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## Alibre Design Xpress tutorial.

By Robert Weekley

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## Extrude Boss & Cut Introduction

### Table Napkin Holder

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This tutorial is one of many produced to help new users of Alibre Design Xpress and Alibre Design learn the program, and is intended to be in addition to the included tutorials that come with Alibre Design as provided by Alibre, Inc. These tutorials are for learning the use of the program by creating an object either from real life experience, industry, or imagination, and will be covering the functions and features with a variety of techniques. Commonly you will find a level of repetition, as well as a level of diversity, designed to introduce you to features, and reinforce your understanding by consistent as well as varied applications.

These Tutorials are an ongoing development, now with an extended delivery plan in place, to deliver more, and varied tutorials using Alibre Design Xpress.

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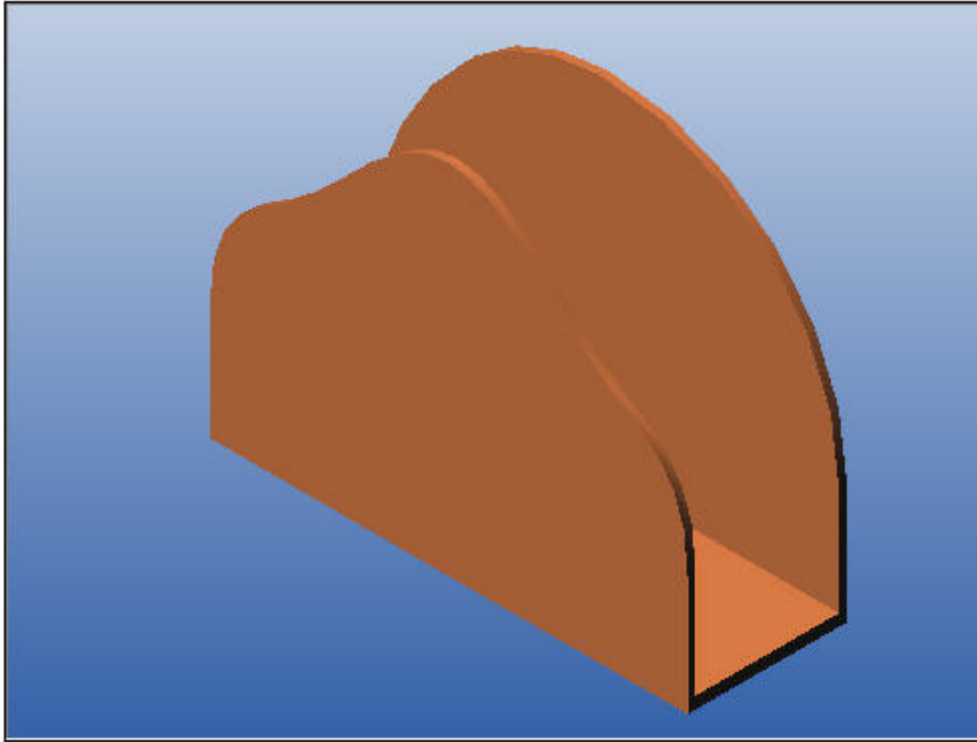
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# Extrude Boss & Cut Introduction

## Table Napkin Holder - Intro



This is another tutorial in a Series on creating 3D Mechanical CAD Models using Alibre Design Xpress. It's intent is to quickly cover two primary features:

- **Extrude Boss** (Make a Solid Object),
- **Extrude Cut** (Remove material from a solid object).

Within these two features you will learn finer points of different types, like Mid-plane, to Next, To Geometry, and uses of them.

You will also learn some simple sketching functions, like creation or application of:

- 2 point Rectangle
- 3 point rectangle
- Circular Arc: Center, Start, End
- Elliptical Arc
- Line, Reference line
- B-spline
- Symmetric Constraints
- Linear Dimensions

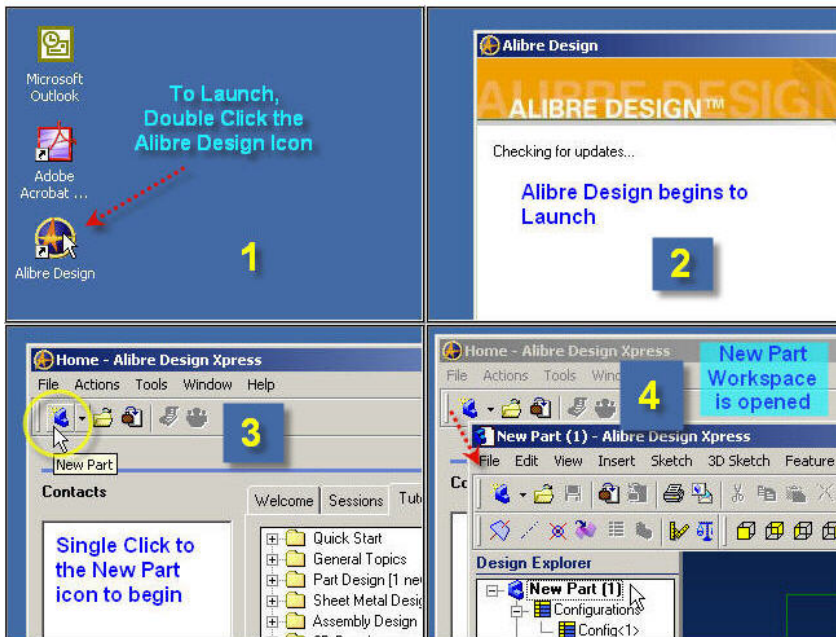
### **Note:**

It is assumed you have already downloaded and installed Alibre Design Xpress, and know already how to start Xpress, if not, look at: **3D CAD Non-Animated Tutorial - Feature #1 - Revolve - Basics - Step #1**, in CAD Group at [www.instructables.com](http://www.instructables.com)

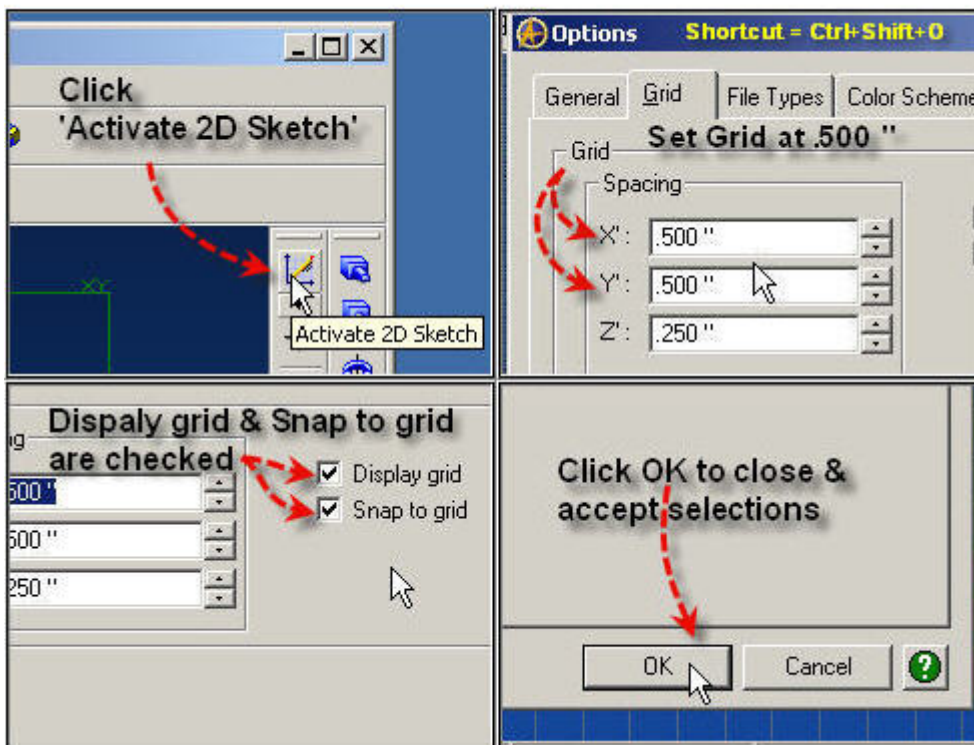
## Step # 1 - Set Workspace Grid

Ok - here we go!

First open a New Part Workspace: (Refresher image shown)



Then, activate the 2D Sketch mode, and Open Options from the Tools selection in the main menu, Set Grid X & Y to 0.500", leave Z alone, Make sure display Grid and Snap to Grid are Checked. Click 'OK' to close the Options Dialog and get ready to continue.



