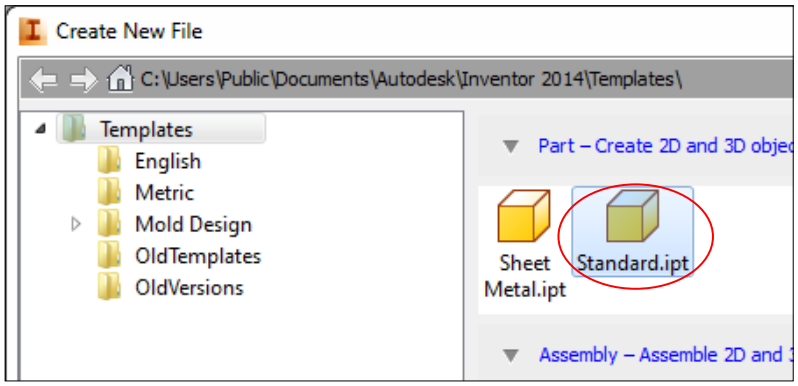
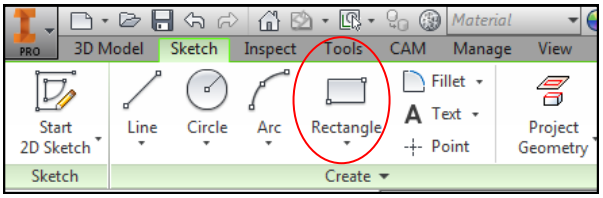
3D Printed Keyring Exercise.

Step # 1. From the Create New File dialog box , select the *Standard.ipt T*emplate.





Step # 2. On the Sketch tab under the "**Create**" panel select the "**Rectangle**" command , and sketch a rectangle **50 mm** long by **25 mm** wide.

See Figure 1.0

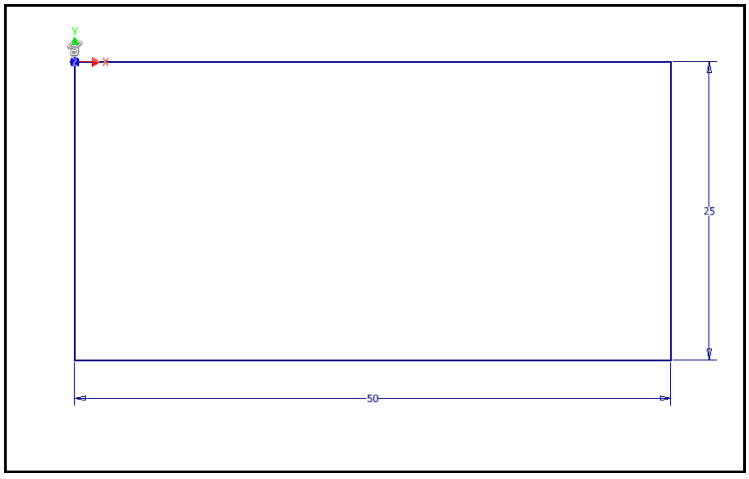
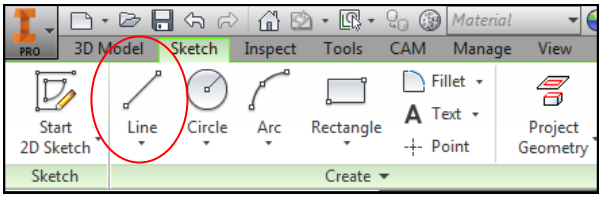


FIG 1.0



Step # 3. Continue on the current sketch. Select the "**Line**" command.

Create 2 lines as shown in figure 2.0

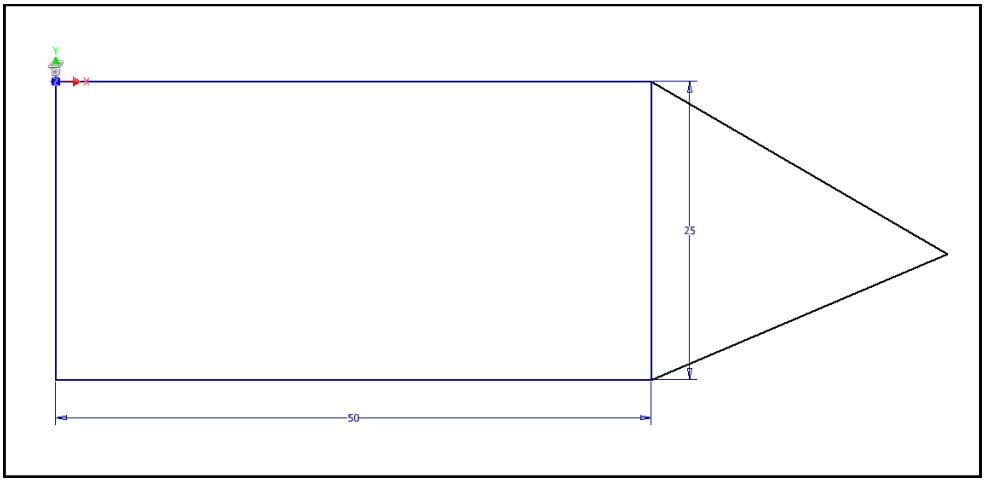


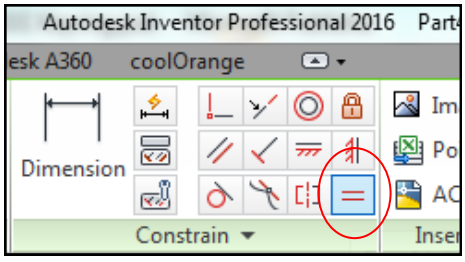
FIG 2.0

Step # 4. On the "**Constrain**" Panel select the "**=**" constraint.

Select the 2 lines you just created.

A "**=**" glyph will appear on the 2 lines, and they will now be of equal length and angle.

