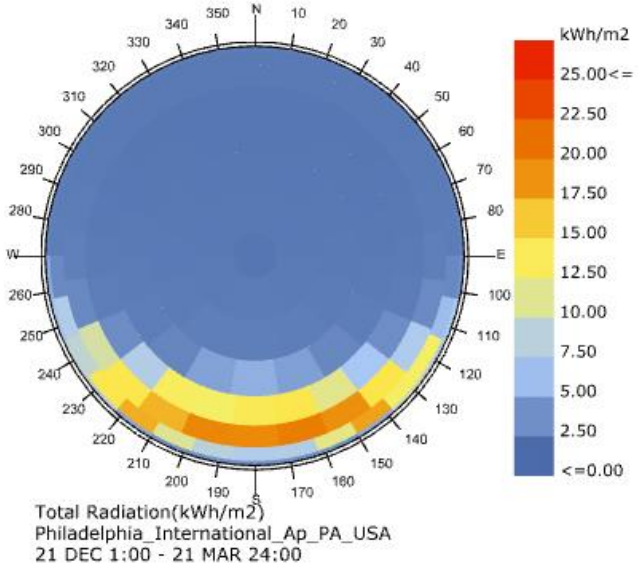
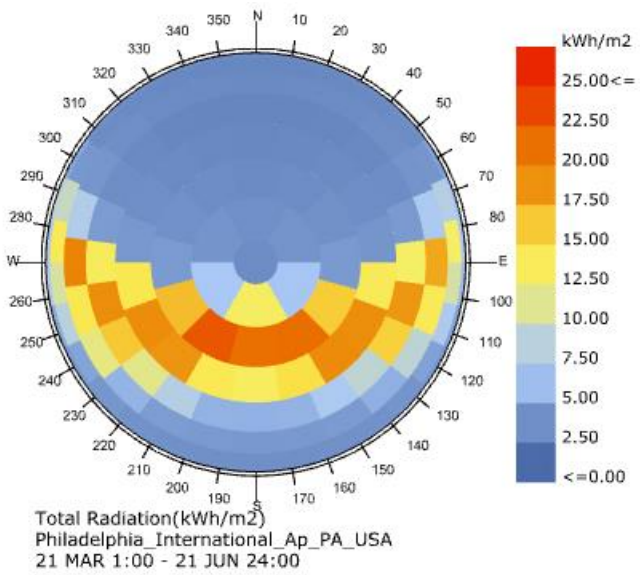
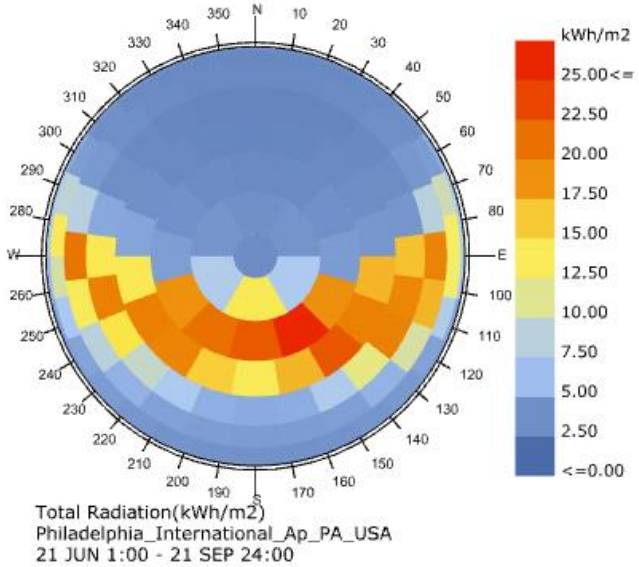
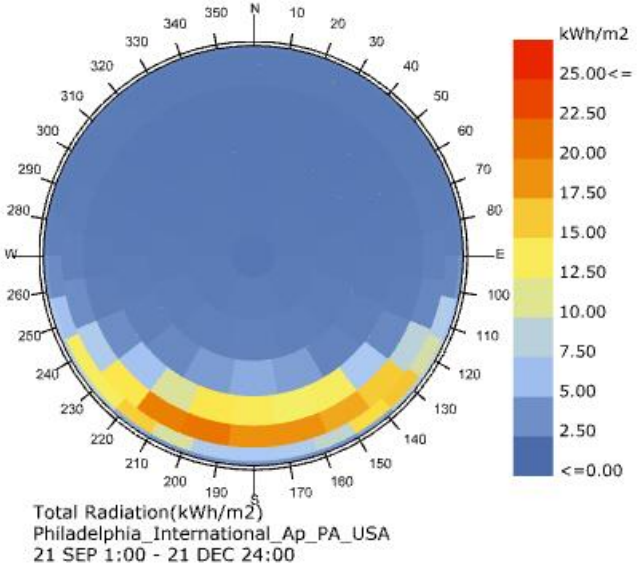
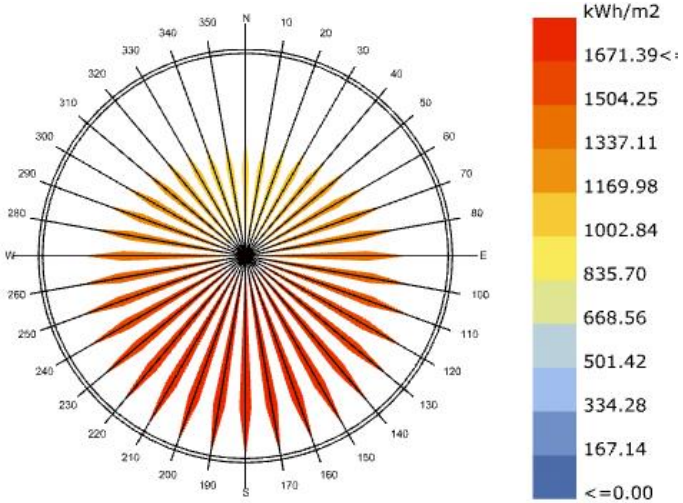








