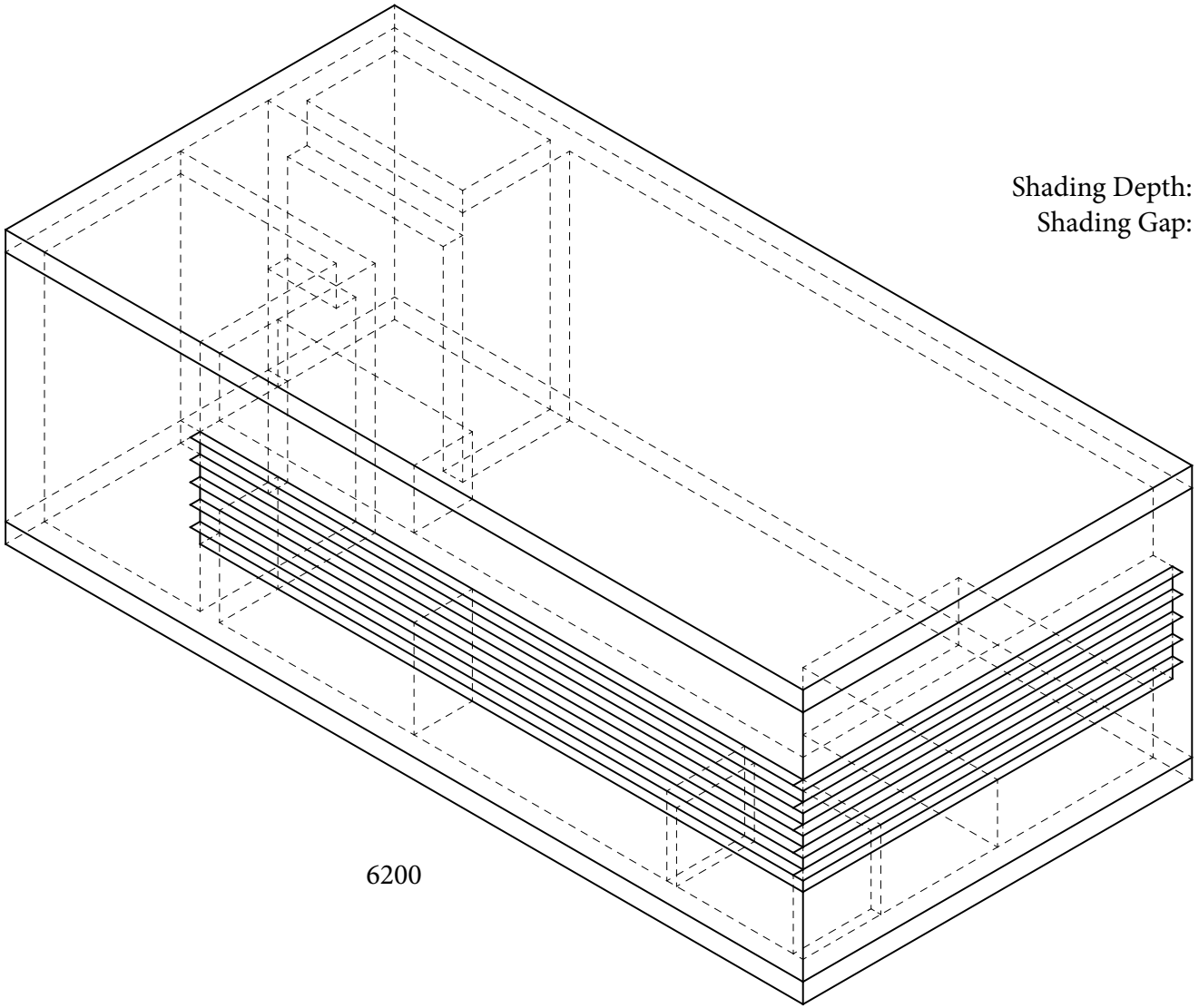
UDI & Glare Simulation

171030 Assignment_5
DREAM ROOM in Philadelphia



Shading Depth: 100mm
Shading Gap: 200mm

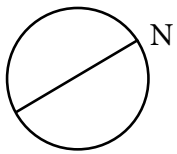
City: Philadelphia, PA

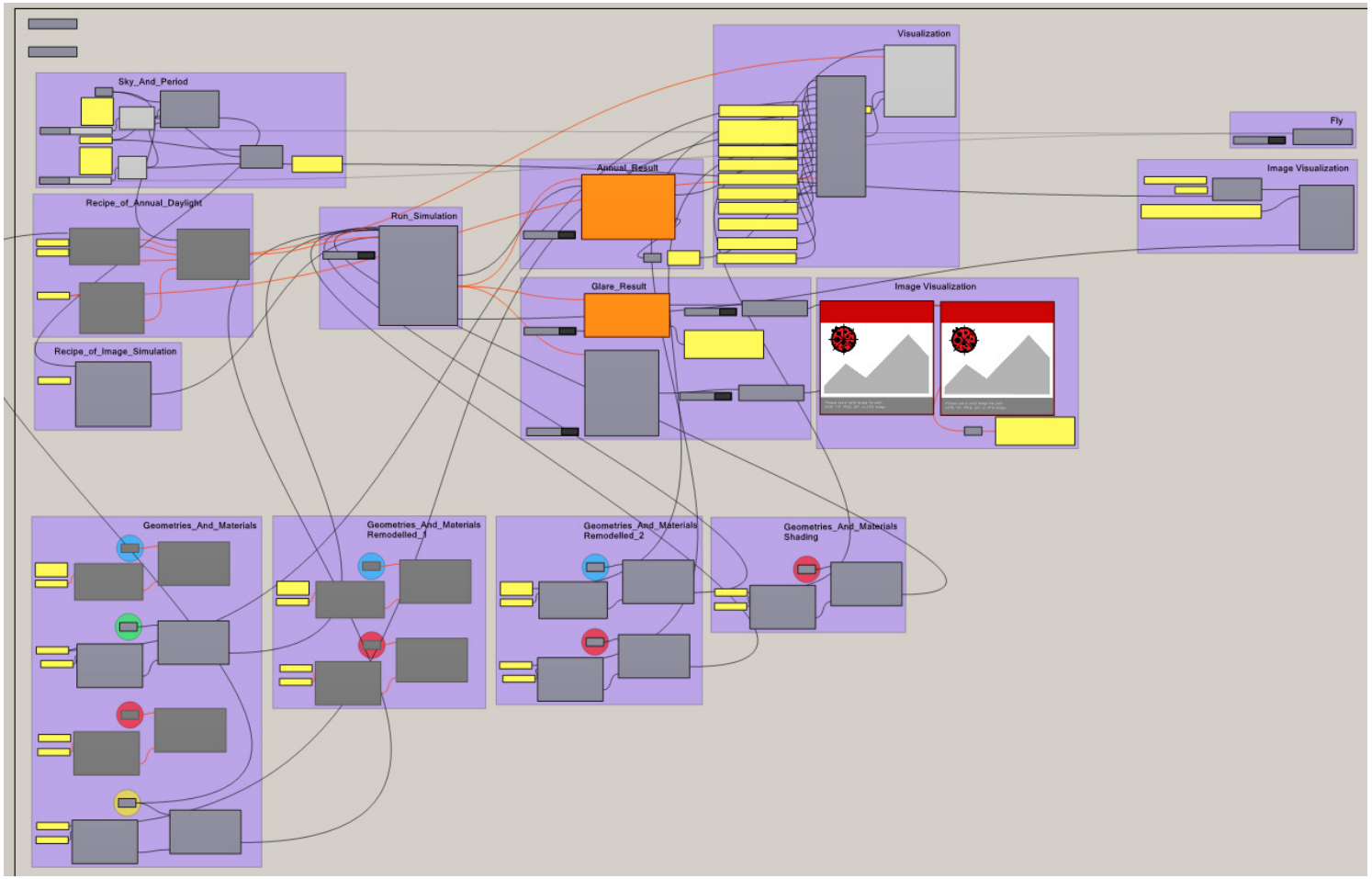
Latitude: 39.8683

Longitude: -75.2311

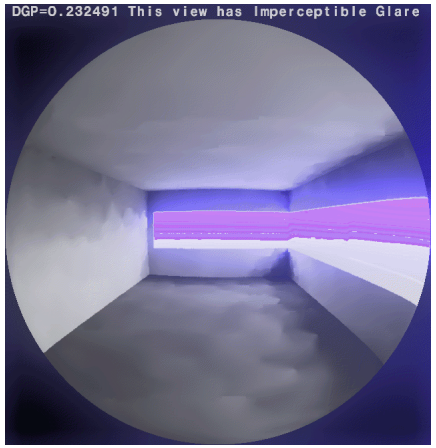
