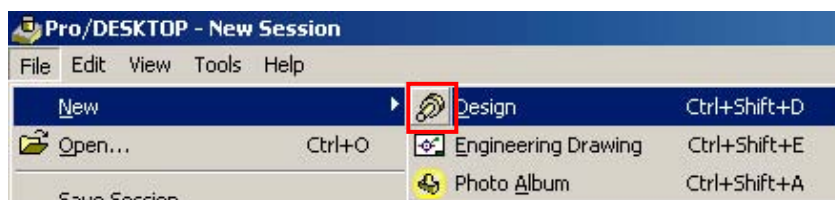## Square Box Tutorial

Draw your spatula shape by:-

1. Open up **PRO-DESKTOP** from your programmes menu. Then click on the file menu > new> design.



2. The new design window will now open. Double click on **'design 1'** the bar and this will maximise the window. Now change the view, click on the **'view menu'**, then select **'Go To'** and select **'Plan'**. Or alternatively use the **'plan view icon'** from the **'view onto work plane icon'** or simply press (Shift P).
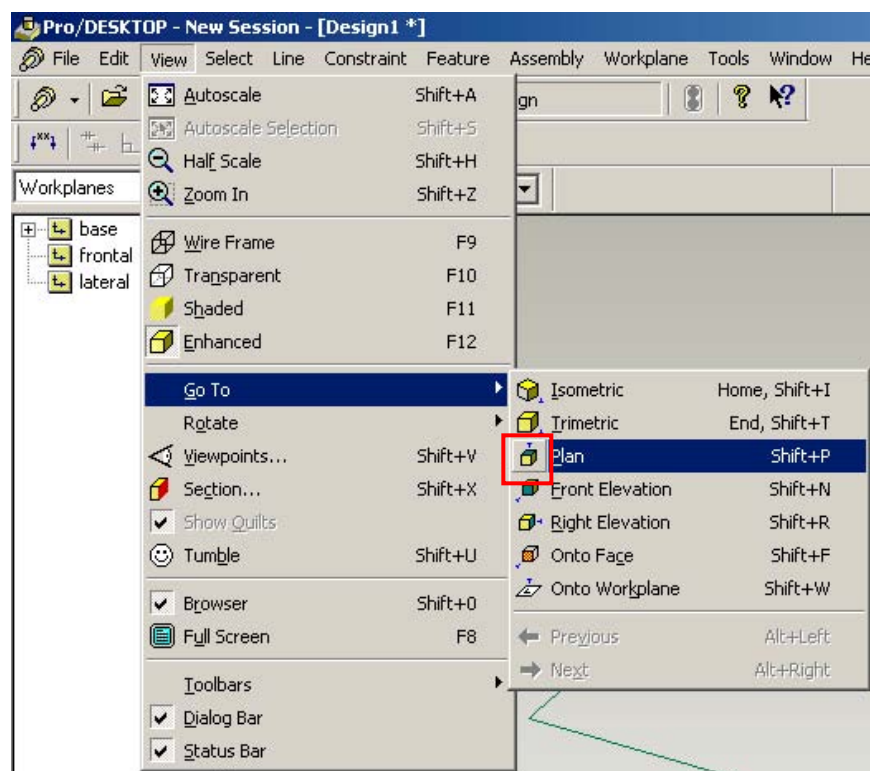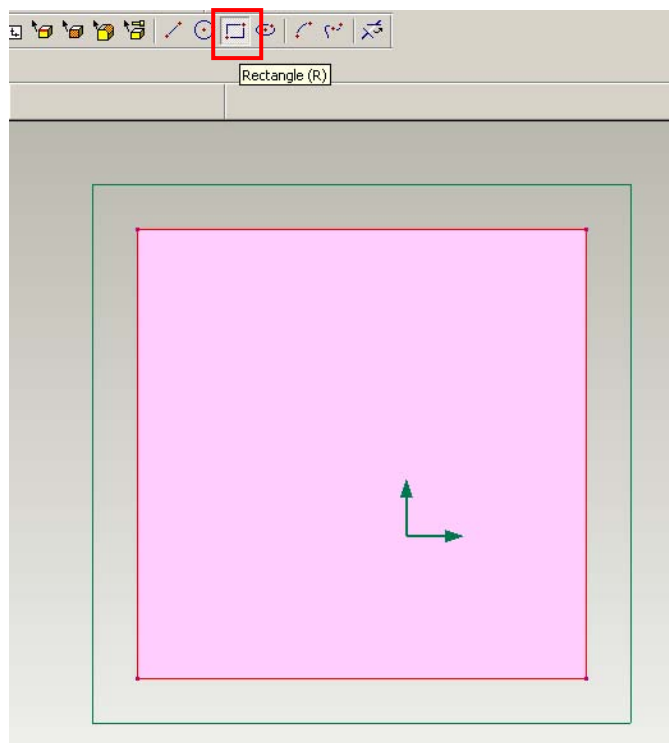


View menu
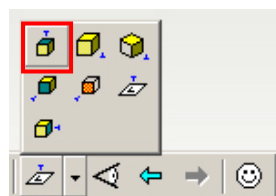


Work plane icon menu

3. Now select the **'rectangle'** tool on the right hand side of the bar and create a square that is 120mm x 120mm. You will have to be patient when you do this as it is slightly tricky.



4. Now click on the file menu and select **'save'** now save your box in your **'my documents folder'** click on the new folder icon and create a new folder called **'box project'**. Now save your box inside this folder name your file **'box'**.
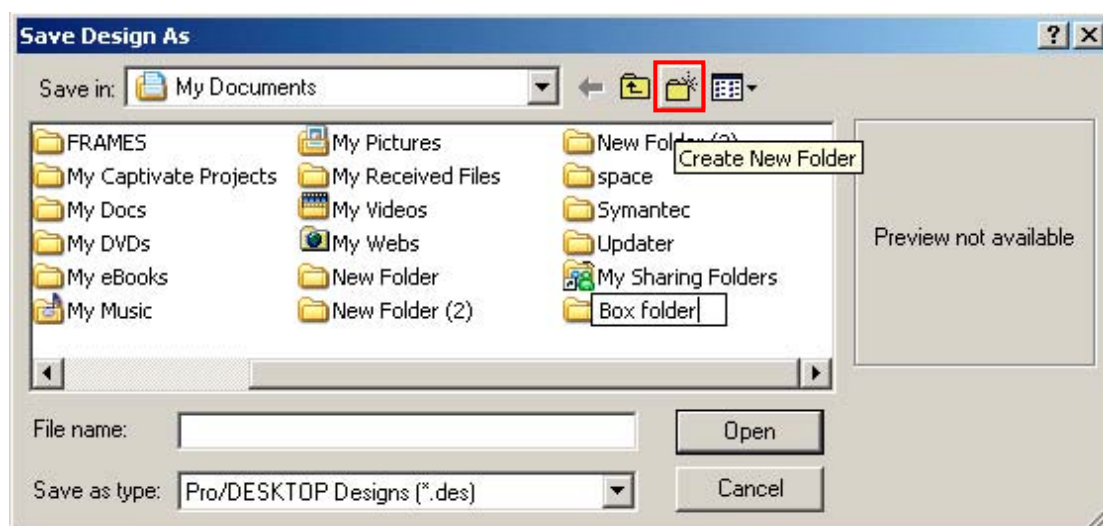


5. This will be your boxes plywood base. Now click on **'view icon'** and select **'isometric view'** as shown in the screenshot below.
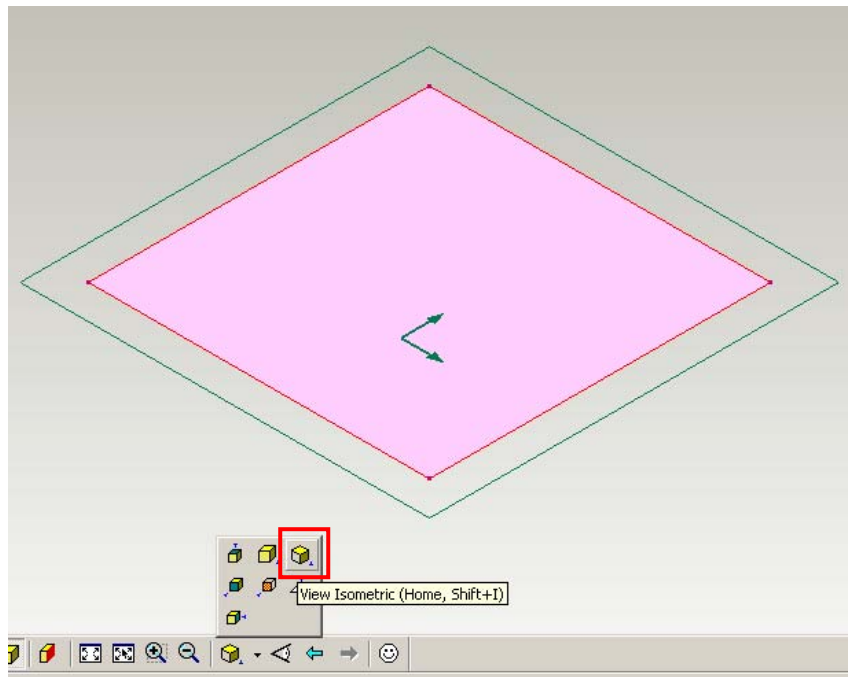
6.  Now we will give the material depth this is called extruding. Now select the **'select lines'** icon and **'draw an outline around the square'** your square will now have red lines around the outside.
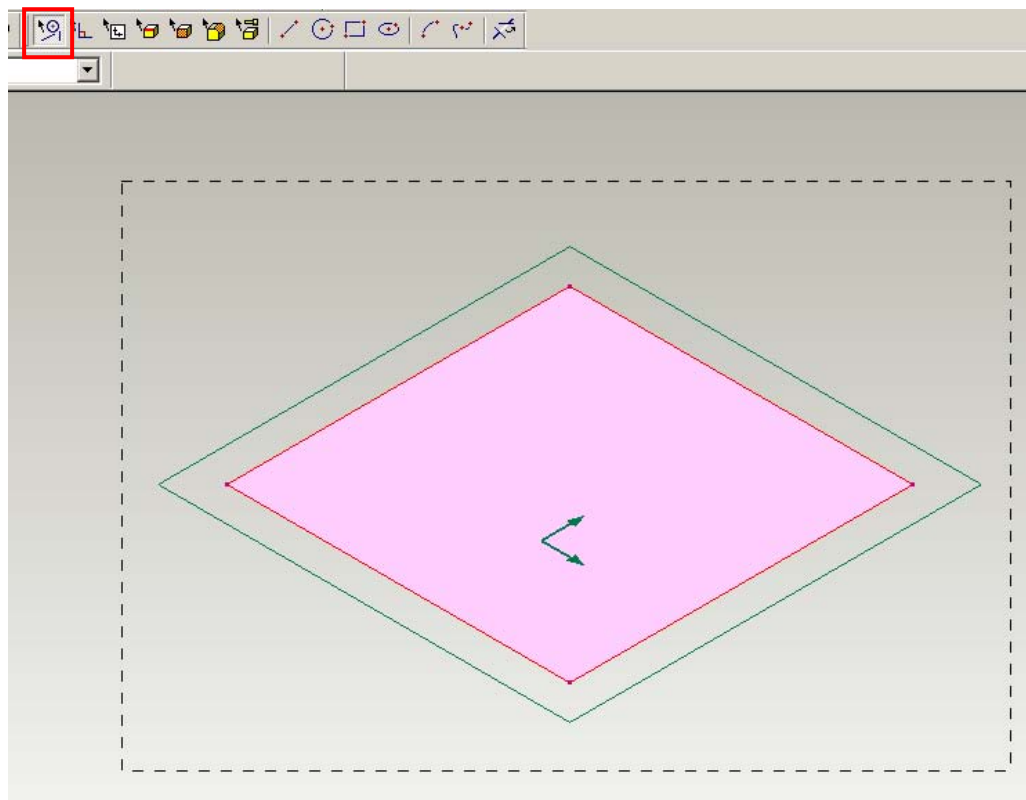


