

Assignment 6. FTorresPérez

miércoles, 13 de noviembre de 2019 07:11 a. m.

1) Previous results:

$$\dot{Q} = 805,6331 \frac{w}{m^2}$$

Calculate number of shields for $\dot{Q}(Nshields) = 1\% \dot{Q}(no\ shields)$

After the formula: $\dot{Q}(Nshields) = \frac{1}{(N+1)} * \dot{Q}(no\ shields)$

$$<=> 0,01 * (805,6331) = \frac{1}{(N+1)} * 805,6331$$

$$<=> 8,056331 = \frac{805,6331}{(N+1)}$$

$$<=> 8,056331 * (N+1) = 805,6331$$

$$<=> 8,056331N + 8,056331 = 805,6331$$

$$<=> 8,056331N = 805,6331 - 8,056331$$

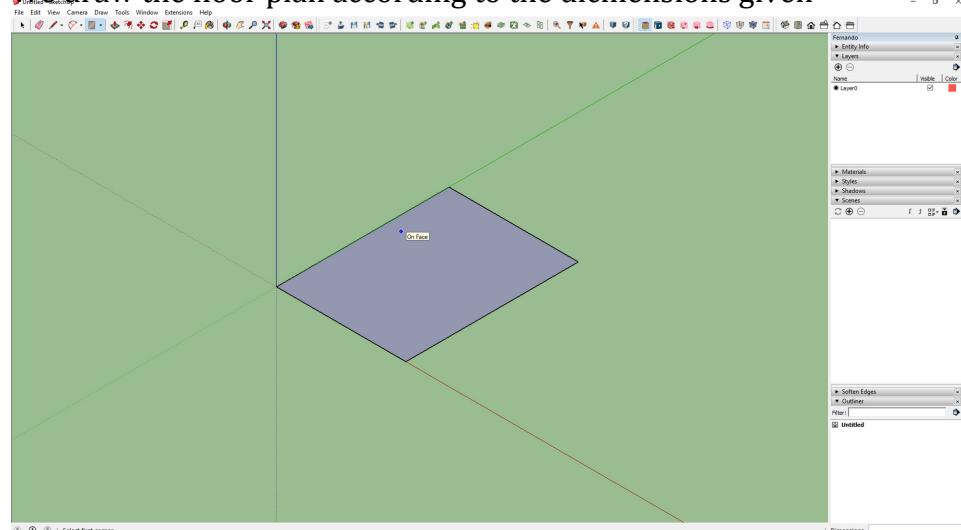
$$<=> 8,056331N = 797,5767$$

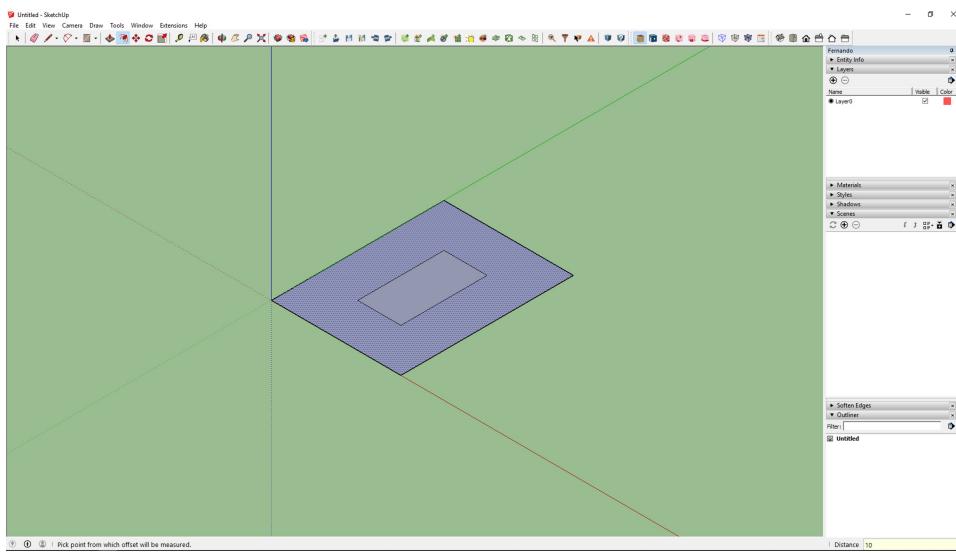
$$<=> N = 797,5767 / 8,056331$$

$$<=> N = 99 \text{ Shields}$$

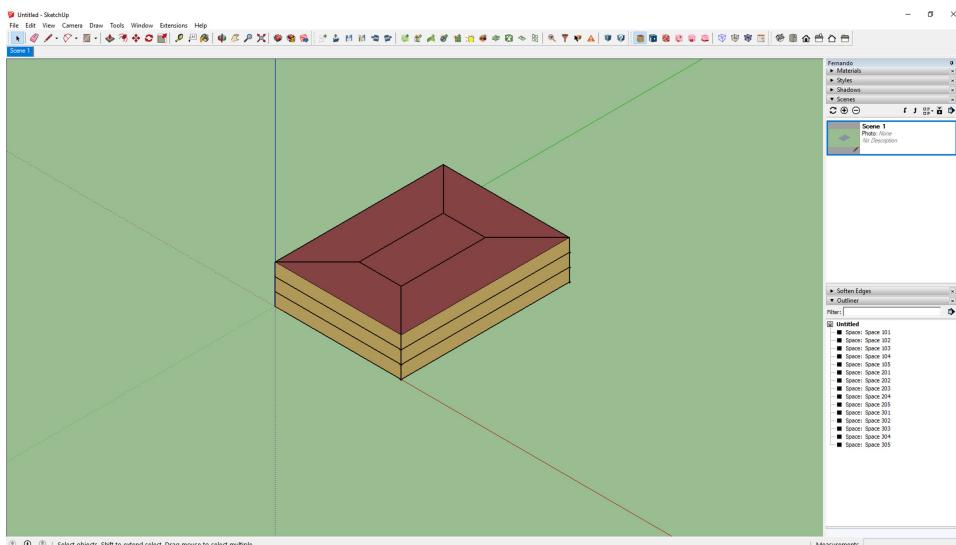
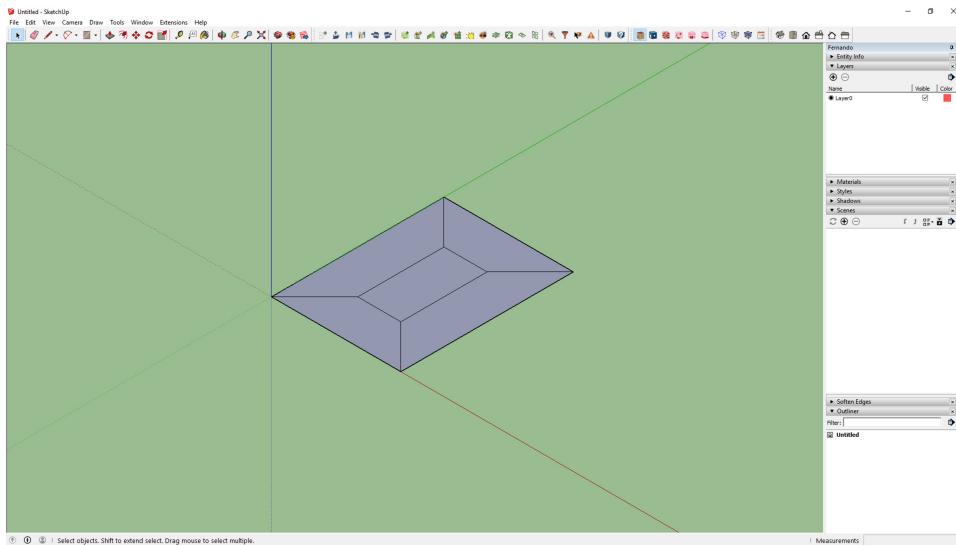
1) Open Studio:

