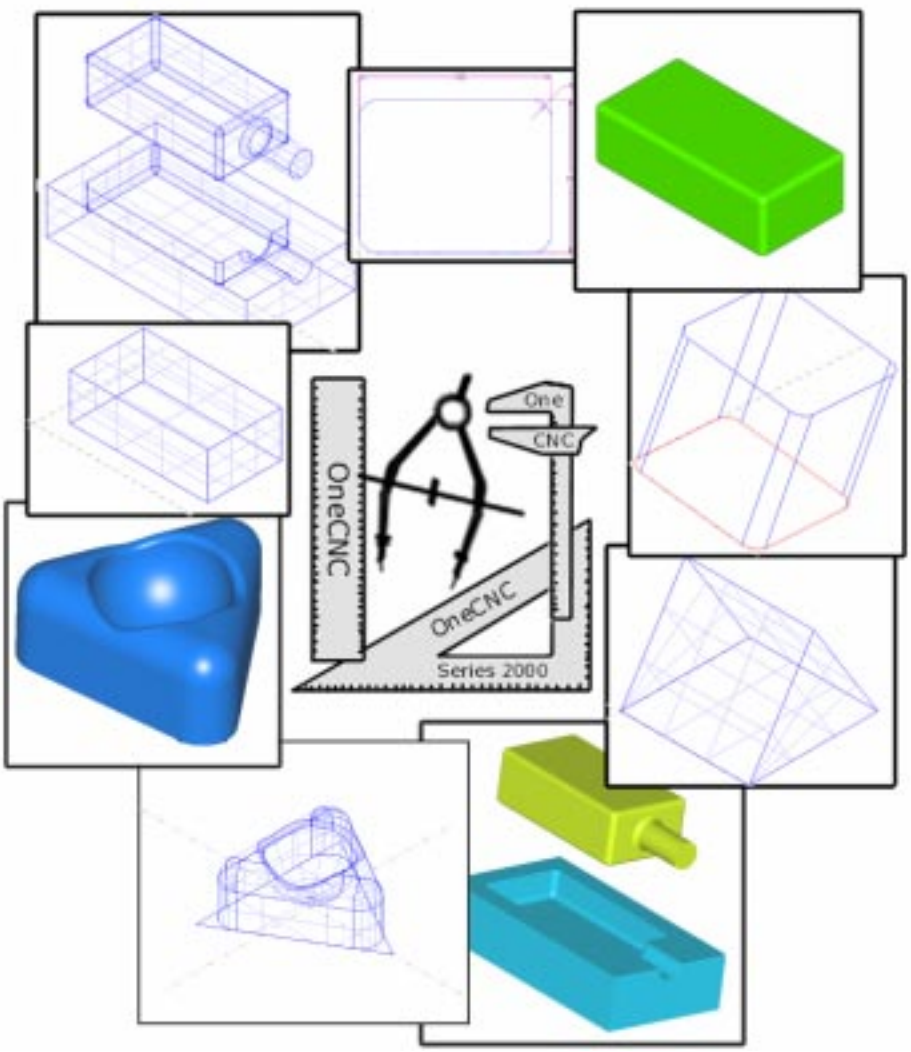
# OneCNC

## 2000 Series

# Manufacturing Software




# CAD Tutorials

# Contents

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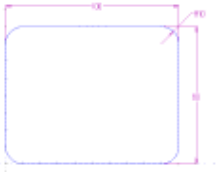
**Version 1.04**

(rev 08-10-01)

# CAD Tutorial 1

## Create and Dimension a 2D Part



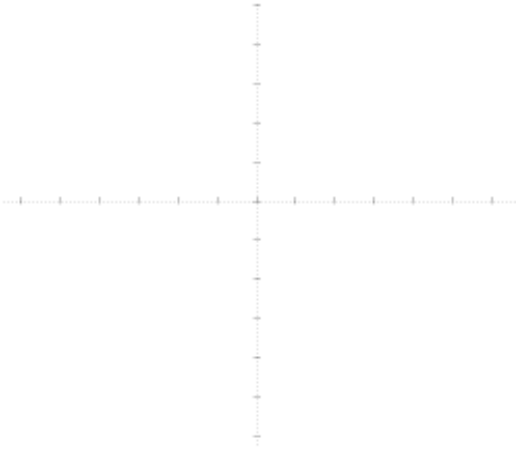
Note: This help uses mm values.

This is a tutorial to draw a 2D part using OneCNC all versions except Lathe. Lathe has some differences in the dialogues due to the fact that the screen is X Z instead of X Y in all the other versions.

## Step 1. Create a New Drawing


Click the **new drawing icon** on the **standard toolbar**.

You should have a blank drawing ready to draw.

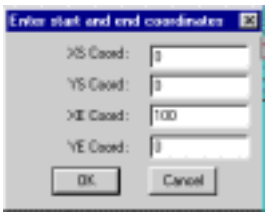


## Step 2. Create Lines by Coordinates

 Click the **line icon** on the **menu toolbar**.

 Click the **line by coordinates icon** on the **line menu toolbar**.

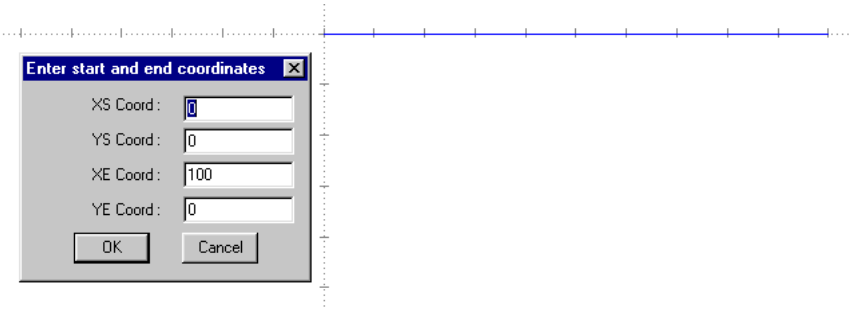
The following dialogue will appear.



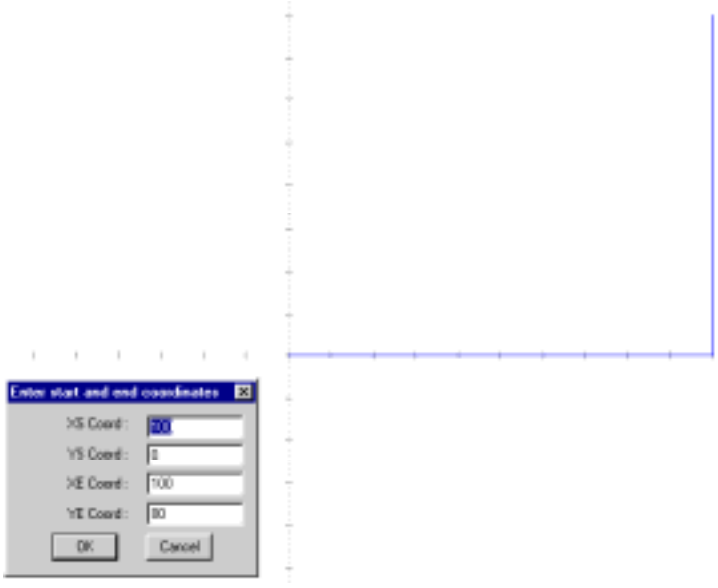

Enter the values of the coordinates of the line. (XS: X-Axis Start Coordinates, YE: Y-Axis End Coordinates, etc.)

Then click **OK**.

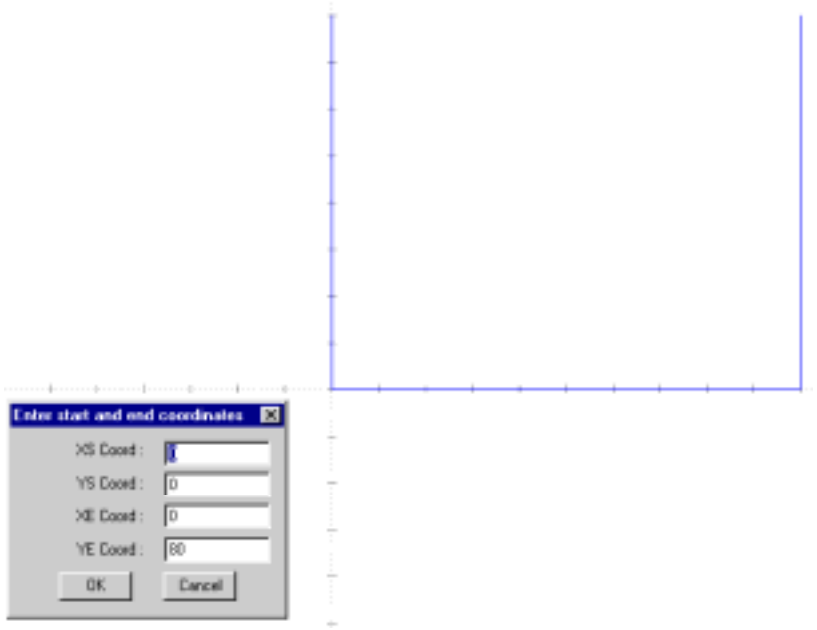
The line is then drawn.



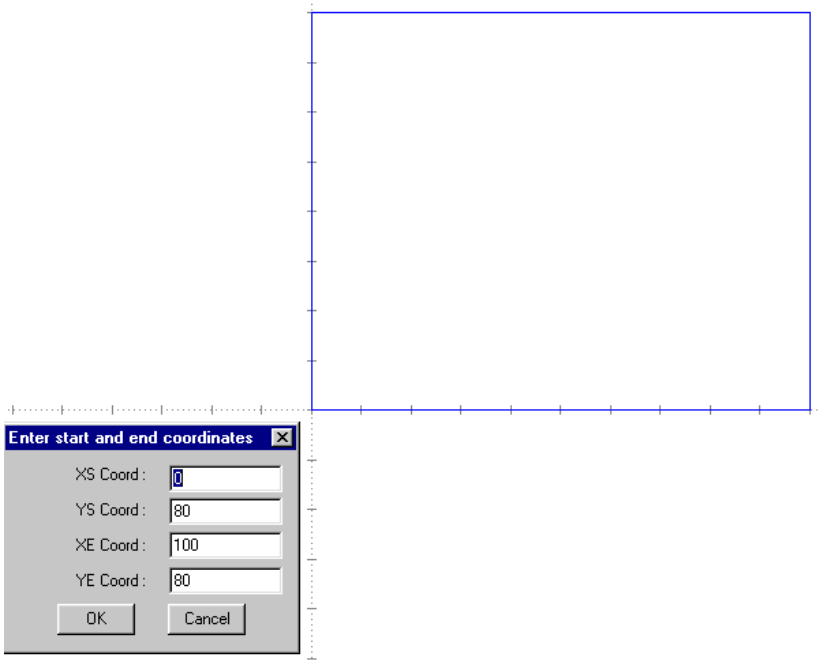

Then enter the value of the next line and click **OK**.



Then enter the next value and click **OK**.




And then enter the last line details and then click **OK**.




Then click the **cancel button** to terminate the line by coordinates dialogue.

## Step 3. Filleting Corners


Click the **home icon** on the **menu toolbar**.

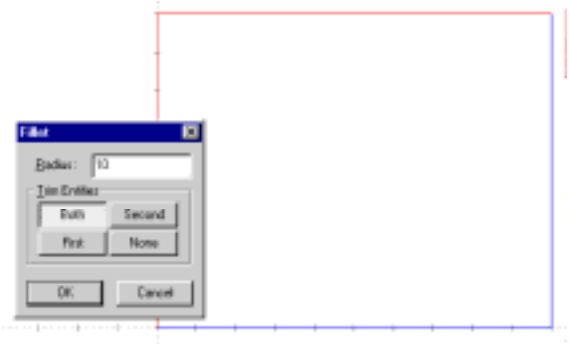
Click the **arc icon** on the **menu toolbar**.

Click the **fillet icon** on the **arc menu toolbar**.

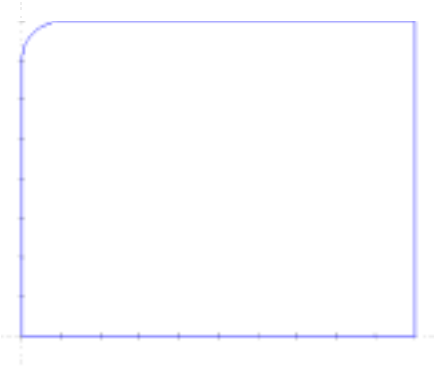
Click the **first line** to be filleted.

Then click the **second line.**

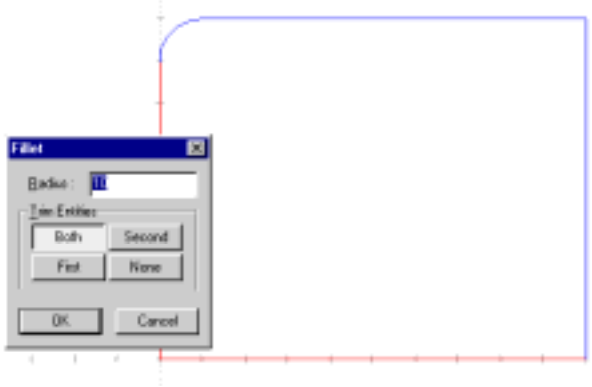
The following dialogue will appear. Enter the value of the fillet and click **ok**.

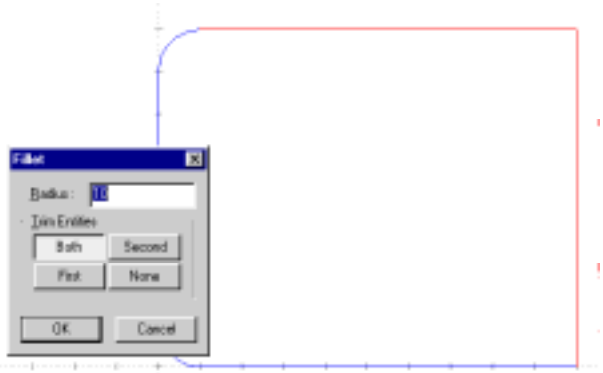


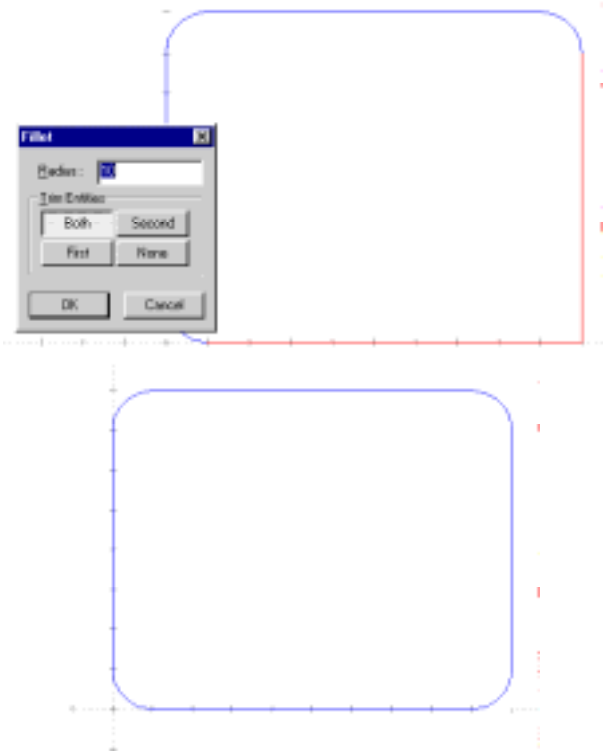

The two lines are now filleted.



We will now do the same with the other three corners.






The drawing is now complete.

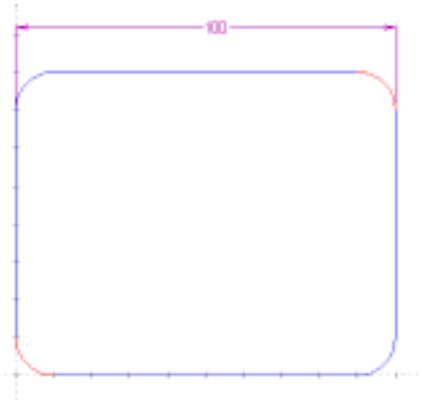
## Step 4. Dimensioning the Drawing


Click the **home icon** on the **menu Toolbar**.

Click the **dimension icon** on the **menu toolbar**.

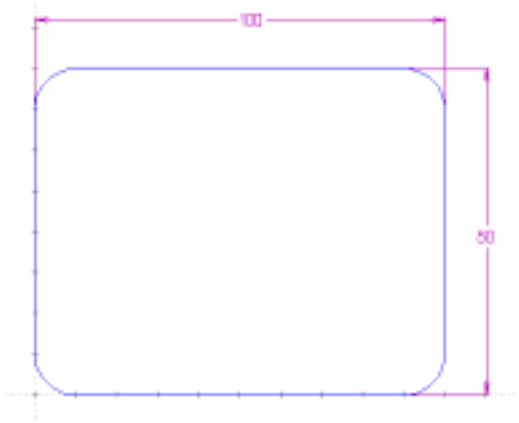
Click the **horizontal dimension icon** on the **dimension menu toolbar**.

Then select the two vertical lines towards the top of each then place the dimension interactively above the rectangle using the mouse and then clicking when positioned correctly like so.



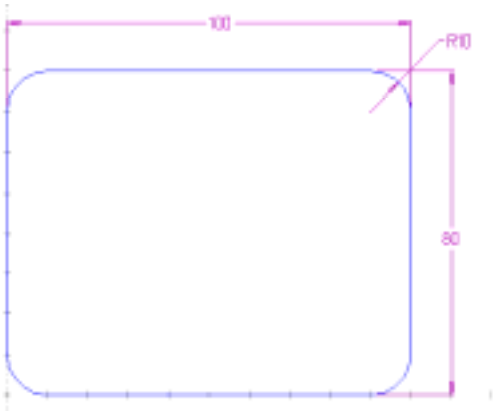

Click the **vertical dimension icon** on the **dimension menu toolbar**.

Then select the two horizontal lines towards the right hand side and place the dimension interactively on the right hand side of the rectangle.




Click the **radius dimension icon** on the **dimension menu toolbar**.

Then select the top right fillet and place the radius dimension interactively with the mouse and click when positioned correctly.

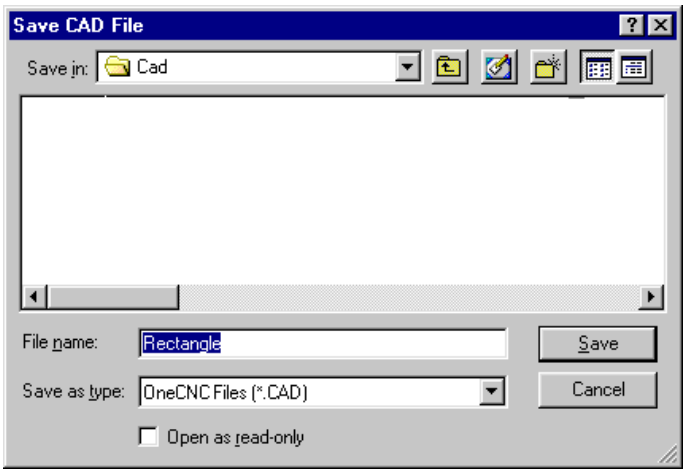



You have now completed this drawing.

## Step 5. Saving the Drawing

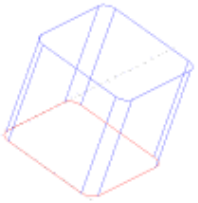
 Click the **save drawing icon** on the **standard toolbar**.

Type in **rectangle** and click **save**.



# CAD Tutorial 2

## Create a 3D Part



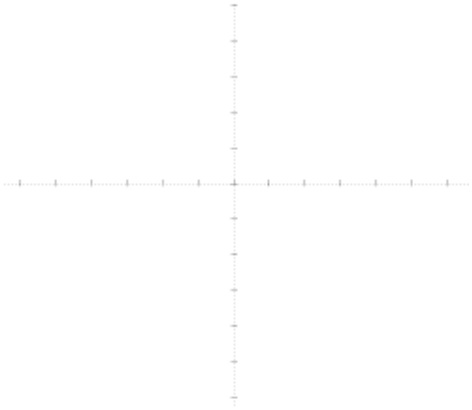
Note: This help uses mm values.

This is a tutorial to draw a 3D part using OneCNC all versions except Lathe and Profiler. Lathe has some differences in the dialogues due to the fact that the screen is X Z instead of X Y Z in all the other versions.

### Step 1. Create a New Drawing


Click the **new drawing icon** on the **standard toolbar**.

You should have a blank drawing ready to draw.

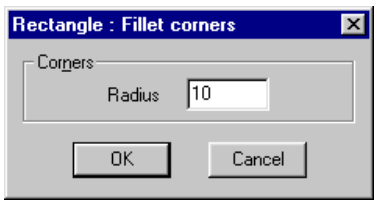


## Step 2. Drawing a Rectangle

 Click the **line icon** on the **menu toolbar**.

 Click the **rectangle icon** on the **line menu toolbar**.

The following dialogue will appear.