7.  Now click on the **'extrude'** icon below, then enter a feature name of **'plywood base'**, a **'distance of 3mm'**, ensure you select **'below work plane'** and make sure the **'add material box'** is select. Then click on **'ok'** and your box will be extruded, now click on the **'save'** button to save your work.   This is shown in the image below.
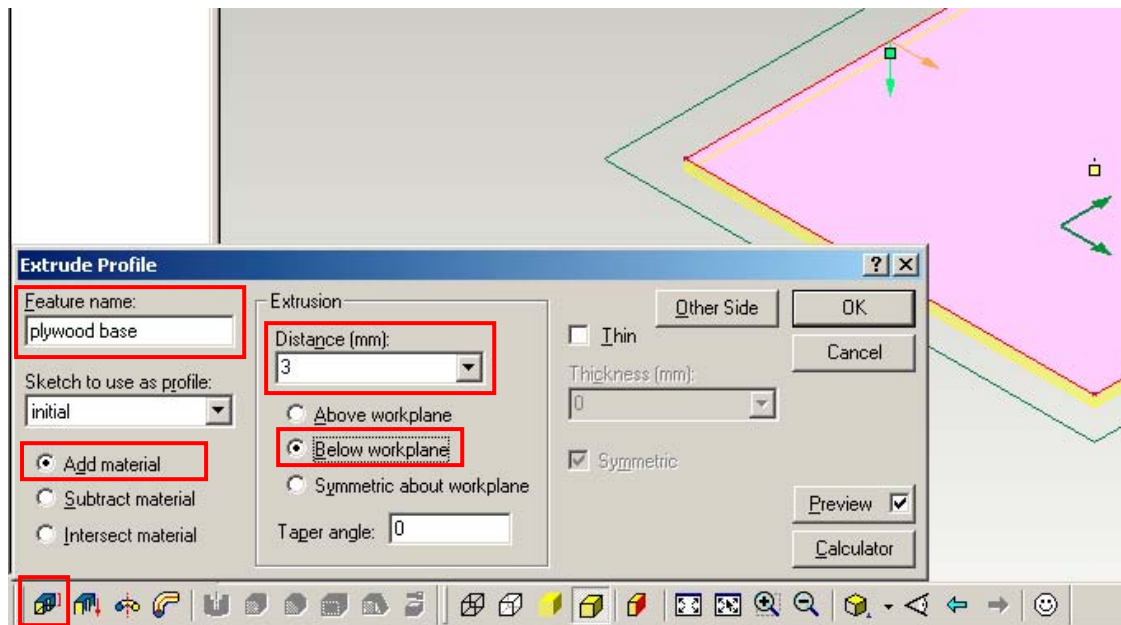
8. Now select the **'select faces'** icon, then select the top face of your plywood base, then **'right click'** on the square and select **'new sketch'**.
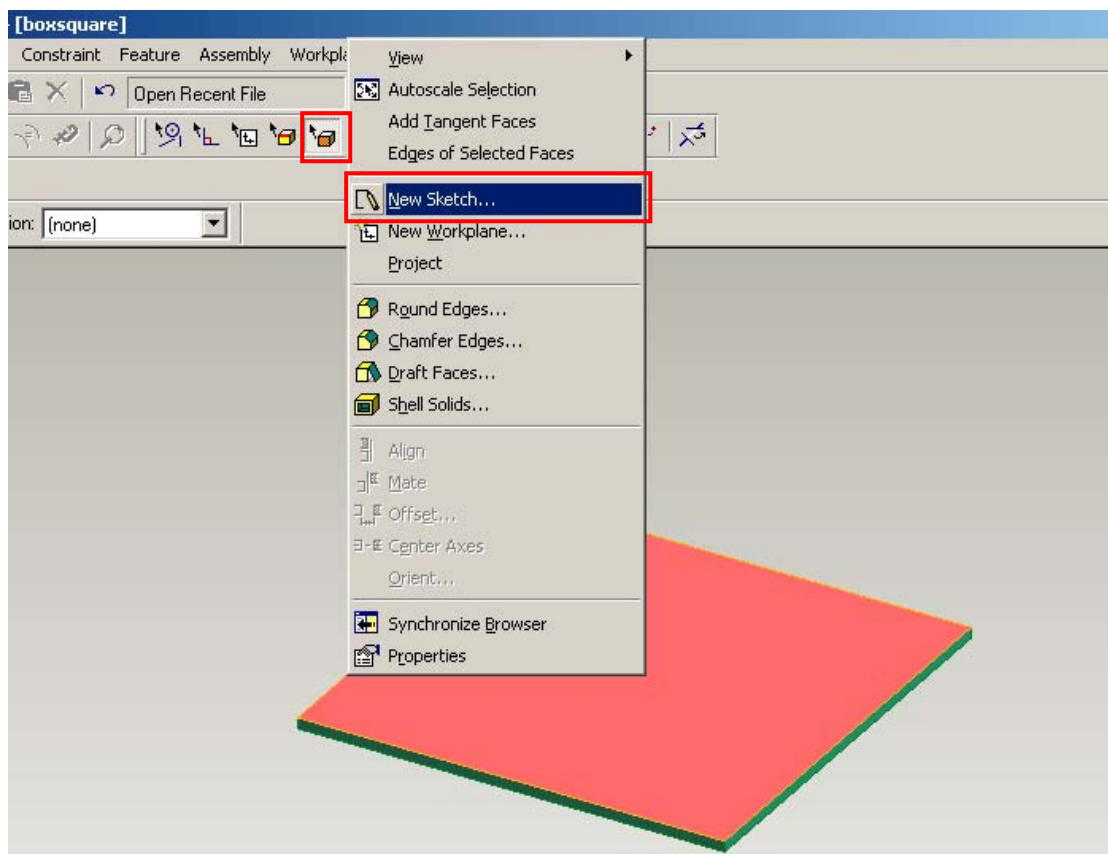
9.  You now need to complete the **'new sketch'** window. Enter **'box sides'** within the name field, then press **'ok'**.
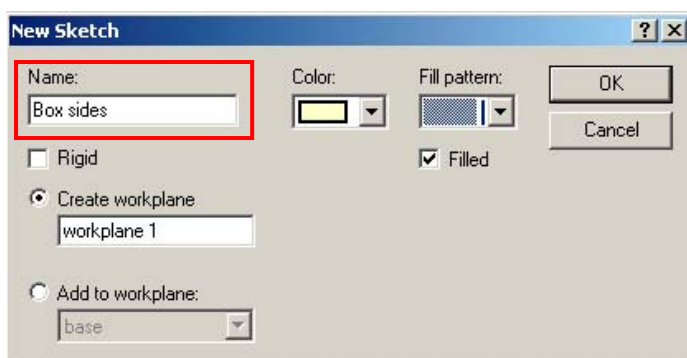


10. Now we need to change views. Click on the **'views icon'** and select **'plan view'** from the pop up window. Then click on the **'outward arrow icon'** this will resize your box so it fits on the screen.
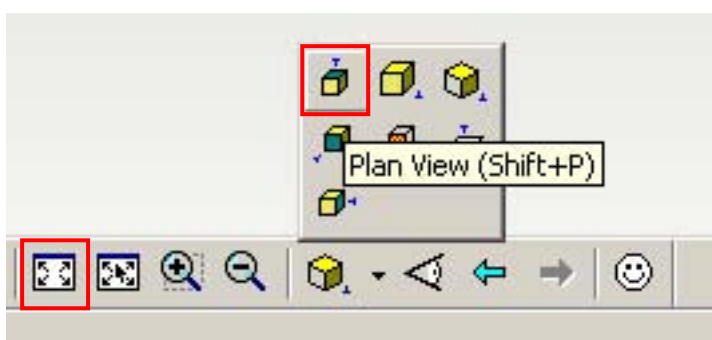


11. Next draw a rectangle over the original plywood base. Use the **'rectangle icon'** and draw a rectangle the same size as the one below which is **120mm x 120mm.**

12. Next select the **'view icon'** and change the view to **'isometric view'**.
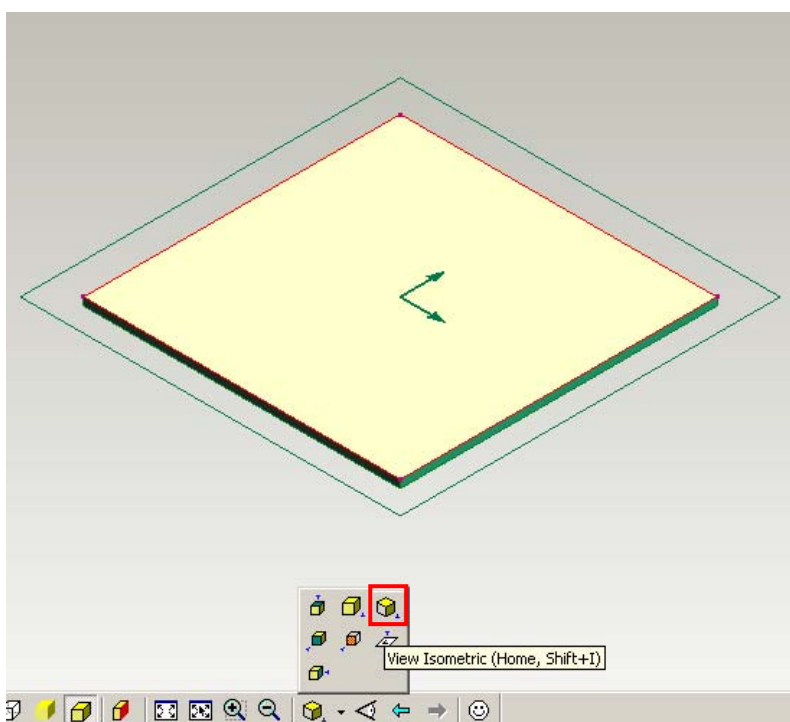


13. Next select the **'extrude icon'** and then complete the extrude pop up window. Enter a feature name of **'Box sides'** then enter a **'distance of 50mm'**, then make sure the **'above work plane'** box is ticked. Then press the **'ok'** button. Now press the **'save' button**. *Note: our original sides were 70mm high but most pupils cut there tops at 50mm. If you made your bottom and top slightly different you will have to enter a different dimension now.*

