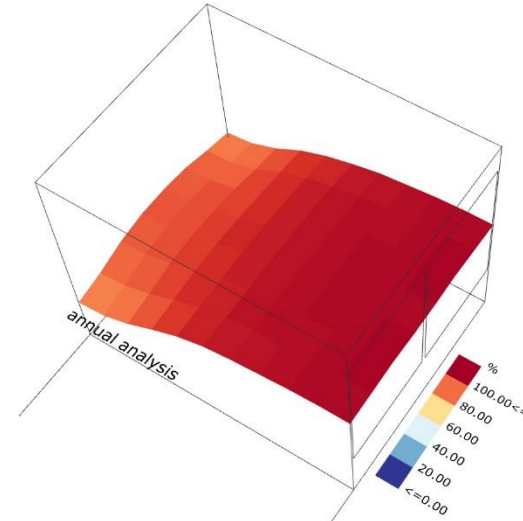
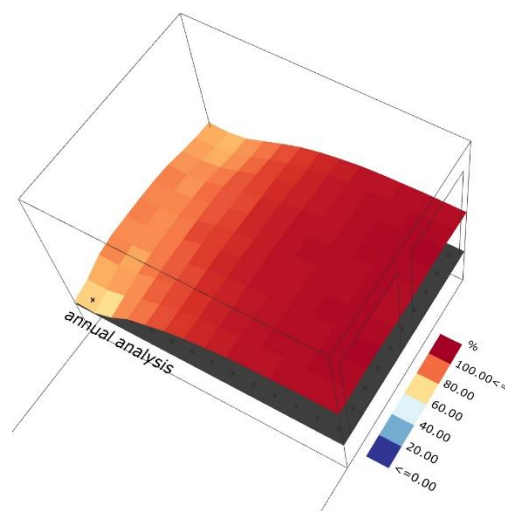
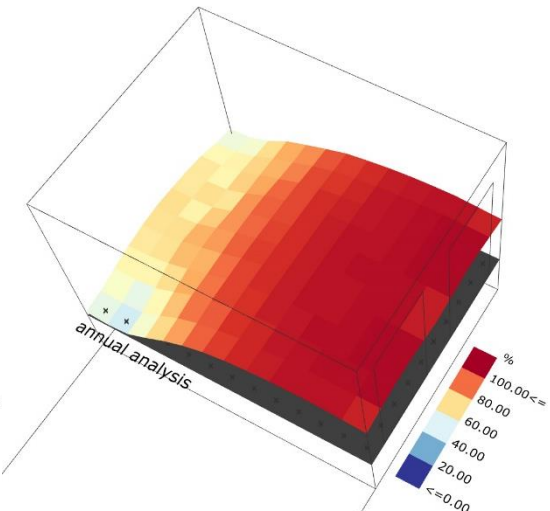
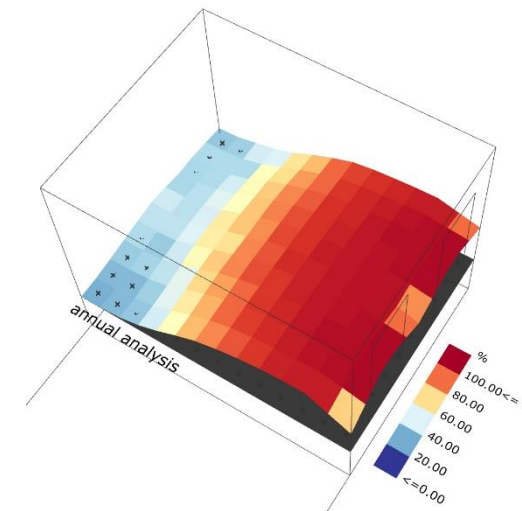


Option 3

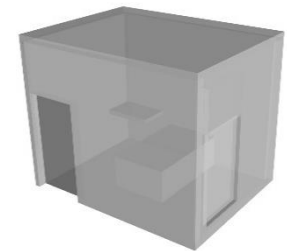


Option 4

- Based on **Annual daylight analysis**,
- Option 1 & 2 cannot be considered as not enough daylight at the rear end of the room.
- Option 3 is optimum as
- Option 4 causes extreme daylight over a larger area, resulting in glare.