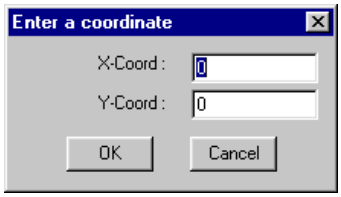



Enter the value of **10** then click **OK**.

Then the position toolbar will appear.

 Click the **coordinate icon** on the **position dialogue**.

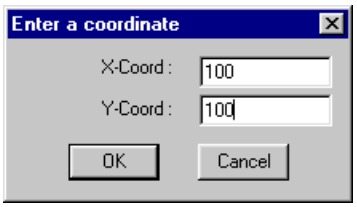
Enter **X: 0**, **Y: 0** in the coordinate dialogue.



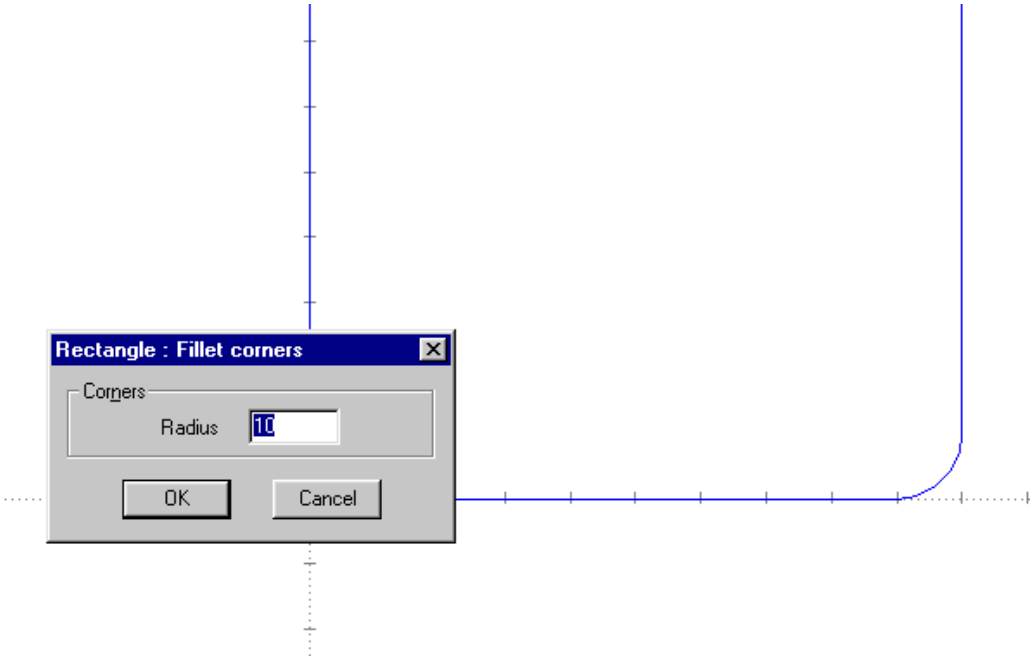

Then click **OK** and the position toolbar will again appear for the coordinate of the opposite corner of the square.

 Click the **coordinate icon** on the **position dialogue**.

Enter **X: 100** and **Y: 100** in the dialogue and click **OK**.



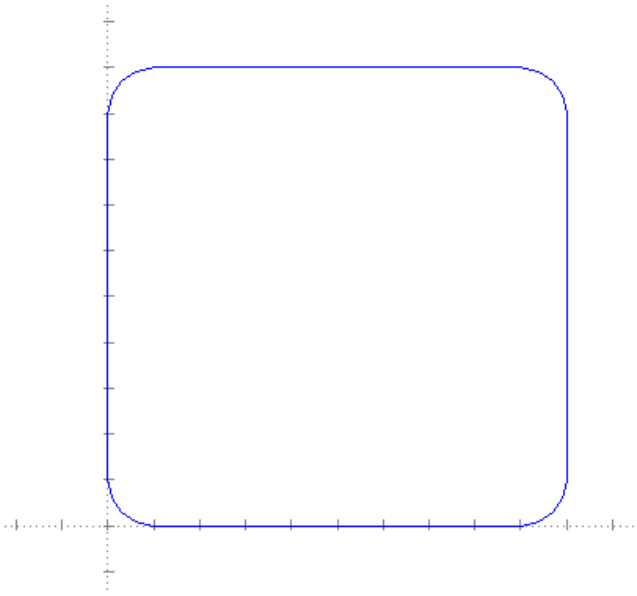
Then click **cancel** to end the rectangle function.



## Step 3. Changing your View

 Click the **view all icon** on the **standard toolbar**.

 Click the **reduce half icon** on the **standard toolbar**.

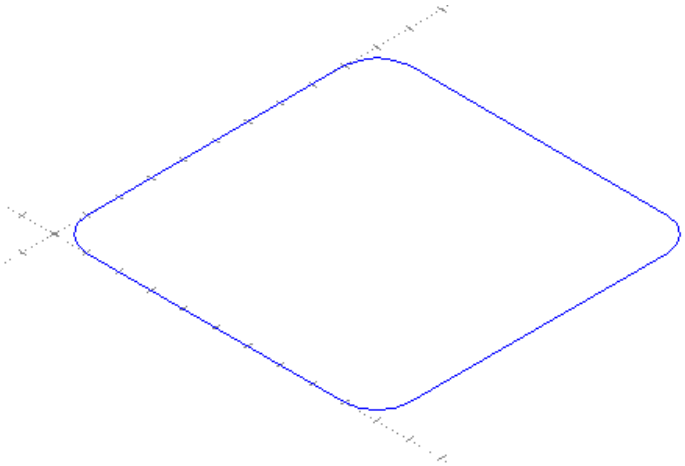


Now we will turn this in to a 3D object.

 Click the **change 3D views icon** on the **menu toolbar**.


Click the **Isometric view icon** on the **3D views dialogue**.

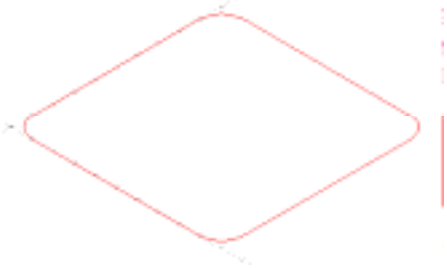
You will now see it in isometric view.



## Step 4. Creating a 3D Entity

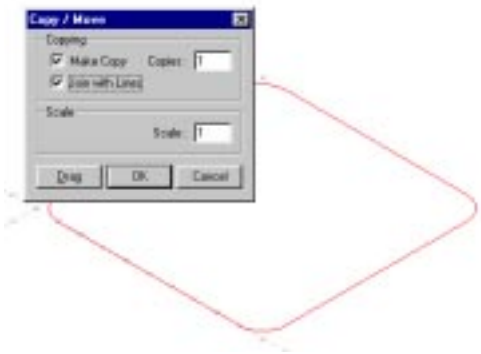
 Click the **select all entities icon** on the **selections toolbar**.

All the entities will turn red.



 Click the **move/copy/scale icon** on the **selections toolbar**.

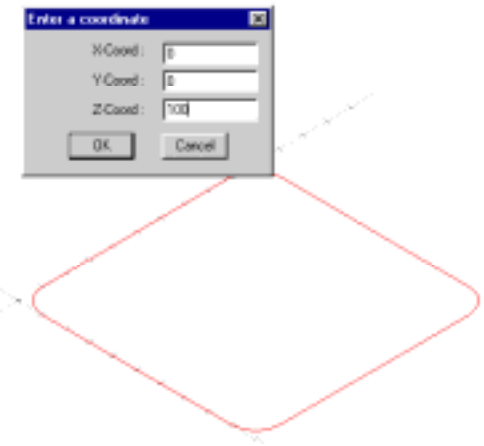
Click **Make Copy** and **Join with Lines check boxes** then click **OK**.



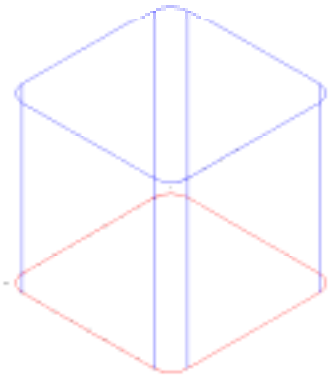

The position dialogue will now appear.

 Click the **incremental icon** on the **position dialogue**.

Enter the following values then click **OK**.



The part is now drawn in 3D.

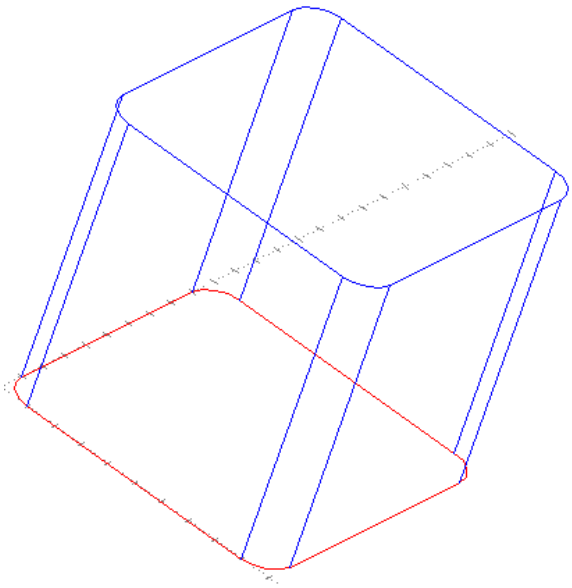


## Step 5. Rotating and Panning

 Click the **live rotate and pan icon** on the **standard toolbar**.

Rotate the part holding down the left mouse button while moving the mouse the mouse to get the feel of the 3D viewing.

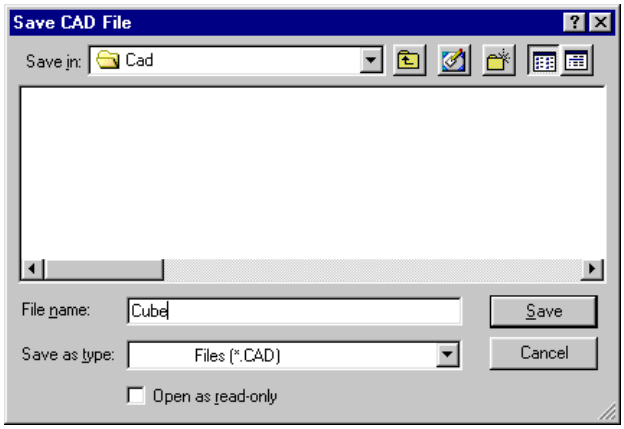
If you hold down the right mouse button while moving the mouse it will pan around your screen.



## Step 6. Saving your Drawing

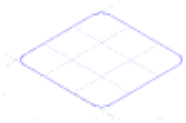
 Click the **save drawing icon** on the **standard toolbar**.

Enter the file name and click **save**.



# CAD Tutorial 3

## Create a Wire frame and surface it



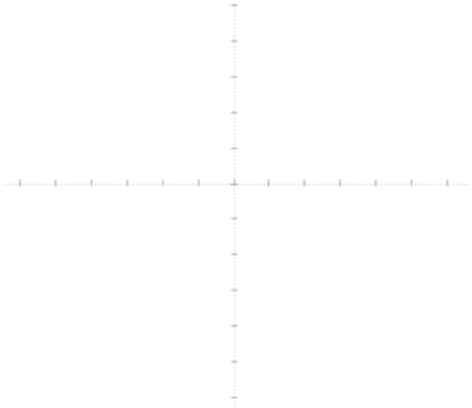
Note: This help uses mm values.

This is a tutorial to draw a part using OneCNC all versions except Lathe. Lathe has some differences in the dialogues due to the fact that the screen is X Z instead of X Y Z in all the other versions.

### Step 1. Create a New Drawing


Click the **new drawing icon** on the **standard toolbar**.

You should have a blank drawing ready to draw your wireframe and then surface it.

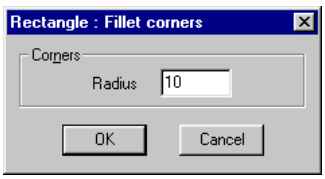


## Step 2. Creating a Rectangle

 Click the **line icon** on the **menu toolbar**.

 Click the **rectangle icon** on the **line menu toolbar**.

The following dialogue will appear.

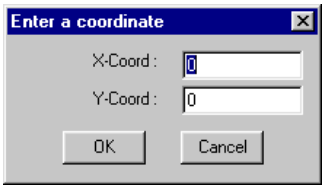



Enter the value of **10** then click **OK**.

Then the position toolbar will appear.

 Click the **coordinate icon** on the **position dialogue**.

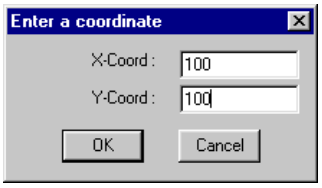
Enter **X: 0**, **Y: 0** in the coordinate dialogue.



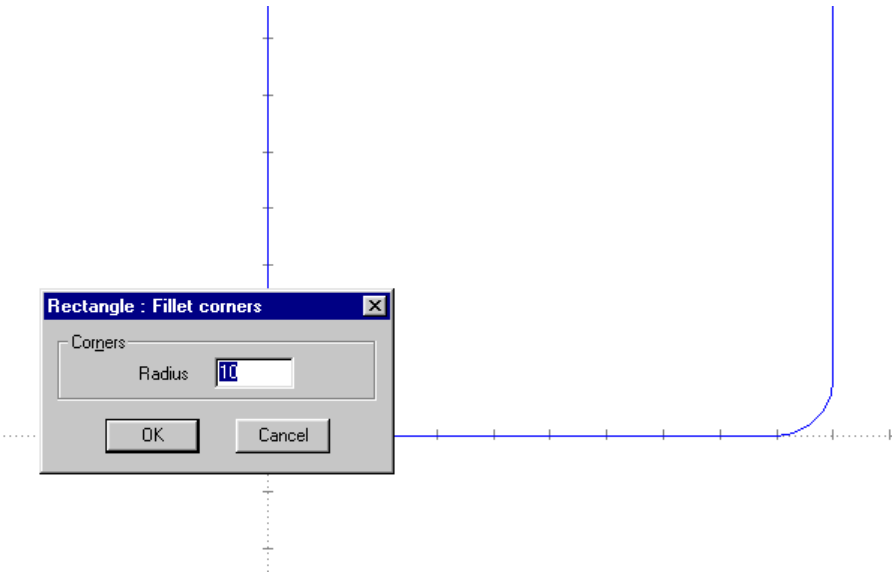

Then click **OK** and the position toolbar will again appear.

 Click the **coordinate icon** on the **position dialogue**.

For the coordinates of the opposite corner of the square enter **X: 100** and **Y: 100** in the dialogue and click **OK**.



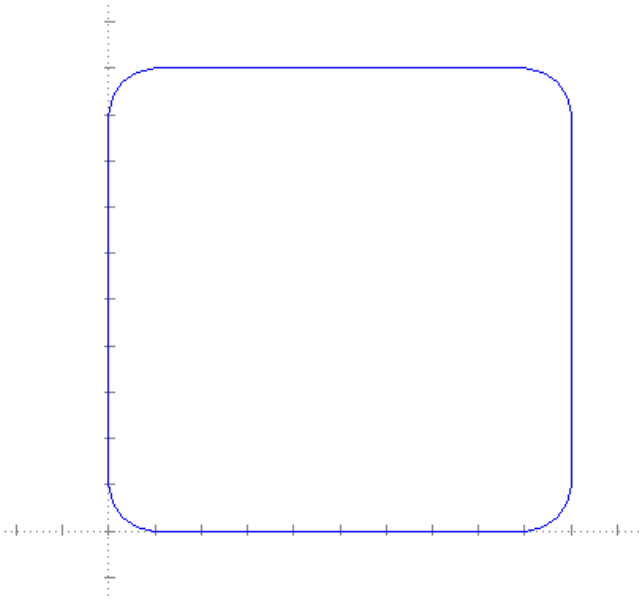
Then click **cancel** to end the rectangle function.



## Step 3. Changing your View

 Click the **view all icon** on the **standard toolbar**.

 Click the **reduce half icon** on the **standard toolbar**.

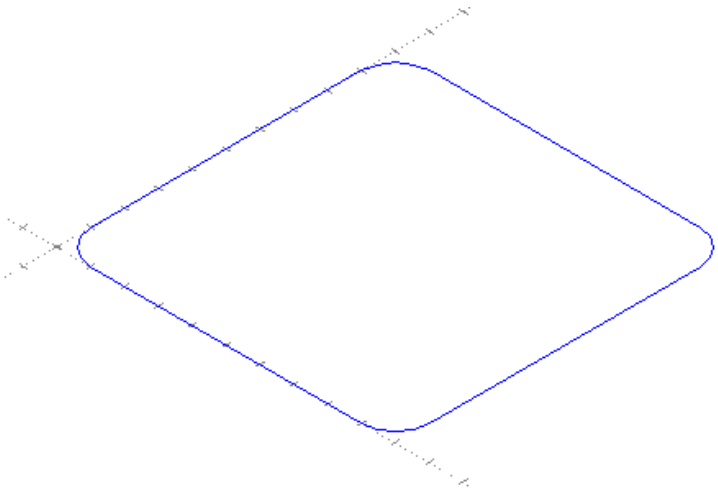


Now we will turn this in to a 3D object.

 Click the **change 3D views icon** on the **menu toolbar**.


Click the **Isometric view icon** on the **3D views dialogue**.

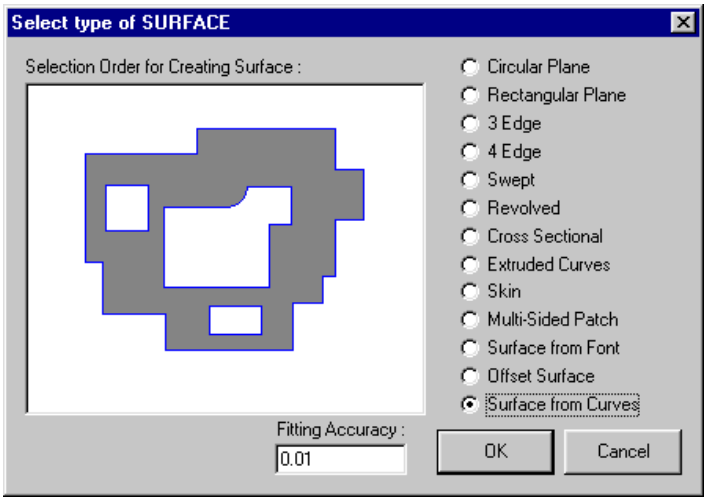
You will now see it in isometric view.



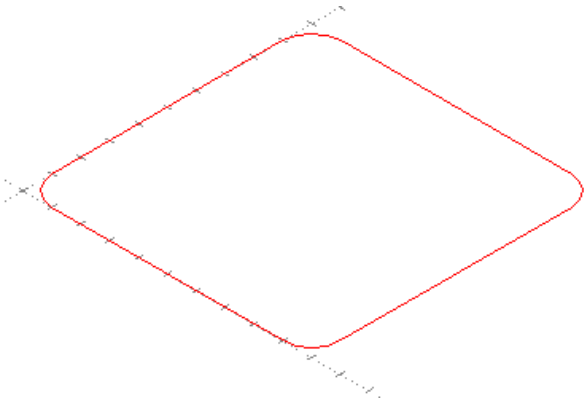
## Step 4. Surfacing the Wire Frame

 Click the **surfaces icon** on the **surfaces and solids toolbar**.

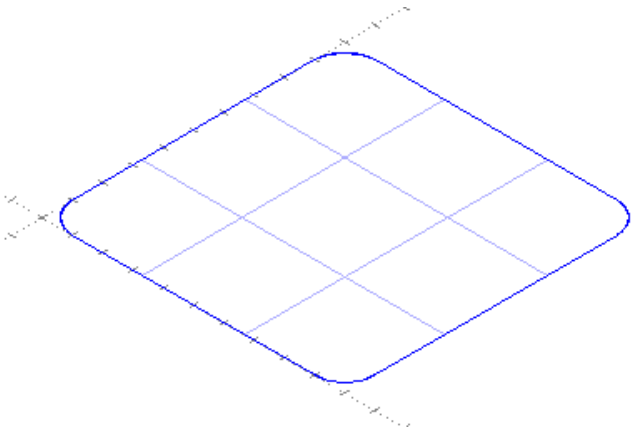
Then tag the **surfaces from curves** then click **OK**.




Select the **border** of the surface and it will turn red.



