

Week 6_sconde

1) Given last weeks assignment result:

$$Q_{no\ shield} = 1035.81\ W/m^2$$

$$(1\%)(Q_{no\ shield}) = \left(\frac{1}{N+1}\right)(100\%)(Q_{no\ shield})$$

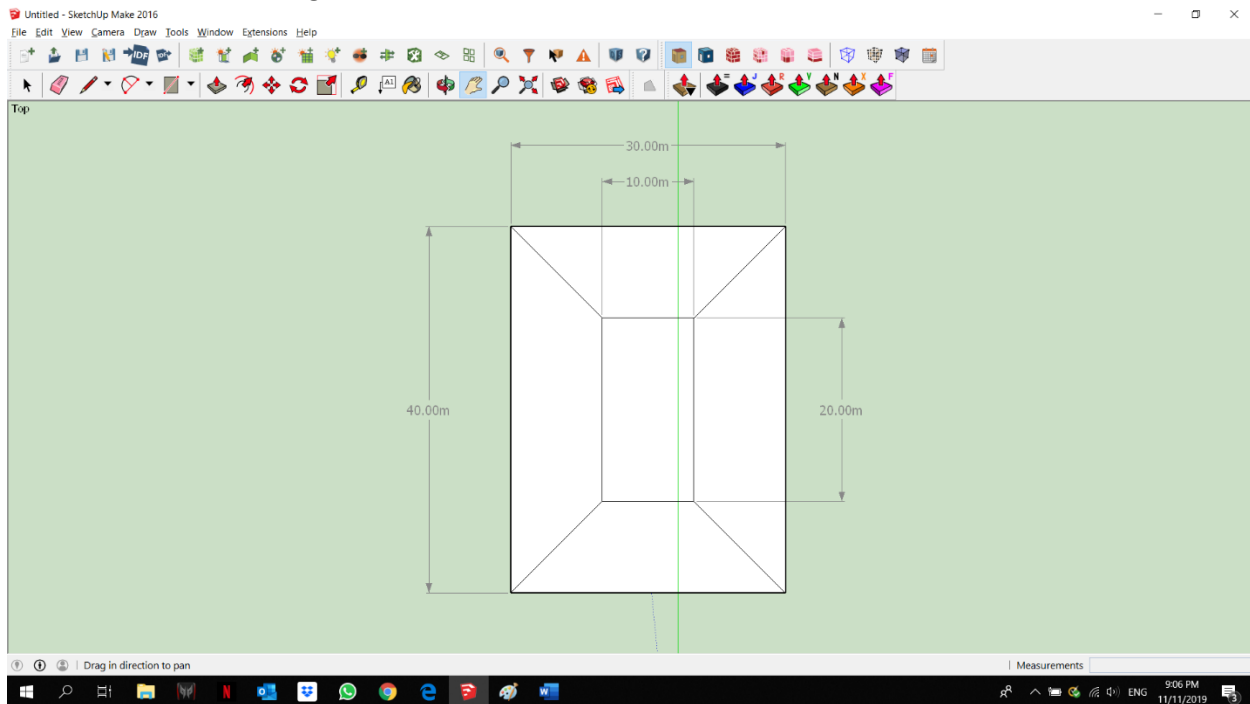
$$(0.01)(1035.81) = \left(\frac{1}{N+1}\right)(1)(1035.81)$$

$$N = \frac{1}{0.01} - 1$$

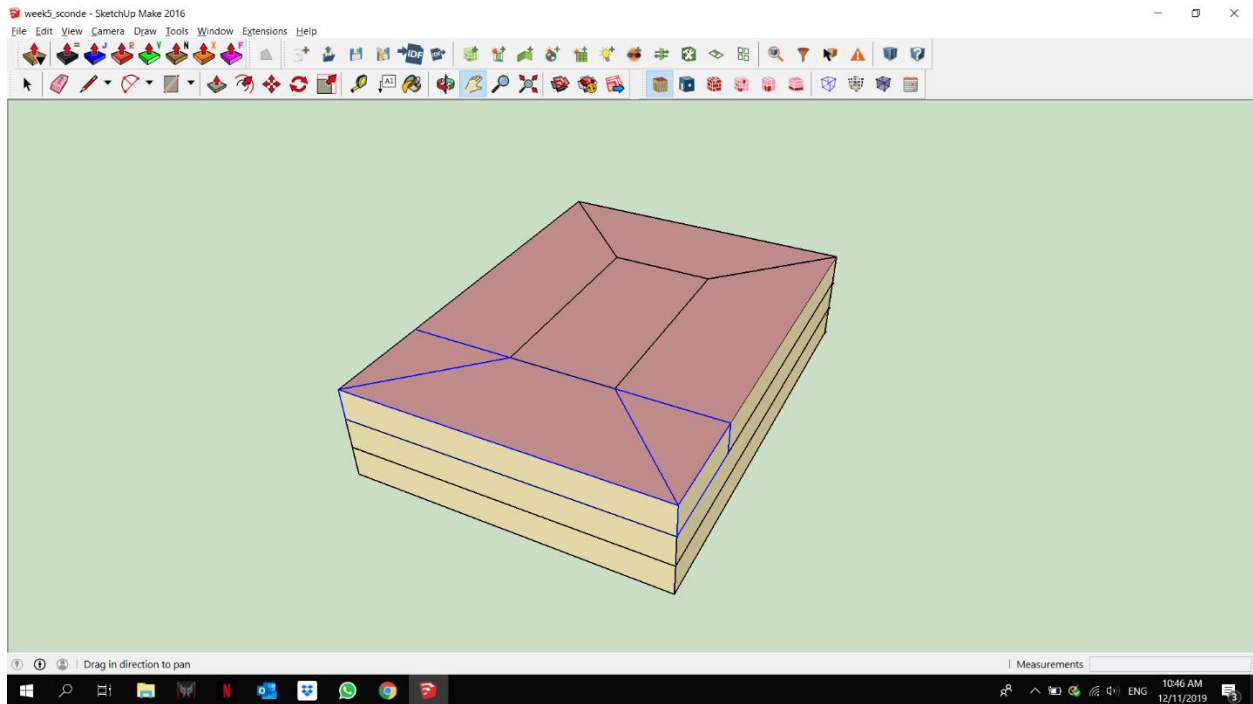
$$N = 99$$

2)

