EXERCISE BOOK

Student Notes:

DASSAULT SYSTEMES

CATIA V5 Training
Exercises

CATIA Surface Design

Version 5 Release 19
September 2008

EDU_CAT_EN_GS1_FX_V5R19

EXERCISE BOOK

Student Notes:

Table of Contents (1/2)

Student Notes:

Table of Contents (2/2)

Student Notes:

Creating Wireframe Geometry

Recap Exercises

25 min

- Button
- Mouse

Student Notes:

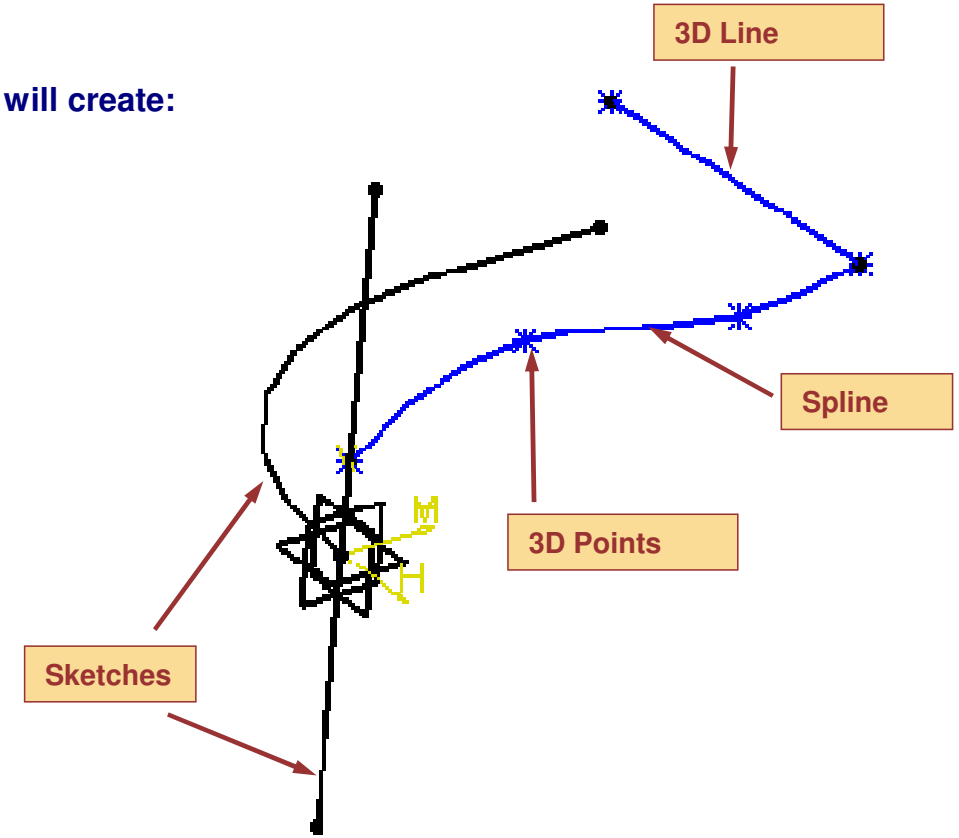
Creating Wireframe Geometry

Recap Exercise: Button

10 min

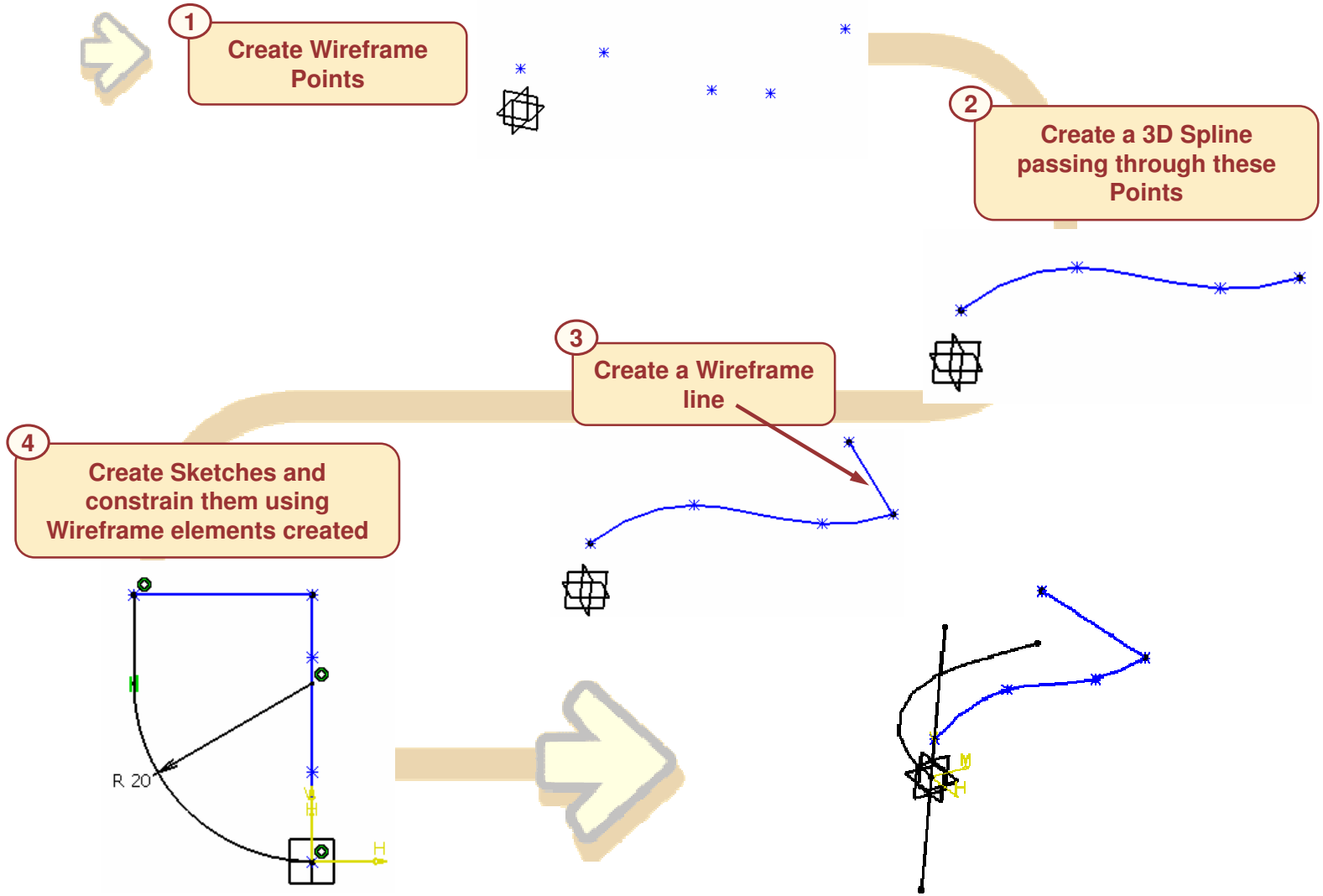
In this recap exercise you will create:

- Points in 3D
- Lines in 3D
- Spline in 3D
- Sketches



Student Notes:

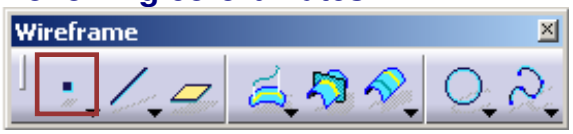
Design Process: Button Recap Exercise

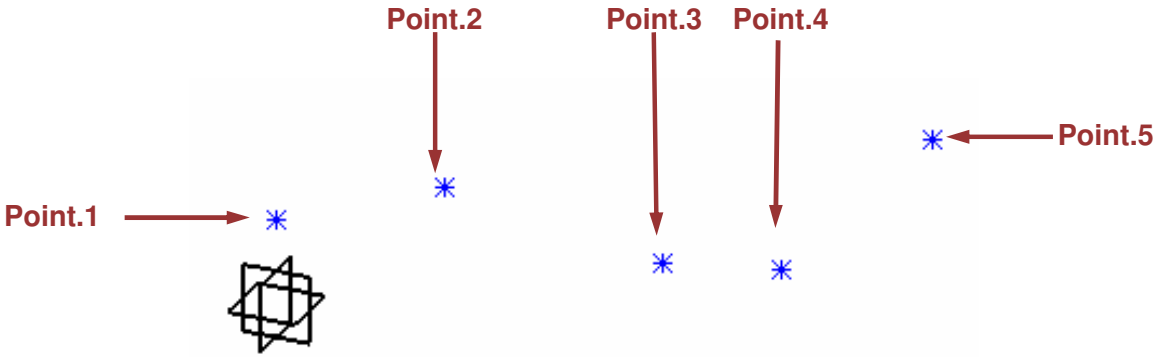


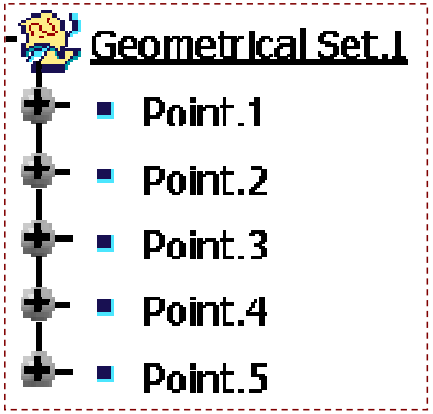
Student Notes:

Do It Yourself (1/4)

- Create a new part to begin the exercise and you can save it as WFS_Modifying_the_Geometry_Button_Start.CATPart
- Create five Wireframe Points with following co-ordinates
  - Point.1 (0,0,5)
  - Point.2 (0,10,9)
  - Point.3 (0,23,7)
  - Point.4 (0,30,8)
  - Point.5 (-20,30,7)





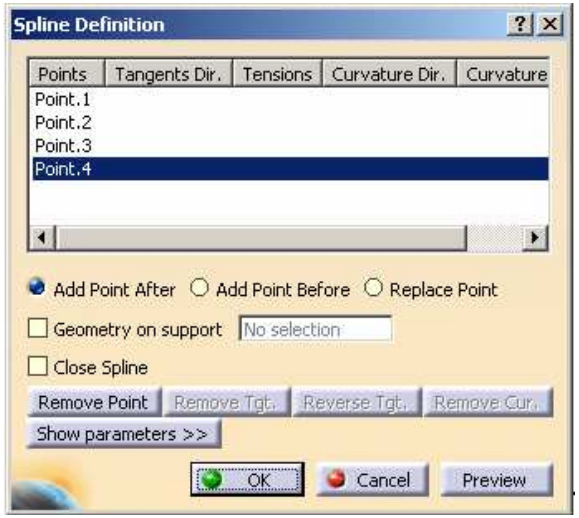


You can Double Click on Points icon to keep it active

Student Notes:

Do It Yourself (2/4)

- Create a 3D Spline Passing through Points 1 to 4 in order
- Create a 3D Line with following specifications:
  - Line Type: Point-Point. Select Point.4 and Point.5 as inputs.



Spline Creation

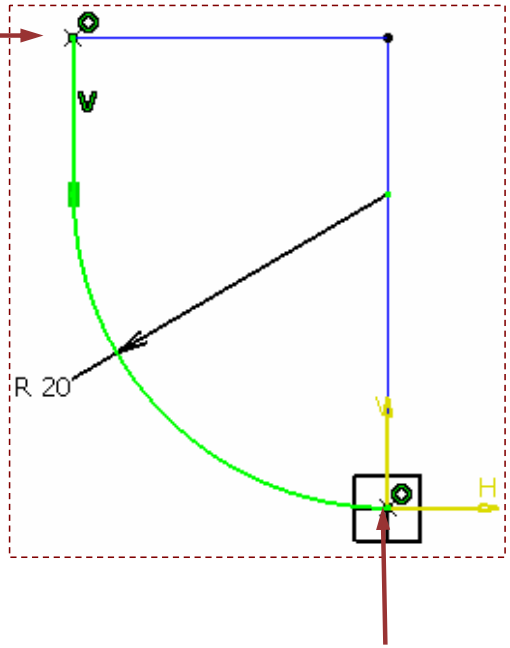
Line Creation

Student Notes:

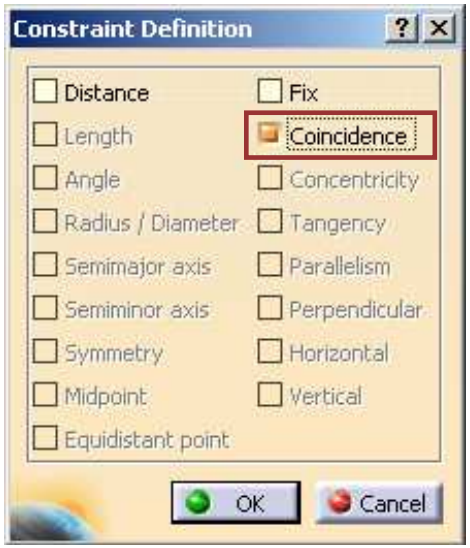
Do It Yourself (3/4)

- Create a Sketch on XY plane and constrain it using the 3D points.

Constrain this point of the sketch with Point.5 using coincidence constraint.



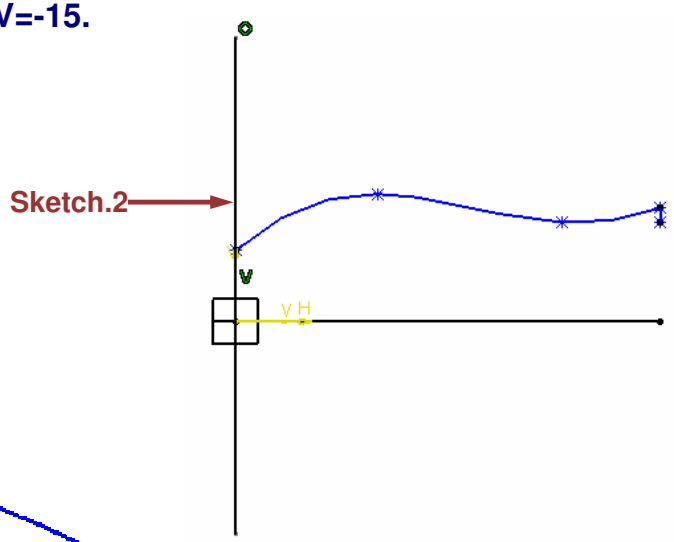
Coincide this point of the sketch with Point.1



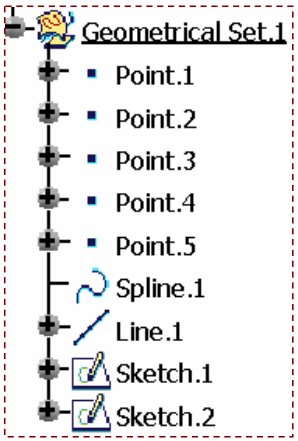
Student Notes:

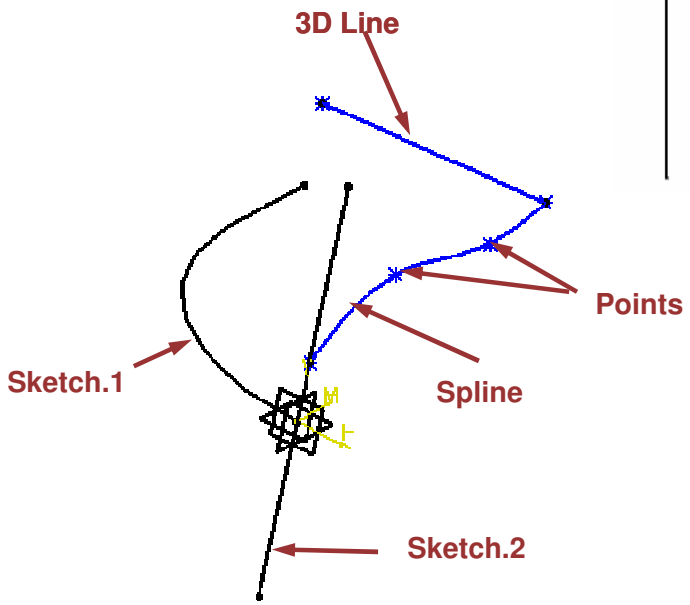
Do It Yourself (4/4)

- Create another sketch on YZ Plane
  - Create line having endpoints H=0, V=20, H=0, V=-15.



The Final Result Should be:





Load: WFS_Creating_Wireframe_Geometry_Button_End.CATPart

Student Notes:

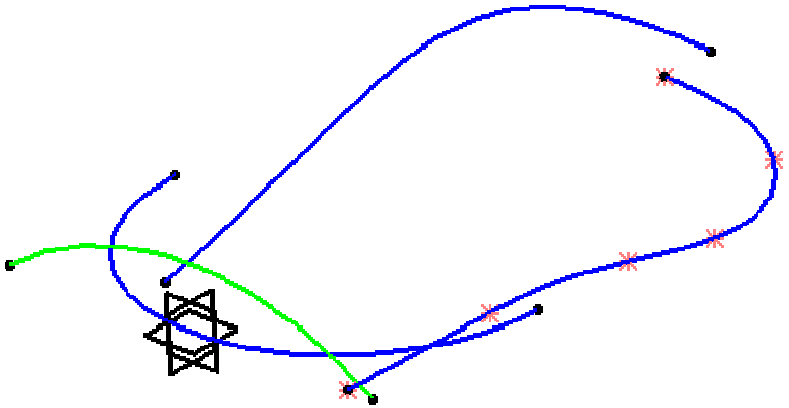
Creating Wireframe Geometry

Recap Exercise: Mouse

15 min

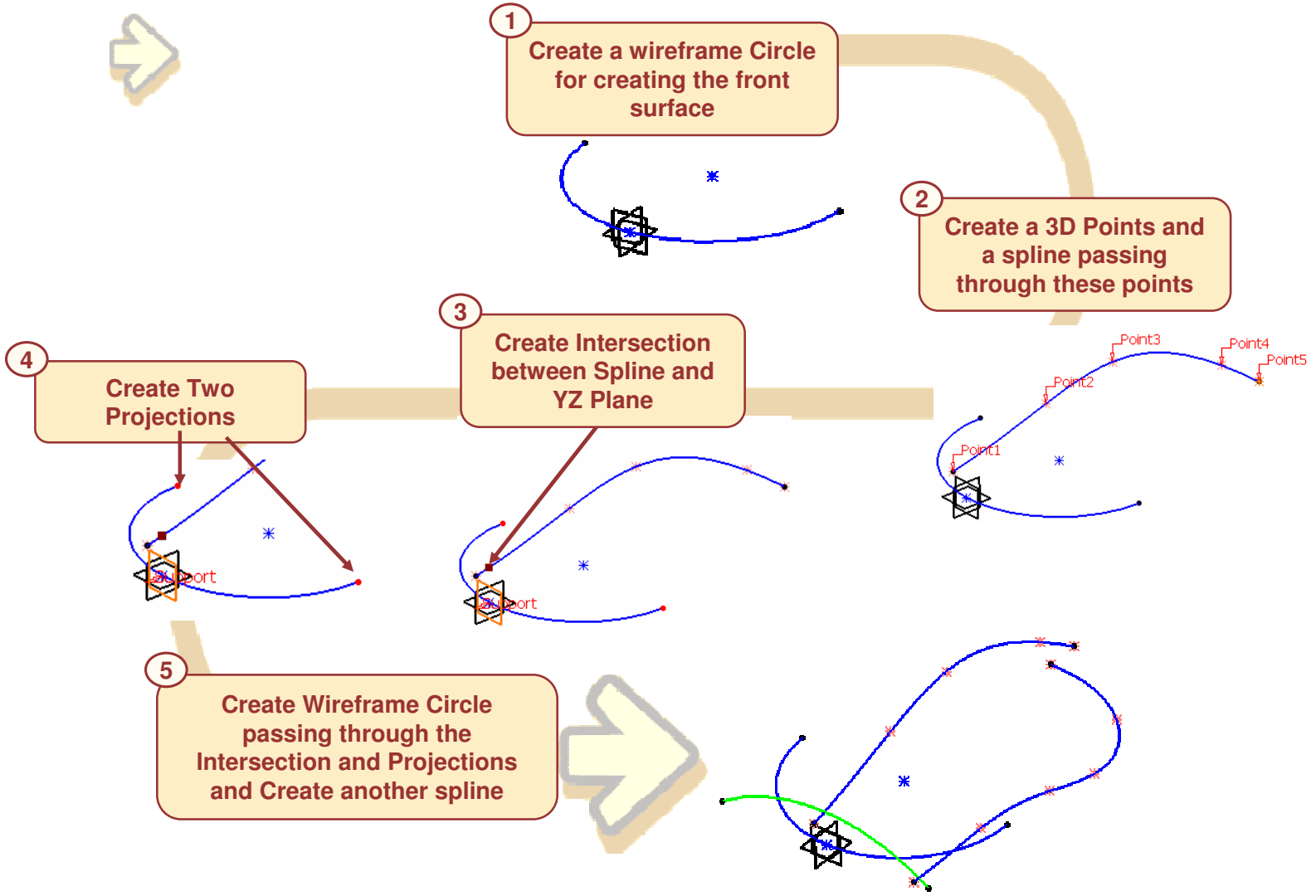
In this recap exercise you will create:

- **Points in 3D**
- **Wireframe Circle**
- **3D Spline**
- **Intersections and Projections**



Student Notes:

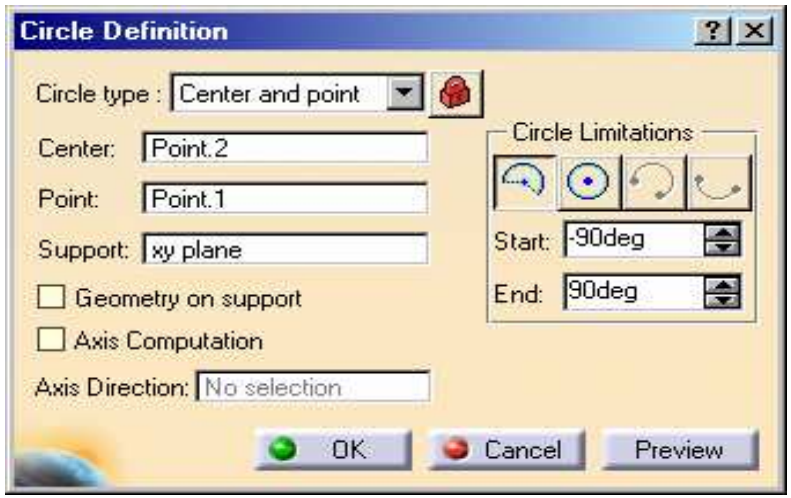
Design Process: Mouse Recap Exercise

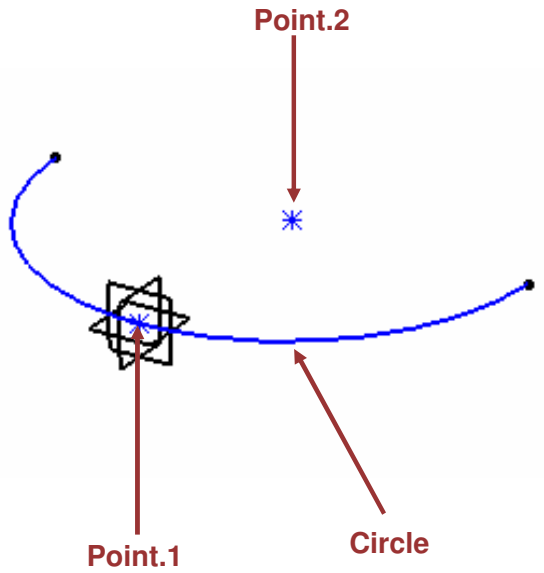


Student Notes:

Do It Yourself (1/6)

- Create a New part and access the Generative Shape Deign workbench
- In a Geometrical set, you will create a circle. Hence create following points required to create the circle.
  - Create Point.1 at Origin 
  - Point.2 (-44.45,0,0)
- Now You can create the Circle using these two points 





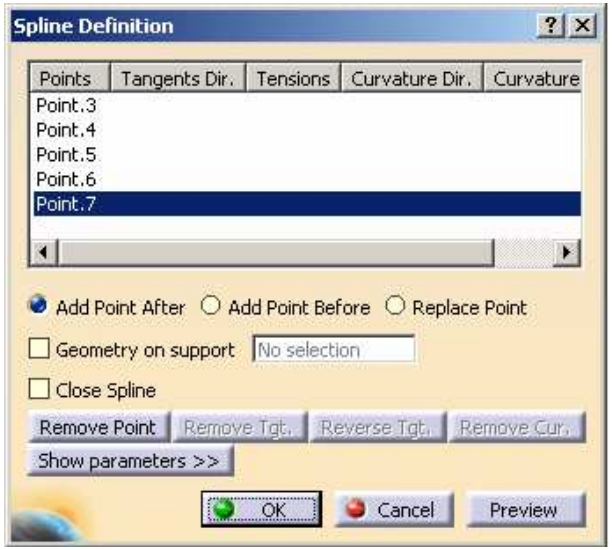
You can also create wireframe points on the fly by using the contextual menu.

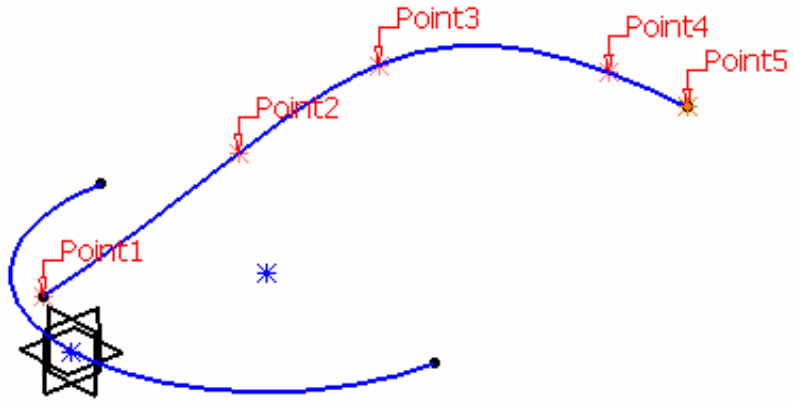
Student Notes:

Do It Yourself (2/6)

You need to create 3D Spline passing through Five points

- **For this you need to Create Five Points first**
  - **Point.3 (6.35,0,12.7)**
  - **Point.4 (-38.1,0,25.4)**
  - **Point.5 (-69.85,0,31.75)**
  - **Point.6 (-121.92,0,12.7)**
  - **Point.7 (-139.7,0,0)**
- **Now you can create a Spline passing through these five points**

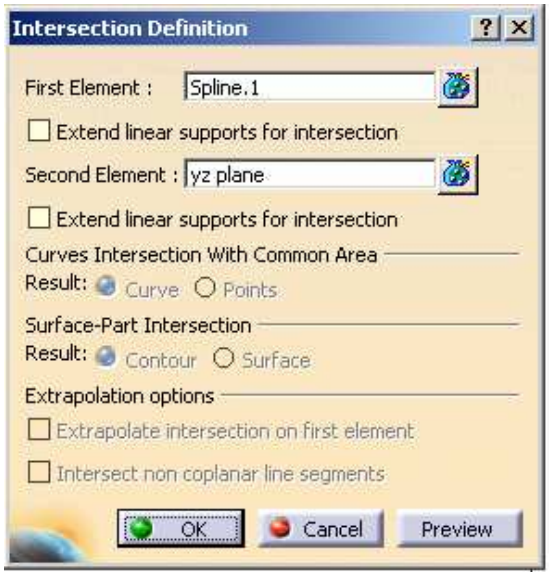


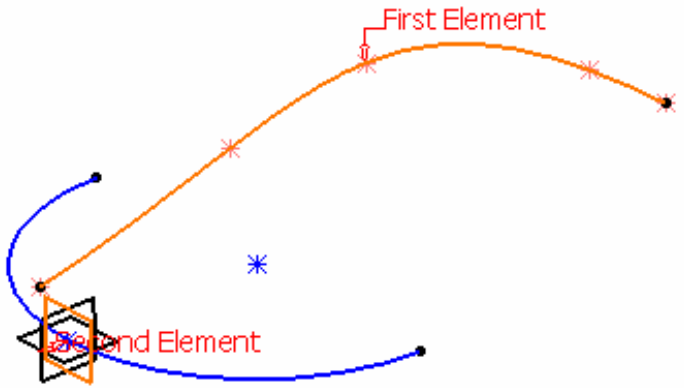


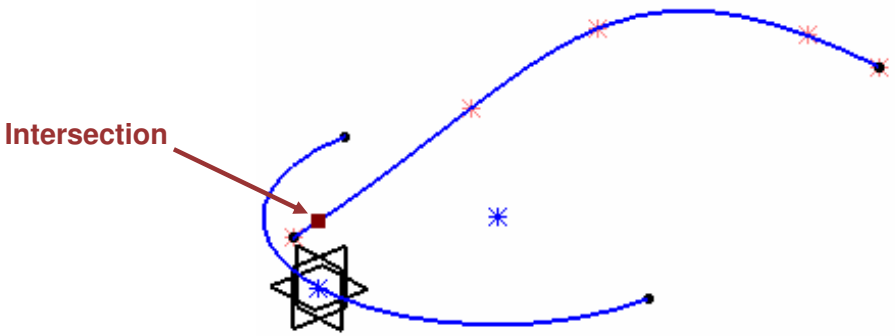
Student Notes:

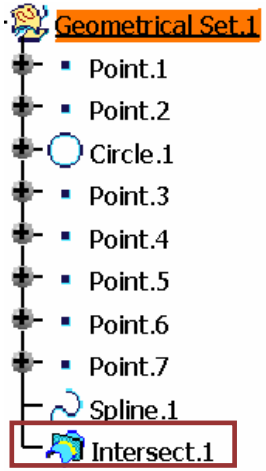
Do It Yourself (3/6)

- Create Intersection between Spline and YZ plane.The Result will be a Point.





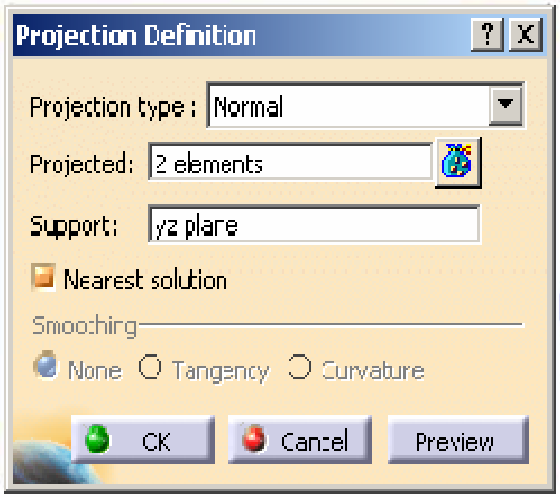


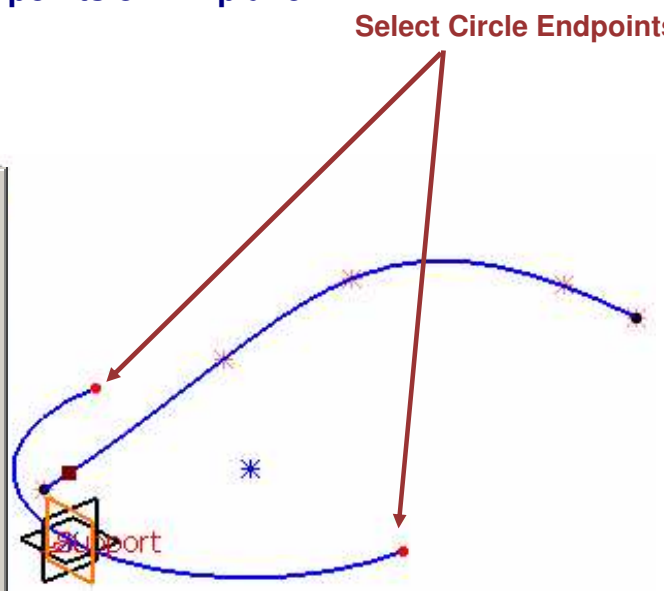


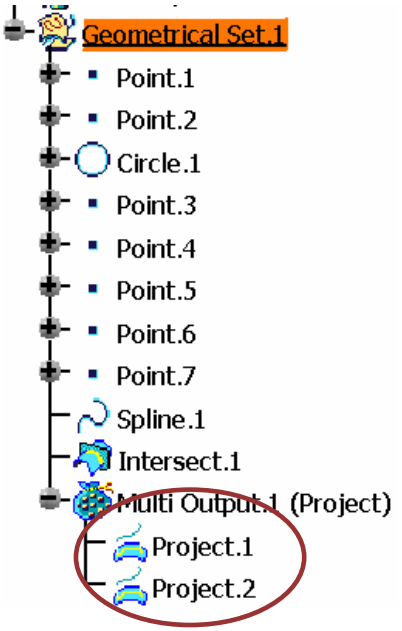
Student Notes:

Do It Yourself (4/6)

- Create Projections of Circle Endpoints on YZ plane.



