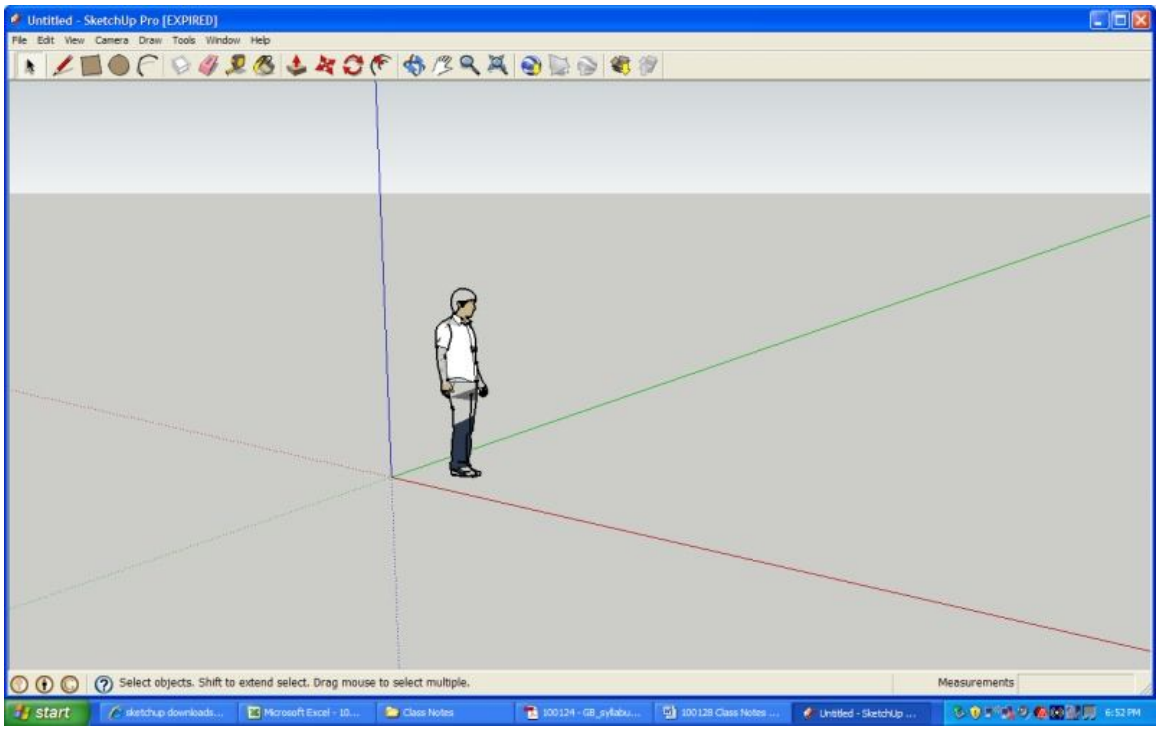
Week 2 – Modeling a basic house shape using Google SketchUp®.

If you don't already have SketchUp® on your computer you can download it for free from the following website: download.cnet.com

