

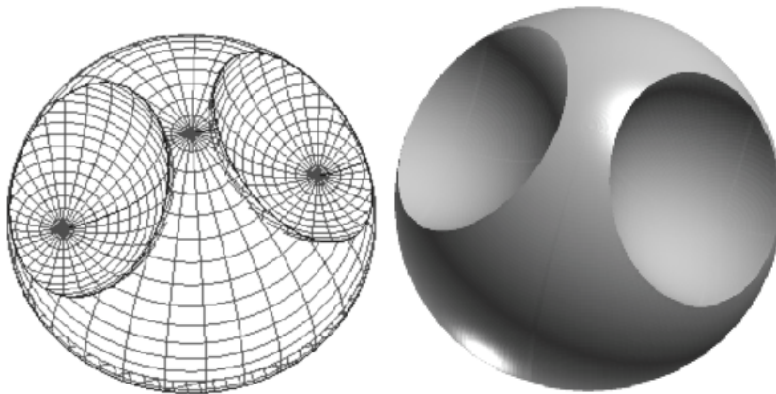
## Quick CAD Lesson

### Basic CAD Design

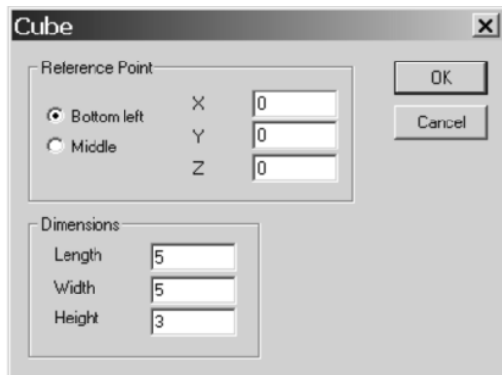
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This section is dedicated to teaching you how to draw and edit with solids in the BobCAD Version 19 software. Here are three basic lessons that use each of the Boolean Operations that you have studied thus far in this training guide.

**CAD DESIGN LESSON ONE:** Follow this basic training lesson and learn how to design a part in the Version 19 software.



**Step 1.** With a fresh drawing screen, select the Solids menu and then Primitives. Choose Cube and click OK.



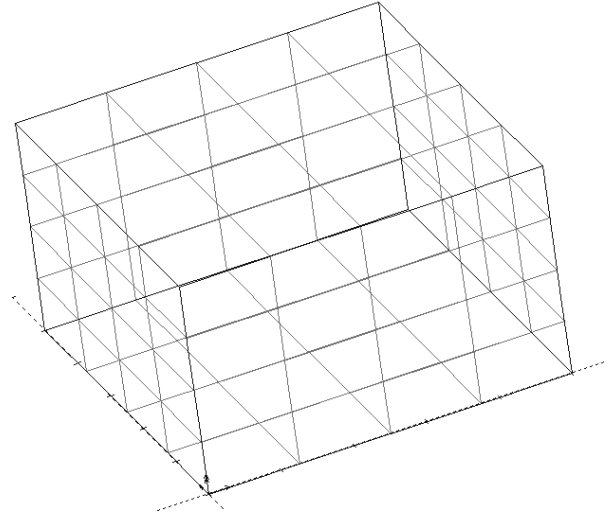
Make sure that Bottom Left is selected as the reference point and that the X, Y and Z coordinates are all 0.

Enter 5 for the Length.

Enter 5 for the Width.

Enter 3 for the height.

Now select OK. Once you have done this, select the 3D menu and Turn 3D ON. You may want to select the View All icon from the main toolbar.



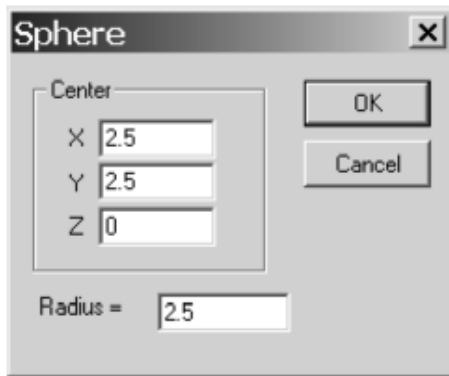
**Step 2.** Select the Solids menu, then Primitives and choose Sphere. In the sphere box:

Enter 2.5 for X.