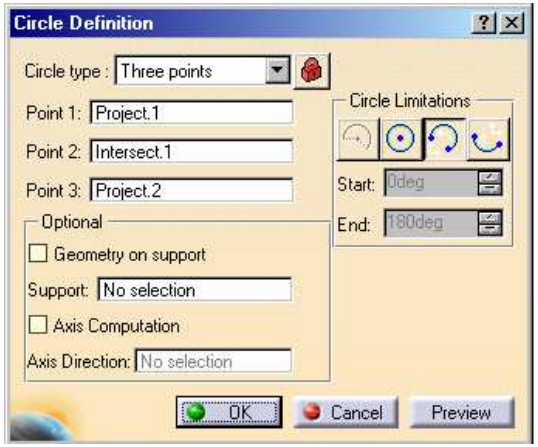


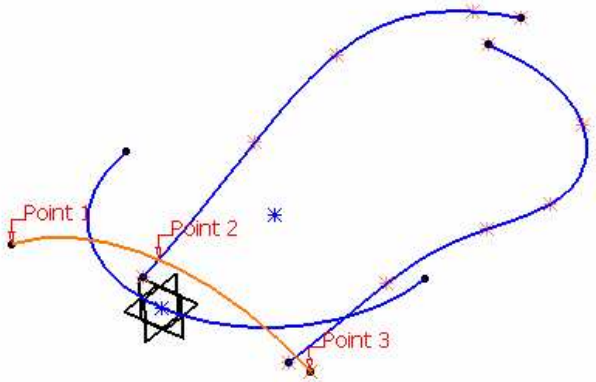


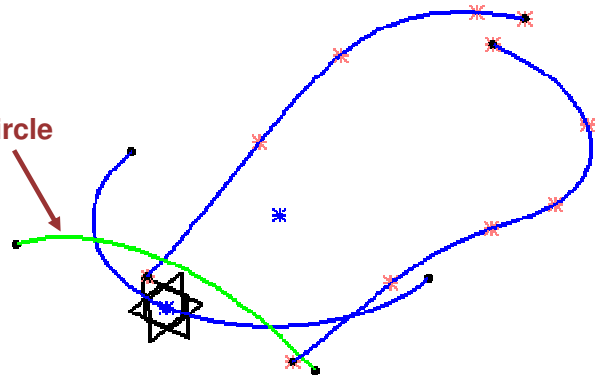
Student Notes:

Do It Yourself (5/6)

- Create a Wireframe Circle using “Three Points” (Project.1, Intersect.1, Project.2)



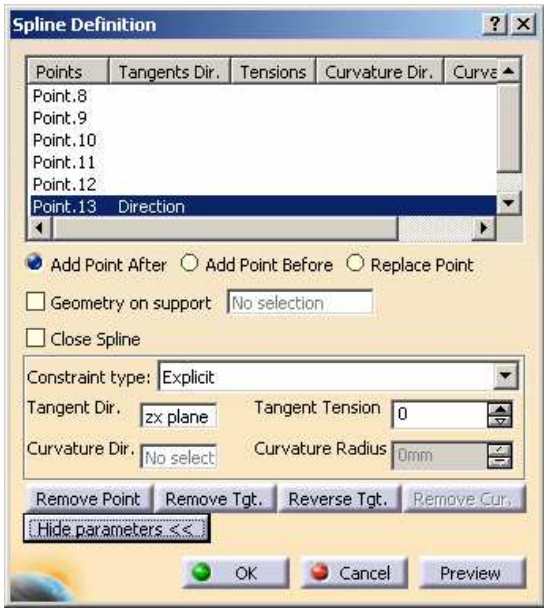


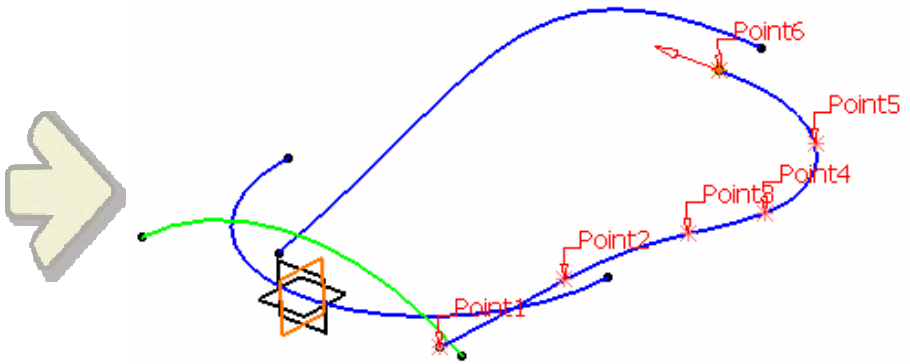


Student Notes:

Do It Yourself (6/6)

- Create Six more Wireframe Points
  - Point.8 (0,38.1,0)
  - Point.9 (-38.1,38.1,0)
  - Point.10 (-68.58,44.45,0)
  - Point.11 (-85.09, 50.8, 0)
  - Point.12 (-114.3, 38.1, 0)
  - Point.13 (-127,0,0)
- Create a Spline passing through these points
  - For Point.13 set tangency direction to ZX plane.





WFS_Creating_Wireframe_Geometry_Mouse_End.CATPart

Student Notes:

Creating Basic Surfaces

Recap Exercises

20 min

You will now do the following exercises

- **Button**
- **Mouse**

Student Notes:

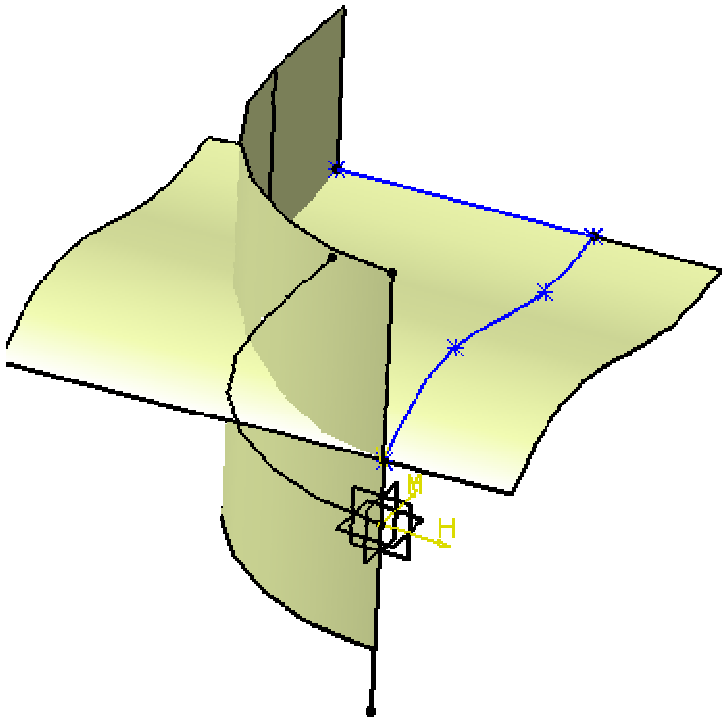
Creating Basic Surfaces

Recap Exercise: Button

5 min

In this recap exercise you will create :

- Use Wireframe geometry completed in previous exercise to create Surface geometry that will be used to shape the solid part.
- Extrude with Plane as direction
- Extrude with Line as direction

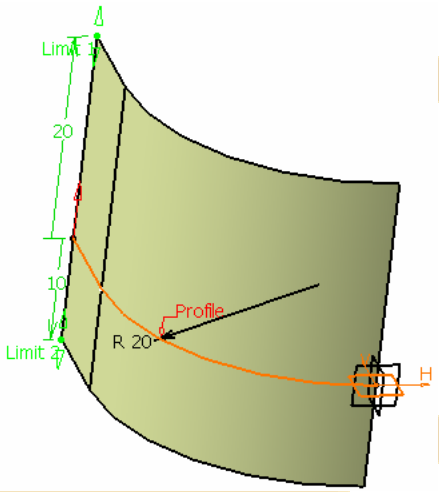


Student Notes:

Design Process: Button Recap Exercise

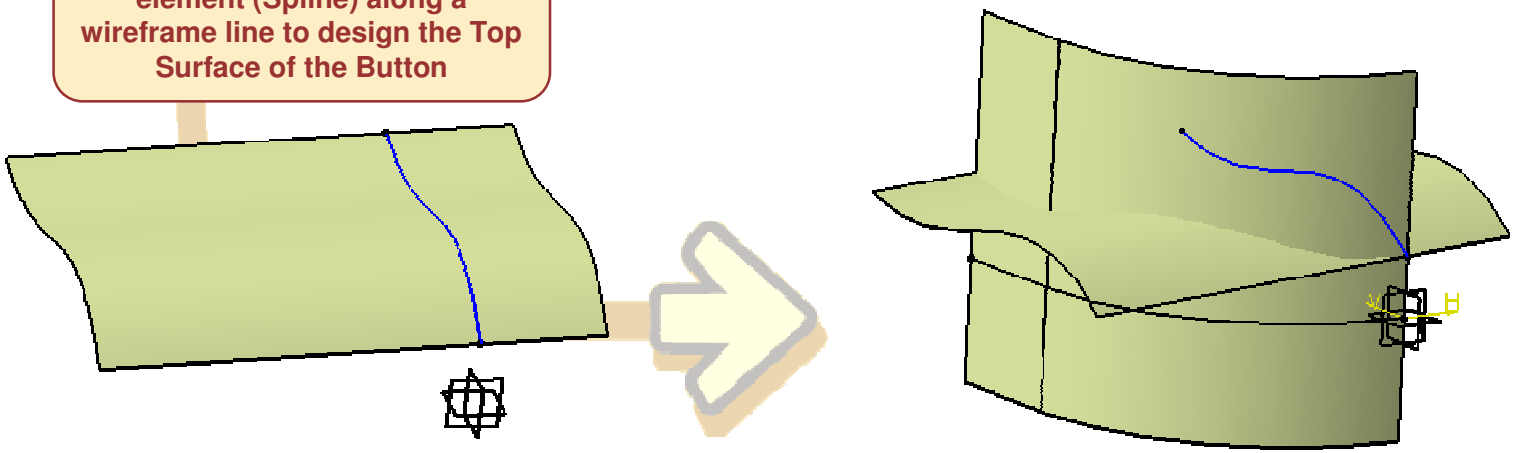
1

Create a Vertical Extrude



2

Create a Extrude of non linear element (Spline) along a wireframe line to design the Top Surface of the Button

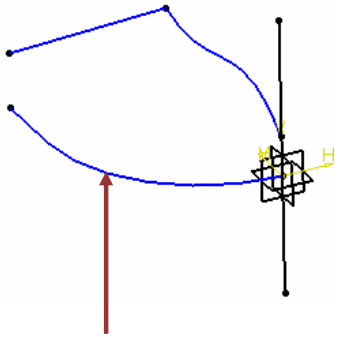


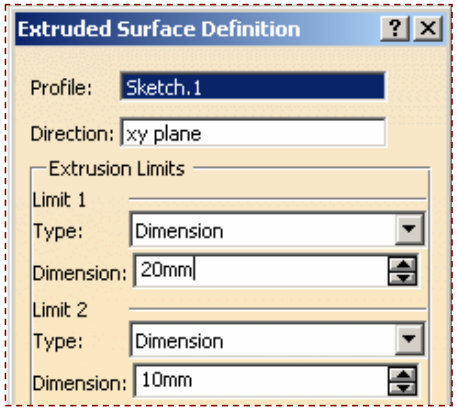
Student Notes:

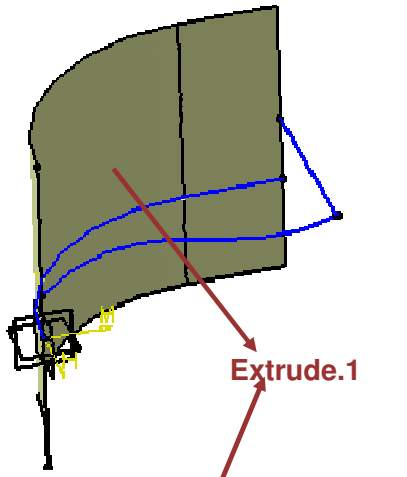
Do It Yourself

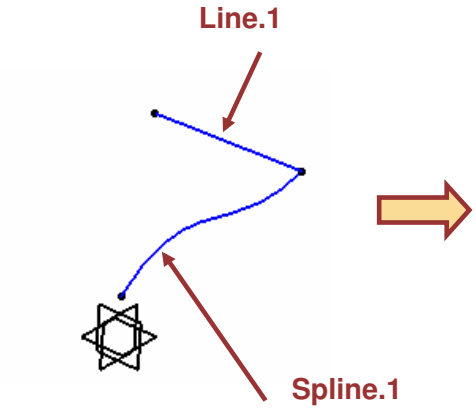
WFS_Creating_Surfaces_Button_Start.CATPart
WFS_Creating_Surfaces_Button_End.CATPart

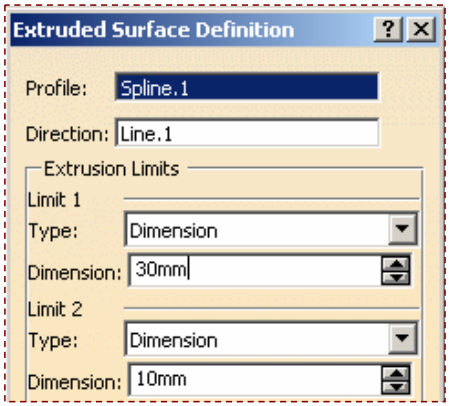
- Create a Extrude from Sketch.1. Enter Limit.1= 20 mm and Limit.2 = 10 mm
- Use XY plane as Direction
- Create another extrude using Spline.1 along Line.1. Enter Limit.1=30 mm and Limit.2 = 10 mm

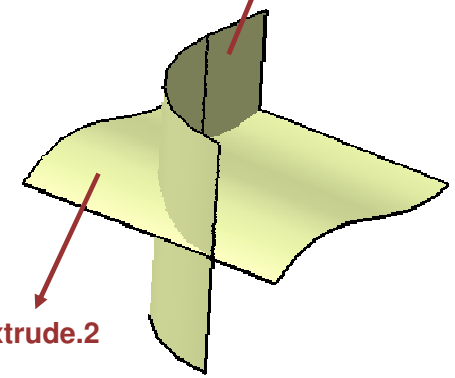












Student Notes:

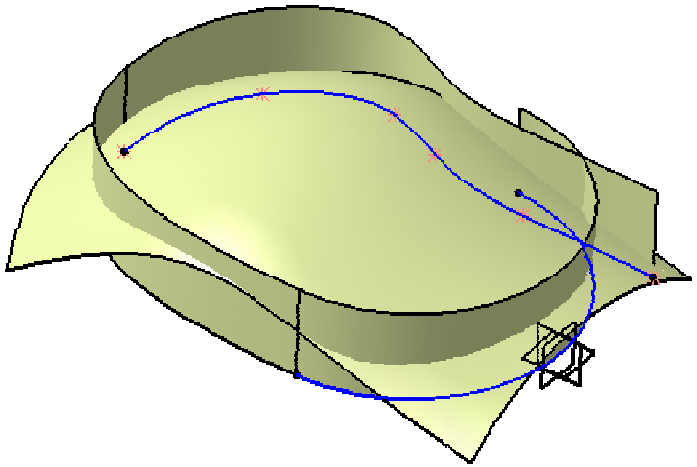
Creating Basic Surfaces

Recap Exercise: Mouse

15 min

In this recap exercise you will create :

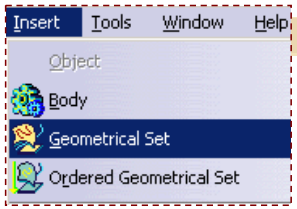
- A swept surface for the top shape of the mouse
- Two extruded surfaces to shape the side and front of the part
- A blend surface to connect existing surfaces while maintaining tangency



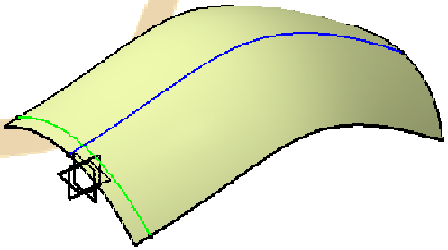
Student Notes:

Design Process: Mouse Recap Exercise

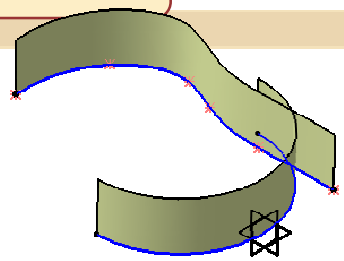
1 Insert a new Geometrical Set



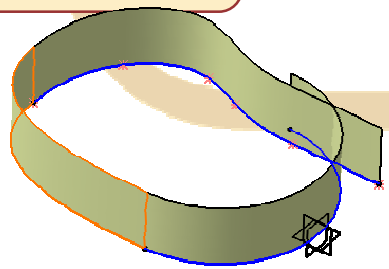
2 Design the Top surface of the Mouse using Sweep surface

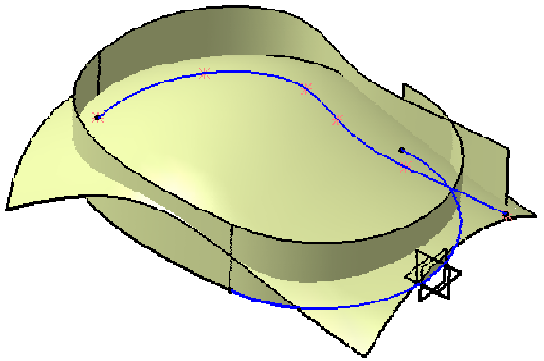


3 Design the side and front surfaces using Extrude



4 Create a smooth surface joining these Surfaces by Blending



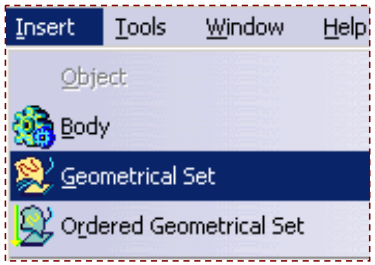


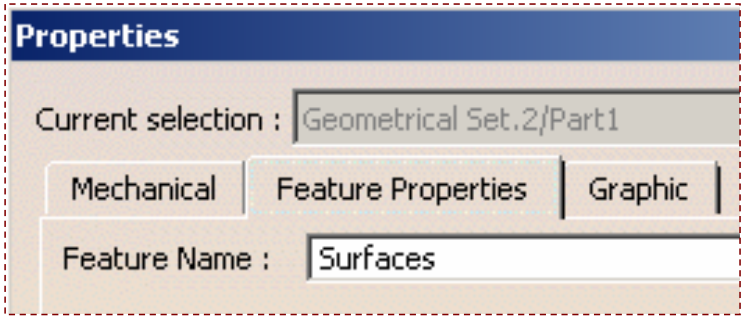
Student Notes:

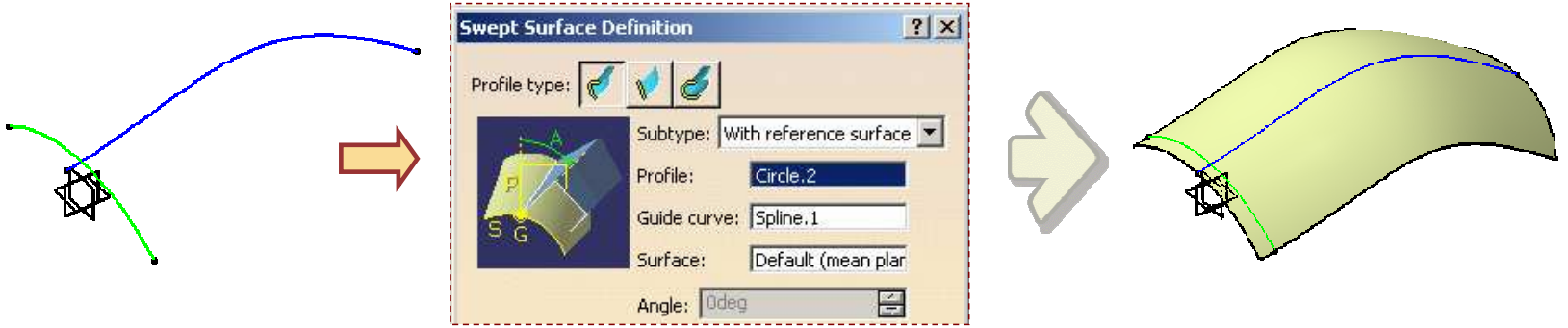
Do It Yourself (1/4)

WFS_Creating_Basic_Surfaces_Mouse_Start.CATPart

- Insert a new Geometrical Set.
- Rename it “Surfaces” through the Properties in the contextual menu.
- Design top surface using the Sweep command
  - Use “Explicit” type of Sweep with subtype “With Reference Surface”
  - Sweep “Circle.2” along “Spline.1”



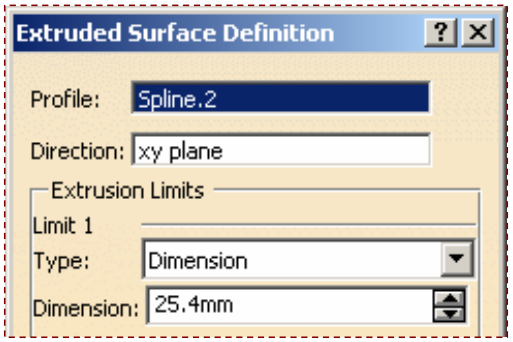


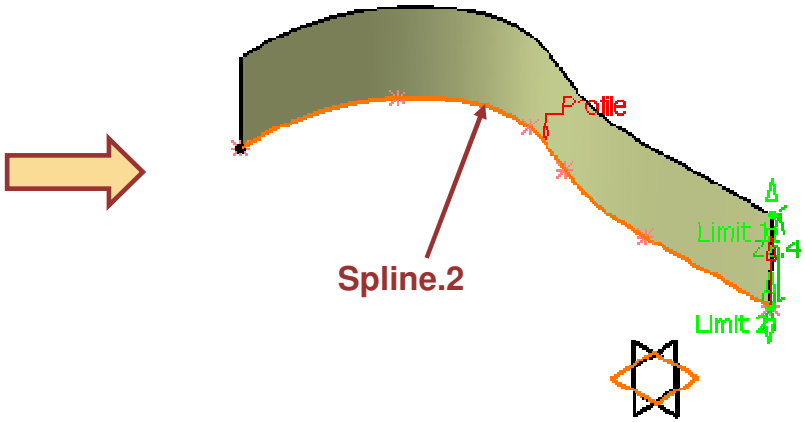


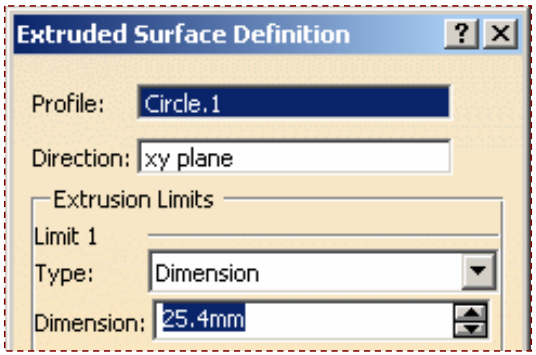
Student Notes:

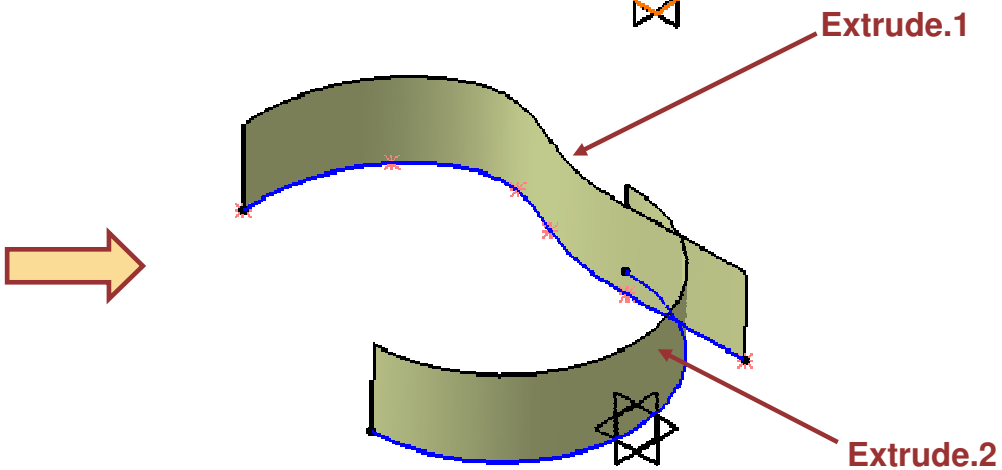
Do It Yourself (2/4)

- Extrude Spline.2 by 25.4mm to design the side surface. Direction of extrusion=XY plane.
- Also, Extrude the Circle.1 by 25.4 mm to design the front surface. Direction of extrusion=XY plane.





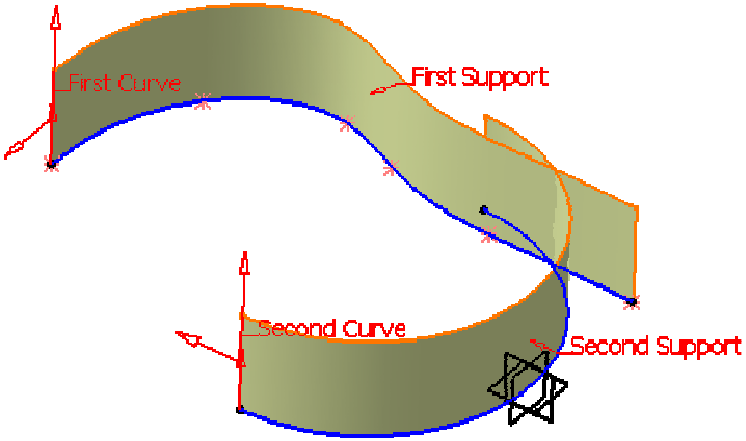


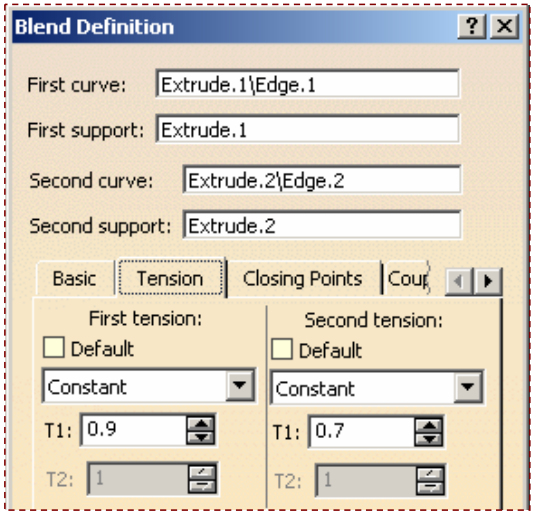


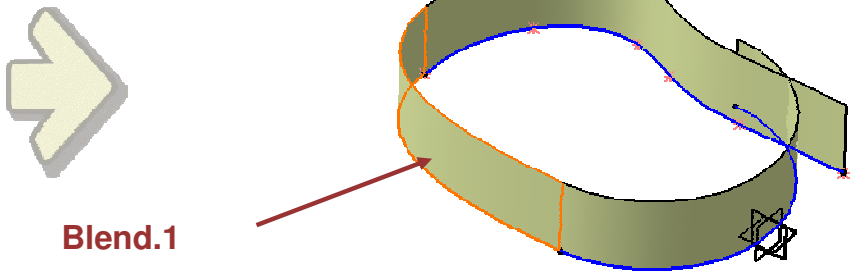
Student Notes:

Do It Yourself (3/4)

- Design a smooth blend surface between the extruded surfaces
  - First Curve : “Edge” of Extrude.1
  - Second Curve : “Edge” of Extrude.2
  - Set First and Second Continuity to Tangency
  - Set First and Second Tension Values to 0.9 and 0.7 respectively.





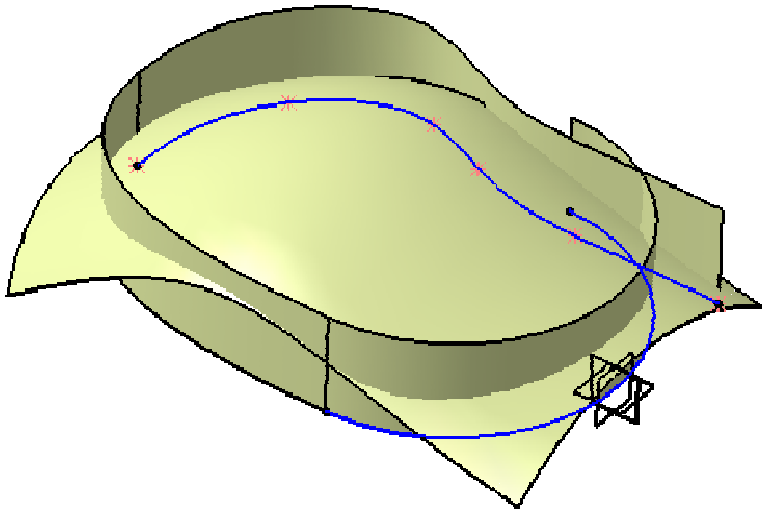


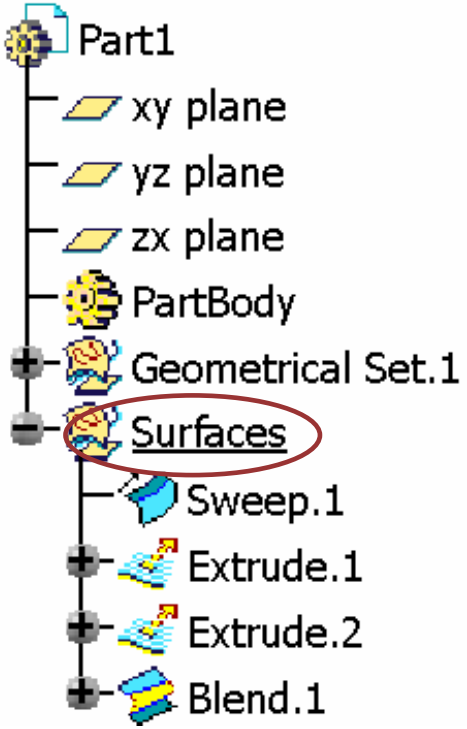
Blend.1

Student Notes:

Do It Yourself (4/4)

Design of Mouse should have a final look as shown





WFS_Creating_Basic_Surfaces_Mouse_End.CATPart

Student Notes:

Operations on Geometry

Recap Exercises

40 min

- Mouse (operations)
- Torch

Student Notes:

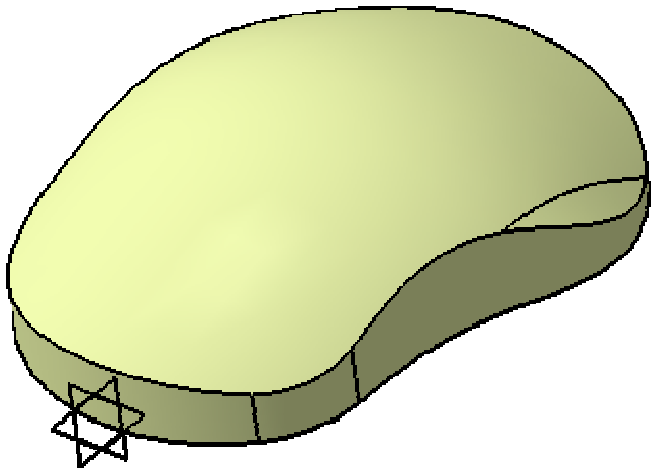
Operations on Geometry

Recap Exercise: Mouse

10 min

In this recap exercise you will:

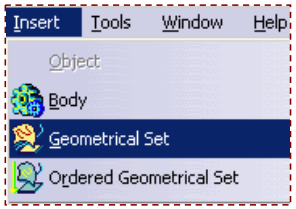
- Create more refined Surface geometry for the shape of the mouse
- Organize the surface geometry in the tree using a new Geometrical Set
- Extrapolate a surface to cover the entire Side surface for the Mouse
- Apply a Surface Fillet
- Create a Join
- Finally, Trim the surfaces to Create a Surface of a Mouse



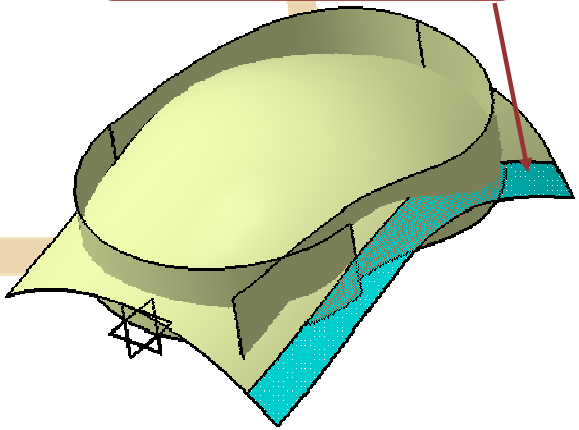
Student Notes:

Design Process: Mouse Recap Exercise

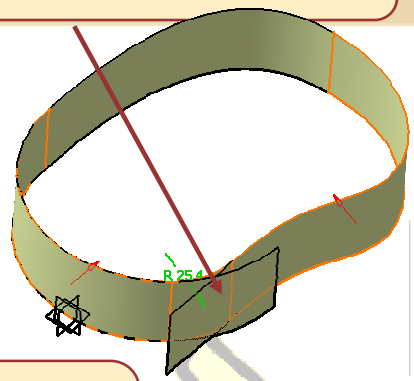
1. Insert a new Geometrical Set



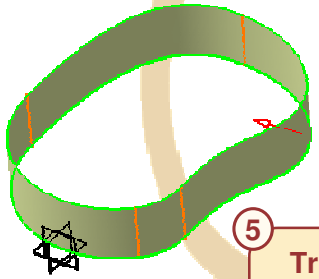
2. Extrapolate the top surface so that it completely covers the Side Surface



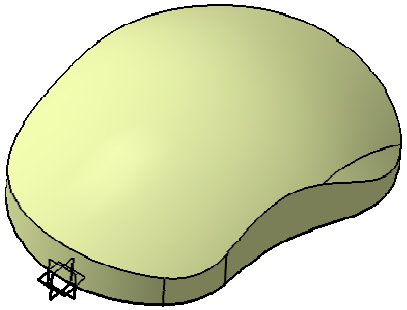
3. Apply a Shape Fillet between surfaces forming the Front and side surfaces



4. Create a Join Between Filleted and Blend Surfaces



5. Trim the Surfaces to Get the Final Mouse & create some more additional surfaces

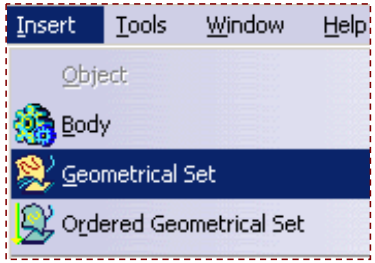


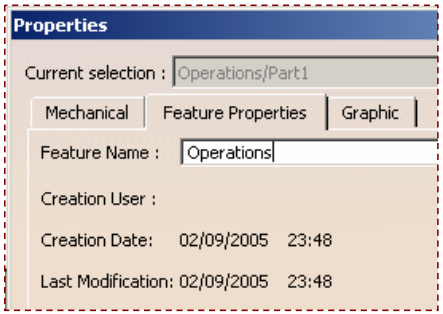
Student Notes:

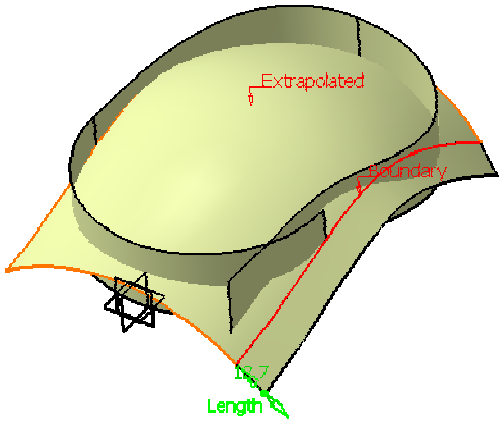
Do It Yourself (1/5)

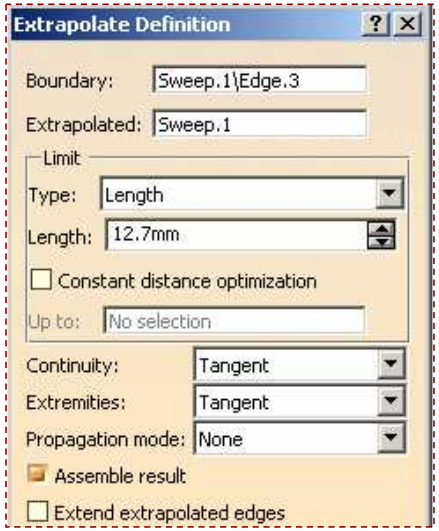
WFS_Performing_Operations_on_Geometry_Mouse_Start.CATPart

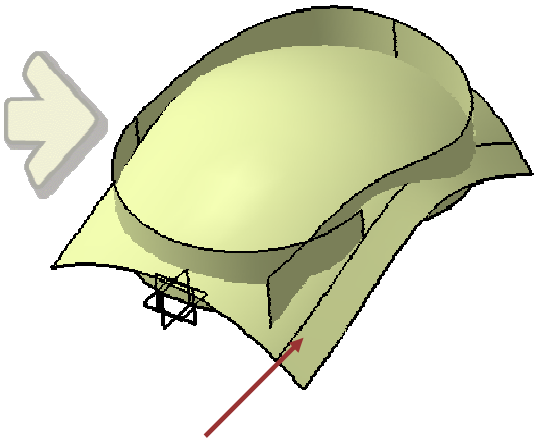
- Insert a new Geometrical Set.
- Rename it to “Operations”.
- Extrapolate the edge of sweep.1by length of 12.7 mm as shown









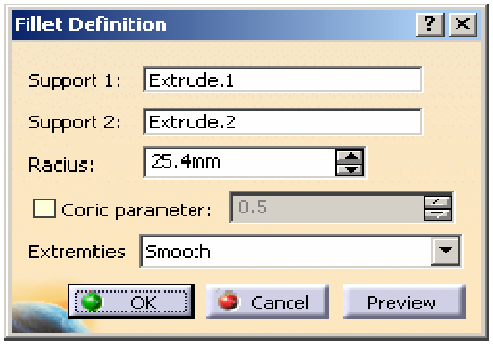


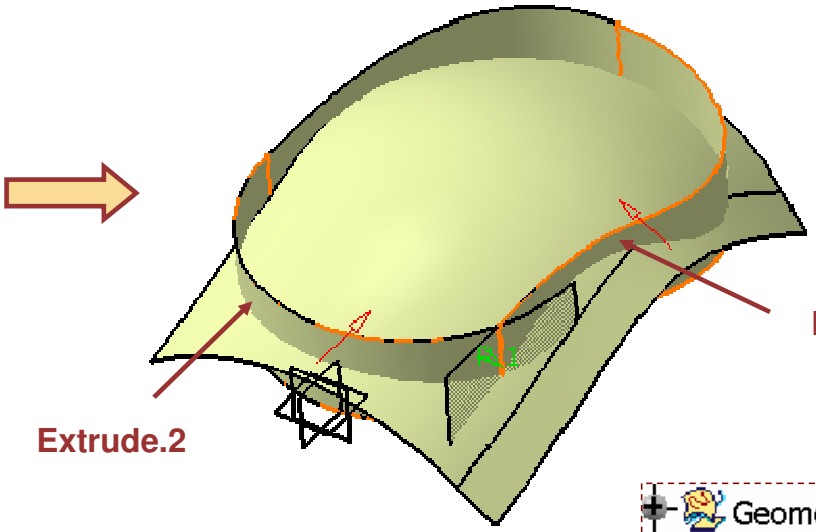
Extrapolated surface

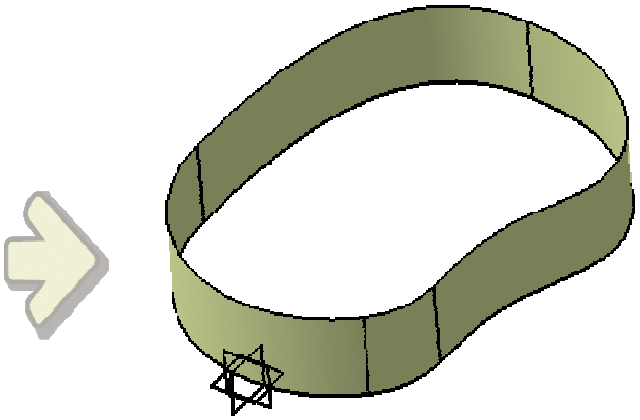
Student Notes:

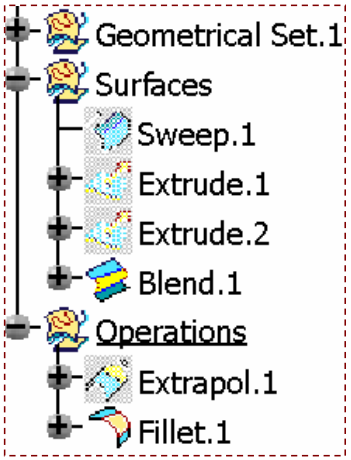
Do It Yourself (2/5)

- Apply a Shape Fillet of 25.4 mm between Extrude.1 and Extrude.2





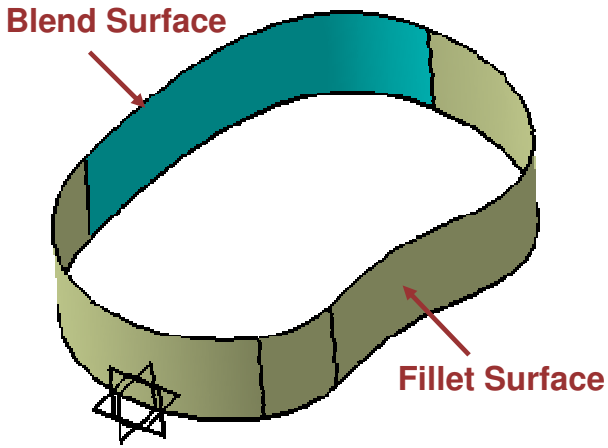


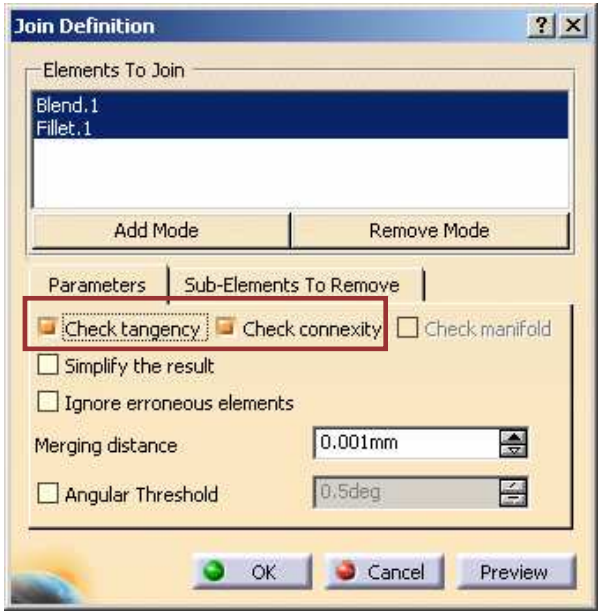


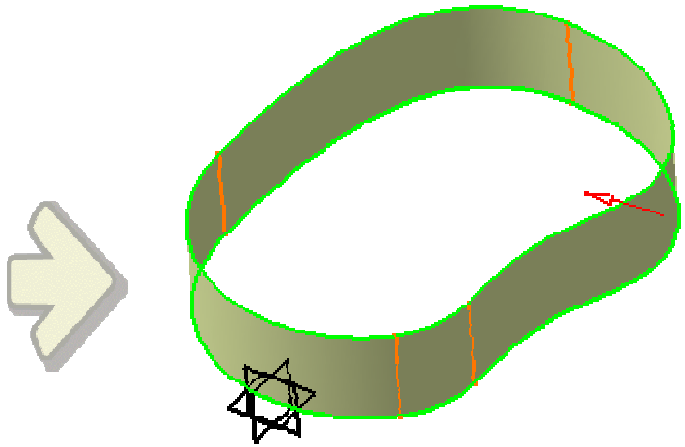
Student Notes:

Do It Yourself (3/5)

- Join the Filleted and and the Blend Surfaces together
  - Check the tangency and connexity options





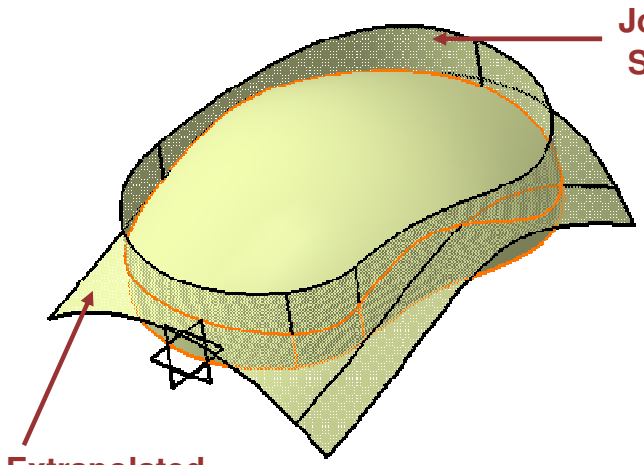


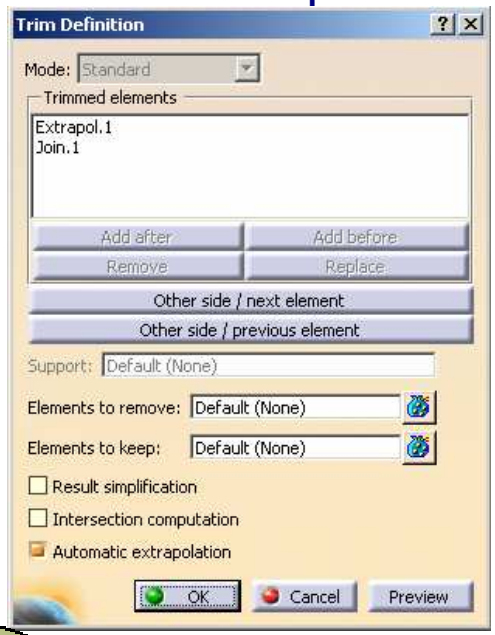
Student Notes:

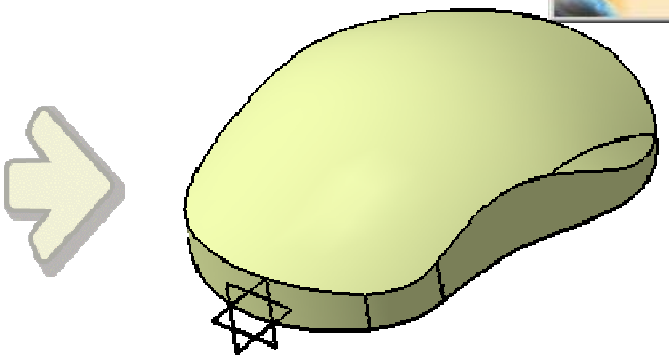
Do It Yourself (4/5)

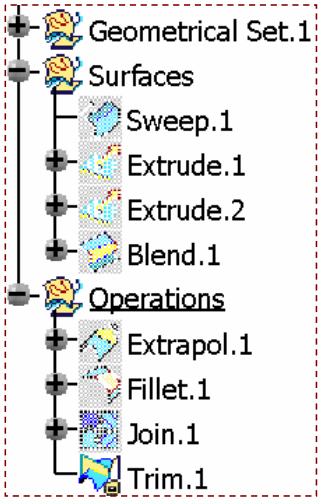
- **Trim the Join and Extrapolated Surface**

To Swap the Trimmed Portion of the Surfaces click on "Other Side…" Option. The Sides to be trimmed become transparent





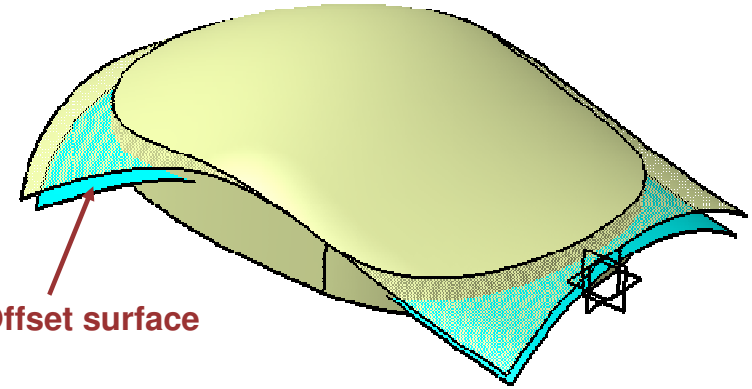


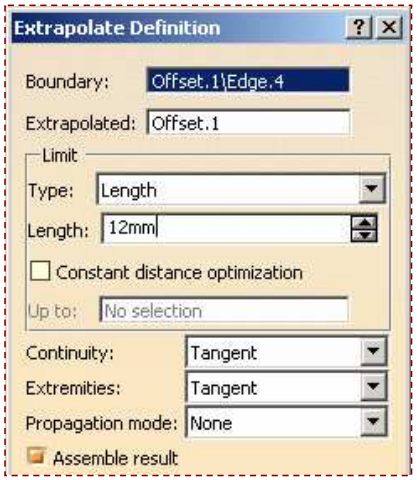


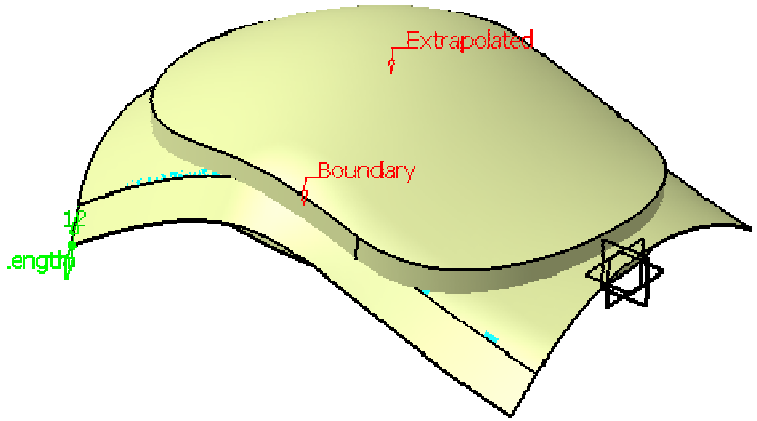
Student Notes:

Do It Yourself (5/5)

- Create offset surface by offsetting sweep.1 by 5mm.
- Extrapolate the edge of this surface by 12mm.







WFS_Performing_Operations_on_Geometry_Mouse_End.CATPart

Student Notes:

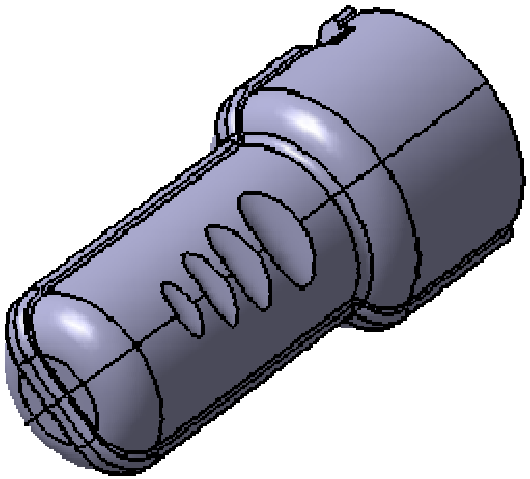
Performing Operations on Geometry

Recap Exercise: Torch

30 min

In this recap exercise you will:

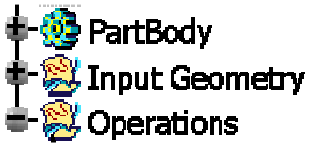
- Create a Join surface
- Split and Trim Surfaces
- Heal a surface



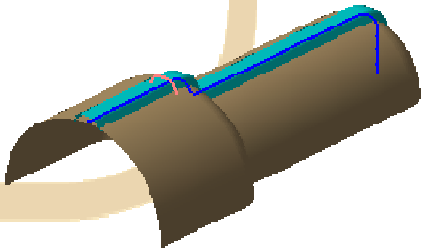
Student Notes:

Design Process: Torch (1/2)

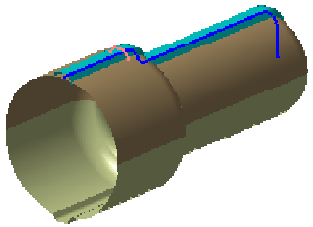
1. Insert a new Geometrical Set called Operations



2. Create Revolve and sweep from existing Geometry and trim them together

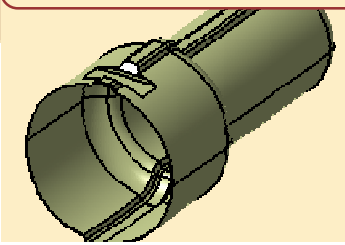


3. Create symmetry



4. Create Extrude and trim with the upper part

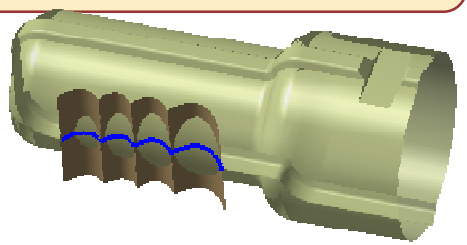
5. Join the top and bottom surfaces.



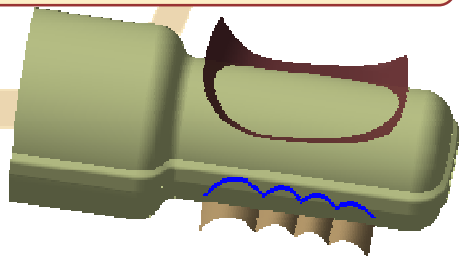
Student Notes:

Design Process: Support (2/2)

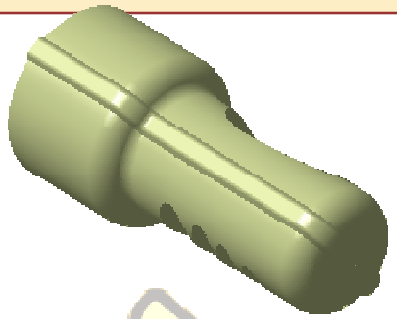
6. Trim the spline curves and create an extrude from the result of the trim operation.



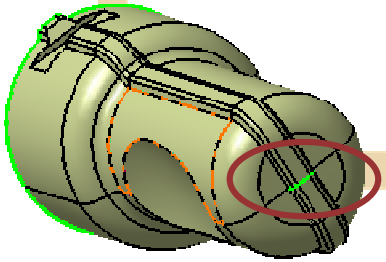
7. Create a sweep surface using the curves provided.

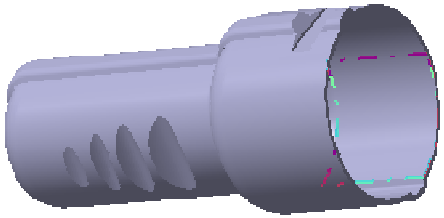


8. Trim the surfaces together again to get a single surface



9. Repair the gap using Healing and then thicken surface to get the final part.



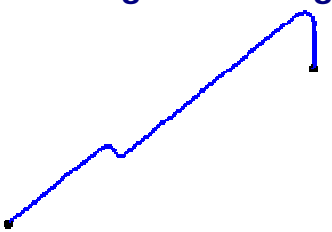


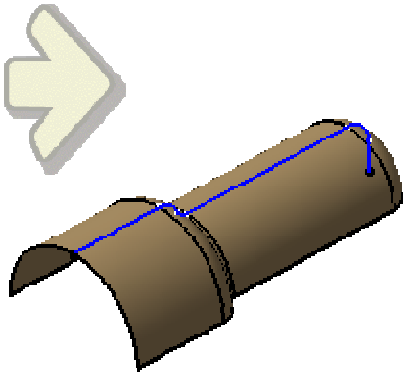
Student Notes:

Do It Yourself (1/8)

Load the part “Torch_StartPart.CATPart”

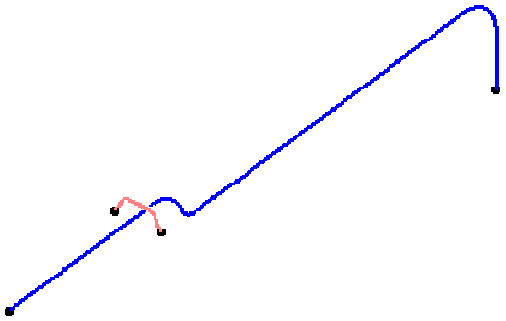
- Insert a Geometrical set and name it as “Operations”
- Create Revolution Surface
  - Create Revolution using “Revolution Sketch” Angle 1 = Angle 2 = 90Deg

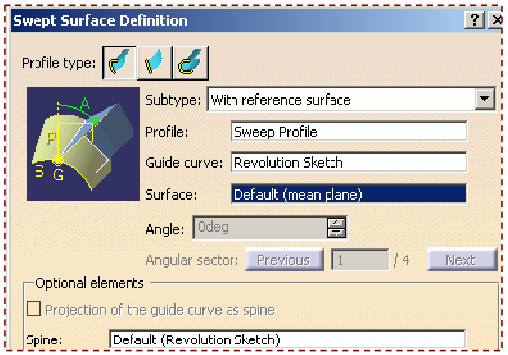


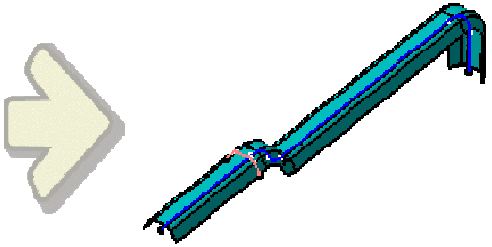


- Create Sweep Surface.

  Create Sweep using “Sweep Profile” as profile and Revolution sketch as Guide curve.



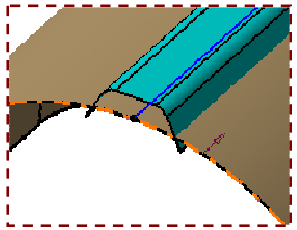


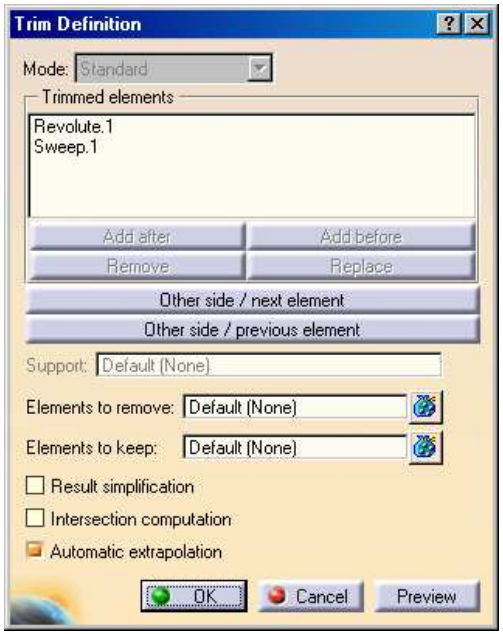


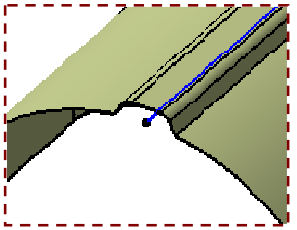
Student Notes:

Do It Yourself (2/8)

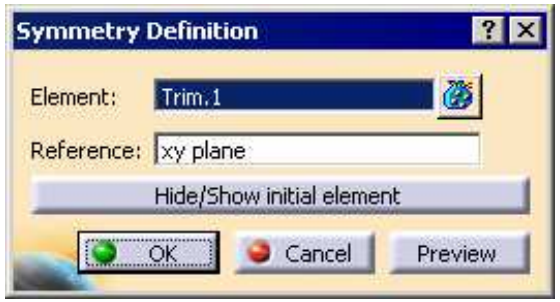
- Trim the surfaces
  - Create trim between Revolute.1 and Sweep.1

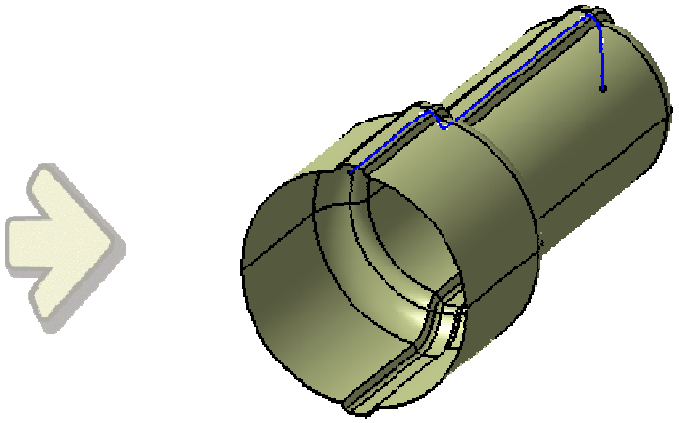






- Create Symmetry
  - Create Symmetry of Trim.1. Take reference plane as xy plane.



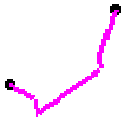


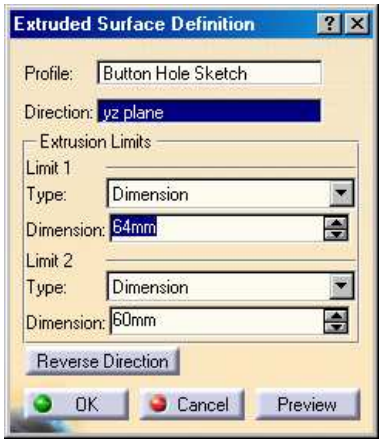
Student Notes:

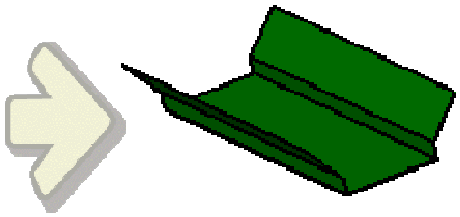
Do It Yourself (3/8)

- Create Button Hole notch
  - Create an extrude Surface
    - Profile: Button Hole Sketch

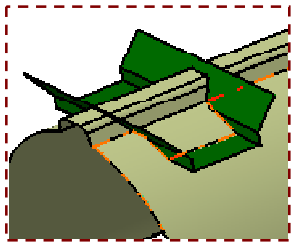
      Direction : yz plane

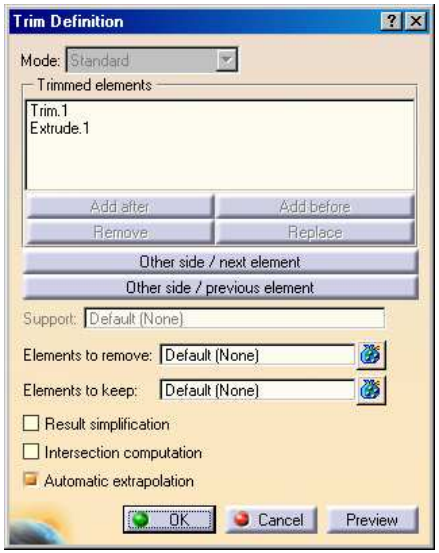


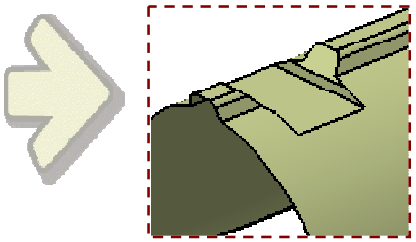




  - Create trim
    - First Element: Trim.1
    - Second element: Extrude.1



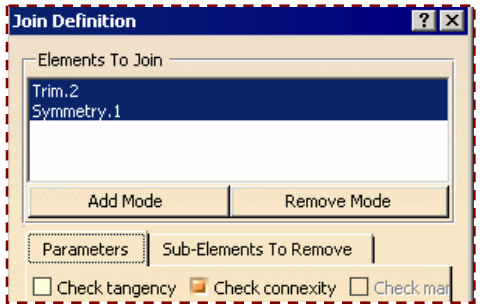


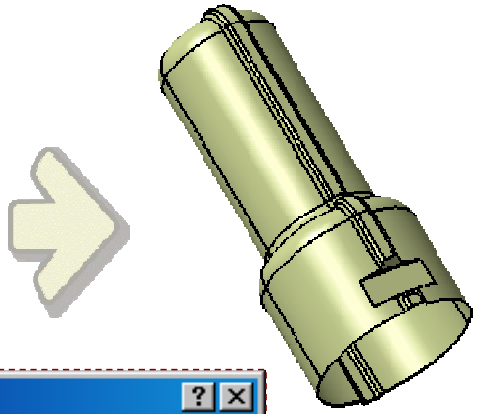


Student Notes:

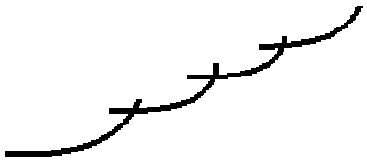
Do It Yourself (4/8)

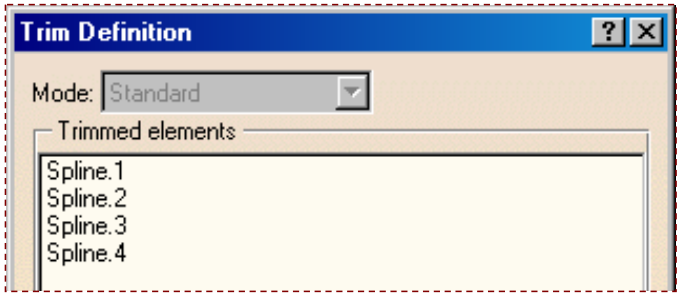
- Join the surfaces
  - Join trim.2 and Symmetry.1

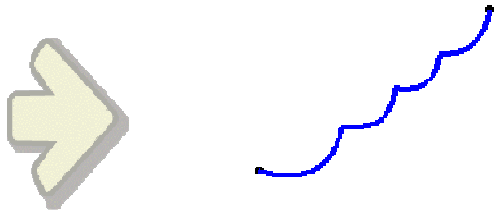




- Trim the four curves.
  - Successively trim the four curves as shown.



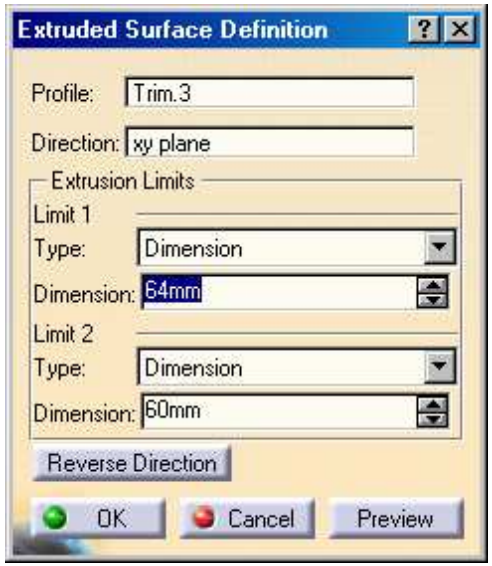


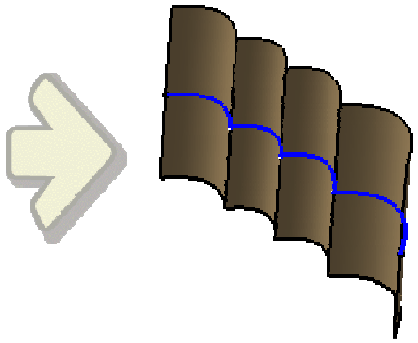


Student Notes:

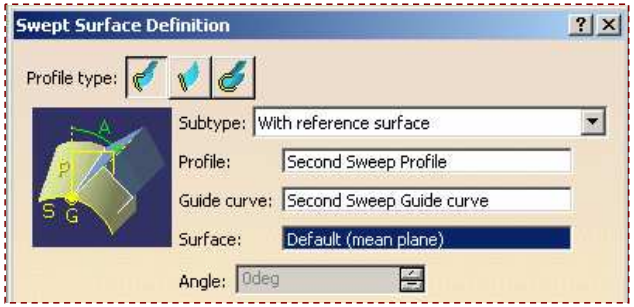
Do It Yourself (5/8)

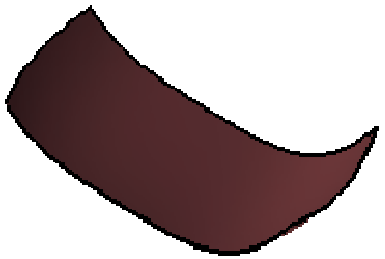
- Create Extrude surfaces
  - Create Extrude with profile : Trim.3
    - Limit 1 : 64 mm
    - Limit 2 : 60mm
    - Direction : xy plane





- Create Sweep.
  - Create Sweep using Second Sweep profile and second sweep guide curve.