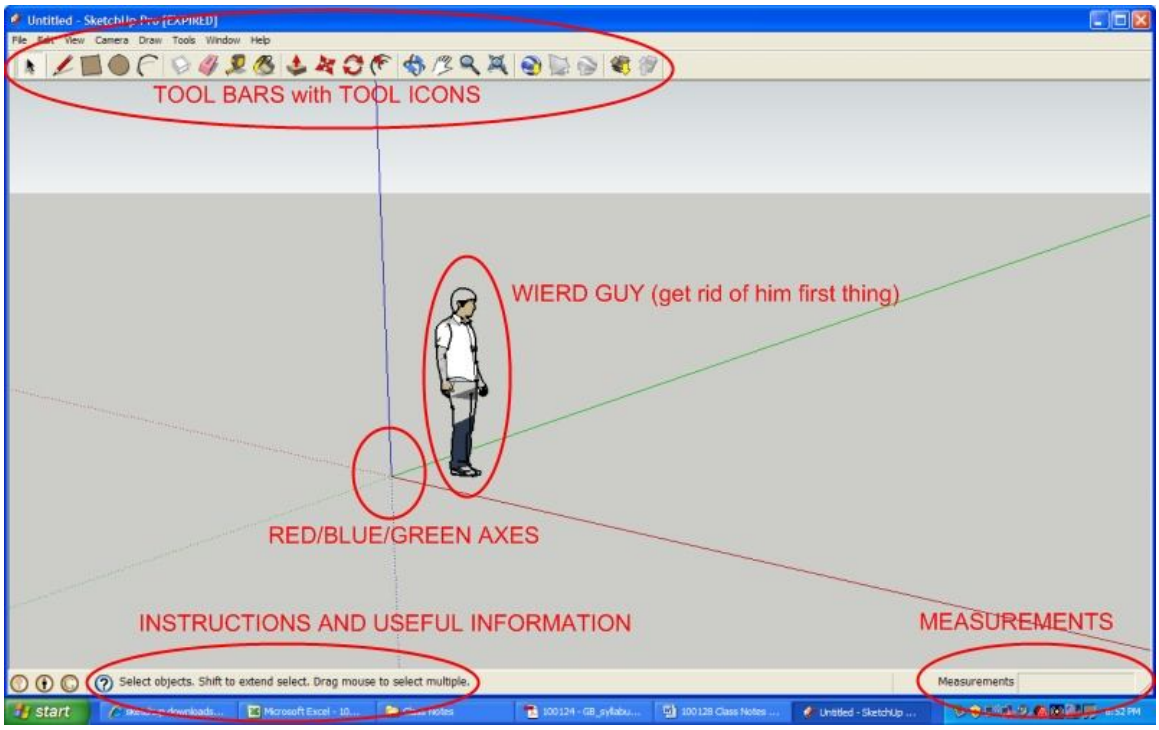
Just type "sketchup" into the search bar at the top of the page. If you have a Mac, click on the "Mac" tab and if you have a PC, click on the "Windows" tab. Then click on the search icon.

Scroll down and you should find a list of available free downloads with "Google SketchUp®" near the top of the list. Simply click on the "Download Now" button and the follow the instructions to download and install the program on your computer and run the program.

The first screen you see will look like this...



Please note the following features that I have marked in red...



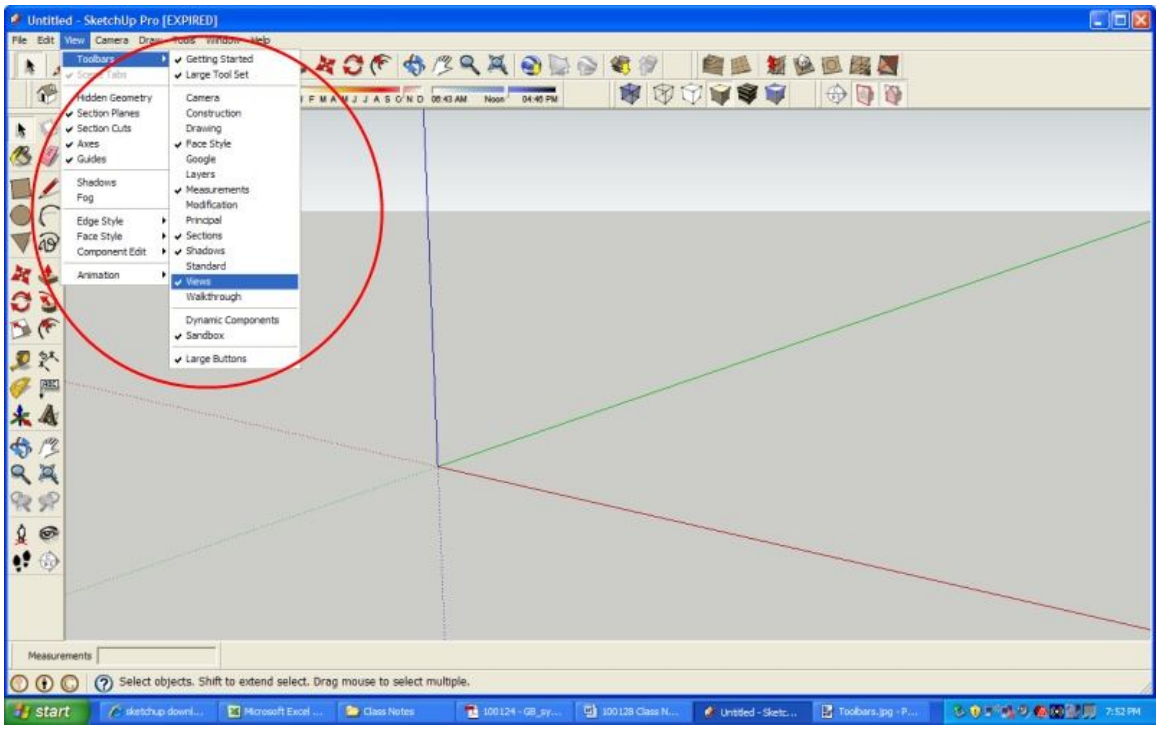
The first thing to do is always to get rid of the Weird Guy. I have no idea what he's doing there but I know how to make him disappear. Just click on him so that he gets a blue box around him and then press "delete" and he should vanish.