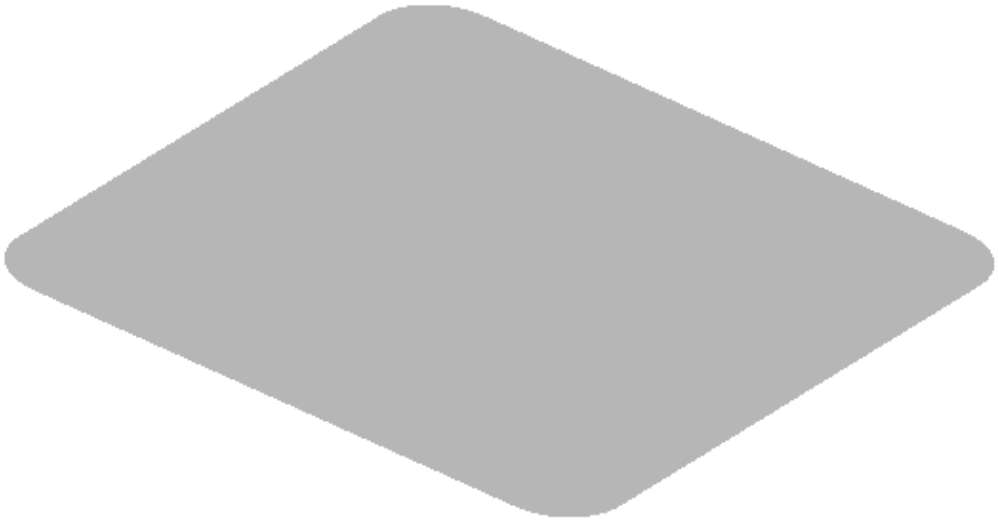
Then click the **right mouse button** to create the surface.



## Step 5. Viewing the Rendered Part

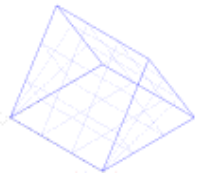
 Click the **render** **icon** on the **standard toolbar**.

Use the left mouse button to **rotate** and the right mouse button to **pan** the object.



# CAD Tutorial 4

## Create a Wireframe Surface and Solid Model.



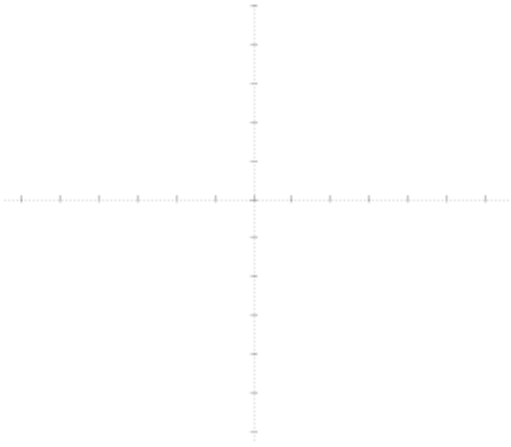
This is a tutorial to draw a wireframe then surface the wireframe to a closed form then turn it into a solid model.

Note: This help uses mm values.

### Step 1. Create a New Drawing


Click the **new drawing icon** on the **standard toolbar**.

You should have a blank drawing ready to surface a wireframe and create a solid.

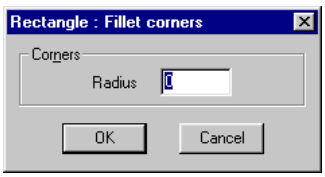


## Step 2. Drawing a Rectangle

 Click the **line icon** on the **menu toolbar**.

 Click the **rectangle icon** on the **line menu toolbar**.

The following dialogue will appear.

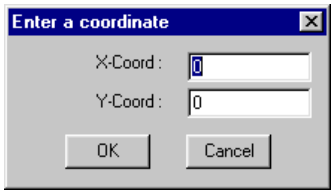



Enter the value of **0** then click **OK**.

Then the position toolbar will appear.

 Click the **coordinate icon** on the **position dialogue**.

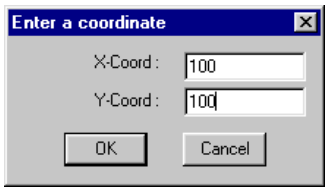
Enter **X: 0**, **Y: 0** in the coordinate dialogue.



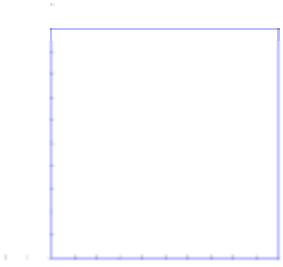

Then click **OK** and the position toolbar will again appear for the coordinate of the opposite corner of the square.

 Click the **coordinate icon** on the **position dialogue**.

Enter **X: 100** and **Y: 100** in the dialogue and click **OK**.



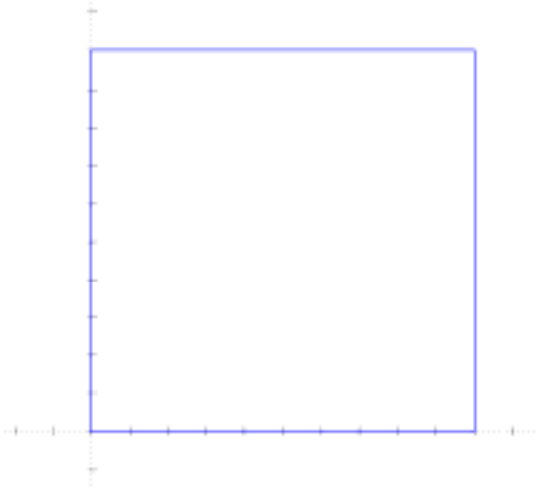

Then click **cancel** to end the rectangle function.



## Step 3. Changing your View

 Click the **view all icon** on the **standard toolbar**.

 Click the **reduce half icon** on the **standard toolbar**.

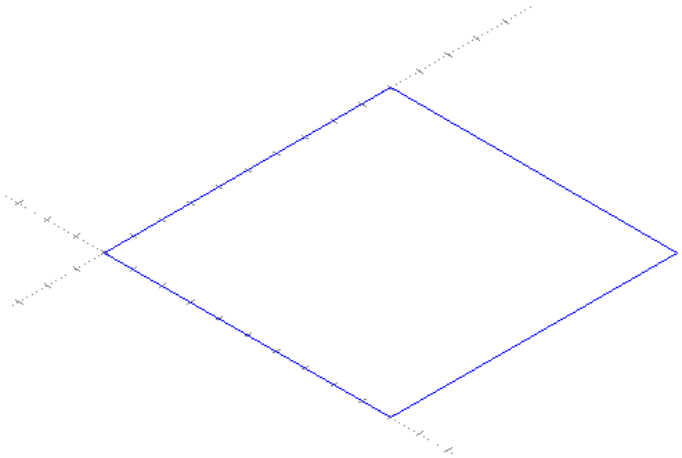


Now we will turn this in to a 3D object.

 Click the **change 3D views icon** on the **menu toolbar**.


Click the **Isometric view icon** on the **3D views dialogue**.

You will now see it in isometric view.



## Step 4. Drawing Lines for the Wire Frame

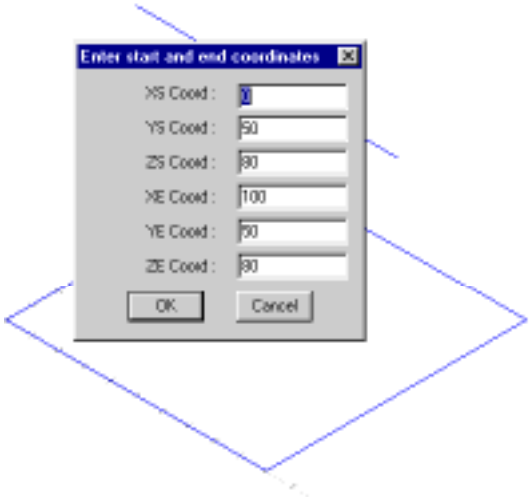

Click the **home icon** on the **menu toolbar**.

Click the **line icon** on the **menu toolbar**.

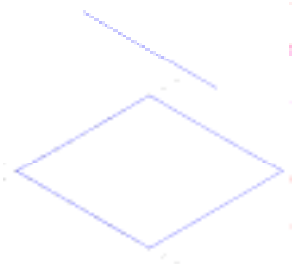
Click the **line by coordinates icon** on the **line menu toolbar**.

The following dialogue will appear.

Enter the following coordinates and click **OK** then click **cancel** to remove the dialogue after the line is created.

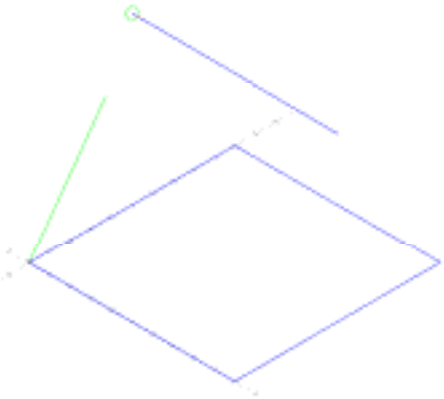



The drawing should now look as below

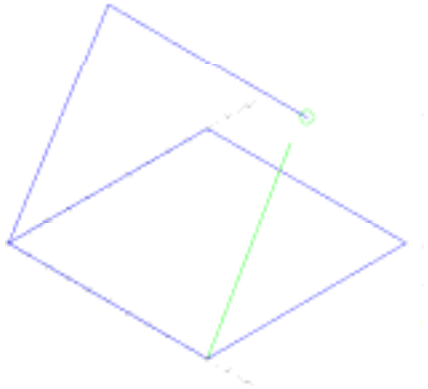


Click the **join line icon** on the **line menu toolbar**.

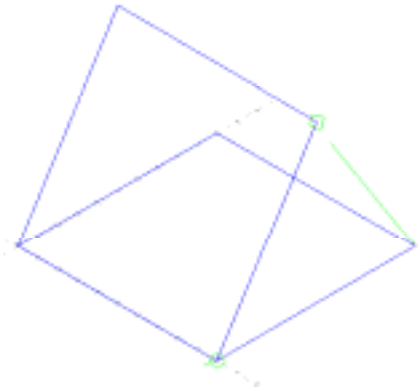
Join the line ends to the corners of the square.



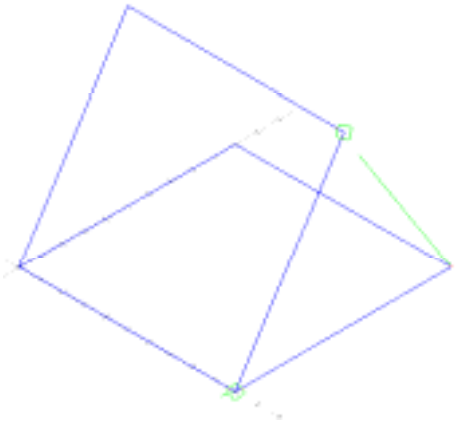
Then the next line



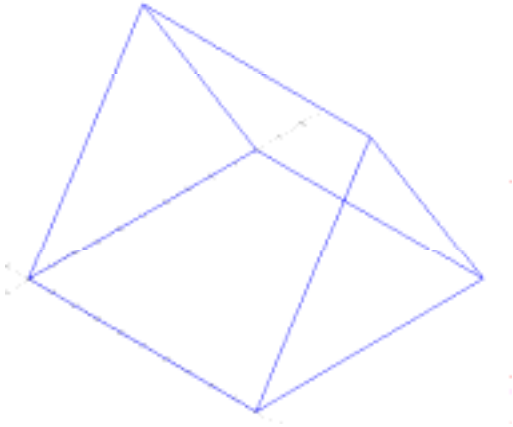
The third line



And the last line



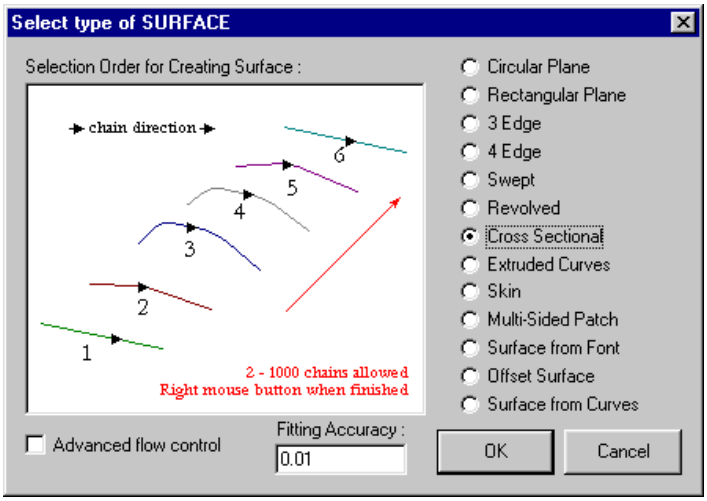
And it should now look like



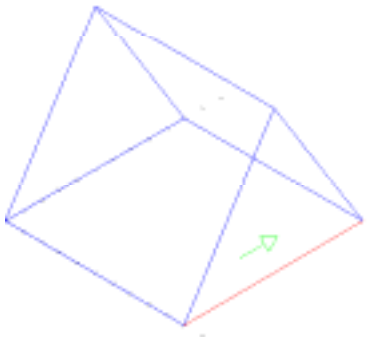
## Step 5. Surfacing the Wireframe

 Click the **surface icon** on the **surfaces and solids toolbar**.

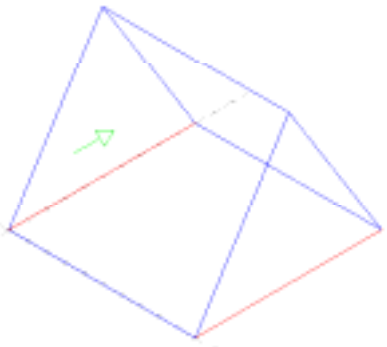
Tag the **cross sectional surface** box and click **OK**




Select the **first side** and then point the arrow like so, click the **left mouse button** and then click the **right mouse button** to finish selecting that side.

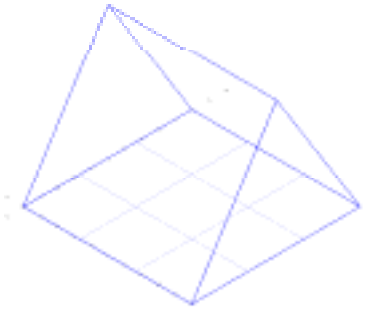


Then click the **next side** and point the arrow in the same direction then click the r**ight mouse button** to accept that side.

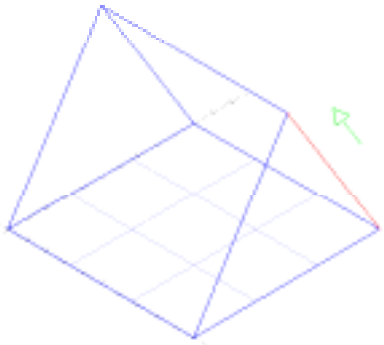


Then click the **right mouse button** again to complete the surface as there are no more edges to this surface.

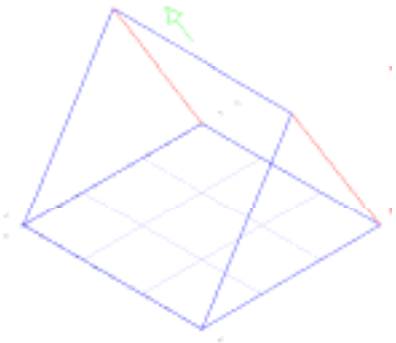
That surface is now created.



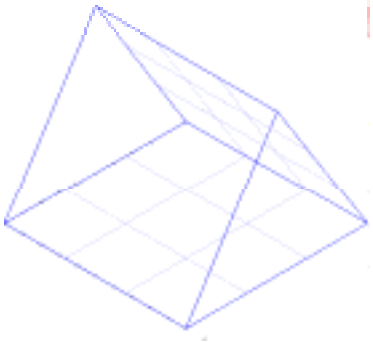
We will now surface the next face. Select the **first side**.



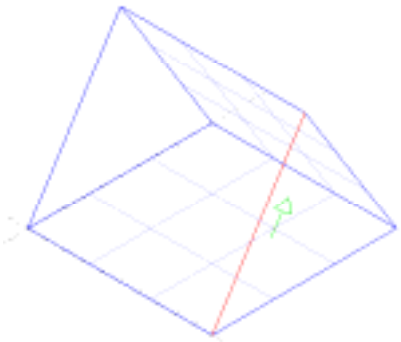
Then the **second side**

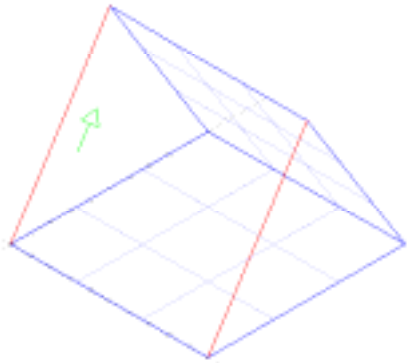


Then click the **right mouse button** again to complete

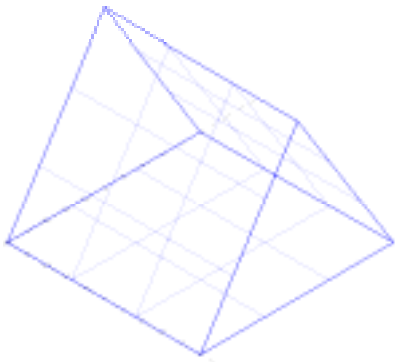


And the next surface by the same method

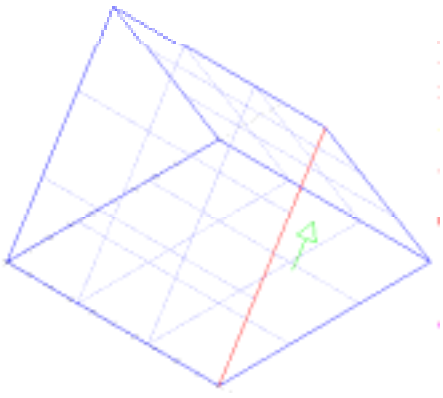




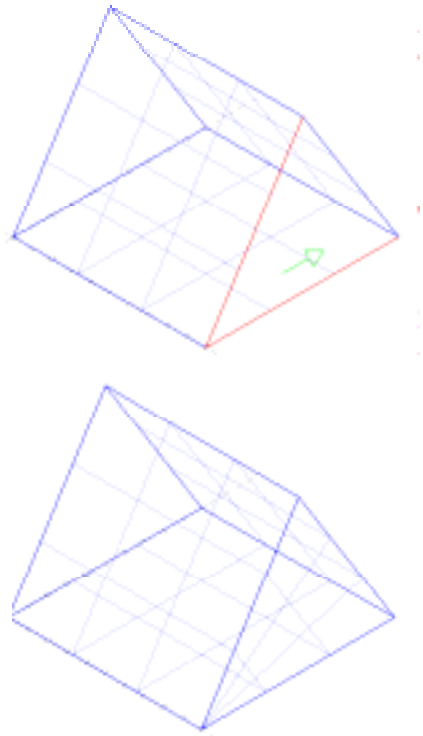
Now that face is completed and now we will do the two ends.



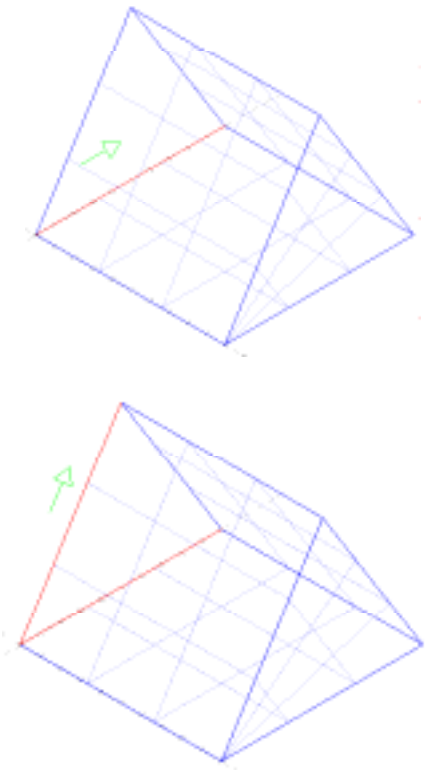
Select this edge and point the arrow in this direction

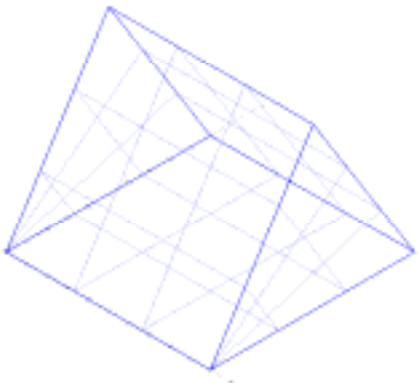


And the next



And the other side by the same method





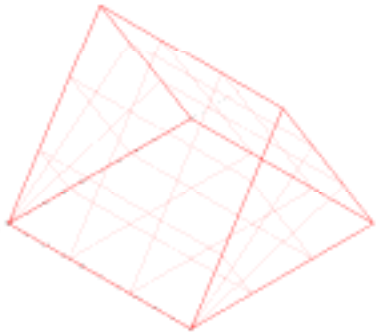
The wireframe is now fully surfaced.