We draw the floor plan according to the dimensions given



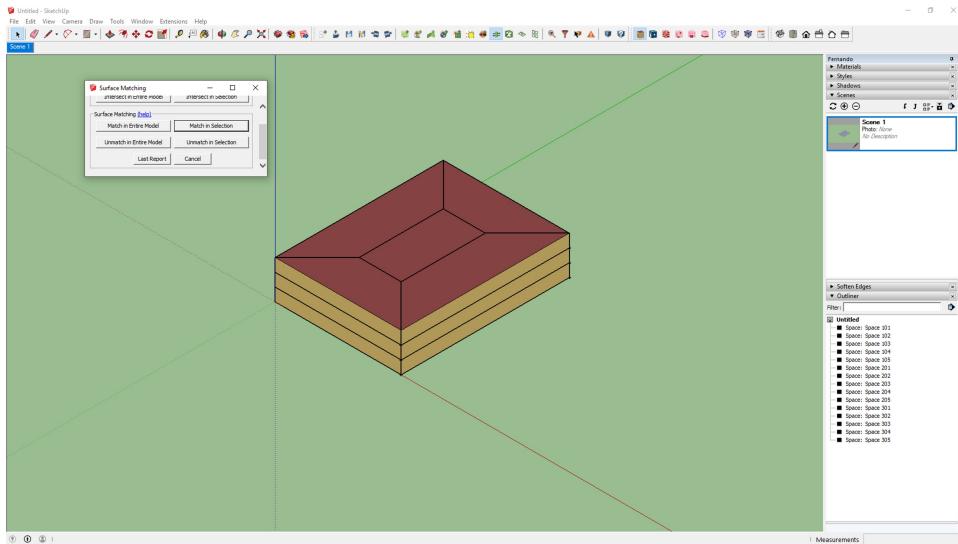


Once the floor plan is done we create the building from diagram, defining the number of floors and the individual height of each of them

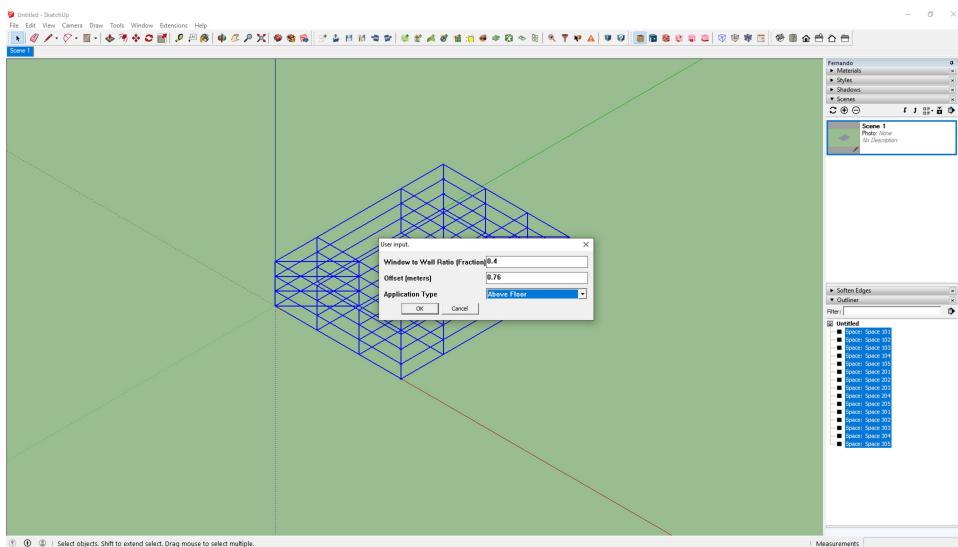


With the building designed we have to match surfaces in entire model, in order to avoid having windows in the inside walls of the

