

# CAD Unit 6

## MAIN DESIGN PROJECT

You have spent the last 3 months learning the basics of both manual (pencil) and CAD drafting. It's now time to put all your knowledge to work in order to develop a set of drawings for a residence. You will be given the basic requirements and a list of required drawings. Furthermore, you will be given a list of drawings that you can complete in order to increase your mark.

### Requirements:

- 1) the house will be a two story with optional basement
- 2) must have 3 bedrooms, at least 2 bathrooms, and a 2 car garage
- 3) house must be between 200 sq. m (2000 sq. ft.) and 240 sq. m (2400 sq. ft.) and have a 'footprint' of no more than 150 sq.m. (1500 sq ft.)
- 4) the lot size is 12m (39ft) across the front, 16m (52ft), and 38m (124ft) deep (for lot plan only)

### Step 1) Research Paper 2 classes (20%)

This is a much more difficult house to design than your smaller, one storey house you did earlier in the year. You need to take some time to look at different designs on the web, books in the classroom, or other resources.

- 1) Put a title, your name, and date on top of the 1st page of your paper
- 2) Find images of (or sketch in your report) bathrooms, kitchens, stairways etc that you like and think will work for your house design. Add these to your report and comment on why you like them
- 3) Furthermore, I would like you to find a floor plan that you like, copy it to a document and tell me, in point form, why you like it, why it works.
- 4) Next find a floor plan that is poorly designed (there are many out there) and add it to your document listing why it is poor. It should go without saying that this document will have a title, name, date, and be formatted well.



Documentation needed: ON 8 1/2" x 11" paper

- 1) Title, name, and date at top of 1st page
- 2) Sketches or images of solutions for parts of house
- 3) Copy of poor design with listed deficiencies
- 4) Copy of good design with listed good qualities



### Step 2) Scale Sketch 4-5 classes (30%)

Using your ideas you've gathered in Step 1, do a scaled drawing of your proposed house. You can scale measure the outside walls but hand draw the interior walls.

You will need to draw both floors (2 pages). Make sure you have read again the 'House Rules' sheet in our space.

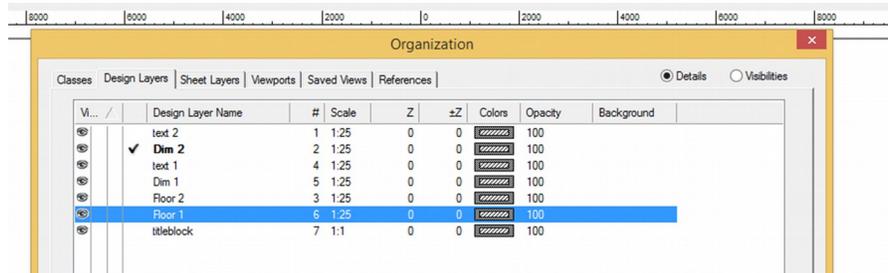


You will need to have his drawing approved before you can start on the computer.