14. Next select the **'select faces'** icon, then select the top face of your box. Then **'right click'** on the top and select **'new sketch'** from the pop up menu. Now enter a name for the sketch call it **'box inside'** and then press **'ok'**.
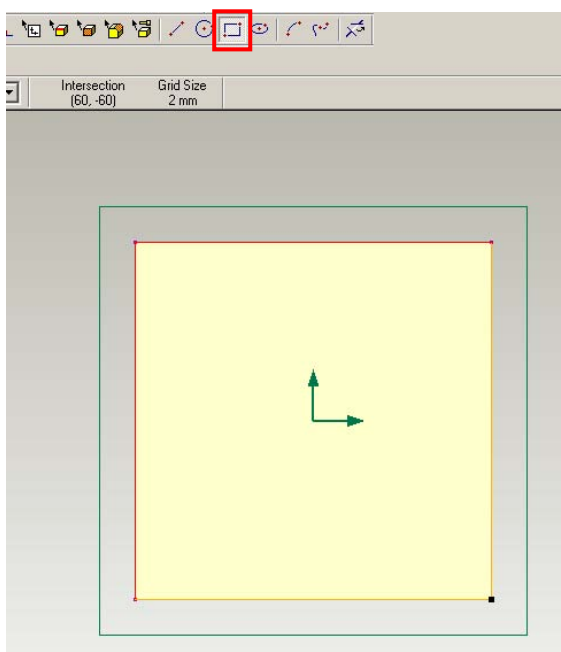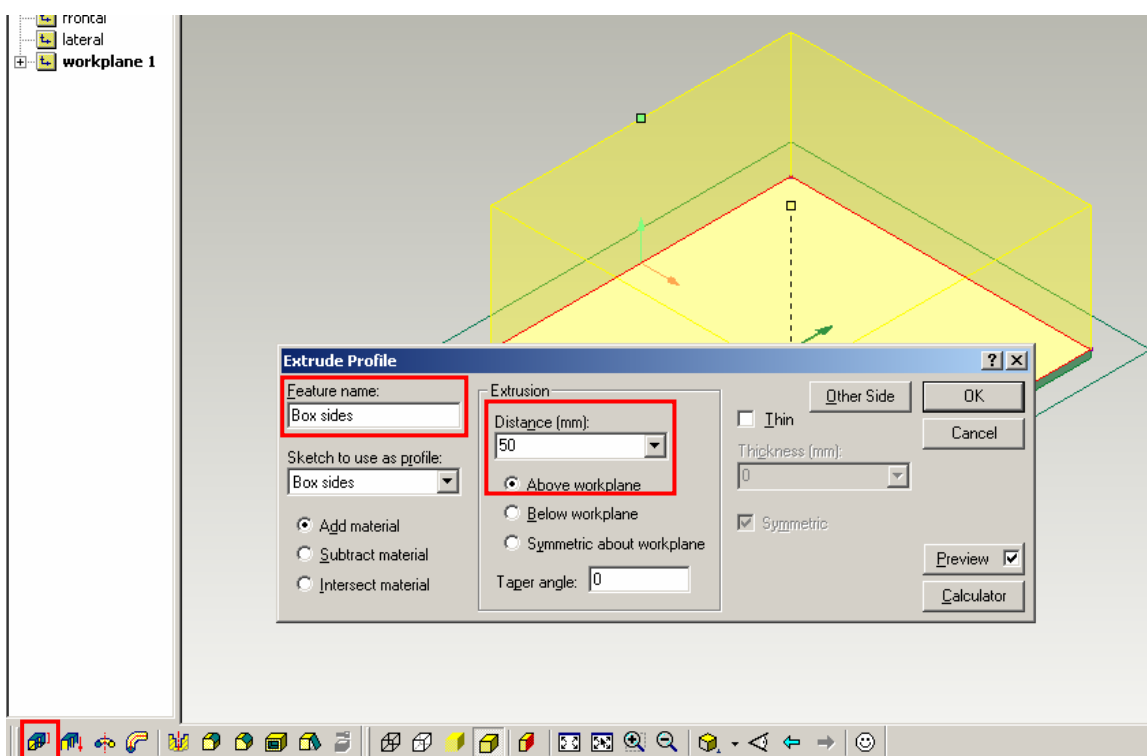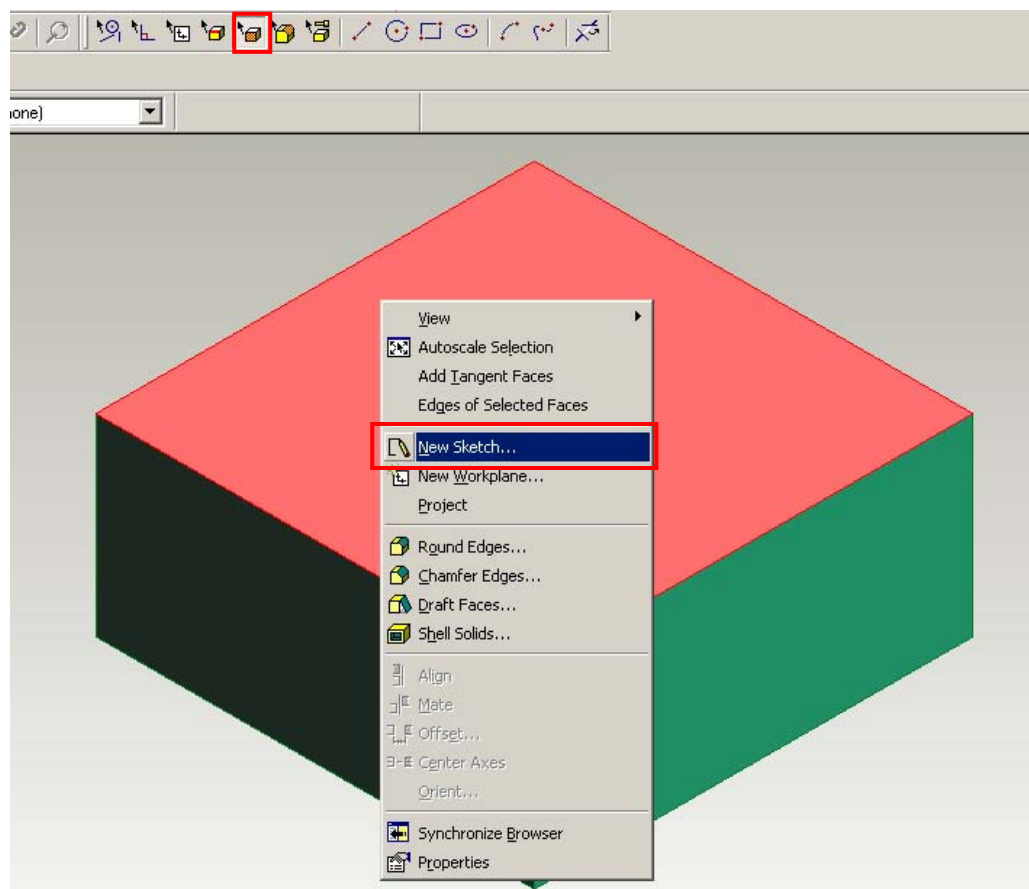
15. Next select the **'view icon'** and choose **'plan view'**, then click on the **'autoscale' icon** with the aarrows on. It is easier to draw in plan view.
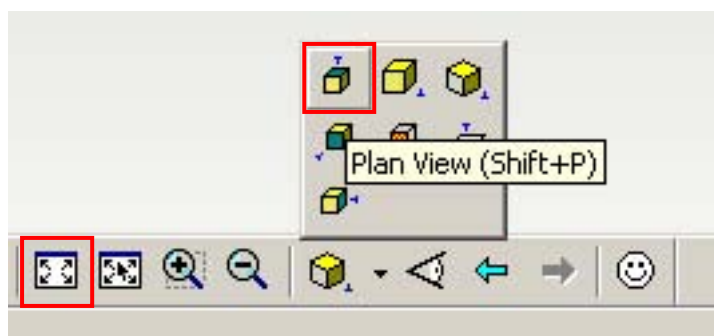
16. Now we need to create some guide square. Remember our box sides were 9mm thick? Now pick the **'rectangle'** icon and draw a 9mm x 9mm square in the top right corner touching the end side as shown below.
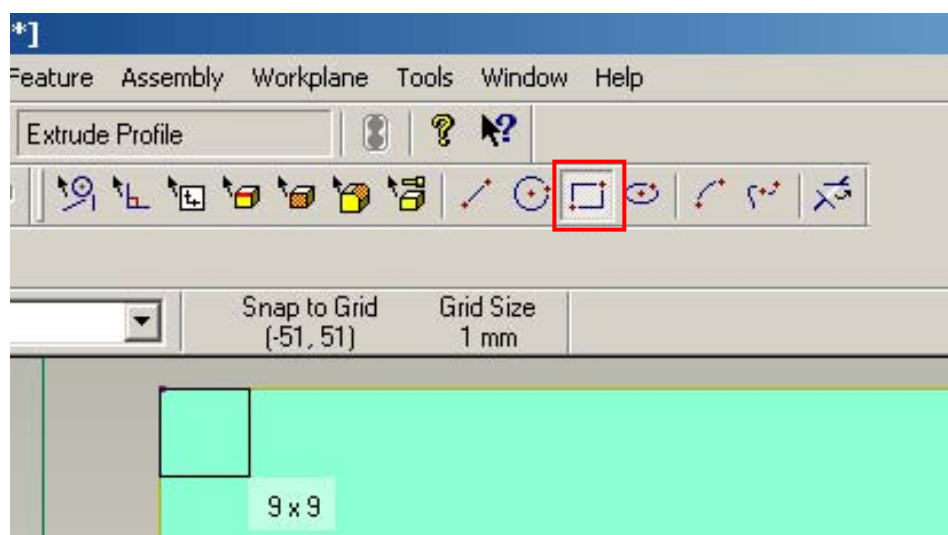
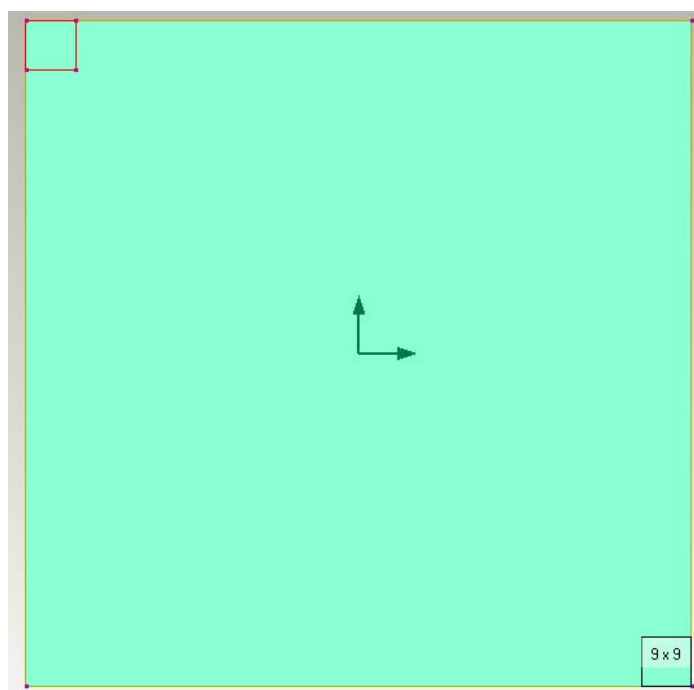17. Now pick the **'rectangle'** icon again and draw a 9mm x 9mm square in the bottom left corner touching the end side as shown below.  Your file should look like this below:-