Enter 2.5 for Y.

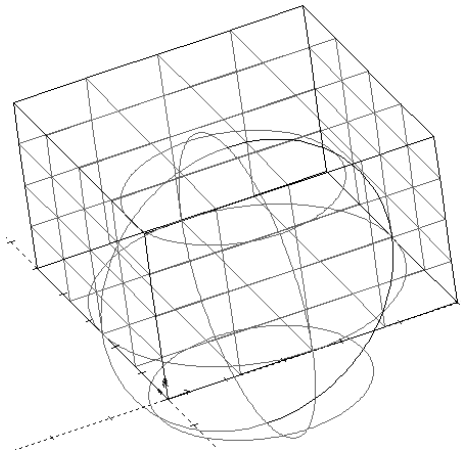
Leave the Z coordinate at 0.

Enter a Radius of 2.5.

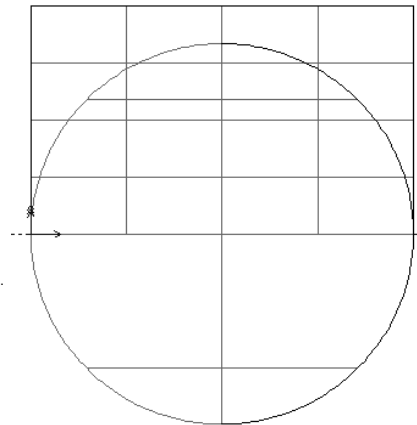


Now click OK.

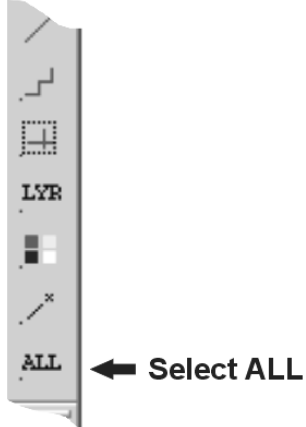
**The 3D View:**



**The Side View:**

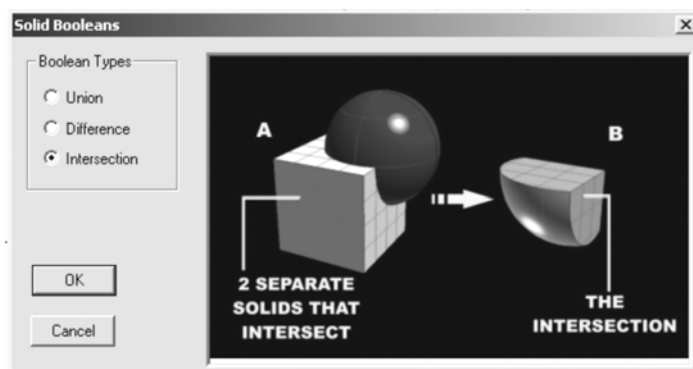


**Step 3.** Now click on the Select ALL icon from the selection toolbox that should be on the left wall of the software.

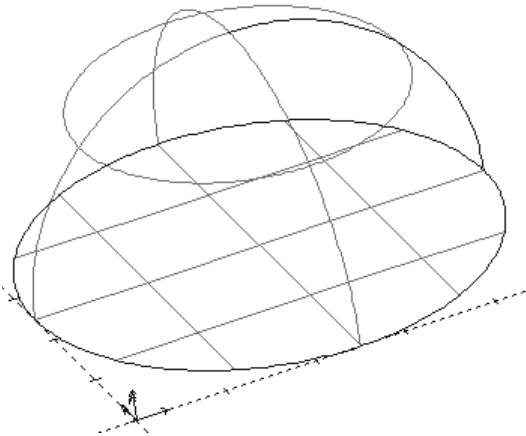


You can also do this by selecting the Edit menu, Select Entities and then Select All. This will select both solids.

**Step 4.** Select the Solids menu, Booleans. In the Solid Booleans box choose INTERSECTION and click OK. This will perform the intersection operation.



See the result in the image below.