All the lines will change to a darker colour, indicating a "Fully Constrained" condition. See Figure 3.0



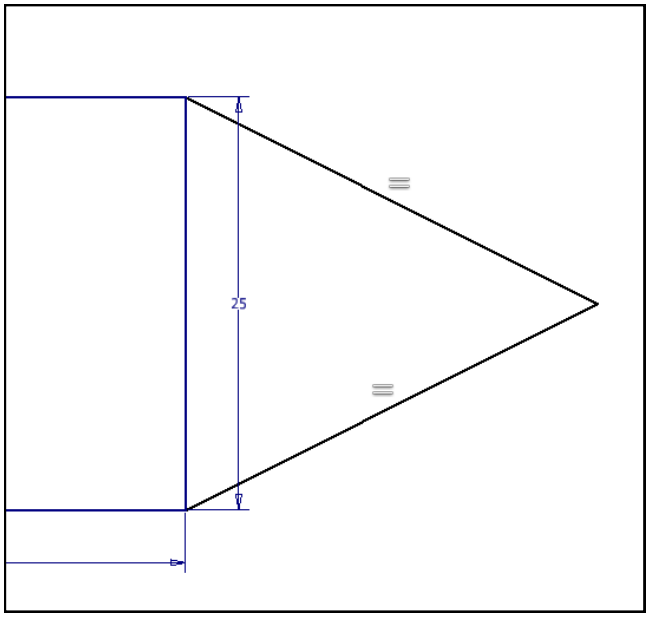
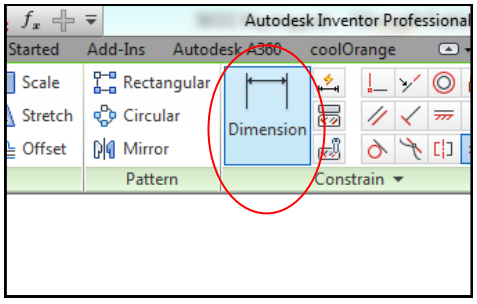


FIG 3.0



Step # 5. On the "**Constrain**" Panel select the "**Dimension**" command.

Create a horizontal dimension of **25mm** , as shown in Figure 4.0

Then Finish the sketch.

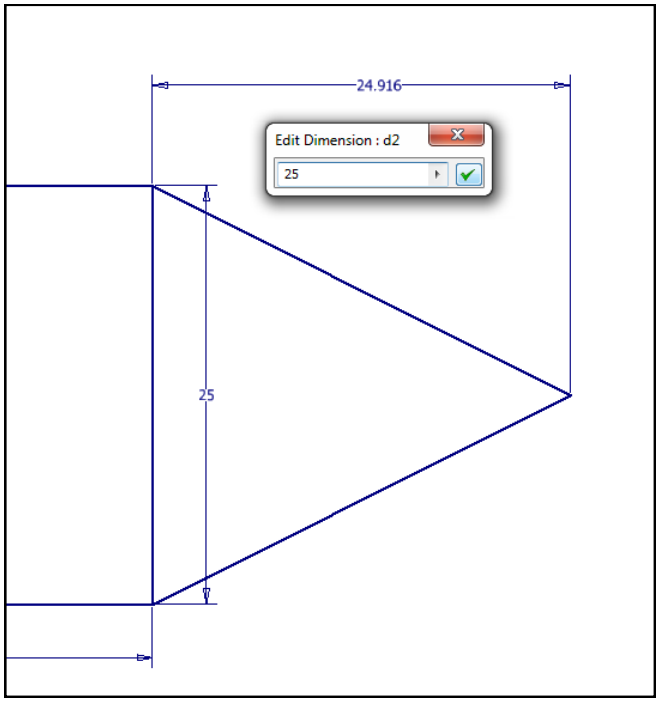


FIG 4.0

Step # 6. On the "**3D Model**" tab, on the "**Create**" panel, select "**Extrude**".
Select the rectangular and the triangular region, and then apply a extrusion distance of **5mm.**
See Figure 5.0

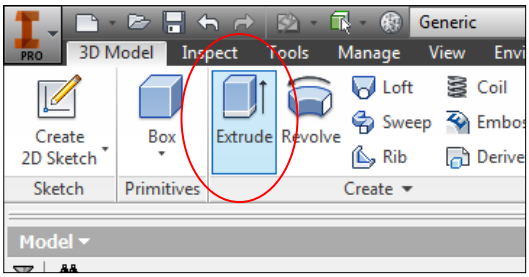
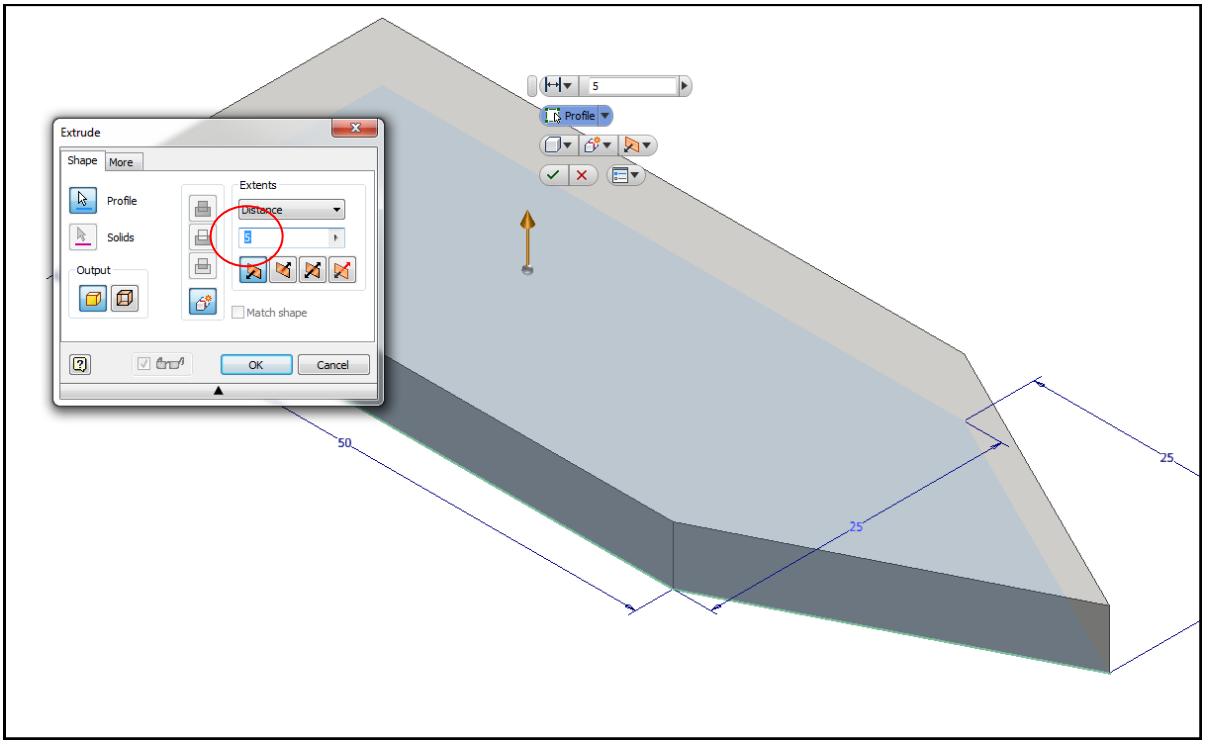


