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TASK 1

CONSIDERING THE SAME EXAMPLE YOU SOLVED IN THE PREVIOUS ASSIGNMENT (RADIATIVE HEAT TRANSFER BETWEEN TWO PARALLEL PLATES), HOW MANY SHIELDS WITH EPSILON = 0.1 SHOULD YOU ADD IN ORDER TO HAVE THE NEW HEAT TRANSFER RATE TO BE 1% OF THE CASE WITHOUT SHIELDS ?

PREVIOUS SUM

$\sigma = 5.67 \; X \; 10^{-8}$

NET HEAT TRANSFER WITHOUT SHIELDS

$$Q/A = \frac{\sigma(T1*4 - T2*4)}{\frac{1}{\varepsilon1} + \frac{1}{\varepsilon2} - 1}$$

$$\frac{Q}{A} = 6.67 X 10 *-8 \frac{(800*4 - 500*4)}{\frac{1}{0.2} + \frac{1}{0.7} - 1}$$

$$\frac{3625.4W}{M*2}$$

CASE 2

WHEN $\varepsilon = 0.1$

$\sigma(T_1^4 - T_2^4) / (1/\varepsilon_1 + 1/\varepsilon_2 - 1) + n(1/\varepsilon_3 + 1/\varepsilon_3 - 1) = \sigma(T_1^4 - T_2^4) / (1/\varepsilon_1 + 1/\varepsilon_2 - 1)$

$(1/\varepsilon_1 + 1/\varepsilon_2 - 1) + n(1/\varepsilon_3 + 1/\varepsilon_3 - 1) = 100 (1/\varepsilon_1 + 1/\varepsilon_2 - 1)$

$(1/0.2 + 1/0.7 - 1) + n(1/0.1 + 1/0.1 - 1) = 100(1/0.2 + 1/0.7 - 1)$
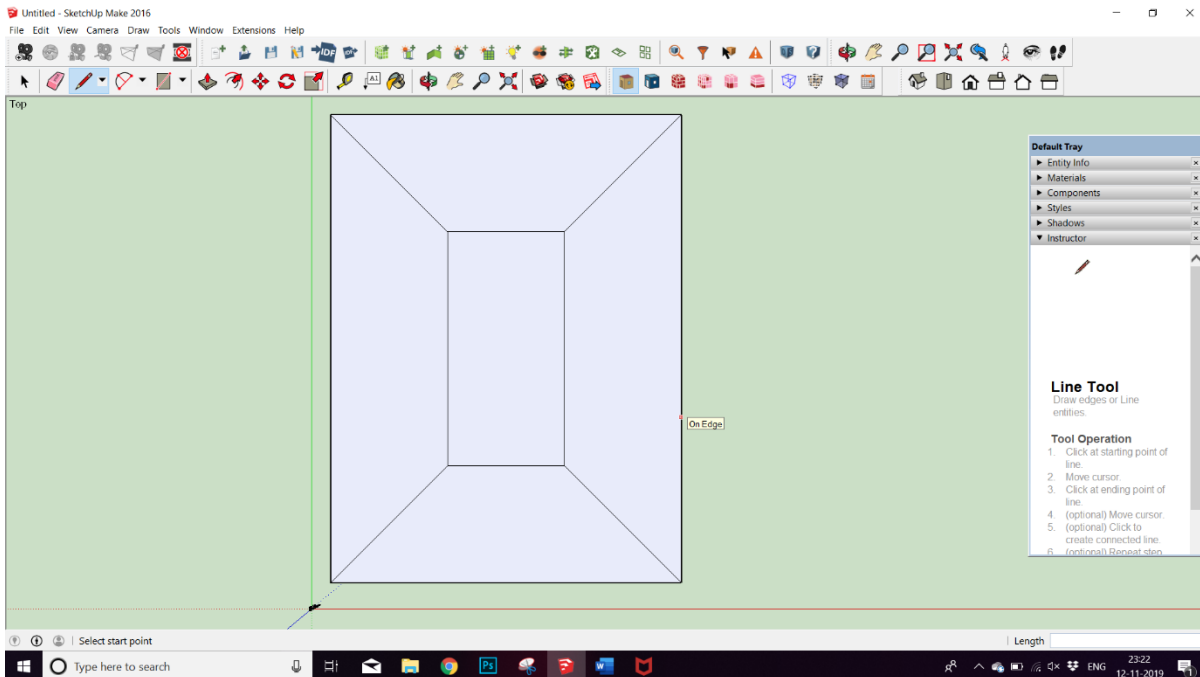
5.43+19n=543