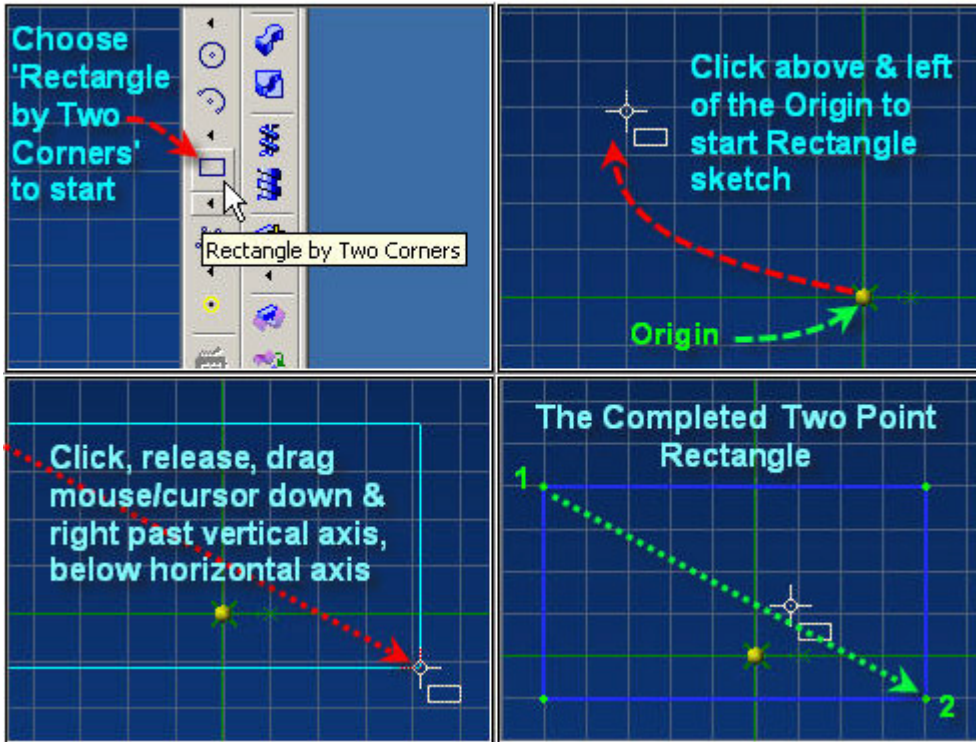
## Step # 2 - Sketch simple Rectangle

From the Sketching [toolbar](#), select 'Rectangle by Two Corners'

Place the mouse above and left of the origin,

Click, release, and Drag the mouse/Cursor down & to the right -

past the Vertical Axis & below the Horizontal Axis, click to complete the Rectangle.



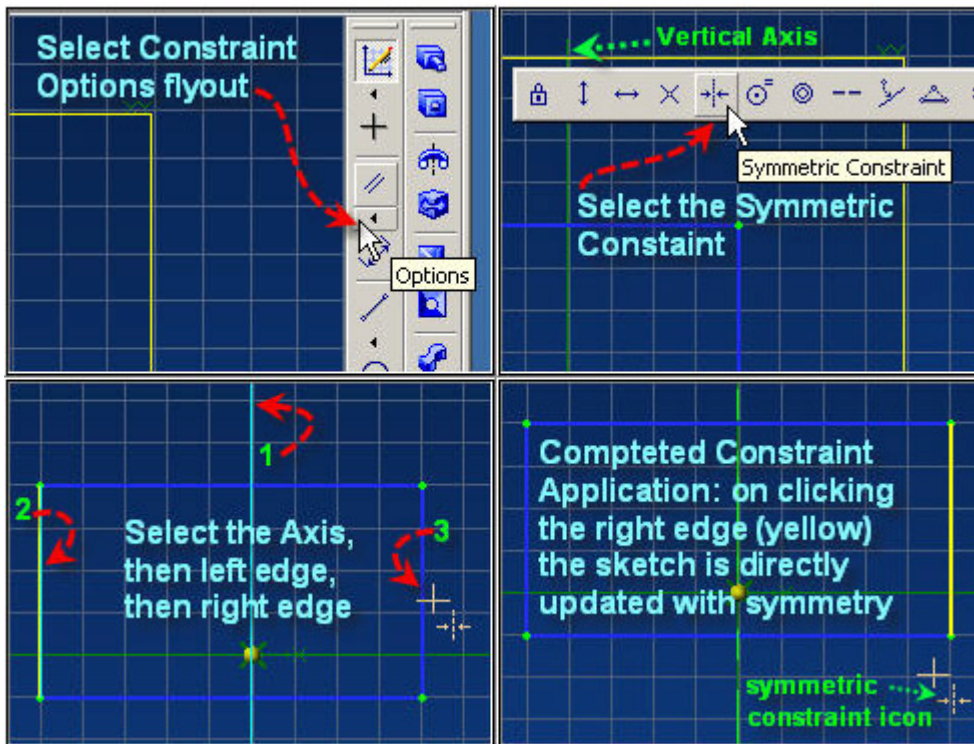
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## Step # 3 - Apply Symmetric Constraint

First select the Constraint Flyout, then select the Symmetric Constraint  
Click the Vertical Axis as the centerline, then click the left edge line of the Rectangle first, then the Right edge line of the Rectangle.

The Symmetric Constraint will directly and automatically adjust the second line selection to be symmetric with the first line selected on the left about the Vertical Axis.

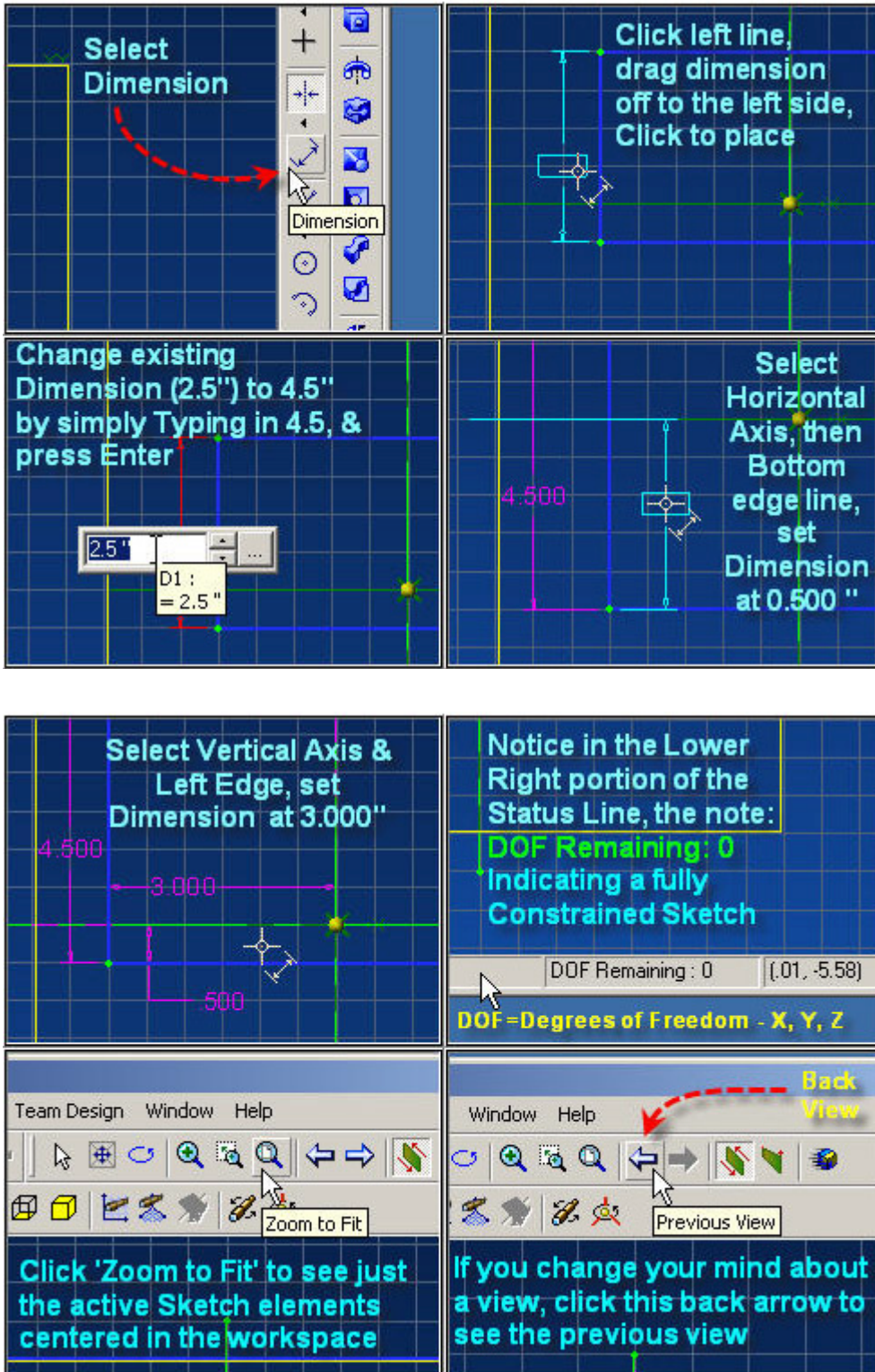


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## Step # 4 - Apply Dimensions

Select the Dimension [Icon](#) in the Sketching Toolbar; Click the left side line and drag left to place dimension, click. Enter 4.5 and press Enter to complete the dimension entry and edit. Now Click the Horizontal Axis and then Click the Bottom Edge line, Click, Type .5, and press Enter, Click the number and drag to place in a suitable [location](#). Now repeat this process by clicking Vertical Axis & Left Edge, Enter a Dimension of 3.000 " and press enter to complete. Clicking the 'Zoom to Fit' icon will now give a closer view; 'Previous View' will take you back.