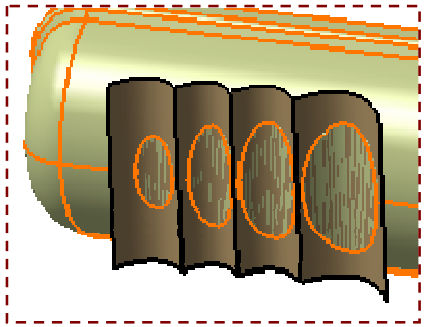


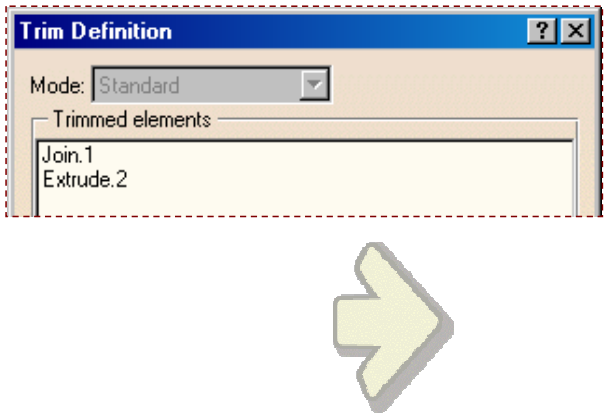


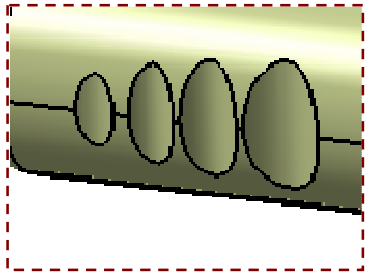
Student Notes:

Do It Yourself (6/8)

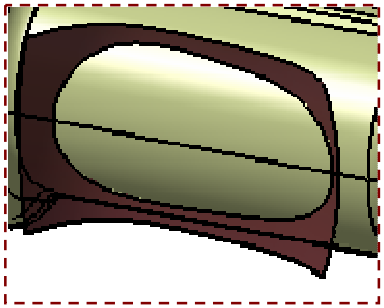
- Trim surface
  - Trim join.1 and Extrude.2

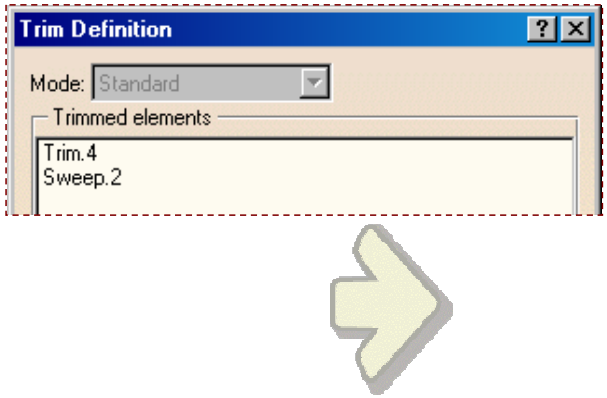


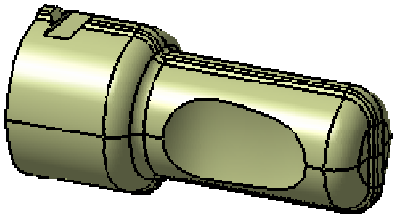




- Trim surface.
  - Trim Create Sweep using Second Sweep profile and second sweep guide curve.





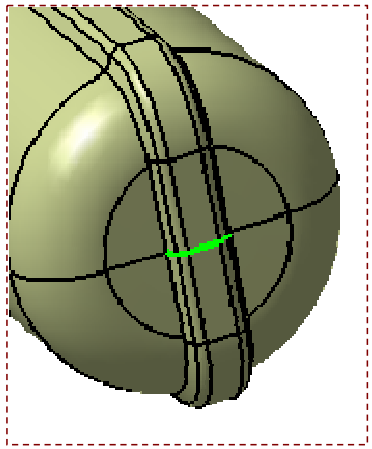


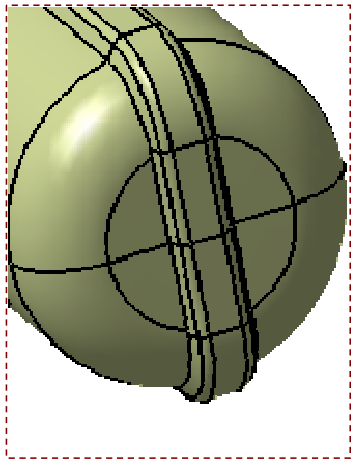
Student Notes:

Do It Yourself (7/8)

- Heal surface
  - Heal Trim.5
    - Merging distance = 0.3mm

(The trim surface has gaps. Because of these gaps we cannot thicken the surface and thus we need to heal the surface)



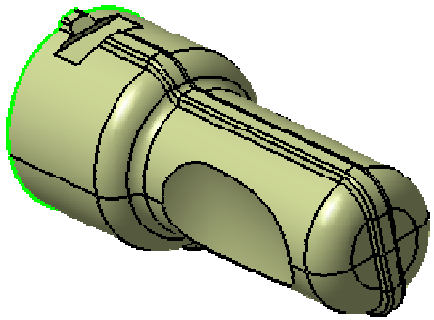


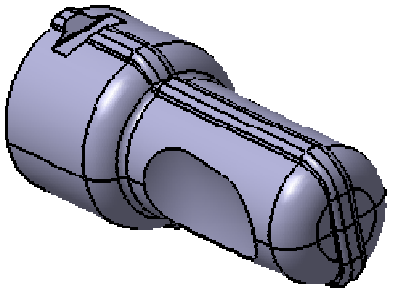
Student Notes:

Do It Yourself (8/8)

Load the part “Torch_EndPart.CATPart”

- Thick surface
  - Thick Healing.1 by going to part design
    - First offset = 5 mm
    - Second offset = 0 mm





Student Notes:

Completing the Solid in Part Design

Recap Exercises

40 min

You will now do the following exercises

- **Button**
- **Mouse**

EXERCISE BOOK

Student Notes:

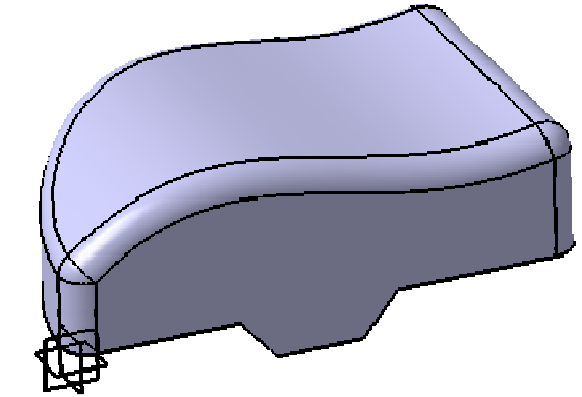
Completing the Solid in Part Design

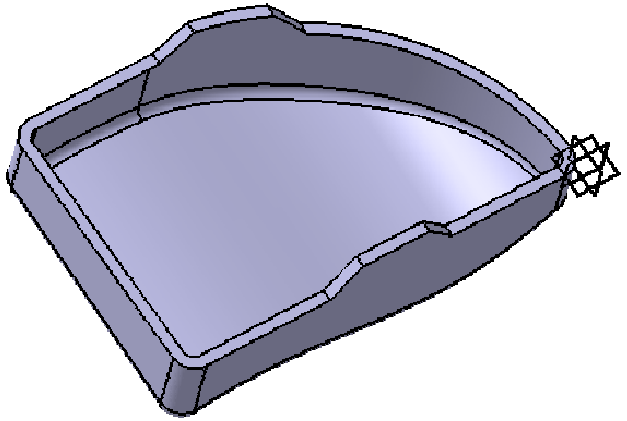
Recap Exercise: Button

10 min

In this recap exercise you will:

- Create a Solid Button using Surface Geometry to define the shape
- Create two sketch profiles for designing solid parts
- Split the solid
- Apply Fillets
- Create Shell

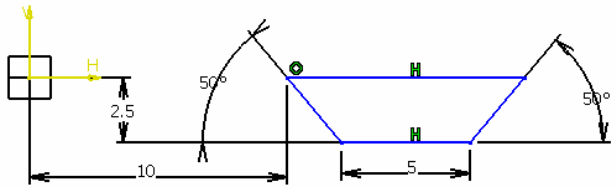


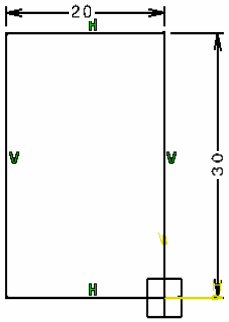


Student Notes:

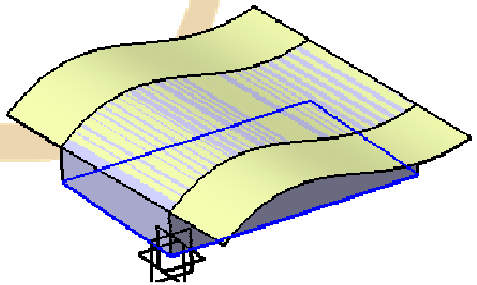
Design Process: Button Recap Exercise

1 Create Sketches to design the Solid parts

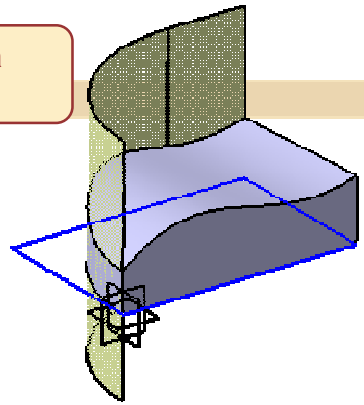




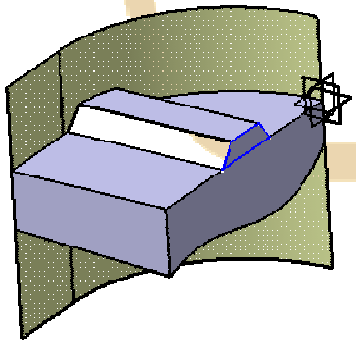
2 Design one solid by Padding one of the sketches upto surface



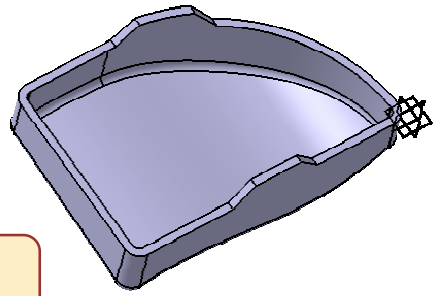
3 Split this solid by a surface



4 Create another Pad, using second sketch



5 Apply Dress- Up features

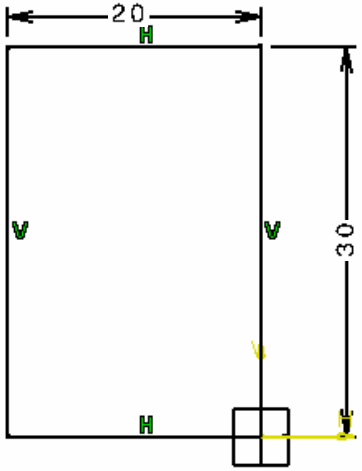


Student Notes:

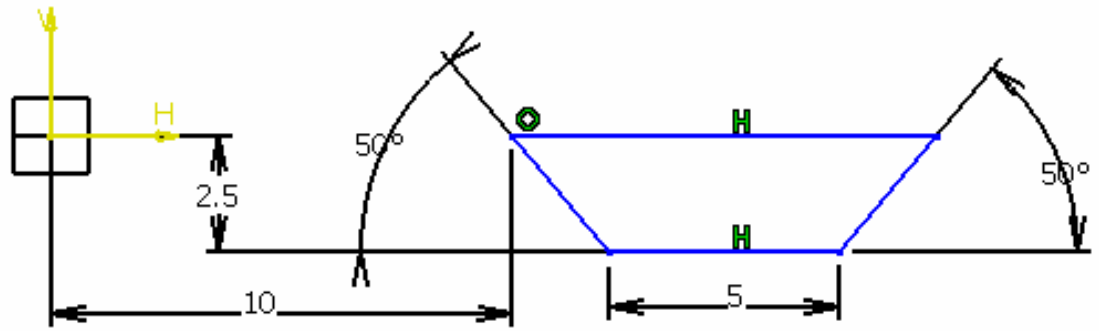
Do It Yourself (1/5)

WFS_Completing_Geometry_in_Part_Design_Button_Start.CATPart

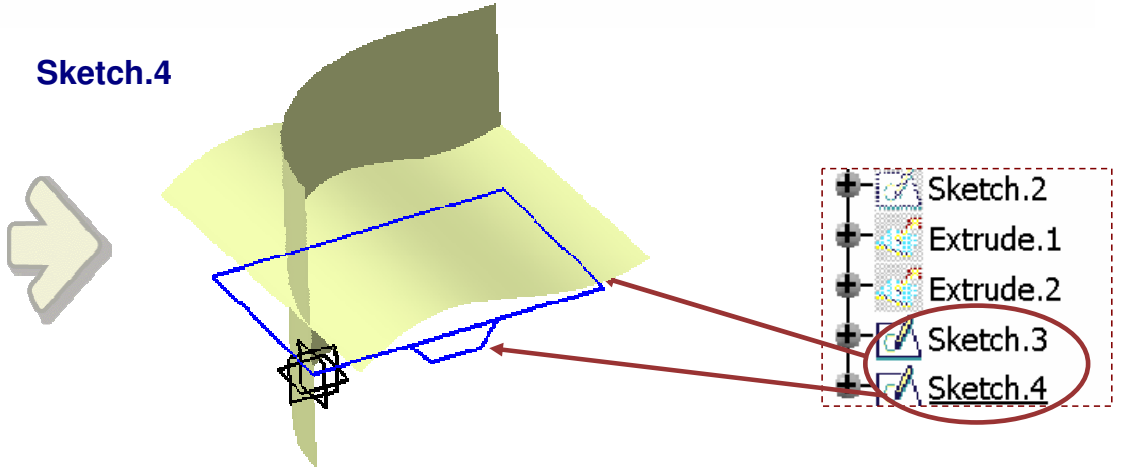
- Access the Part Design Workbench.
- Sketch on XY plane. This is Sketch.3
- Exit the Sketcher
- Create another Sketch on YZ plane.This is Sketch.4



Sketch.3



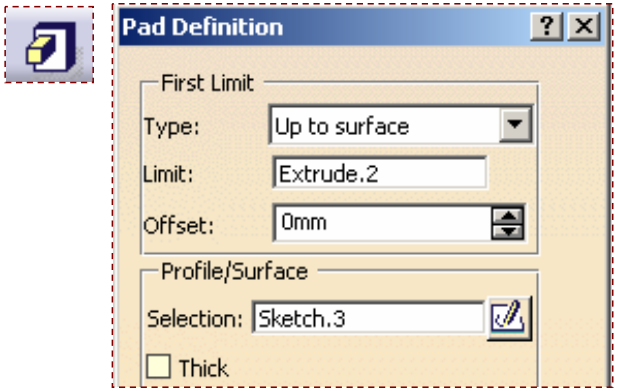
Sketch.4

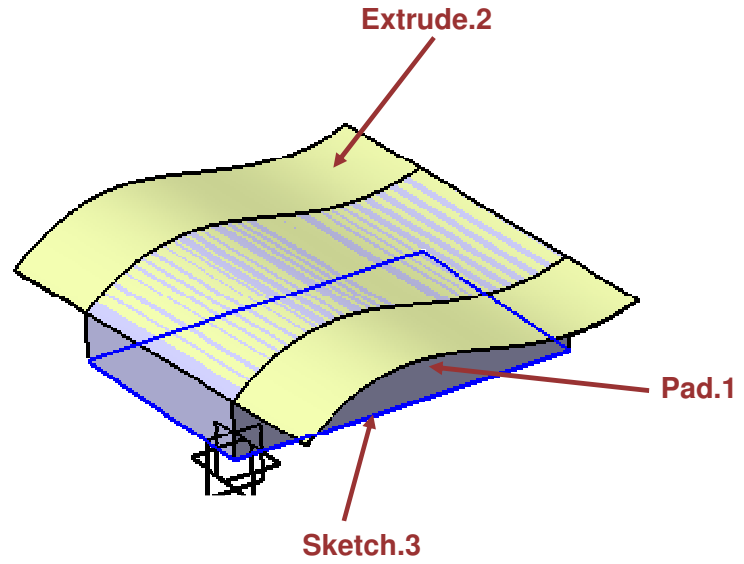


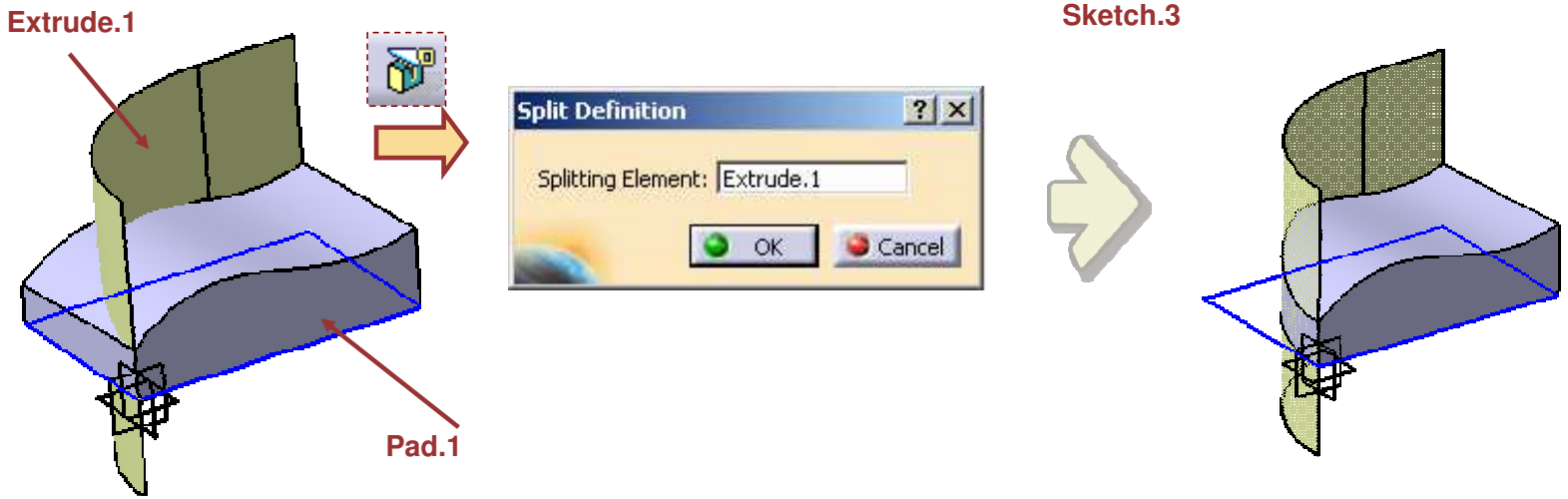
Student Notes:

Do It Yourself (2/5)

- Pad Sketch.3 upto Extrude.2
- Split this Pad with Extrude.1



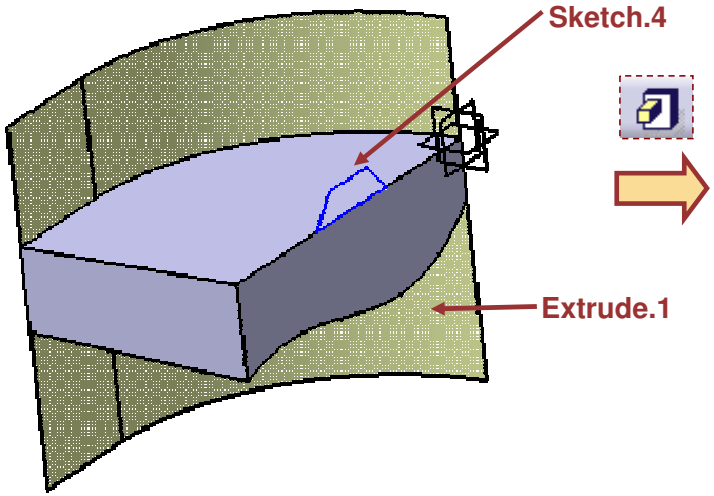


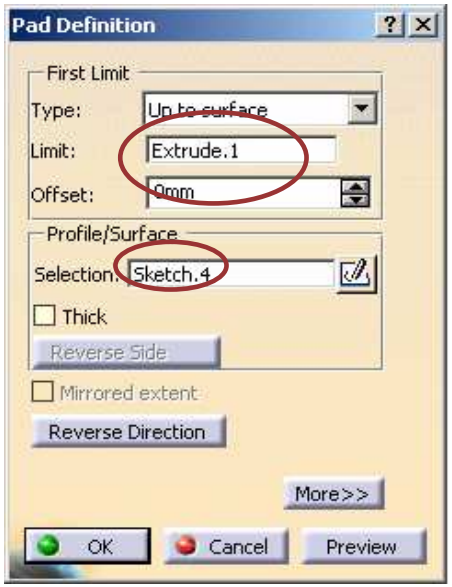


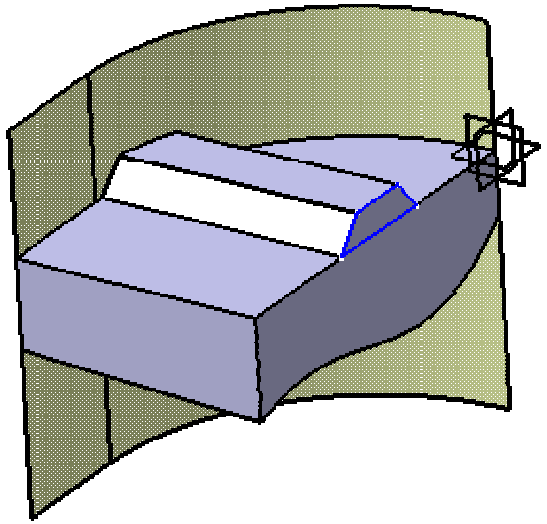
Student Notes:

Do It Yourself (3/5)

- Pad Sketch.4 upto surface Extrude.1



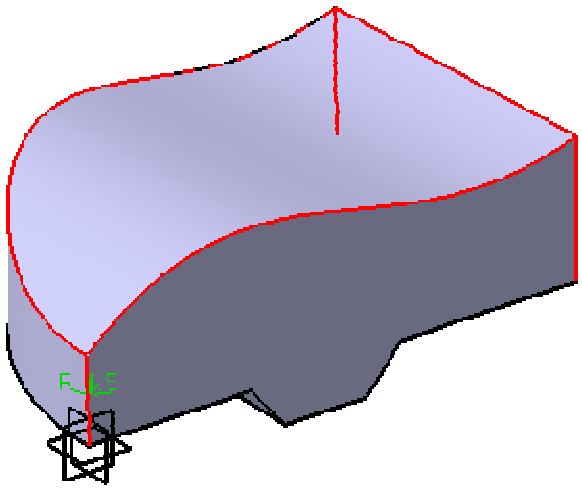


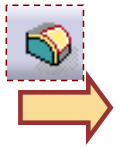


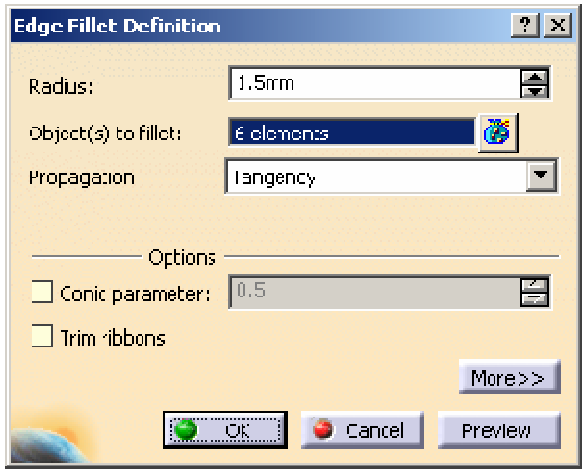
Student Notes:

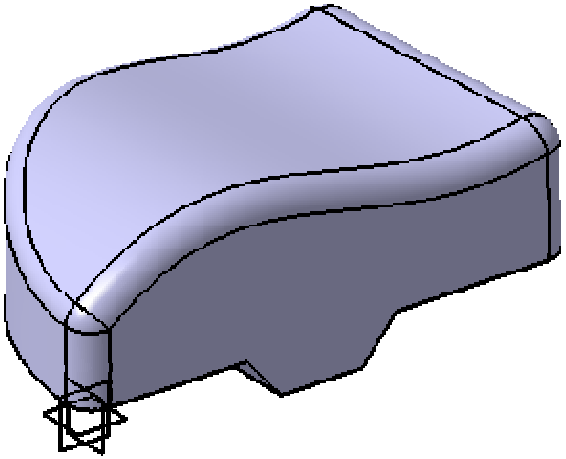
Do It Yourself (4/5)

- Apply Edge Fillet of 1.5 mm to the edges shown.





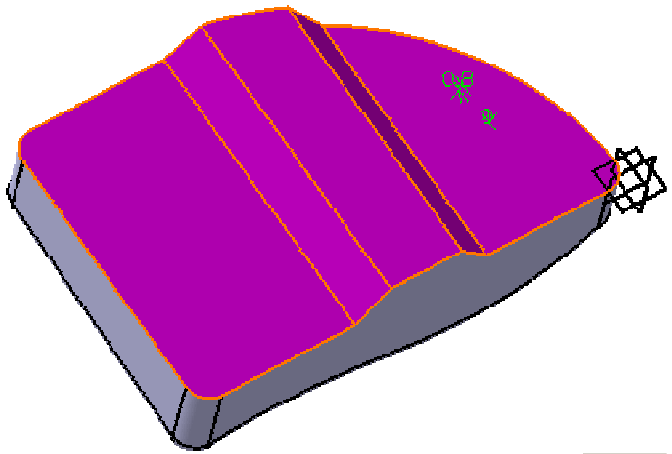


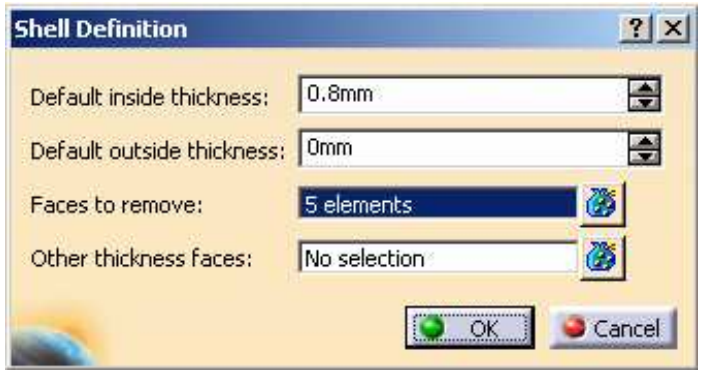


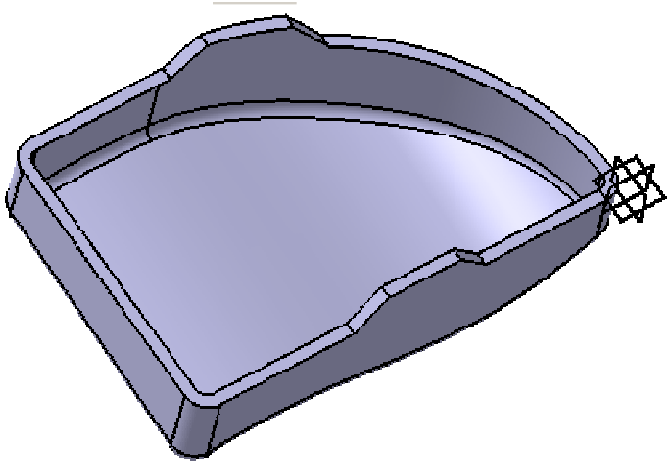
Student Notes:

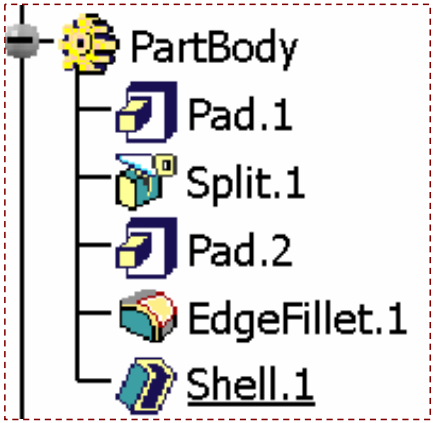
Do It Yourself (5/5)

- Shell the solid by removing 5 faces.









WFS_Completing_Geometry_in_Part_Design_Button_End.CATPart

Student Notes:

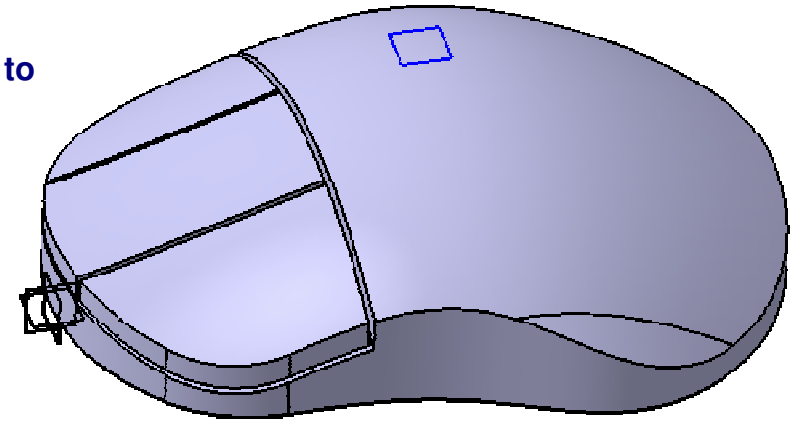
Completing the Solid in Part Design

Recap Exercise: Mouse

30 min

In this recap exercise you will:

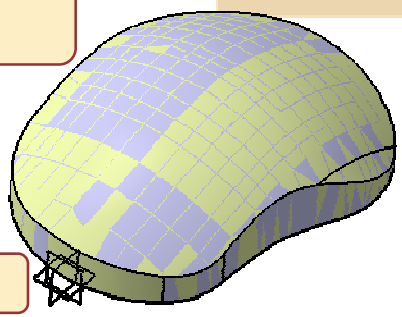
- Create a solid using Close Surface functionality
- Create Pads and Pockets
- Use the thickness command to provide thickness to surface and shell command to hollow a solid.