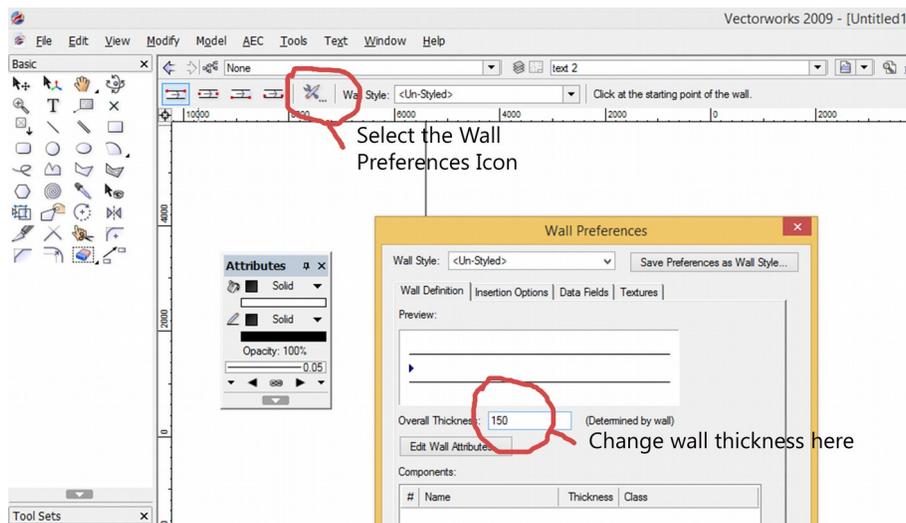
## Step 3: Computer Drawings

### Floor Plans: (30%)

- 1) Open your **BIG PAPER** template. **SAVE AS** *House Floor Plans*.
- 2) Add these layers to your drawing: *Floor 1, Dim 1, Text 1, Floor 2, Dim 2, and, Text 2*. These layers will probably have a scale of 1:25 or maybe 1:50. You should keep your *Title block* layer and delete (or rename your current *Dimension, object, and Text* layers)



- 3) Draw your walls - exterior walls are now 200mm and interior are 150mm. You can change this like this:



- 4) Add ALL fixtures in baths, laundry, and kitchens including cabinets (upper and lower), appliances, faucets, etc. from the various libraries.

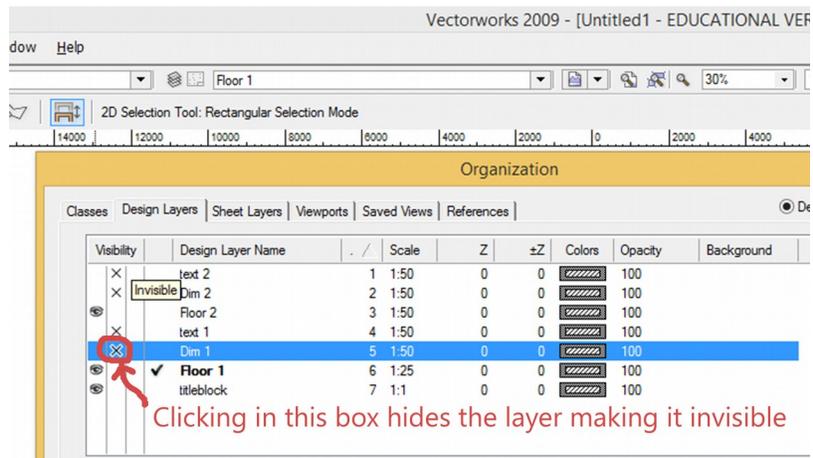
- 5) Dimension (on the DIMENSION layer!) both layers as you did on your paper drawings.

- 6) **SAVE** your drawing

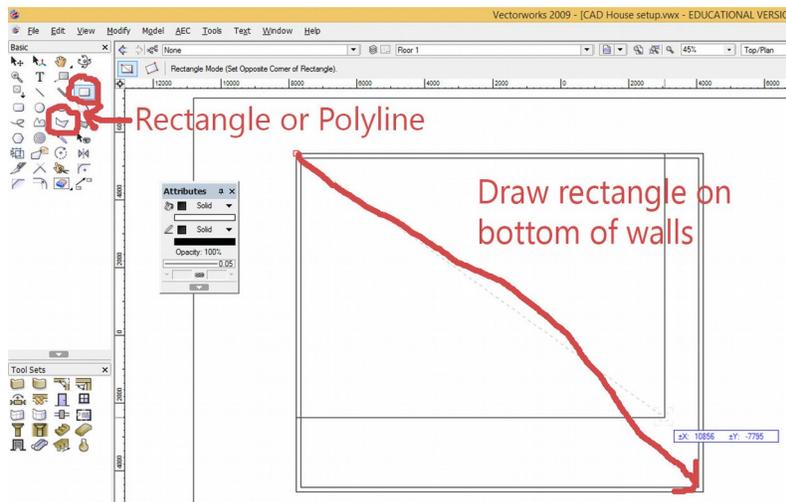
### Elevations: (20%)

- 1) **OPEN** *House Floor Plans* (if not already open) and **SAVE AS** *House Elevations*.