## Step 6. Creating a Solid

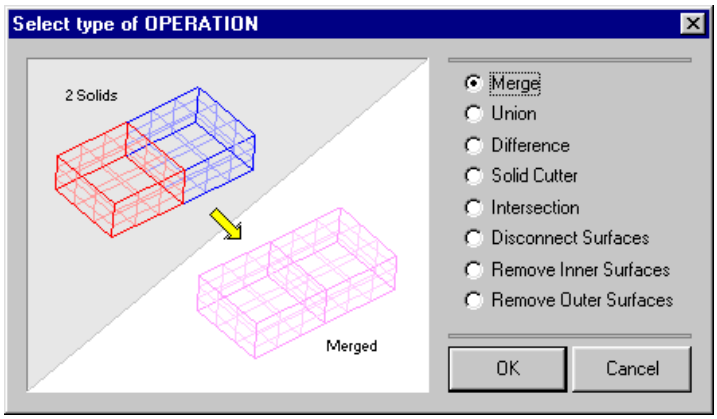
 Click the **single entity selection icon** on the **selection toolbar**.

Select all the surfaces individually, until they are all red.

**NOTE:** Do not use select all as the wireframe would also be selected and all we want is all if the surfaces.

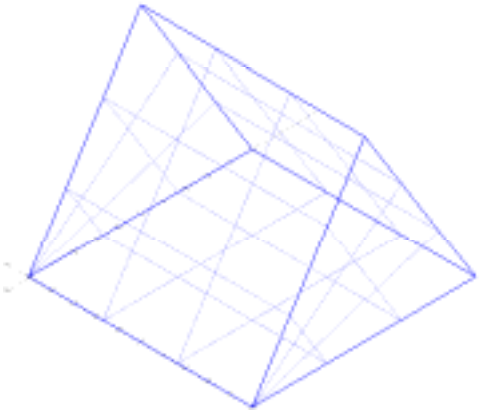


 Click the **surface solids operations icon** on the **surface and solids toolbar**.




Tag the **merge** button and click **OK**

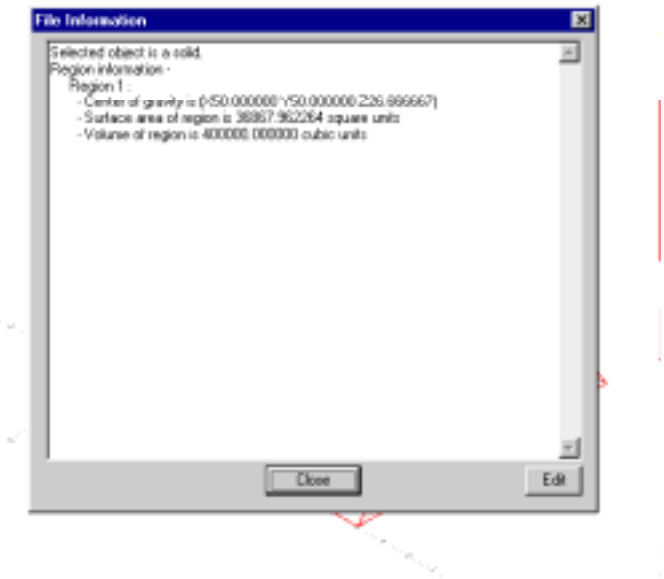
A solid is now created.



## Step 7. Viewing Information on a Solid

 Click the **verify single entity icon** on the **standard toolbar**.

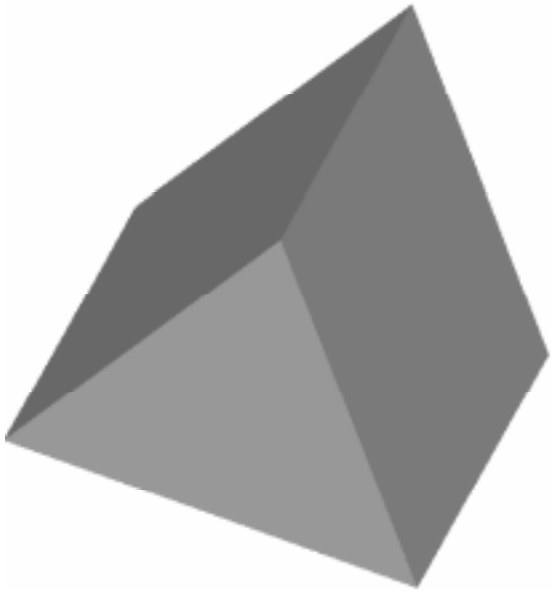
Select the object and the following dialogue will be displayed showing useful information on the object.




## Step 8. Rendering a Solid

 Click the **render icon** on the **standard toolbar**.

Use the left mouse button to **rotate** and the right mouse button to **pan** the object.



# CAD Tutorial 5

## Create a Solid Model 

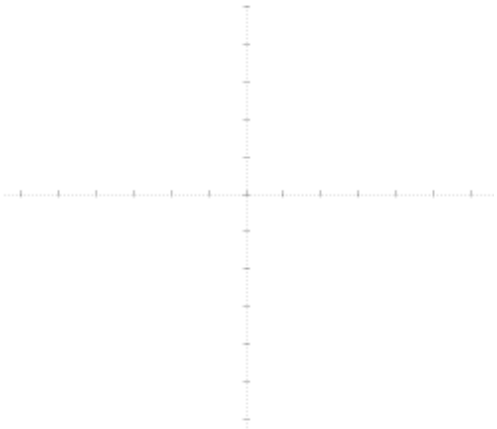
This tutorial is for creating the model of a rectangular solid.

NOTE: This tutorial is in mm.

### Step 1. Create a New Drawing

 Click the **new drawing icon** on the **standard toolbar**.

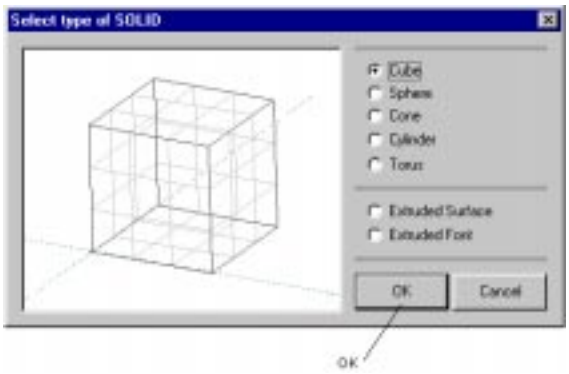
You should have a blank drawing ready to draw your solid.



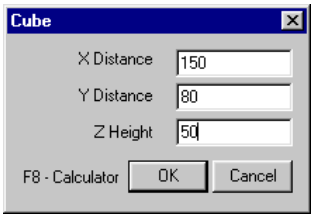
## Step 2. Creating the Solid


Click the **create solid icon** on the **surfaces and solids toolbar**.

Select Cube.




Then click **OK** and enter the cube details as shown below .




Then click **OK**.


Click the **coordinate icon** on the **position dialogue**.

The corner position dialog will show.

Enter the corner of the body coordinates **X: 20** and **Y: 20**


Then click **OK.**

The solid body for the bottle is then created.

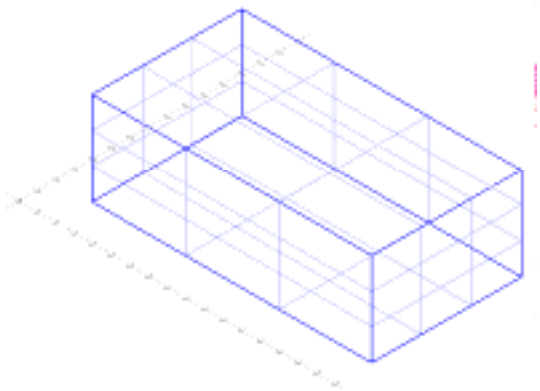
## Step 3. Changing the View

 Click the **change 3D view icon** on the **menu dialogue**.

Click the **isometric view icon** on the **change 3D views dialogue**.

 Click the **view all icon** on the **standard toolbar**.

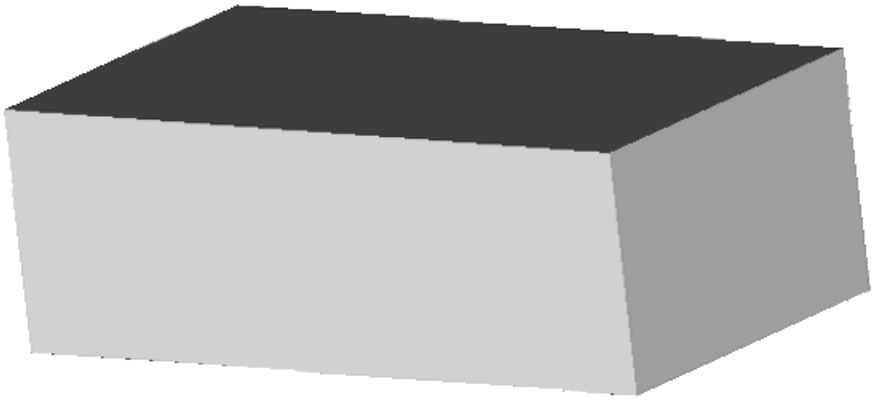
The view should look like this now.



## Step 4. Rendering the Object

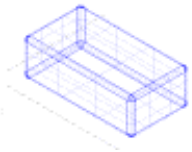
 Click the **render icon** on the **standard toolbar**

You will then see the rendered model.



# CAD Tutorial 6

## Create a Solid Model and Fillet It

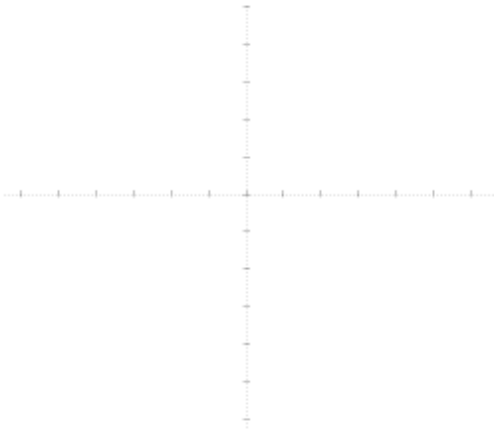


This tutorial is for creating a rectangular solid and filleting it.

## Step 1. Create a New Drawing


Click the **new drawing icon** on the **standard toolbar**.

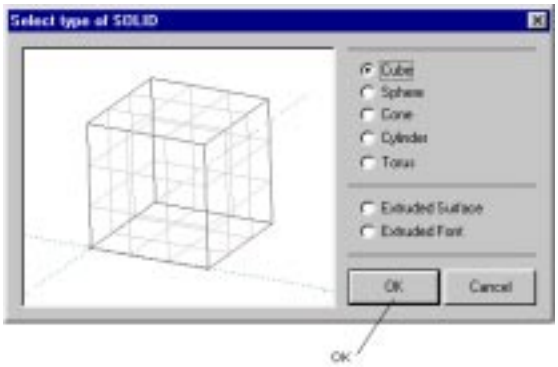
You should have a blank drawing ready to draw your solid.



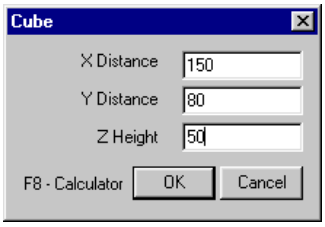
## Step 2. Creating the Solid


Click the **create solid icon** on the **surfaces and solids toolbar**.

Select Cube.




Then click **OK** and enter the cube details as shown below .

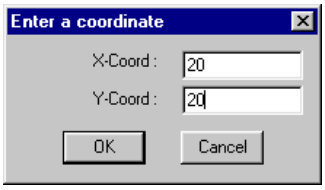



Then click **OK**.


Click the **coordinate icon** on the **position dialogue**.

The corner position dialog will show.

Enter the corner of the body coordinates **X: 20** and **Y: 20**




Then click **OK.**

The solid body for the bottle is then created.

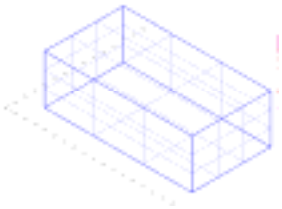
## Step 3. Filleting the Solid


Click the **change 3D view icon** on the **menu dialogue**.

Click the **isometric view icon** on the **change 3D views dialogue**.


Click the **view all icon** on the **standard toolbar**.

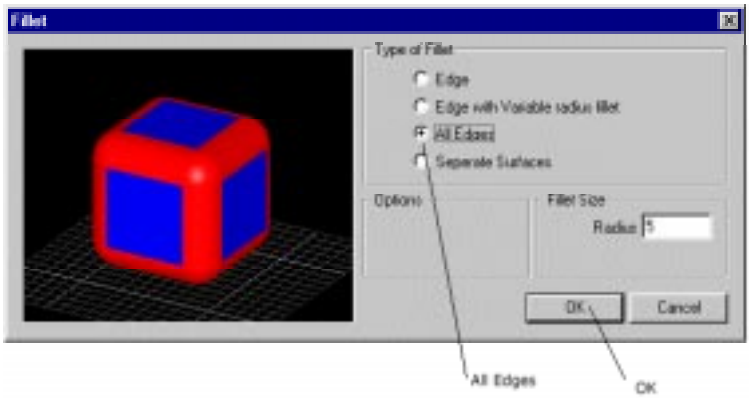
The view should look like this now.



We will now fillet the solid body with a 5 mm fillet.

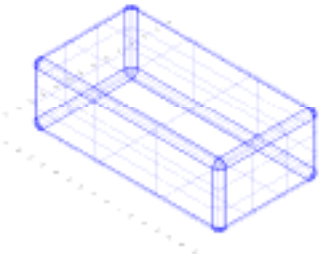

Click the **fillet surfaces or solids icon** on the **surfaces and solids toolbar**.

The following dialogue will appear.




Select **All edges** and enter the **radius 5mm**.

Then click **OK** and select the solid body.



The body is then filleted on all edges.

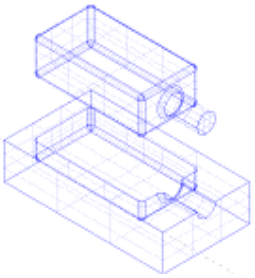
## Step 4. Rendering the Object

 Click the **render** **icon** on the **standard toolbar**

You will then see the rendered model.

# CAD Tutorial 7

## Create a Mold Cavity and Core

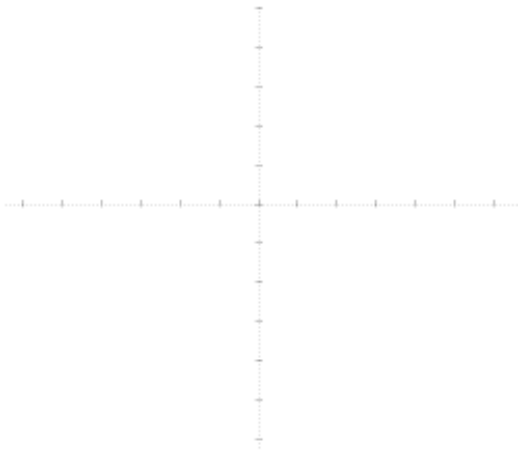


This tutorial is for creating the model of a bottle creating a die cavity for it by subtracting one model from another.

### Step 1. Create a New Drawing


Click the **new drawing icon** on the **standard toolbar**.

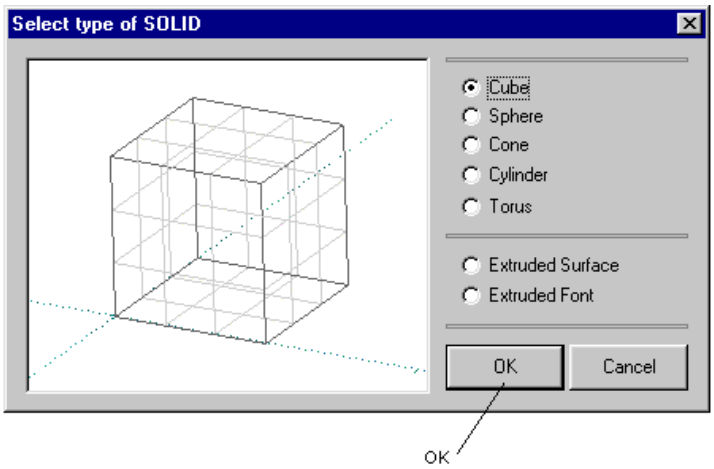
You should have a blank drawing ready to draw your solid.



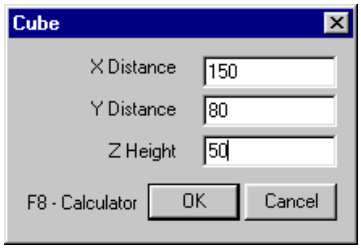
## Step 2. Creating the Body


Click the **create solid icon** on the **surfaces and solids toolbar**.

Select Cube.




Then click **OK** and enter the cube details as shown below .

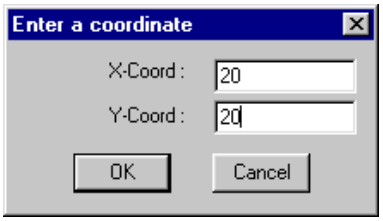



Then click **OK**.


Click the **coordinate icon** on the **position dialogue**.

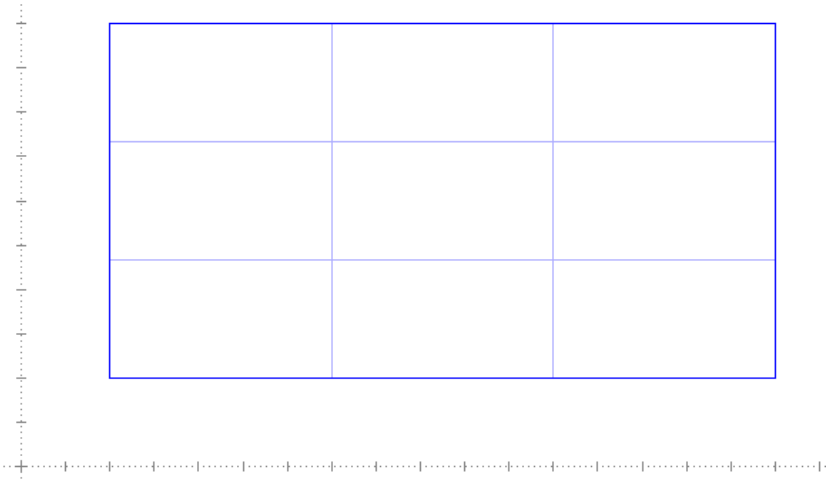
The corner position dialog will show.

Enter the corner of the body coordinates **X: 20** and **Y: 20**




Then click **OK.**

The solid body for the bottle is then created.



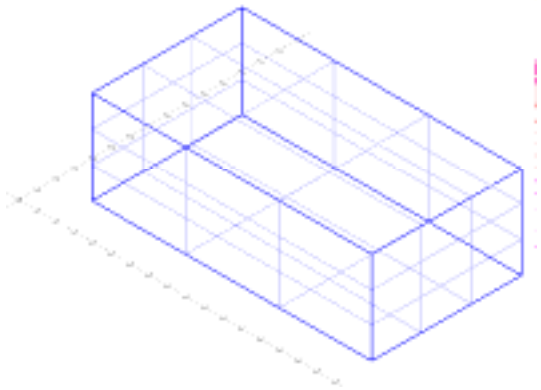
## Step 3. Changing the View

 Click the **change 3D view icon** on the **menu dialogue**.


Click the **isometric view icon** on the **change 3D views dialogue**.

 Click the **view all icon** on the **standard toolbar**.

The view should look like this now.

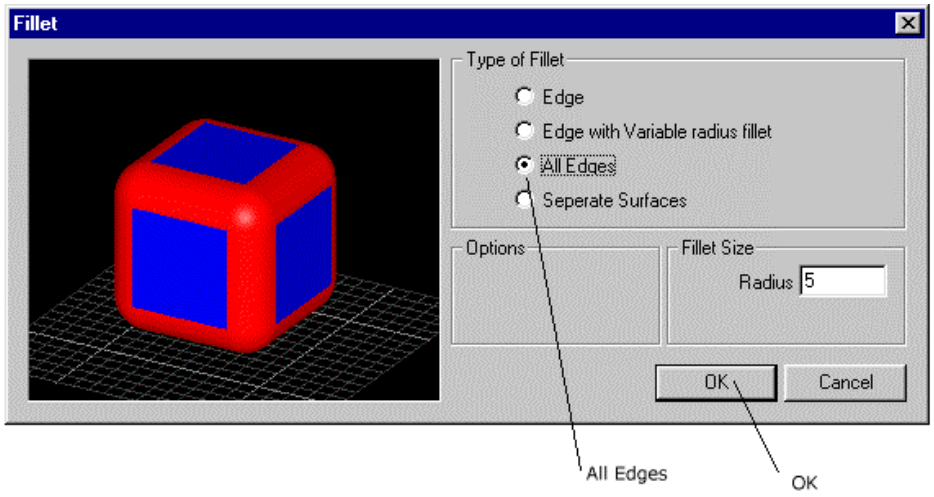


## Step 4. Filleting the Body

We will now fillet the solid body with a 5 mm fillet.