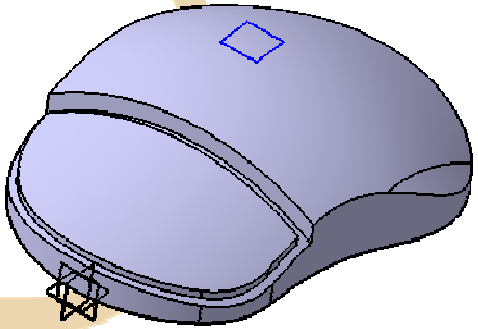
Student Notes:

Design Process: Mouse Recap Exercise

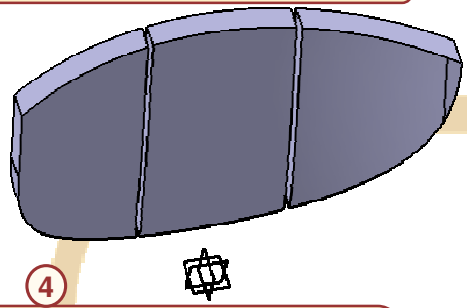
1. Create a Close Surface



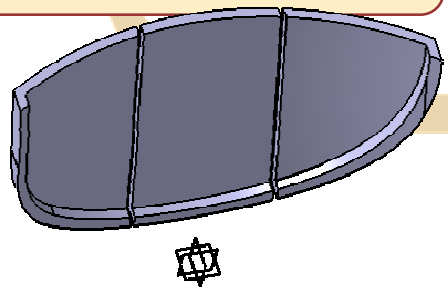
2. Design the Button Section



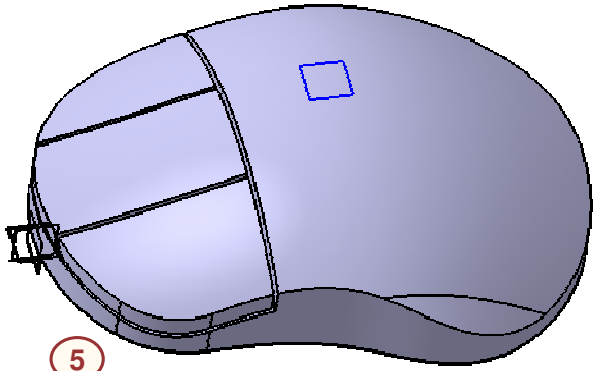
3. Create Solid Buttons



4. Shelling the Buttons so that the Button sections can be accommodated in the buttons



5. Trim the Surfaces to Get the Final Mouse

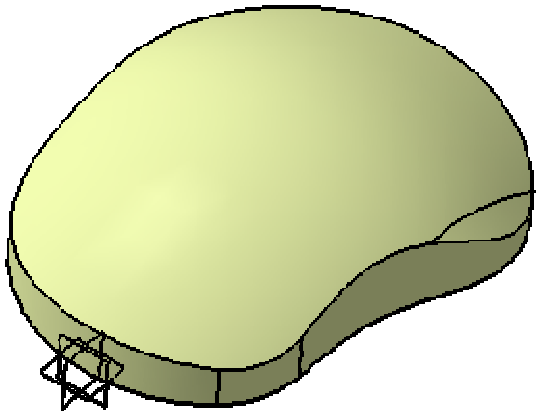


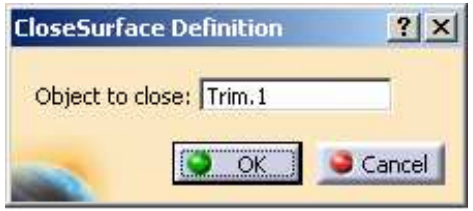
Student Notes:

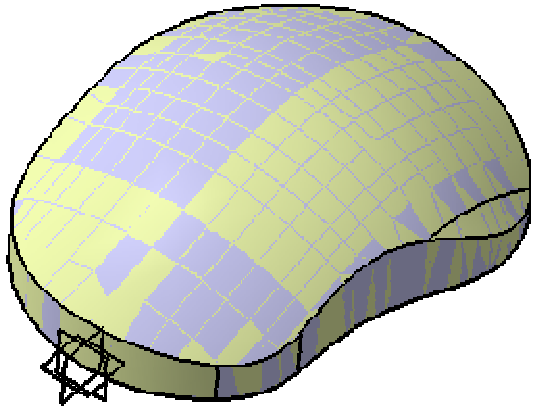
Do It Yourself (1/8)

WFS_Completing_Geometry_In_Part_Design_Mouse_Start.CATPart

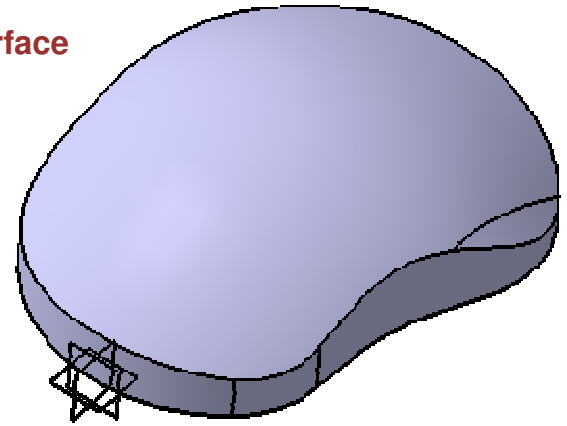
- Access the Part Design Workbench
- Close the Trim.1 using “CloseSurface” command
- The surface is converted into a solid







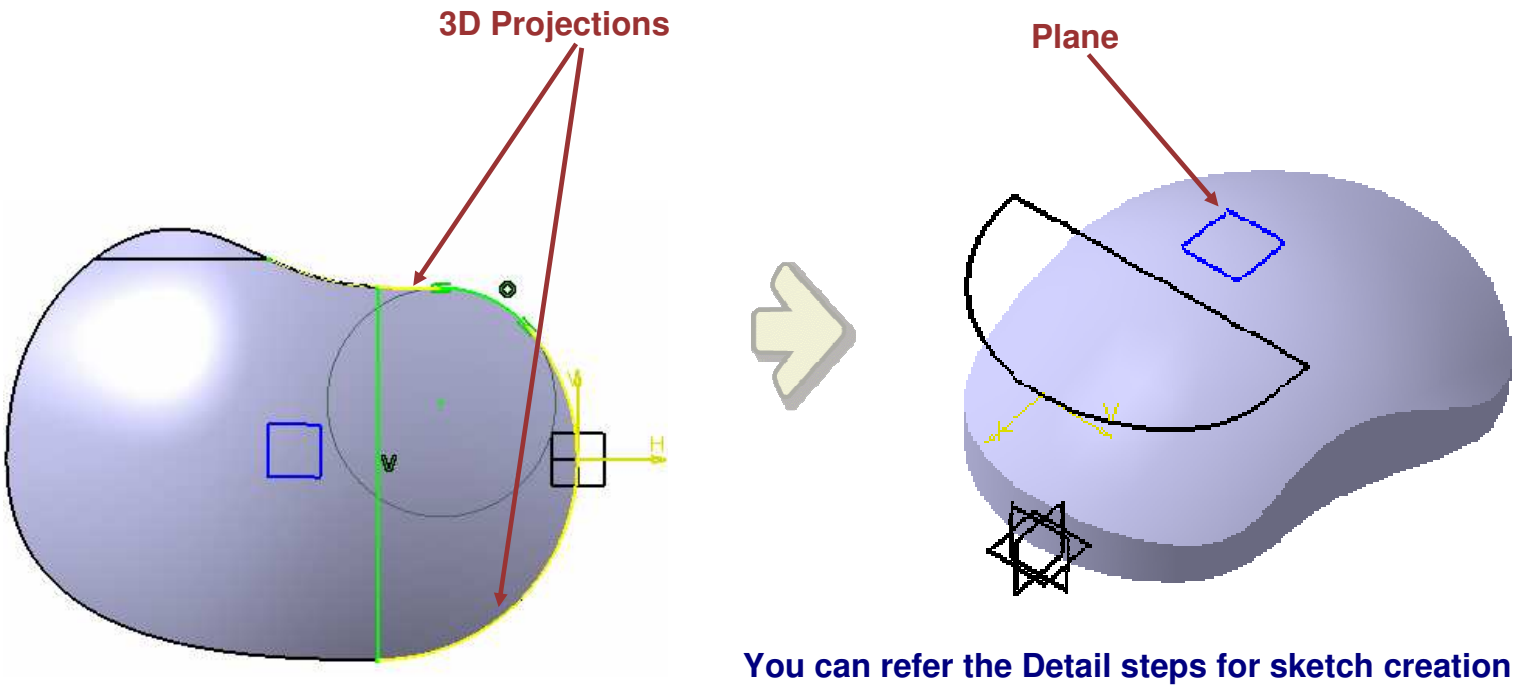
After Hiding the Trim Surface



Student Notes:

Do It Yourself (2/8)

- Create a Profile to design the buttons of the Mouse
- Create a Plane Offset from Bottom Face of the solid at a distance of 46 mm
- Create a Sketch on it as Shown
  - First Project the two edges belonging to the solid into this sketch Plane 
  - Create an arc joining these two edges
  - Create a vertical line
  - Trim the remaining portion of the sketch 
- Exit the Sketcher

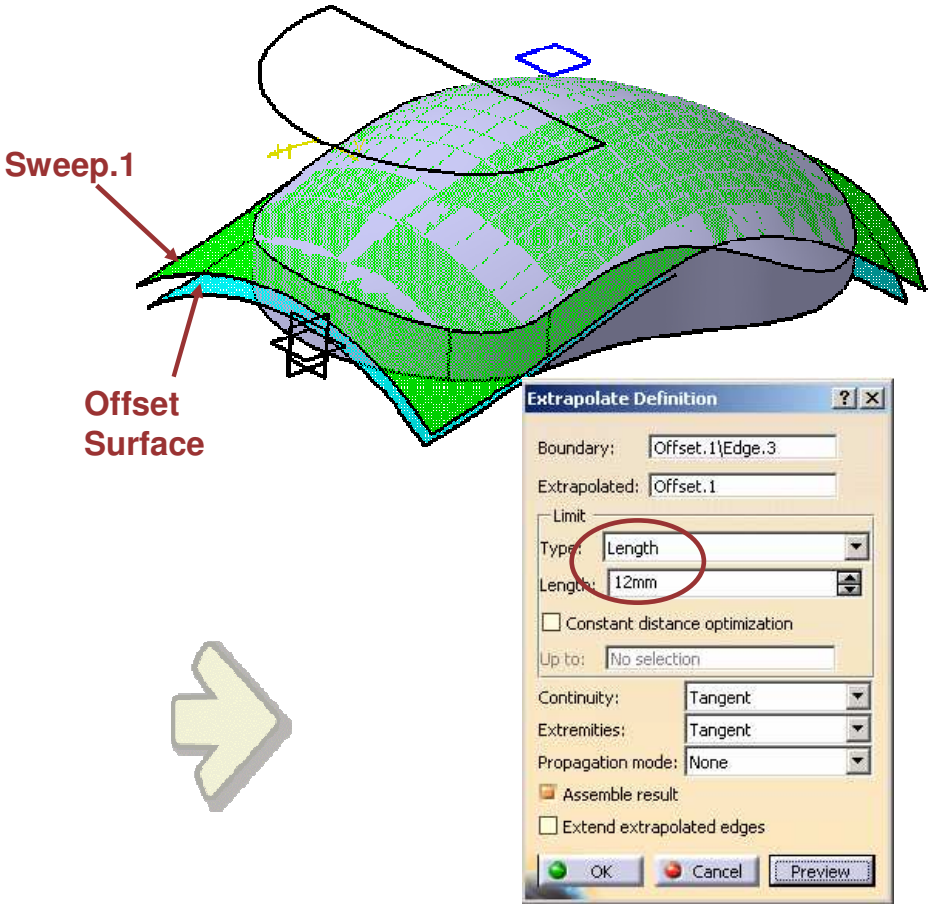


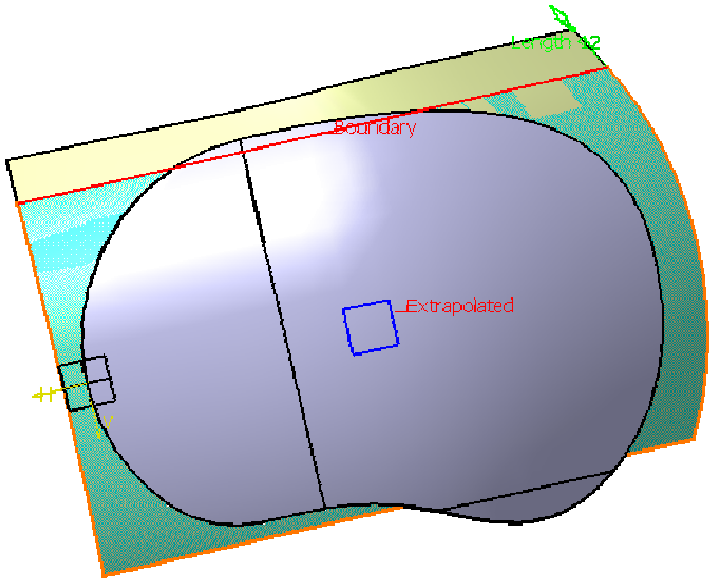
You can refer the Detail steps for sketch creation

Student Notes:

Do It Yourself (3/8)

- "Show" the top swept surface (Sweep.1)
- Access the Generative Shape Design Workbench
- Offset this Swept surface in –Z direction by 5 mm
- Extrapolate the offset surface by 12 mm

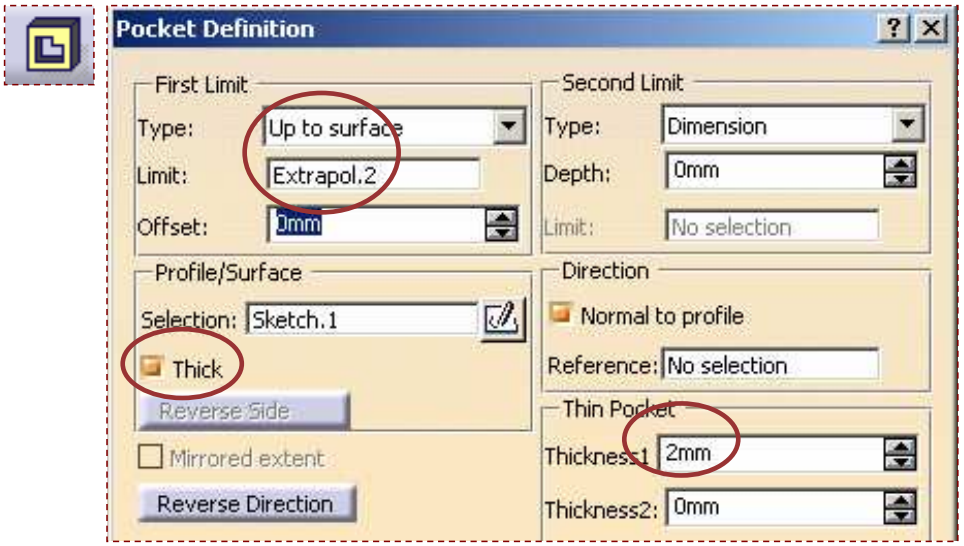


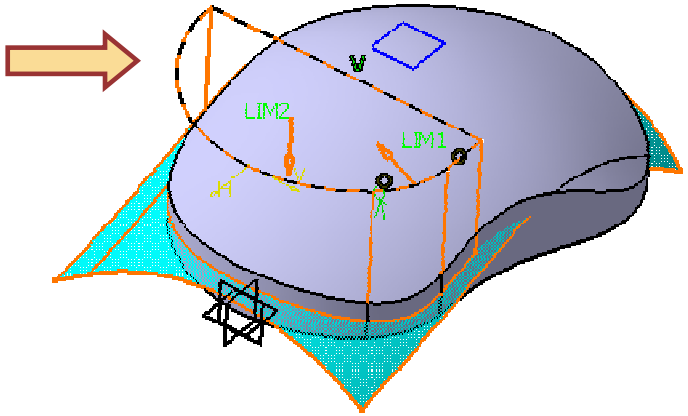


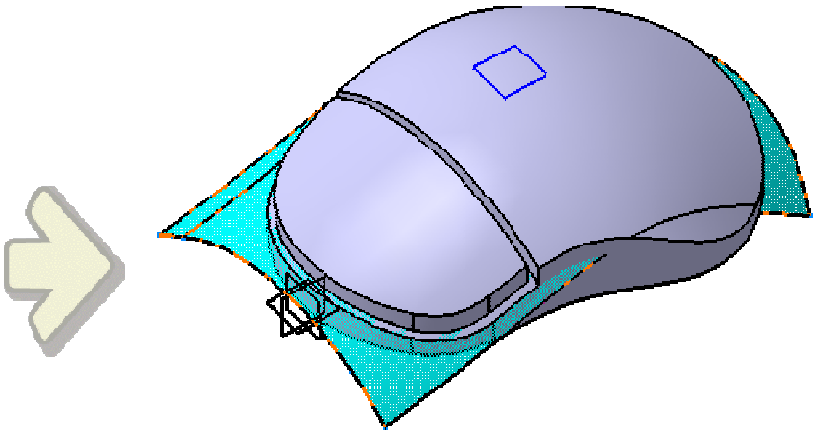
Student Notes:

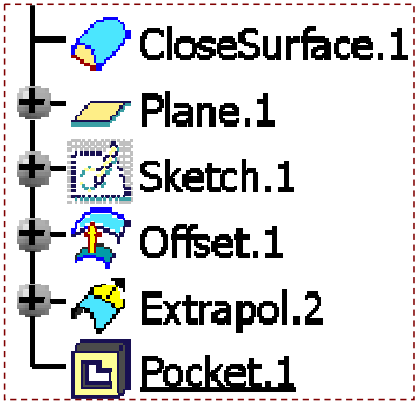
Do It Yourself (4/8)

- Create a Pocket from the sketch “Upto Surface” and select “Extrapol.2”





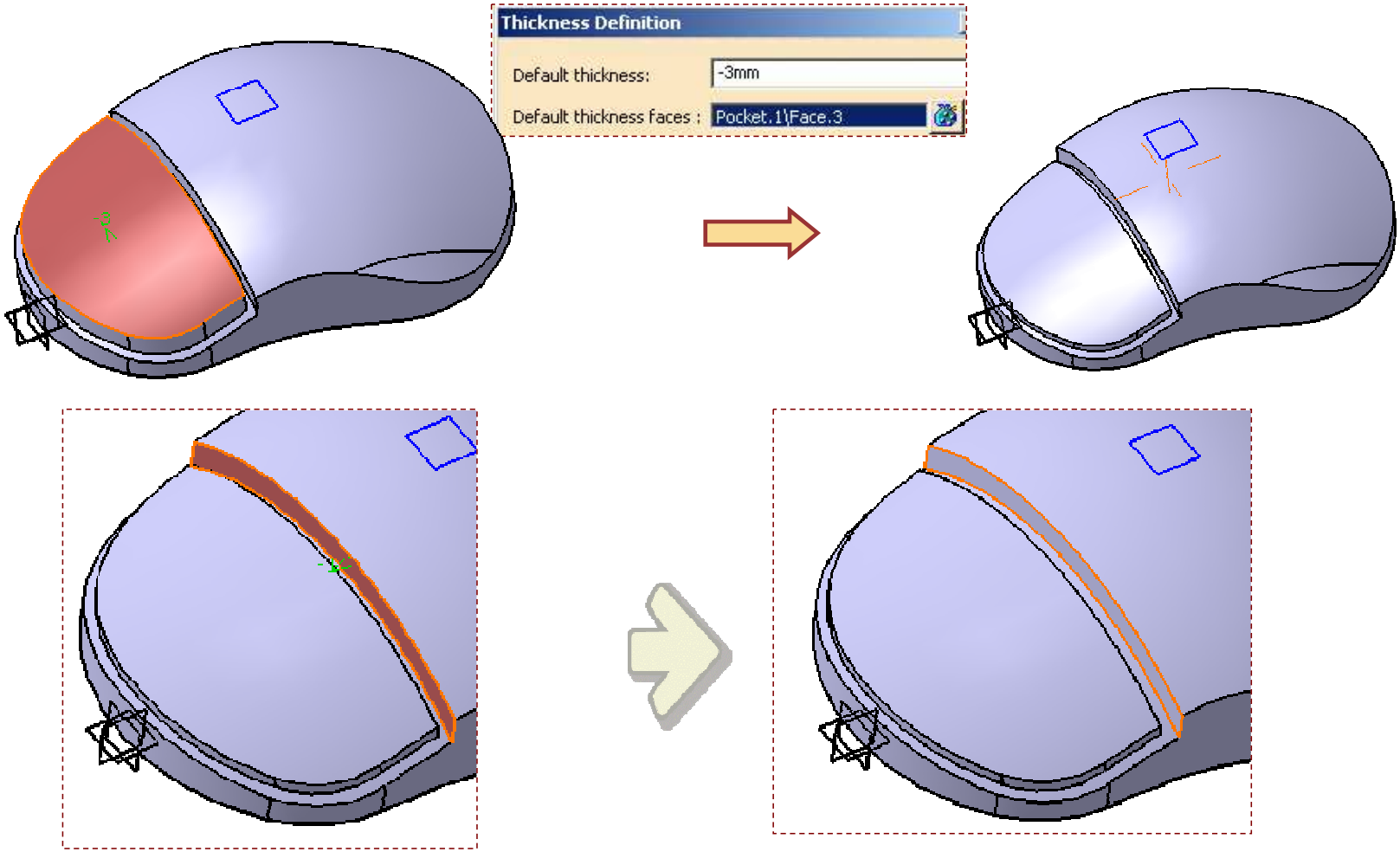




Student Notes:

Do It Yourself (5/8)

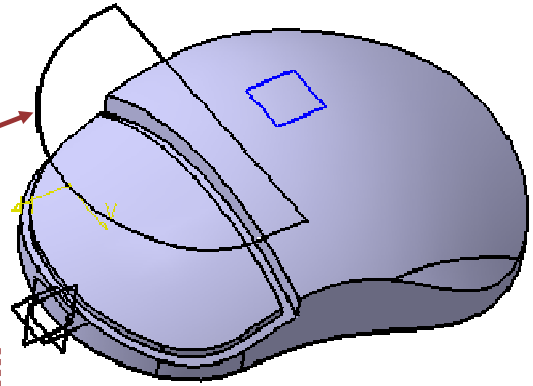
- Using “Thickness” command remove material by 3mm 
- Also apply a “Thickness” of –1 mm on vertical face.

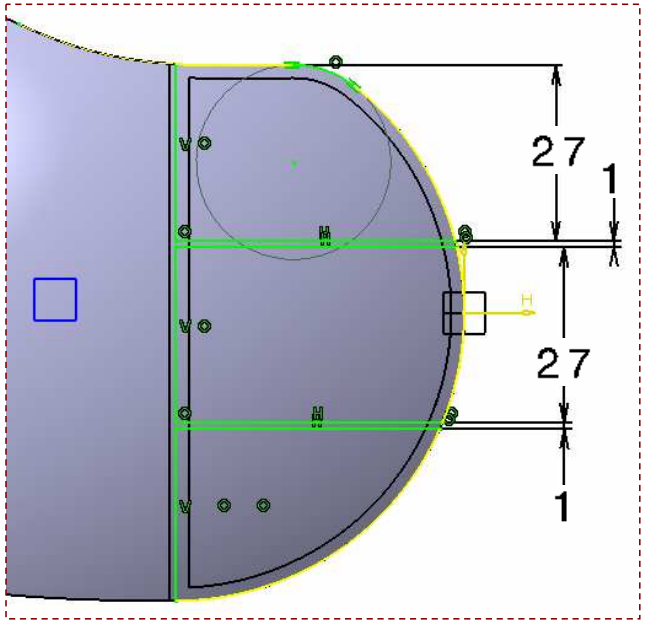


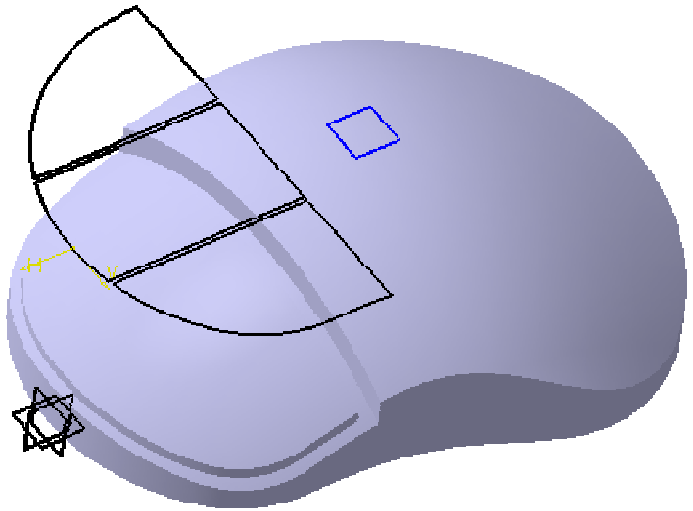
Student Notes:

Do It Yourself (6/8)

- Insert a new Body.
- Copy Sketch.1 using the contextual menu and paste it in the new body.
- Edit the copied Sketch in the new Body.



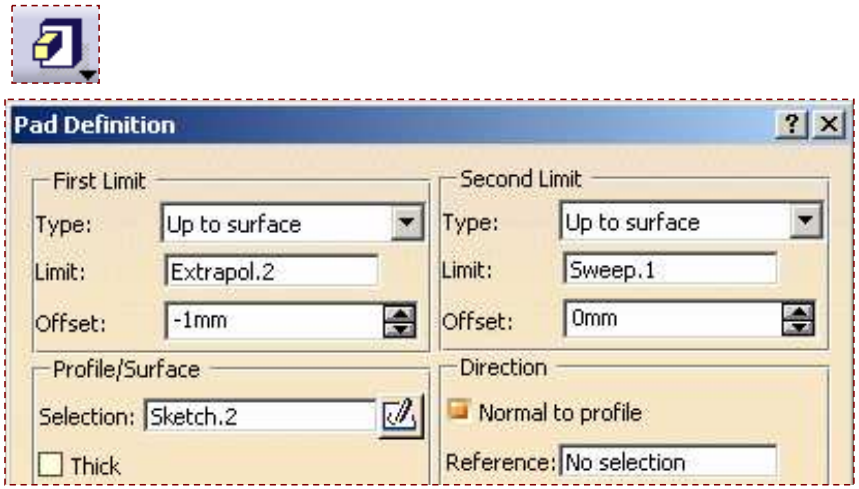


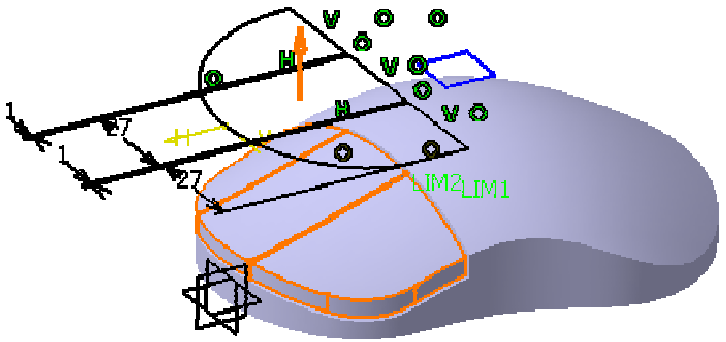


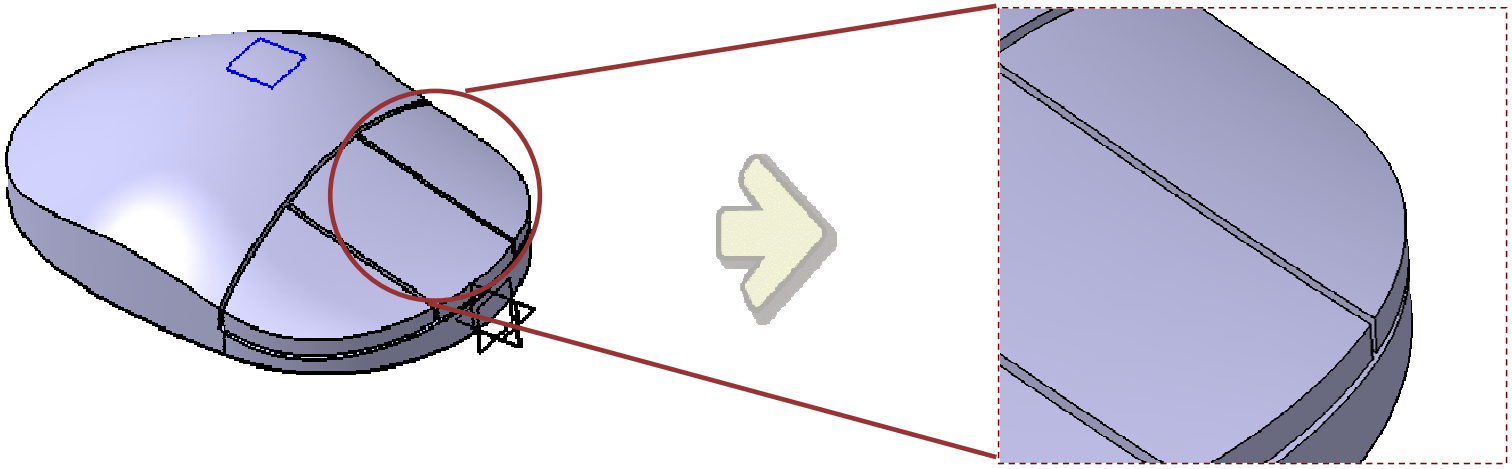
Student Notes:

Do It Yourself (7/8)

- Pad this Sketch by having following parameters



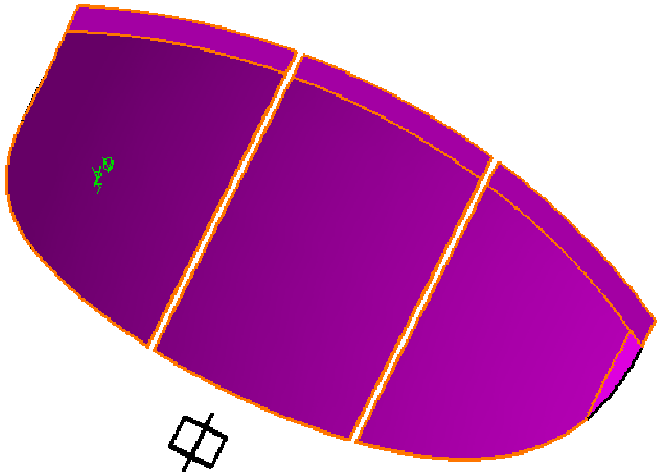


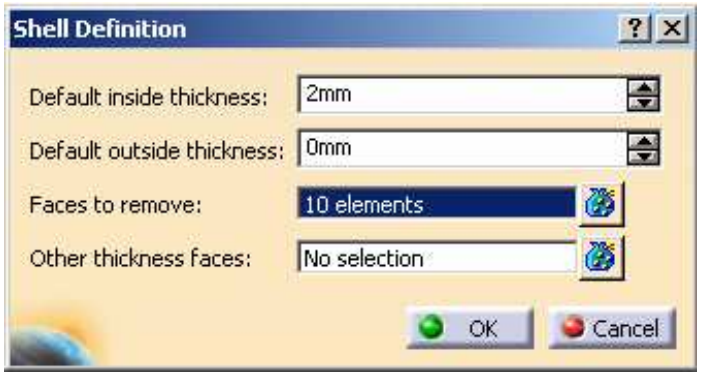


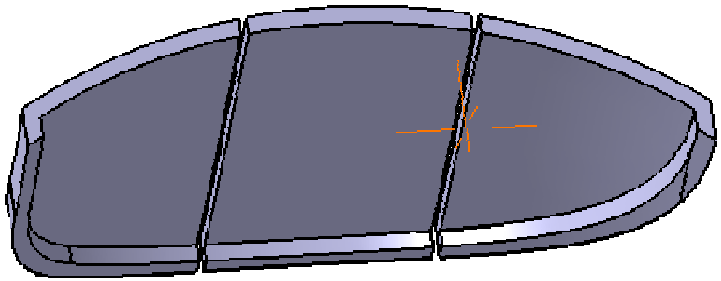
Student Notes:

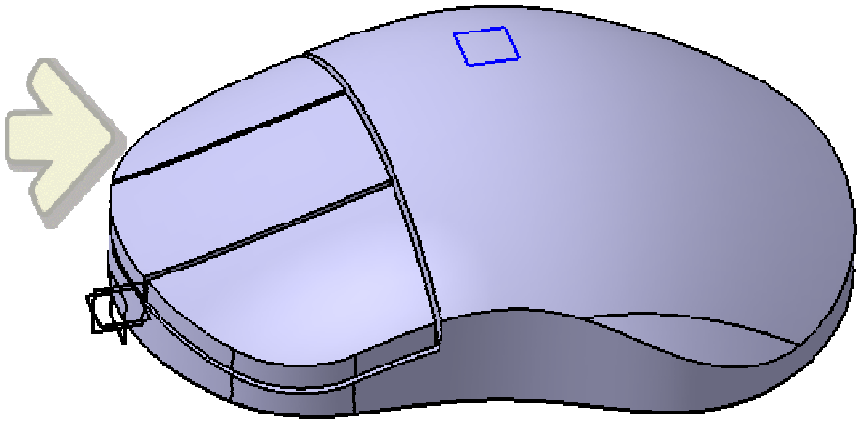
Do It Yourself (8/8)

- Hide the Main Part Body, So that you can see only the Mouse Buttons
- Shell the New Buttons by 2mm.Select 10 faces to remove









WFS_Completing_Geometry_In_Part_Design_Mouse_End.CATPart

Student Notes:

Modifying the Geometry

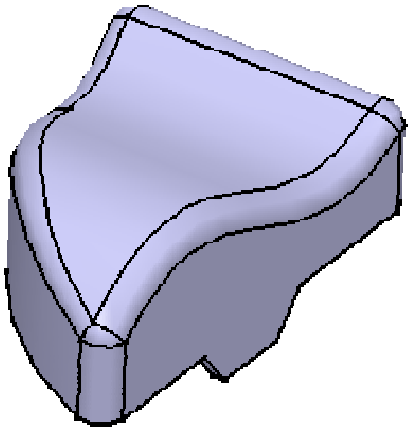
Recap Exercises

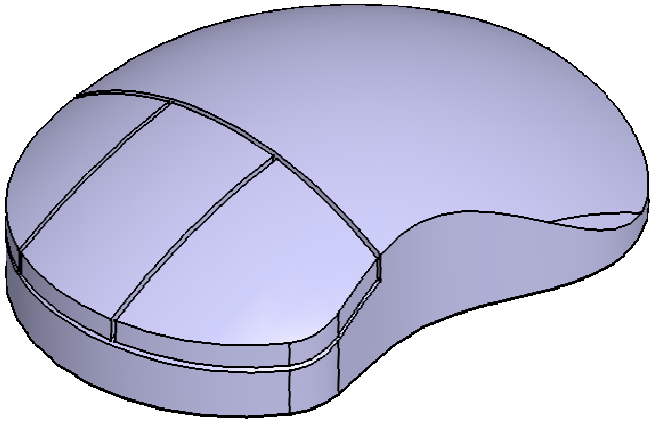
20 min

Button and Mouse Exercises

Topics covered:

- Modify spline control points
- Modify a surface profile sketch
- Modify a surface fillet radius





Mouse Exercises

EXERCISE BOOK

Student Notes:

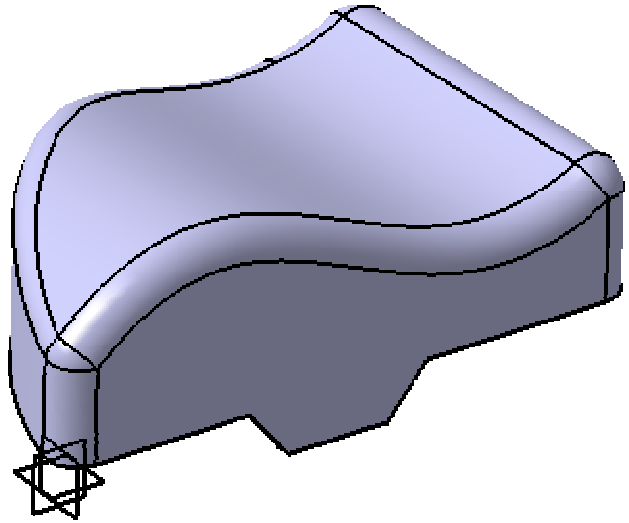
Modifying the Geometry

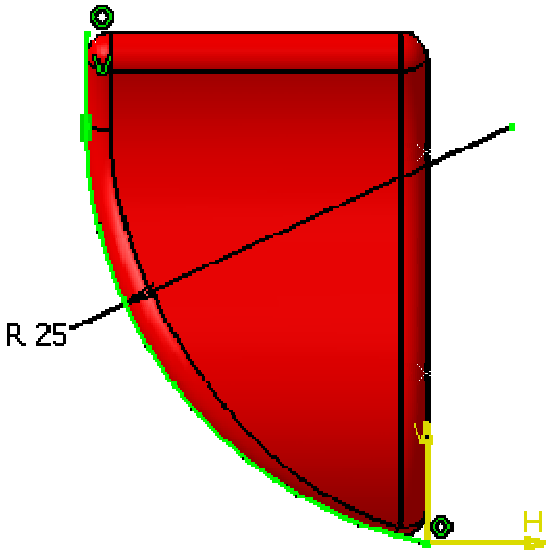
Recap Exercise: Button

10 min

In this step you will:

- Modify the Surface Shape of the Button
- Modify the Co-ordinates of the Spline
- Modify the radius of sketch used to design the side surface



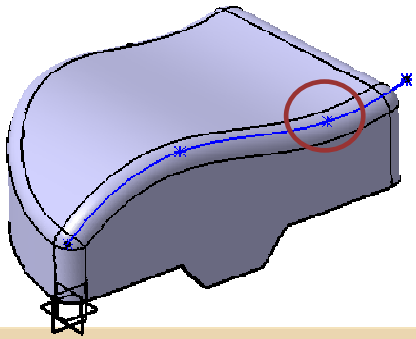


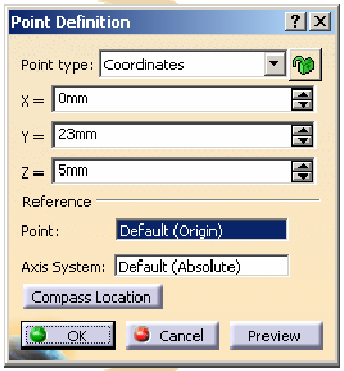
Student Notes:

Design Process: Button Recap Exercise

1

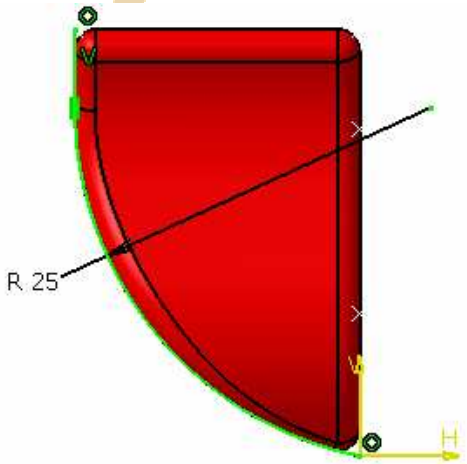
Modify the Co-ordinates of the Spline control point.