## Step # 5 - Extrude Boss

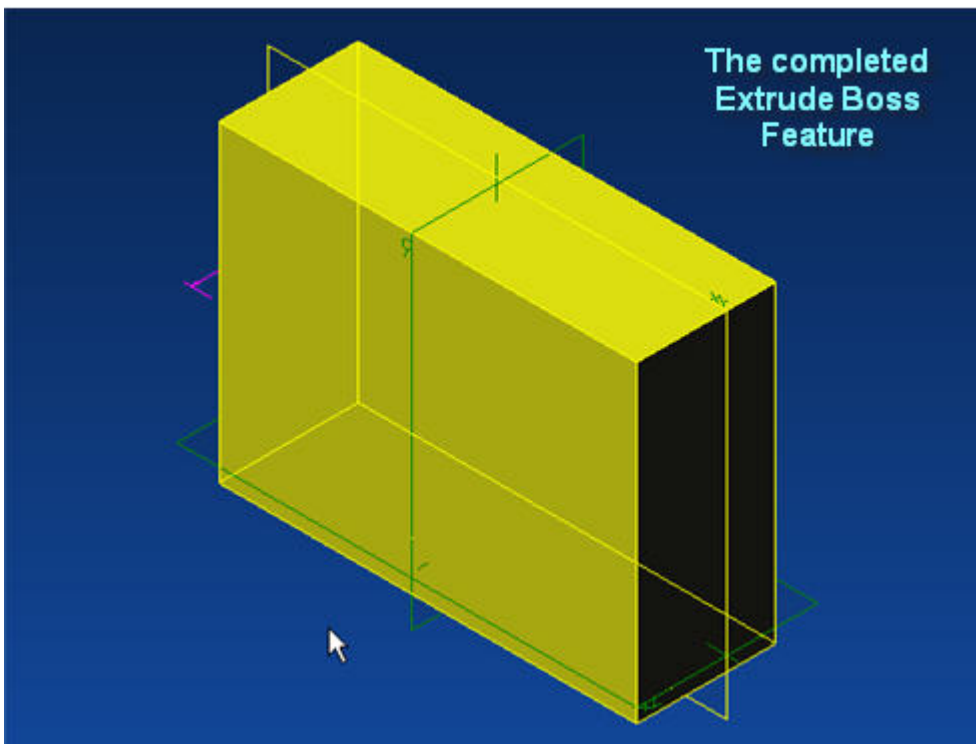
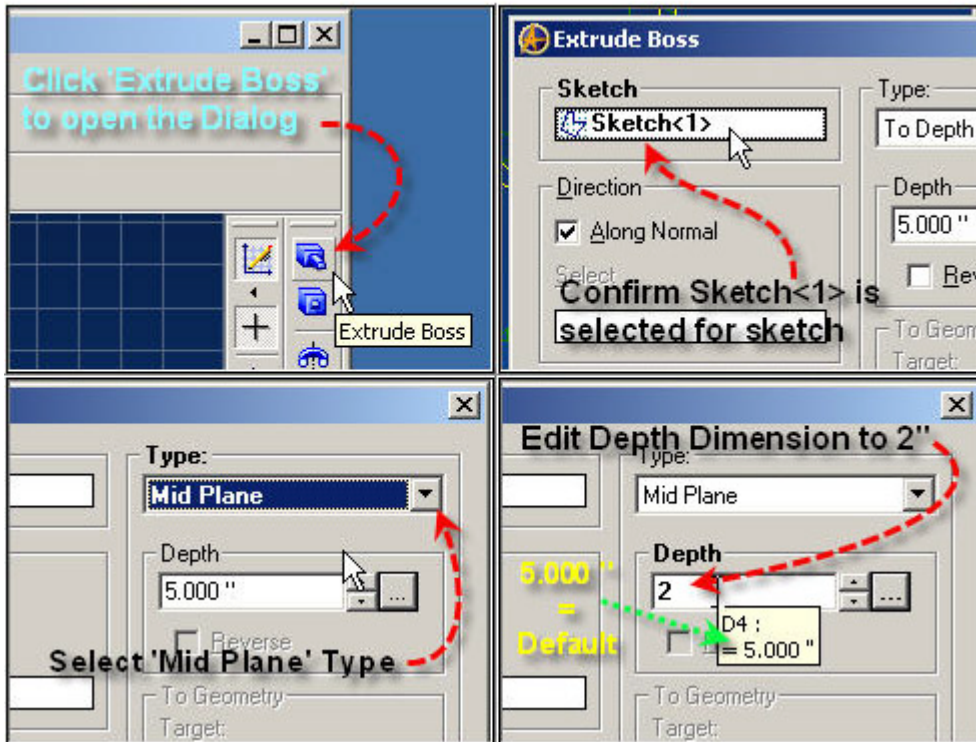
Click the Extrude Boss icon in the Part Modeling Toolbar.

Confirm that Sketch<1> is selected in the Dialog for Sketch,

Click on 'To Depth' or the Triangle Icon in Type: to select Mid Plane

Highlight the Depth Dimension (5.000 ") and Type 2,

Press Enter (or Click OK) to Complete the Extrude with the dimension of 2.000 " for depth



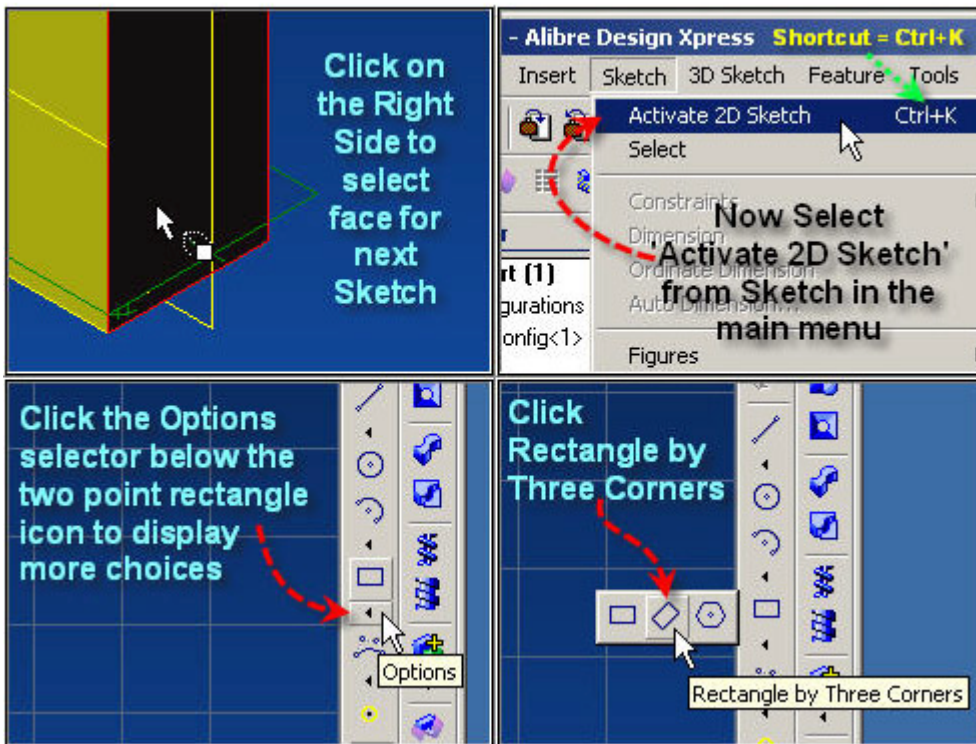
## Step # 6 - Initial End Sketch

While we could use 'Rectangle by Two Corners' to accomplish this - I am introducing the 'Rectangle by Three Corners', for practice, which will be used more effectively in later tutorials.

Click on the Right End (Shown as dark, but visible) of the Extrusion.