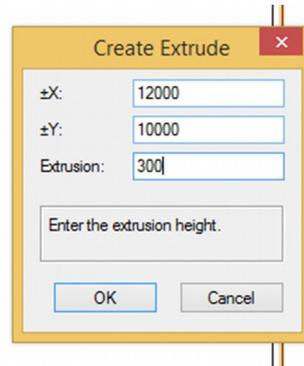
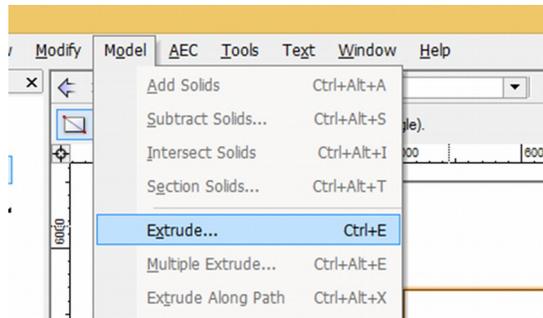
2) Open your Layer window and **HIDE** (Turned off) all your *Dim*, and *Text* layers for both floors.



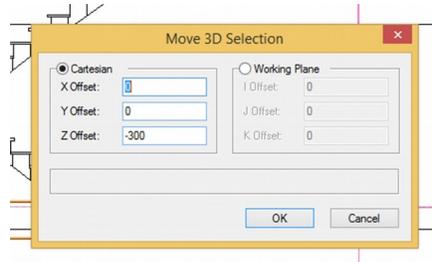
3) Now we need to add floors to the walls we've drawn on our 2 floor layers.  
In Floor 1 layer, View Bottom in Wireframe, and draw using the *2D Rectangle Tool*(or trace your walls with the *Single Polyline Tool*).



Click the **Model** tab and select **Extrude**, in the Extrude pop up window set the *Extrusion* to 300.

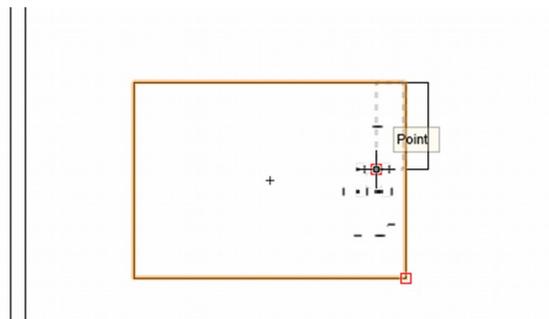


You will need to go to **Front** view to set the floor underneath the walls in stead of inside them. In front view select your *floor extrusion*, select the **Modify** tab, select **Move**, select **Move 3D**, enter **-300** in the **Z Offset** box. Your floor should drop down to the bottom of the walls.

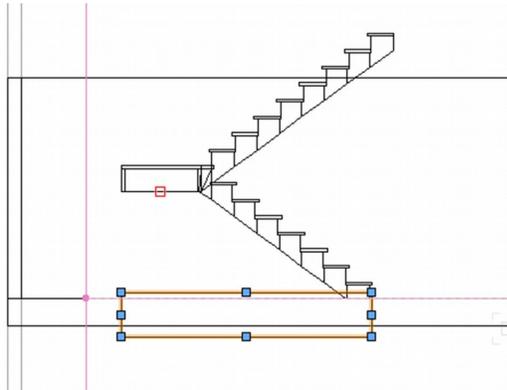


Repeat the same process for **Floor 2**.

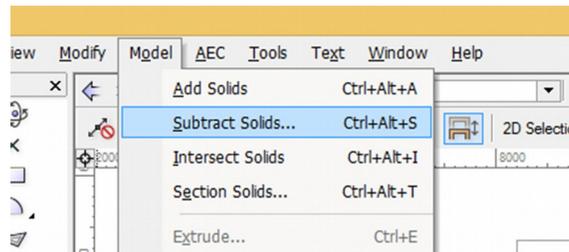
We now need to cut out the hole in the 2<sup>nd</sup> floor for the stairs. In the **Floor 2** layer (Top/plan view) use the 2D Rectangle Tool (or polyline) to trace the outline of your stairs (yes these stairs will be erased later but we need them for now) and Extrude to **500**.