19n = 543-5.43
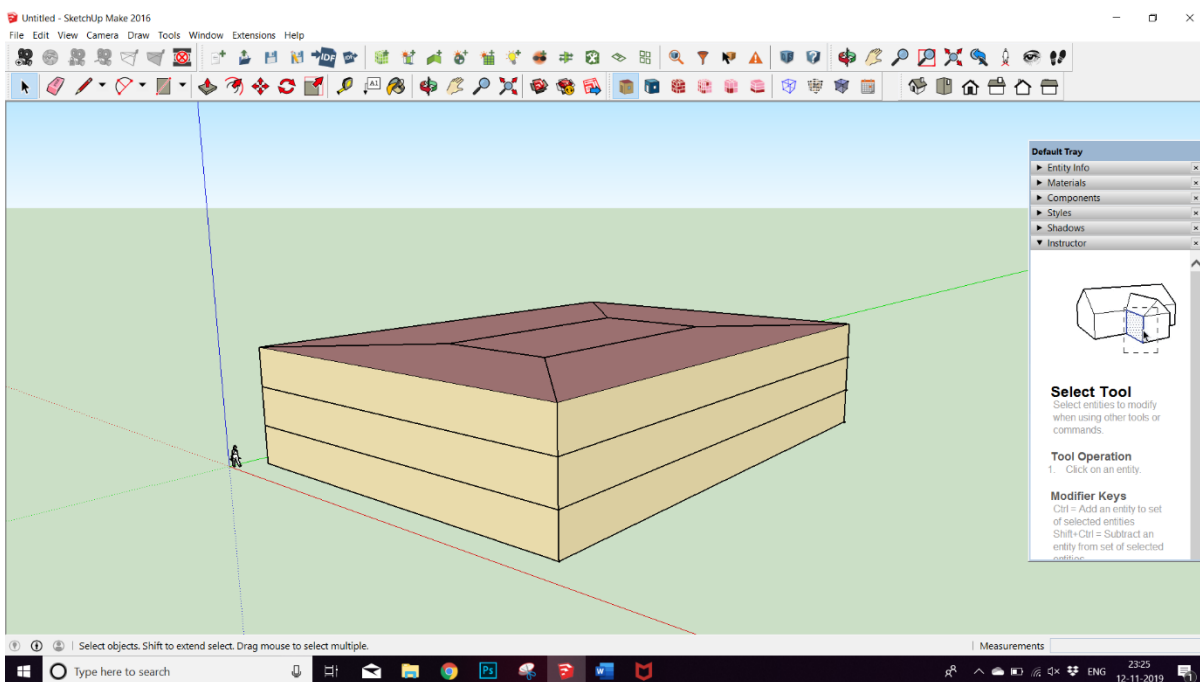
19n = 537.57

N = 537.57/19 = 28.29
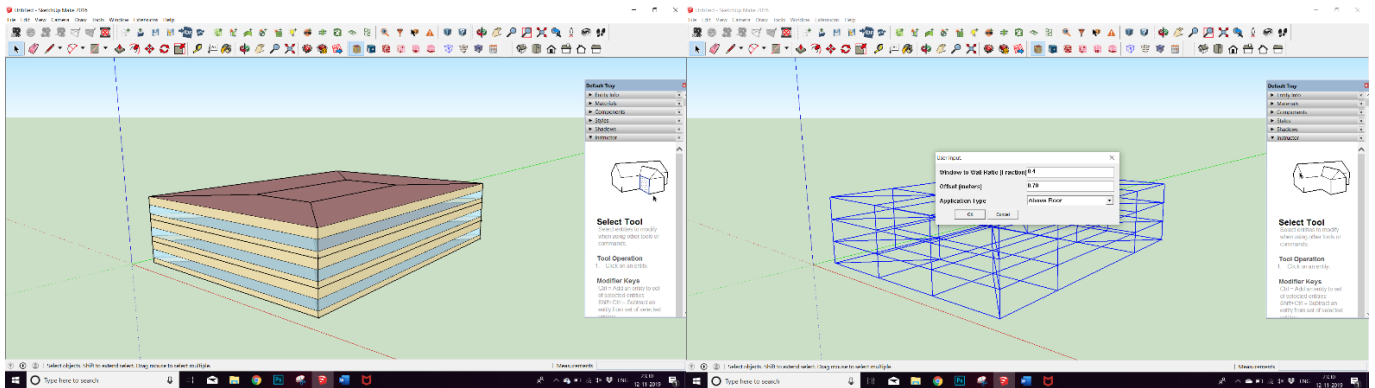
N = 28 shield

TASK 2