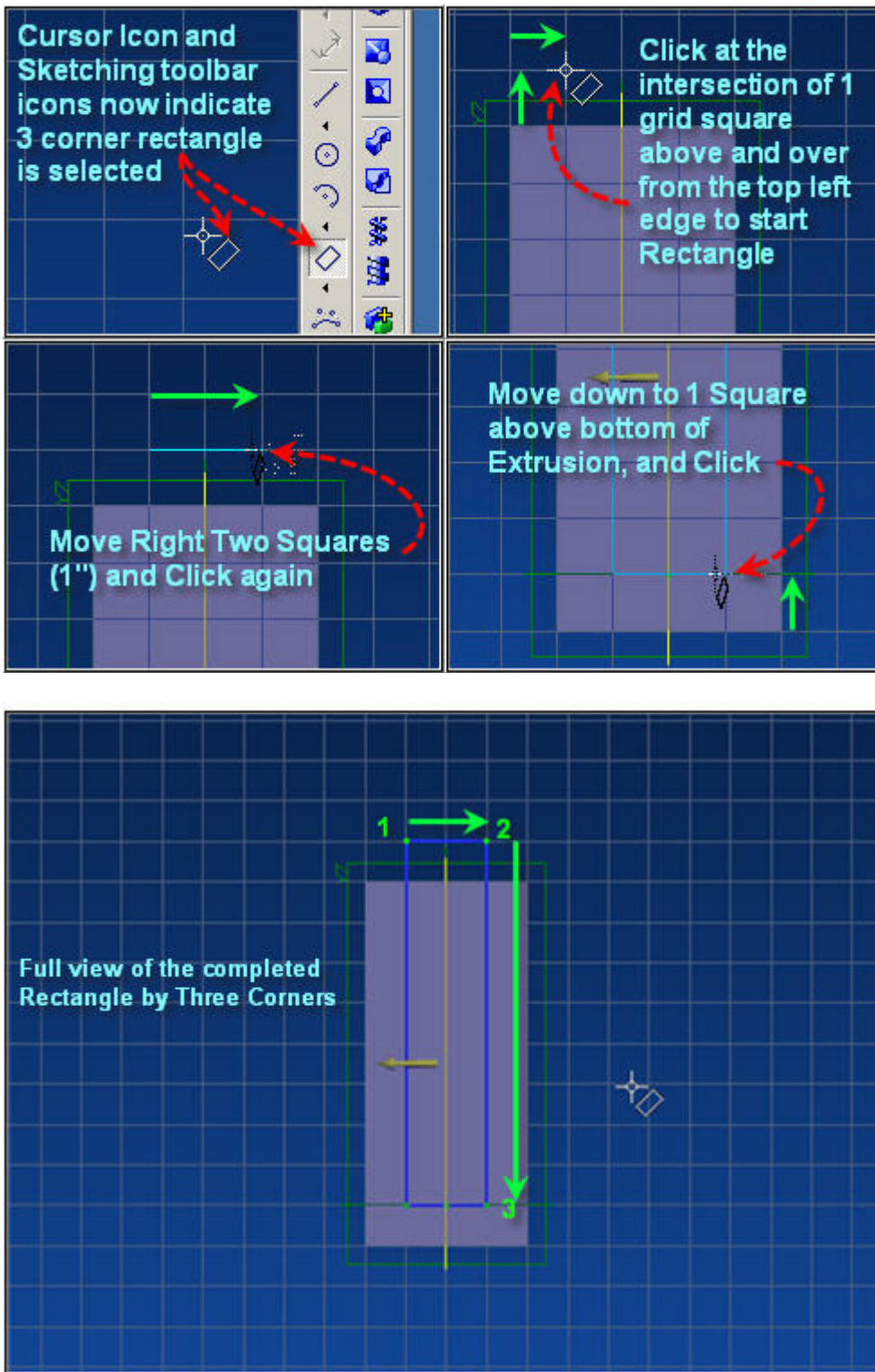
Select 'Activate 2D Sketch' from Sketch in the main menu (Shortcut=Ctrl+K).

Click the Rectangle options selector, Click 'Rectangle by Three Corners' icon from the fly-out menu.



Now - Click the first point at a cursor location of  $-0.50, 4.50$ , (See the Status line - at the lower right)  
The second point at a cursor location of  $0.50, 4.50$ ; and the third point at a cursor location of  $0.50, 0.00$ .

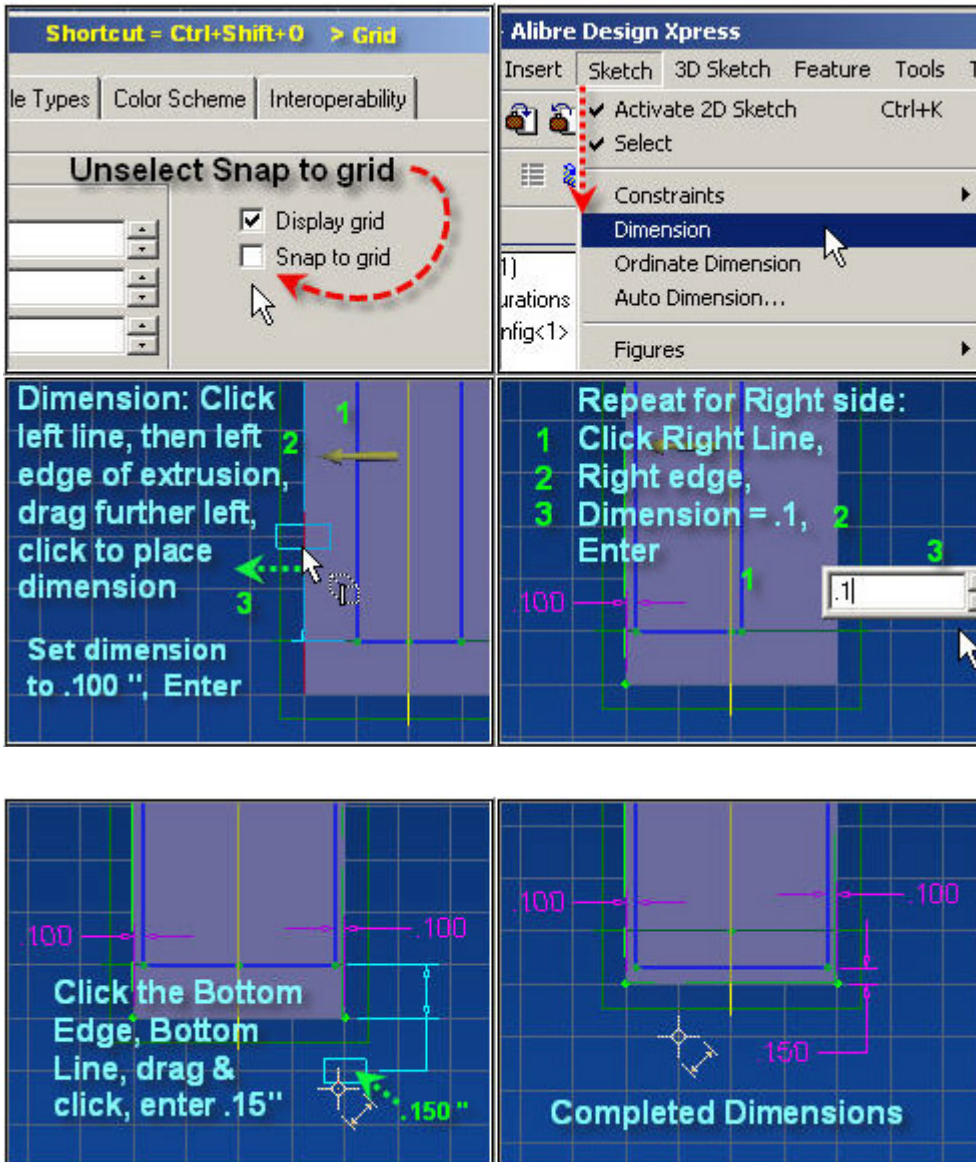
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## Step # 7 - End Sketch Dimensions

To begin - first go back to Menu: Tools, Options, (Ctrl+Shift+O) Grid Tab, and unselect 'Snap to Grid', Click OK. Menu Select Sketch, Dimension (or icon select as in step 4), Click Left line, then Left edge of Extruded Boss, drag further left to place Dimension location, Set dimension to .1", Press Enter to accept dimension and exit dimension value edit. Click Right line, then Right edge of Extruded Boss, then drag further right to place Dimension, Set Dimension to .1", Press Enter to accept dimension and exit dimension value edit. Click Bottom edge of Extruded Boss, click Bottom line, drag to place dimension to suit, Set Dimension value to .15", Press Enter to accept dimension and exit dimension value edit.