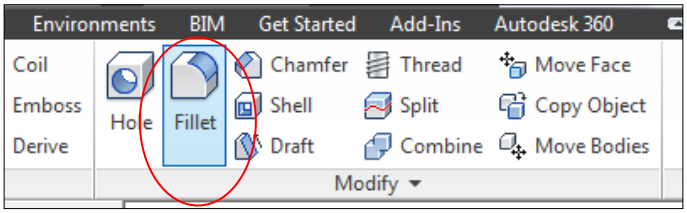
FIG 5.0



Step # 7. On the "**Modify**" panel, select "**Fillet**" command.

Set the Radius to **4.5**

See Figure 6.0



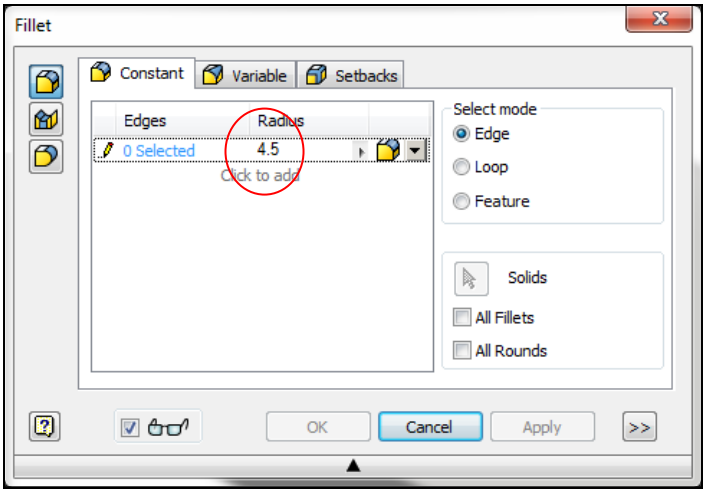


FIG 6.0

Step # 7. Continued.
Select the 5 edges as shown in Figure 7.0
OK the dialog box.

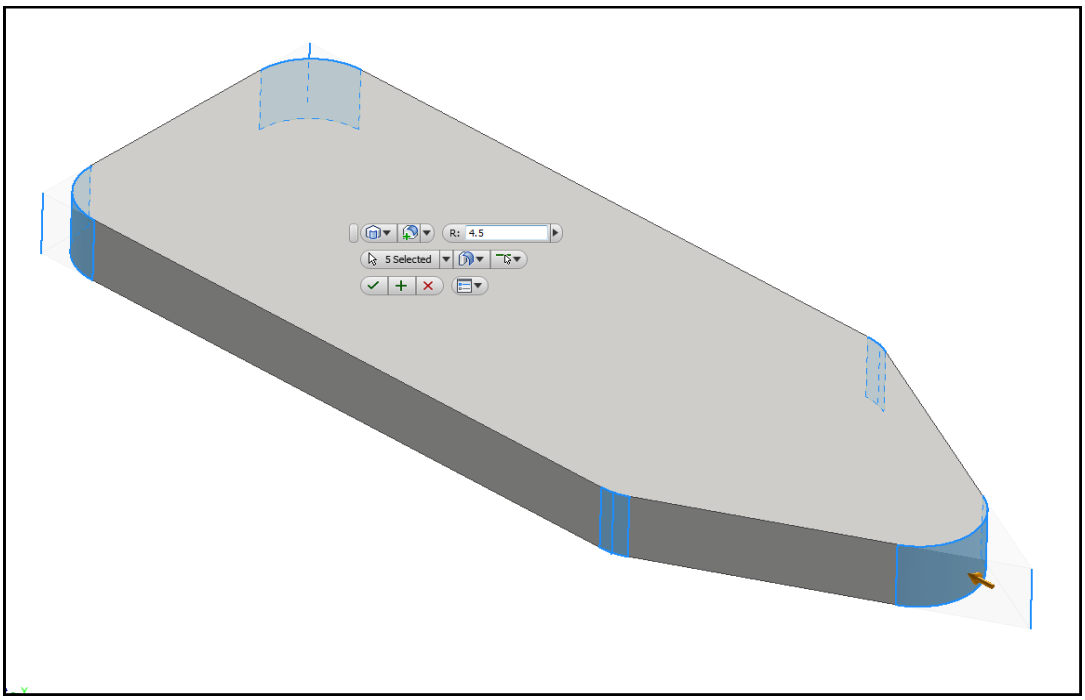
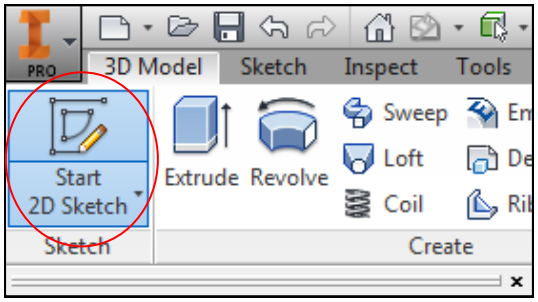
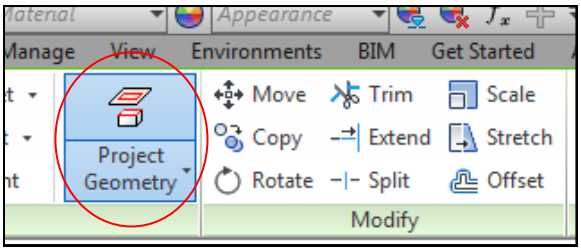


FIG 7.0

Step # 8.
Create a new Sketch.
On the "**Sketch Panel**" select "**Start 2D Sketch**".
Dwell the cursor on the top face of the solid until it changes to a "red" colour.
Select the top face.
The solid will rotate and present the new sketch plane to the user.