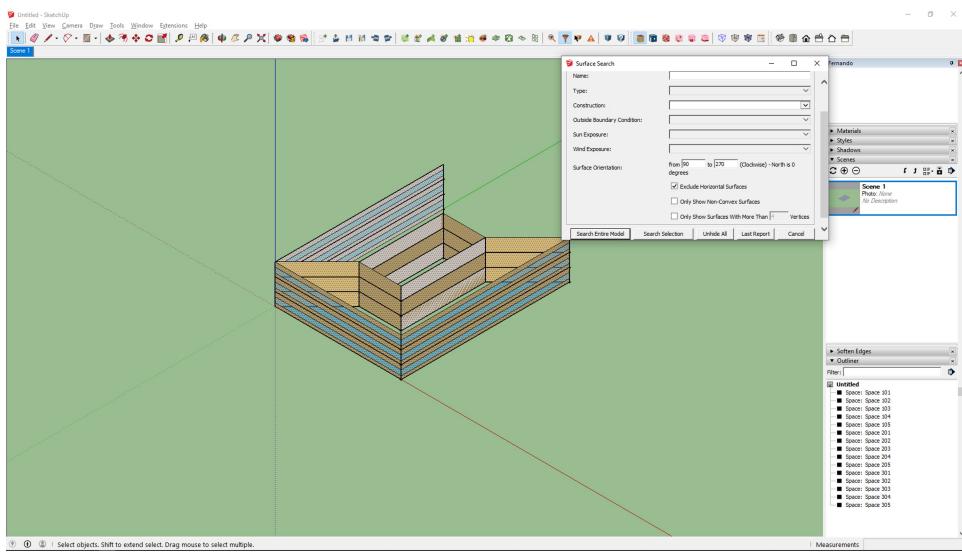
model, in order to avoid having windows in the inside walls of the building



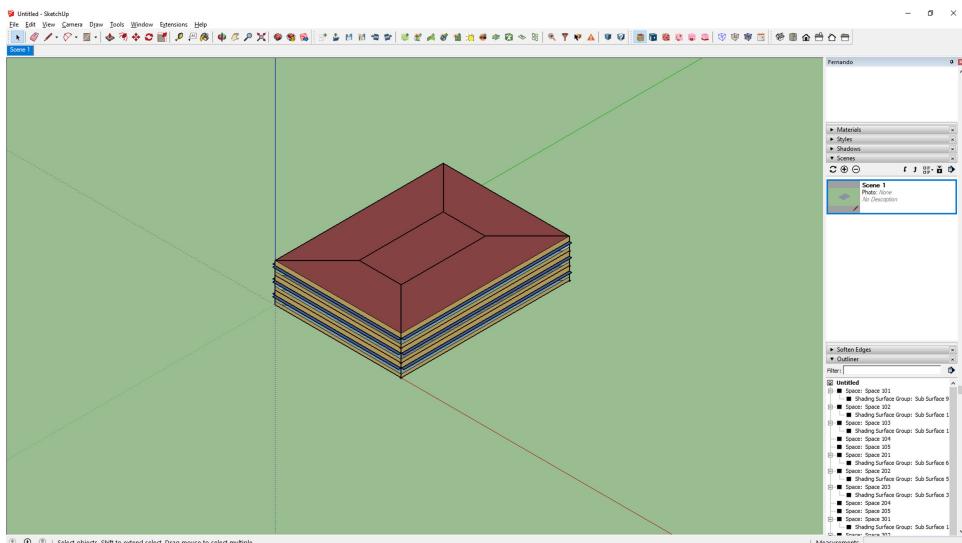