Okay now...take note of the location of the measurement box and instruction line at the bottom of the page. These will come in handy later on.

Also notice the three dimensional axes and their corresponding colors...red, blue, and green. These are also extremely useful as you set about building models in SketchUp.

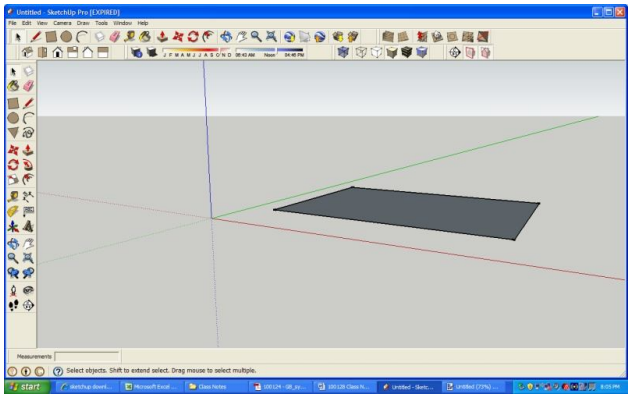
Now look at the top of the screen where the tool bars and tool icons appear. The first time you start the program there are only a few tools showing in the toolbar. These are the most commonly used tools but there are lots of others available.

If you click on the "View" menu at the top of the page and then on "Toolbars" it will bring up a drop-down menu of all of the toolbars that are available. The ones I usually use are shown in the picture below. You can set these to suit yourself but, for the purposes of this exercise it might be helpful to set it up the same way that I have mine. If you click on any of the toolbars listed it will appear on the screen and a check mark will appear on the menu next to. I have checked "Getting Started", "Large Tool Set", "Face Style", "Measurements", "Sections", "Shadows", "Views", "Sandbox", and "Large Buttons". You can move these around if you want to by clicking on the double line at the left hand end and dragging them to where you want them.

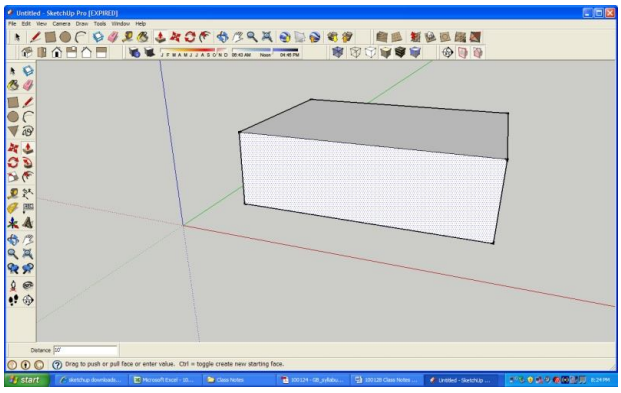


Now we're ready to start drawing a building but before we do it's a good idea to save the project with the name and location of your choosing. Then, to begin...