OPEN STUDIO- SKETCHUP PROCEDURE

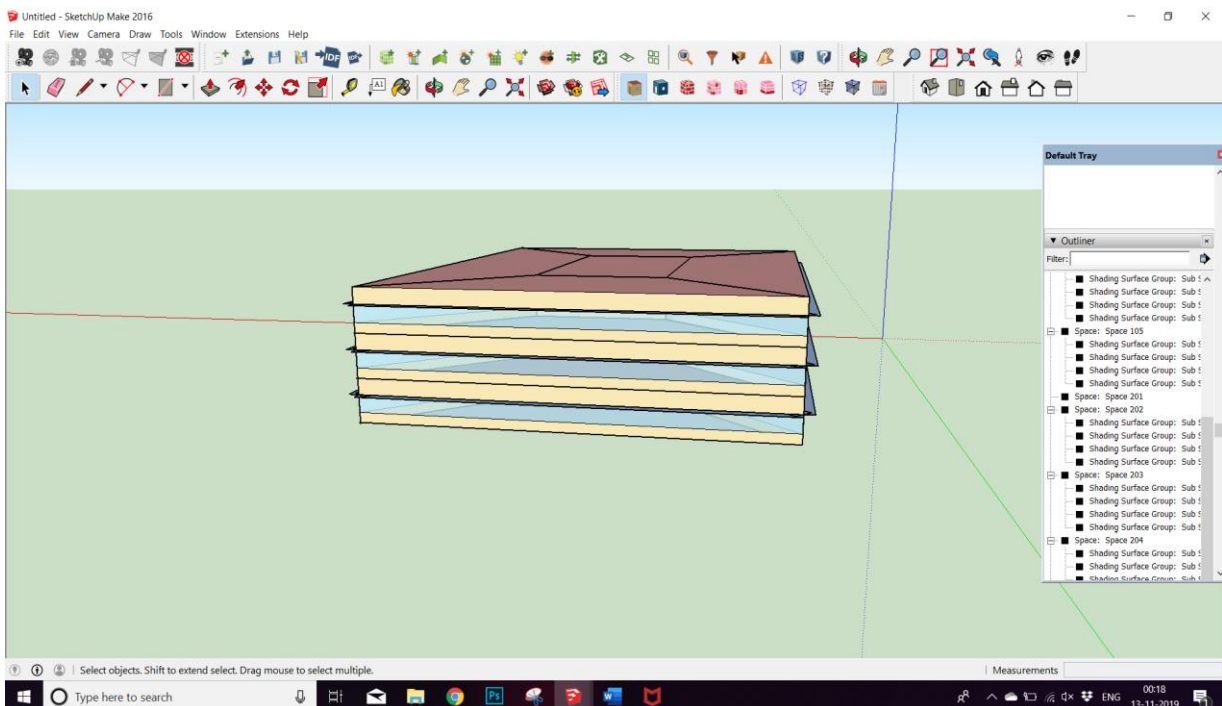1) CREATE A RECTANGLE OF DIMENSIONS 30M X 40M. OFFSET 10M INSIDE THE RECTANGLE AND CONNECT THE EDGES WITH LINES.