Step # 9.
Project geometry onto a new Sketch.
On the "**Create Panel**" select "**Project Geometry**".
Select the 3 edges and 2 radii, as shown in Figure 8.0

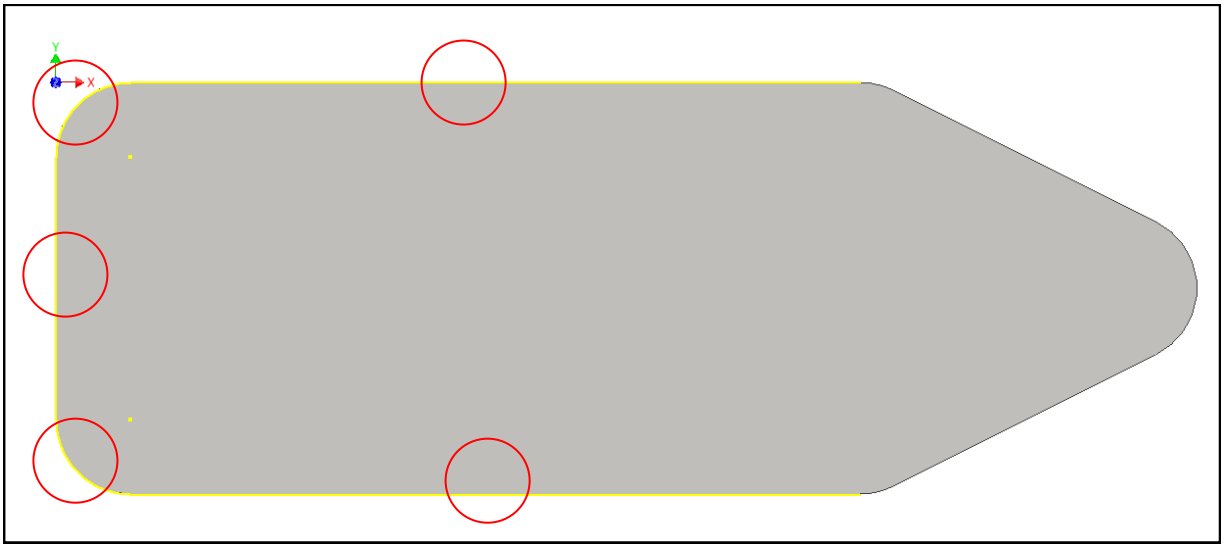


FIG 8.0

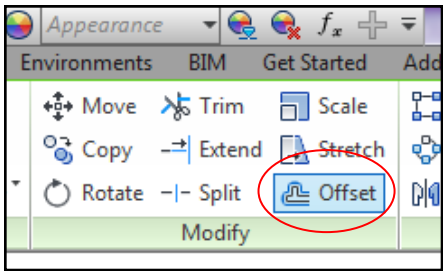
Step # 10. Create an offset geometry.

On the "**Modify**" panel select "**Offset**".

Select the projected geometry , and move the cursor toward the centre of the solid.

In the text box, enter **3.0**

The result is shown in Figure 9.0



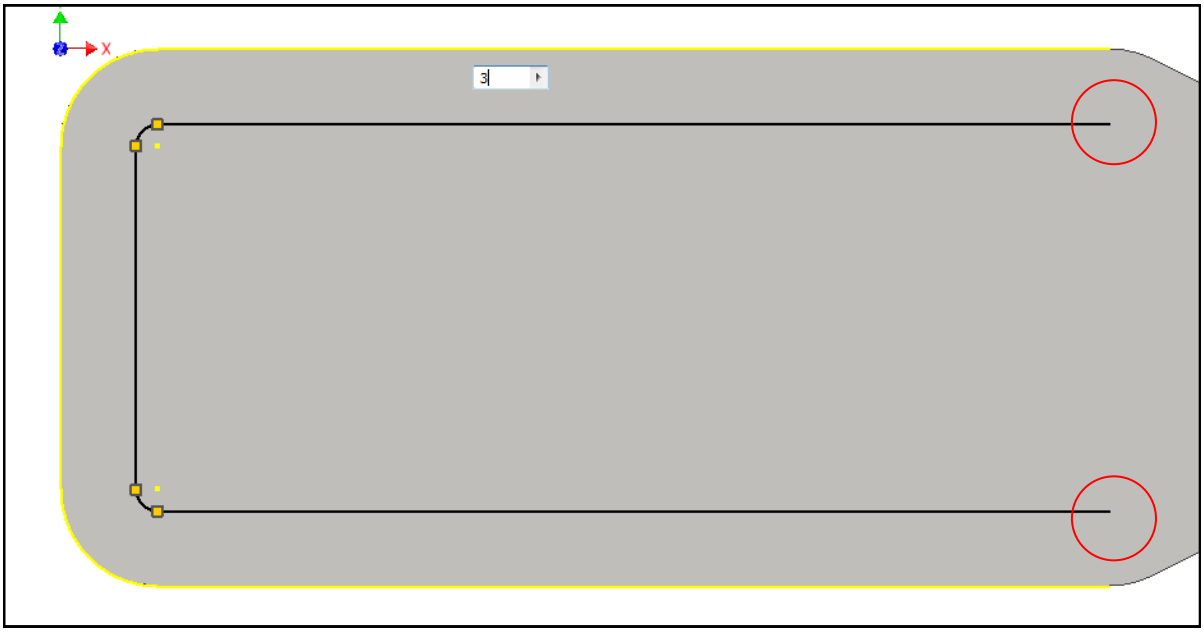
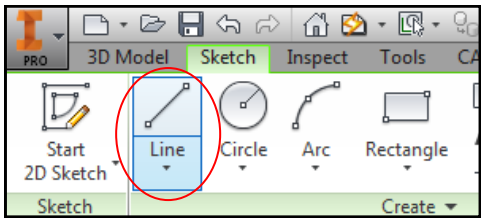


FIG 9.0



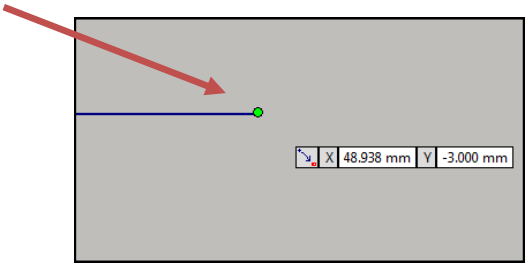
Step # 11. Complete the sketch geometry.