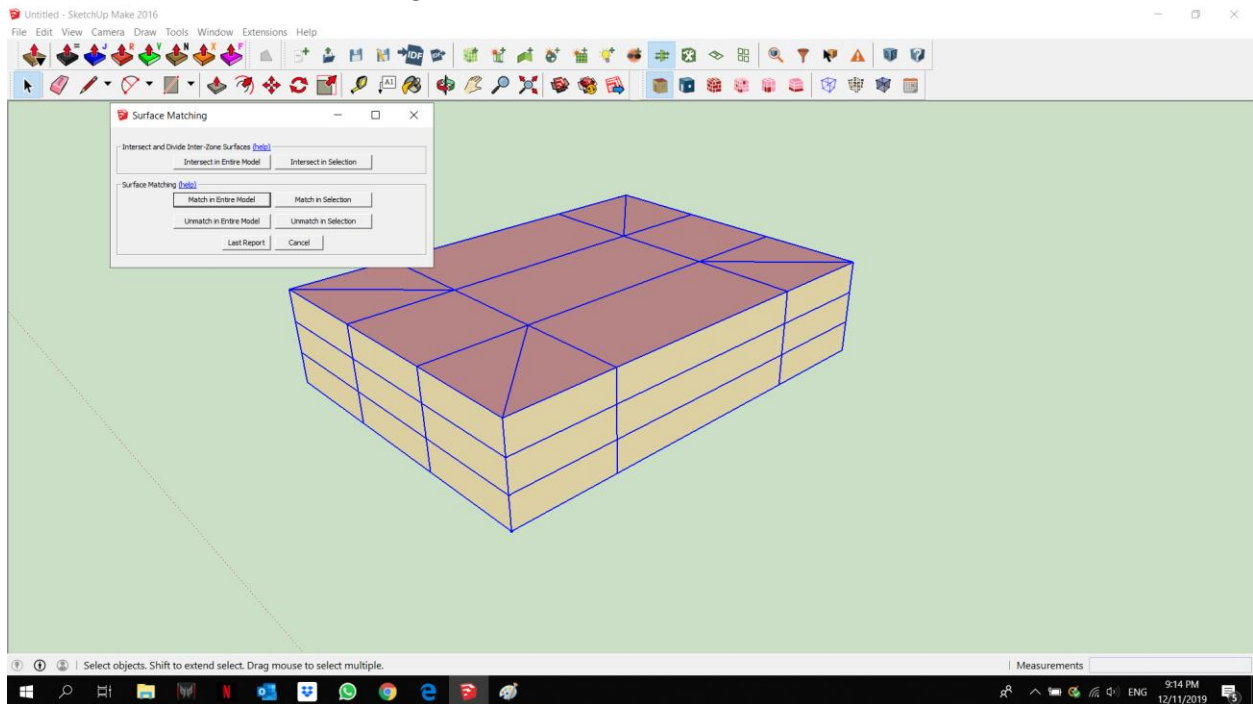
1. Draw this diagram. Given here are the Dimensions.



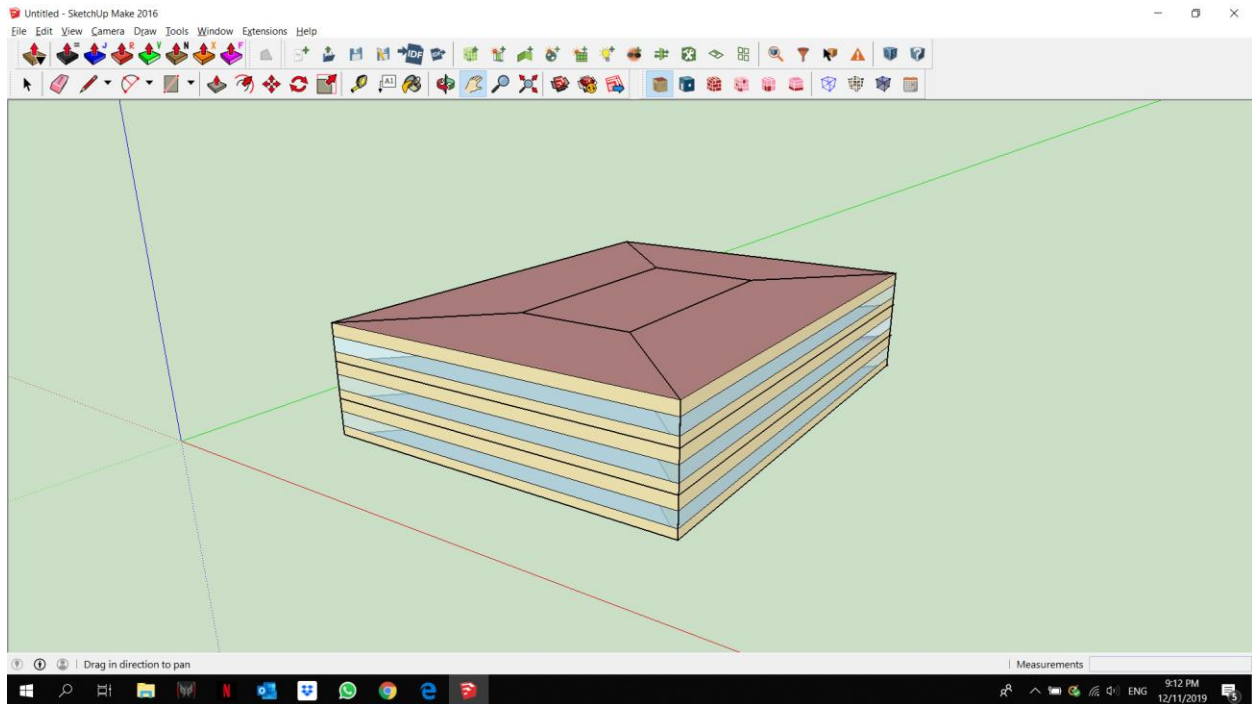
2. Make each floor by using the “Create Spaces from Diagram” Tool. Set to 3 floors and set the desired height of each floors.