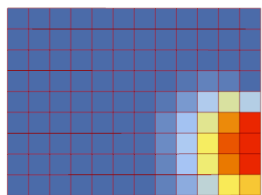


# Window size Iterations

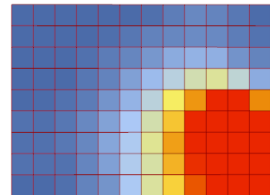


## Option 1

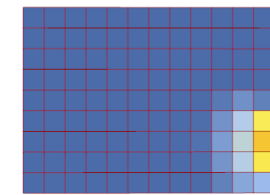
- Reducing the size of the window, reduces the glare but not significantly.
- Most part of the room still requires adequate daylight.



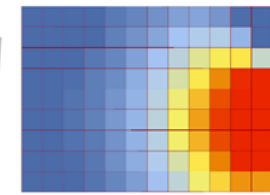
0: illuminance  
21 MAR 9:00



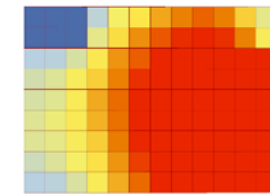
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21 JUN 9:00



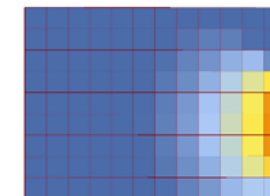
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21 DEC 9:00



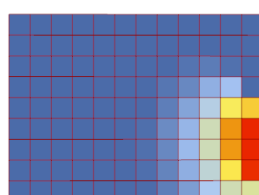
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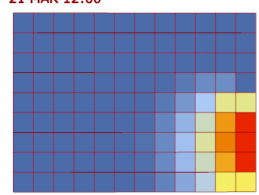
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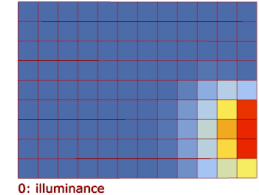
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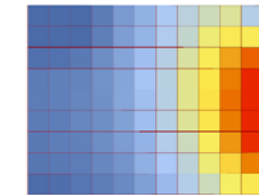
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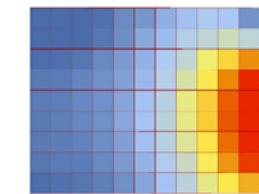
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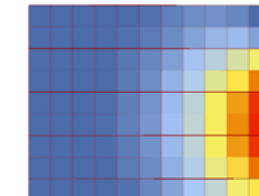
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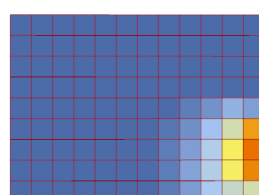
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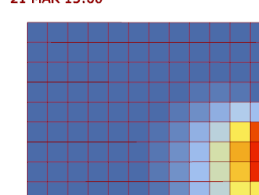
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21 JUN 12:00



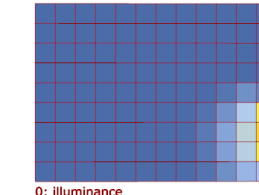
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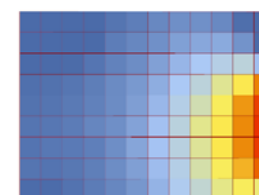
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21 MAR 15:00



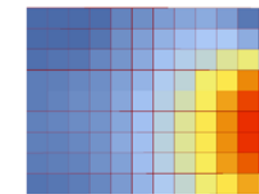
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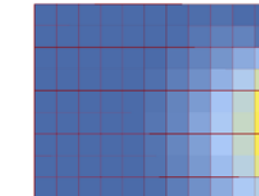
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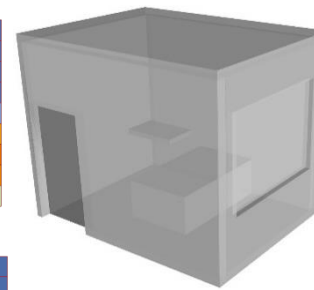
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0: illuminance  
21 JUN 15:00

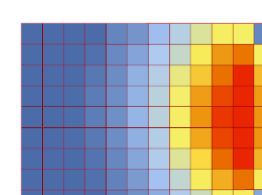


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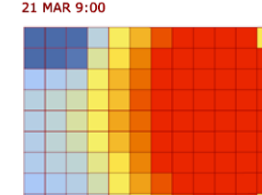


## Option 2

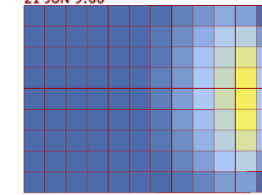
- Increasing the size of the window, helps in improving the daylight results in the mid room section.
- Daylight can be made better and glare needs to be managed.