On the "**Create**" panel, select the "**Line**" command.

Create a line on the offset geometry by selecting the 2 endpoints , as shown on Figure 9.0 above.

Right Click and select OK to complete the "**Line**" command.

Note : Always dwell the cursor over any snap point until a "green" dot appears.



Step # 12. Fillet sketch geometry.

On the "**Create**" panel select the "**Fillet**" command.

Enter a value of **1.5** in the 2D fillet dialog box.

Select the intersection points created by the line created in the last step. A preview of the fillet will be displayed in "green".

The result is shown in Figure 10.0

Right Click and select OK to complete the "**Fillet**" command.

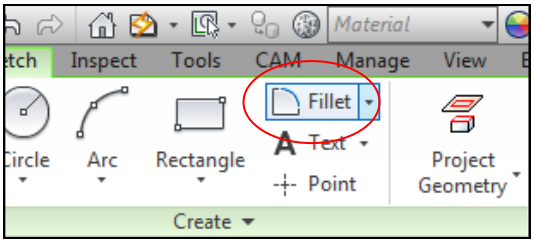
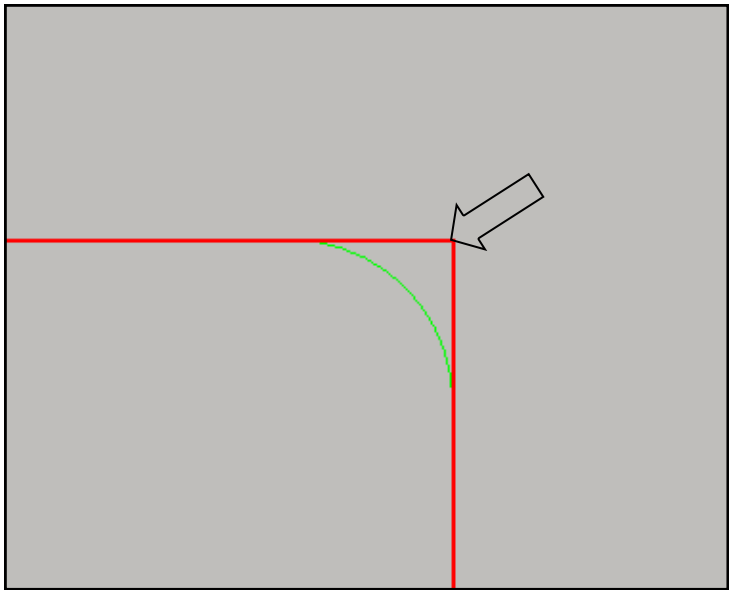
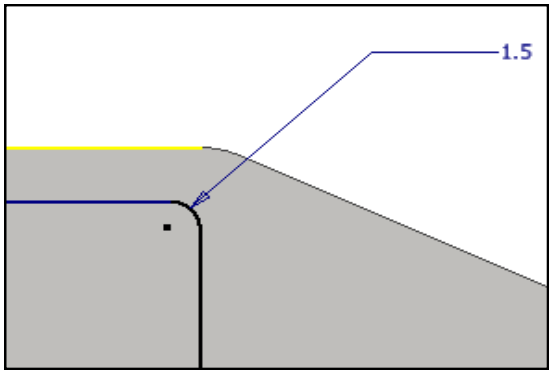
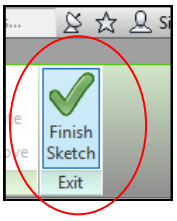


FIG 10.0







Select "**Finish Sketch**" to complete this sketch.

Step # 13. Create a recess with the "**Extrude**" command.

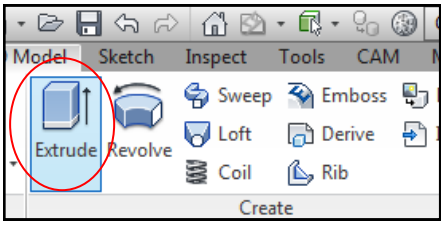
On the "**Create**" panel select the "**Extrude**" command.

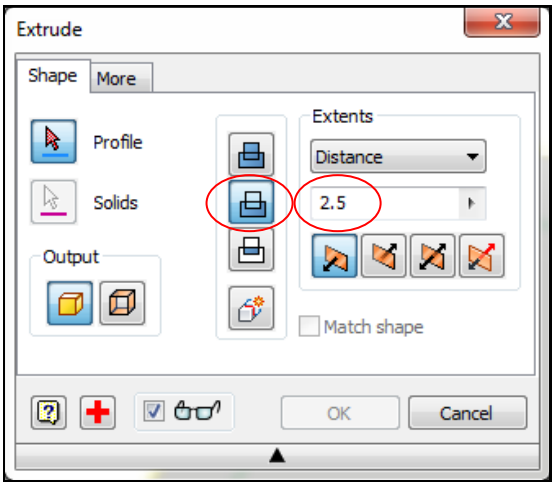
Enter a distance value of **2.5** in the dialog box.

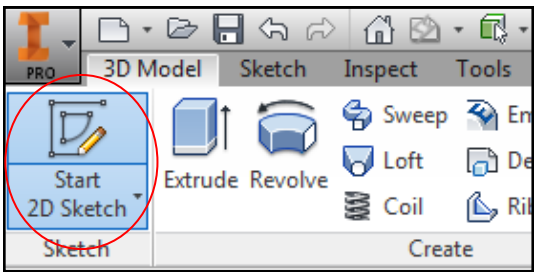
Select the "**Cut**" method.

Select the point inside the region created in the previous sketch. Alter the "**Cut**" direction until a recess view appears.

OK the dialog box.





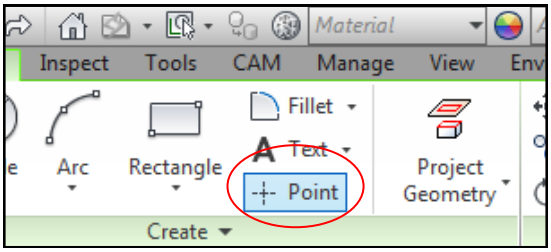


Step # 14.

On the "**Sketch**" panel select the "**Start 2D Sketch**" command.

Dwell the cursor on the top face of the solid until it changes to a "red" colour. Select the top face.

The solid will rotate and present the new sketch plane to the user.