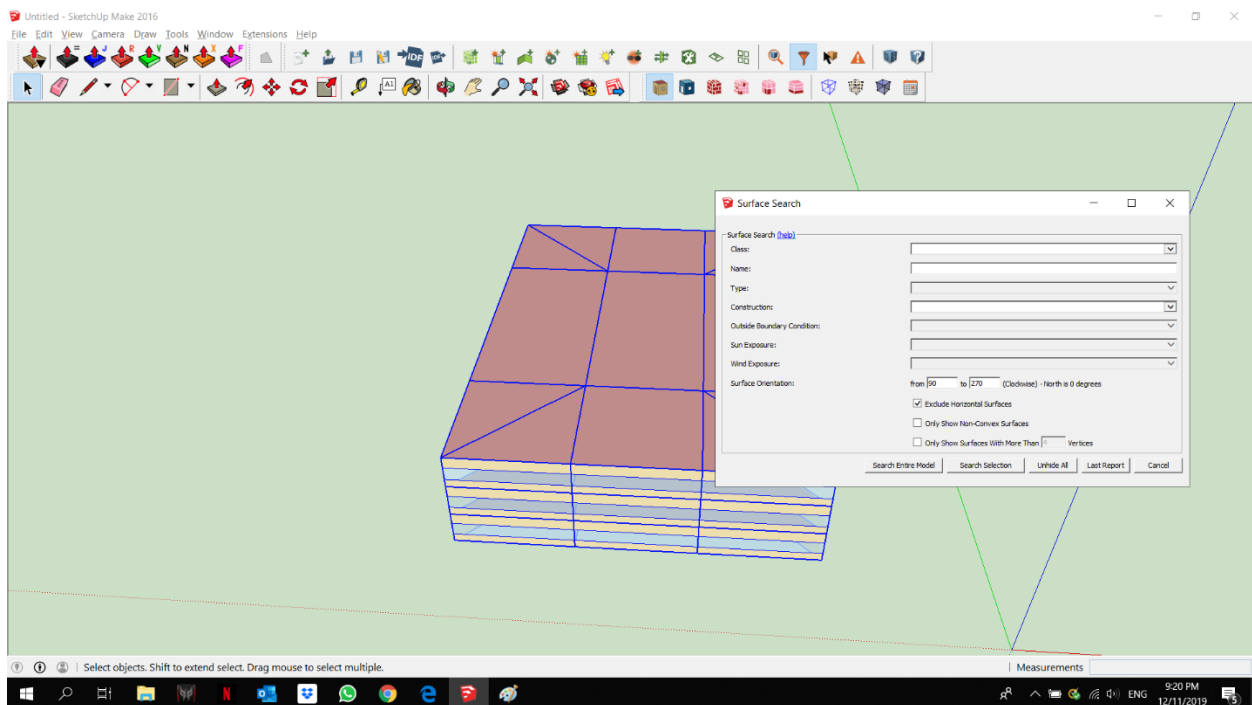
3. Use “Surface Matching” Tool and “Match in Entire Model”.



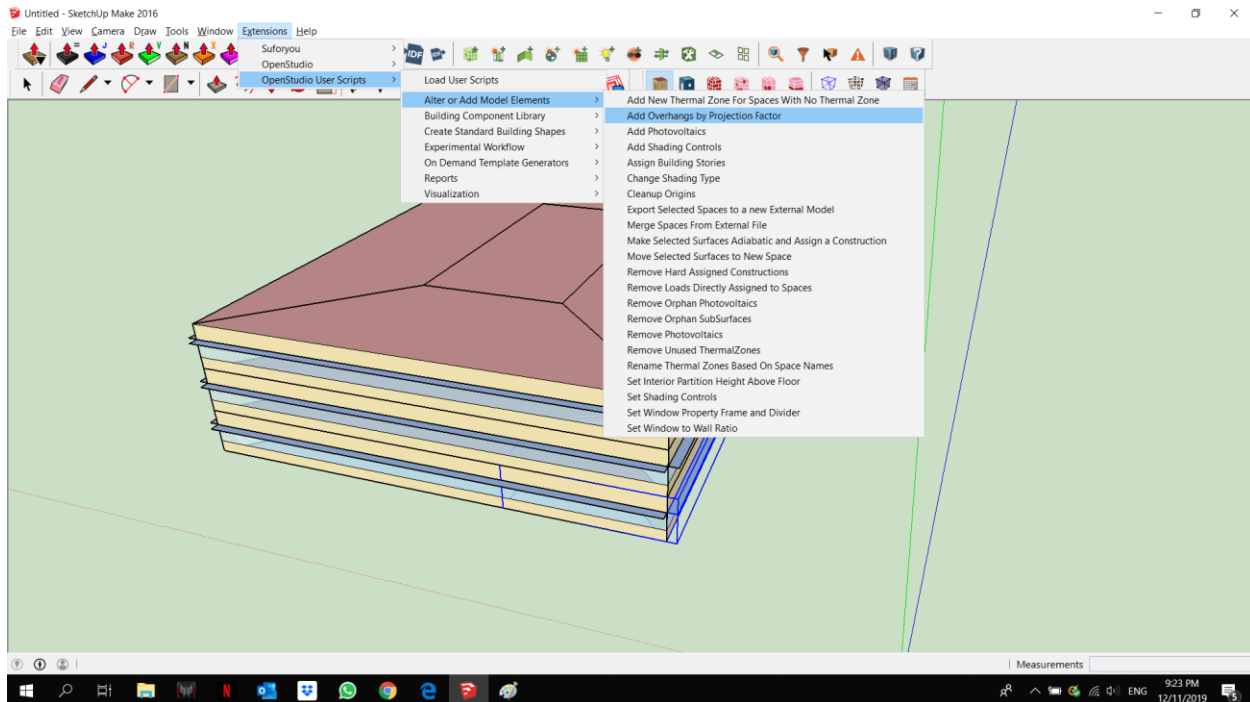
4. To create the windows, go to Extensions > Open Studio User Script > Set Window to Wall Ratio.