18. Now press the **'autosacle'** icon so you can see your whole square. Now pick the **'rectangle'** icon again and draw a 102mm x 102mm square from the bottom corner of the top sqaure to the top corner of the bottom square like the image below! The rectangle tool will automatically lock on to each square. *Note: these are the internal dimensions of our square box.*
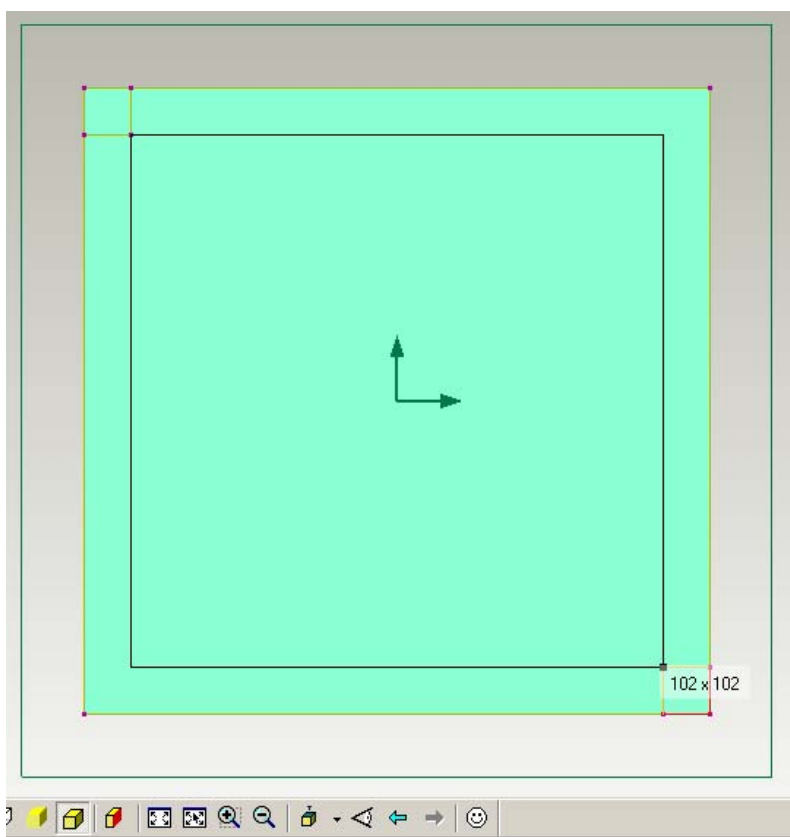
19. Next select the **'select lines'** tool and click on the two small guide square and 'delete' each line. Then still using the **'select lines'** tool draw a square around the outside of the smaller square to select the square. Ensure you delete all the guidelines you will no you have because your centre square will flash up with a colour like below:-
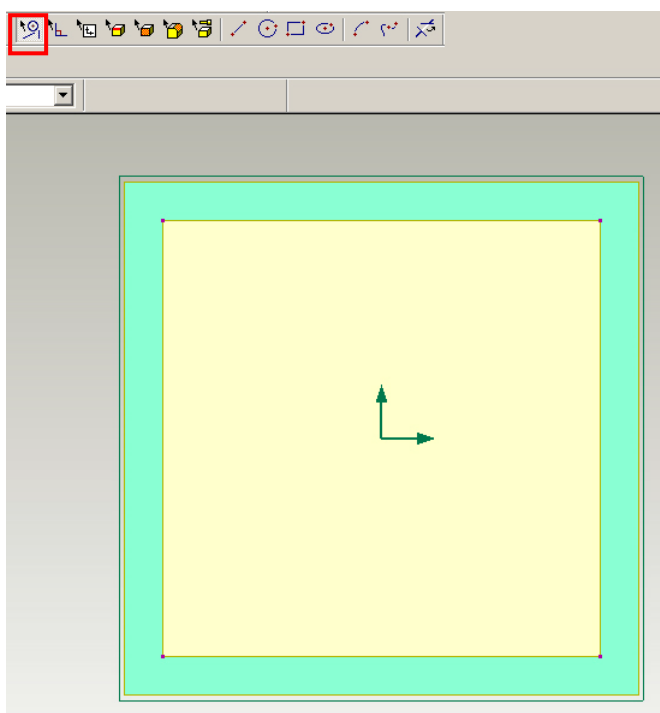


20. Now click on the **'view icon'** and select **'isometric view'.** Then press the **'save'** button. Your file should now look like the image below:-
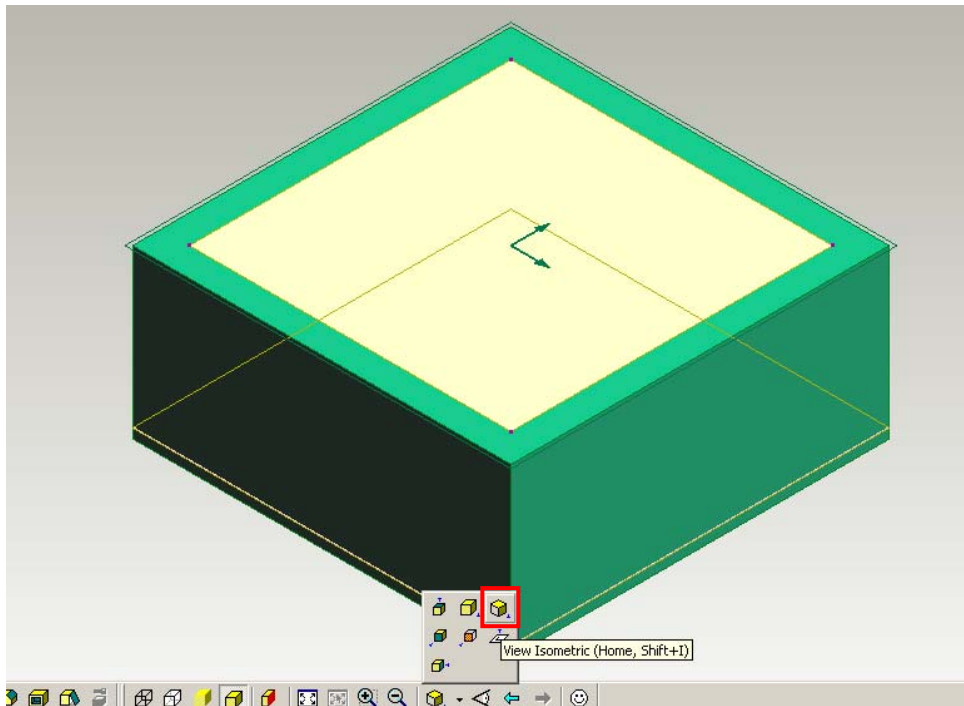
21. We have previously extruded material by adding it on to our box. We will now remove material to create the inside of our box. Now click on the **'extrude'** icon and change the **'feature name'** to inside box, select **'subtract material'**, enter a **'distance of 50mm'** and select **'below workplane'**. Then click on the **'ok'** button.
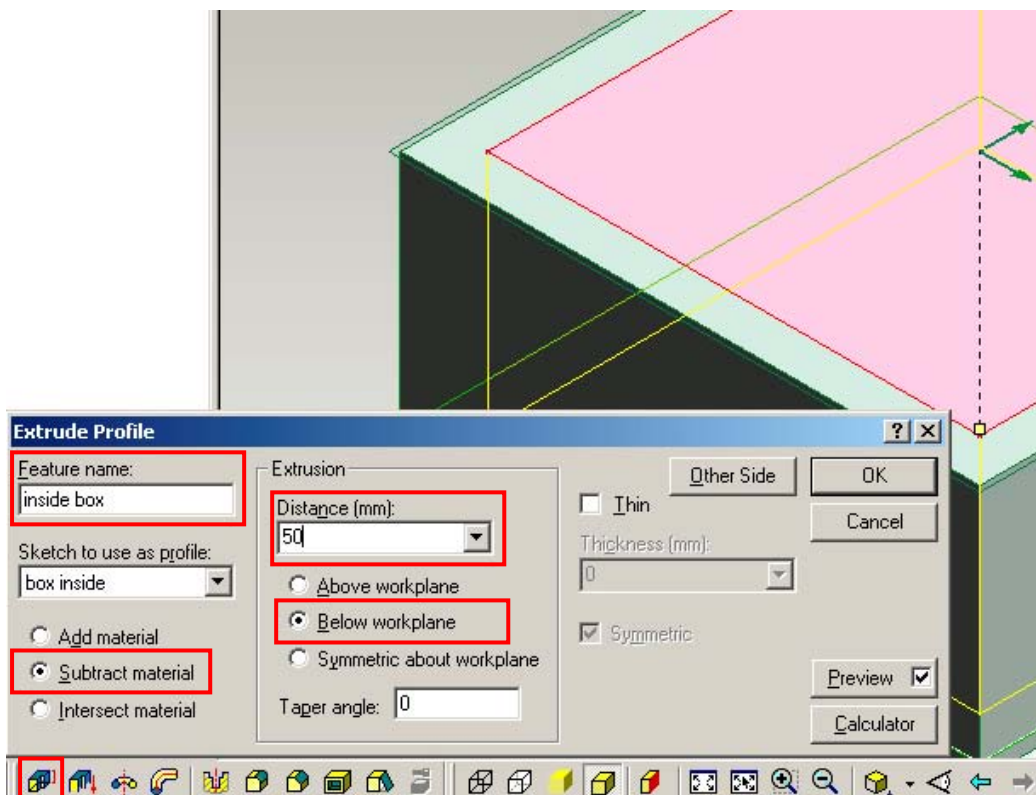