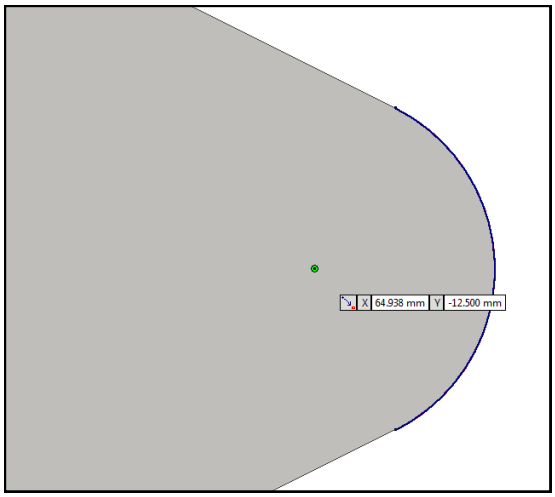


Step # 14. Continued.

On the "**Create**" panel select the "**Point**" command.

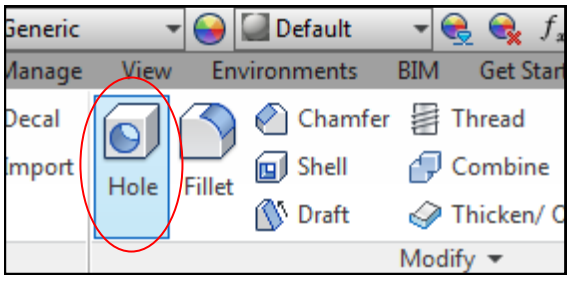
Dwell the cursor on the radius on the right end to "**Wake Up**" the centre of the radius. Click on the centre of the radius to create a "**Point**".

See Figure 11.0



After creating the point, right click and select "**Finish Sketch**"

FIG 11.0



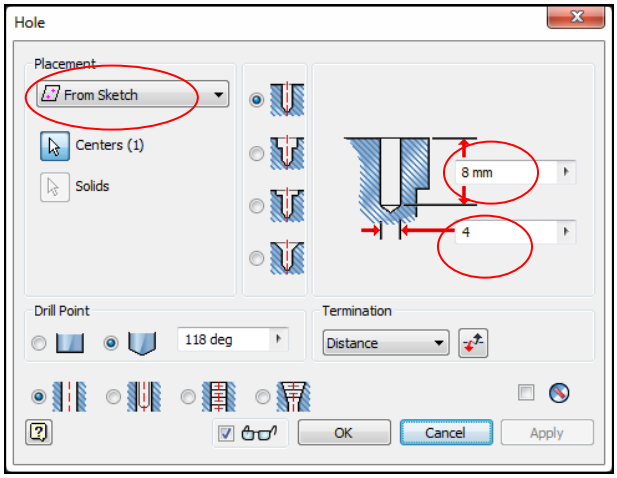
Step # 15.

On the "**Modify**" panel select the "**Hole**" command.

Inventor will automatically find any point objects on the solid and provide a preview.

Set your hole values Diameter **4** , and **8** Deep like those in Figure 12.0

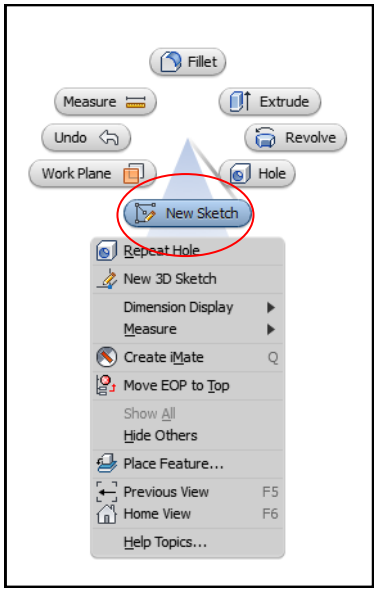
FIG 12.0



OK the Dialog box to complete the "**Hole**" Command.

Step # 16. Create some text.

On the in middle of the drawing area, right click and select "**New Sketch**"

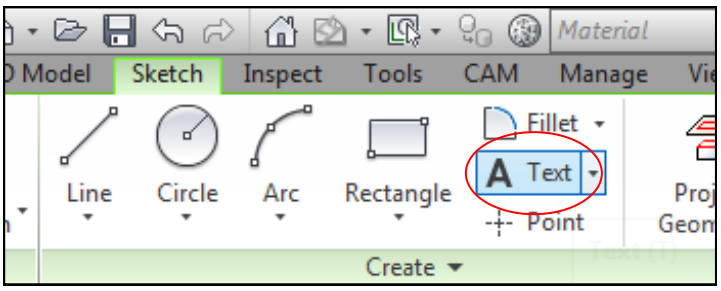


Select the bottom face of the recess created earlier.

On the "**Create**" panel select the "**Text**" command.