1. Click on the "Rectangle" tool  and draw a rectangular shape on the ground as shown in the picture below. Simply click in one corner, move the mouse to the next corner, and click again. (Whenever I write "click" I mean left-click, if I want you to "right-click I'll tell you).
2. Now, without doing anything else type 32',24' You will see these numbers appear in the "Dimensions" box in the bottom left hand corner of the screen. When you hit "Enter" (or "Return") you will see the rectangle change shape. Now you have a rectangle on the ground that is exactly 32' long and 24' wide. (see picture below)



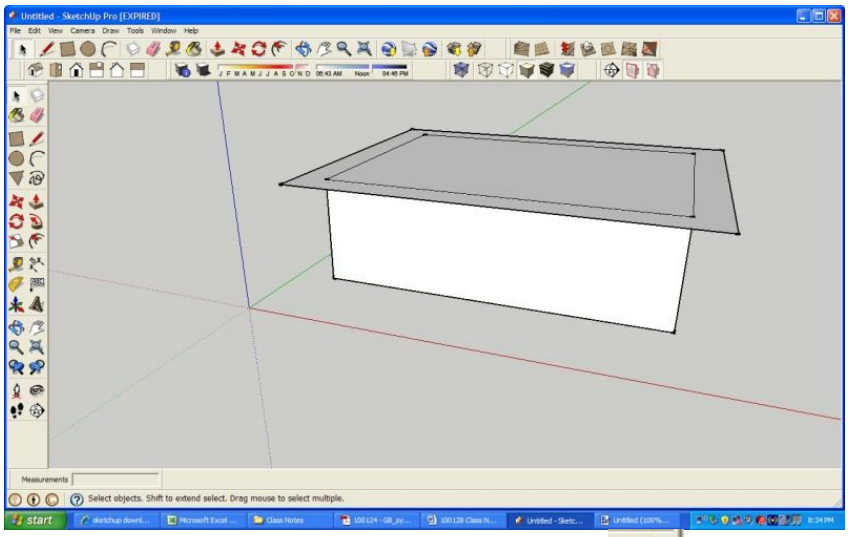
3. Now I want you to play around with some of the navigation tools so that you get the hang of moving around your model. Try the "Orbit" tool  first and see what happens when you hold down the mouse button and move the mouse around. Now try the same thing with the "Pan" tool  (Hint: if you hover the cursor over a tool for a few seconds it will tell you what the name of the tool is). Now try playing with the "Zoom" tool  . The "Zoom Extents" tool  automatically zooms the view to where the whole model fills the screen. This comes in handy at times.
4. Now click on the "Top View" icon  and you will get a view looking straight down on the model. It is helpful to know that, when using SketchUp with Google Earth®, North is always up and South is always down when you click on "Top View". For Passive Solar Design you definitely need to know which side of the building is facing south.
5. Now orbit and zoom back to where the view looks something like the one above. (Hint: if you have a mouse with a wheel, you can zoom in and out by turning the wheel and you can activate the "Orbit" tool by holding down on the wheel as you move the mouse around).
6. Click on the "Push/Pull" tool  and click anywhere inside the rectangle that you have already drawn. Now watch what happens when you move the mouse up and down. The shape is extruded in the direction that the mouse moves. So move the mouse upwards a bit then type 10' and hit "Enter". You now have a box that is exactly 32' long, 24' wide, and 10' high as shown below.