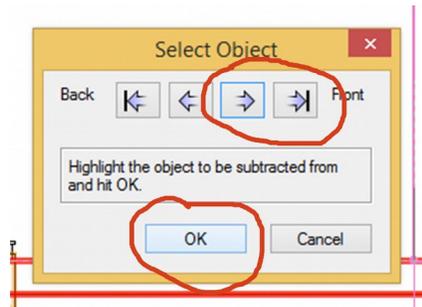
Change to *Front* view and move (Shift + down arrow) the floor extrusion so that it extends past both the top and bottom of the floor extrusion



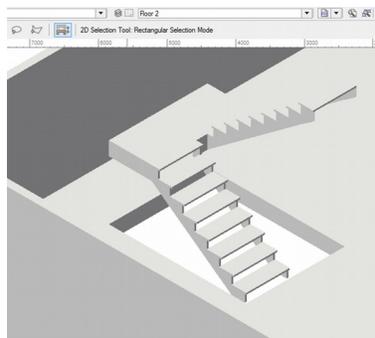
Select both the floor and the stair extrusions. Select the **Model** tab, select **Subtract Solids**



in the pop up window click one of the **right arrows** once. The floor extrusion should turn a darker red. This selects to floor to be subtracted from and it will remain and the smaller extrusion will be cut out of the floor. Click **OK**.



The floor should now have a rectangular hole cut through it that matches the size of the stairs. Check by viewing *Right Isometric* in *Renderworks with Shadows*.

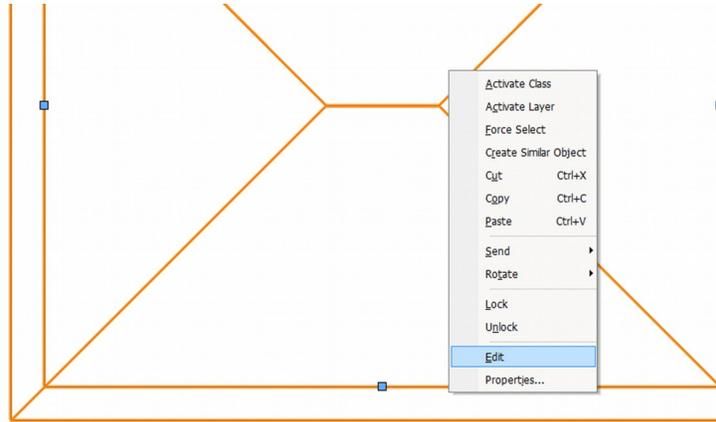


Delete your stairs.

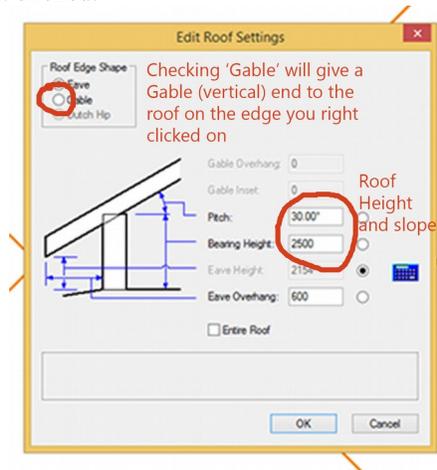
4) Add a roof to Floor 2 Layer. The roof can be edited to have different styles.

If you wanted to wanted gable ends instead of the default hip roof:

From a *Top/plan* view, right click near one of the blue squares and select **Edit**



In the *Roof Settings* pop up window, select *Gable*. This will give a gable end to the roof on the side on which you right clicked.



You should get something like this:

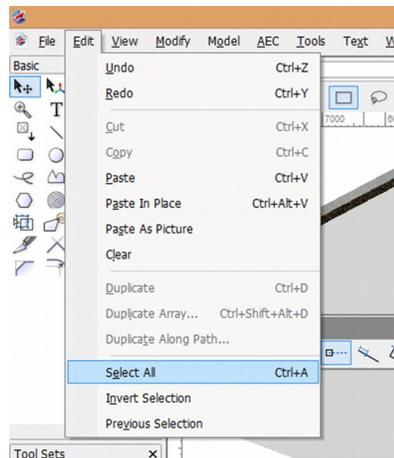


Edit your roof line (especially your garage) to suit.

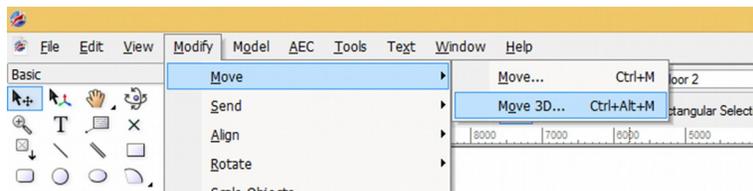
5) We now need to get all our walls, floors, roof, etc on the same layer so we can move everything together.