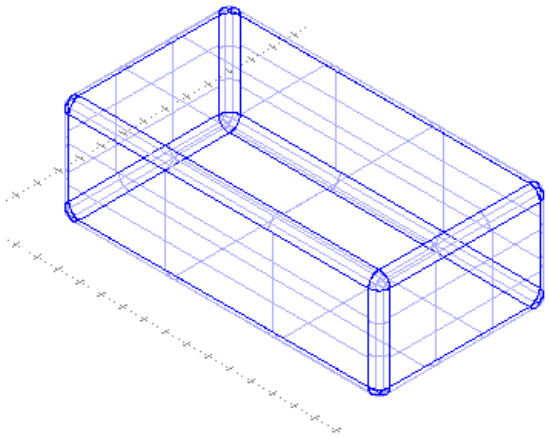
 Click the **fillet surfaces or solids icon** on the **surfaces and solids toolbar**.

The following dialogue will appear.




Select **All edges** and enter the **radius 5mm**.

Then click **OK** and select the solid body.

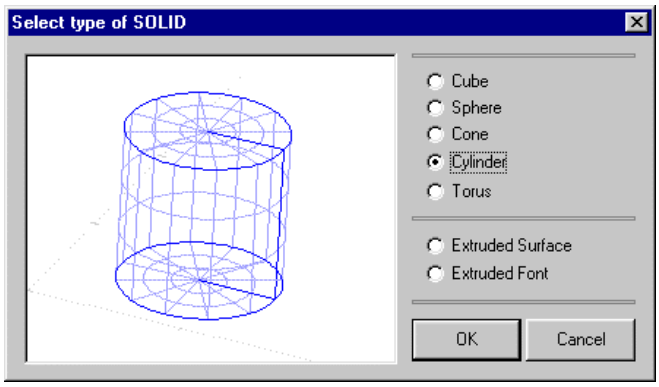


The body is then filleted on all edges.

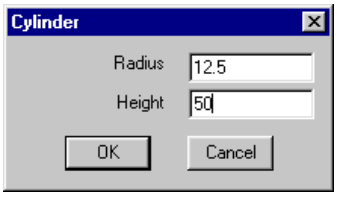
## Step 5. Creating and Joining the Bottle Neck

 Click the **create solid icon** on the **surfaces and solids toolbar**.

Select **cylinder.**




Then click **OK**.

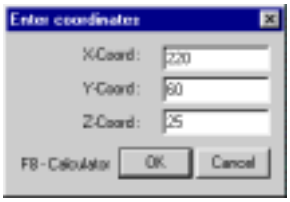



Enter the values for the neck and click **OK**.

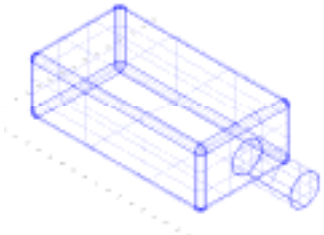
 Click the **Y Z icon** on the **planes dialogue**

 Click the **coordinate icon** on the **position dialogue**.

Enter the values of the center of the body end.




Then click **OK** and the neck is created.



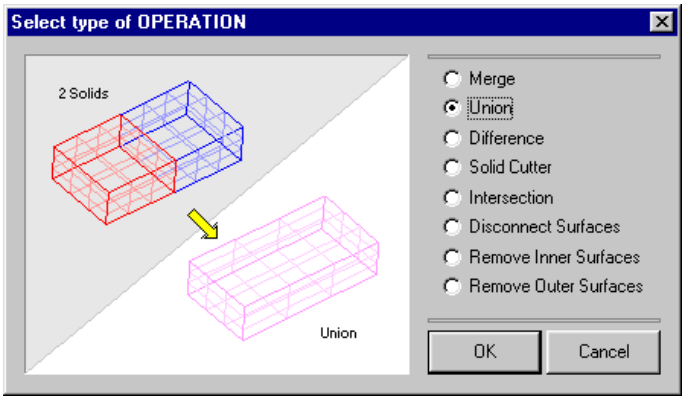
We will now union these two solids to form one.

 Click the **select single entity icon** on the **selections toolbar**

Select the **body** then the **neck** so that they are both red.

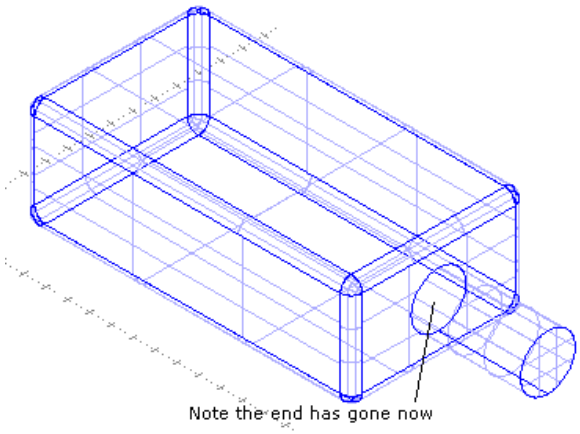
 Click the **solids and surface operations icon** on the **solids and surfaces toolbar**

Select **union**.




Then click **OK**.

The two solid will then union to form one solid.

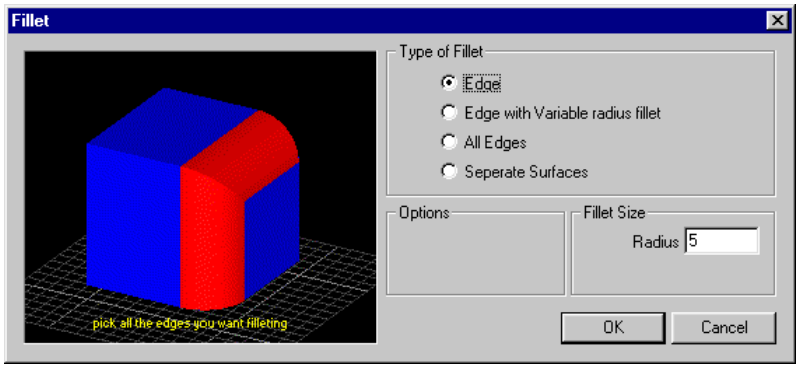


## Step 6. Filleting the Neck

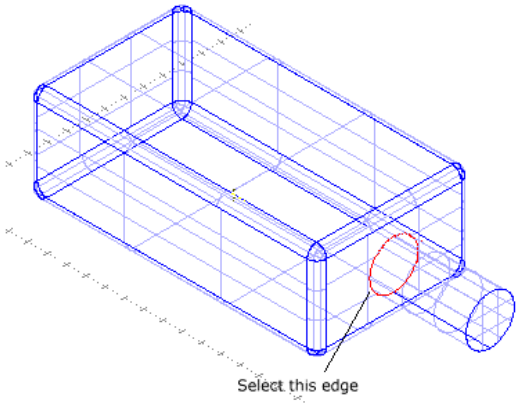
We will now fillet the neck of the bottle where it joins the body.

 Click the **fillet surfaces or solids icon** on the **surfaces and solids toolbar**.

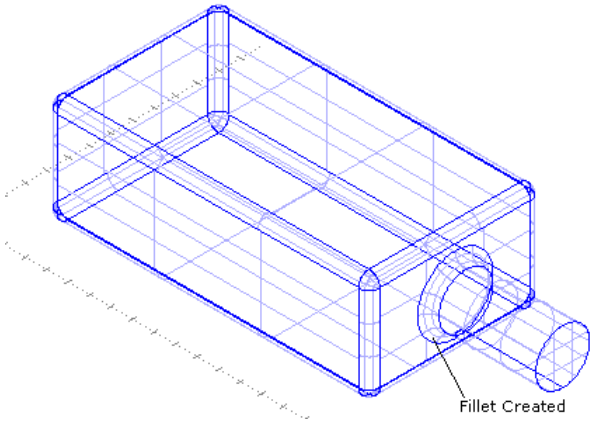
Then select **edge** and enter the **radius value** of the fillet and click **ok**.




Then select the **neck edge** and it will turn red.




Then click the **right mouse button** and the fillet will be created.

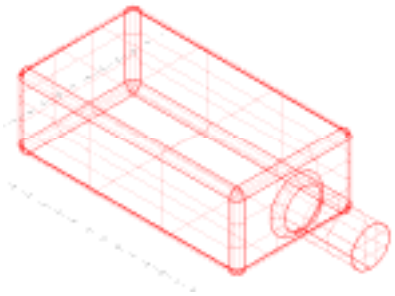


## Step 7. Moving the bottle

We will now position the model where we want it to create the die cavity for it.

 Click the **select single entity icon** on the **selections toolbar**

Then select the **bottle**.



The bottle will turn red after selection.

 Click the **move/copy/scale icon** on the **selections toolbar**

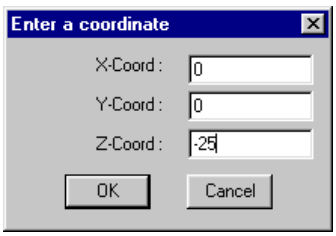
The following dialogue will appear.

Then select **OK** as is, because we don't want to make a copy but just move it and keep the present scale.

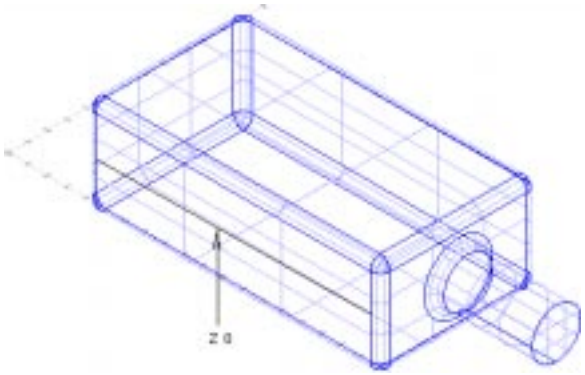

The position dialogue will then appear.

 Click the **incremental icon** on the **position dialogue**.

Enter the value **- 25** in **Z** and **X Y** leave at **0**




Then click **OK**.




And the bottle is lowered in Z by 25 mm so the center of the bottle is at Z 0.

## Step 7. Copying the Bottle

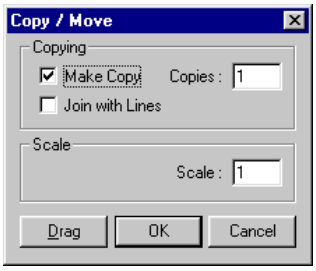
We will now make a copy of the bottle on another layer for use later.

 Click the **select single entity icon** on the **selections toolbar**

Select the **model** it will turn red.

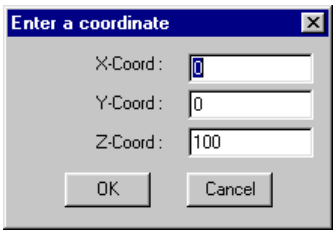
 Click the **move/copy/scale icon** on the **selections toolbar**

Click **make copy** and click **OK**.

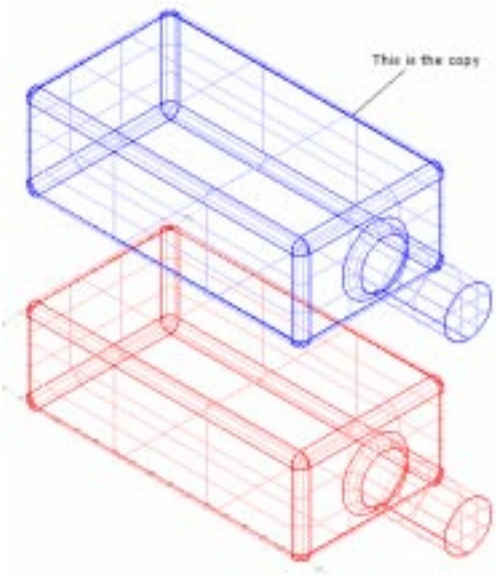



 Click the **incremental icon** on the **position dialogue**.

Enter **Z: 100**.




Click OK and there will be a copy of the bottle made above the present one.



## Step 8. Creating the Die Block

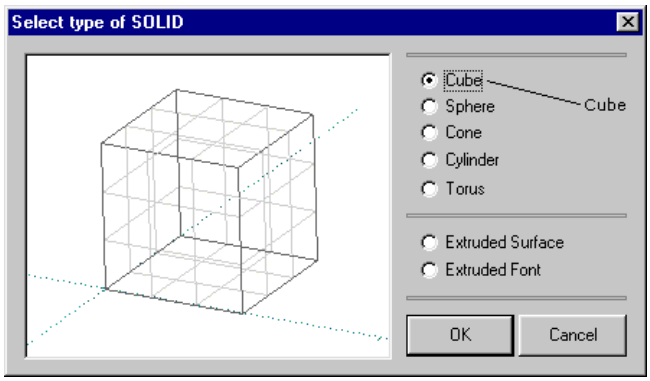
We made a copy as we are now going to make a die block and subtract the bottle from the die block and that copy will be lost, so that is why we have created a copy.

We will now create the die block.

 Click the **create solid icon** on the **surfaces and solids toolbar**

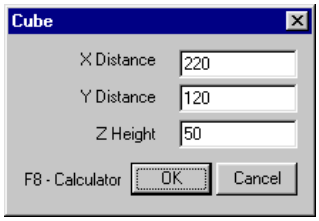
The following dialogue will appear.

Select **cube**.




Then click **OK**.

Enter the following details.

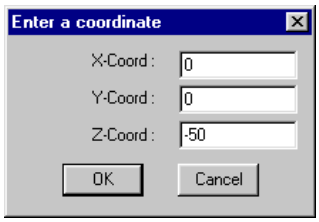



Then select **OK**.

 Click the **coordinate icon** on the **position dialogue**.

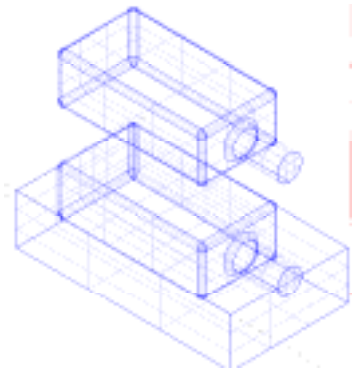
This will create the position the die block will sit at.

Enter **X: 0**, **Y: 0**, **Z: -50**.




Then click **OK**.

And the die block is created as shown below.

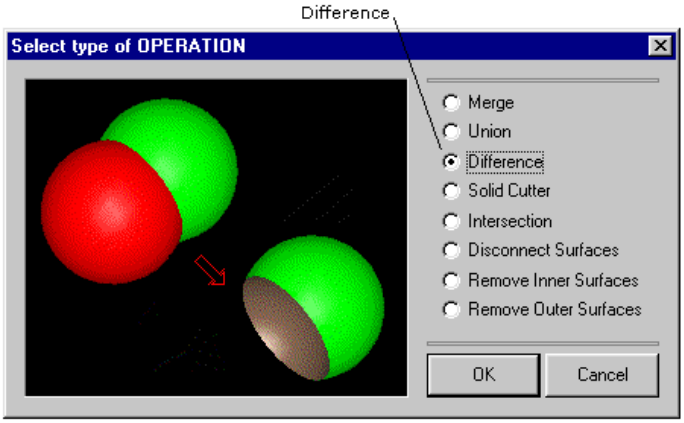


We will now subtract the model of the lower bottle away from the die block to leave the cavity for the half bottle.

 Click the **solids and surface operations icon** on the **solids and surfaces toolbar**

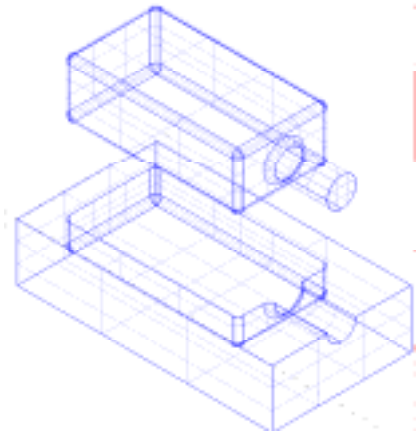
The following dialogue will appear.

Select **Difference**.




Click **OK**.

Then click and select the **die block** then the **lower bottle** and the cavity will be formed as shown below..



## Step 9. Changing the Color and the Layer of the Bottle

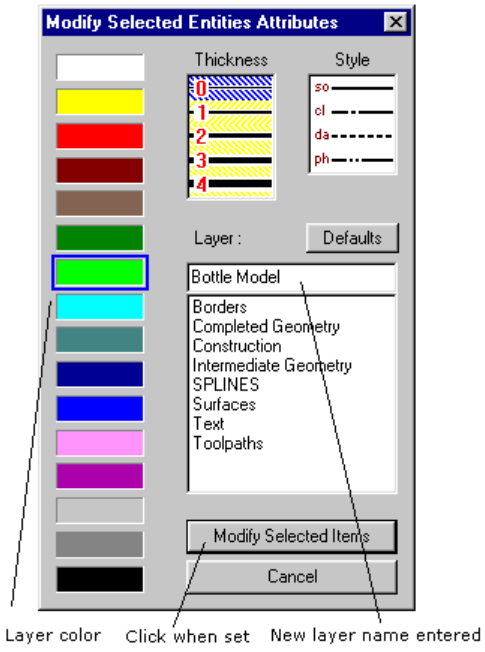
 Click the **select single entity icon** on the **selections toolbar**

Then select the **bottle model above** the die cavity**.**

It will turn red.

 Click the **modify selected entity icon** on the **menu toolbar**

Then select **green** and enter a **new layer name: Bottle Model**.

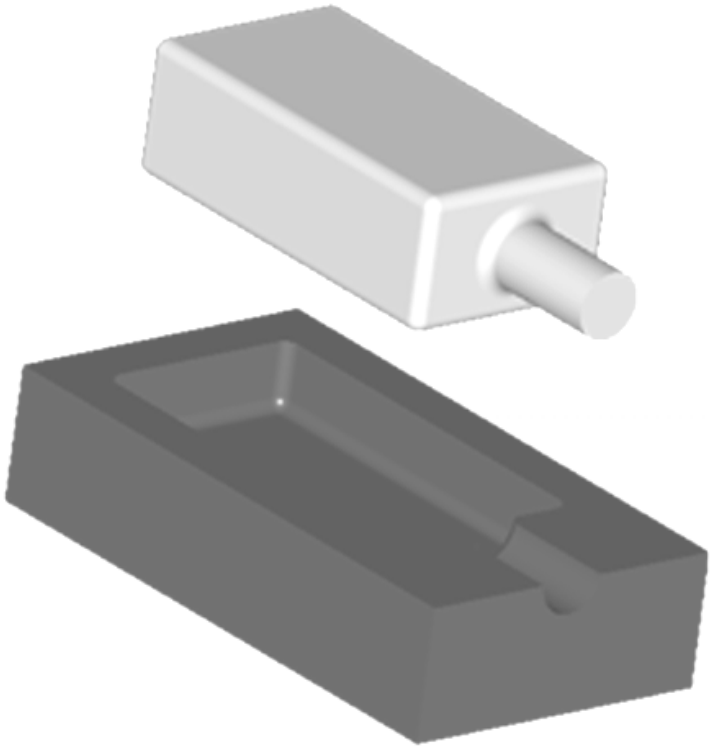



Then click **modify selected items**.

The layer and color will be changed.

## Step 10. Rendering the Bottle

 Click the **render** **icon** on the **standard toolbar**.

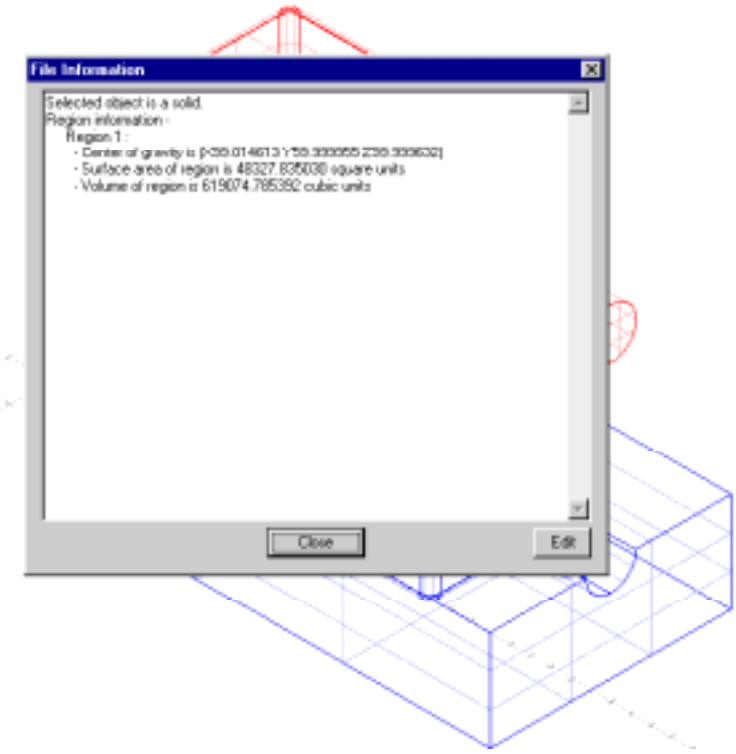


## Step 11. Viewing Information on the Bottle

With a solid model you also have other valuable information about the Solid.

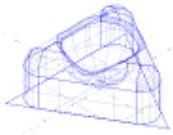
 Click the **verify single entity icon** on the **standard toolbar**.

Then select the **solid model of the bottle** and the following information will be displayed.