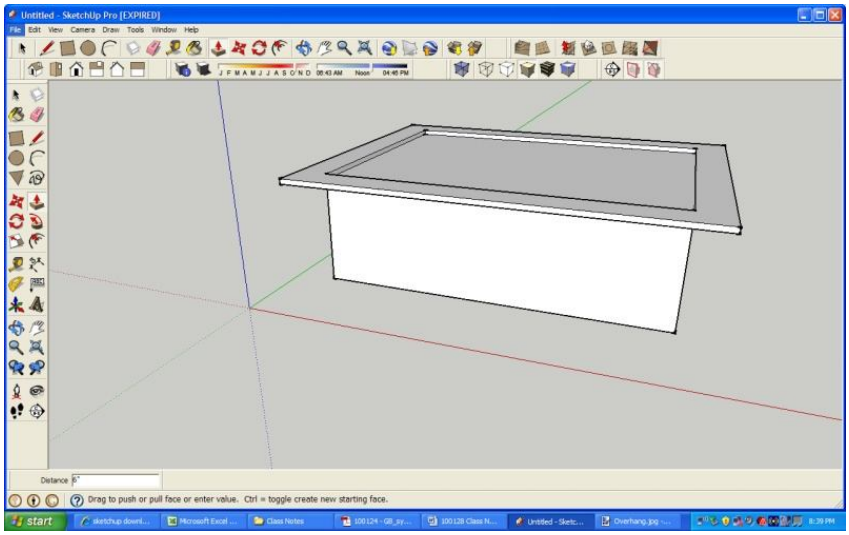
This is the basic shape of the building we are drawing. Please save your project at this point. I won't keep reminding you but it's good practice to save you project VERY often. Now we're going to put a roof on it starting with an overhang.

7. Click on the "Offset" tool  then click anywhere inside the top surface of the box. Watch what happens when you move the mouse this time. The rectangle is offset either inside or outside of the original. So move the

mouse to where the rectangle is offset to the outside and then type 3' and hit "Enter". You should now have an overhang all the way around the box as shown below.