22. Well done you have now created your 'box base' Now click on the **'save button'**. Now click on the **'smiley face'** icon to **rotate your 'box'**. Click on the **'tumble'** icon again

to stop the box tumbling.
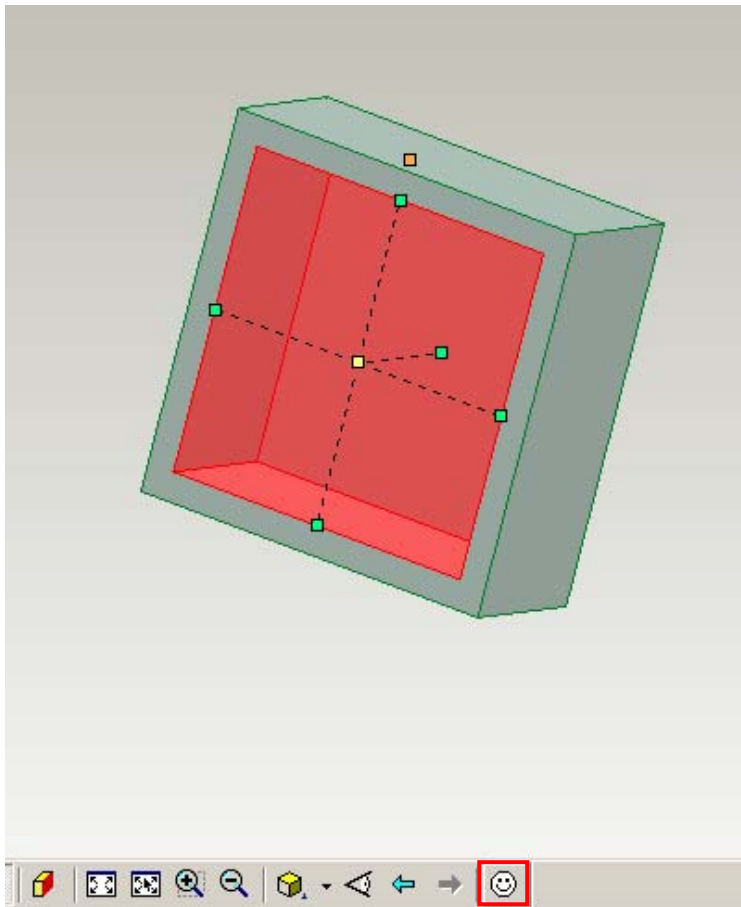


23. Now select the **'select faces'** icon and click on the **box face furthesist away from you**, see the image below. Click on it once to select it.
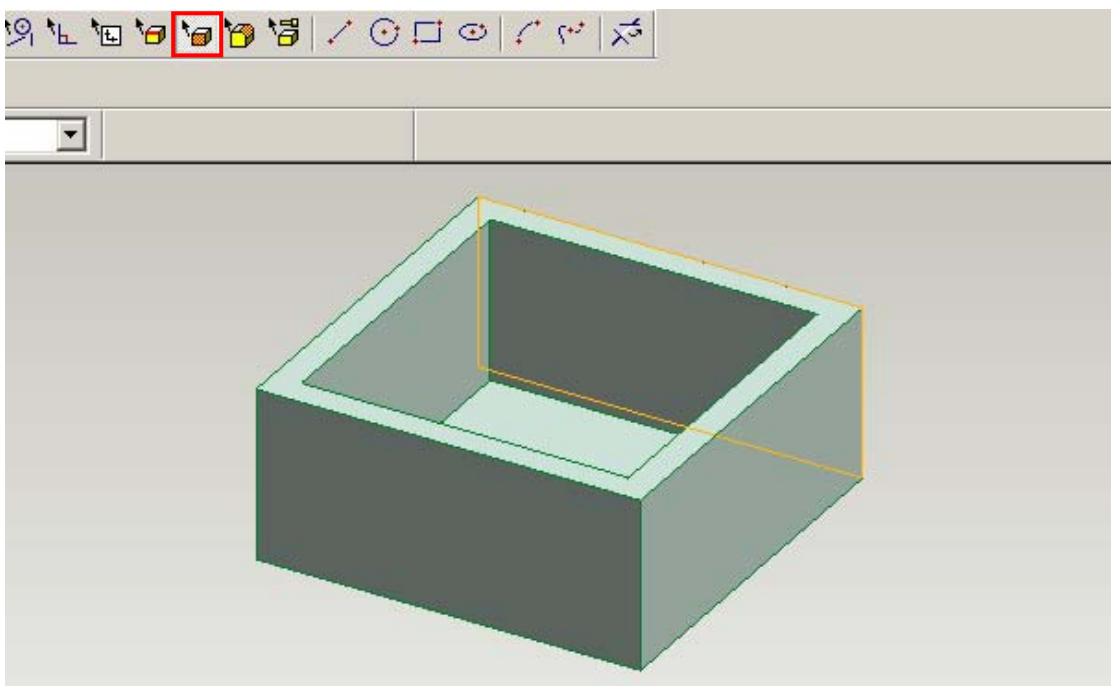
24. Now '**right click**' on your selected face and select '**new sketch**' from the pop up window. Then enter a name for the new sketch call it '**box lid**' and then press '**ok**'.
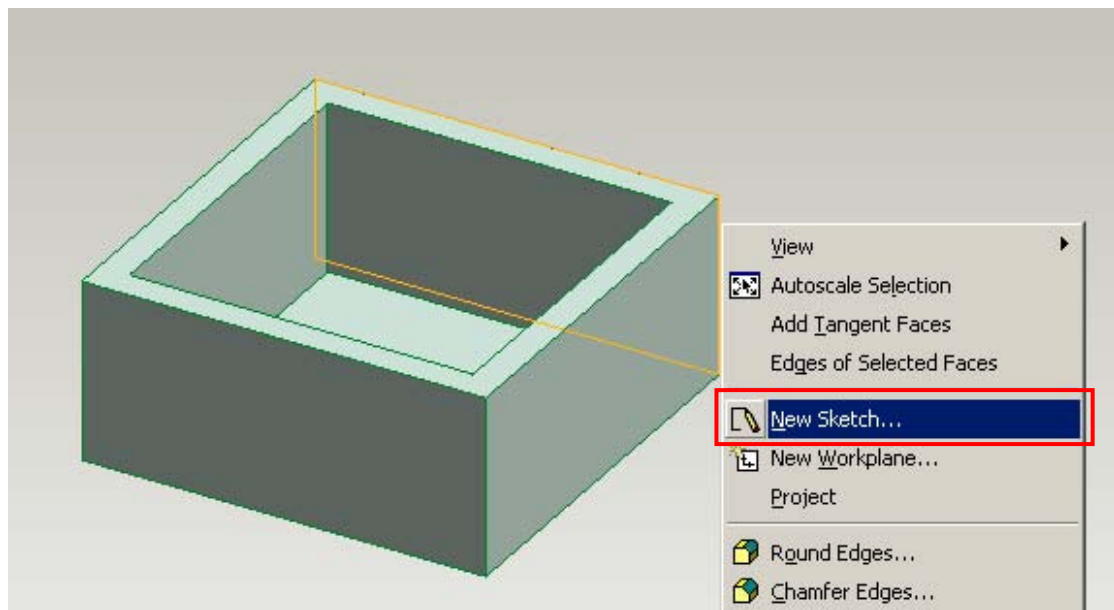


25. Now zoom out a little by pressing the '**zoom out**' icon. Now select the '**line tool**' and draw a '**line straight up to 120mm**', make sure you keep your finger on shift to keep the line straight.
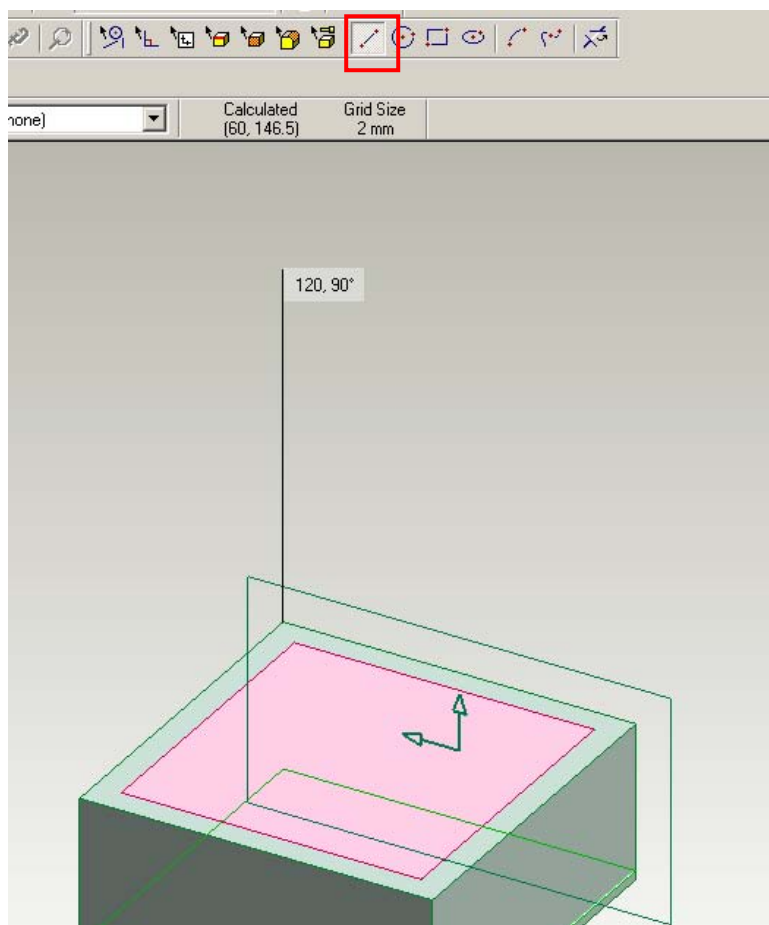
26. Now draw **another line at 90 degree** to that one like below at **120mm**, don't forget to keep shift down. Now keep on drawing until you make a square. You square will light up if it is correct.
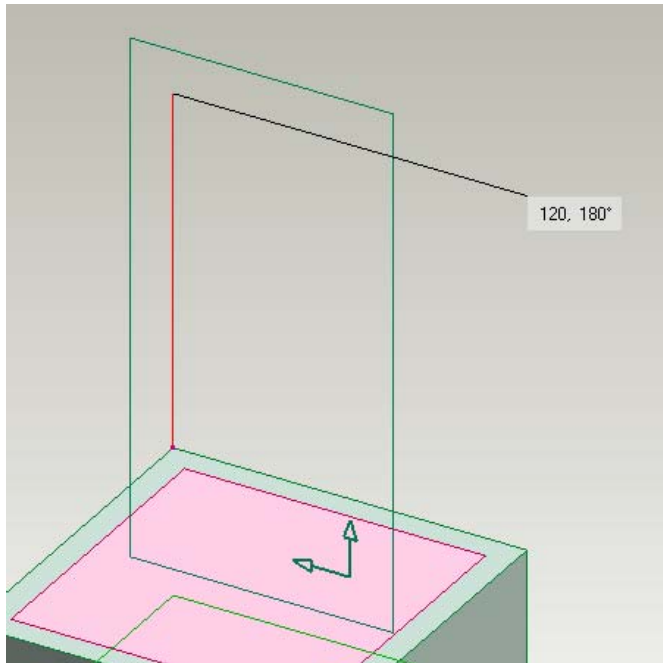


Second line at 90 degree's.
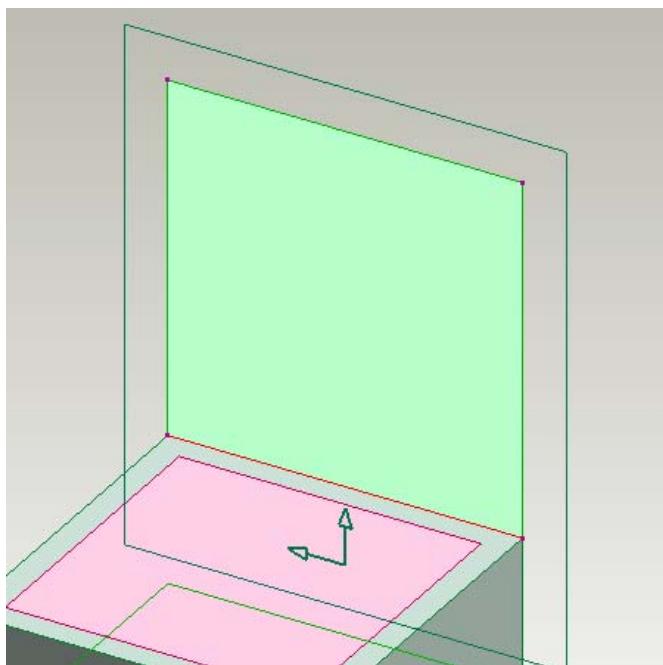


Highlighted square after four lines.