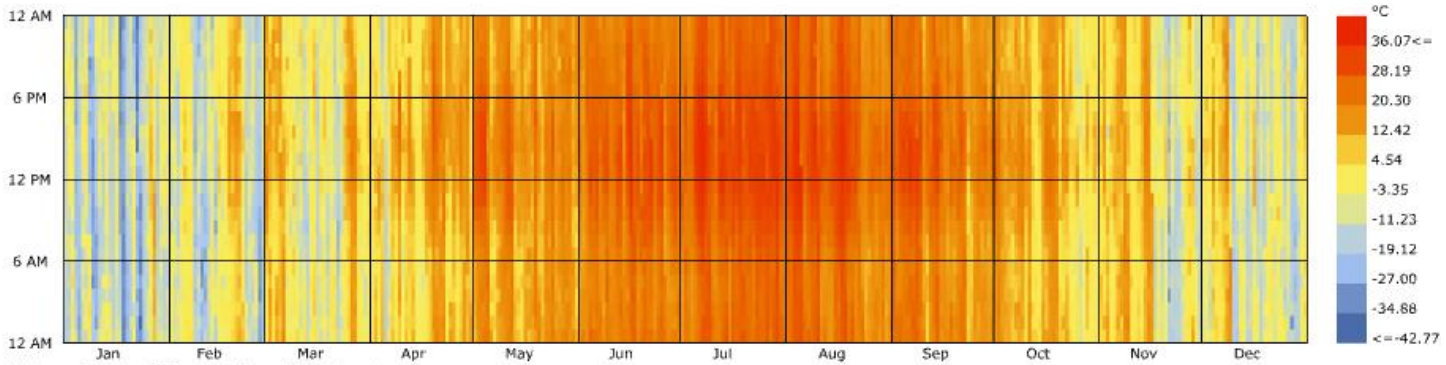
ARCH-753-001
Building Performance Simulation
Assignment-3