5. Use Surface search tool to add shadows, and set the orientation from 90 to 270. Then click "Search Selection".

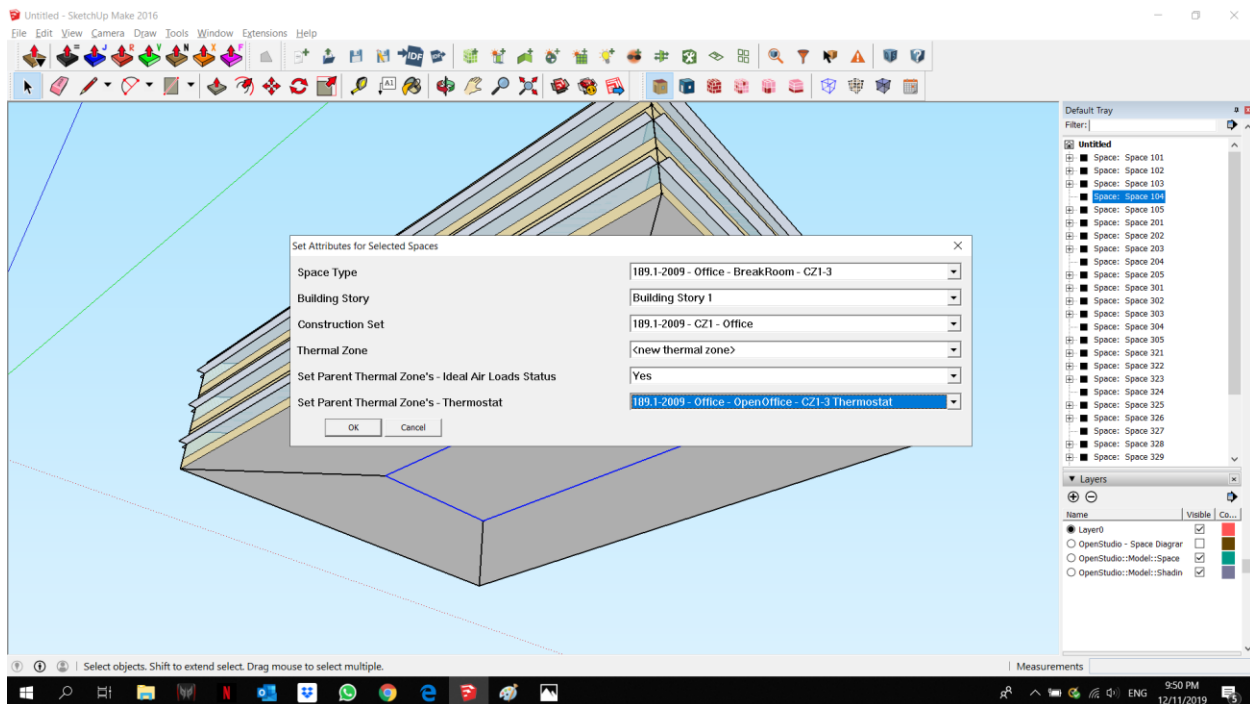


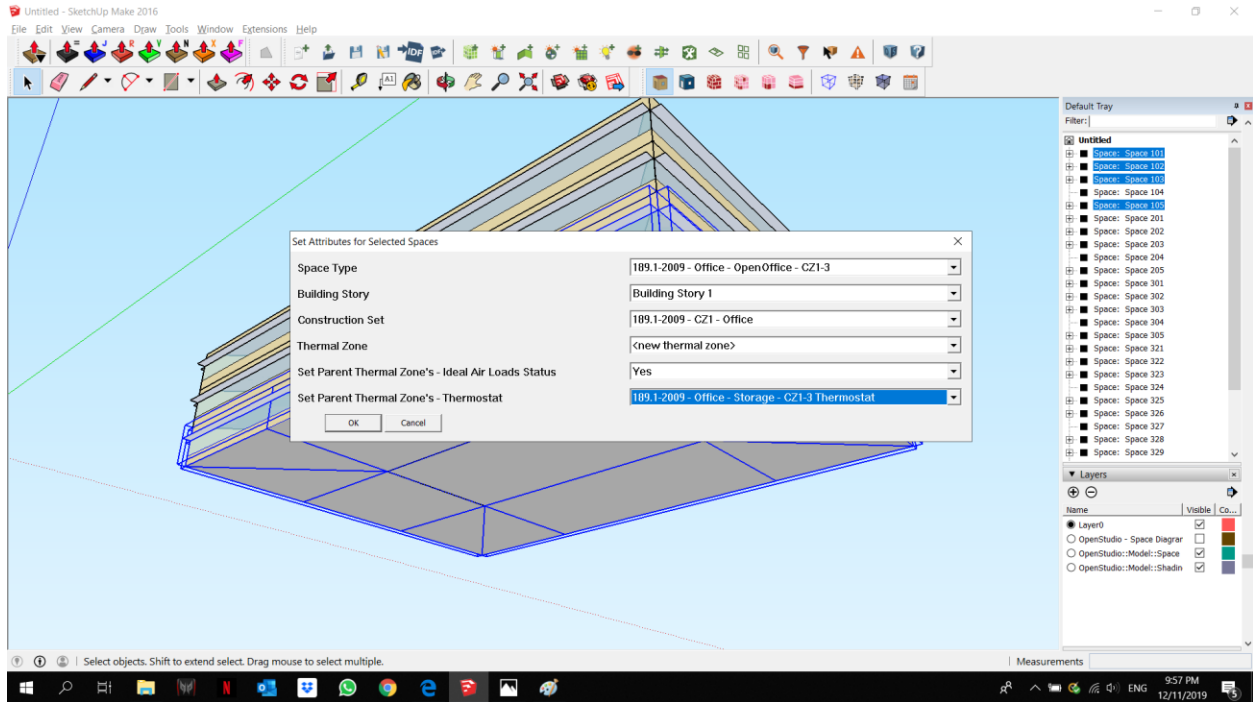
6. To put the Overhangs, go to Extensions > Open Studio User Script > Add Overhang by Projection.



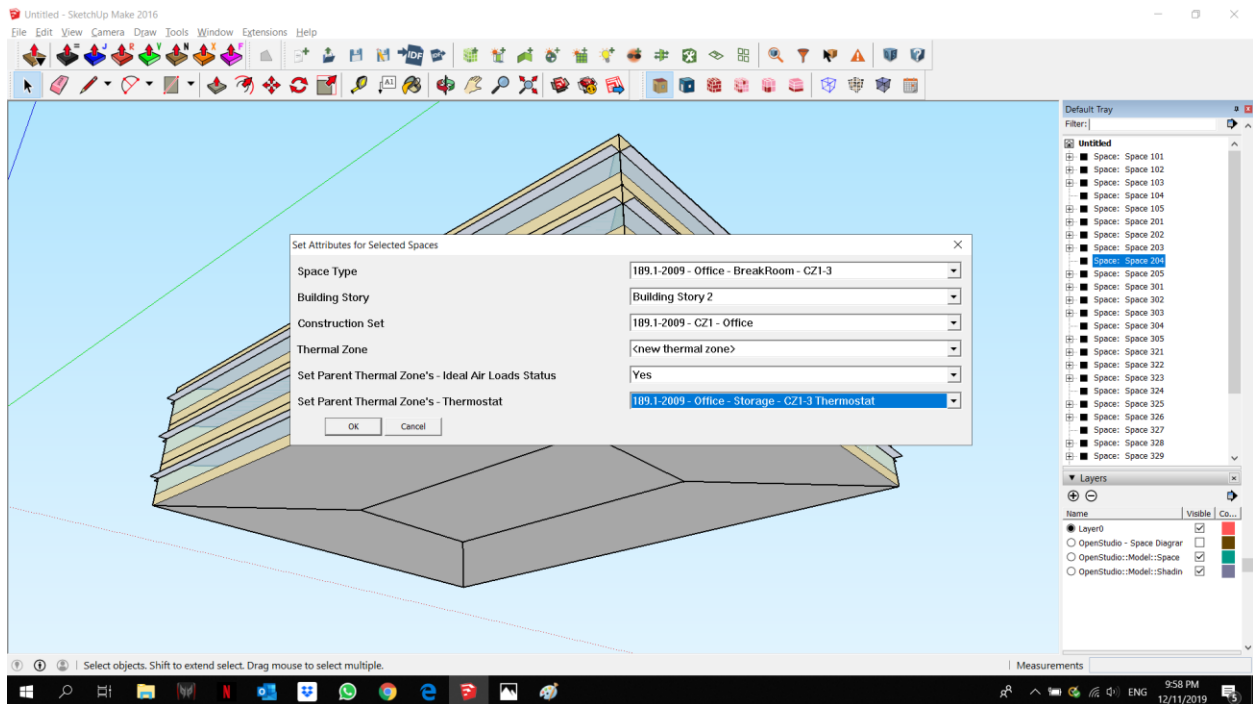
7. To set the attributes of selected spaces, you should set first the “Outliner” on the Default Tray, and then click the “Set Attributes for Selected Spaces” tool and set the attributes accordingly.