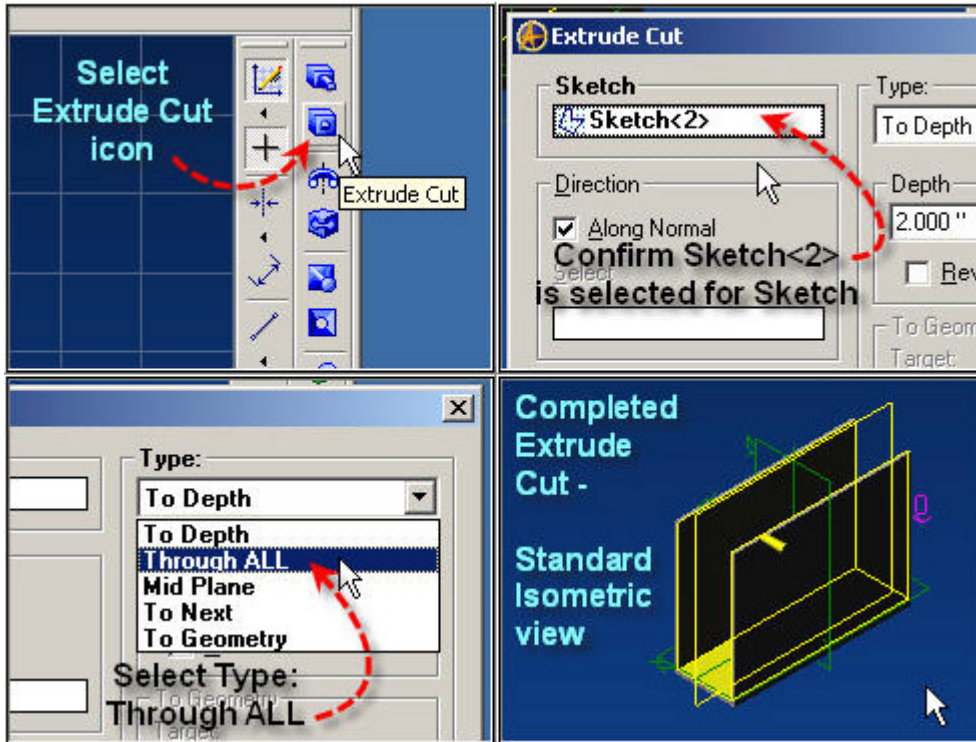


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## Step # 8 - End Sketch Extrude Cut

Select the Icon for Extrude Cut from the Part Modeling toolbar,  
 Confirm that Sketch<2> is selected for the desired Sketch,  
 Select Type: Through All, and press Enter (or click OK).



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## Step # 9 - Initial Side Sketch

Click on nearest visible outside face to select working plane and face,

Type: Ctrl+K, Enter, to begin Sketching on this face.

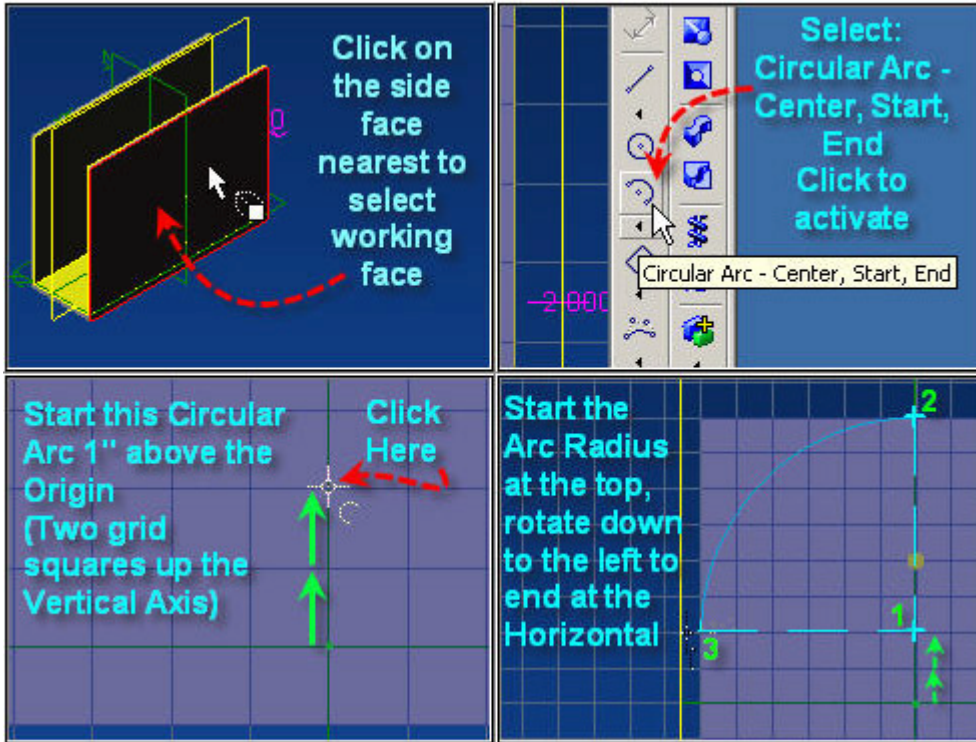
Select from the Sketching toolbar, the icon: Circular Arc, Center, Start, End

(Reset Snap to Grid before Proceeding: Ctrl+Shift+O > Grid Tab, Click in Snap to Grid, OK)

Click on a grid intersection two squares above the Origin along the Vertical Axis to center the Arc,

Click on the Top edge at the Vertical Axis to start the arc.

Then on the Left edge at the completion of a 90° arc.

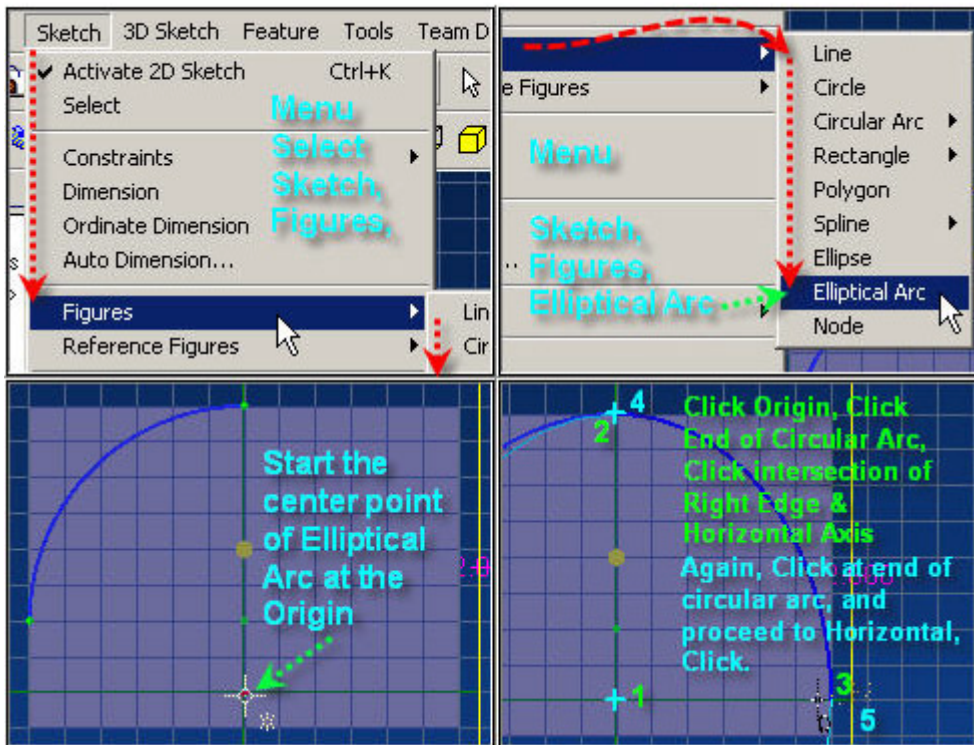


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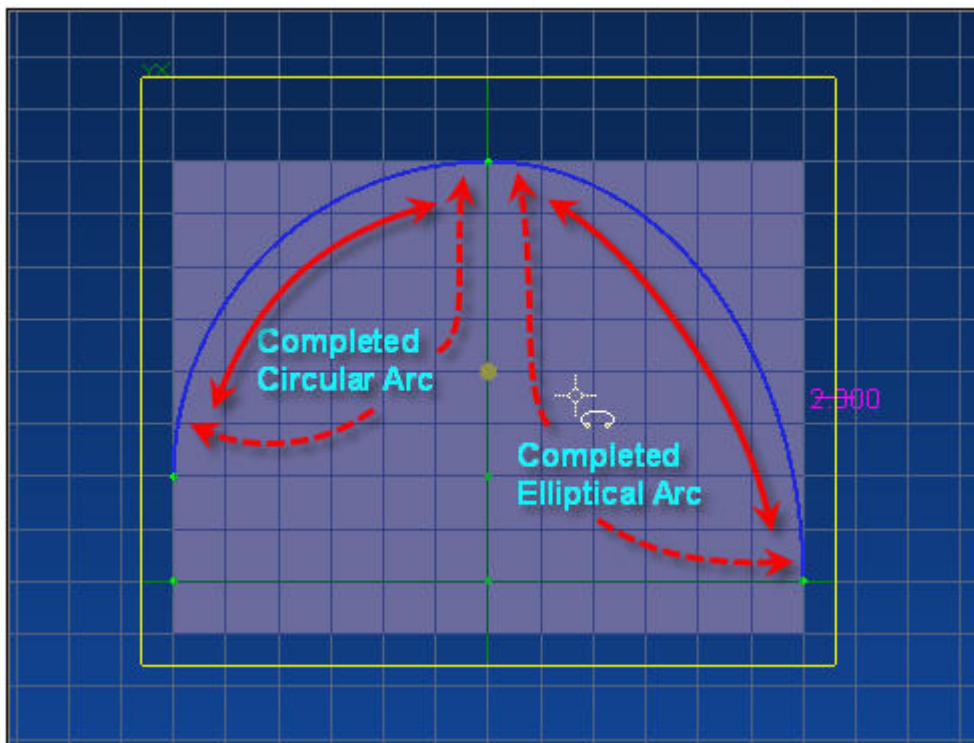
Now Menu select: Sketch > Figures > Elliptical Arc, Click.