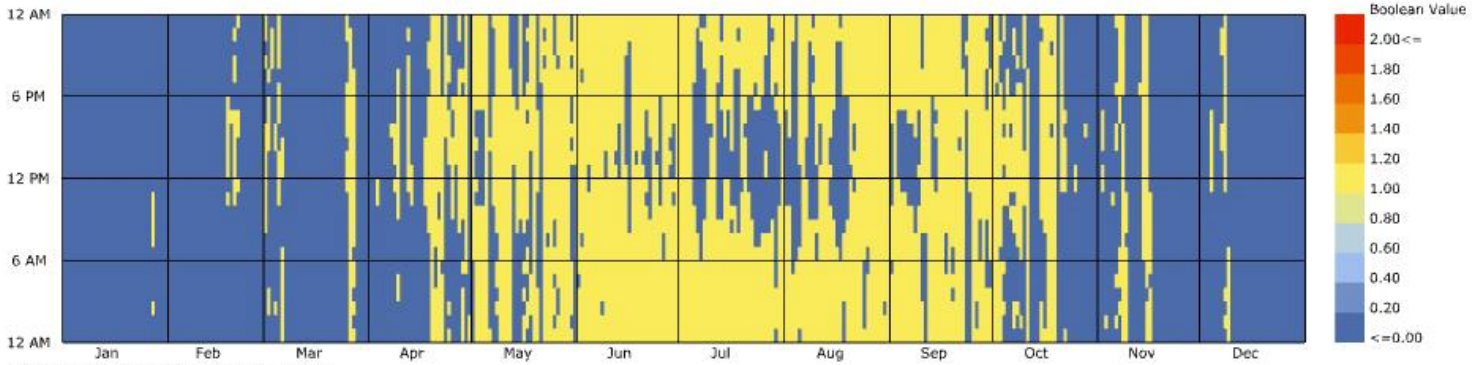
Radiation Analysis

Inference:

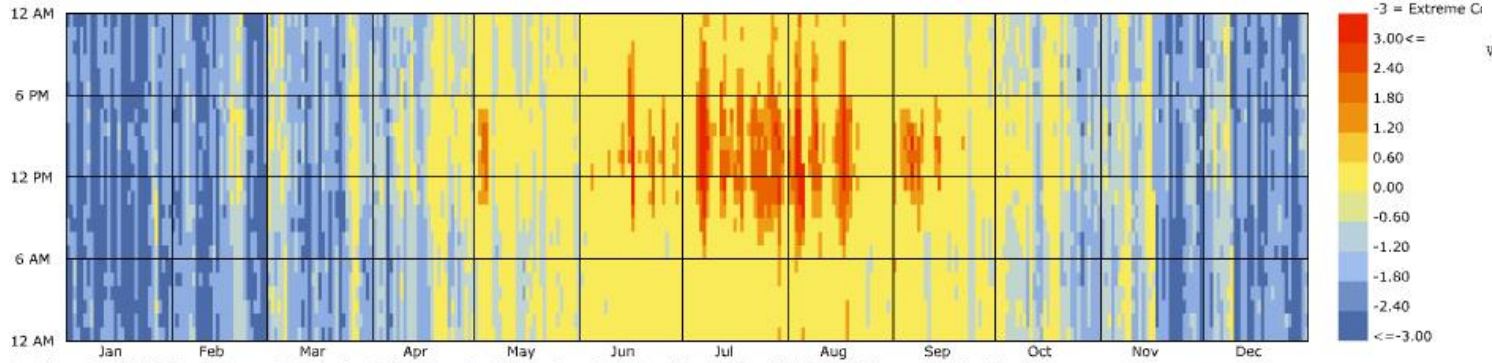
1. March 21-Sep 21 the radiation is from the east west and south directions
2. Sep21 – March 21 the major amount of radiation is from the south which means during the noon, it is relatively less when compared to summer and fall months
3. So, overall major amount of radiation is from the south as we can see in the Radiationrose



Universal Thermal Climate Index (°C) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00



Comfort or Not (Boolean Value) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