Click and drag a textbox similar to that shown in Figure 13.0

After creating a text area, a dialog will be displayed as shown in Figure 14.0



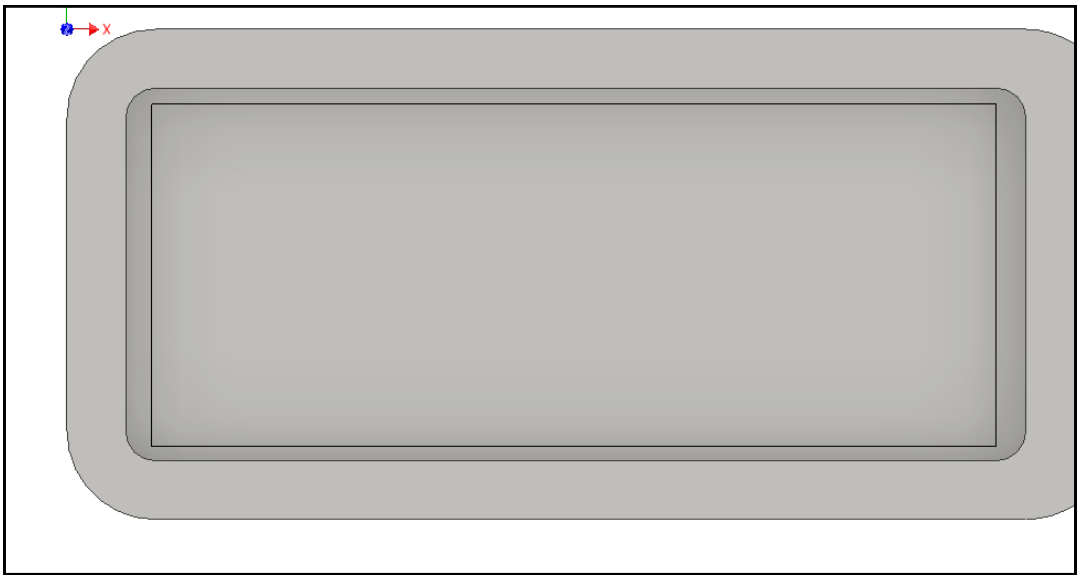


FIG 13.0

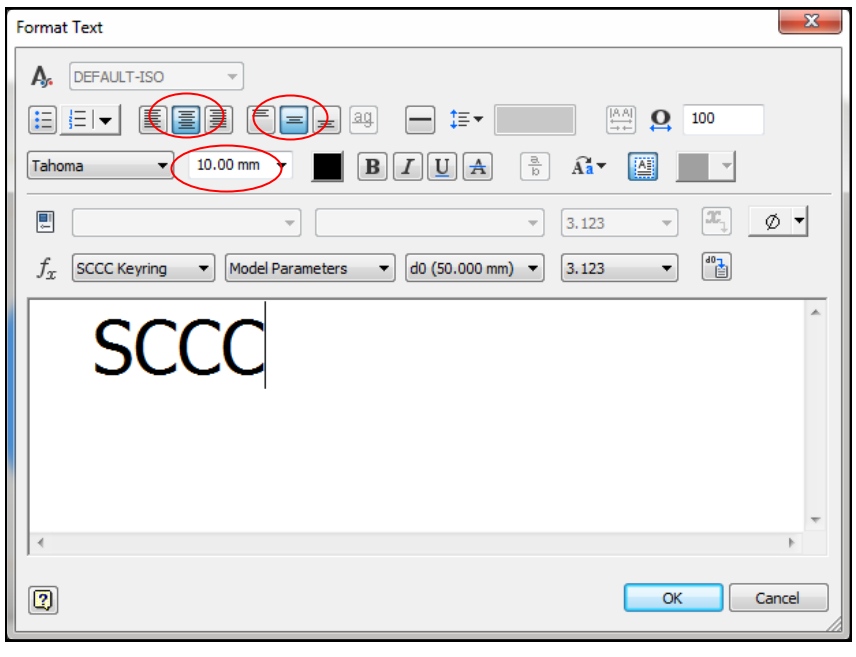


FIG 14.0

Set the text height to **10.00 mm**

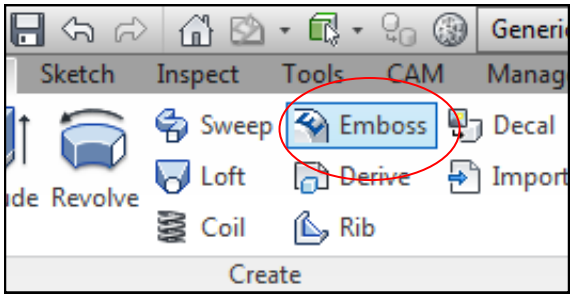
Set the text justification to **""Middle"** and **"Centre"**

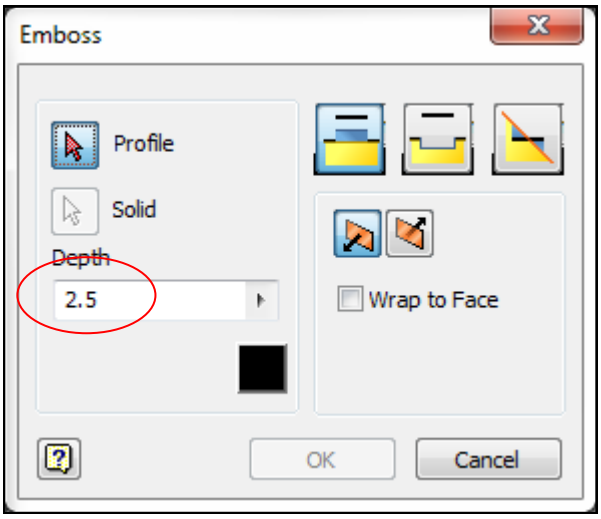
as shown in Figure 14.0

Enter text, and OK the dialog box.

Step # 17. Emboss the text.

On the "**Create**" panel select the "**Emboss**" command.





When the Emboss dialog box is displayed, select the text just created, it will turn "Red". Set the Depth value to **2.5**

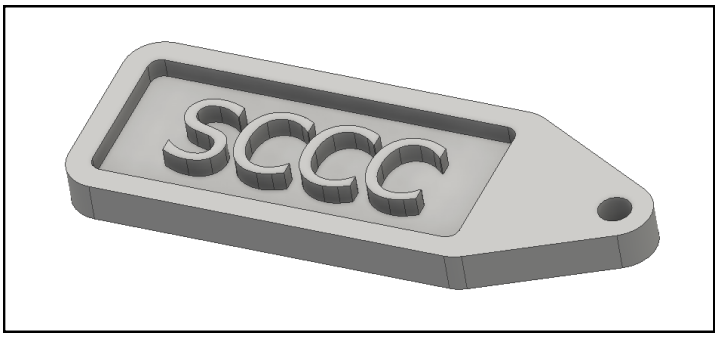
Ensure that the other settings appear as shown in Figure 15.0

OK the dialog box to complete the command.

A finished view is shown in Figure 16.0

FIG 15.0

FIG 16.0



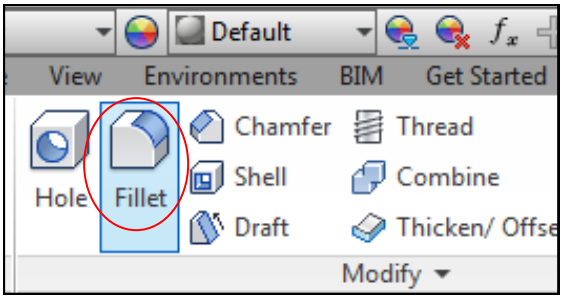
Step # 18. Apply Fillets.