27. Now click on the **'extrude'** button and enter the following details feature name **'box lid'**, select **'add material'**, enter a **'distance of 20mm'**, and select **'above workplane'** then press **'ok'**. Note if an error message appears just click on **'yes'**.
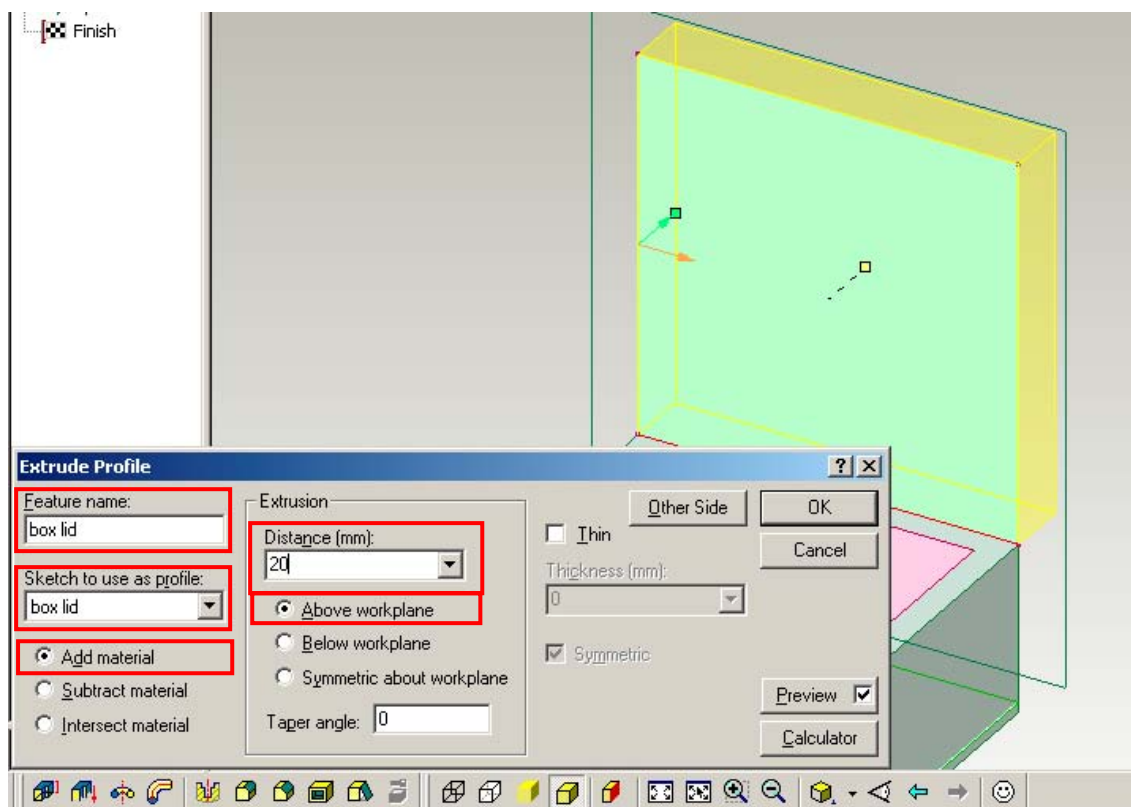


28. Next click on **the 'select face'** icon and select the closest face of your lid, then **'right click'** and select **'new sketch'**, then enter a name of **'inside lid'** and press **'ok'**.
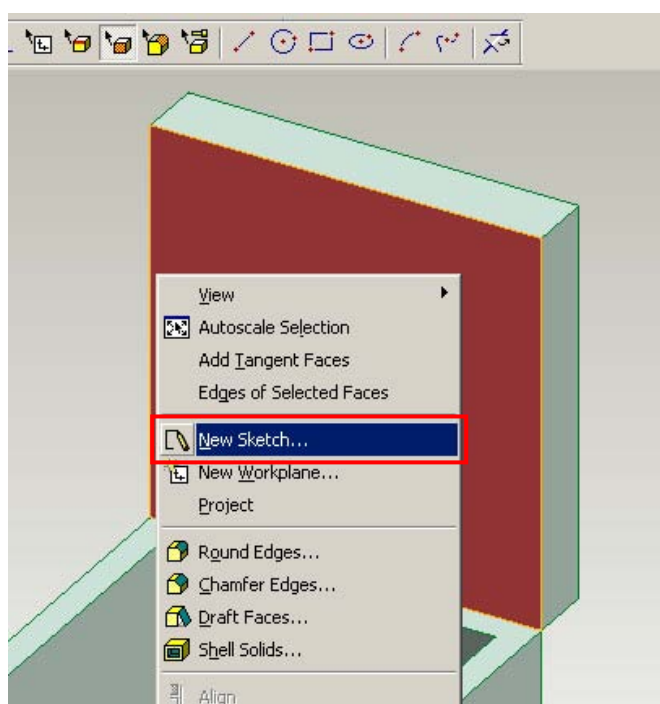
29. We will now do what we did before and remove part of the inside of the box. Before moving on **'press save'**. Now click on the 'view icon' and select 'front view'. Then click on the 'auto scale' icon.
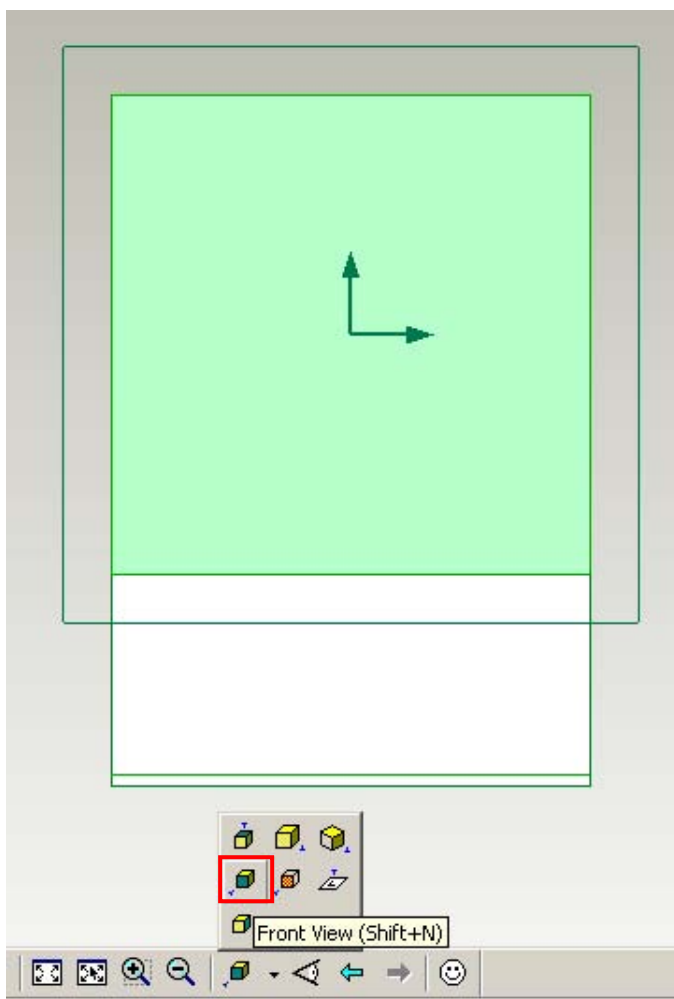


30. Now select the **'rectangle tool'** and draw two guidelines like before in each corner at **9mm x 9mm**. Note if you cannot get 9mm x 9mm you will have to **zoom in** on each corner until you can. Please see the image below:-
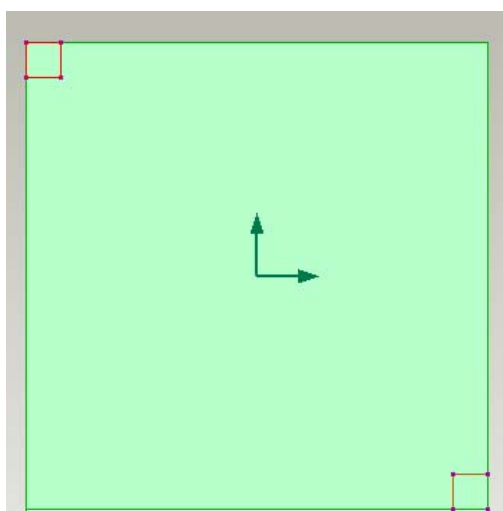
31.  Now pick the **'rectangle'** icon again and draw a 102mm x 102mm square from the bottom corner of the top sqaure to the top corner of the bottom square like the image below! The rectangle tool will automatically lock on to each square.  *Note: these are the internal dimensions of our square box.*
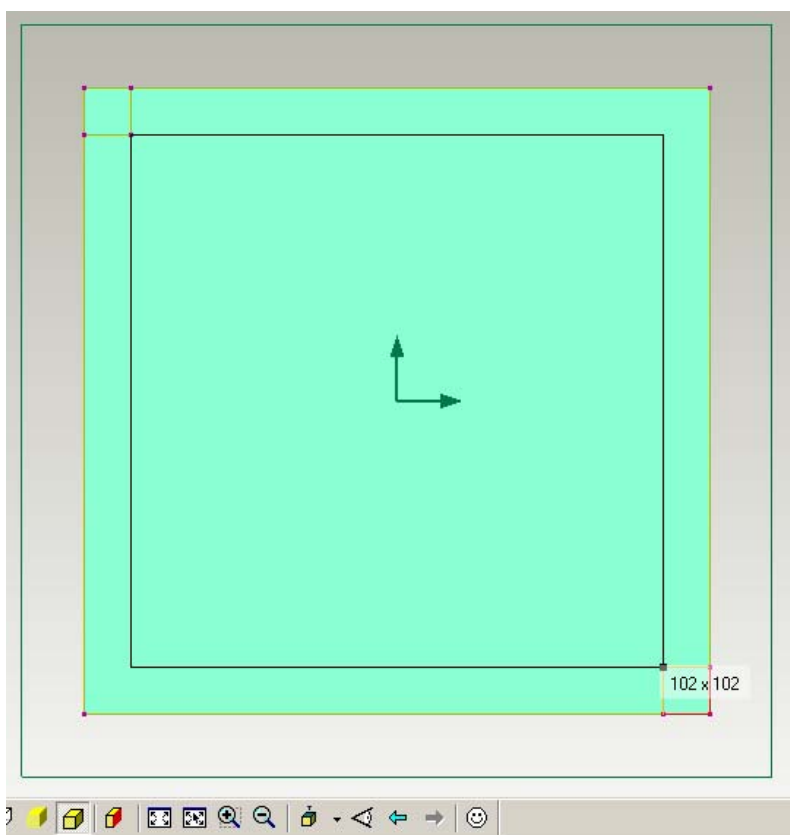