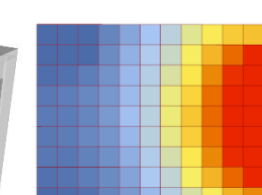
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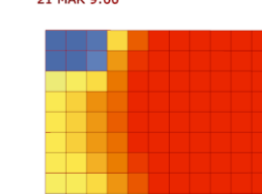
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21 JUN 9:00



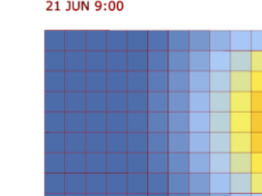
0: illuminance  
21 DEC 9:00



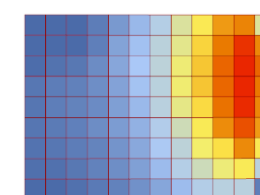
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21 MAR 9:00



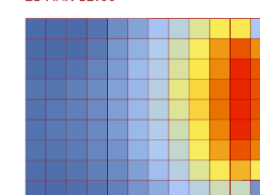
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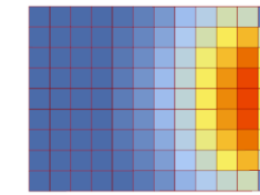
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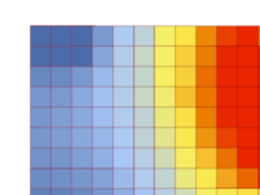
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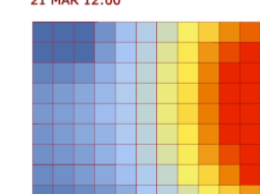
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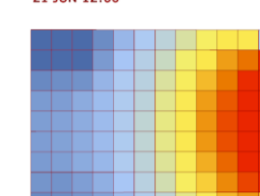
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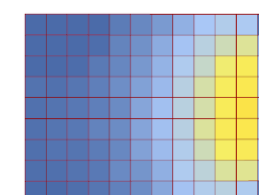
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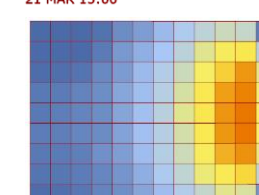
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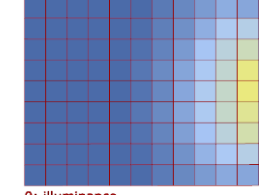
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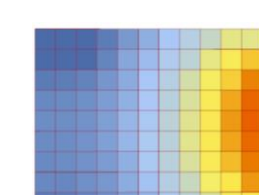
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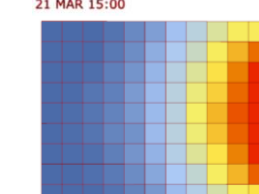
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21 JUN 15:00



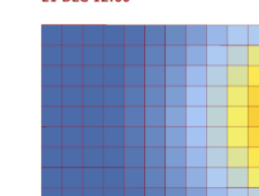
0: illuminance  
21 DEC 15:00



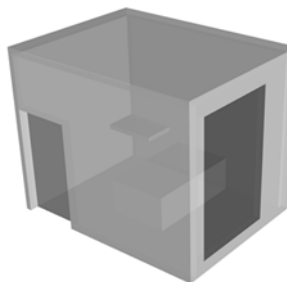
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21 MAR 15:00



0: illuminance  
21 JUN 15:00

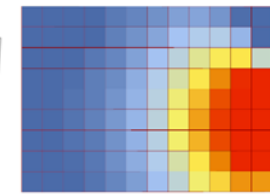


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21 DEC 15:00

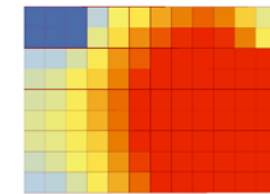


## Option 3

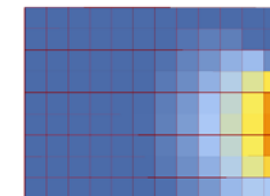
- The daylight reading is significantly better but can be made even better.