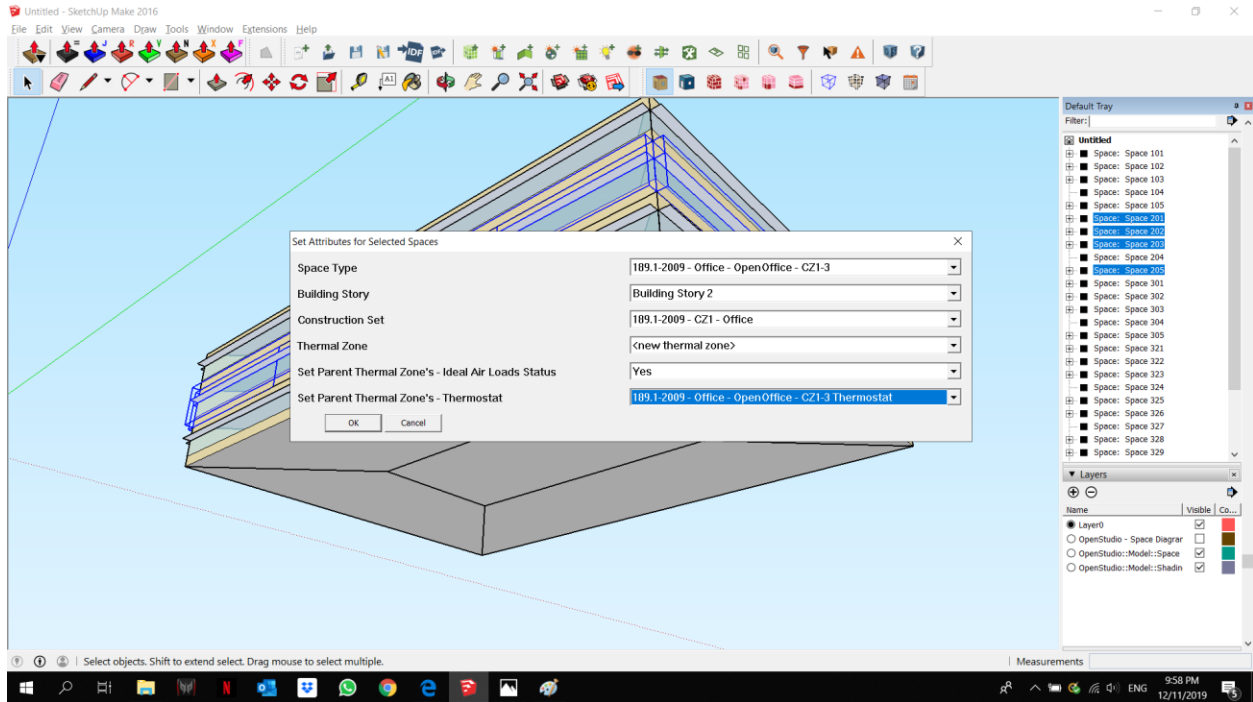
a. First Floor:



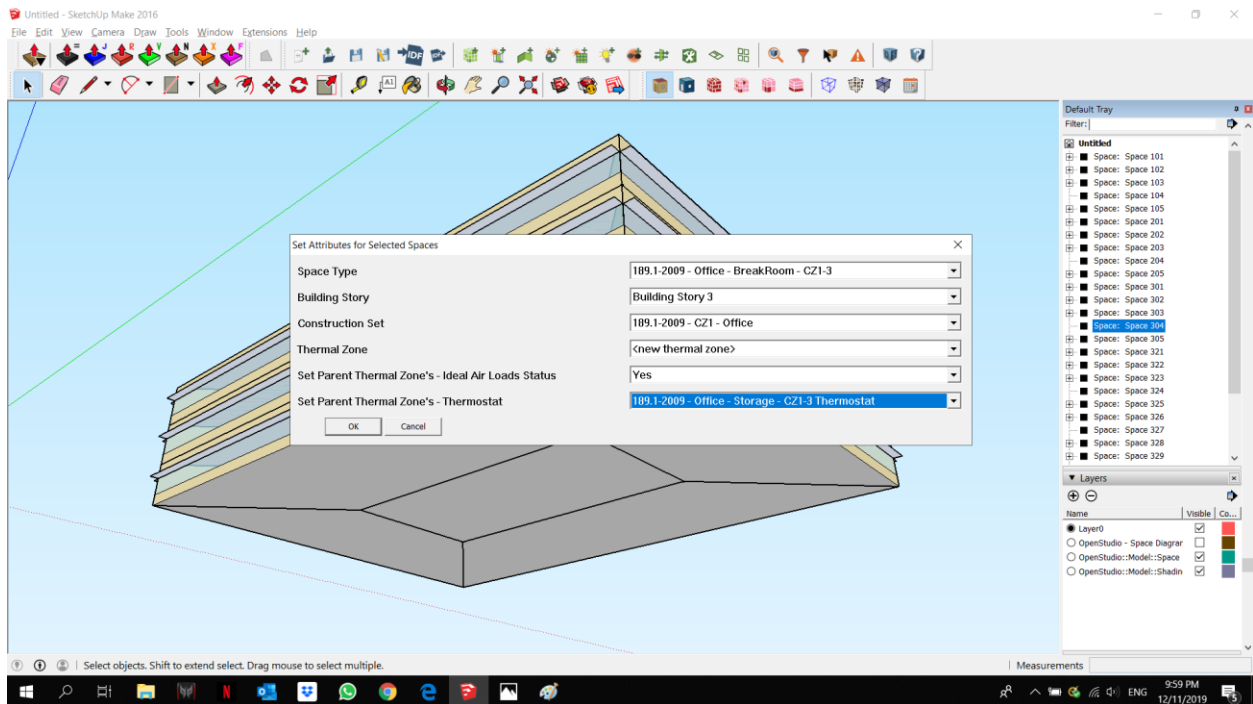


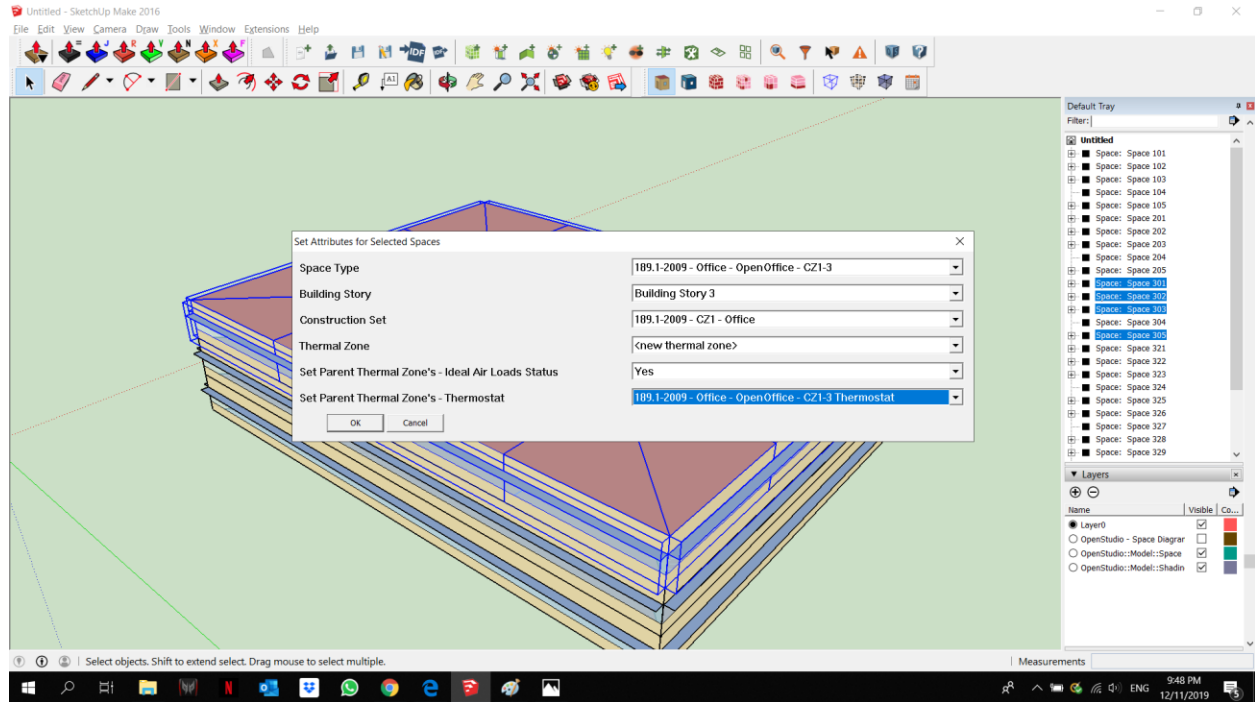
b. Second Floor



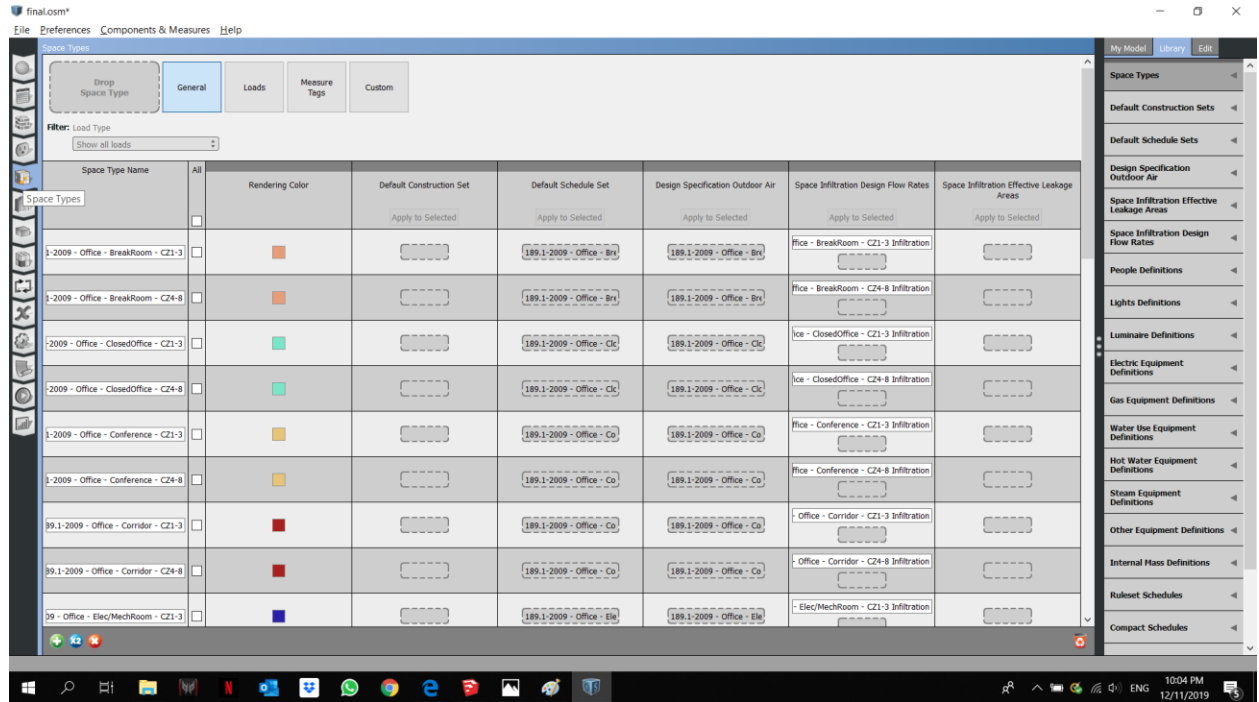


c. Third Floor

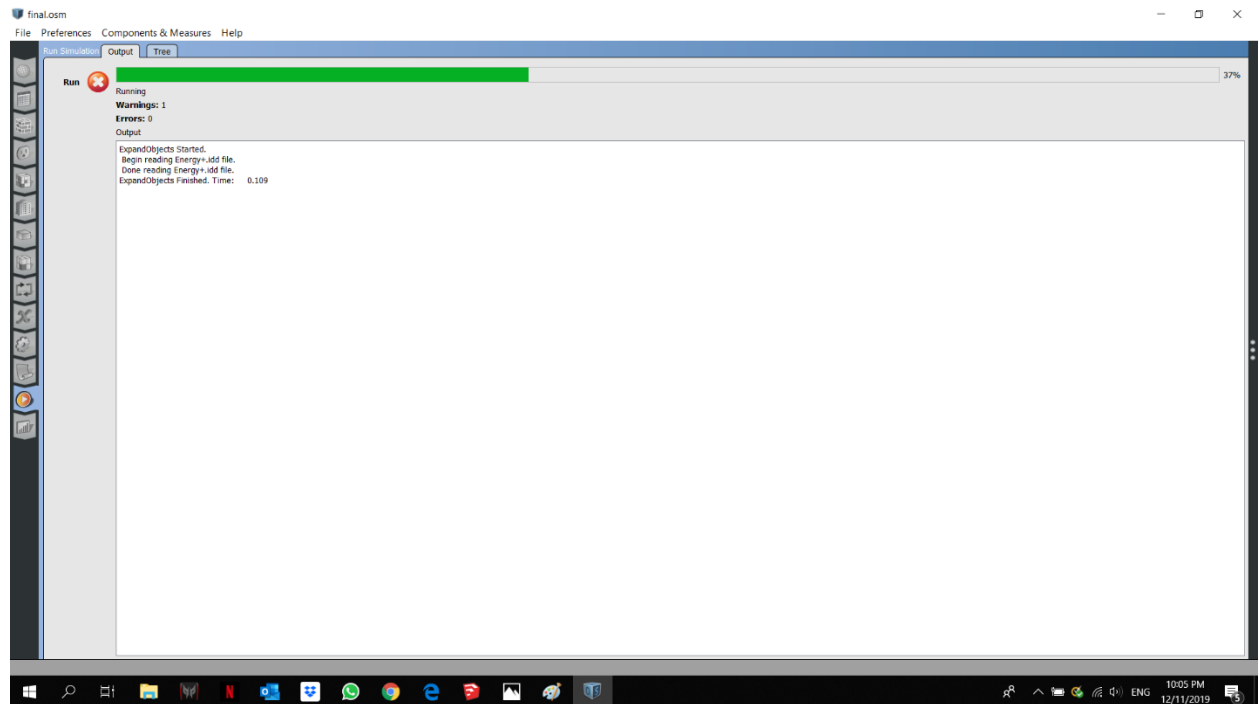




8. To save the file, remember that you should click "Save OpenStudio Model As" the write the file name and save it.
9. Open the OpenStudio File> Import the Weather file of Piacenza. You can Check the Space Type to see each floor's attributes.



10. Run Simulation



11. You can check the Result Summary afterwards.

- Open Studio

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File Preferences Components & Measures Help

Results Summary

Reports: OpenStudio Results

Open Results/Viewer for Detailed Reports

OpenStudio Results

Model Summary

Building Summary

| Information | Value | Units |
|--|------------|----------------------|
| Building Name | Building 1 | building_name |
| Net Site Energy | 2,244,763 | kBtu |
| Total Building Area | 38,750 | ft ² |