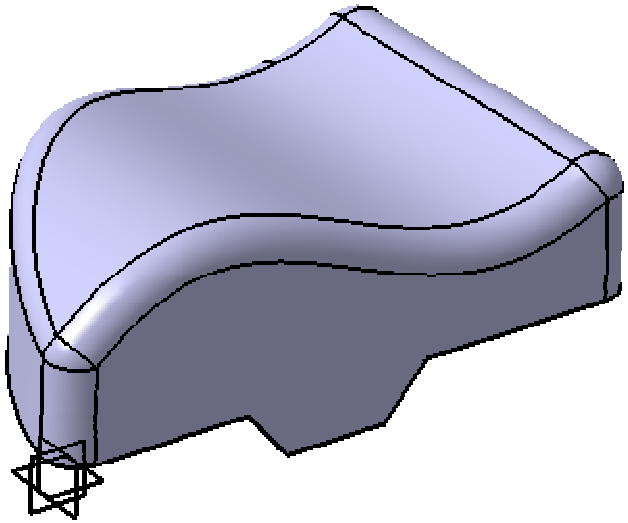




2

Modify the Radius of sketch used to design the side surface of the Button



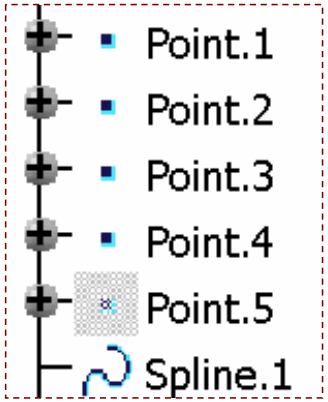


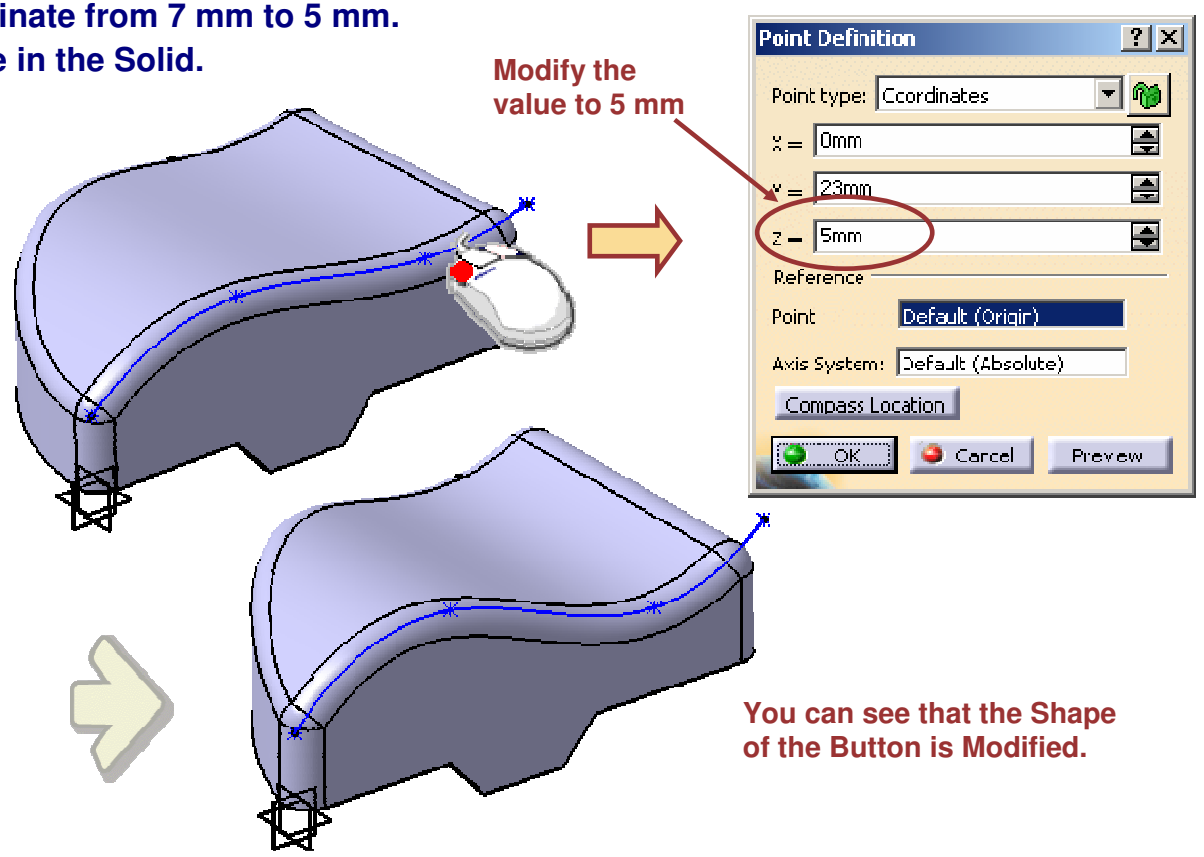
Student Notes:

Do It Yourself (1/3)

WFS_Modifying_the_Geometry_Button_Start.CATPart

- You will modify the Geometry of the Spline.1 by editing the co-ordinates of one of its Control Points.
- Show the Spline.1. Show all the wireframe points used to create the Spline.1.
- Double click on Point.3 in the tree or in the geometry area.
- Modify the Z co-ordinate from 7 mm to 5 mm.
- Observe the change in the Solid.



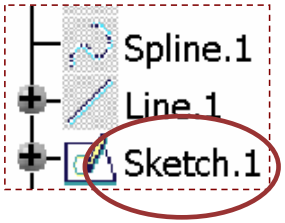


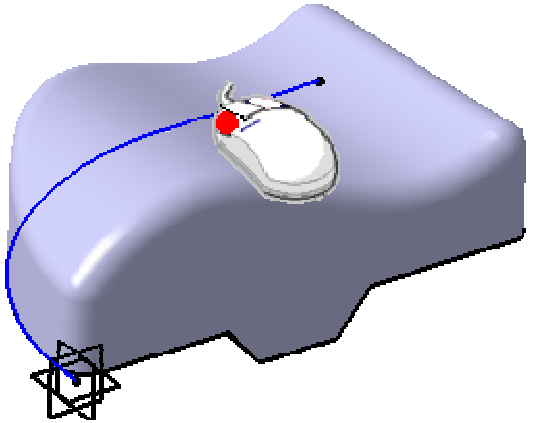
You can see that the Shape of the Button is Modified.

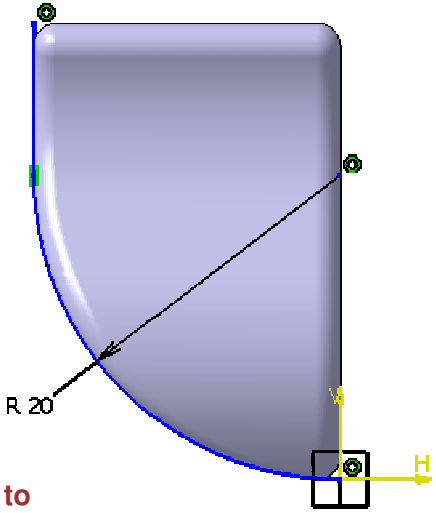
Student Notes:

Do It Yourself (2/3)

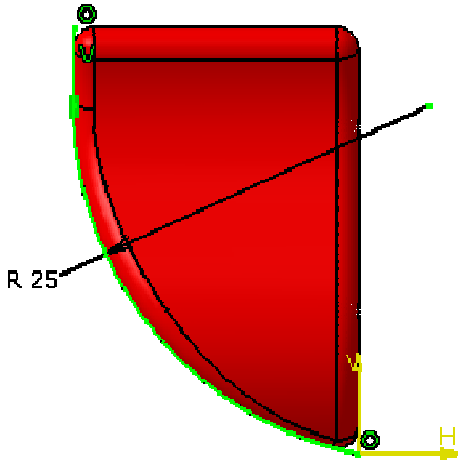
- You will modify the Geometry of the Sketch used to create Side surface of the Button i.e Sketch.1
- Hide the spline.1 and all its points. Show the Sketch.1.
- Double click on the Sketch.1 to edit it.







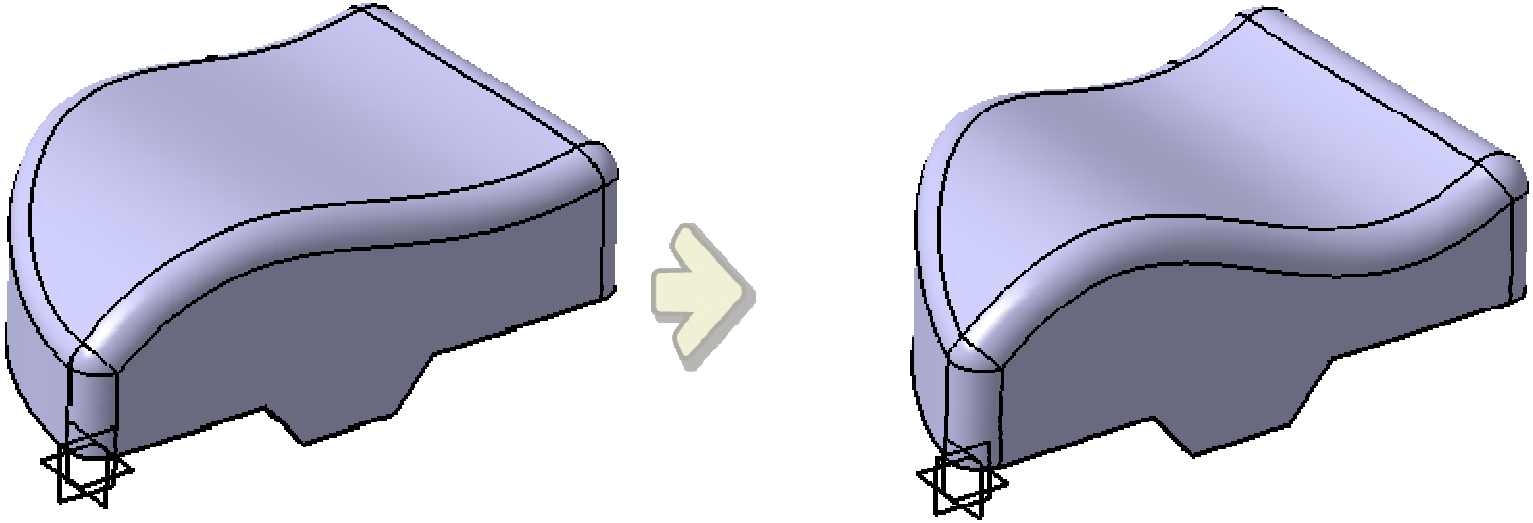
Modify this Radius value to 25 mm.



Student Notes:

Do It Yourself (3/3)

- Exit the Sketcher to see the effect of modifications.



Before Modifications

After Modifications

WFS_Modifying_the_Geometry_Button_End.CATPart

Student Notes:

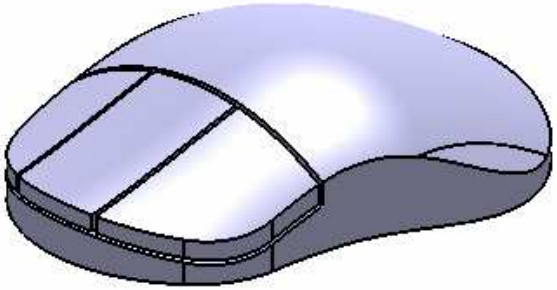
Modifying the Geometry

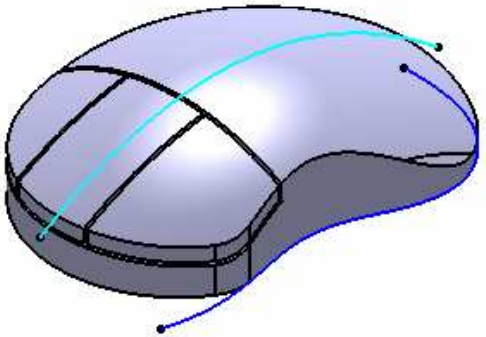
Recap Exercise: Mouse

10 min

In this step you will:

- Modify the Wireframe geometry in order to change the surface shape and create more ergonomic solid
- Modify the Co-ordinates of the Top Spline control points
- Modify the fillet radius
- Modify several control points on the side spline

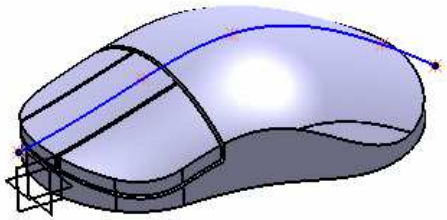




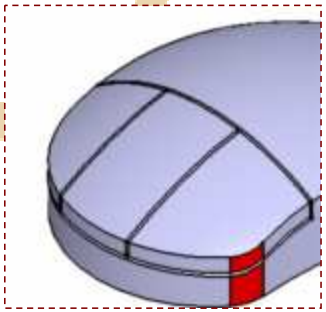
Student Notes:

Design Process: Mouse Recap Exercise

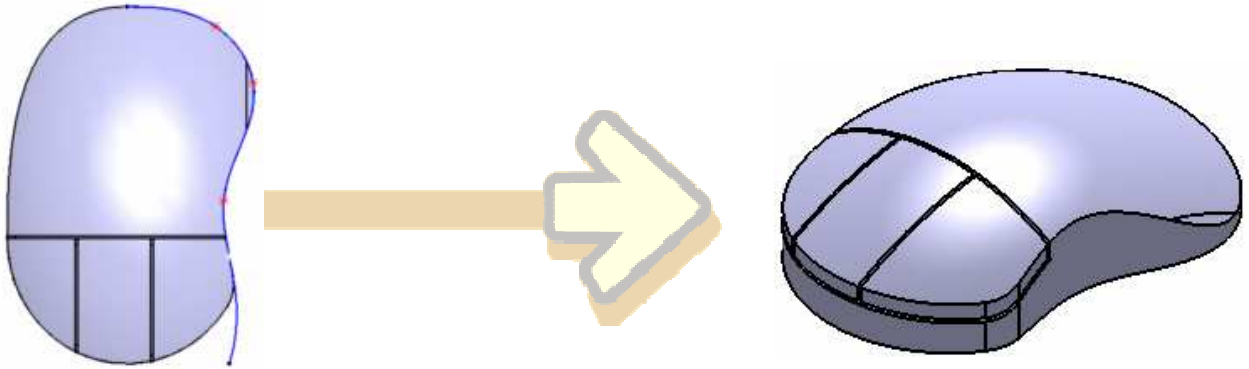
1. Modify the Co-ordinates of the Top Spline control point.



2. Modify the Radius of sketch used to design the side surface of the Button



3. Modify the co-ordinates of the side spline to make more ergonomic mouse



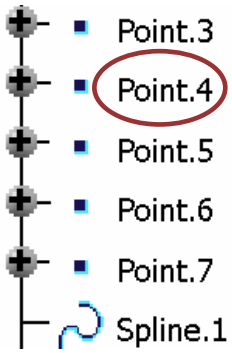
Student Notes:

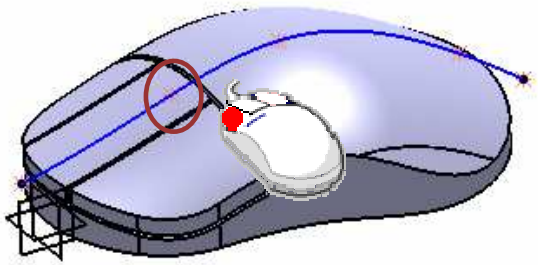
Do It Yourself (1/3)

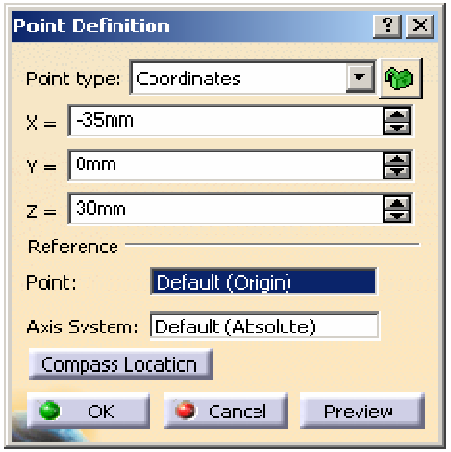
WFS_Modifying_the_Geometry_Mouse_Start.CATPart

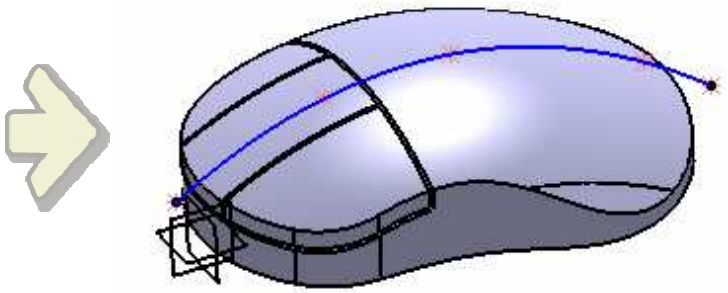
You will modify the Geometry of the Spline.1 by editing the co-ordinates of one of its Control Points.

- Show the Spline.1. Show all the wireframe points used to create the Spline.1.
- Double click on Point.4 in the tree or in the geometry area.
- Modify the X co-ordinate from -38.1 mm to -35 mm.
- Modify the Z co-ordinate from 25.4 to 30 mm
- Observe the change in the Solid.









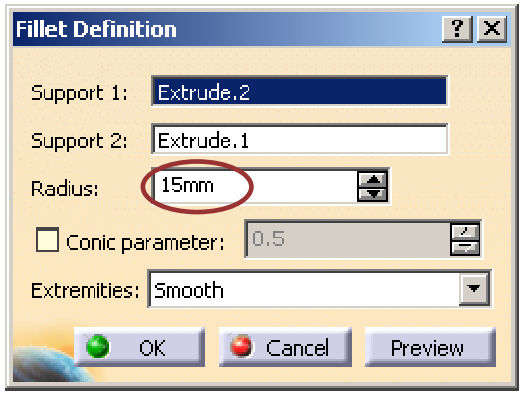
You can see that the Shape of the Mouse is Modified.

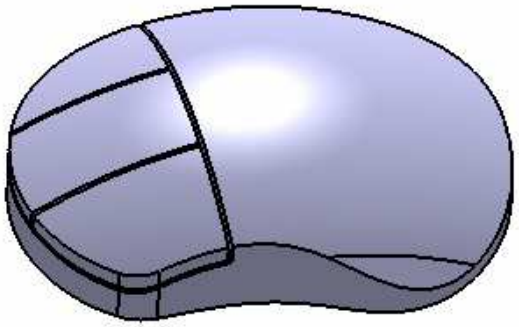
Student Notes:

Do It Yourself (2/3)

Change the surface fillet radius parameter to 15mm.

- **Expand the Operations body in the tree.**
- **Double-click the fillet branch (Fillet.1) to modify its definition.**
- **Change the radius value to 15mm.**



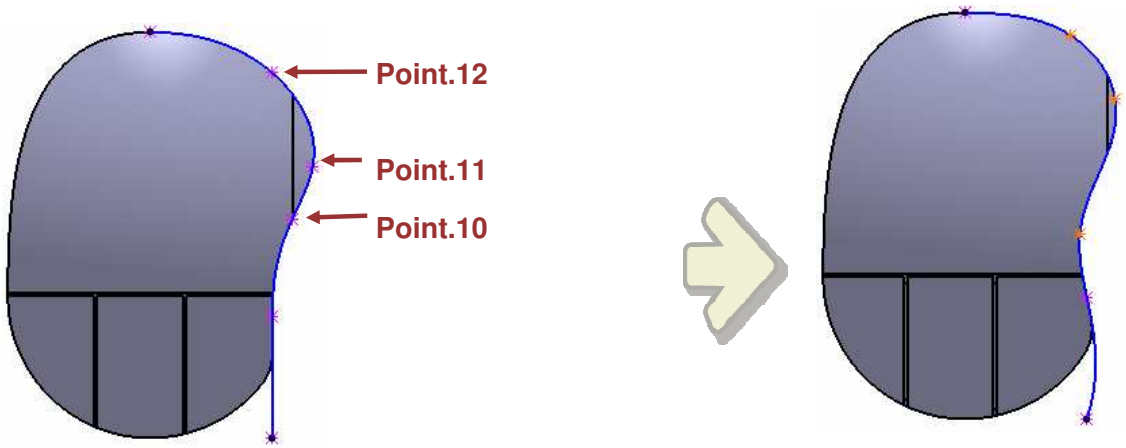


Student Notes:

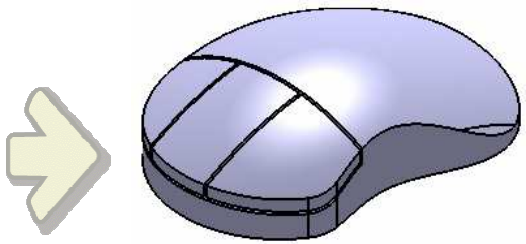
Do It Yourself (3/3)

Modify several points in the spline for the side surface.

- Change to the Top View orientation.
- Modify the following three points to new coordinate values:
  - Point10 (-58mm, 36mm, 0)
  - Point11 (-100mm, 47mm, 0)
  - Point12 (-120mm, 33mm, 0)
- Notice how the contour of the solid part changes after each modification.



Return to the Isometric View orientation to see the more ergonomic mouse



WFS_Modifying_the_Geometry_Mouse_End.CATPart

Student Notes:

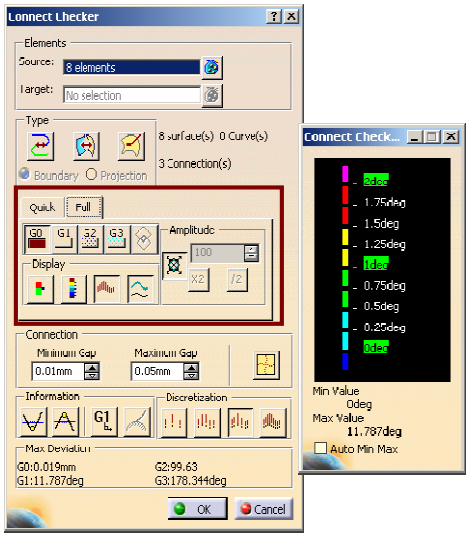
Using Tools

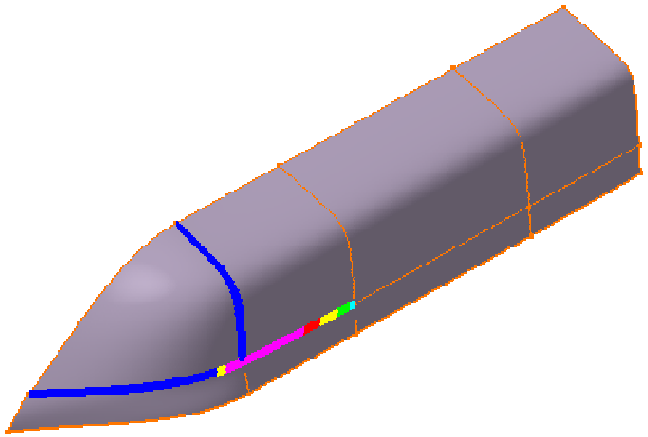
Recap Exercise: Surface Check Exercise

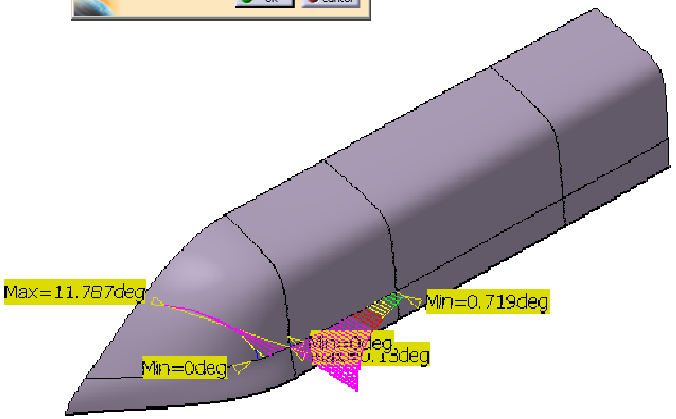
10 min

In this exercise you will:

- Analyze a set of surfaces for deviation gaps, non tangency, and curvature value.
- Perform a quick analysis for summary of results
- Perform a detailed analysis and also change the color scale
- Display the results with 'Comb' and 'Information' displays.





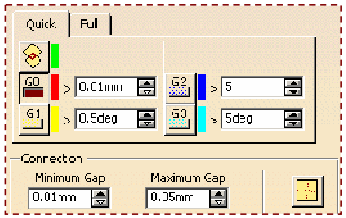


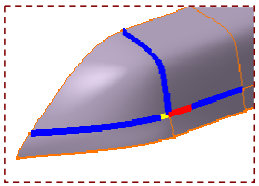
Student Notes:

Design Process: Surface Check Exercise

1

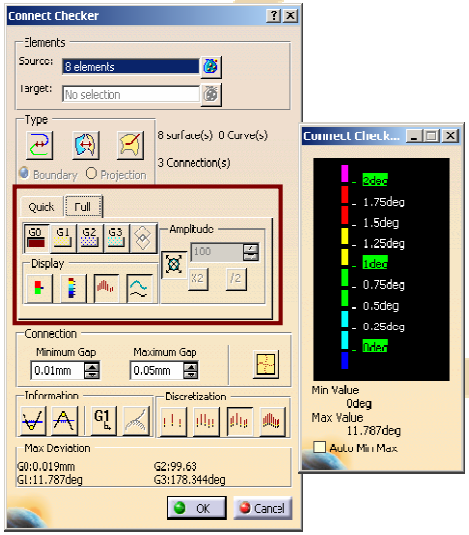
Perform a Quick analysis checking for distance, tangency and overlap

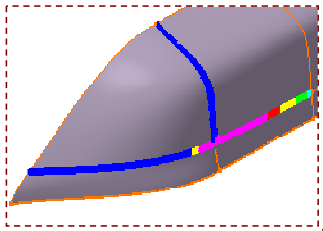




2

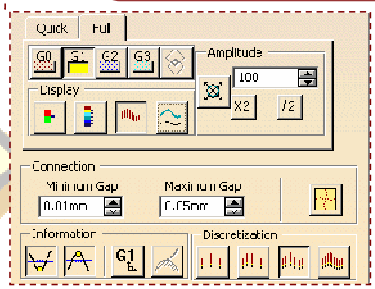
Perform a Full analysis and modify the color scale display

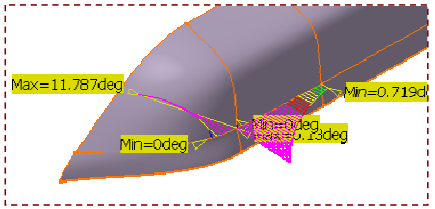




3

Preview other results display methods – comb, information



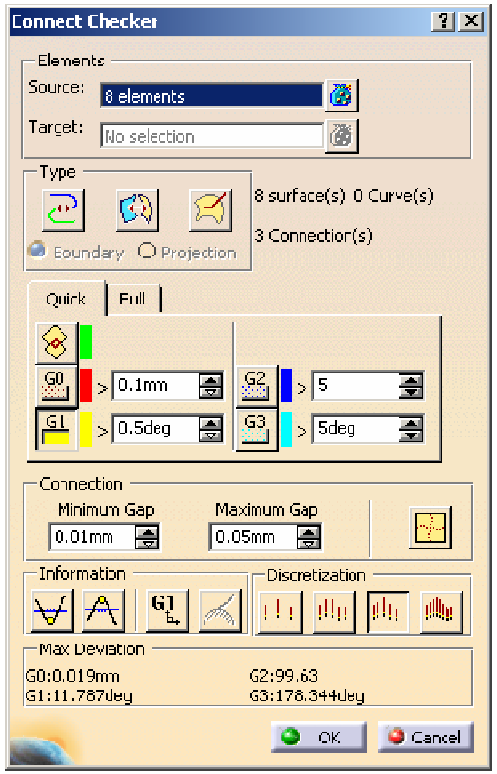


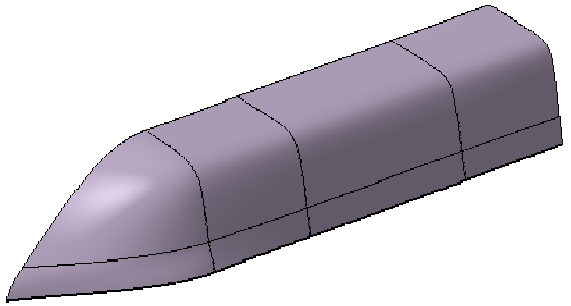
Student Notes:

Do It Yourself (1/6)

Part used: Using_Tools_Surf_Check.CATPart

- You will perform a Quick analysis checking for distance, tangency and overlap.
  - Click the Connect Checker icon
  - Choose all the visible geometry using a trap window.





Student Notes:

Do It Yourself (2/6)

This window gives a summary of all four types of connection analysis.
The number of surfaces selected and number of connections are shown.
The maximum deviation for distance, tangency, curvature, and curvature tangency, are also displayed.

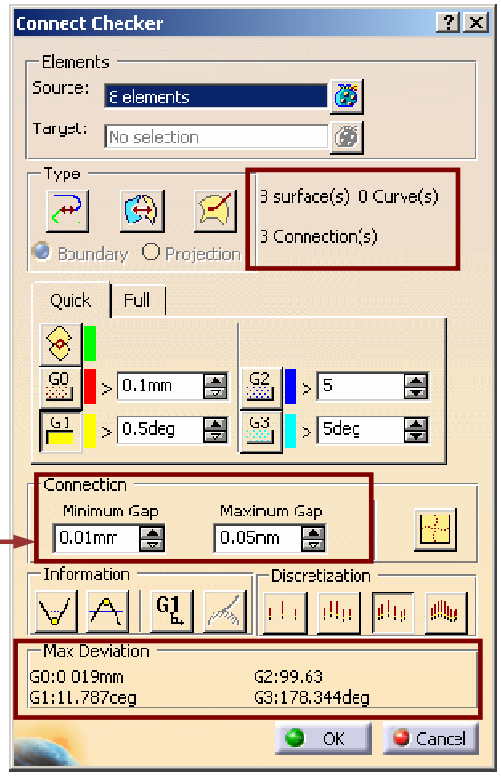
Distance Analysis

Tangency Analysis

Curvature Analysis

Curvature Tangency Analysis

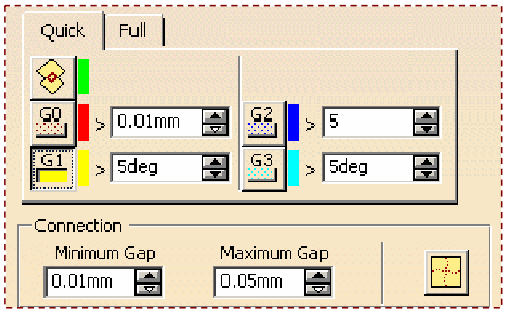
Analysis will performed in the range of values mentioned in Minimum Gap and Maximum Gap.



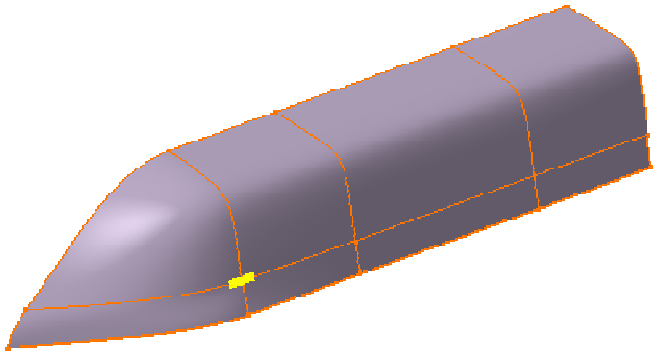
Student Notes:

Do It Yourself (3/6)

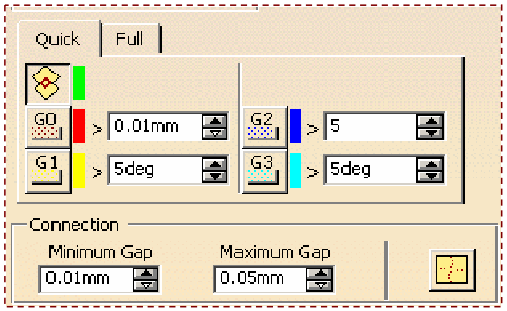
- Now check Tangency at connections.
  - Select the 'Tangency' option.
  - Increase the tangency angle value to 5 deg.