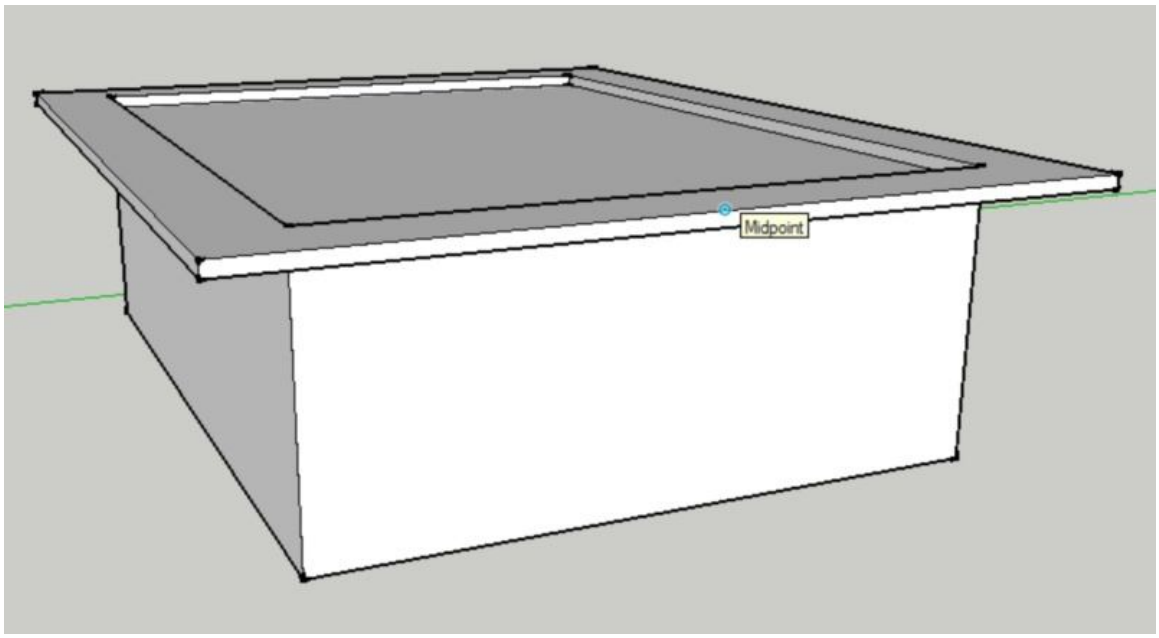


8. Now take the "Push/Pull" tool again  , click anywhere inside the surface of the overhang, pull it upwards, and type 6 and hit "Enter". This gives the roof a 6 inch fascia as shown below. (Note: the dimensions are in inches by default so, when you are entering inches you don't need to type " but when you are entering feet you do need to type '. If you want to enter feet and inches you only have to type the ' between them e.g. 2'6 will give you two feet and six inches).

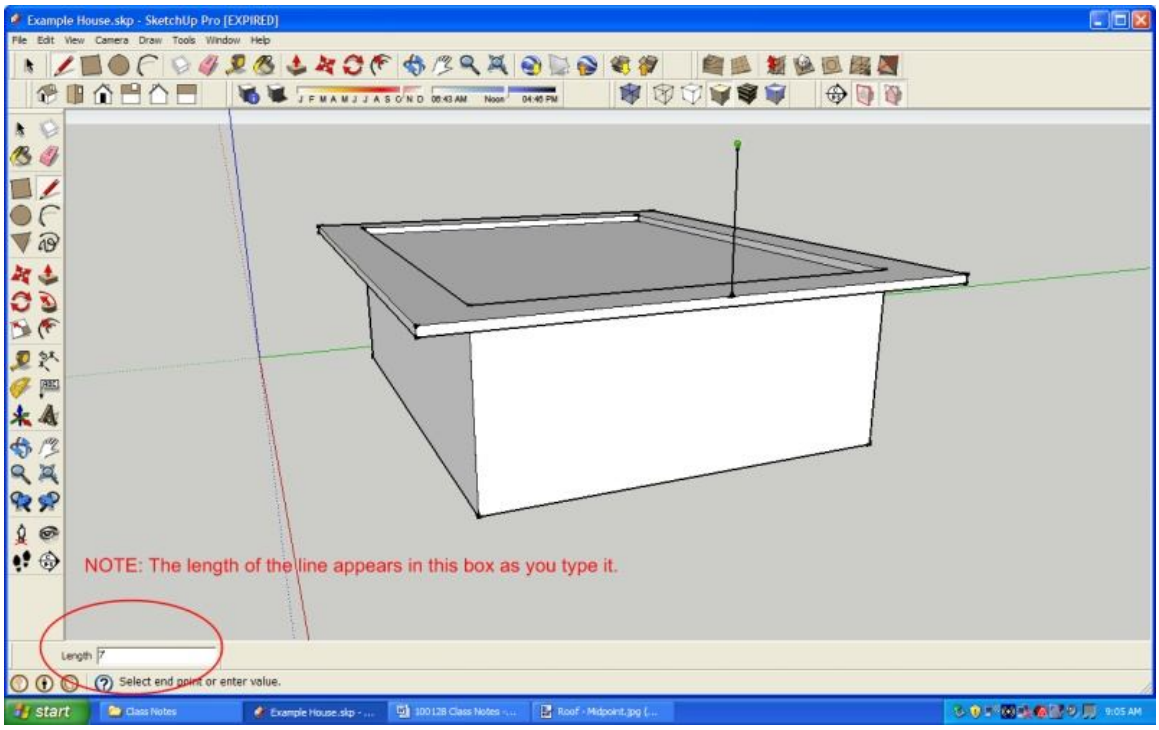


9. Now orbit around so that you are looking at the right hand side (or East side) of the building as shown below. Take the "Line" tool  and hover over the outside edge of the roof. A small red square should appear on the line (the "tooltip") and, if you hold the pencil still, a box should appear with