| EUI (Based on Net Site Energy and Total Building Area) | 57.93 | kBtu/ft ² |
| OpenStudio Standards Building Type | | |

Weather Summary

| | Value |
|---------------------|--------------------------------|
| Weather File | Piacenza - ITA IGDG WMO#160840 |
| Latitude | 44.92 |
| Longitude | 9.73 |
| Elevation | 440 (ft) |
| Time Zone | 1.00 |
| North Axis Angle | 0.00 |
| ASHRAE Climate Zone | |

Model Summary

- Annual Overview
- Monthly Overview
- Utility Bills/Rates
- Envelope
- Space Type Breakdown
- Space Type Summary
- Interior Lighting Summary
- Plug Loads Summary
- Exterior Lighting
- Water Use Equipment
- HVAC Load Profiles
- Zone Conditions
- Zone Overview
- Zone Equipment Detail
- Air Loops Detail
- Plant Loops Detail
- Outdoor Air
- Cash Flow
- Site and Source Summary
- Schedule Overview

b. Energy Plus

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File Preferences Components & Measures Help

Results Summary

Reports: EnergyPlus Results

Open Results/Viewer for Detailed Reports

Program Version: EnergyPlus, Version 8.5.0-c87e61b44b, YMD=2019.11.12 22:05

Tabular Output Report in Format: HTML

Building: Building 1

Environment: RUN PERIOD 1 ** Piacenza - ITA IGDG WMO#160840

Simulation Timestamp: 2019-11-12 22:05:19

Report: Annual Building Utility Performance Summary

For: Entire Facility

Timestamp: 2019-11-12 22:05:19

Values gathered over 8760.00 hours

Site and Source Energy

| | Total Energy [GJ] | Energy Per Total Building Area [MJ/m ²] | Energy Per Conditioned Building Area [MJ/m ²] |
|---------------------|-------------------|---|---|
| Total Site Energy | 2368.35 | 657.88 | 657.88 |
| Net Site Energy | 2368.35 | 657.88 | 657.88 |
| Total Source Energy | 6106.49 | 1696.25 | 1696.25 |
| Net Source Energy | 6106.49 | 1696.25 | 1696.25 |

Site to Source Energy Conversion Factors

| | Site to Source Conversion Factor |
|------------------|----------------------------------|
| Electricity | 3.167 |
| Natural Gas | 1.084 |
| District Cooling | 1.056 |
| District Heating | 3.613 |