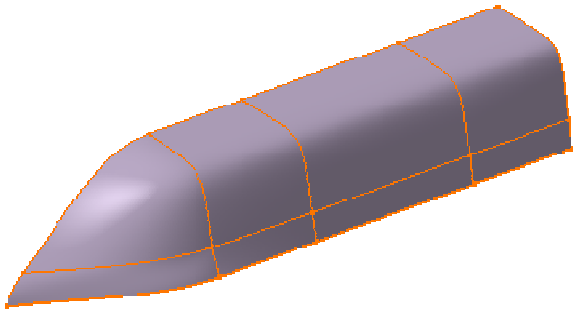
Notice the area in yellow having an angle > 5deg is shown. The maximum Value of angle in this zone is 11.787deg.



- Click the Overlapping button to check for overlap of surfaces at their boundaries.
  (No overlap is found between surfaces.)



This means that the surfaces do not overlap and intersect each other

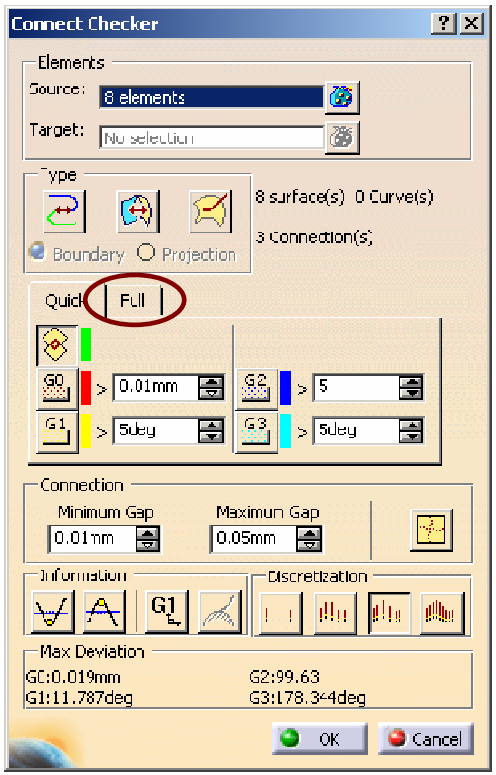


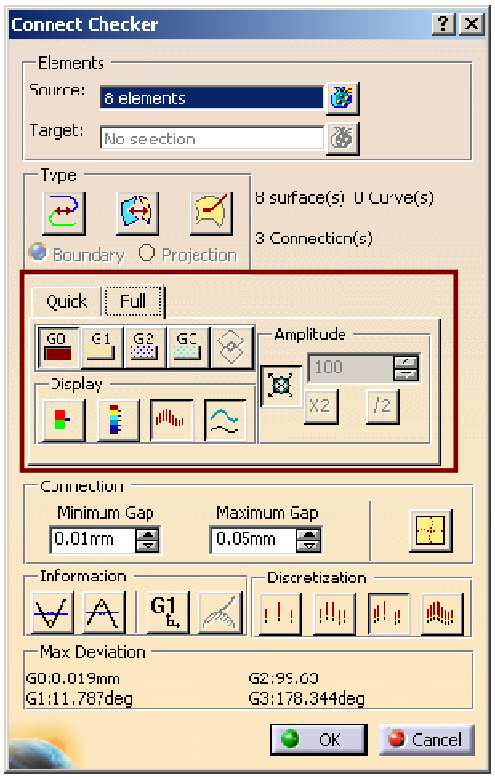
Student Notes:

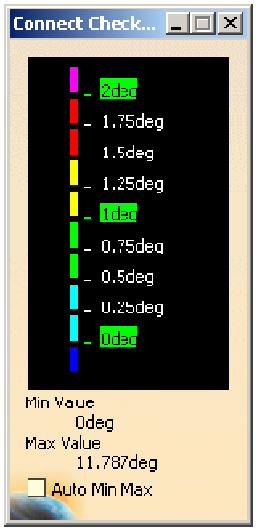
Do It Yourself (4/6)

- Perform a Full analysis and modify the color scale display.
  - Select the Full button
  - The full Connect Checker window is displayed. You can display the color scale window by clicking the color scale icon .

  The values set during our Quick analysis are maintained.



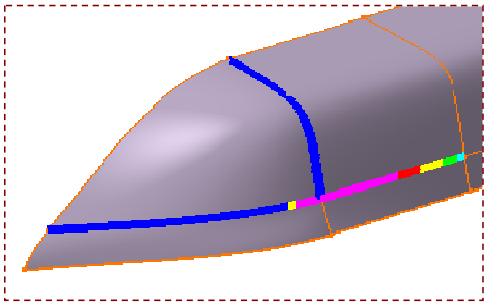




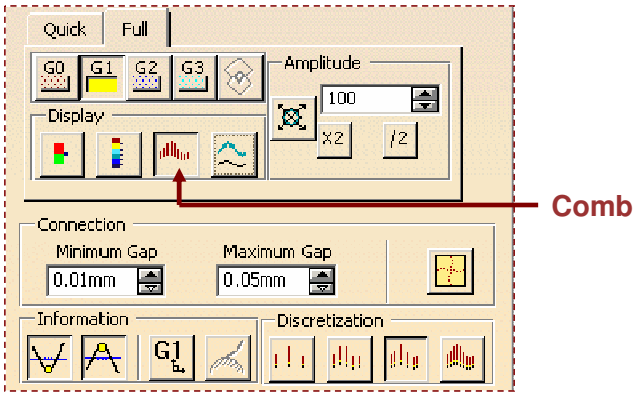
Student Notes:

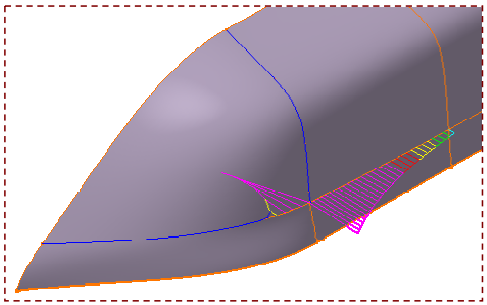
Do It Yourself (5/6)

- Tangency deviations are displayed with different colors using the scale values in the color scale window. Currently 2 deg is maximum value.
- All connection areas with tangency deviation greater than 2 degrees are shown in purple.



- You will see the analysis results in various display mode by using different options like ‘Comb’ and ‘Information’.
  - Click the Comb box in the Connect Checker window
  - Also, click the Automatic dial to activate automatic scaling of results

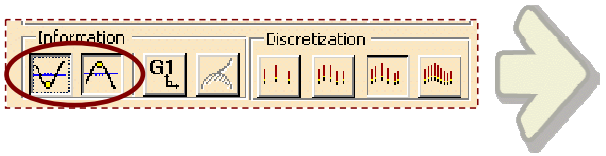


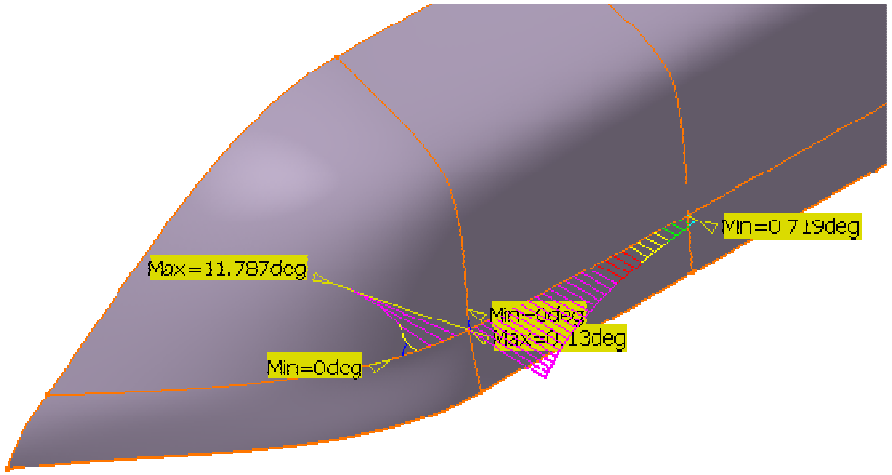


Student Notes:

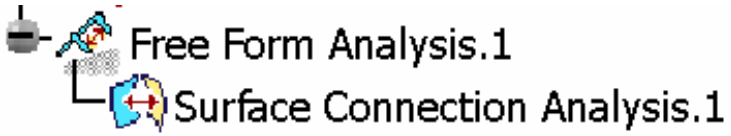
Do It Yourself (6/6)

- Click the Information box to identify the location of maximum and minimum deviations





- Click OK to save the Connection Analysis in the tree for later use.



Part used: Using_Tools_Surf_Check_End.CATPart

Student Notes:

Master Exercise: Mobile Phone

In this exercise you will create 'Mobile Phone' model using the tools of Wireframe and Surface Design workbench.

- Mobile Phone: Presentation
- Mobile Phone (1): Creating Wireframe Geometry
- Mobile Phone (2): Creating Basic Surfaces
- Mobile Phone (3): Trimming and Joining the Body Surfaces
- Mobile Phone (4): Creating the Part Body
- Mobile Phone (5): Modifying the Geometry

EXERCISE BOOK

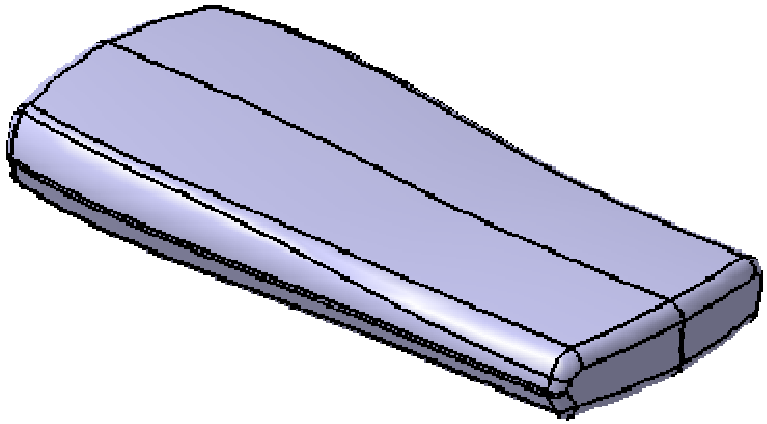
Student Notes:

Mobile Phone

Master Exercise Presentation

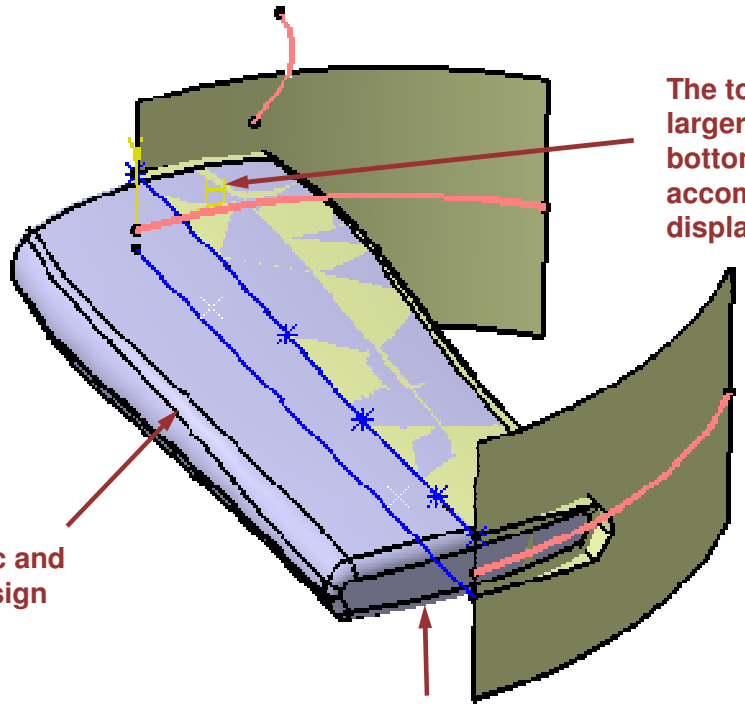
65 min

- In this exercise you will build Mobile Phone body using Wireframe, Generative Shape Design, and Part Design Workbenches.
- Here you will first create all the necessary wireframe elements.
- After that you will create surfaces from these wireframe elements
- Then you will perform operations on these Surfaces to get a single homogenous surface.
- Using this surface you will create a part from it.
- You will finally optimize your design by modifying some of its specifications.



Student Notes:

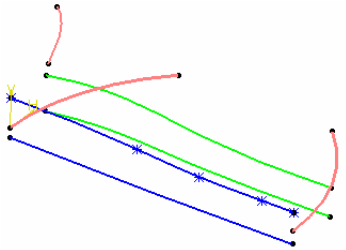
Design Intent: Mobile Phone



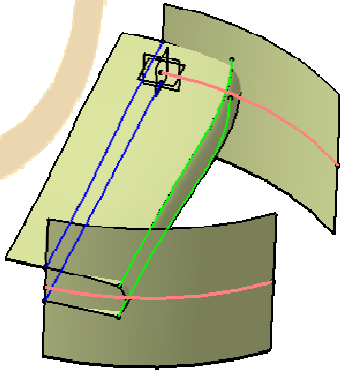
Student Notes:

Design process: Mobile Phone

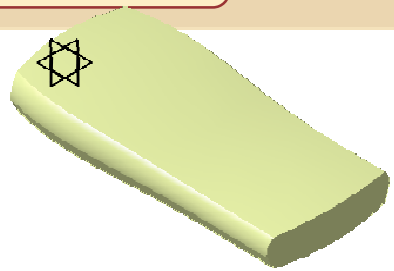
1. Create the Wireframe Geometry



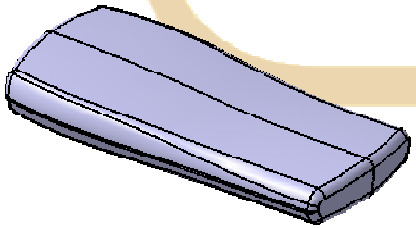
2. Create the Basic Surfaces



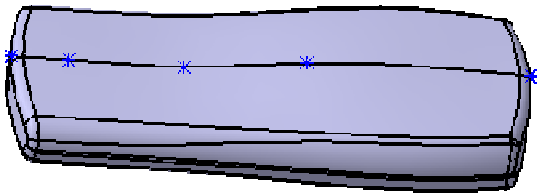
3. Trim and Join the Surfaces



4. Create the Part Geometry



5. Modify the Geometry



Student Notes:

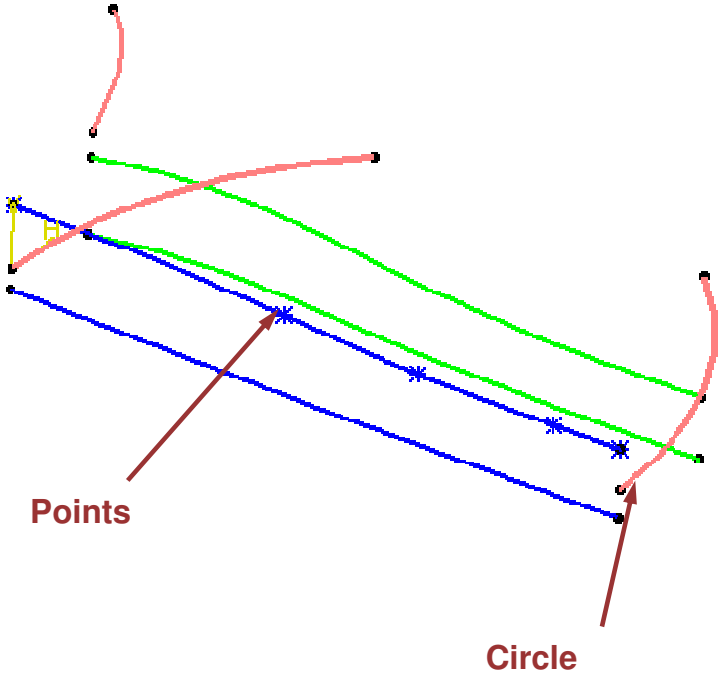
Mobile Phone

Step 1: Create the Wireframe Geometry

15 min

In this step you will create the basic wireframe elements.

- **Create Points**
- **Create Splines**
- **Create Projections**
- **Create 3D Circles**

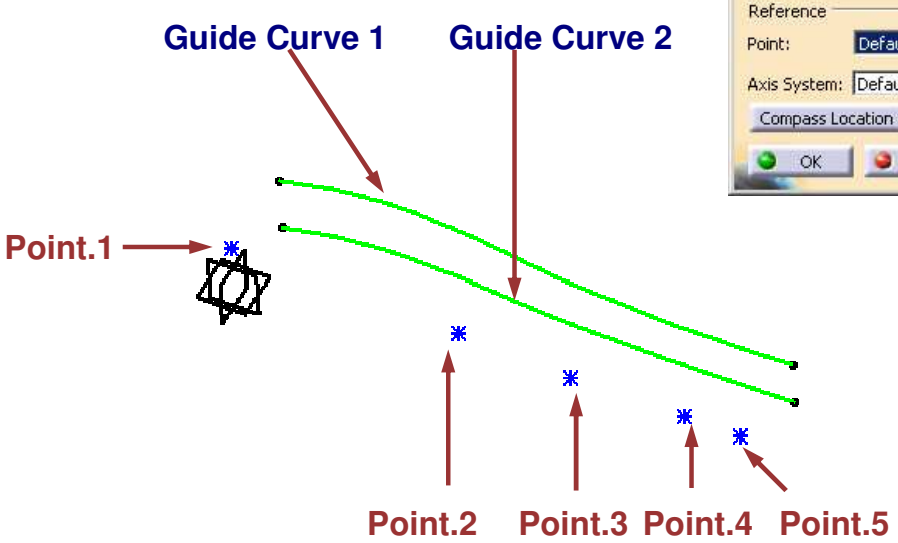


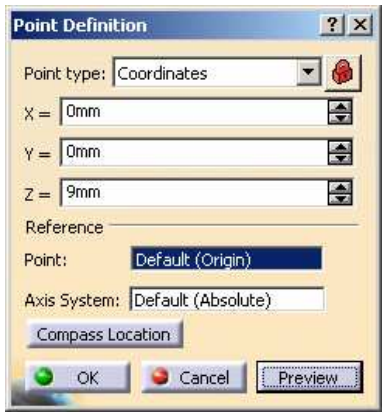
Student Notes:

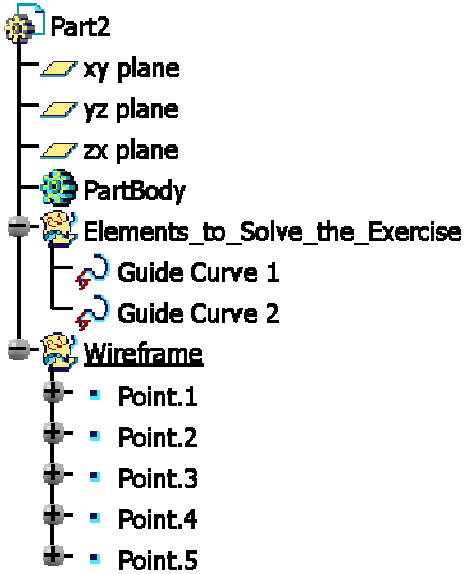
Do It Yourself (1/4)

Load the part “Mobile_Phone_Step_1_Start.CATPart”

- You have been provided two Guide curves to help you to build the exercise
- Insert a Geometrical Set “Wireframe”
- Create five wireframe points in it with following specifications:
  - Point.1 (0,0,9)
  - Point.2 (40,0,7.5)
  - Point.3 (60,0,6)
  - Point.4 (80,0,5.8)
  - Point.5 (90,0,5.8)



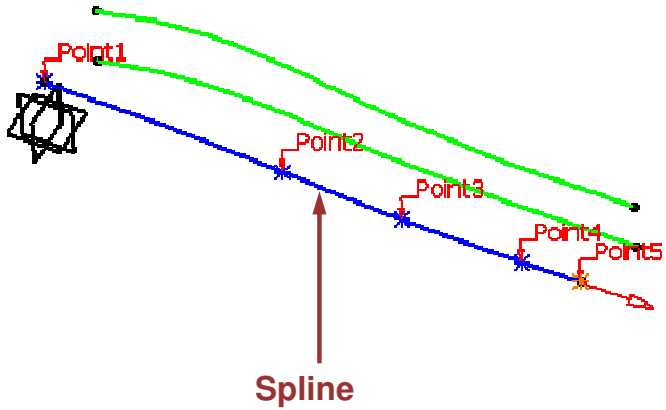


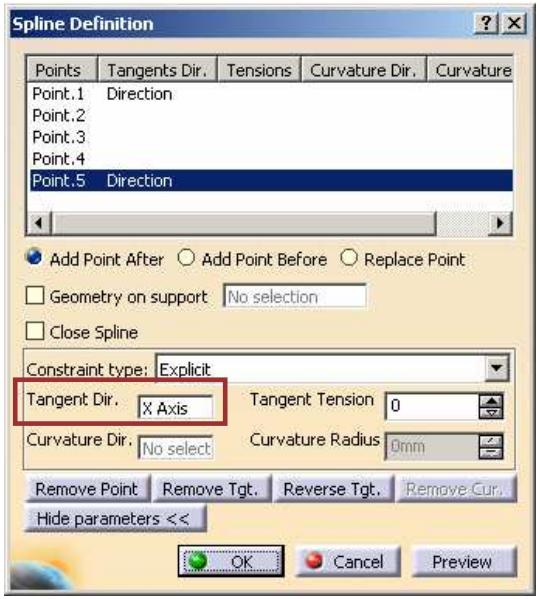


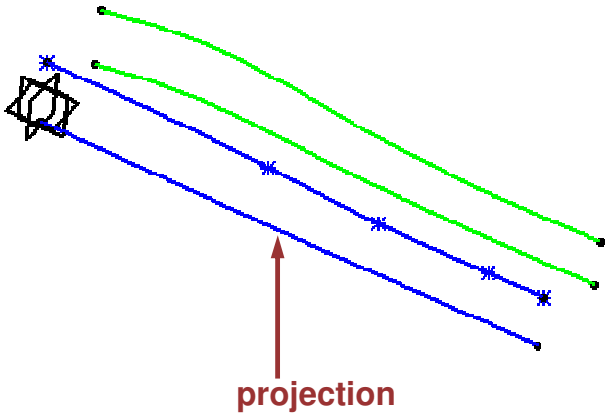
Student Notes:

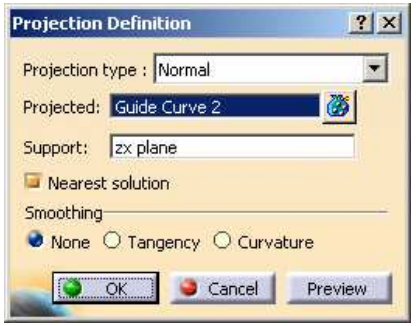
Do It Yourself (2/4)

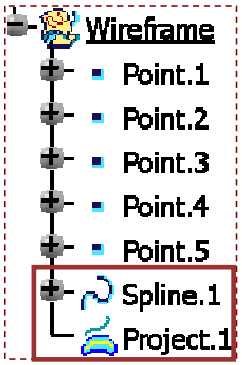
- Create a spline passing through these five points
- Select tangent directions for point.1 and point.5 as X axis
- Project Guide Curve 2 on ZX plane







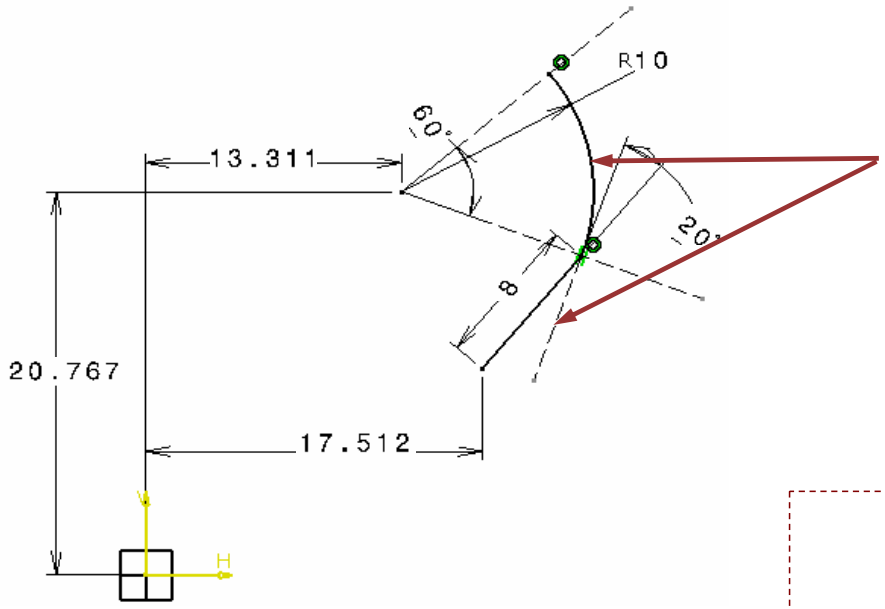




Student Notes:

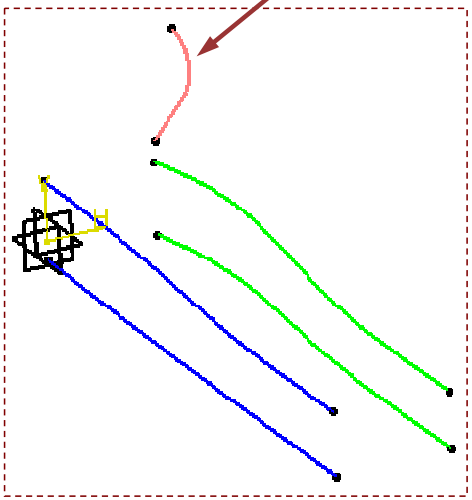
Do It Yourself (3/4)

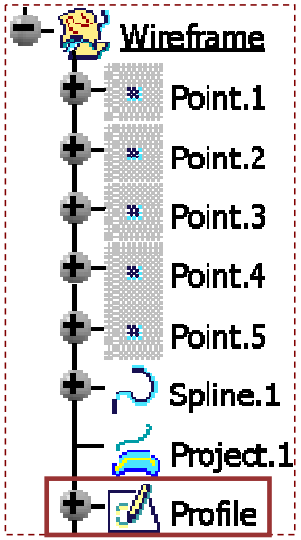
- Create a sketch “profile” in YZ plane as shown



This dotted line is tangent to the arc

profile

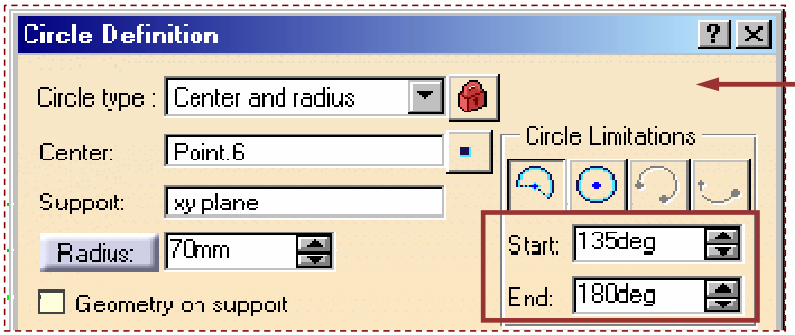




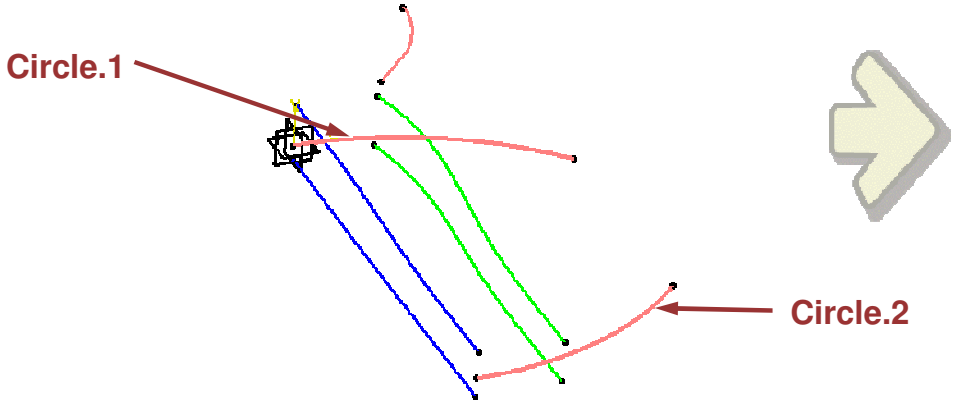
Student Notes:

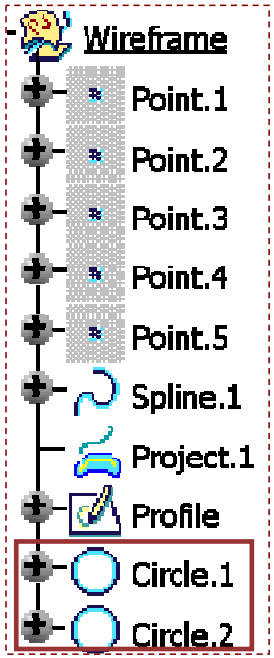
Do It Yourself (4/4)

- Create a 3D circle using 'Center and Radius' option. Create the circle center using contextual menu (70,0,0).
- Create another 3D circle using 'Center and Radius' option. Create the circle center using contextual menu (20,0,0).
  - Start Angle = 0 deg and End Angle = 45 deg. Rest other specifications are same as the first circle.



Parameters for Circle.1





Load the part "Mobile_Phone_Step_1_End.CATPart"

Student Notes:

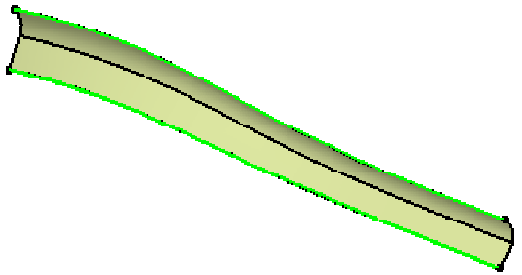
Mobile Phone

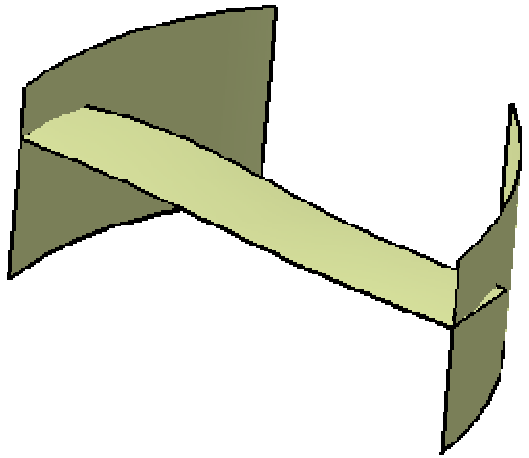
Step 2: Create the Basic Surfaces

20 min

In this step you will create the basic Surfaces from the wireframe elements created previously to build the part.

- **Create Sweep Surfaces**
- **Create Blend Surfaces**
- **Create Extrude Surfaces**



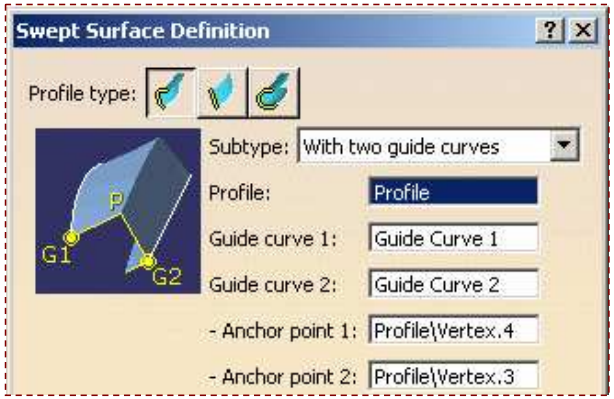


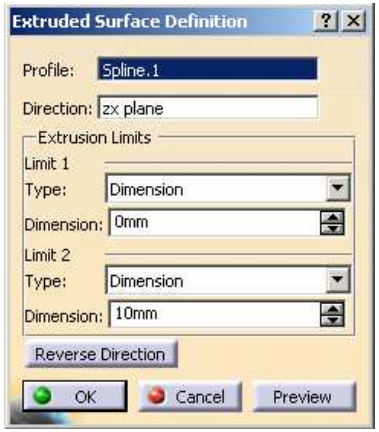
Student Notes:

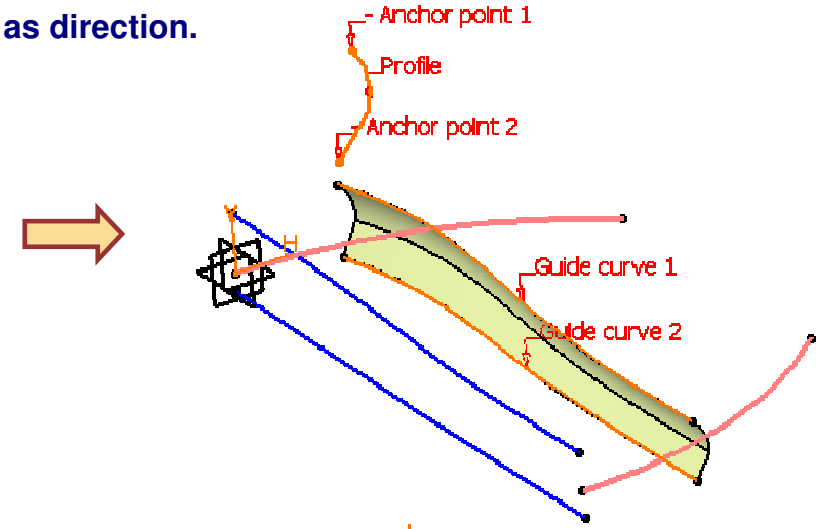
Do It Yourself (1/3)

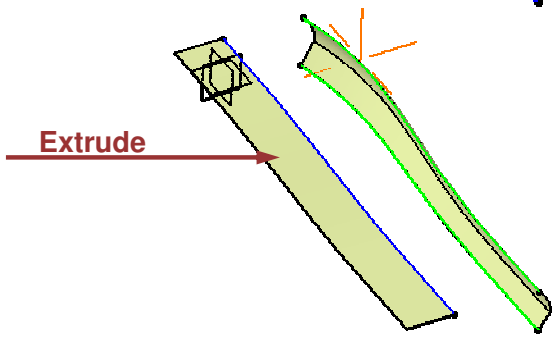
Load the part “Mobile_Phone_Step_2_Start.CATPart”

- Create a geometrical set “Surfaces”
- Create a explicit Sweep using two guide curves in this geometrical set. Sweep the “Profile” along “Guide Curve 1” and “Guide Curve 2”.Use “Profile” extremities as anchor points. Rename this as “Side”
- Extrude the Spline.1 by 10 mm. Use ZX plane as direction.