32. Next select the **'select lines'** tool and click on the two small guide square and 'delete' each line. Then still using the **'select lines'** tool draw a square around the outside of the smaller square to select the square. Ensure you delete all the guidelines you will no you have because your centre square will flash up with a colour like below:-
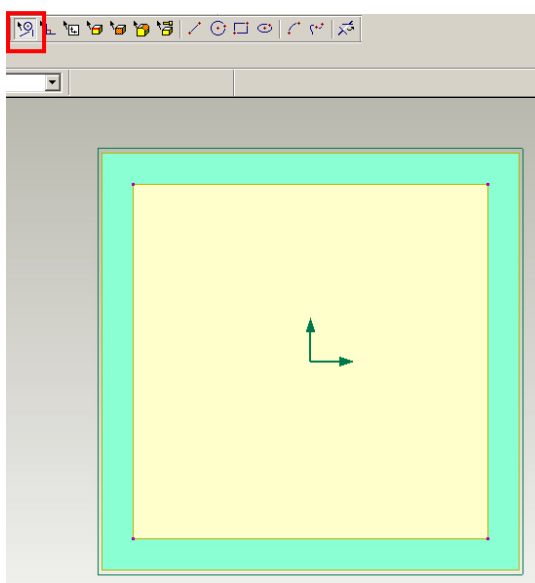
33. Now click on the **'extrude'** icon and enter in the below information. Feature name **'inside lid'**, select **'subtract material'**, select a **'distance of 17mm'**, and select the **'below workplane'** option, then press **'ok'** Now press **'save'** Then press the **'tumble icon'** to see your box rotate, then click on the **'tumble icon'** to stop your box moving.
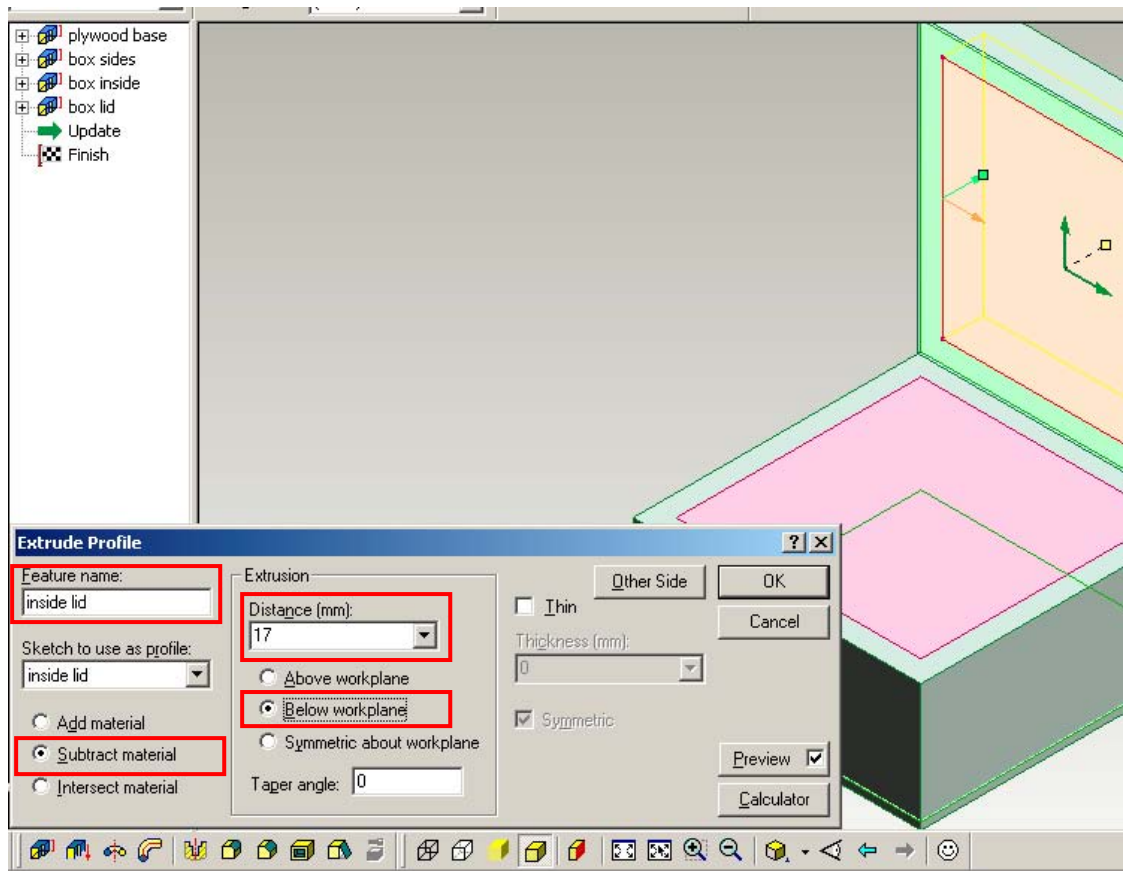


extruding options



Your box should look like this.

34. Now we will add the internal segments to our box. Now select the **'select faces'** icon and select the **'bottom of you box'**. Then right click and select **'new sketch'**. Then name your sketch **'box bottom'**, then click on the **'ok'** button.
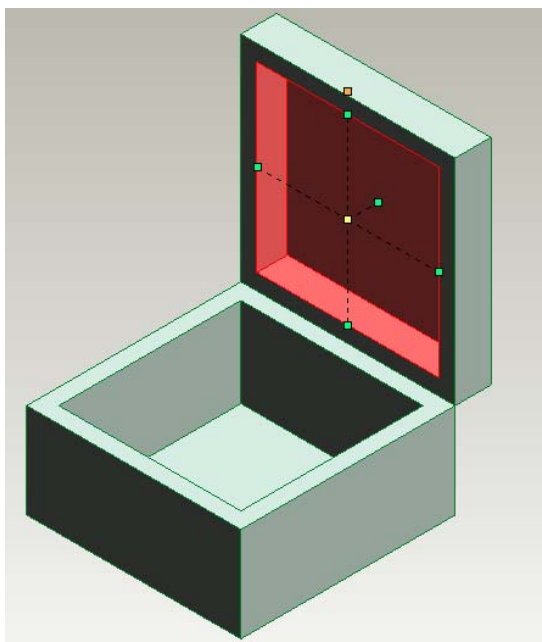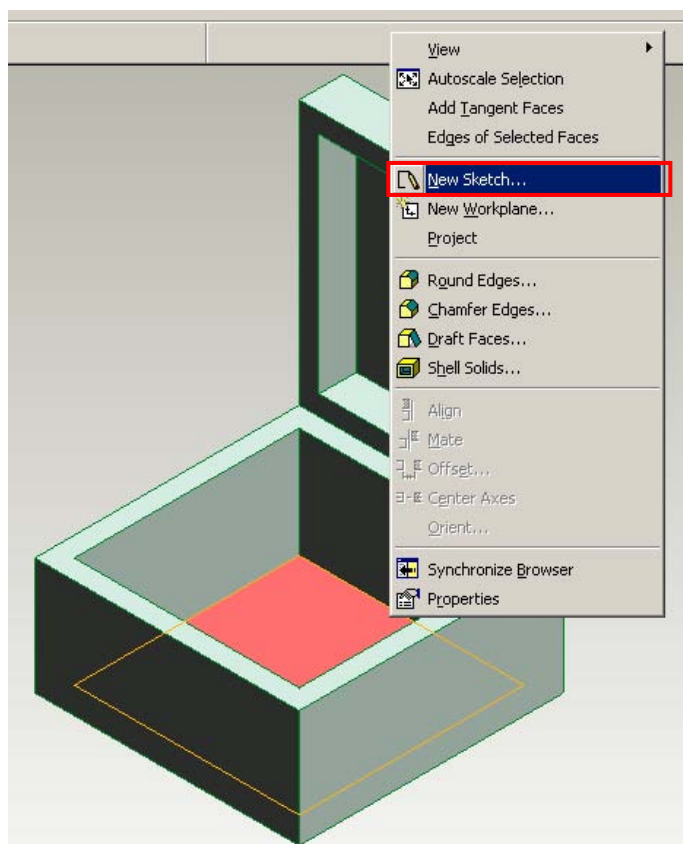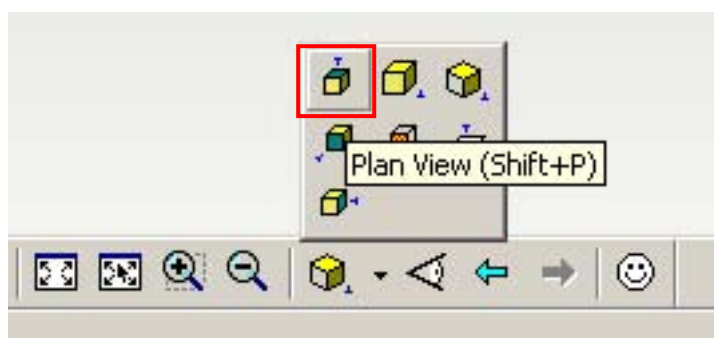


35. Next select the **'view icon'** and choose **'plan view'**, then click on the **'autoscale' icon** with the aarrows on.  It is easier to draw in plan view.



36. Next select the **'view icon'** and choose **'plan view'**, then click on the **'autoscale' icon** with the aarrows on.  *Note: It is easier to draw in plan view.* (Please remember the next sequence of points as this is how you add elements to your box, you should note this if you wish to add more elements later on.)