# CAD Tutorial 8

## Create Wireframe Surface and Solid



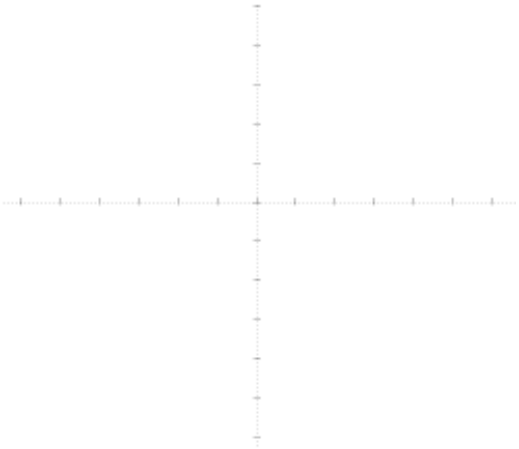
This tutorial is designed to teach you how to create a model using wireframe, surface and solid geometry.

Note: The unit values shown in this help topic are inch values.

## Step 1. Create a New Drawing


Click the **new drawing icon** on the **standard toolbar**.

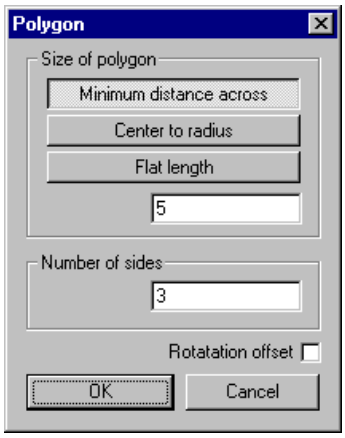
You should have a blank drawing ready to draw a triangle.



## Step 2. Creating a Wireframe Triangle

 Click the **create polygon icon** on the **line menu toolbar**.

The following Dialogue Box will Appear:

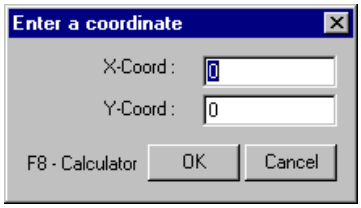



Enter the following details and click **OK**.

The Position Toolbar will now appear.

 Click the **coordinate icon** on the **position dialogue**.

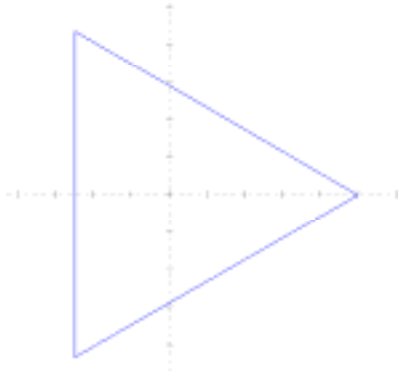
The following dialogue will appear enter **X: 0**, **Y: 0** and click **OK**




Click **Cancel** to end this function, when the polygon dialogue reappears.

 Click the **view all icon** on the **standard toolbar**.

 Click the **reduce half icon** on the **standard toolbar**.

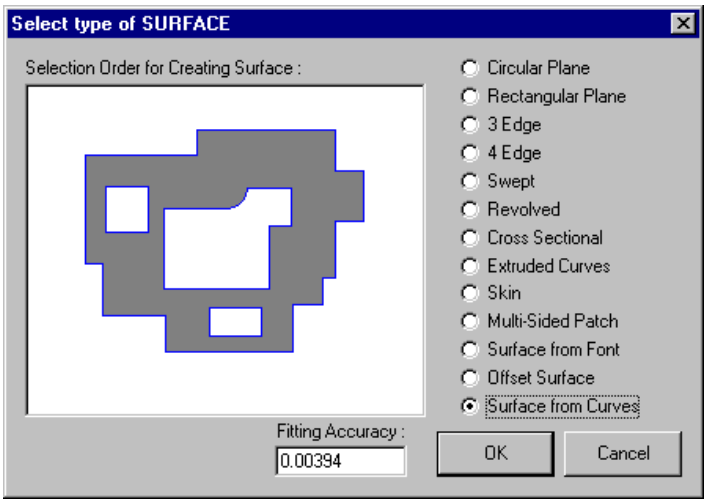


## Step 3. Surfacing the Triangle

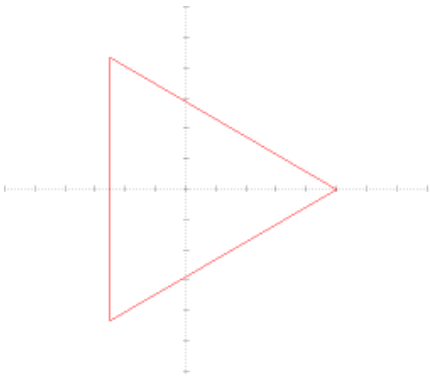
From here we will use the chain that consists of the three lines that make up the polygon to create a surface.

 Click the **create a surface icon** on the **surfaces and solids toolbar**

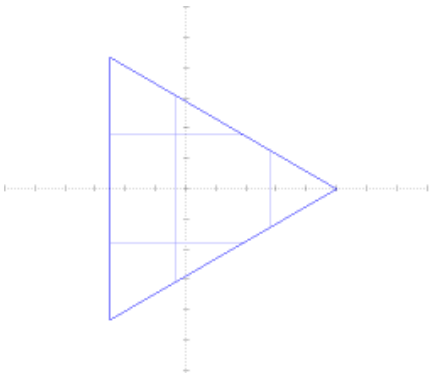
Click the **surface from curves** box and click **OK.**




Click the **left mouse button** onto **any line** on the triangle



Then click the **right mouse button** and the surface will be created.



## Step 5. Creating a Solid from the Triangle

We will now create a solid by extruding the surface 3 inches up in Z.

Now we will turn the triangle in to a 3D object.

 Click the **change 3D views icon** on the **menu toolbar**.

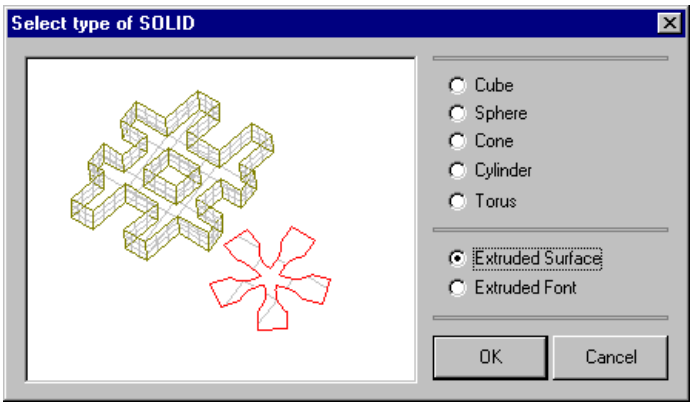

Click the **Isometric view icon** on the **3D views dialogue**.

You will now see it in isometric view.

Now we will create a solid from the triangle.

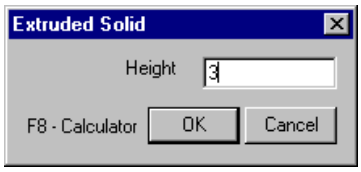
 Click the **create solid icon** on the **surfaces and solids toolbar**

The following dialogue will appear:




Select **Extruded Surface** and Click **OK**.

The following dialogue box will appear:




Enter **height: 3** and Click **OK**.

Select the **triangle** with the **left mouse button** to create the solid.

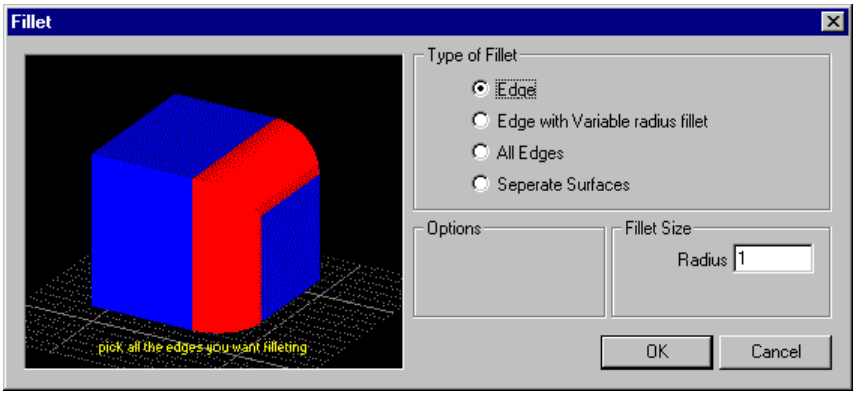
The result is the surface has been extruded up 3" to create a solid.

## Step 6. Filleting the Solid

We will now place a 1" fillet between the top and sides and the corners of the model.

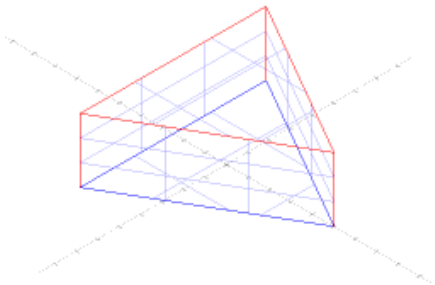
 Click the **fillet surfaces or solids icon** on the **surfaces and solids toolbar**.

The following dialogue box will appear:



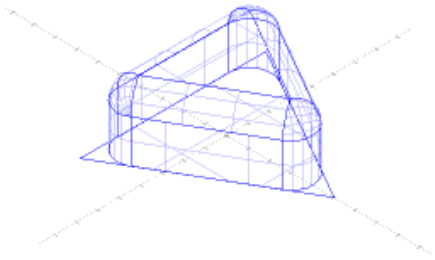

Select **Edge** for Type of Fillet and enter Radius: 1 and click **OK**.

Using the **left mouse button** select all the **edges that make up the top and the side** of the solid.



Click the **right mouse button** to create the filleting.

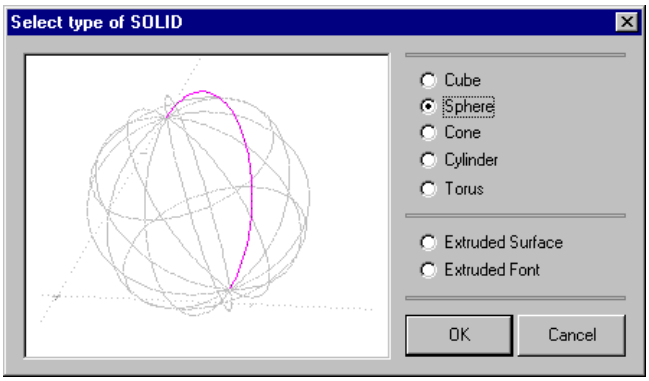
A 1" fillet is created between all corners and between the side and to surfaces as seen below.



## Step 7. Creating a Sphere for the Difference Function

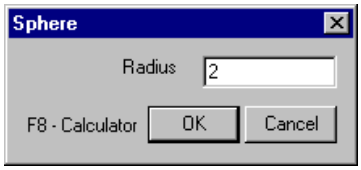
 Click the **create solid icon** on the **surfaces and solids toolbar**

The following dialogue box will appear:



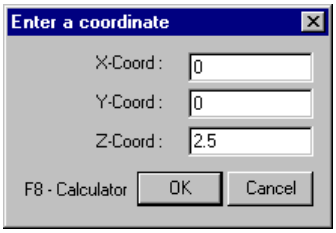

Select **Sphere** and Click **OK**.

Enter **Radius: 2** and Click **OK**

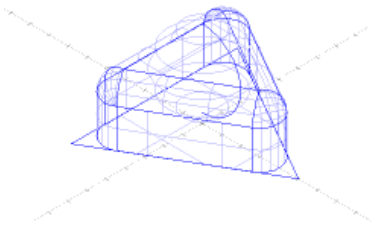



 Click the **coordinate icon** on the **position dialogue**.

Enter **X: 0**, **Y:0**, **Z: 2.5** in the dialogue box, then click **OK**.




A 4" diameter sphere is drawn with a center at X0, Y0 , Z2.5 and intersects the triangular solid we created.

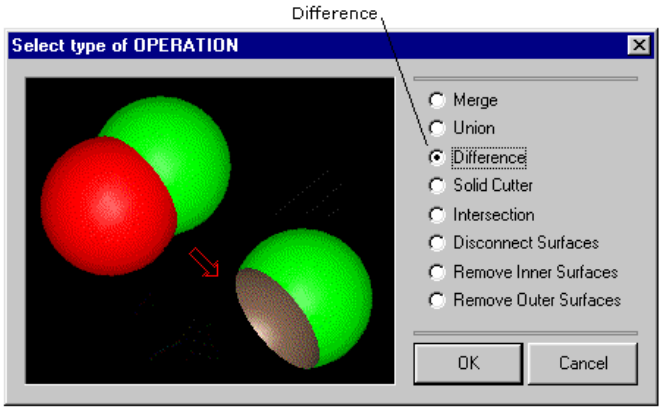


We are now going to remove the section of the sphere that intersects the triangular solid and create a cavity.

 Click the **solids and surface operations icon** on the **solids and surfaces toolbar**

The following dialogue will appear.

Select **Difference**.

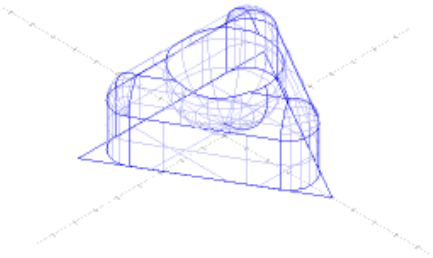



Click **OK.**

First click the **object to be modified**, which is the **triangular base.**

Secondly click the **object to be removed**, which is the **sphere**.

The sphere has been removed from the triangular solid where they intersect.



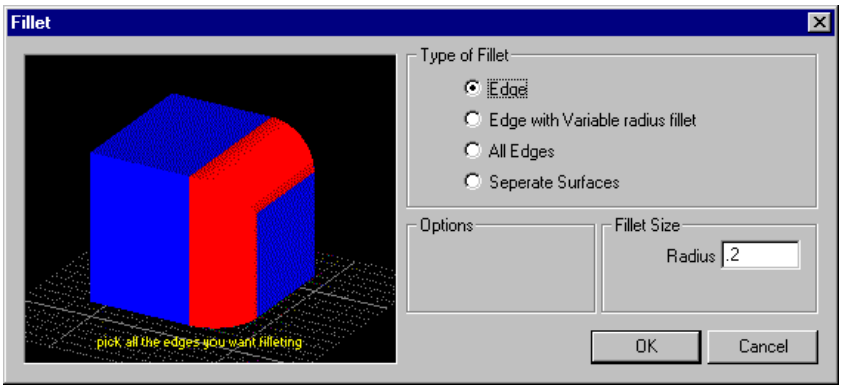
## Step 8. More Filleting

We will now put a .2' fillet along the edge where the sphere was removed from the solid.

 Click the **fillet surfaces or solids icon** on the **surfaces and solids toolbar**.

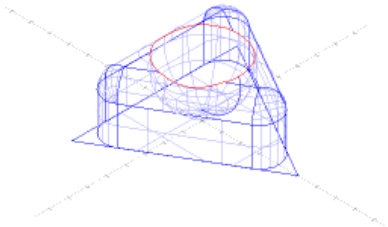
The Fillet dialogue box will appear like below:

Select **edge.**



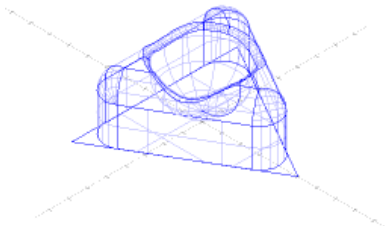

Enter **Radius: .2** and click **OK**.

With the left mouse button select **all segments** that make up the circle on top. So that your drawing should match the drawing below.



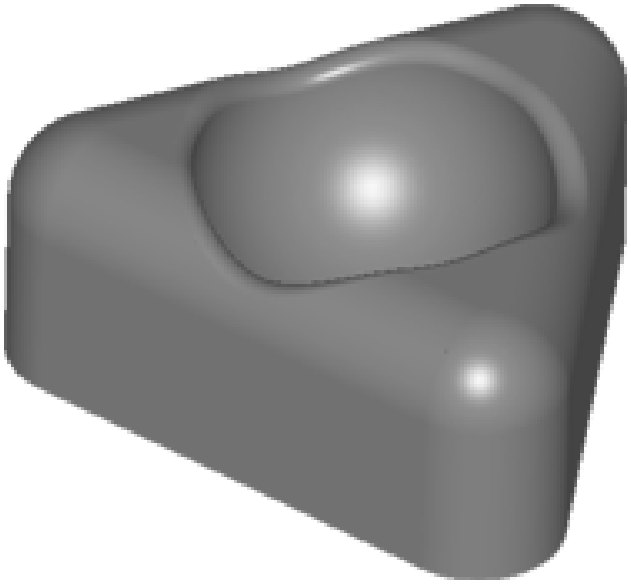
After all have been selected **right mouse click**.

A .2" radius is created around the circular opening at the top of the model.



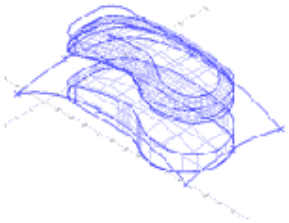
## Step 9. Rendering the Object

 Click the **render** **icon** on the **standard toolbar**.



# CAD Tutorial 9

Draw a 3D model of a Mouse.



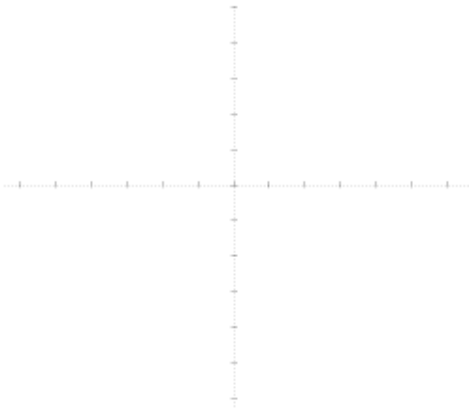
In this tutorial we will create a model of a mouse.

NOTE: This tutorial uses **mm** values.

## Step 1. Create a New Drawing


Click the **new drawing icon** on the **standard toolbar**.

You should have a blank drawing ready to draw.

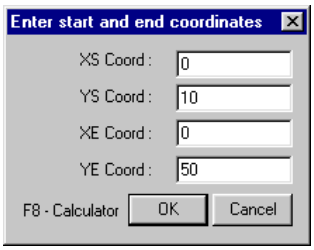


## Step 2. Create a Wireframe 2D Mouse Shape


Click the **line icon** on the **menu toolbar**.

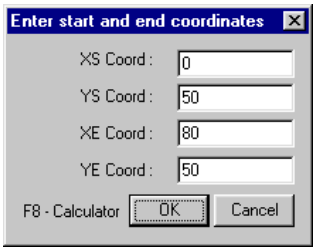

Click the **line by coordinates icon** on the **line menu toolbar**.

Enter the following values and click **OK.**



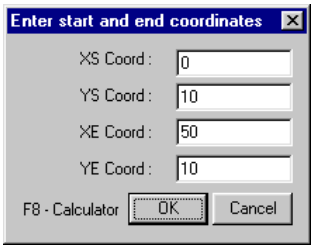

And the line is created.

Enter the following values and click **OK.**




And the line is created.

Enter the following values and click **OK.**




And the line is created.

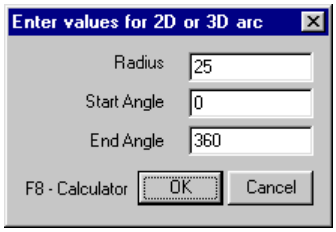
Click **cancel** to end the line function.


Click the **home icon** on the **menu toolbar**.

Click the **arc and spline icon** on the **menu toolbar**.

Click the **circle or arc icon** on the **arc and spline menu toolbar**.

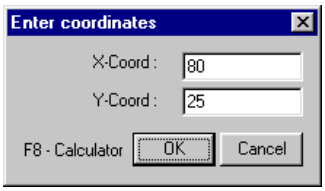
The following dialogue will appear, enter the following details and click **OK**



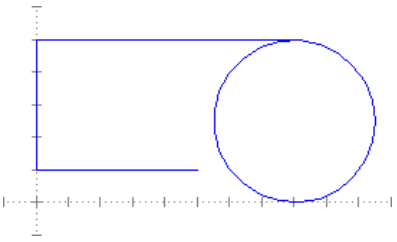


Click the **position by coordinates icon** on the **position toolbar**.

Enter the following details and click **OK.**



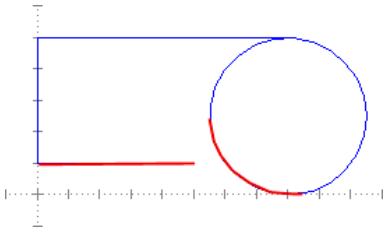
The circle is then created.



Click **cancel** to end the circle function.

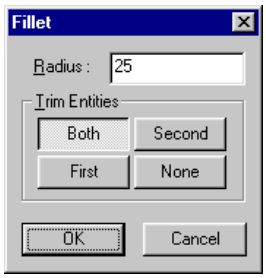
 Click the **fillet icon** on the **arc and spline menu toolbar**.

Select the **arc** and the select the **bottom line** as shown below.

