Getting Started with SketchUp (v1)

Brown Bag Workshop taught by Dr. Warner Smidt, Department of Industrial Studies.

SketchUp is a 3D drawing program from Google. It is a Windows-based program. There is not Mac version available. SketchUp is free, but SketchUp Pro costs several hundred dollars. The latter allows you to create and edit dynamic components. Only power users would consider purchasing it.

SketchUp is one of the easiest 3D programs to learn to use. It can be used for drawing large things like buildings to small things like woodworking projects or smaller. Component libraries are available online so you don't have to draw everything from scratch. You can save various views as 2D graphics which can be used as graphics in word processing documents or D2L graphics in quizzes. SketchUp allows you to color surfaces and use textures. Objects drawn are accurate and can be dimensioned.

SketchUp allows you to view the objects in parallel projection, 2-point perspective and 3-point perspective. It is easier to draw using parallel projection and this is what you would use to create traditional orthographic projection views. To view objects in a more natural or realistic way, use either of the perspective views.

Installation

Go Google.com > in top menu bar pick “More” > “Even More” > scroll down until you find SketchUp listed. Click on icon to download and install.

SketchUp was recently purchased by Trimble but is still available via the Google website. Trimble is a construction, engineering, surveying, agricultural, fleet and field service management company. It will be interesting to see what happens to SketchUp.

Setting Things Up

1. As a beginner, turn ON the following tool bars: Getting Started, Construction, Styles, Measurement, Standard, Views, Large Buttons. This is accessed from the main menu bar > View > Toolbars. They are turned ON when there is a check mark adjacent to the name.

2. To set the units of measure (imperial or metric): from the main menu > View > Animation > Settings > Units. To draw accurately, you will need to enter numbers from the keyboard. The setting (feet, inches, centimeter, millimeter, etc.) that you make here “tells” SketchUp what unit of measure that is being entered.

3. It is easier to draw using parallel projection rather than either of the perspective settings. To set the type projection: from the main menu > View > Parallel Projection.

Getting Help

The online help and instructions are excellent! It is accessed from main menu > Help > Help Center > SketchUp User Guide.

Drawing Basics

1. Axes: +X is red, +Y is green, +Z is blue; dotted is the negative each axes.
2. The inference feature helps you to draw accurately. (In AutoCAD is it called object snaps or osnaps.)
   a. A green dot appears along with a word as bubble feedback when the mouse hovers over an inference feature; for example, endpoints and midpoints of lines or arcs.
   b. When two lines intersecting lines are drawn, the result is shorter lines which are broken at the original intersection. (As a result, there is no such thing as an intersection of lines in SketchUp.)
   c. A dotted line appears when the pointer aligns with a feature at a distance. For example, when drawing the 3rd side of a box, an inference line appears when the 3rd line length matches the length of the 1st line.
3. The Zoom Extents tool tells Sketch to zoom so everything that is drawn (and visible) appears on the screen in the largest zoom that is possible. This is a good way to get back on track you get lost.
4. Use the Tape Measure Tool to draw reference dots and reference lines. It is common to draw several reference lines to aid in the construction of some geometry and then delete the reference lines.
5. Lines can be drawn
   a. Freehand using inferences
   b. Via keyboard entry of the length:
      i. Invoke the line command
      ii. Using inference or reference points/lines to locate the starting point of the line by clicking on that location.
      iii. Start moving the pointer in the direction that the line is to go—again using snap inferences to head in the right direction, BUT DO NOT click.
      iv. Use the number pad to manually enter the length of the line. As you enter the number, it appears in the Measurement box at the bottom left of the screen. You can edit this number as needed using the <Backspace> and <arrow> keys.
      v. Press the <Enter> key to accept the value as the length of the line.
      vi. The result is a perfect length line.
6. Rectangles can be drawn
   a. Freehand using inferences
   b. Via keyboard entry of the length and width:
      i. Invoke the rectangle command
      ii. Using inference or reference points/lines to locate the starting corner of the rectangle by clicking on that location.
      iii. Start moving the pointer in the direction that the rectangle is to go—again using snap inferences to head in the right direction, BUT DO NOT click.
      iv. Hint: In the above step, intentional distort the aspect ratio of the rectangle. The dimensions appear in the Measurement box. This will help you know whether the first value is the length or the width of the rectangle.
      v. Use the number pad to manually enter the length, comma, width of the rectangle. As you enter the number, it appears in the Measurement box at the bottom left of the screen. You can edit this number as needed using the <Backspace> and <arrow> keys.
      vi. Press the <Enter> key to accept the values as the size of the rectangle
      vii. The result is a perfect sized rectangle.

**Hot Keys**

<Drag Mouse Wheel> Orbit

<Shift—Drag Mouse Wheel> Pan
Making Components

SketchUp uses surface modeling (rather than solid modeling) to create the 3D objects. For example, a simple box consists of 6 surfaces and 12 edges (rather than one rectangular prism shaped mass as a solid modeling system would do).

Let’s say you are creating a flower arrangement whereby you are putting seven potted plants on a series of plant stands. You will need seven “boxes” to serve as plant stands. Rather than dealing with seven sets of 18 objects (6 surfaces and 12 edges), you combine each set of 18 into one object called a component. Now the component acts as one object rather than 18 separate objects.

To create a component, do the following:

1. Draw the object.
2. Draw it out in space so it is separate from other objects. You may have to use the Move command. It is imperative that the objects that are to form the new component do not touch other objects.
3. Although not discussed yet, you can use the Hide command to temporarily isolate objects that do not belong to the component being created.

Exporting 2D Graphics

Many of you will be using SketchUp to generate graphics for use in student handouts, D2L quizzes, and other classroom purposes. The obvious advantage of drawing in 3D is that you only need to draw the object once. Then you can rotate, orbit, zoom, and pan the object to generate an infinite number of views and perspectives.

These views can be “frozen” by using the Scene feature in Sketchup. This allows SketchUp to store these views for future use and enhancements. These views can be annotated with text, dimensions, color, and textures.

SketchUp allows you to save 2D graphics in the following formats: BMP, JEG, PNG, and TIF. Here is how it is done:

1. Orientate object in SketchUp as you want it to appear in the 2D graphic by using orbit, pan, and zoom.
2. From the main menu pick File > Export > 2D Graphic. The “Export 2D Graphic” dialog box appears.
3. In the “Export type” field select the file format that you desire: BMP, JEG, PNG, and TIF.
4. (Beginners should skip this step.) Click the [Options] button if you want to control the size of the graphic being exported.
5. Select the folder where you want to place the file.
6. Enter the file name.
7. Click the [Export] button.
Intermediate SketchUp

After you have mastered the above basics, you are ready to learn the following features of SketchUp. They will improve your capabilities and productivity.

1. Hiding and unhiding objects
2. Use of layers
3. Use of the protractor tool
4. Create unique component