Start the center of the Elliptical Arc at the Origin,

Then to starting the Major Axis at the intersection of the Vertical Axis and the top, selecting the end of the Circular Arc, ending the minor axis at the intersection of the Horizontal Axis and Right Edge.

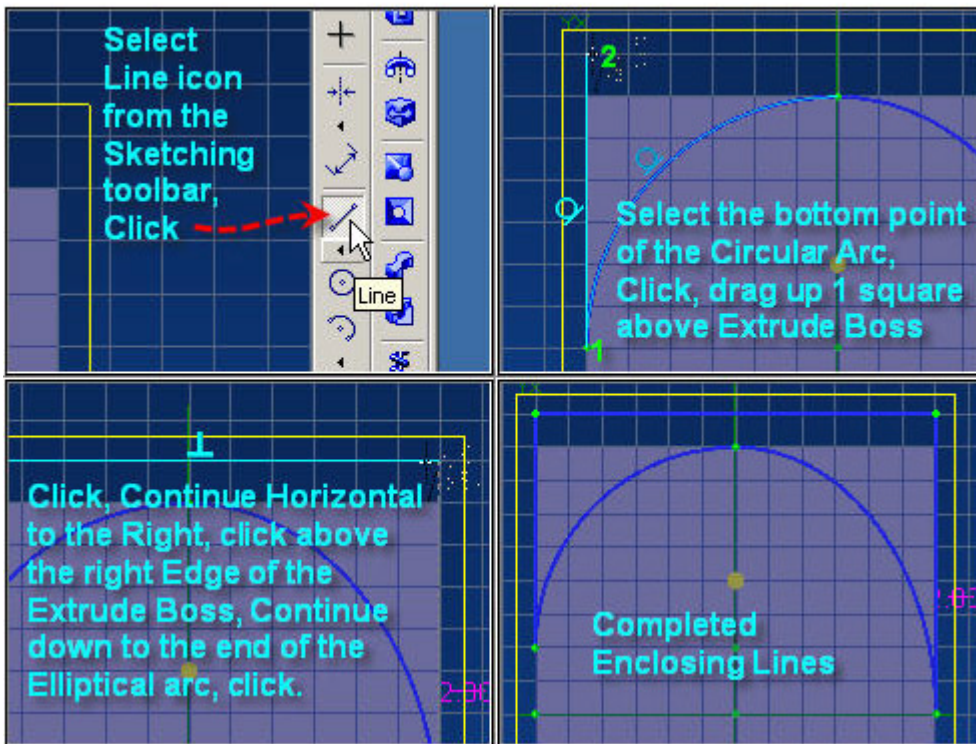


Again, click the end of the Circular Arc, and drag down to the right to begin tracing how far the Elliptical arc will cover, stopping at the Horizontal. Click to end.



## Step # 10 - Complete Side Sketch

Select the Line icon from the Sketching toolbar on the right,  
 Click the bottom end point of the Circular Arc,  
 Drag Vertically up one square above the Extruded Boss, Click,  
 Continue Horizontally to the Right, click above the right Edge of the Extrude Boss,  
 Continue down to the bottom end point of the Elliptical arc,  
 Double click to complete the line and close the sketch.



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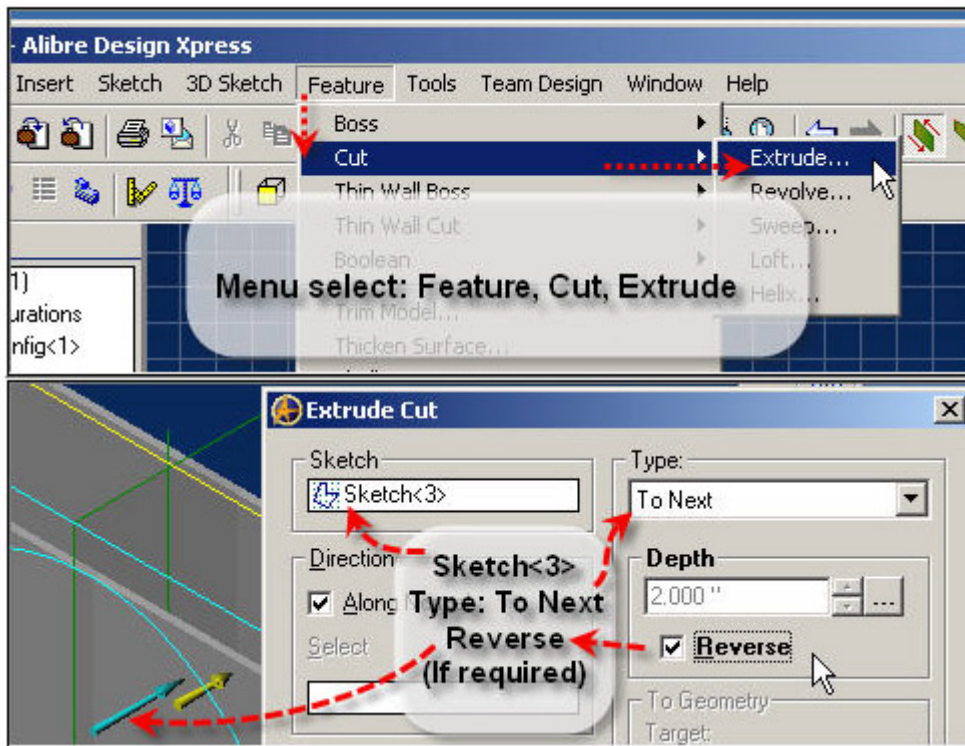
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## Step # 11 - Extrude Cut Side Sketch

From the Main Menu, Select Feature > Cut > Extrude  
 (Same as clicking Extrude Cut icon in Part Modeling toolbar)  
 Confirm Sketch<3> is selected for sketch, Change Type: to To Next  
 Click Reverse if turquoise Arrow is pointed away from face  
 Click OK or press Enter to complete the feature.

You can select various views also by holding the shift key  
 and pressing the arrows for incremental view changes.



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## Step # 12 - B-Spline

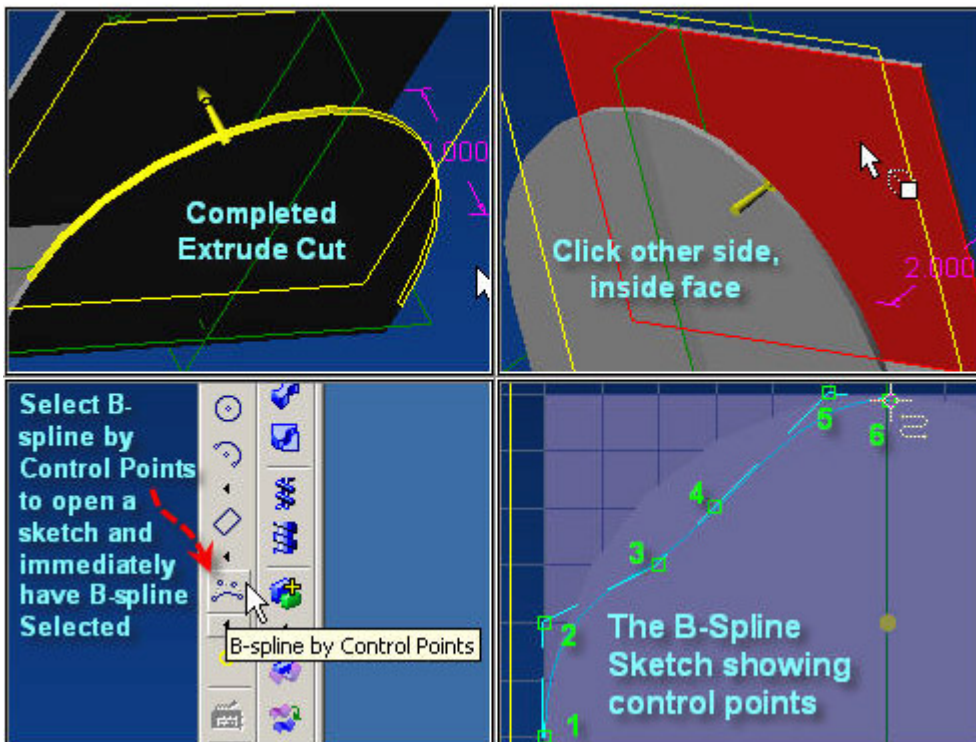
Now - select the face of the inside opposite