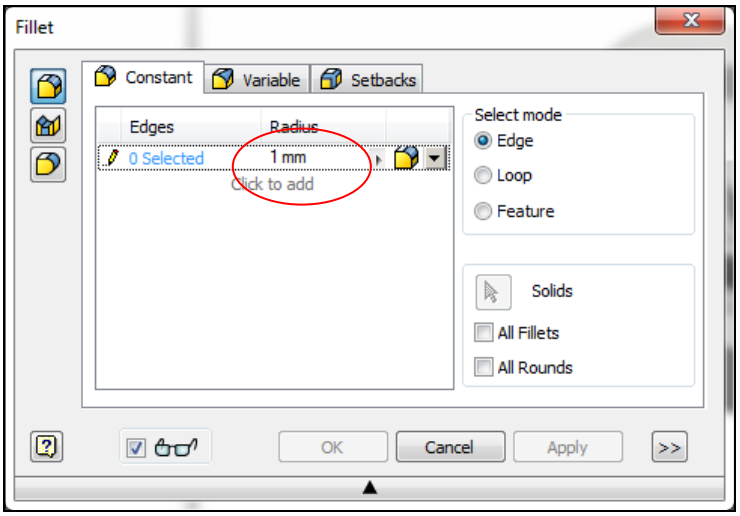
On the "**Modify**" panel select the "**Fillet**" command.

Set the Radius value to **1 mm.**

Select all the sharp edges on the solid.

Ok the dialog box to complete the "**Fillet**" command.



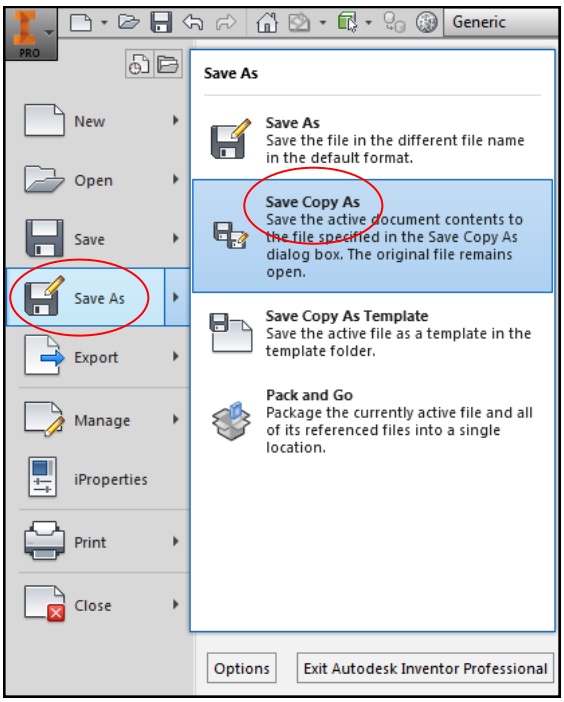


Step # 19. Create an "**STL**" file suitable for 3D Printing.

Finished 3D Model.

Step # 20. On the Inventor "**Application Icon**" select "**Save As**" then "**Save Copy As**".
Figure 17.0 shows the "**Save Copy As**" dialog box, Under "**File Type**" select from the pull down list "**STL**"
Select the "**Options**" button, on the "**Options**" dialog box set the vales as shown in Figure 18.0.
Ok the dialog box and select "**Save**". The part file is now saved as an STL file suitable for 3D Printing.

FIG 17.0



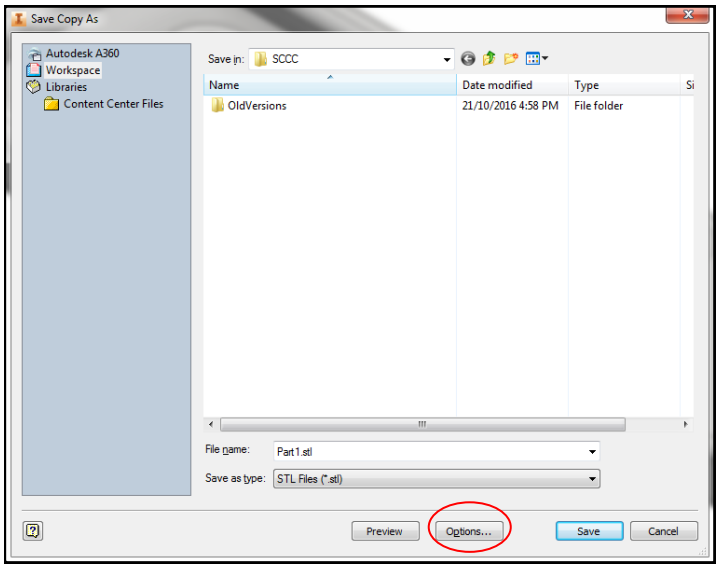
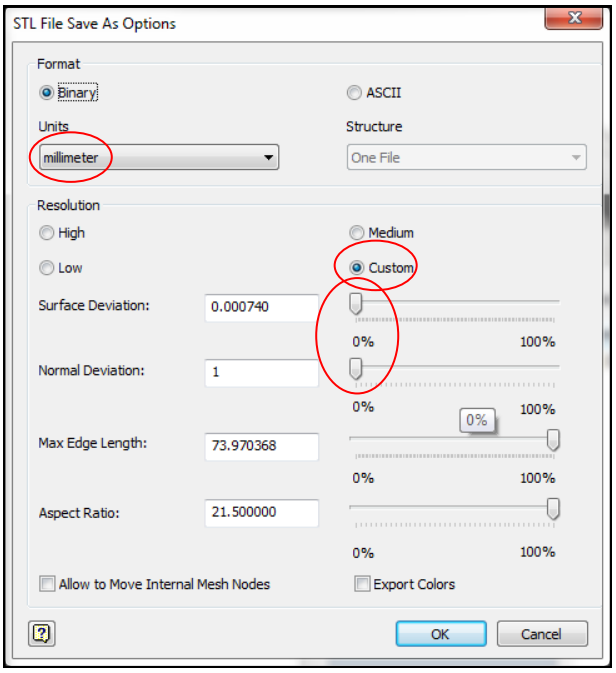


FIG 18.0



Ensure that the "**Resolution**" is set to "**Custom**" and the "**Surface Deviation**" and the "**Normal Deviation**" are both set to "**0%**"
This will save the "**STL**" file in the highest possible resolution.
Set the "**Units**" appropriately, usually "**Millimetres**".