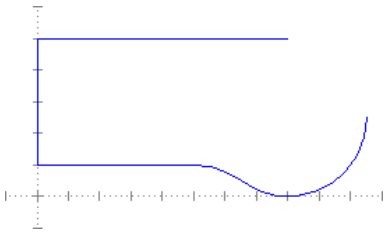


The following dialogue will appear.

Enter the following details and click **OK**




The fillet is then created



 Click the **view all icon** on the **standard toolbar**.

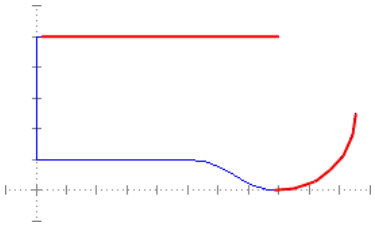
 Click the **view all icon** on the **standard toolbar**.

Click the **home icon** on the **menu toolbar**.

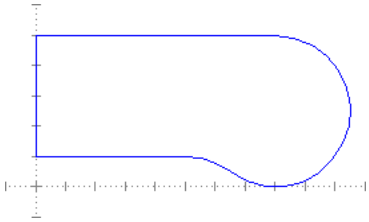
 Click the **edit icon** on the **menu toolbar**.

 Click the **trim 2 entities icon** on the **edit menu toolbar**.

Select the **arc** and the select the **top line** as shown below.



The entities are then trimed.

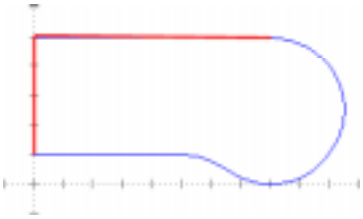


Click the **home icon** on the **menu toolbar**.

 Click the **arc and spline icon** on the **menu toolbar**.

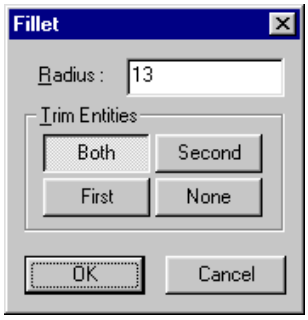
 Click the **fillet icon** on the **arc and spline menu toolbar**.

Select the **top line** and then select the **left line** as shown below.

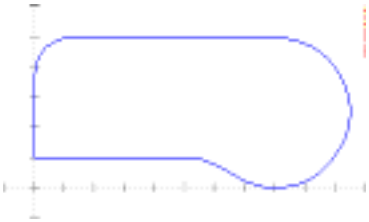


The following dialogue will appear.

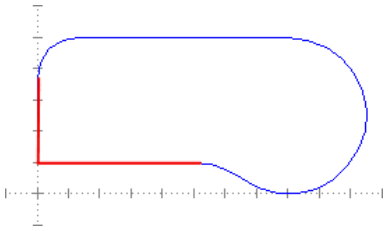
Enter the following details and click **OK**



And your fillet is created.

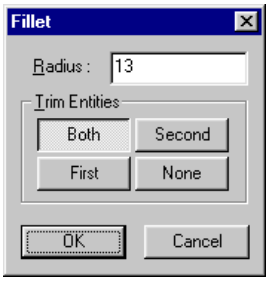


Select the **left line** and the select the **bottom line** as shown below.

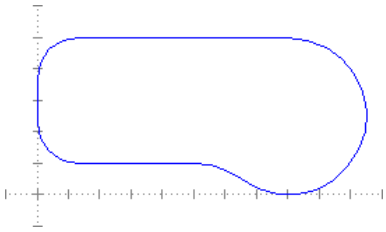


The following dialogue will appear.

Enter the following details and click **OK**




And your fillet is then created.



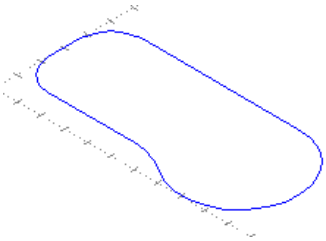
## Step 3. Create a Top Surface for the Mouse


Click the **change 3D views icon** on the **menu toolbar**.

Click the **isometric icon** on the **views dialogue**.


Click the **view all icon** on the **standard toolbar**.


Click the **view all icon** on the **standard toolbar**.

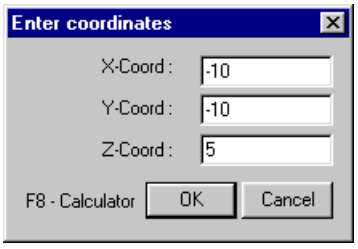


Click the **home icon** on the **menu toolbar**.

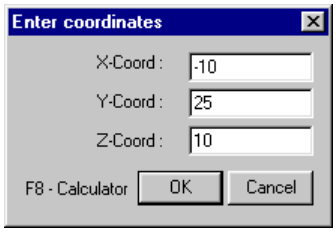

Click the **point icon** on the **menu toolbar**.

Click the **point by coordinate icon** on the **point menu toolbar**.

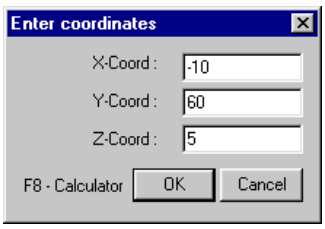
Enter the following values and click **OK.**



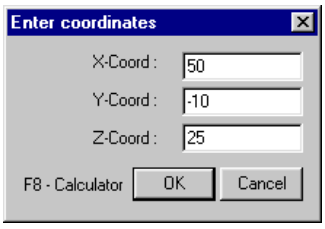

Enter the following values and click **OK.**



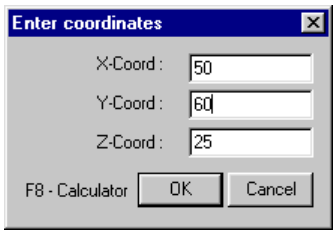
Enter the following values and click **OK.**



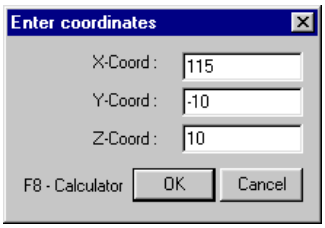

Enter the following values and click **OK.**



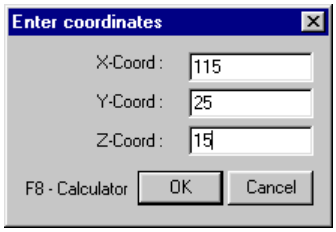

Enter the following values and click **OK.**



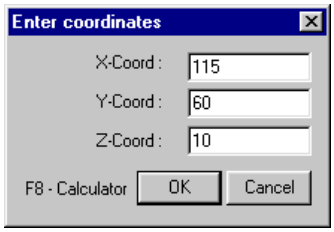

Enter the following values and click **OK.**




Enter the following values and click **OK.**



Enter the following values and click **OK.**




Click **cancel** to end the point function.

 Click the **view all icon** on the **standard toolbar**.

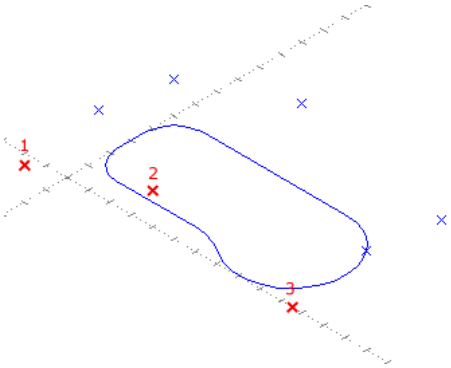
 Click the **view all icon** on the **standard toolbar**.

Click the **home icon** on the **menu toolbar**.

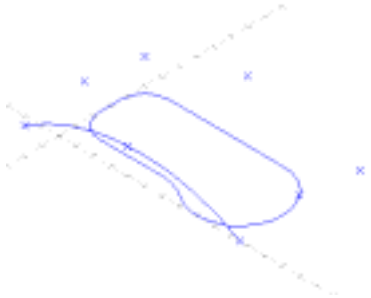
 Click the **arc and spline icon** on the **menu toolbar**.

 Click the **arc 3 point icon** on the **arcs and splines menu toolbar**.

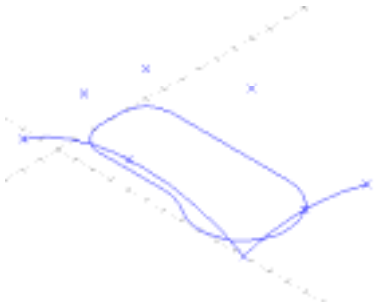
Select the points int the order shown below.



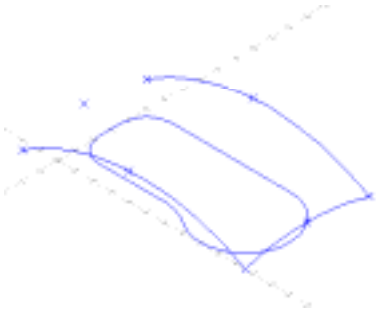

And the arc is created.



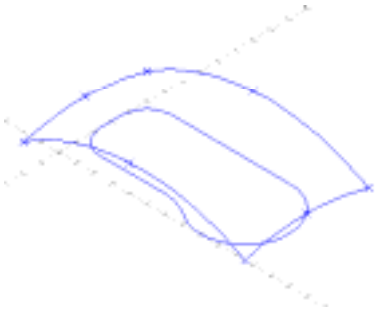
Now arc the next 3 points.



And the next 3 points.



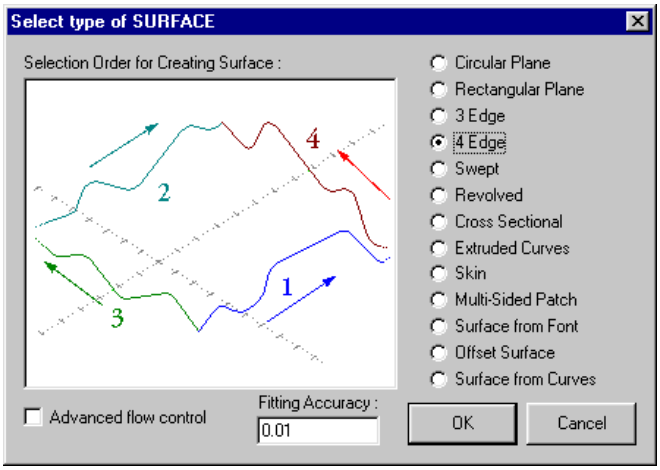
And the last point.



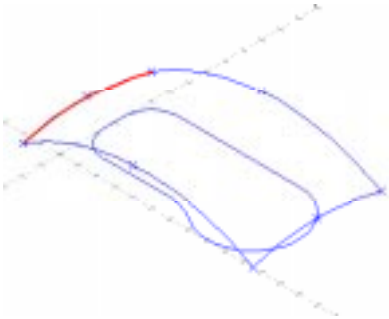
We will now surface the wire frame.

 Click the **create a surface icon** on the **menu toolbar**.

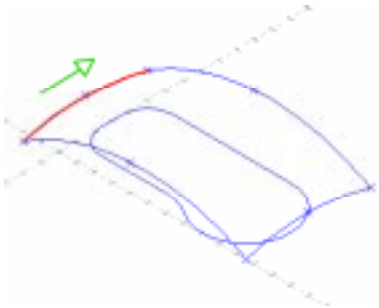
The following dialogue will appear, select **4 edge** and click **OK.**



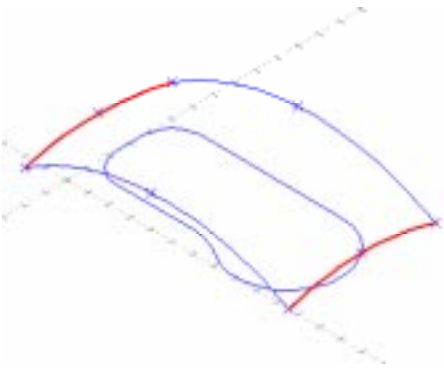

Select the first line as shown below.



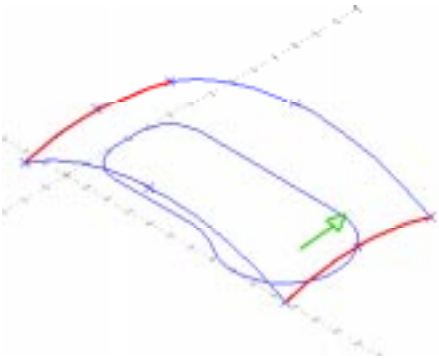
And point the arrow in the direction shown and click the **right mouse button**.



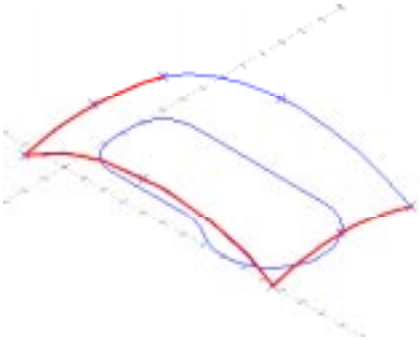
Now select the next line as shown below.



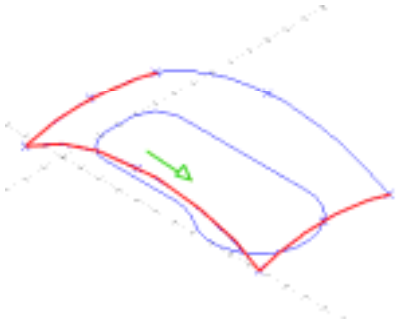
And point the arrow in the direction shown and click the **right mouse button**.



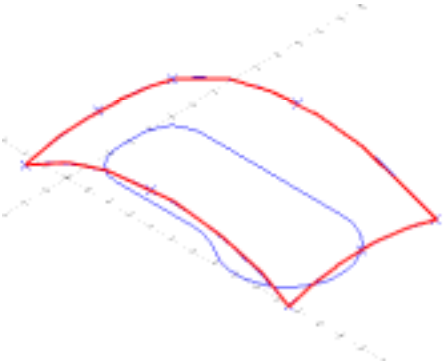
Now select the next line as shown below.



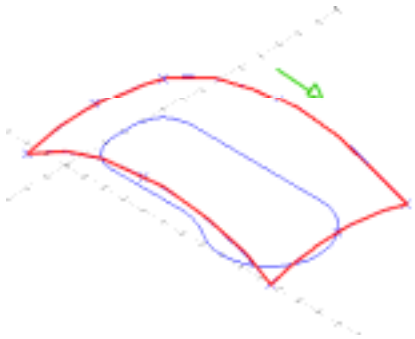
And point the arrow in the direction shown and click the **right mouse button**.



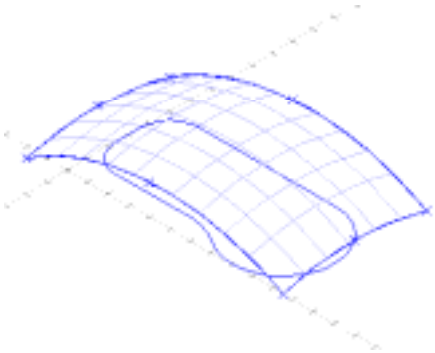
Now select the last line as shown below.



And point the arrow in the direction shown and click the **right mouse button**.

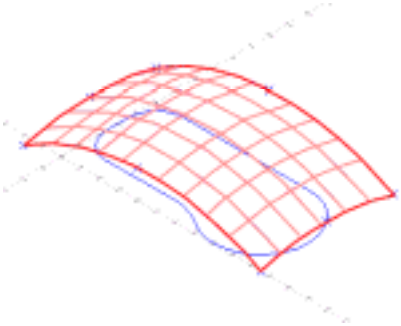


And the surface is created.



 Click the **select single entity icon** on the **selections toolbar**.

Select the surface.

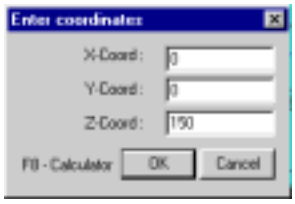


 Click the **move copy scale icon** on the **selections toolbar**.

Enter the following details and click **OK.**

 Click the **position incremental icon** on the **position toolbar**.

Enter the following details and click **OK.**

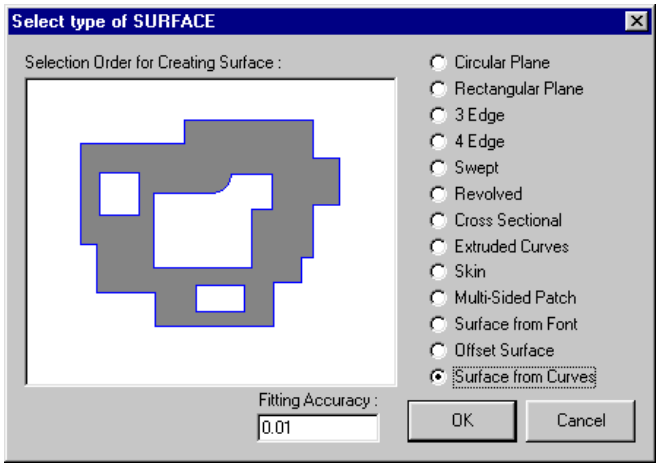



This create a surface 150mm above the current surface, we will use this surface later.

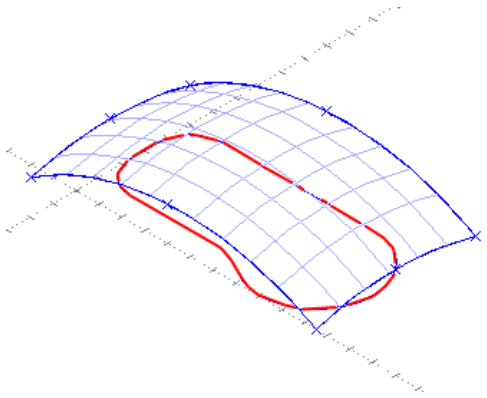
## Step 4. Surfacing the mouse

 Click the **create a surface icon** on the **menu toolbar**.

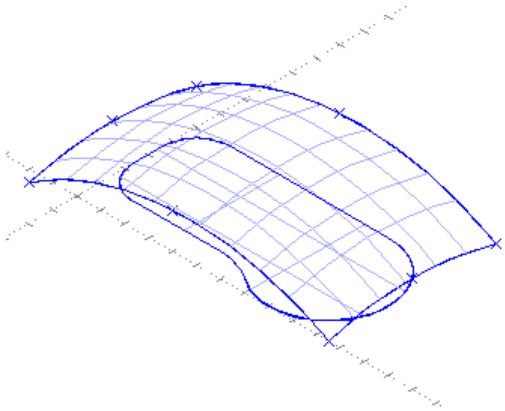
The following dialogue will appear, select **surface for curves** and click **OK.**




Select the **bottom curves** and click the **right mouse button.**

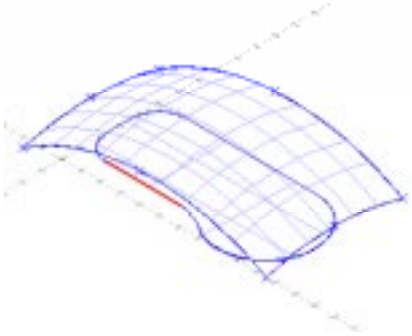


And the surface is created.

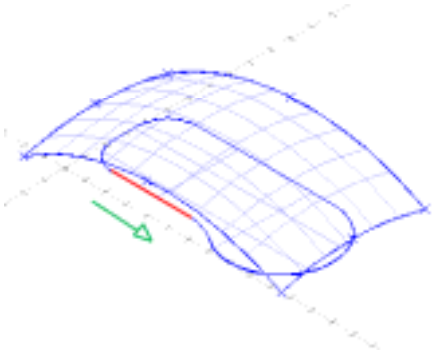


 Click the **select chain icon** on the **selections toolbar**.

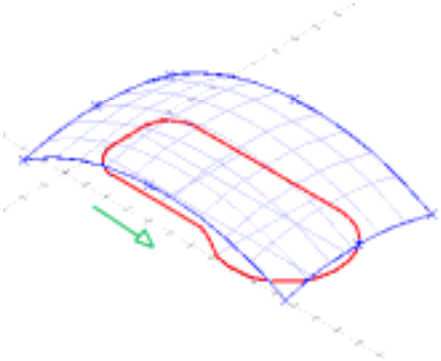
Select the first line of the chain.



Set the arrow like so.



Now press the close square bracket key ( **[** ) on the keyboard and the chain will be selected.

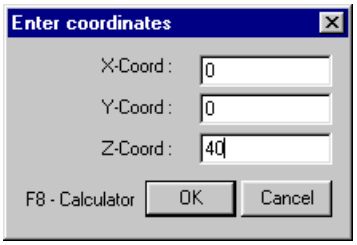


 Click the **move copy scale icon** on the **selections toolbar**.

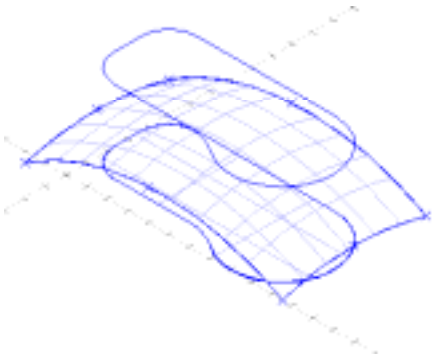
Enter the following details and click **OK.**


 Click the **position incremental icon** on the **position toolbar**.