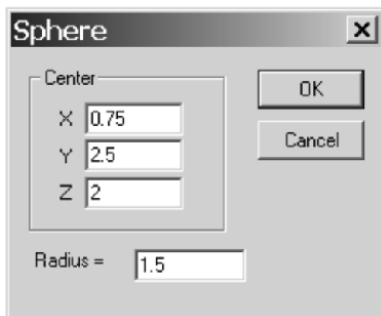
**Step 5.** We are going to go ahead and draw a new sphere. And so, select the Solids menu, Primitives and then choose Sphere. When the new sphere box appears:

Enter .75 for X.

Enter 2.5 for Y.

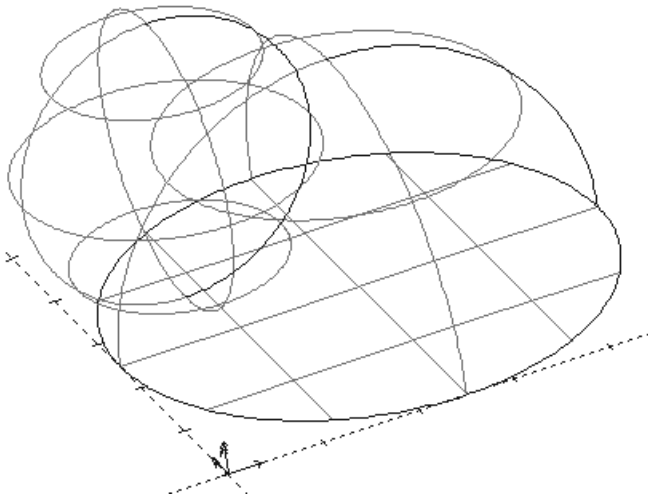
Enter 2 for Z.

Enter 1.5 for the Radius.



Now select OK to draw the new solid sphere.

Have a look at the image below as this is what you should have on your screen now.

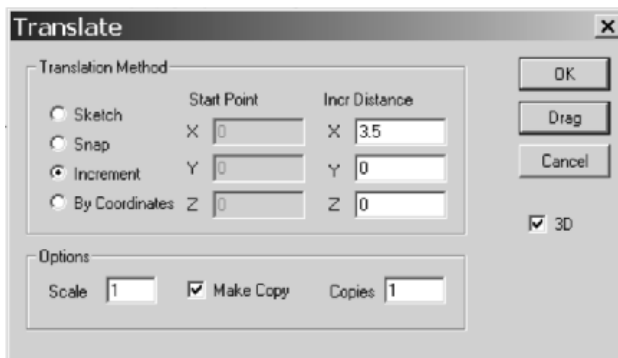


OK. Now we are going to use the Translate function to make a copy of the sphere you just created.

**Step 6.** Place your cursor on one of the interior or edges of the sphere that you just created and click on it to select it.

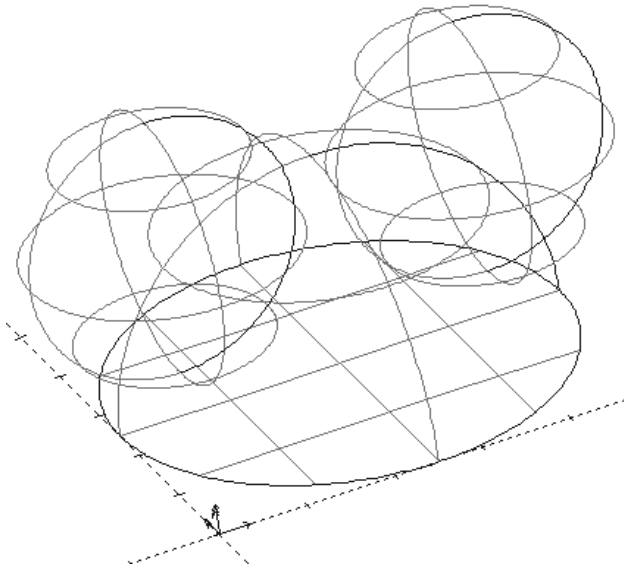
**NOTE:** *If both solids are still selected you will have to deselect them first before trying to make the new selection of the sphere. To do this you simply place your cursor in an empty area of the drawing screen and click your mouse button. This will deselect everything. This method is faster than going to the edit menu and choosing Unselect All.*

Once you have selected the sphere, select the Change menu and Translate. In the Translate box as seen here below, click on the INCREMENTAL option and check the 3D box if it is not already selected for you.