Then Select from the Sketching toolbar: B-spline by Control Points

Now - using the Status line cursor location as a guide,

Click at the following locations:

1. -3.00; 1.00
2. -3.00; 2.00
3. -2.00; 2.50
4. -1.50; 3.00
5. -0.50; 4.00
6. -0.00; 4.00 (Double Click to end)

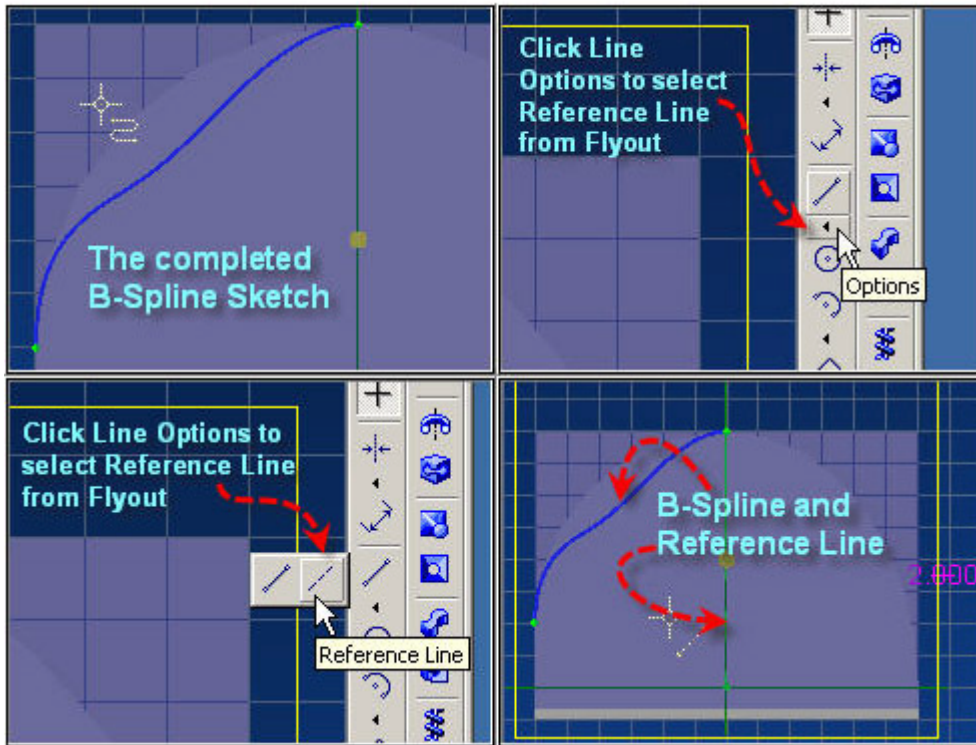


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Before selecting the Sketch Mirror, you need to add a Mirror Reference Line.  
Select the Line Options flyout menu to select the Reference Line icon  
Create a Vertical Reference Line by clicking at the Origin at the bottom,  
and the upper end of the B-Spline at the top



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## Step # 13 – Mirror

Select the Sketch Mirror icon in the Sketching toolbar at the bottom,

In the Mirror Figure Dialog:

Click inside the white area for Figures to mirror

and then click the B-Spline Sketch. (B-spline<1> populates the field)

Click inside the white area for Mirror axis:

then click the Reference Line. (Reference Line<1> populates the field)

Also - a preview of the Mirrored B-spline is shown.

Click OK to complete the Mirror

Now - once again - you will need to create a closed figure to make the cut.

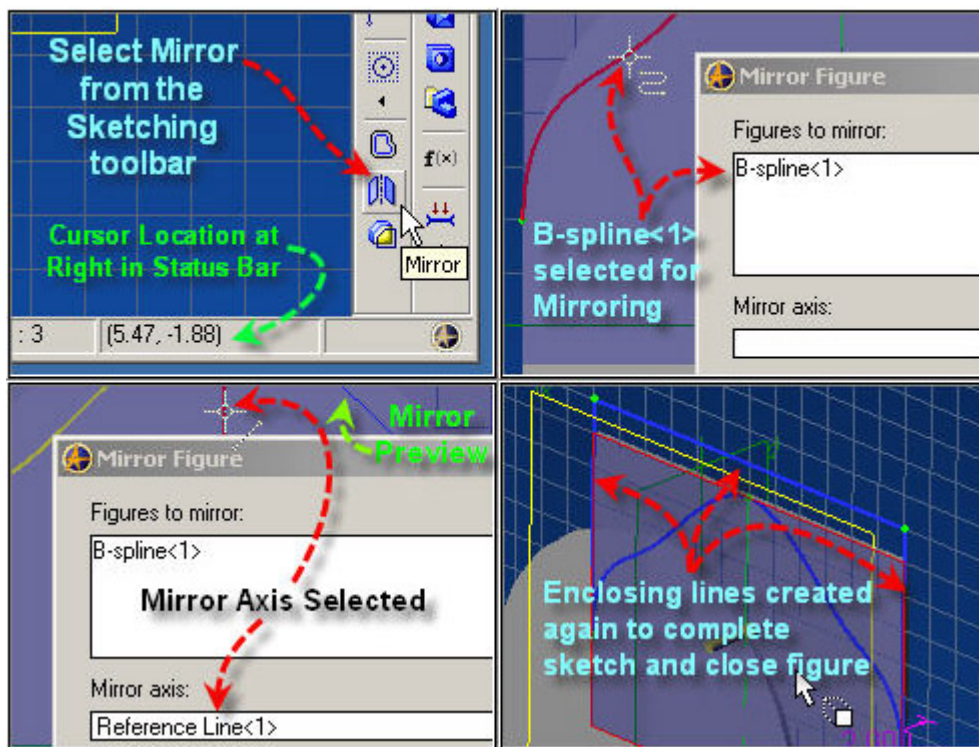
Select the Line options flyout again, and select the line icon from the flyout menu.

Click the lower left edge of the B-spline, then move up the left edge to one square above the Extrusion,

Click again, and move right, Continue right to the edge of the extrusion,

click again, and move down to the end of the mirrored B-spline,

Double Click to end the line and close the figure.