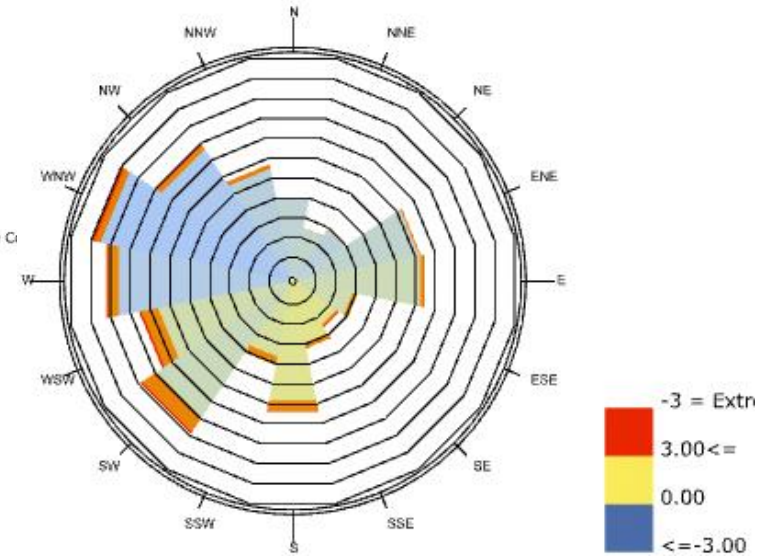


Outdoor Comfort (-3 = Extreme Cold | -2 = Cold | -1 = Cool | 0 = Comfort | 1 = Warm | 2 = Hot | 3 = Extreme Heat) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

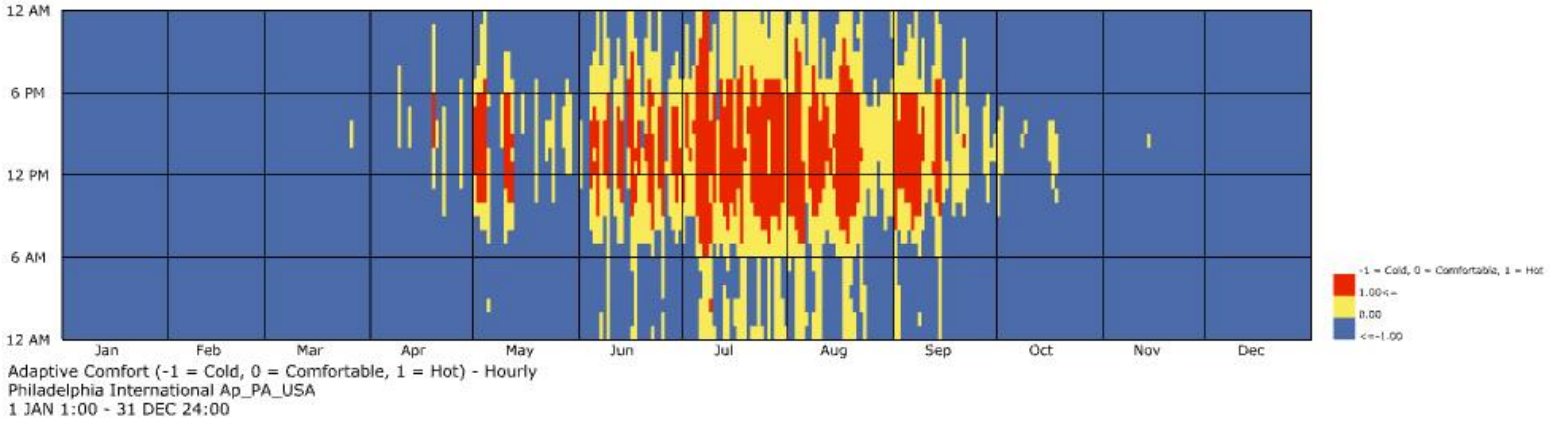
Outdoor Comfort Analysis

Inference:

1. From the comfort and the climate index graphs it is visible that maximum comfort is during the summer and the fall months, when the temperature is between 20 and 28degree
2. 40% of the time all over the year is comfortable and 21% of time for a short period
3. 3% heat and 34% cold stress, which clarifies that maximum effort or energy is consumed in heating during the cold whether and little amount for cooling during the hot summer months
4. Mostly from Jan-Apr is when we require heating and Jun-Sep cooling
5. Also, the south, south west and south east winds are relatively comfortable



Wind-Rose
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Hourly Data: Outdoor Comfort (-3 = Extreme Cold | -2 = Cold | -1 = Cool | 0 = Comfort | 1 = Warm | 2 = Hot | 3 = Extreme Heat)
Calm for 2.81% of the time = 246 hours.
Each closed polyline shows frequency of 1.0%. = 90 hours.



Indoor Adaptive Comfort Analysis

Inference:

1. Only 14% of time over the year is comfortable
2. 8% of time we need cooling during the hot whether
3. 74% of time we need heating during the cold whether

Room Orientation

In case of south facing 3.6x4sq.m room, the radiation analysis says that it is already in the best orientation possible, which means a 0degree rotation is need
(that is when a minimum difference is achieved between the summer and winter radiation)