Climate:
According to the Köppen climate classification, Philadelphia falls under the northern periphery of the humid subtropical climate zone (Köppen Cfa),[71] whereas according to the Trewartha climate classification, the city has a temperate maritime climate (Do).[72] Summers are typically hot and muggy, fall and spring are generally mild, and winter is cold. (Wikipedia)

Wind:
Generally, not too extreme, however, sometimes in winter, it's quite strong.

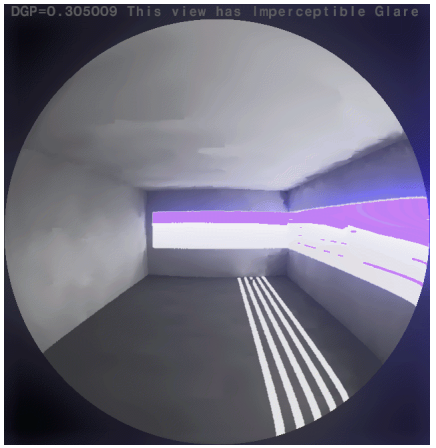




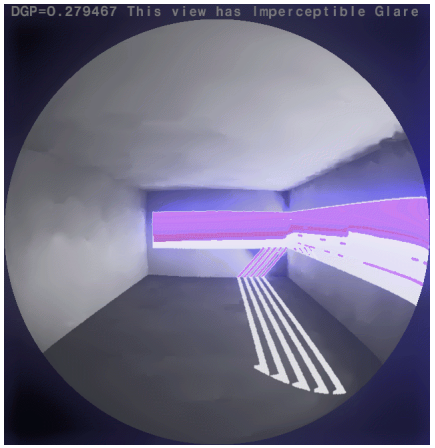
Using the last final design, I simulated several different conditions to evaluate my design. UDI and glare analysises were done.