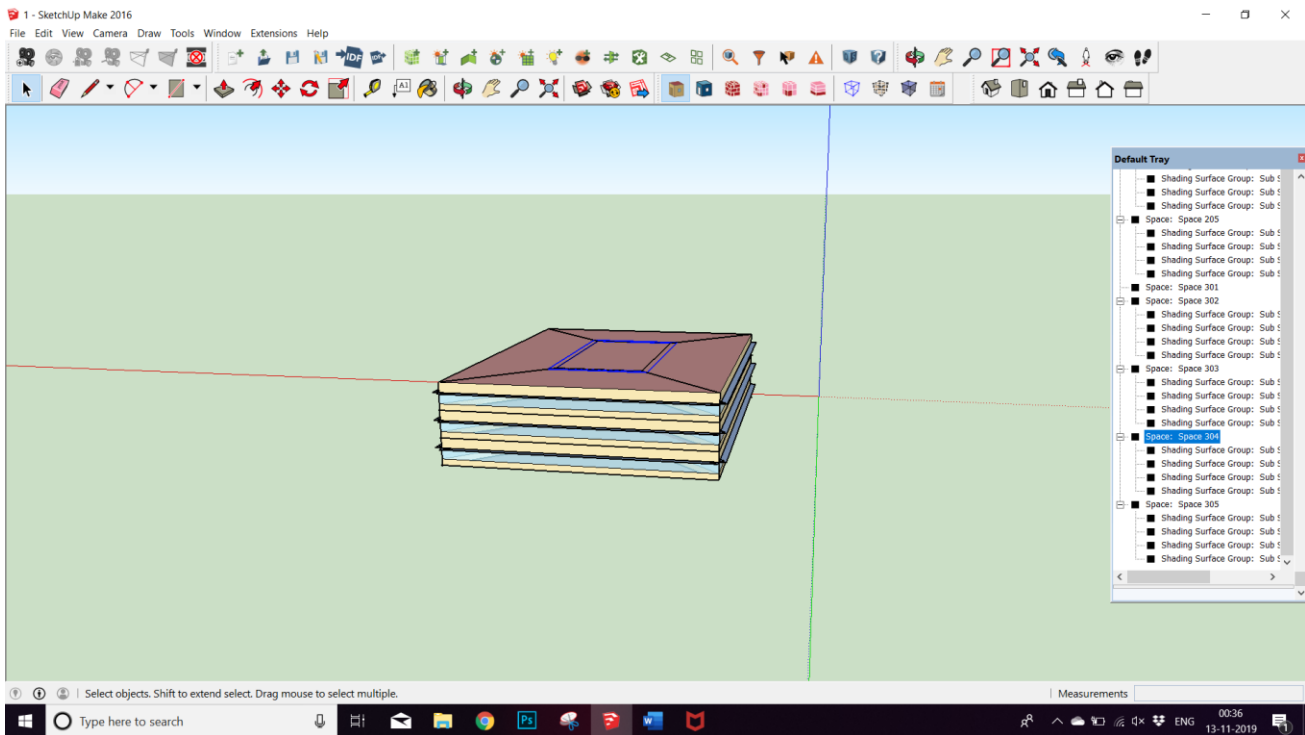2) SELECT THE ENTIRE RECTANGLE AND CLICK ON CREATE SPACES ICON. CHANGE THE NO.OF FLOORS TO 3 AND HEIGHT REMAIN 10'.