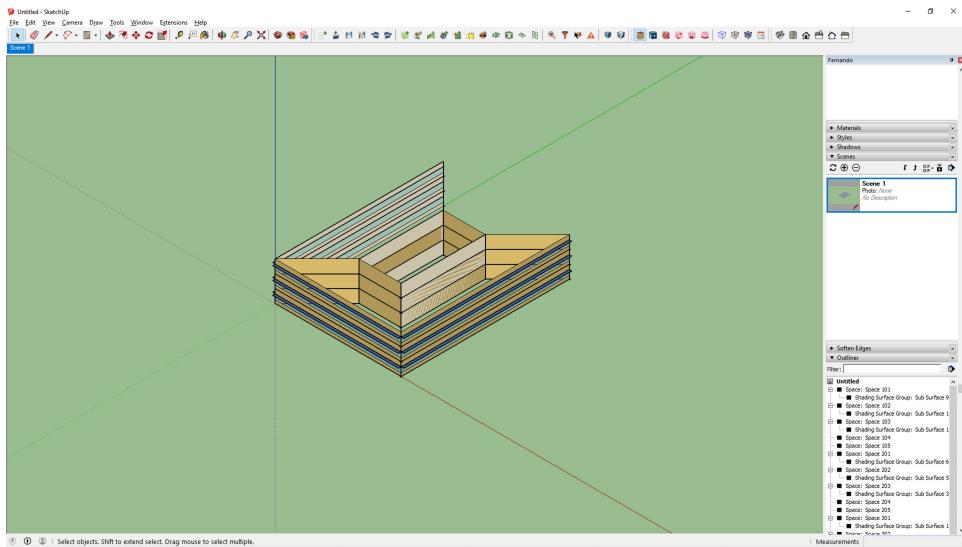
We add the windows through the open studio app, defining the height and window to wall ratio