Enter 3.5 for the X axis, Y & Z leave at 0 with a scale factor of 1. Check the Make Copy option and enter 1 for the number of copies to be made. Now select OK.

You should now have the translated sphere as seen in the image below.



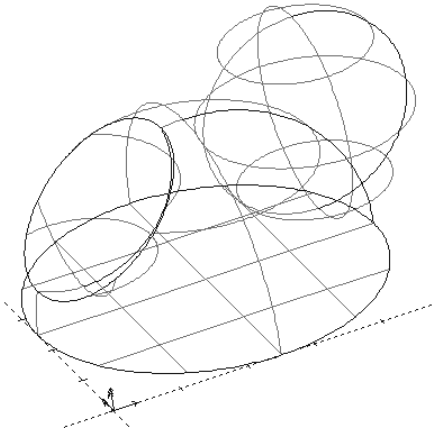
**NOTE:** After the translation, both spheres will be selected. **Deselect them** as we don't want anything to be selected prior to our next action. Remember, you can do this by placing your cursor in an empty area of the drawing screen and clicking your mouse button once.

**Step 7.** Now you want to select the bottom solid first. This was the first solid that you created. Place your cursor on one of the edge or interior lines and select it. Make sure that this is the one selected.

Once you have selected the bottom solid, hold down your shift key and select the top LEFT solid. When you have selected the top left solid, let go of the shift key.

**Step 8.** Select the Solid menu, Booleans. In the Solid Booleans box, select Difference and click OK. This will perform the operation and change the bottom solid shape. Leave the changed solid selected.

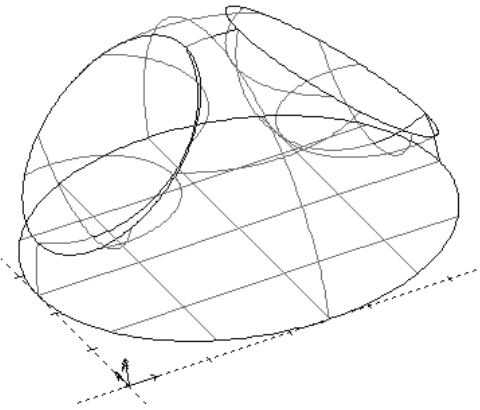
The image below shows what you should have on your screen at this time.



At this time, the bottom solid should be selected. If it is, that is good. If not, select it now.

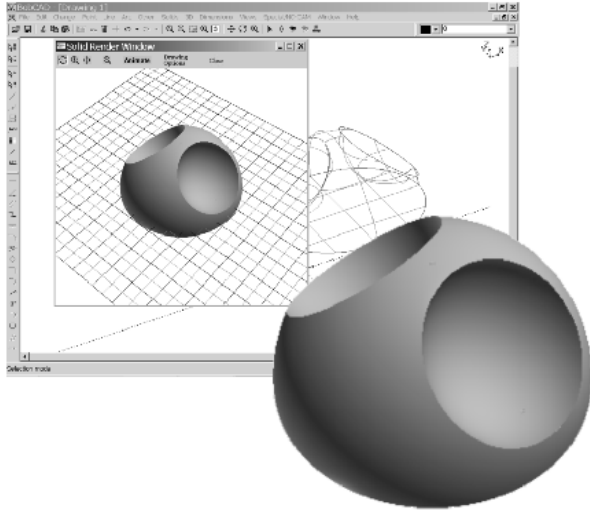
**Step 9.** Make sure that the bottom solid is selected. Select the last sphere next so that both solids are selected. Then choose the Solids menu and Booleans. Now select the Difference option. It may already be selected as you just performed this operation. Click OK and the bottom solid will now be changed again.

Have a look at the image below. This is what you should have on your screen at this time.



OK. In this lesson you learned how to draw with solid shapes as well as use the Boolean Operations Intersection and Difference functions. Let's go ahead and render this solid.

**Step 10.** After performing the last Boolean operation, your solid will be selected. If it is not, select it now. Once you have done this, select the Solids menu and then Render. This will open the render window and give you a look at the solid part that you just made.



This concludes the CAD Design Lesson One.