3) TO CREATE WINDOWS,
    EXTENSIONS – OPEN STUDIO USER SCRIPTS – ALTER/ADD MODEL ELEMENTS – SET WINDOW WALL   RATIO.
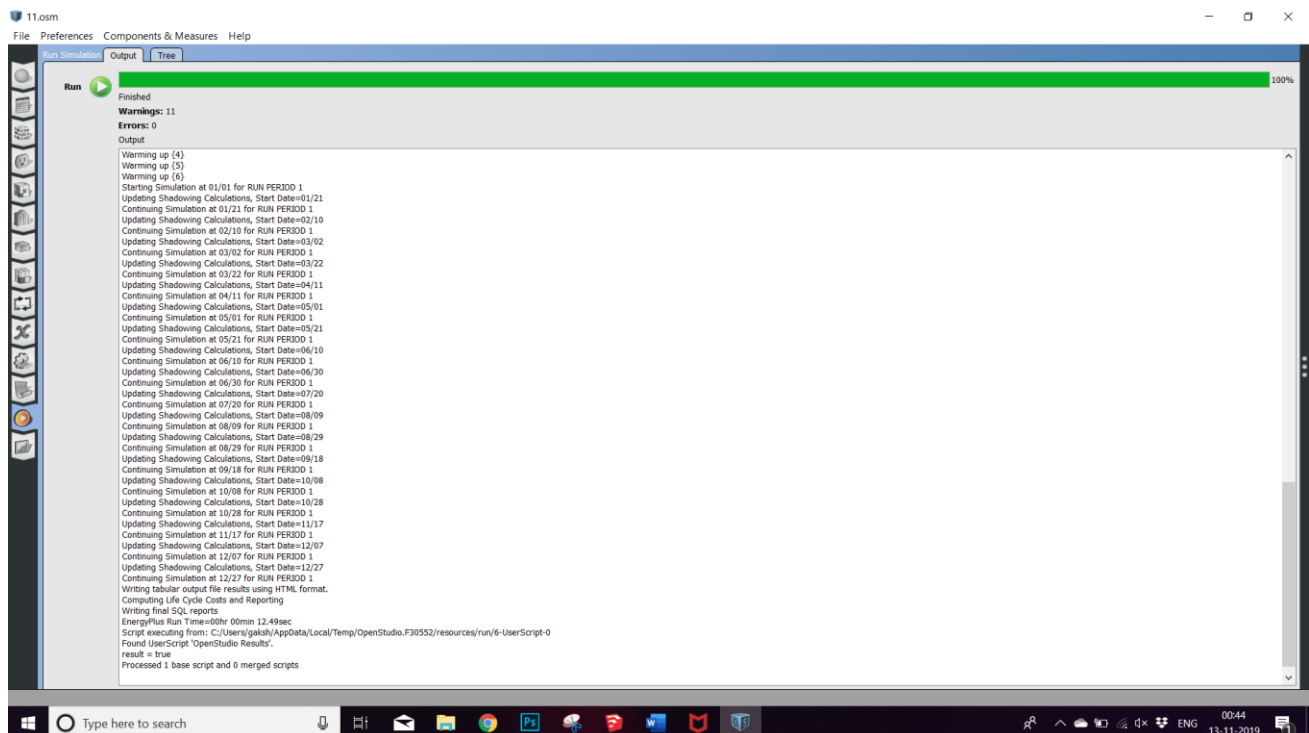   CHANGE OFFSET TO 0.7M.

4) THE NEXT STEP IS TO CREATE SUNSHADE OVER THE WINDOWS. SELECT THE ENTIRE MODEL, UNSELECT THE
    WALL OF THE NORTH SIDE AND CLICK ON SURFACE SEARCH TOOL. CHANGE THE VALUE FROM 0 TO 90 AND
    SEARCH THE MODEL. ONE SIDE WILL NOT APPEAR AND SUNSHADE WILL BE PROVIDED LATERR TO
    RETRIEVE THE ENTIRE MODEL, SELECT THE ENTIRE MODEL AGAIN AND SELECT SURFACE SEARCH , CHANGE
    THE VALUE FROM 90 TO 0 AND SEARCH THE ENTIRE MODEL.

5) IN THE OUTLINER TOOLBOX , TO SET THE THERMAL ZONE, SELECT 101,102,103 AND 105 OF LEVEL 1 AND CLICK ON SELECT ATTRIBUTES FOR SELECTED SPACES. CHANGE THE VALUES ACCORDINGLY.REPEAT THE STEPS WITH OTHER LEVELS. THIS PROCESS IS DONE TO SET THE THERMAL ZONES OF DIFFERENT LEVELS.

6) OPEN OPENSTUIO APP AND ADD THE OPENSTUDIO MODEL AND ALSO ADD THE WEATHER DATA OF PIACENZA AND RUN THE MODEL.

7) THE RESULTS DATA SUMMARY WILL APPEAR ONCE THE MODEL HAS BEEN RUN.