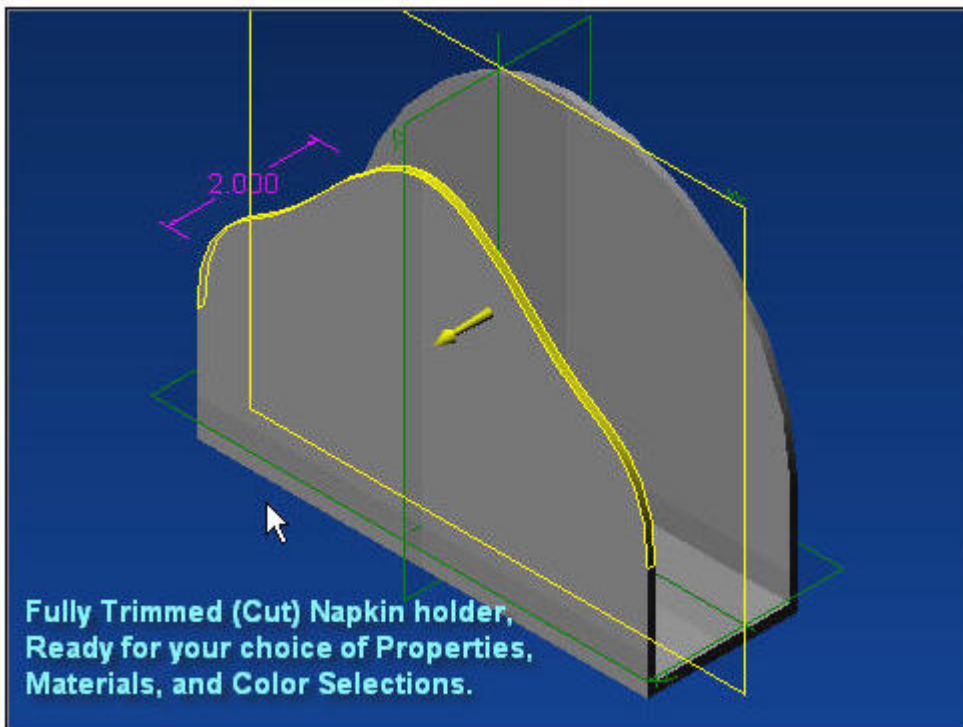
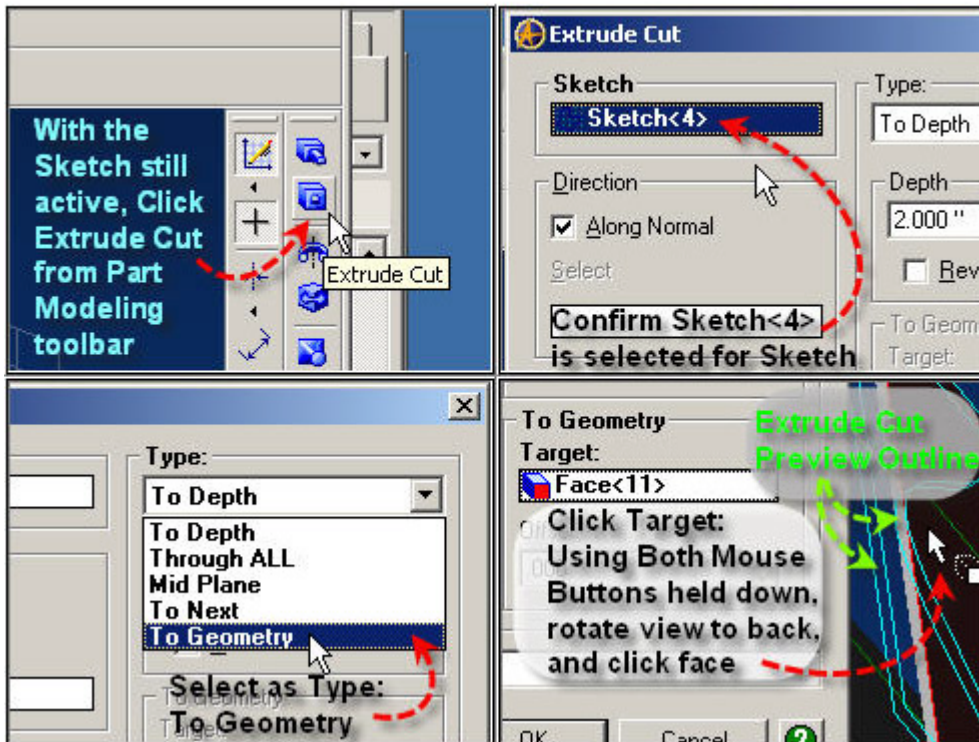
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## Step # 14 - Extrude Cut 2nd Side Sketch

Select Extrude Cut from the Part Modeling toolbar, Confirm Sketch<4> is selected for sketch, Select as Type: - To Geometry, Rotate the View (Hold down both mouse buttons and drag) and click in the Target field, then on the back side of the face the sketch was placed on, You can see the light blue lines showing the Extrude Cut preview outline. Press Enter, or Click OK to complete.

All that remains is for you to choose material properties and colors, reflectivity.



## Step # 15 - Applying Properties, Color, & Saving

To set the Material Properties,  
Press Alt+Enter, go to Material Tab; select Nylon 6/10 from the drop down list. Click Apply, Close.  
Right-Click in the workspace, away from your model, on the background somewhere,  
and select Color Properties from the pop-up menu.

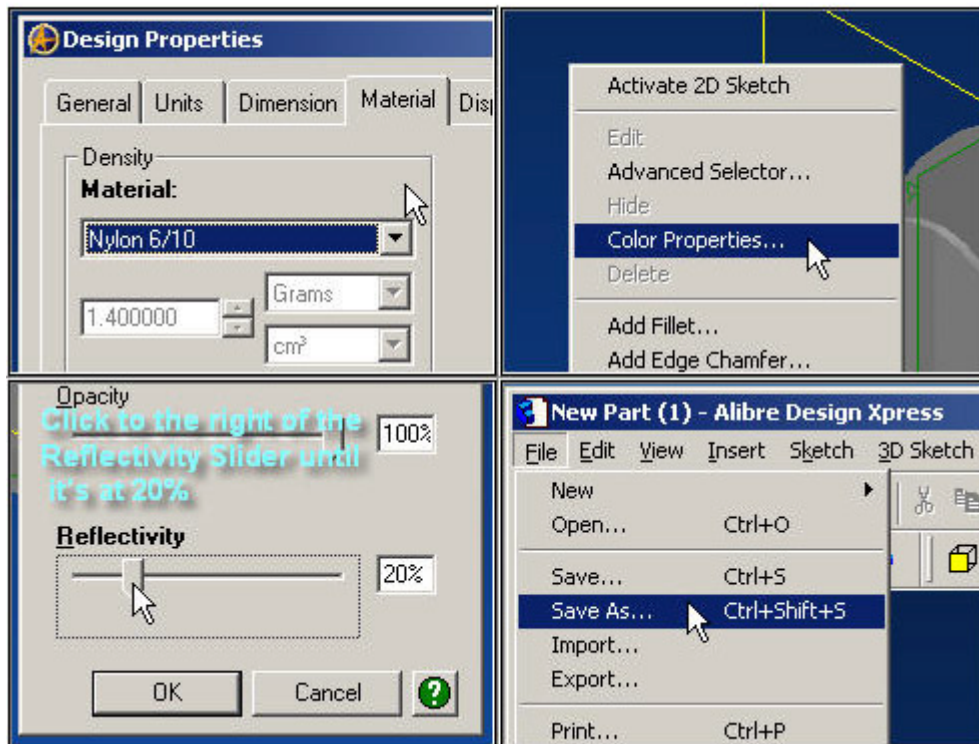
Click to the right of the Reflectivity Slider until it jumps over to 20%;

Click the Color Button to select a color from the color Chooser. (Any color)

(I chose the first Orange block - Red=255, Green=128, Blue=64)

Click OK to accept the color choice, and OK to Exit the Color Properties Dialog

You're all set to save it now!



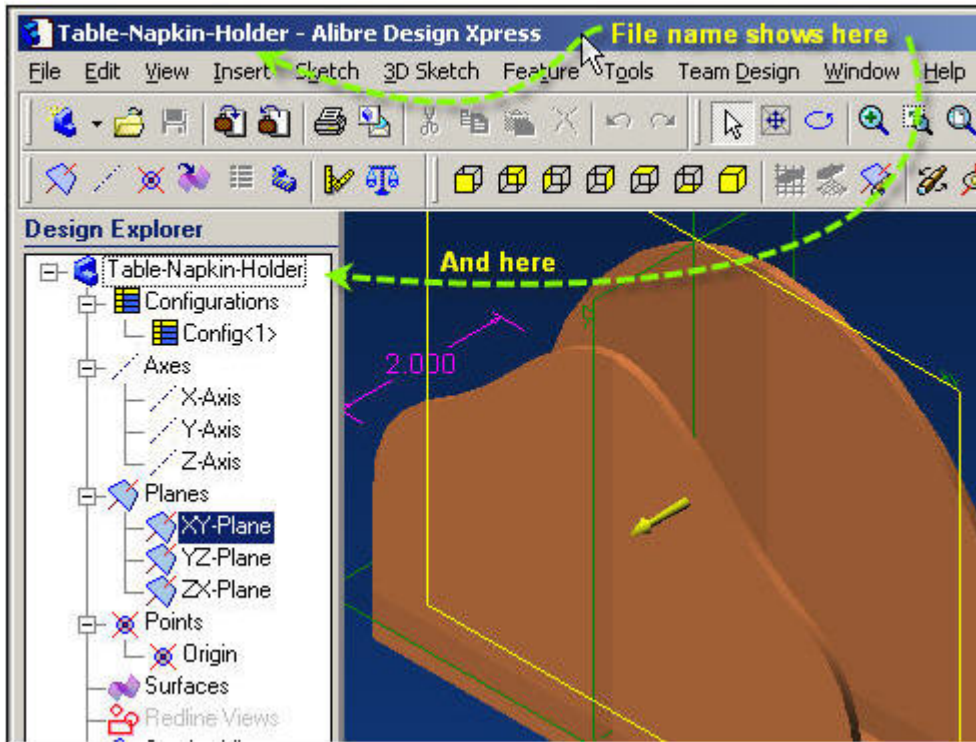
Click File > Save As from the main menu - Select a folder of choice and name the file "Table-Napkin-Holder",

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Click Save to complete the process, and notice the activity on the Status Bar at the left.



It indicates the action of saving the file - showing the file save name, and when complete, the workspace shows the finished name, and also the Design Explorer.

## Congratulations!

You've Completed the whole 15 steps in the Table Napkin Holder experience and been introduced to a number of the sketch elements and feature elements and techniques for 3D Mechanical CAD with Alibre Design Express.

Please feel free to [send me an email](#) and let me know how you liked (or didn't like) this Tutorial.

If you want to do more - check out [Alibre Design Pro or Expert!](#)