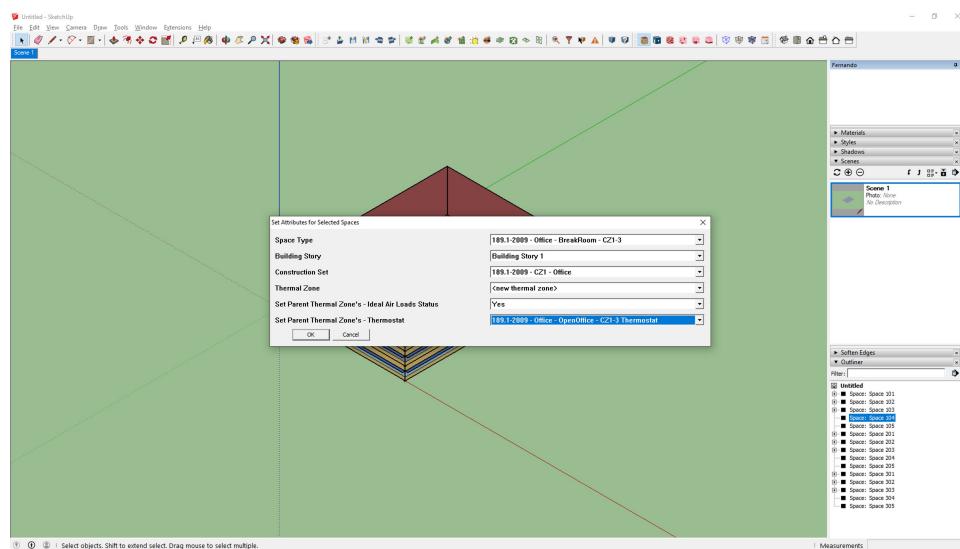
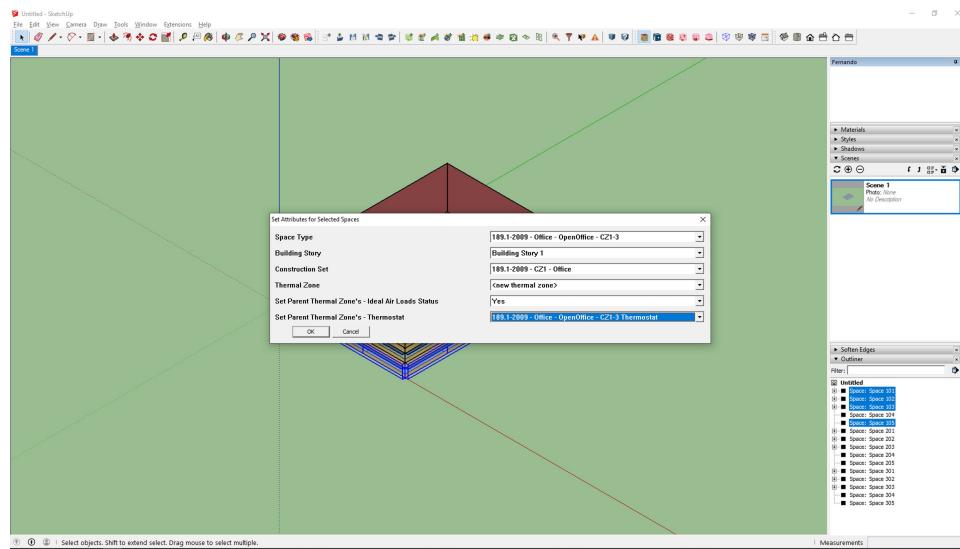
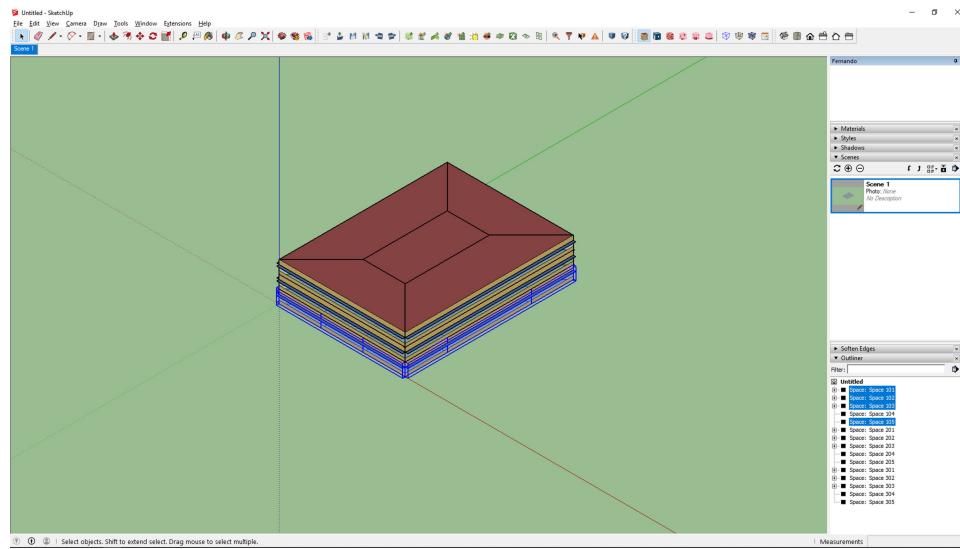
We filter the facades of the building, because we only need the sun shades in the east, south and west facades