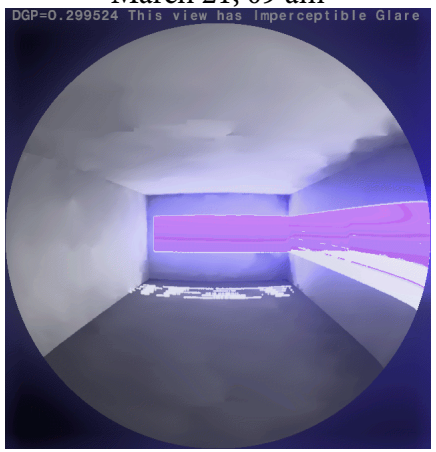
March 21, 09 am



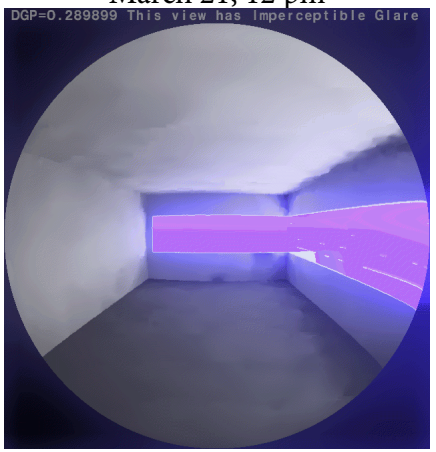
March 21, 12 pm



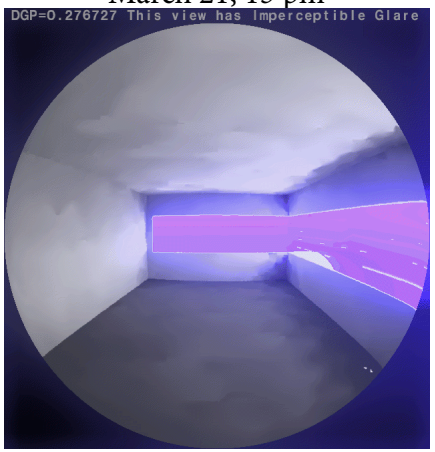
March 21, 15 pm



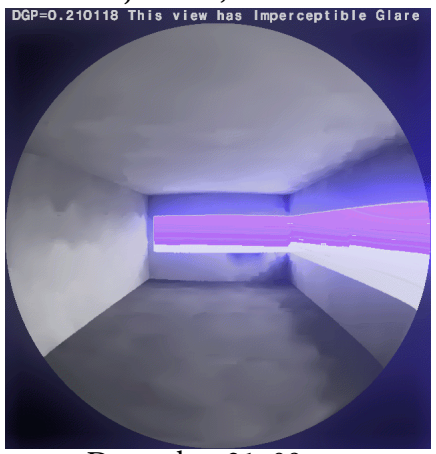
June 21, 09 am



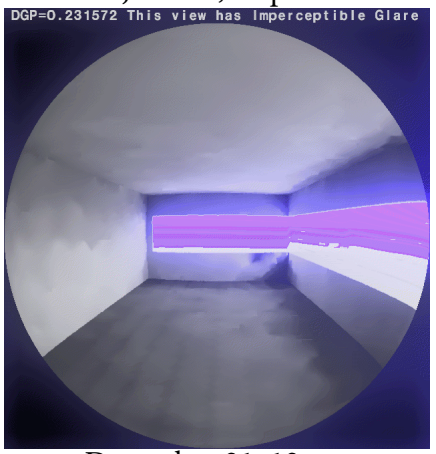
June 21, 12 pm



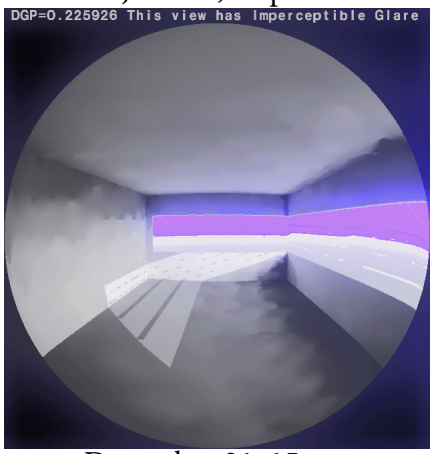