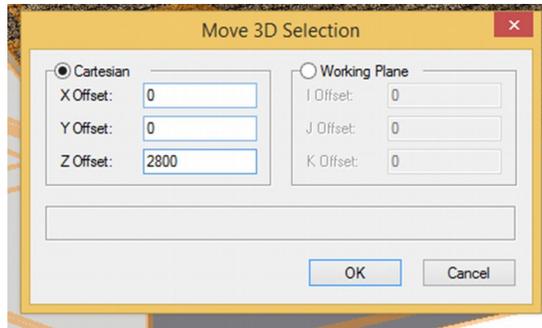
Before you can move everything to the same layer you need to raise the objects on **Floor 2** up so they will sit on top of the **Floor 1** objects.

On your **Floor 2** layer, go to the **Edit** tab at the top and select *Select All*.

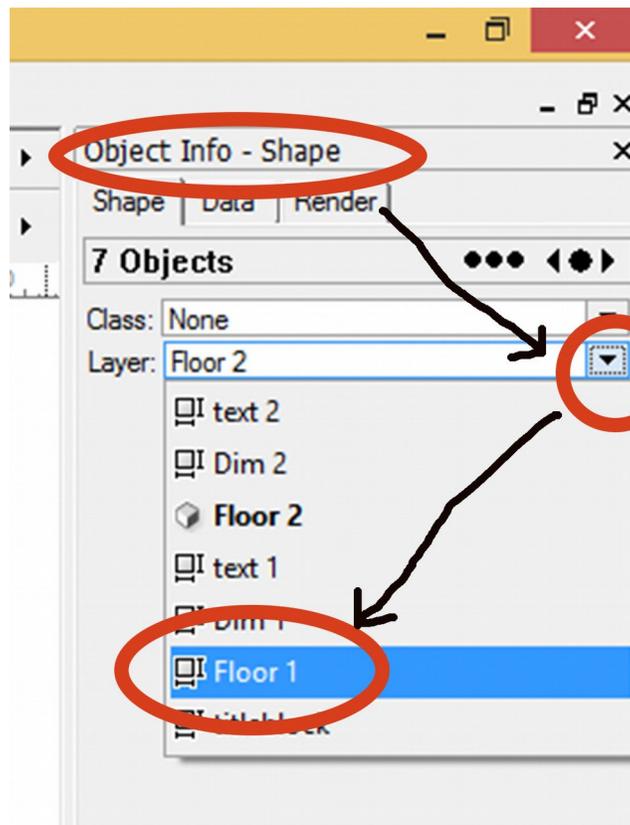


Go to the **Modify** tab, select **Move**, select **Move 3D**, enter **height of your walls (usually 2500) + the thickness of your floor (300) = 2800** in the **Z Offset** box of the *Move 3D Selection* menu.





Next, in the **Object Info** window, click the **Layer** box arrow and change the layer to **Floor 1**



This will move your Floor 2 objects so they will sit on top of Floor 1 objects.

**Important !!! Make sure everything is ready to move as it is very difficult to reverse this step**

Now all your objects are on Floor 1 and everything will move as one

6) On **Layer 1** texture all the objects of your house. It will help your rendering if you go into your house and delete all 3D fixtures like cabinets, sinks, appliances, etc. - your house will render much faster without all these.

7) Add **3D** landscaping to your house such as grass, trees, driveways, decks, porches, cars, etc.

8) **SAVE** your Elevation drawing.

DO NOT PRINT ELEVATIONS!

## **WHAT TO SUBMIT**

- a) Drawings of ideas for specific areas of the house such as kitchen, bath, entrance, etc.
- b) Document with both good and bad house plans with a specific list of what is good and bad about the respective plans.
- c) Paper scale drawing of your house plan with approval initial by me.
- d) Print out each Floor plan – remember to change your title block for each print!
- e) Completed elevation drawing on computer
- f) Download, print, and complete the Self-Evaluation sheet from the unit list.  
Attach this to your package.

### **Optional Additional Drawings:**

- Site Plan:**
  - building must be at least 7m (23ft) from the front of the property
  - must have the same distance on either side and be at least 2m (6ft)
  - should include all fences, trees, shrubs, and gardens
- A Basement:**
  - requires an additional floor plan
  - must be seen on sectional
- Electrical:**
  - should be an additional layer on the floor plan
  - will show placement of switches, plugs, and wiring