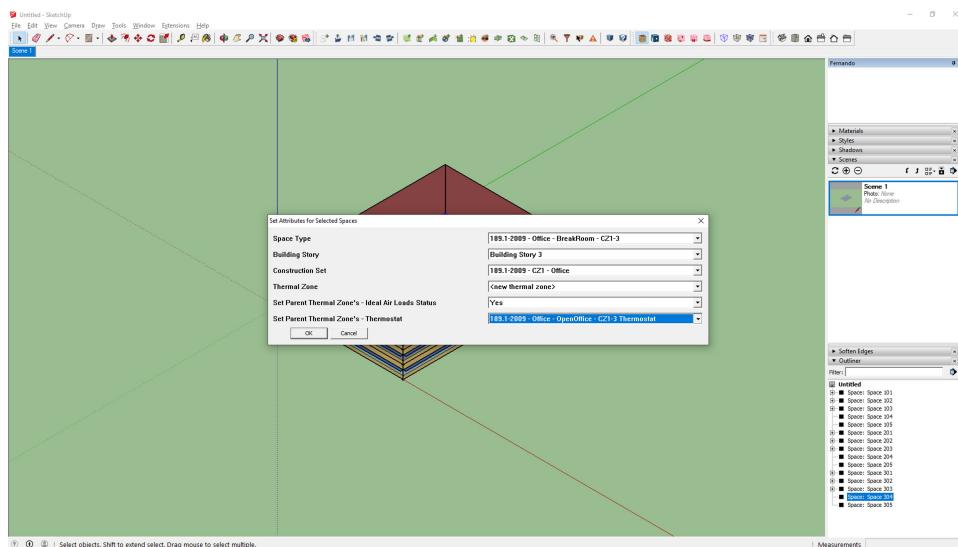
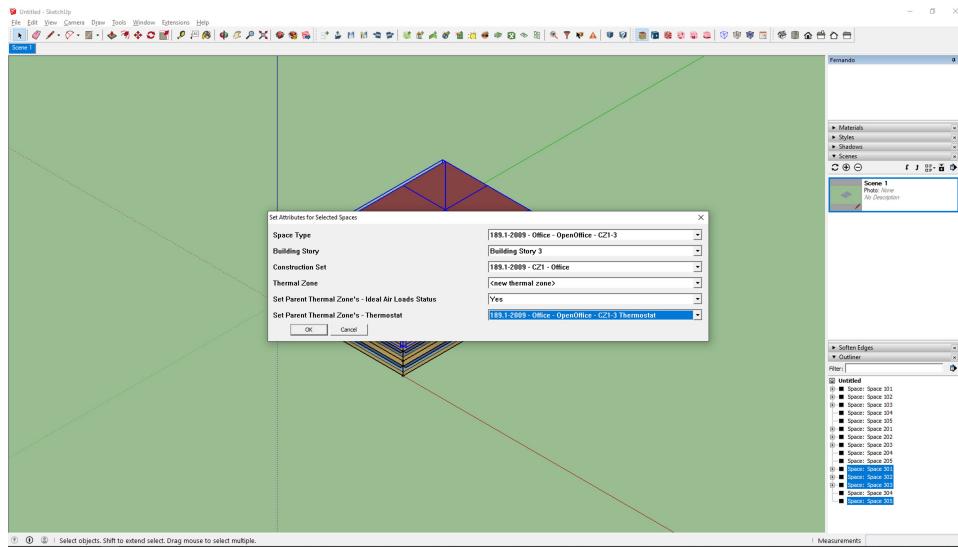
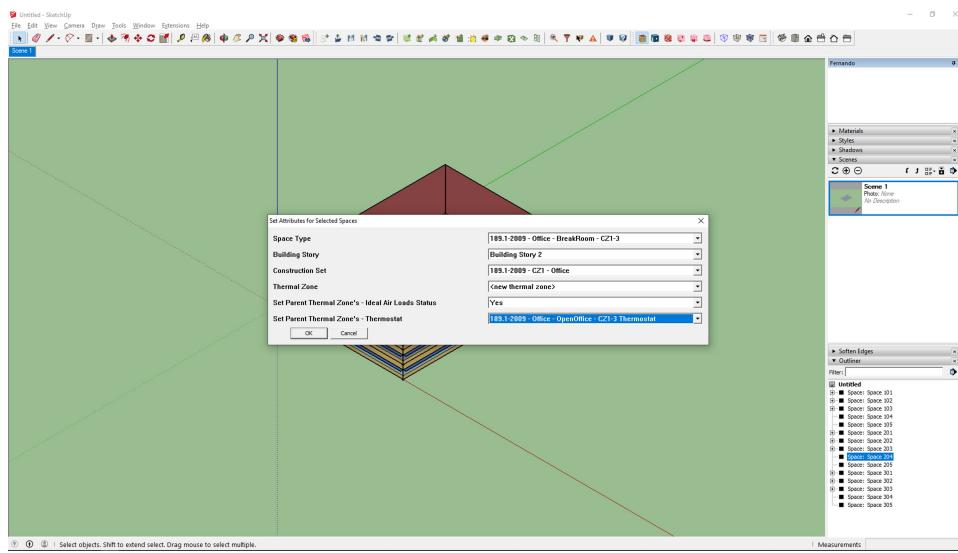