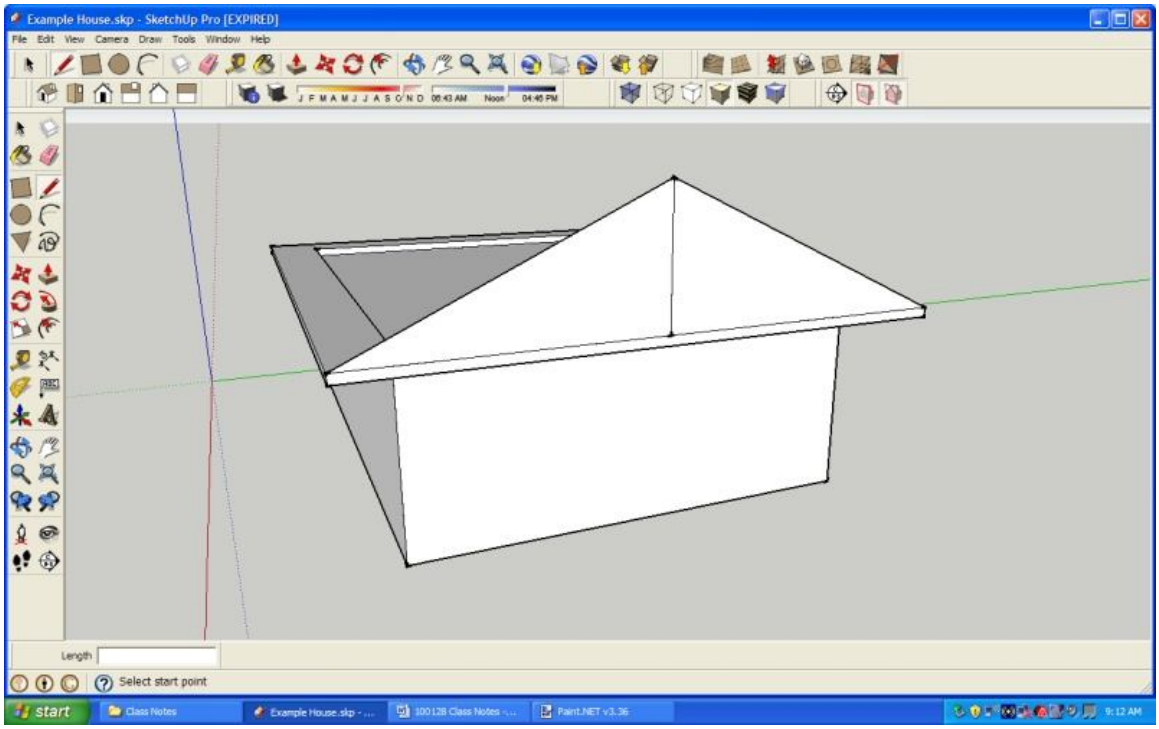
"On Edge" written in it. If you move to either end of the line the red square should change to a green circle and the message should read "Endpoint". These are just two of the extremely useful "Inference Tools" built into SketchUp. We will cover more of these as we go along so pay attention to what your "tooltip" is telling you at all times. Now move the tip of the pencil along the line until the tooltip tells you that you are at the midpoint (blue circle) as shown below (my pencil has disappeared but I'm sure you get the idea).