June 21, 15 pm



December 21, 09 am

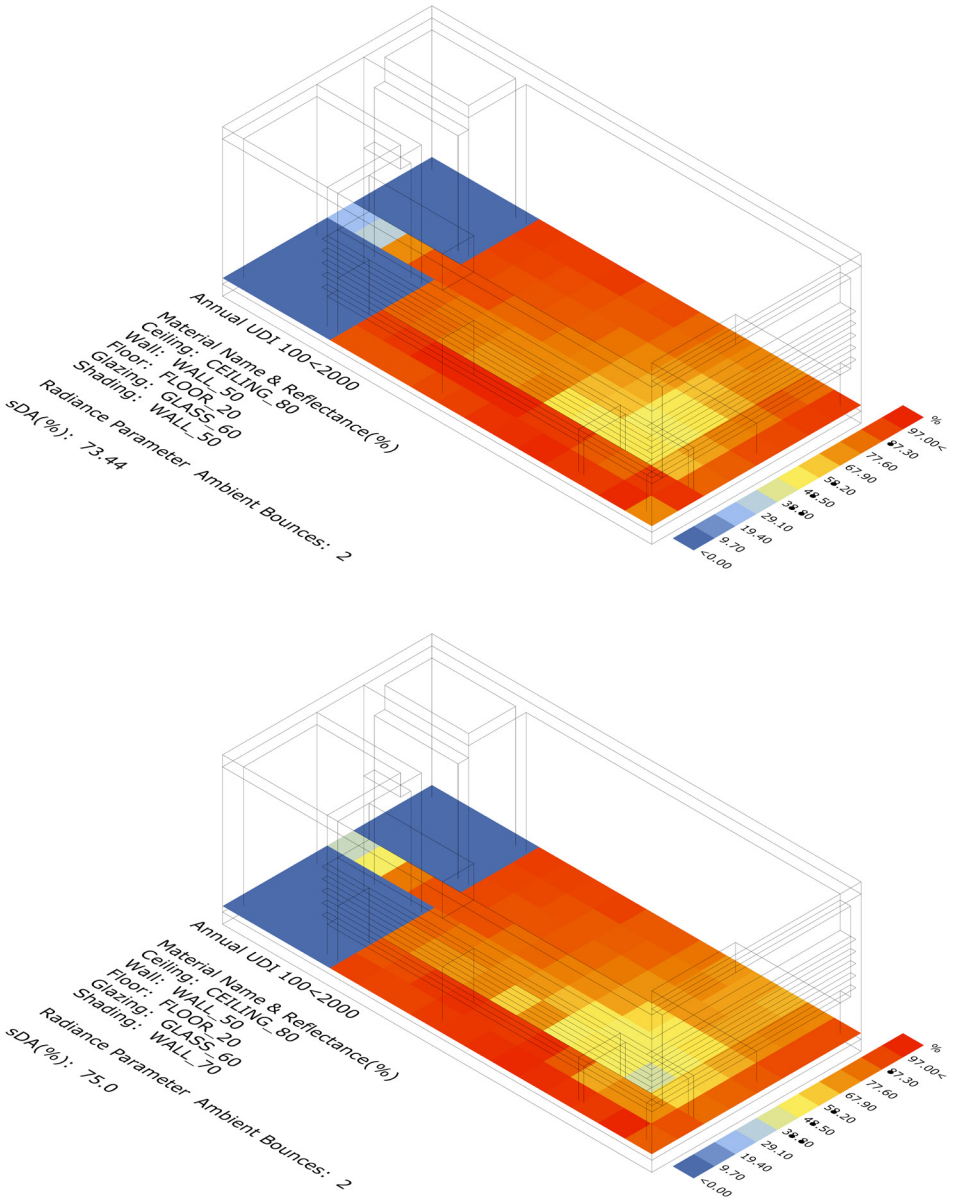


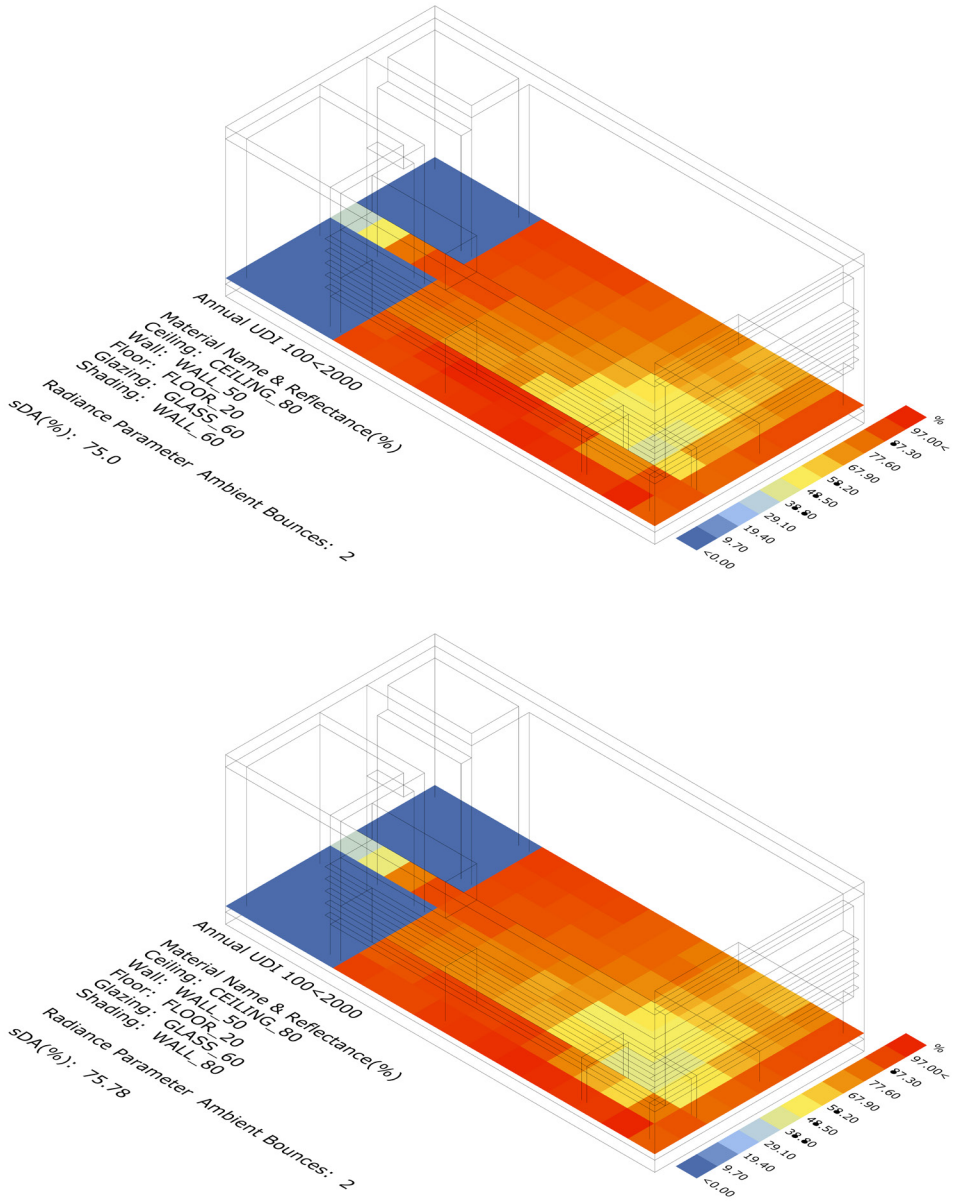
December 21, 12 pm



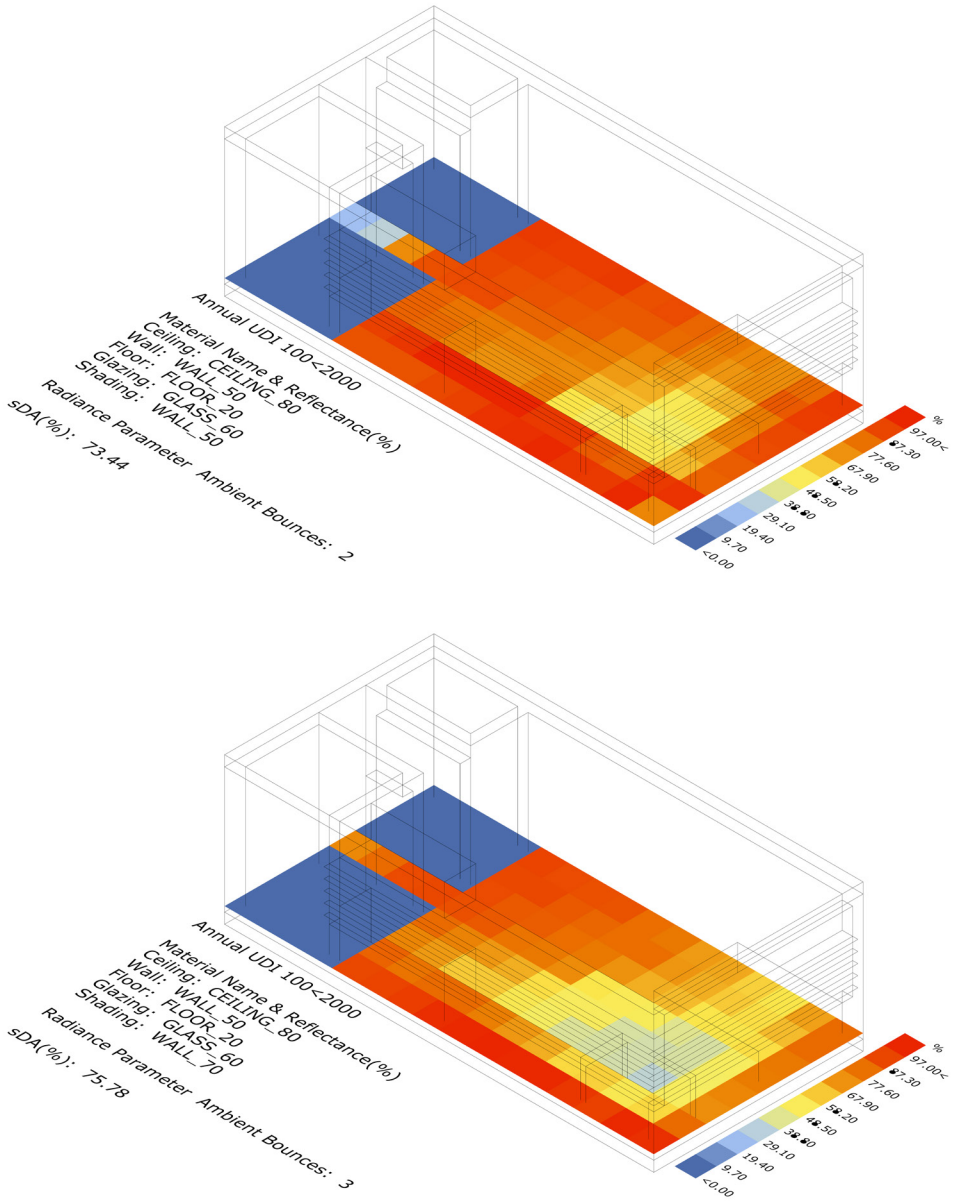
December 21, 15 pm

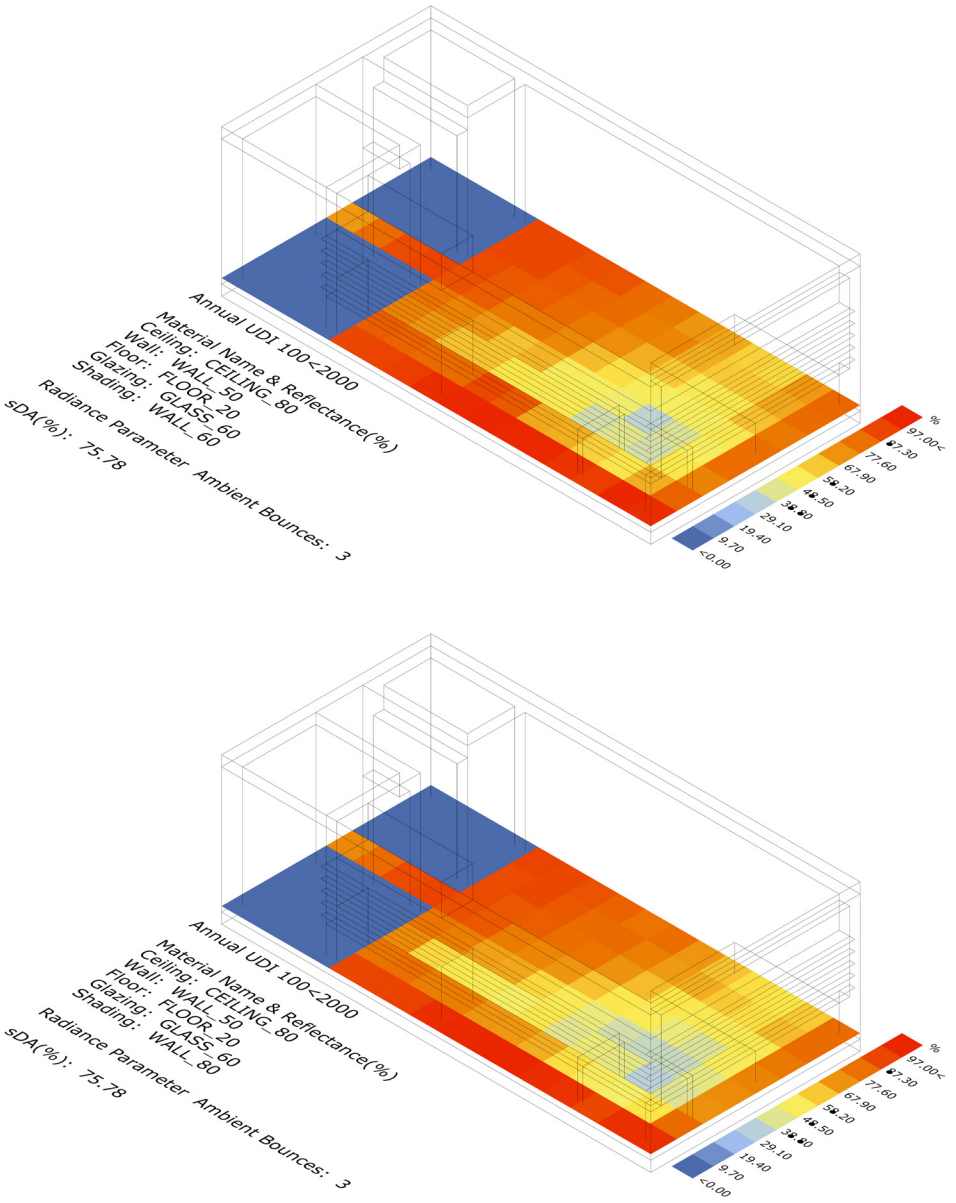
Firstly, I've simulated expected glare in my dream room. Daylight analysis was done carefully with several iterations last weak, so the simulation says the degree of glare is imperceptible.





Second, I've simulated annual Useful Daylight Illuminance of my room. It was done for a whole year and evaluated how much percentage each spot get between 100 and 2000 lux illuminance. I took general material reflectance for each components; ceiling 80%, wall 50%, floor 20%, and glazing 60%. Then, shading material was changed, and got the better results while the reflectance increses.





Lastly, I've changed radiance parameters. One of the critical results was discovered, when ambient bounce(AB) was adjusted. I've changed shading material simultaneously with different AB values. What was interesting was the Annual UDI of the spots near the opening decreased while taht of the deep inside of the room increased. I guess that the light particles which stopped their journey near the opening traveled farther, so that result was derived.