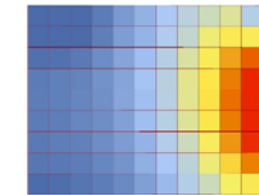
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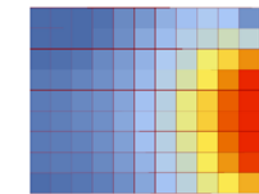
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21 JUN 9:00



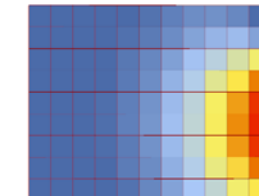
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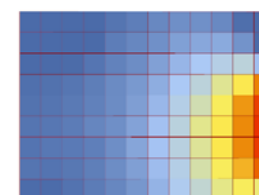
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21 MAR 12:00



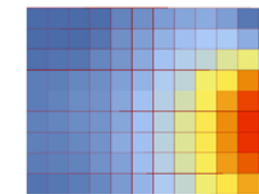
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21 JUN 12:00



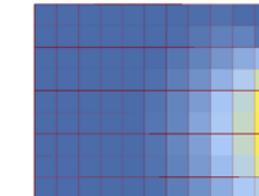
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21 DEC 12:00



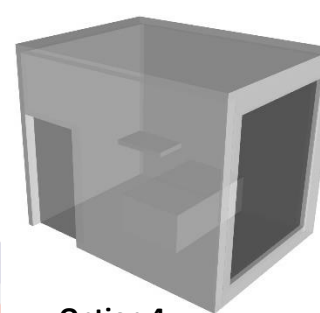
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0: illuminance  
21 JUN 15:00

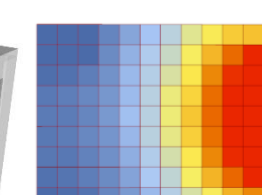


0: illuminance  
21 DEC 15:00

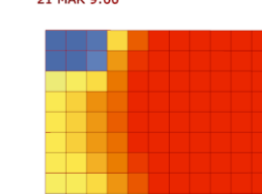


## Option 4

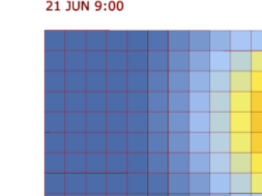
- Daylight readings better in this option, thus can be taken forward.
- High glare as a result of bigger area of window, solutions to be worked to reduce this discomfort.



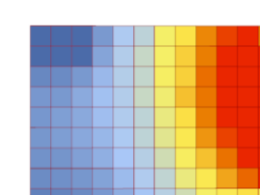
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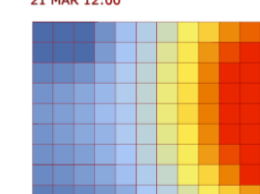
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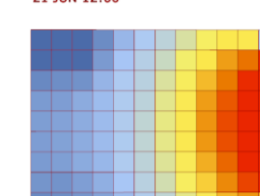
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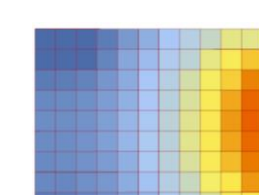
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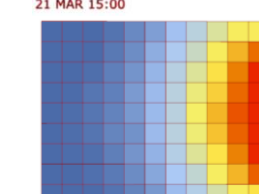
0: illuminance  
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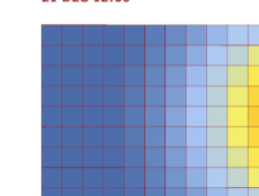
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0: illuminance  
21 MAR 15:00

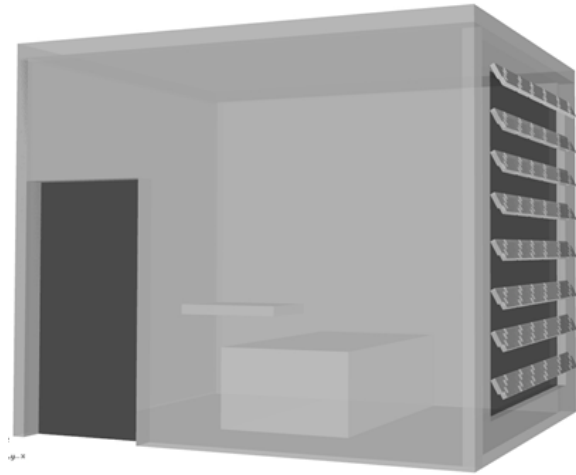


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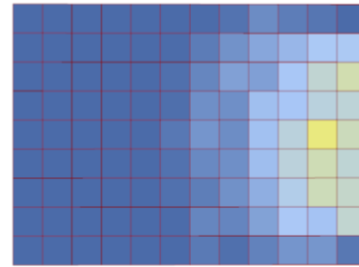
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21 DEC 15:00