37. Next select the **'rectangle tool'** and draw a rectangle  from one end of the box to the other make sure it is only **'4mm thick'**. Now draw **'two more similar rectangles'** so that you have **three** in total. Next select the **'select line tool'** and select each rectangle and drag it to where you want it to be.  *Note: you may choose a different layout here as everyone has designed different box bottom design . But it will be up*

*to you to add your layout in here.*
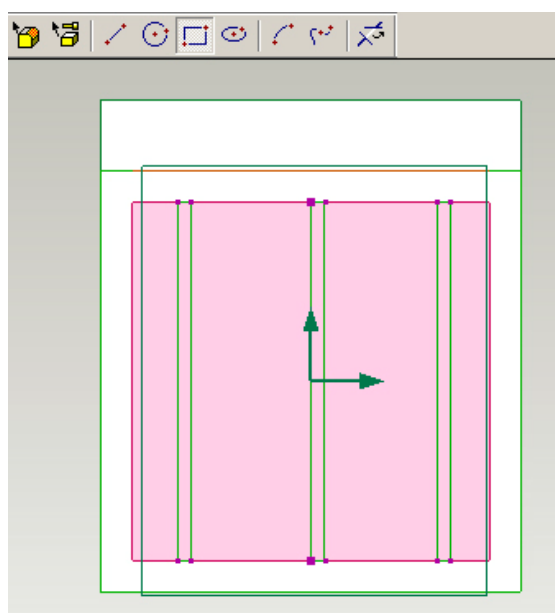


38. Next pick the **'select line'** tool and **draw a rectangle** around your **three rectangles** that you have just drawn. Now click on the **'view' icon** and **choose 'isometric view'** now **click on the 'extrude'** icon and enter in the following information. Enter a feature name of **'box bottom'**, select **'add material'**, select a **'distance of 30mm'**, and select **'above work plane'**. You may change the height of this depending on your box.
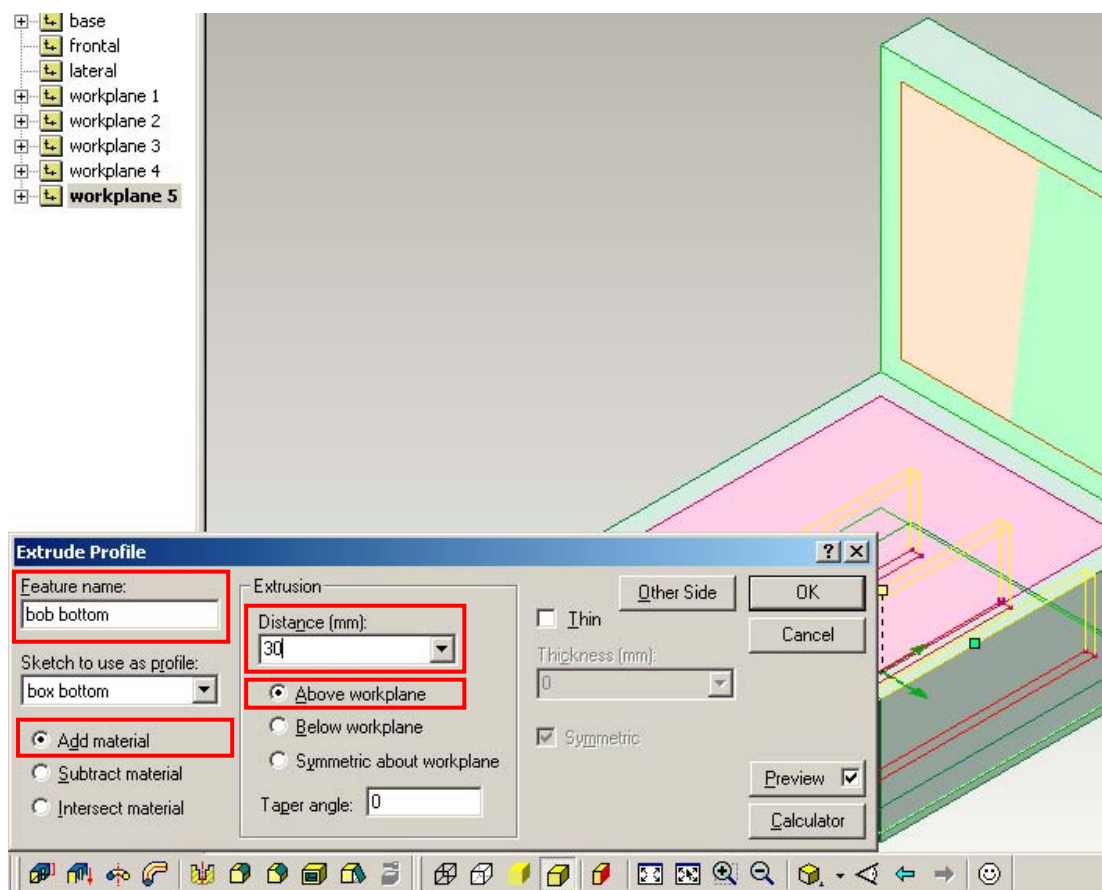
39. Next pick the **'select faces'** tool and select the face of the centre rectangle that you just extruded. Now **'right click'** on that face and select **'new sketch'** from the pop up window. Name your new sketch the **'centre partition'**.
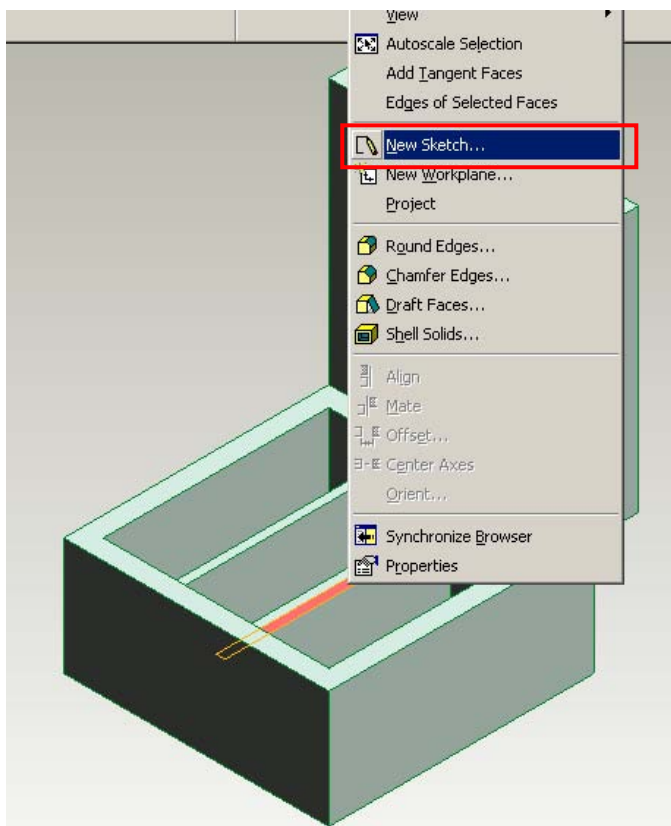


40. Next select **'plan view'** from the view menu. Now select the **'rectangle tool'** and draw a rectangle across the middle of your box that is **'4mm thick'**. Don't forget you can use the **'select line tool'** to move your rectangle to the centre of your box.
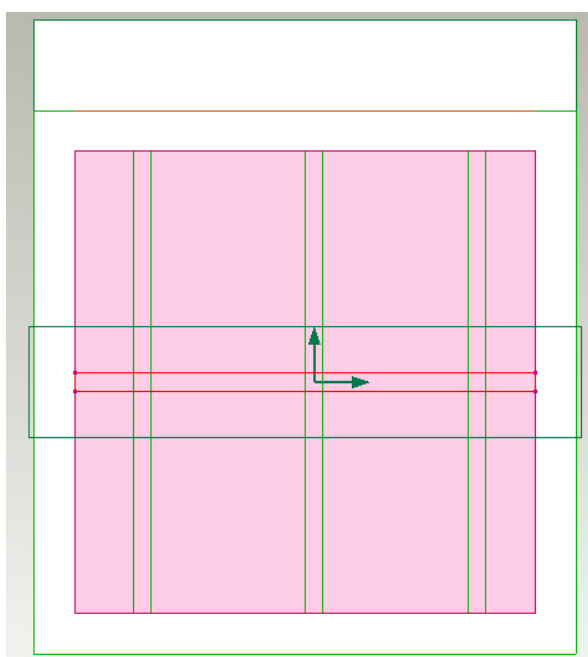
41. Now select the views icon and choose the **'isometric view'** Next select the **'extrude icon'** now enter in this information. Change the feature name to **'centre partition'**, select **'add material'**, set a **'distance of 30mm'** and select the **'below workplane'** option. Now click on the **'ok'** button. Now press **'save'**.
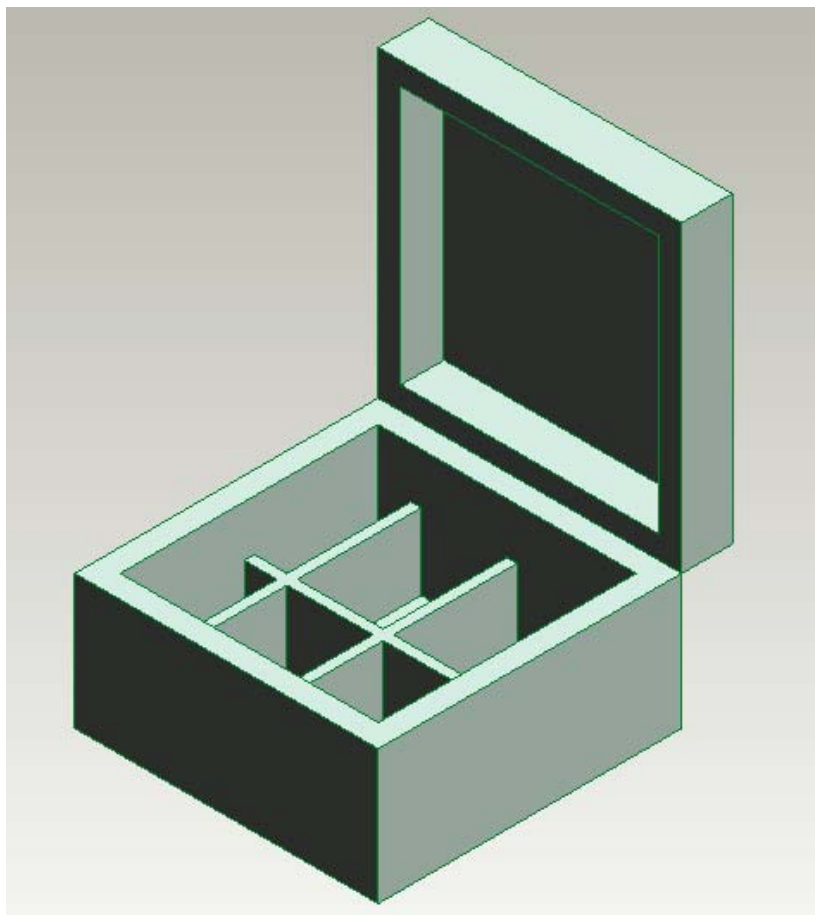




Your box should now look like this.

### What next I hear you say?

- You now know that to add a new element you need to choose the 'select face' icon then right click and choose new sketch.

- You then can draw your element and extrude it using the extrude icon.

- You know how to view your 3D model in numerous views.

- You also know that you can only extrude items in one plane e.g. :- (horizontally only) to extrude items in another angle you need to create a new sketch and extrude it by adding the material below the work plane.

I now want you to add a rectangular clasp to the top of your box lid and to the bottom section of the box. You should know how to do this now! You can also change the inside of the box to look like your box. You can also add any extra elements you're your box design has such as extra blocks, etc.

**Remember constantly save your box so if things go wrong you can revert back to the saved file!**

**Carry on working until you are done. Once complete you will need to render your box go back to the web page you got this tutorial from and open the render tutorial PDF.**

# Well done you have now created a 3D Box!

### Top Tips!

Click on the '**small drop down window**' and select the '**features**' selection. You now can see the names of all your previous drawings. If you feel the need to undo what you have done? Then drag a '**drawing element**' into the '**recycle bin**' at the bottom of the page. Then '**right click**' and empty your bin.  Your drawing will now have moved back to the drawing element before the deleted section.