Enter the following details and click **OK.**



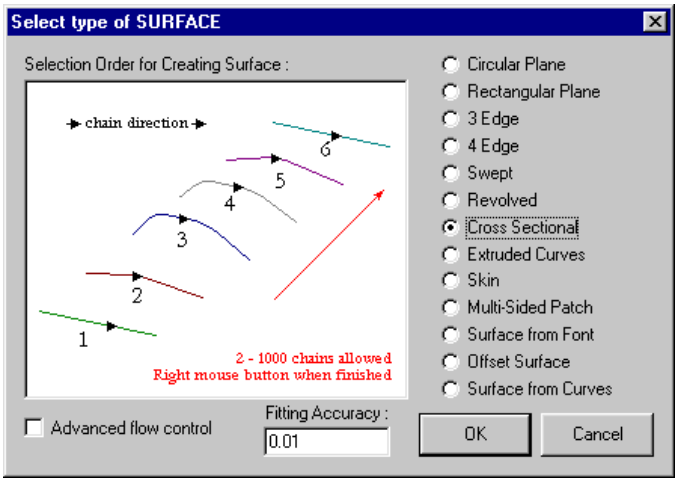

Your model should now look as follows.



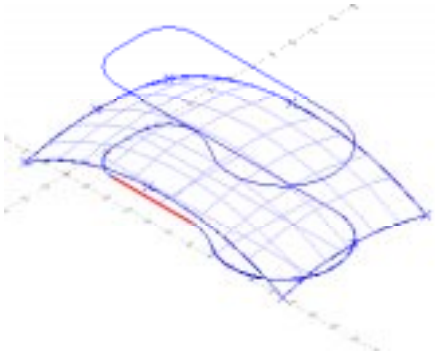
We will now create a cross sectional surface with the top and bottom frames.

 Click the **create a surface icon** on the **menu toolbar**.

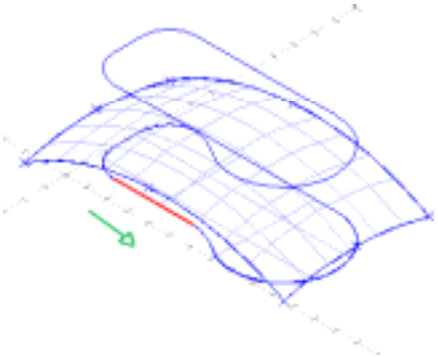
The following dialogue will appear, select **cross sectional** and click **OK.**



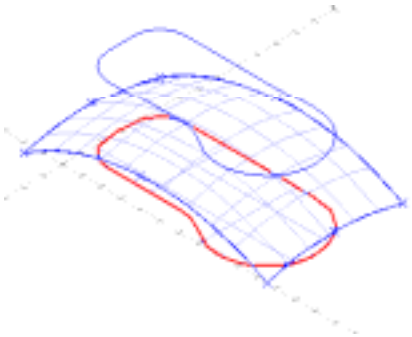
Select the first line of the chain.



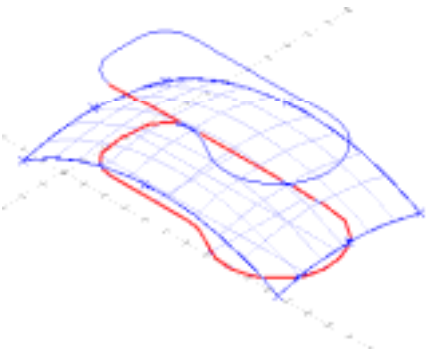
Set the arrow like so.



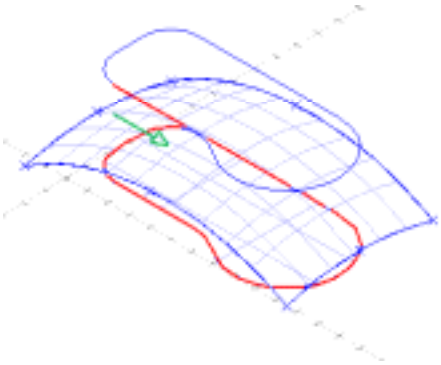
Now press the close square bracket key ( **[** ) on the keyboard and the chain will be selected.



Now select the first line of the top wireframe.

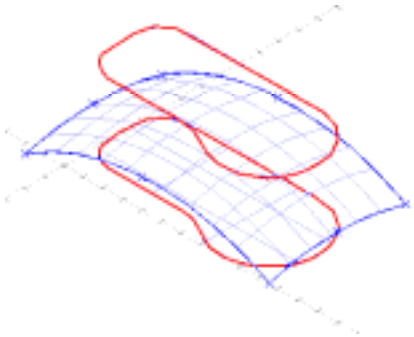


Point the arrow in this direction.

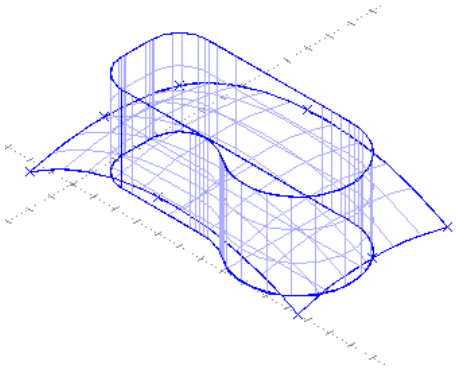


Now press the close square bracket key ( **[** ) on the keyboard and the chain will be selected.

Now click the **right mouse button**.



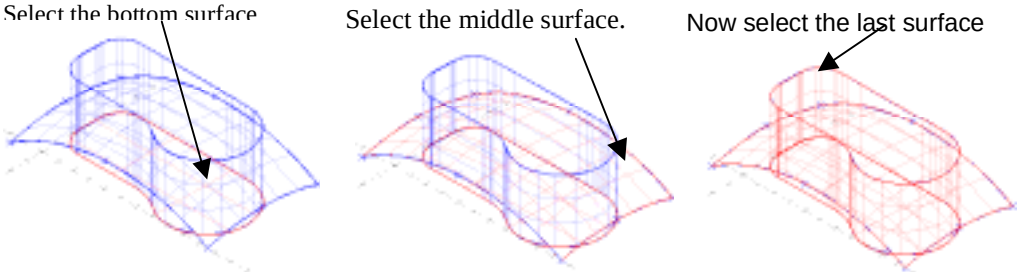
And the surface will be created.



## Step 5. Create a Solid


Click the **select single entity icon** on the **selections toolbar**.

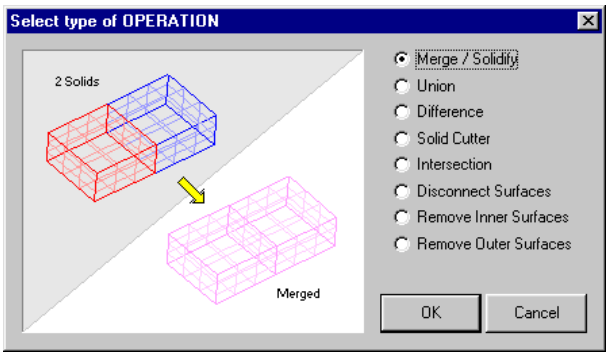
Select each surface. so that all three are red (note: do not use select all as we need only to select the surfaces and not the wire frame geometry).



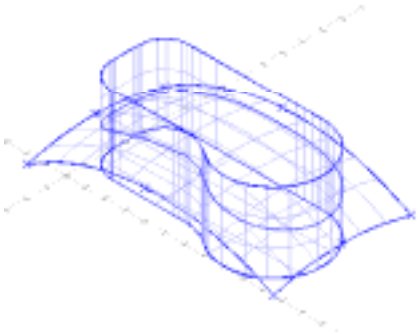


Click the **operations icon** on the **surfaces and solids toolbar**.

Select **Merge / Solidify** and click **OK**

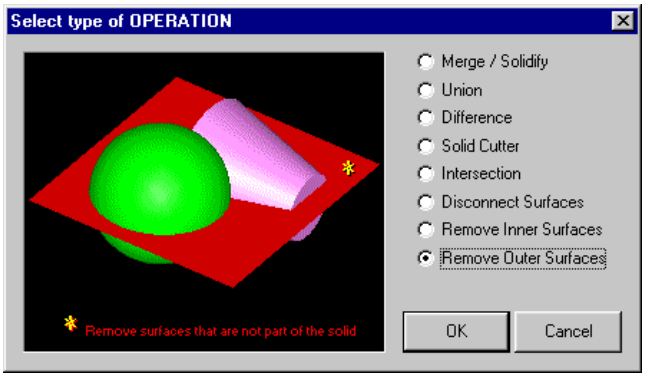



And the model is created.

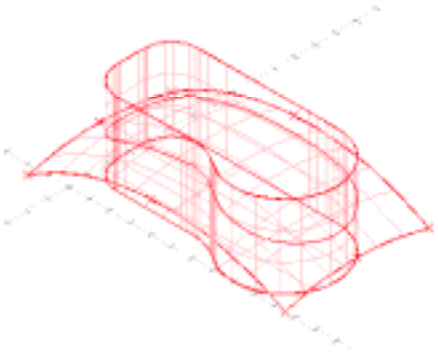



Click the **operations icon** on the **surfaces and solids toolbar**.

Select **remove outer surfaces** and click **OK**

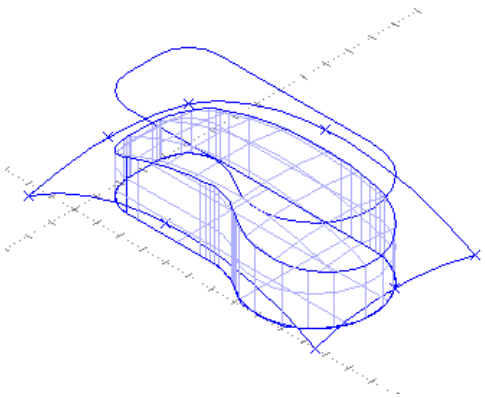



And select the **model.**



 Click the **redraw icon** on the **standard toolbar**.

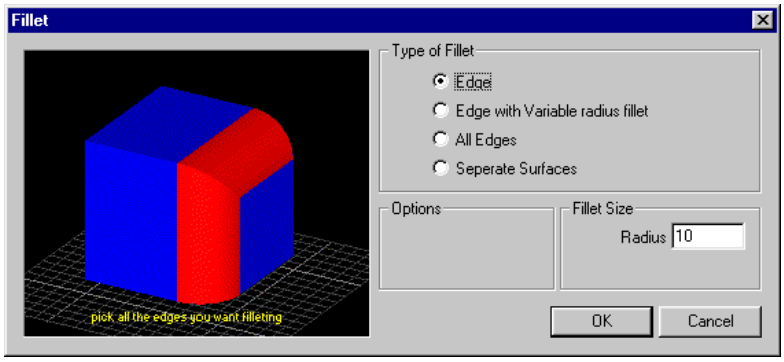
The surfaces are then removed.



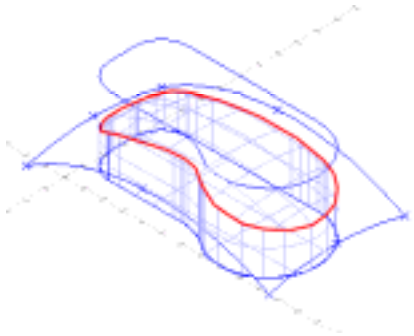
## Step 6. Filleting the Solid

 Click the **fillet solid icon** on the **surfaces and solids toolbar**.

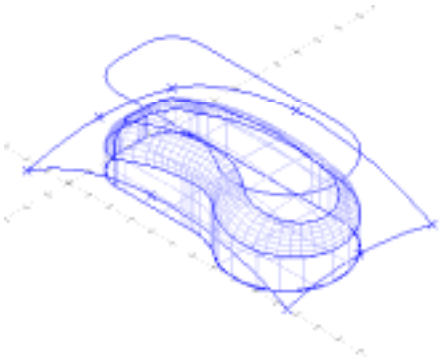
Enter the following details and click **OK**.




Select the top edge and click the **right mouse button.**



And the fillet is created.



 Click the **render icon** on the **standard toolbar**.

You will then see the rendered model.

## Step 7. Cutting the Mouse in Two

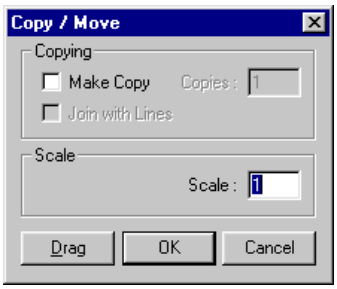

Click the **view all icon** on the **standard toolbar**.


Click the **select single entity icon** on the **selections toolbar**.

Select the **top surface** we raised earlier


Click the **move copy scale icon** on the **selections toolbar**.

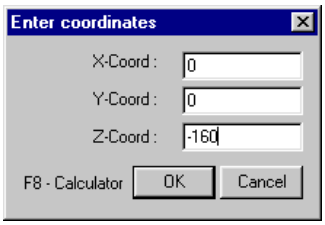
Enter the following details and click **OK.**

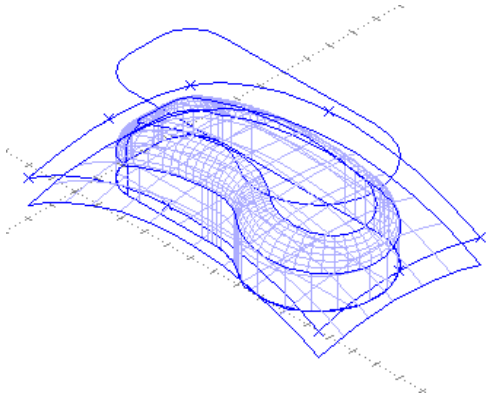




Click the **position incremental icon** on the **position toolbar**.

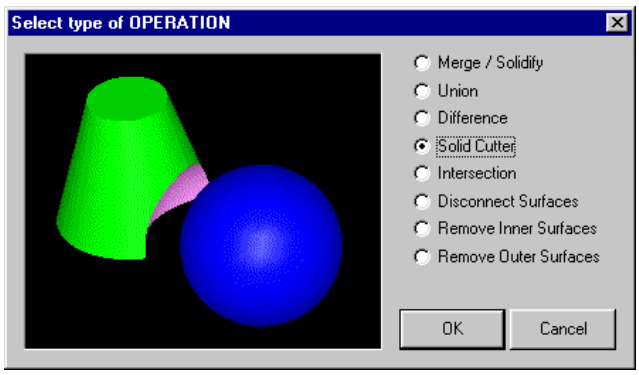
Enter the following details and click **OK.**



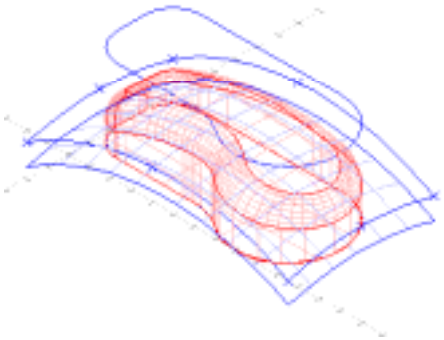




Click the **operations icon** on the **surfaces and solids toolbar**.

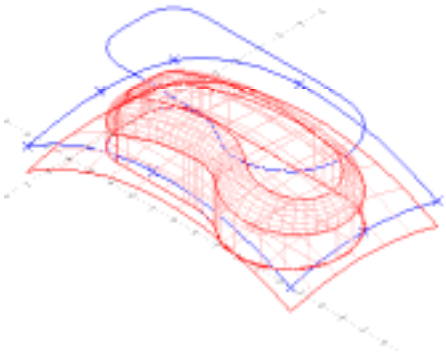
Select **solid cutter** and click **OK**




Now select the mouse.



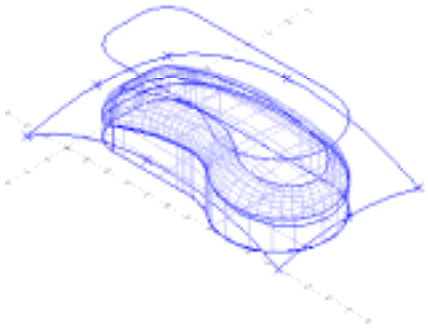
And then select the surface.



 Click the **select single entity icon** on the **selections toolbar**.

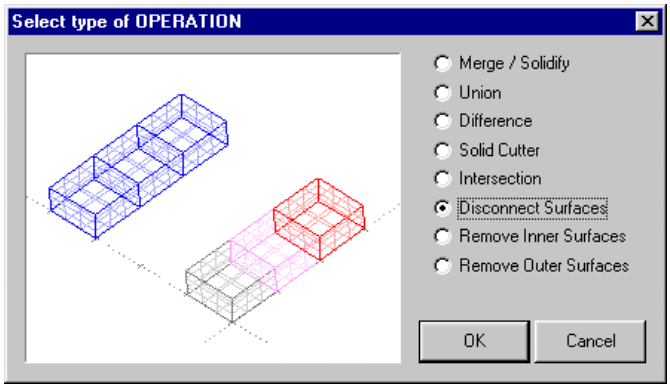
Select the **surface** and press the **delete** button.

The cut is then made with a surface being left in the middle of the solid.

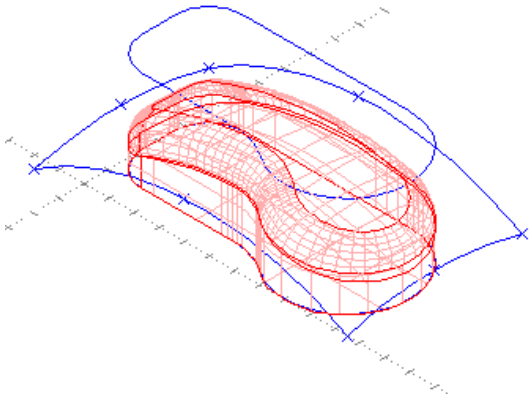


 Click the **operations icon** on the **surfaces and solids toolbar**.

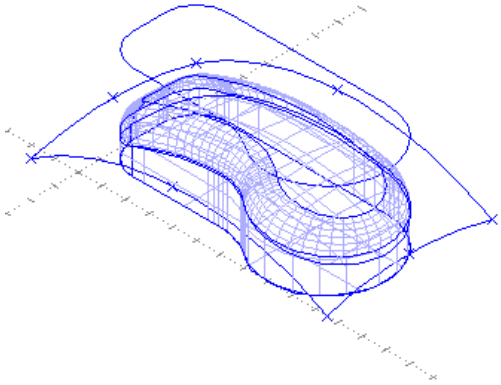
Select **disconnect surface** and click **OK**




Now select the **mouse**.

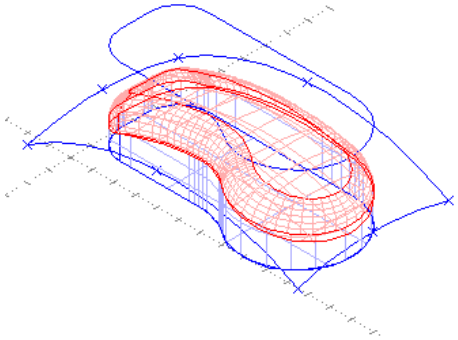


And the surfaces are now disconnected.



Click the **select single entity icon** on the **selections toolbar**.

Select the **top half** of the mouse.

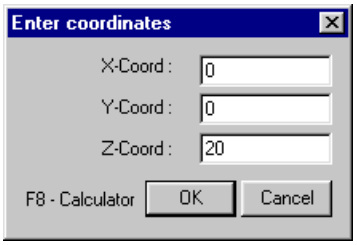


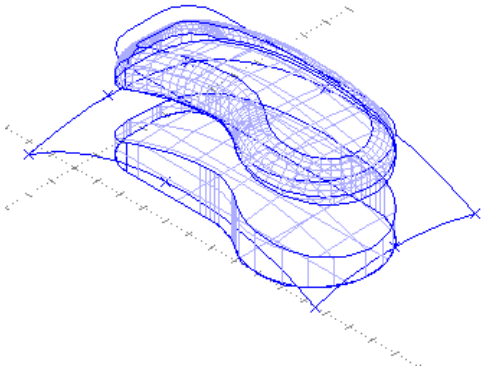
Click the **move copy scale icon** on the **selections toolbar**.

Enter the following details and click **OK.**

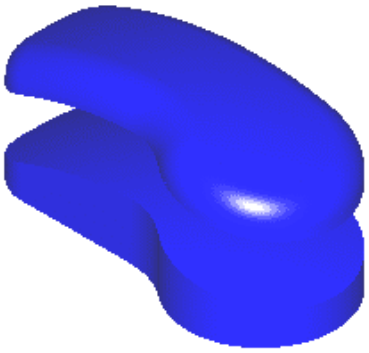

Click the **position incremental icon** on the **position toolbar**.

Enter the following details and click **OK.**





 Click the **render icon** on the **standard toolbar**.



The mouse is now complete.