# Window shading Iterations

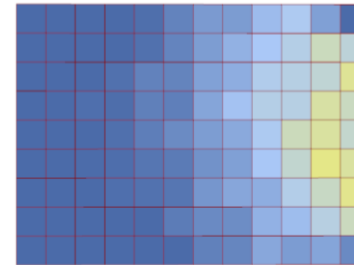


## Shading Option 1:

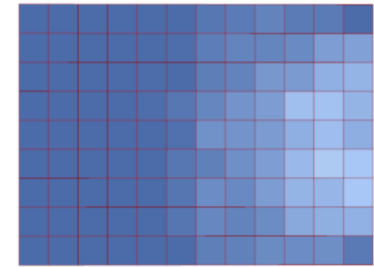
- As seen in the results, compared to the base results, the daylight readings improved till the middle part of the room.
- As this is the only external wall and the size of the window is the largest (amongst the iterations), it is suggested to move the study desk.
- As for the high glare seen in the reading specifically for 21 June 9 a.m., internal blinds can be installed to manage the same.



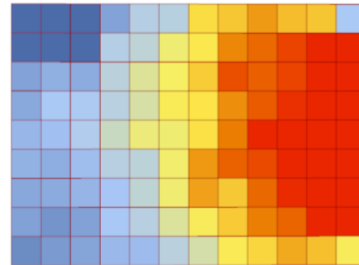
0: illuminance  
21 MAR 9:00



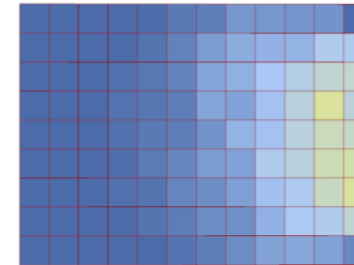
0: illuminance  
21 MAR 12:00



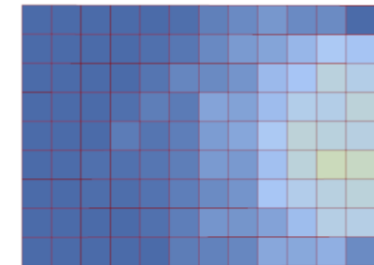
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21 MAR 15:00



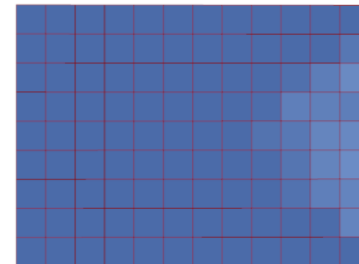
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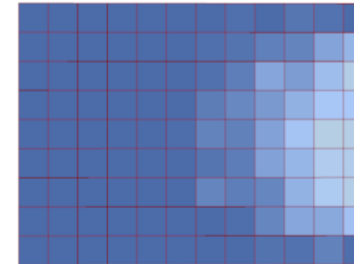
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21 JUN 12:00



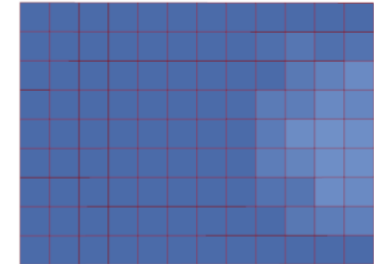
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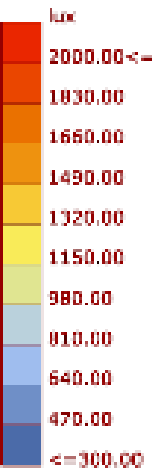
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21 DEC 9:00



