

# *Tutorial:*

In order to create an object, usually six views need to be created: top, bottom, left, right, front and back. Each view is a group of points, lines and planes. To create a

solid shape with opaque surfaces, planes must be used. Hidden lines can be displayed as solid, dashed or invisible lines.

1. To create a new object, select *NEW* from the *DOCUMENT* menu. This will open a display view *UNTITLED0* with a browser attached.
2. Select *NEW PLANE* from *TOOLS/NEW ELEMENTS*. In the browser, the name *Plane\_0* will appear.

3. Select it and then select *EDIT/GROUP* or press command-g. This will create directory called *Group\_1* in the browser. This directory contains *Plane\_0*.
4. Select *Group\_1*, its directory will open, revealing *Plane\_0*. Select *GROUP* again. This will place the first group inside another directory called *Group\_2*.
5. Now, open the inspector by selecting *TOOLS/INSPECTOR*. The inspector panel will appear. At the top of the panel is a pull-down menu with *Editor* selected.

6. Select *Group\_2* in the browser. Its name will appear in the inspector along with a matrix of zeros and ones. Change the name of the group to *MyBlock* by selecting the name in the inspector. Press *RETURN* to make the change.
7. Select *Group\_1* and rename it to *Front* using the inspector.
8. Now select and copy *Front* using *EDIT/COPY* or command-c. Click the left arrow of the browser to reveal *MyBlock*. Select it and select *EDIT/PASTE* or command-v.

9. Select *PASTE* four more times. The browser should look like:

paste\_0.tiff ↵

10. Rename five of the *Front's* to *Back*, *Top*, *Bottom*, *Left* and *Right*, respectively.

11. Now pull-down to *Graphics Manager* in the pull-down menu of the inspector. Change the scale to 80 and then pull-down to *Editor* again.

12. Select *Standard View* from *TOOLS/VIEWS*. This will make the object more visible as we begin drawing.

Now we are ready to begin. Let's make a simple cube:

paste\_6.tiff ↵

Each edge of the cube will be one unit long. We'll put one vertex at the origin (0,0,0) and the remaining vertices will all have positive coordinates.

13. Select *Front* in the browser. Now select *Plane\_0*. In the inspector, there are

three text fields for each of three points: A, B and C. These points are the points that define *Plane\_0*. Above the point coordinates, is a set of radio buttons for each edge of the plane. When one of the buttons is selected, the corresponding edge will be displayed. We want to make a square, not a triangle, so we'll have to split the square into two triangles. Let's start.

14. Point A should have the coordinates (0,0,0) change point B to (0,1,0) and point C to (1,1,0.)

15. Now select *Edge AB* and *Edge BC*. We don't want to select *Edge CA*, because this would place a line diagonally through the face of the square. The inspector should look like:

paste\_1.tiff ↵

Select *OK*. The display view should look like:

paste\_3.tiff ↵



16. Now select *NEW PLANE* from *TOOLS/NEW ELEMENTS*. *Plane\_1* should appear in the same directory as *Plane\_0*.

17. Select *Plane\_1* and change its points: point A: (0,0,0); point B: (1,0,0); point C: (1,1,0.) Then select *Edge AB* and *Edge BC*. Select *OKAY* and the completed square should appear in the display view (it will appear as a diamond due to the isometric view.)

18. Next, select *Back* in the *MyBlock* directory, change *Plane\_0* and add a new plane to create a square one unit away in the z-direction from *Front*. The display view and browser should look like:

paste\_4.tiff ↵

19. Change the other views to create the entire cube. It may be helpful to make a rough sketch and label some of the coordinates on the cube to keep yourself straight. The final cube should look like:

paste\_5.tiff ↵

20. Pull-down to *Graphics Manager* in the inspector. By dragging the sliders, you can change the orientation of the cube. You can change the scale and change the way hidden lines are displayed. Experiment with the controls.
21. Pull-down to *Instance* in the pull-down menu. This lets you reflect, rotate and translate the cube or parts of the cube, depending on what is selected in the browser.

Experiment with the controls. Try change the shape of the entire cube as well as individual planes.

You are ready to create your own objects. Some helpful hints: When two planes share a common edge, it is best to have both planes display the edge, otherwise, at certain angles, the edge may appear as a hidden line. Polygons can be broken down into triangles in many different ways. Try to minimize the number of triangles used to create a complex plane. Sometimes, it is necessary to create a plane that has no visible edges in order to completely fill a surface. Several sample objects are located

in the *BlockViewer* application directory in *SampleFiles*, including *MyBlock*.