We add the sun shades and then we delete the facade filter, in order to see all the building again

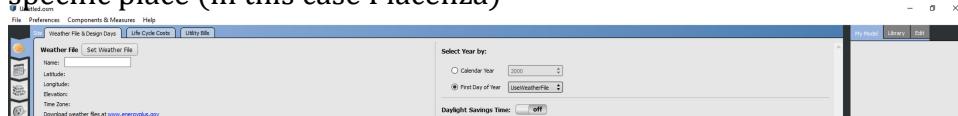


We start to add the attributes to each of the building areas, defining it's type, thermostat, thermal zone and floor.





Once we finished we save the model and launch the open studio application, were we have to load the weather and location data of the specific place (in this case Piacenza)



The image consists of three vertically stacked screenshots of the OpenStudio software interface. The top screenshot shows the 'Weather File' dialog box, where a user has selected 'UserDefinedFile' for the weather file type. The middle screenshot shows the 'Design Days' dialog box, where a user has selected 'UserDefinedFile' for the design day type. The bottom screenshot shows the 'DDY File' dialog box, where a user has selected 'UserDefinedFile' for the design day type. All three dialogs show various configuration options for defining the weather file, design days, and daylight saving time.

We verify that the surfaces of the building are loaded, and we run the simulation

Space Properties								
	Properties	Loads	Surfaces	Subsurfaces	Interior Partitions	Shading		
File	General	Airflow	Custom					
	Filters:	Story	Thermal Zone	Space Type	All	All	All	
	Space Name	All	Story	Thermal Zone	Space Type	Default Construction Set	Default Schedule Set	Part of Total Floor Area
			Apply to Selected	Apply to Selected	Apply to Selected	Apply to Selected	Apply to Selected	
Space 201	<input type="checkbox"/>	Building Story 1	Thermal Zone 1	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 202	<input type="checkbox"/>	Building Story 1	Thermal Zone 1	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 203	<input type="checkbox"/>	Building Story 1	Thermal Zone 1	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 204	<input type="checkbox"/>	Building Story 1	Thermal Zone 2	181-1-2009 -Office -Breakd	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 205	<input type="checkbox"/>	Building Story 1	Thermal Zone 3	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 201	<input type="checkbox"/>	Building Story 2	Thermal Zone 2	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 202	<input type="checkbox"/>	Building Story 2	Thermal Zone 3	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 203	<input type="checkbox"/>	Building Story 2	Thermal Zone 3	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 204	<input type="checkbox"/>	Building Story 2	Thermal Zone 4	181-1-2009 -Office -Breakd	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 205	<input type="checkbox"/>	Building Story 2	Thermal Zone 3	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 301	<input type="checkbox"/>	Building Story 3	Thermal Zone 3	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 302	<input type="checkbox"/>	Building Story 3	Thermal Zone 3	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 303	<input type="checkbox"/>	Building Story 3	Thermal Zone 3	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 304	<input type="checkbox"/>	Building Story 3	Thermal Zone 6	181-1-2009 -Office -Breakd	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space 305	<input type="checkbox"/>	Building Story 3	Thermal Zone 3	181-1-2009 -Office -OpenO	181-1-2009 -C1 -Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A screenshot of the SAP BusinessObjects Data Services interface. The window title is "Untitled4.rmd". The top menu bar includes "File", "References", "Components & Measures", and "Help". Below the menu is a toolbar with icons for "Run Simulation", "Output", and "Tree". The main workspace is currently empty. On the left side, there is a vertical toolbar containing various icons for navigating and managing data objects.

Once the simulation is finished we check the final results.

OpenStudio Results

Model Summary

Building Summary

Information	Value	Units
Building Name	Building 1	building_name
Net Site Energy	2,248,905	kBtu
Total Building Area	38,750	ft ²
EUI (Based on Net Site Energy and Total Building Area)	58.04	kBtu/ft ²
OpenStudio Standards Building Type		

Weather Summary

Weather File	Value
Piacenza - ITA IDG VMCH=160840	
Latitude	44.92
Longitude	9.73
Elevation	440 (ft)
Time Zone	1.00
North Axis Angle	-0.00
ASHRAE Climate Zone	

Sizing Period Design Days

Maximum Dry Bulb (F) Daily Temperature Range (R) Humidity Value Humidity Type Wind Speed (mph) Wind Direction

Annual Overview

End Use - view table

Energy Use - view table

EUI : Electricity - view table