0: illuminance  
21 DEC 12:00



0: illuminance  
21 DEC 15:00





9 A.M.

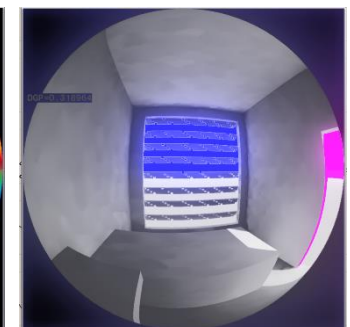
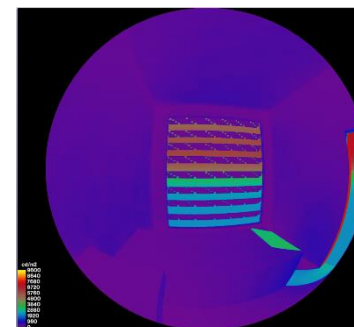
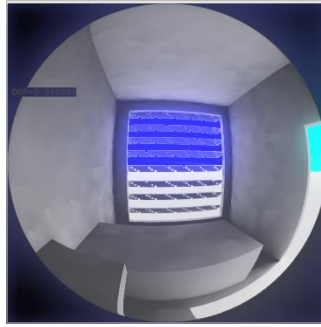
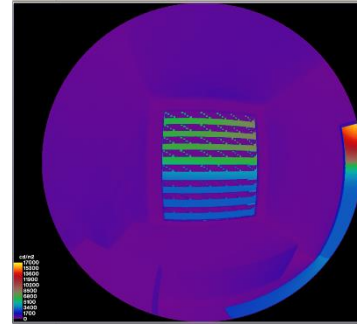
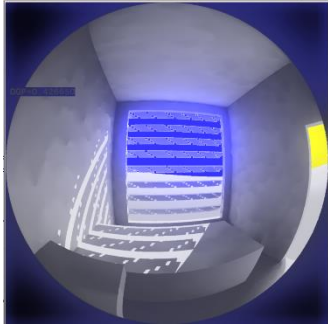
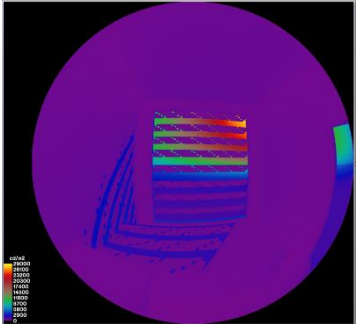
12 Noon

3 P.M.

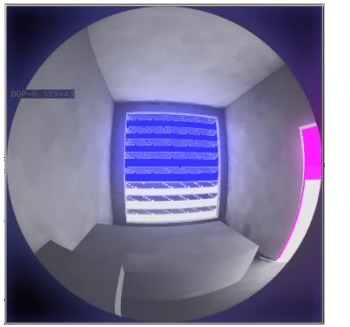
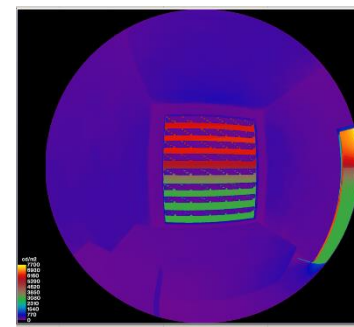
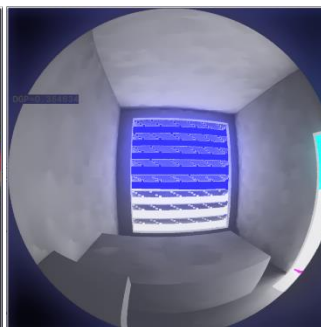
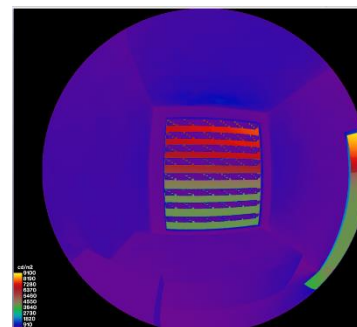
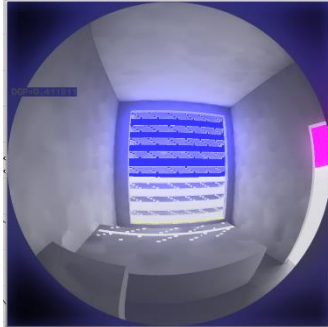
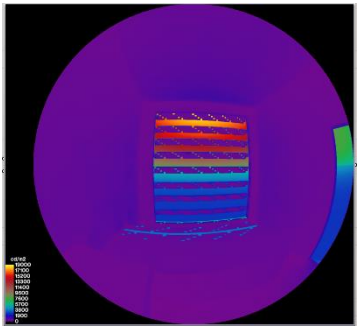
## Glare Analysis

- The glare accounted here with the proposed shading system remains between perceptible glare to imperceptible glare.
- The readings indicate that the shading system helps retain glare below disturbing and intolerant glare.

March



June



December