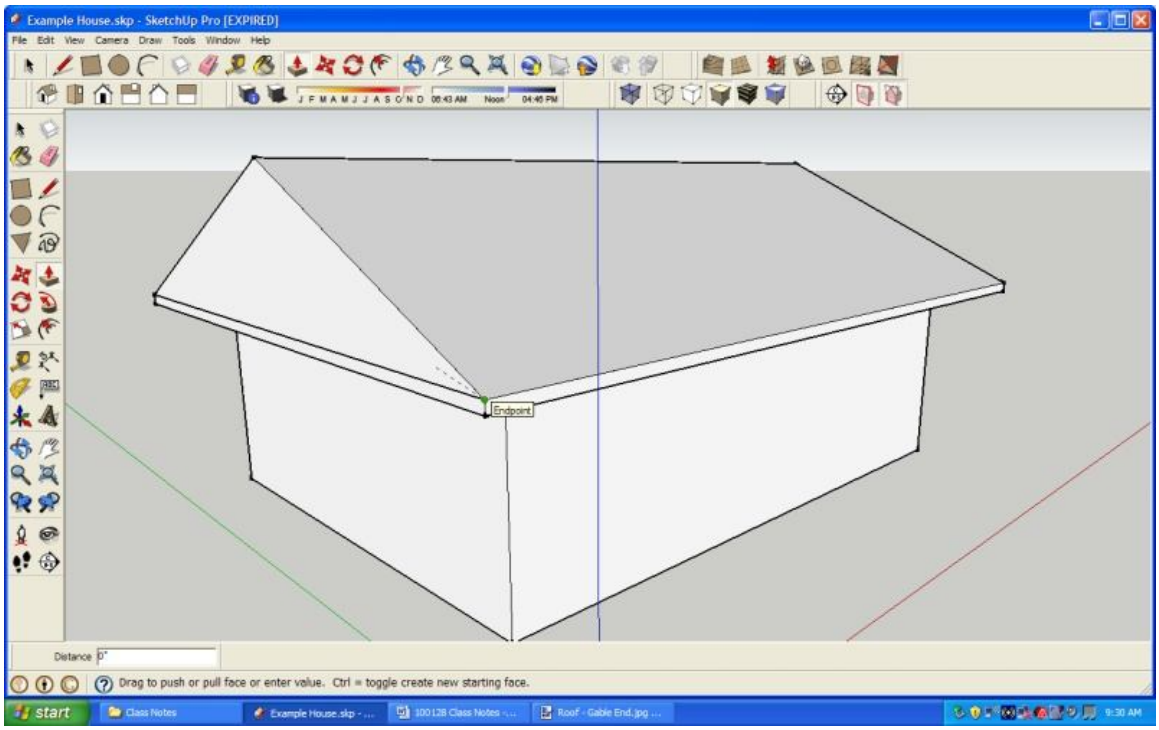
10. Move the pencil upwards so that the line you are drawing is blue and, if you hold the pencil still you get the "On Blue Axis" message. This is another Inference Tool that tells you that the line you are drawing is exactly vertical. (Hint: if you can't get the line to turn blue, try orbiting to a different view that is more horizontal rather than vertical and try again). Now type 7' and you should have drawn a vertical line 7' long as shown below.



11. Using the “Endpoint” Inference Tool (green circle) draw diagonal lines to form the gable end of the roof as shown below. You will notice that, as you complete any set of lines that form a plane, the surface automatically fills in. If your lines are not exactly in the same plane they will just remain as lines and the surface won’t infill.



12. If you don't want a surface filled in (if you just want to see the lines) you can simply click on the surface with the "Select" tool  (Hint: you can choose the select tool simply by hitting the Spacebar). If you've clicked in the right place the surface will become shaded to indicate that it has been selected. Select the surface you don't want and hit "Delete" and it should disappear leaving the lines that surround it. Try this on one of the triangles that are forming the gable end of the roof. Now, if you want to get it back you simply have to trace over any one of the lines that form the triangle using the "Line" tool  which you can choose simply by typing an L)
13. Now that you have your gable end back, delete the vertical line in the middle. This is done by choosing the "Select" tool (Spacebar), clicking on the line so that it turns blue (this shows that the line has been selected), then hitting "Delete".
14. Next we're going to extrude this gable end to form the roof. So orbit your view so that you're looking at the roof from the other end (as shown below). Choose the "Push/Pull" tool  , click on the triangular gable end and drag it towards the other end of the roof. Hold down the (left) mouse button as you drag and position the tooltip over the "Endpoint" of the roof as shown. (For some reason my tool doesn't appear in these images so you'll just have to imagine it). Then let go of the mouse button and the extrusion should snap precisely to the end of the overhang.



That completes the basic building shape. In the next paper we'll add more detail.