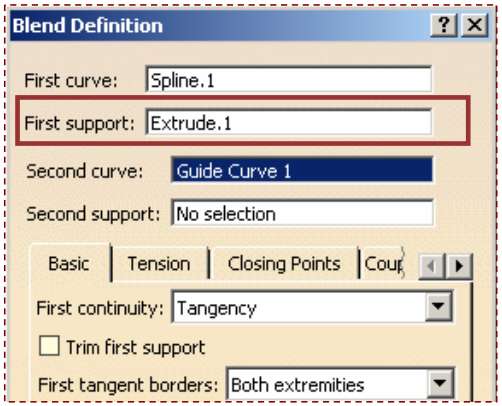




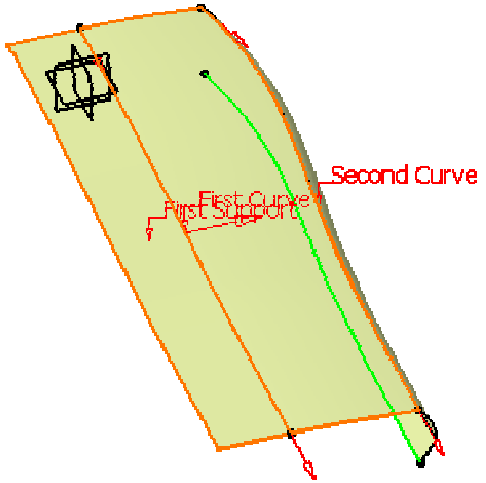
Student Notes:

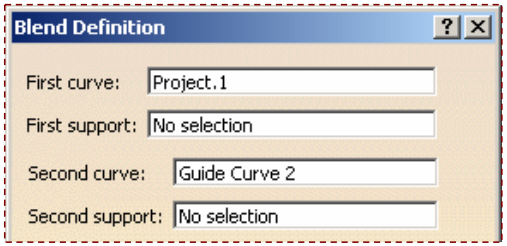
Do It Yourself (2/3)

- Create a blend surface between spline and Guide Curve.1. Rename it to “Top”
- Create another blend surface between projected Curve and Guide curve.2. Rename it to “Bottom”

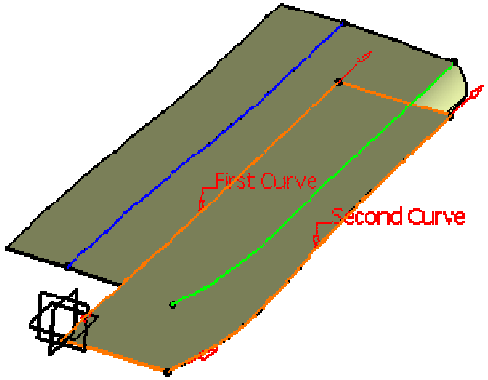


Top Blend surface





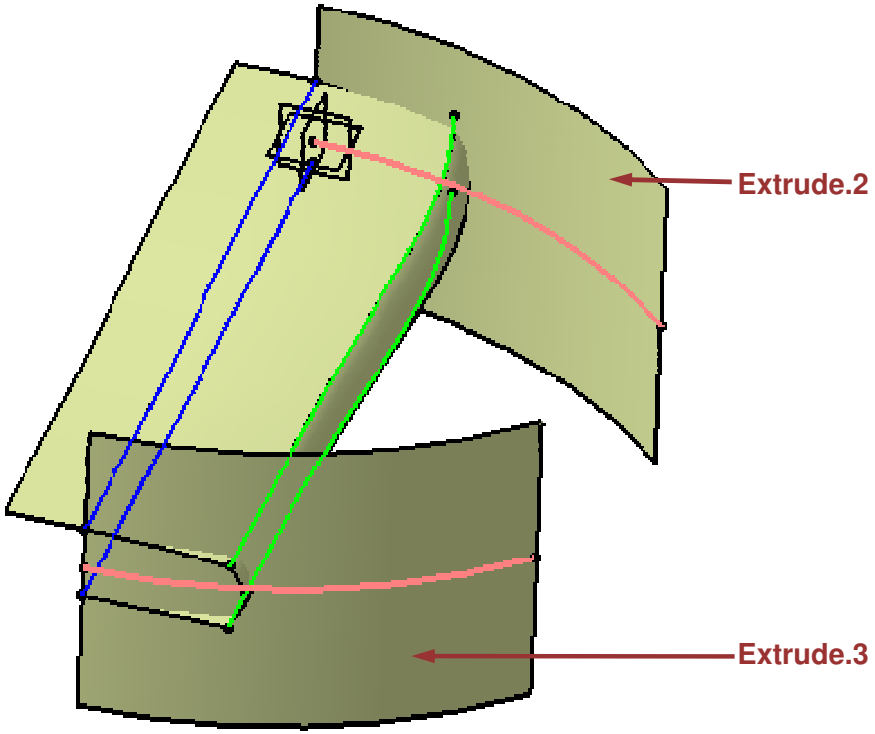
Bottom Blend surface

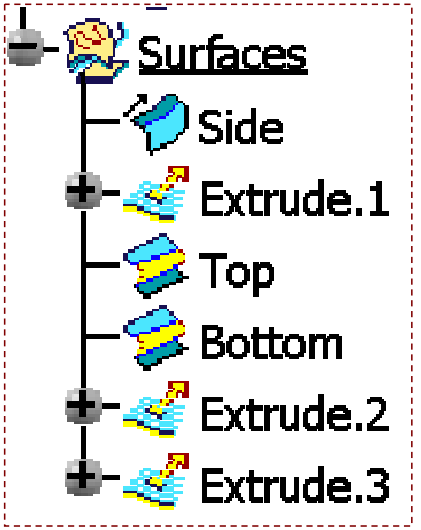


Student Notes:

Do It Yourself (3/3)

- Extrude Circle.1 and Circle.2 with following specifications:
  - Limit 1 =20 mm
  - Limit 2= 20 mm
  - Direction = XY Plane





Load the part “Mobile_Phone_Step_2_End.CATPart”

Student Notes:

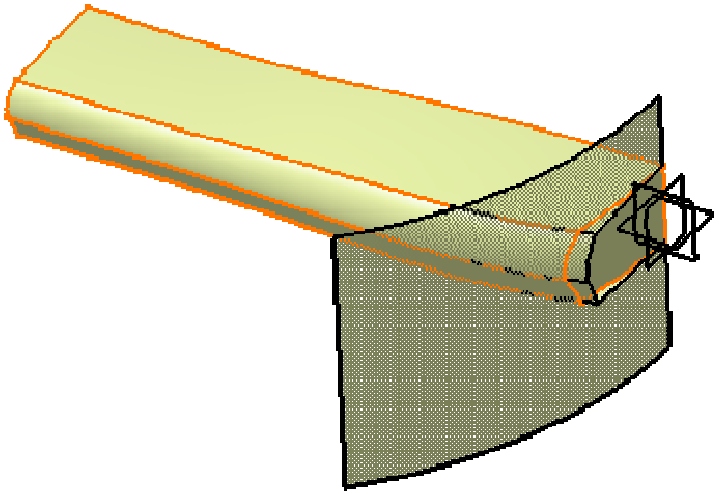
Mobile Phone

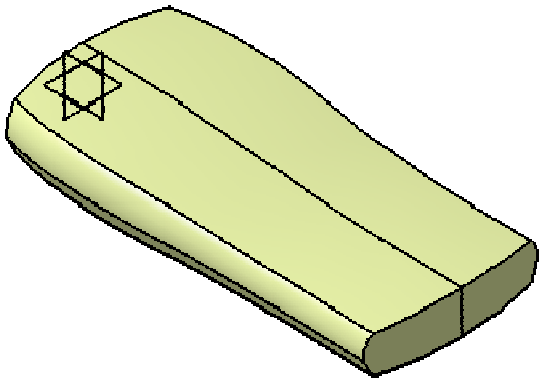
Step 3: Trimming and Joining the Body Surfaces

15min

In this step, you will perform operations on the surfaces that you have created to get a single uniform surface.

- **Create Joins**
- **Trim Surfaces**
- **Cerate symmetrical surfaces**

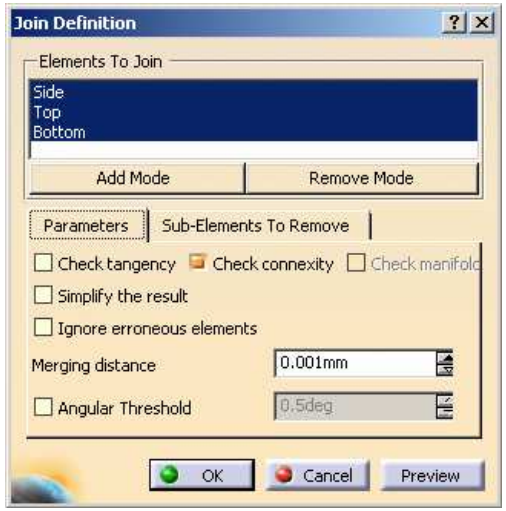


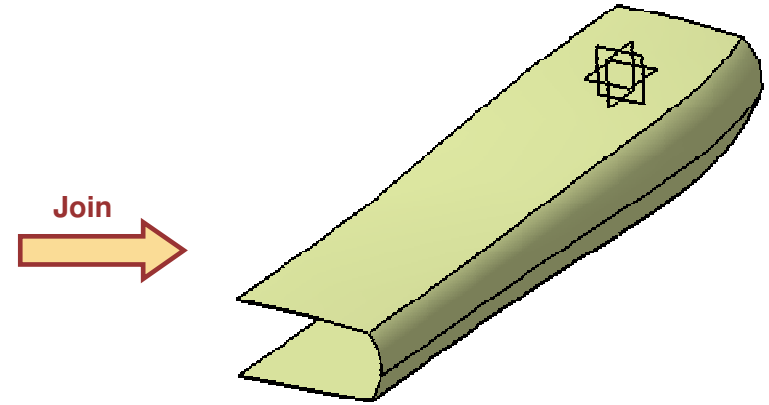


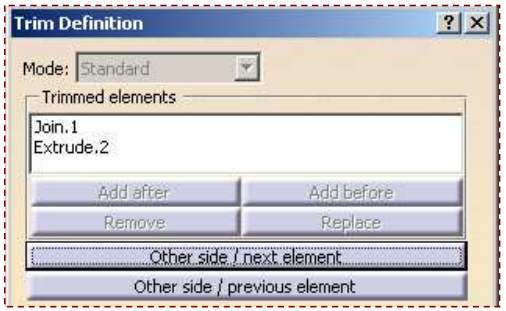
Student Notes:

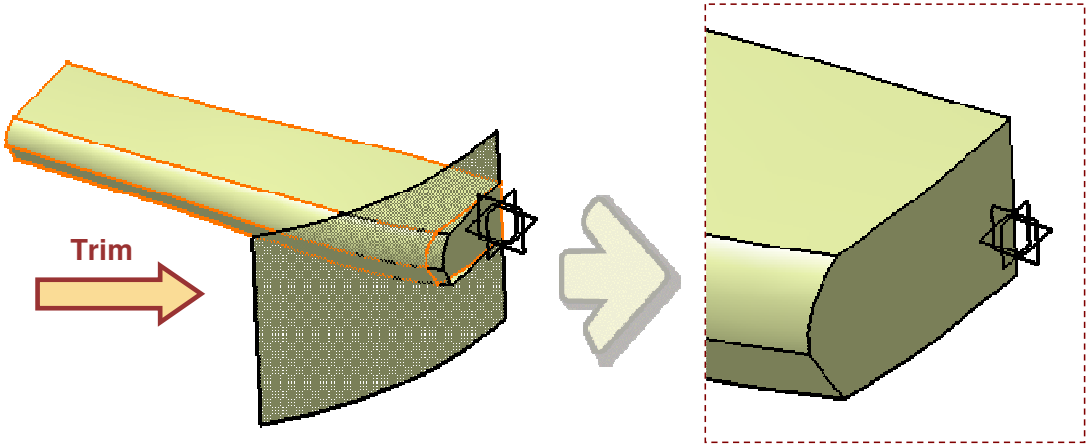
Do It Yourself (1/3)

- Load the part “Mobile_Phone_Step_3_Start.CATPart”
- Insert Geometrical set “Operations”
- In this set create a Join between “Side”, “Top” and “Bottom” surfaces
- Trim this Join and Extrude.2 (Extrusion from circle.1)





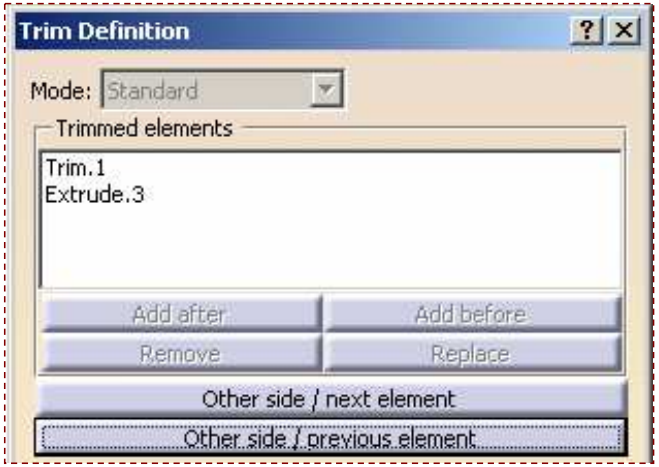


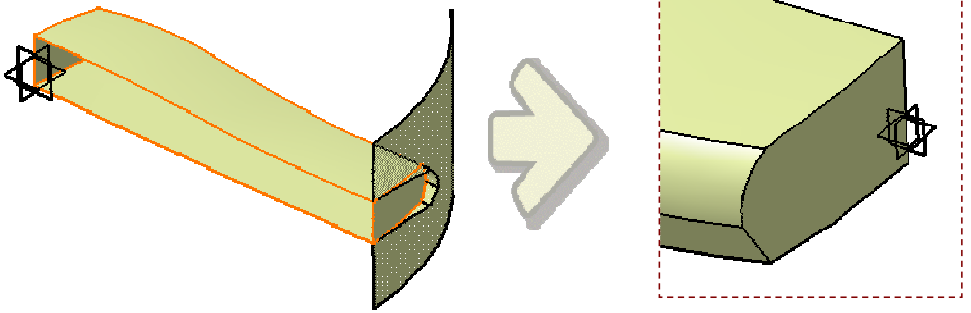


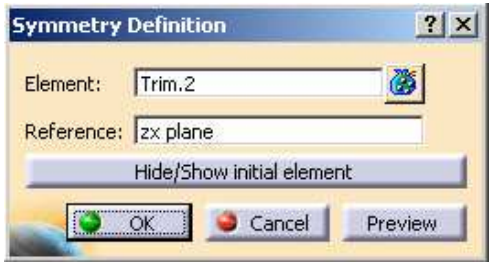
Student Notes:

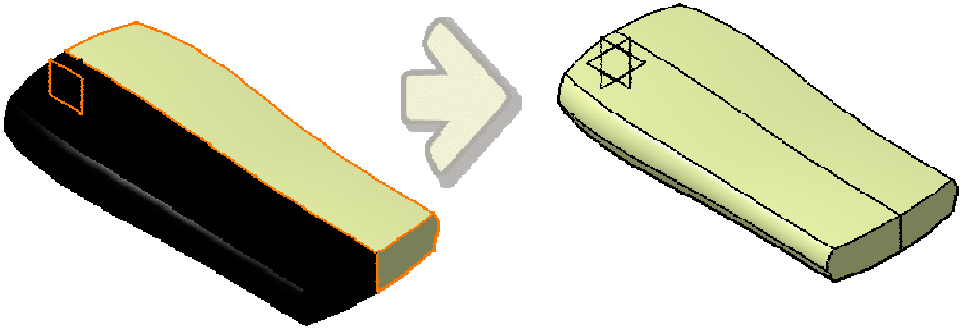
Do It Yourself (2/3)

- You will Trim the previously trimmed surface with Extrude created from second circle.
- Create symmetrical surfaces from Trim result using ZX plane.





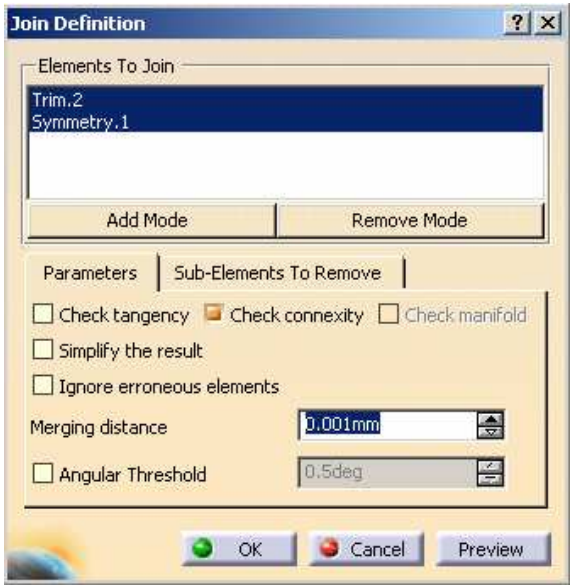


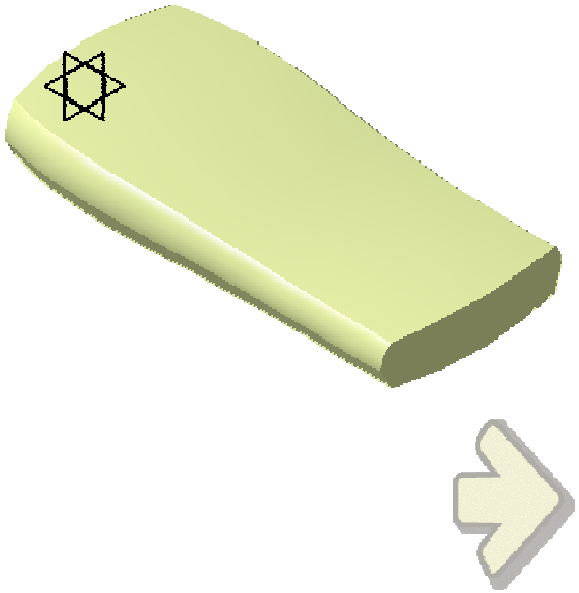


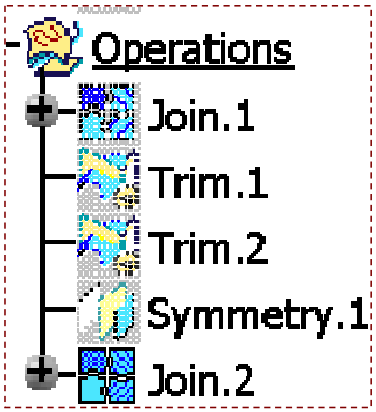
Student Notes:

Do It Yourself (3/3)

- Join this Symmetry with Previous Trim.







Load the part “Mobile_Phone_Step_3_End.CATPart”

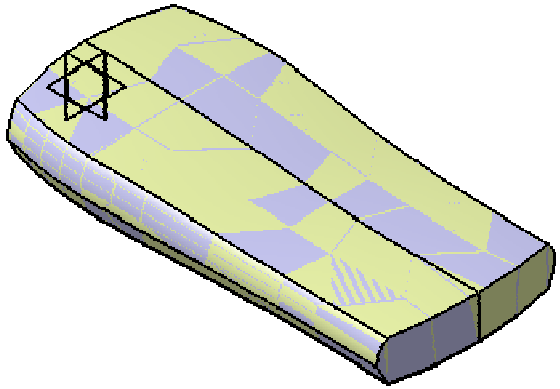
EXERCISE BOOK

Student Notes:

Mobile Phone

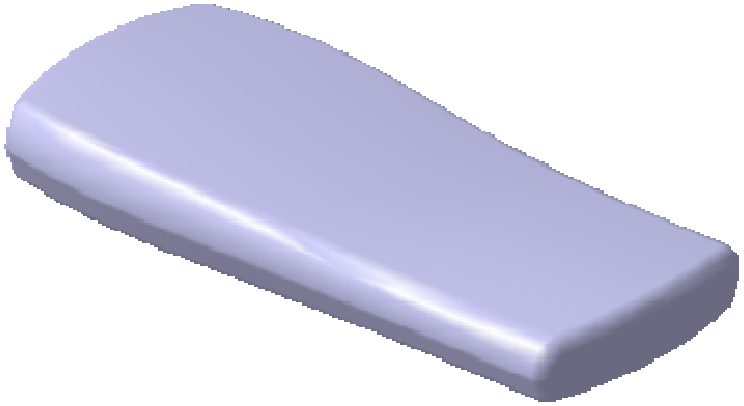
Step 4: Creating the Part Body

10 min



In this step, you will create the Part from the surfaces you have created, by accessing the Part Design Workbench

- **Create a Closed part from a surface**
- **Apply Fillets**

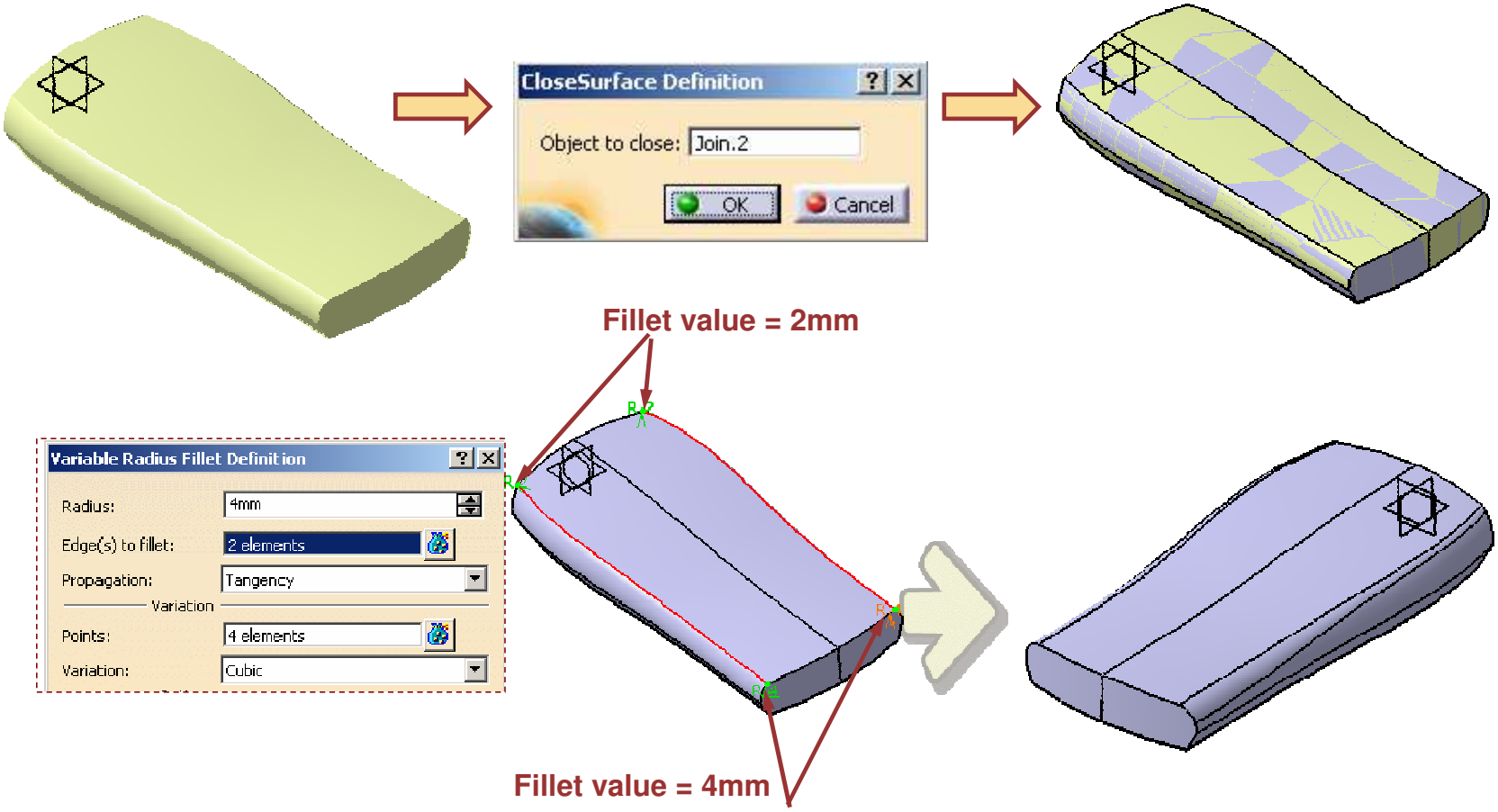


Student Notes:

Do It Yourself (1/3)

Load the part “Mobile_Phone_Step_4_Start.CATPart”

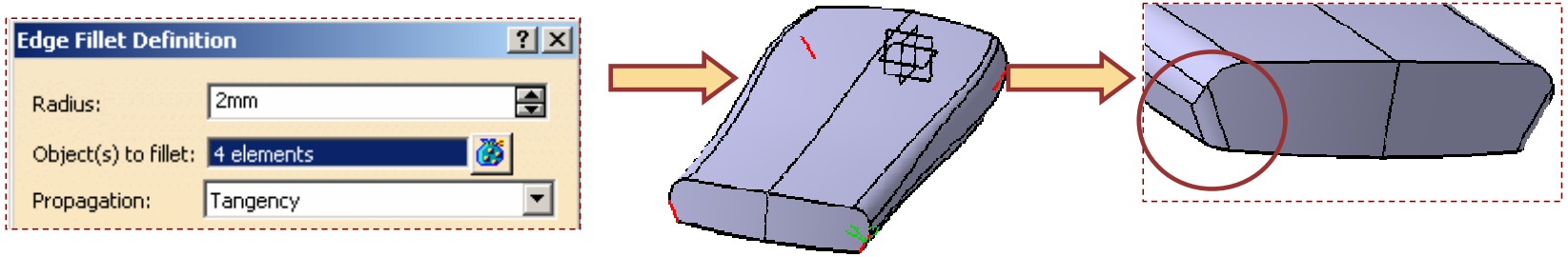
- Shift to Part Design Workbench through Start > Mechanical Design > Part Design
- Close the Joined surface using CloseSurface command
- Apply a Variable radius Fillet as shown

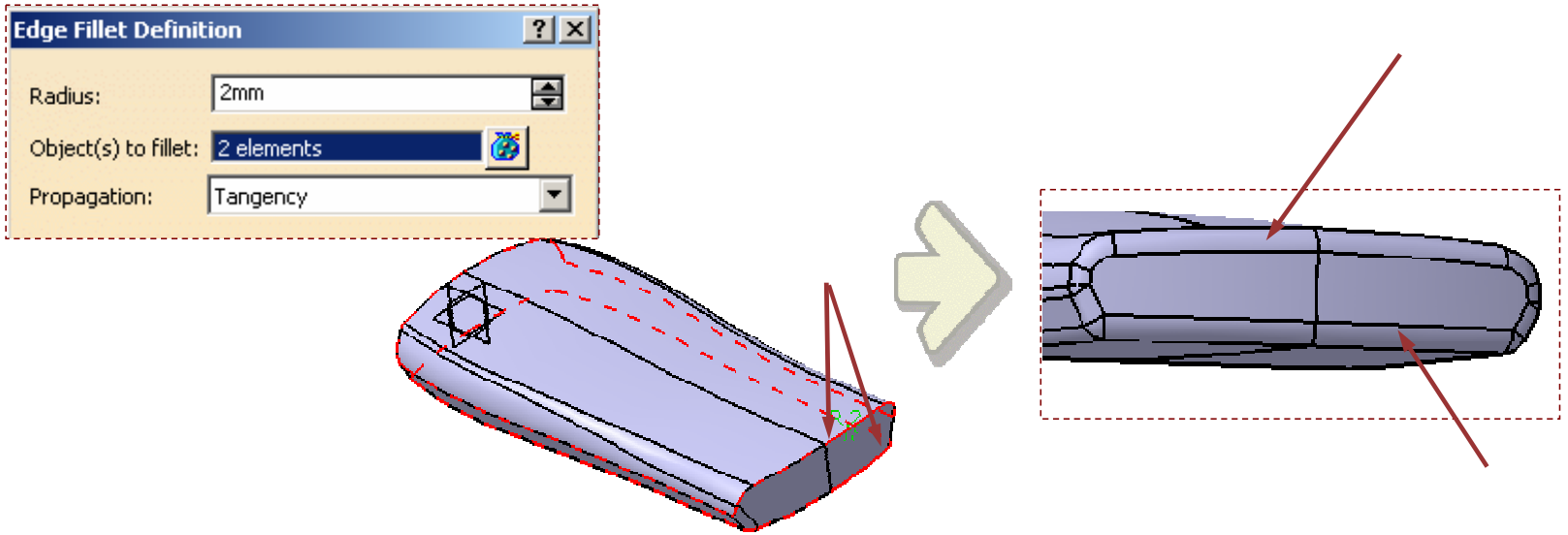


Student Notes:

Do It Yourself (2/3)

- Apply a edge fillet of 2 mm on four edges as shown
- Apply another edge fillet of 2 mm on two edges shown

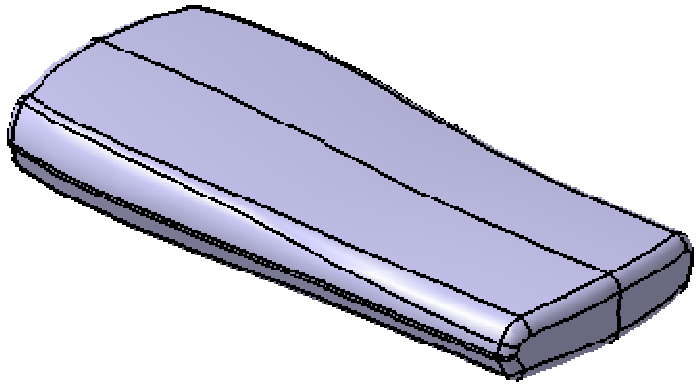


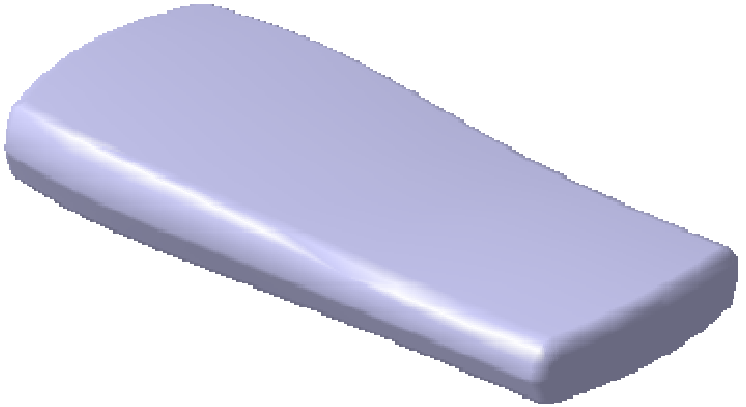


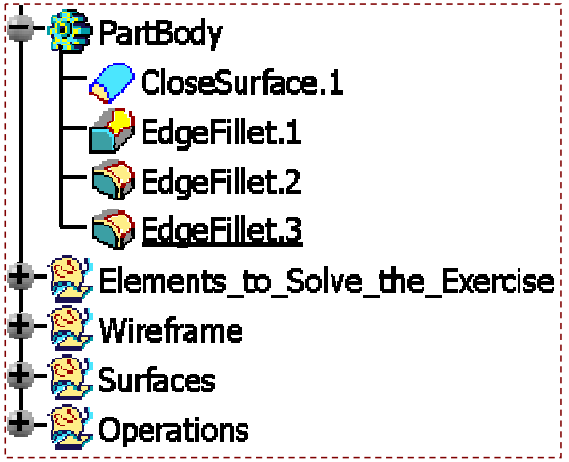
Student Notes:

Do It Yourself (3/3)

- Your result should be as shown







Load the part “Mobile_Phone_Step_4_End.CATPart”

Student Notes:

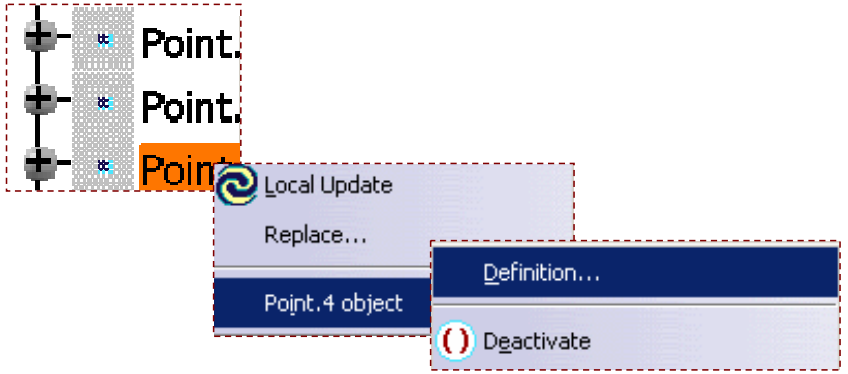
Mobile Phone

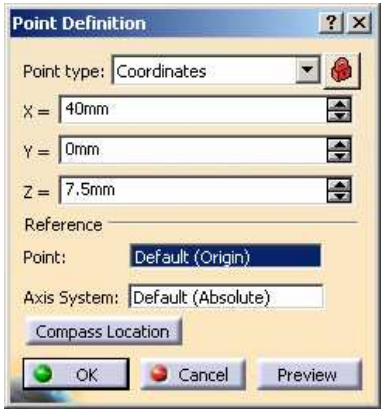
Step 5: Modify the Geometry

5 min

In this step you will Modify the overall Shape of the Part by changing the parameters of the 3D reference elements.

- Edit the values of the 3D reference elements
- Study the impact of these modifications



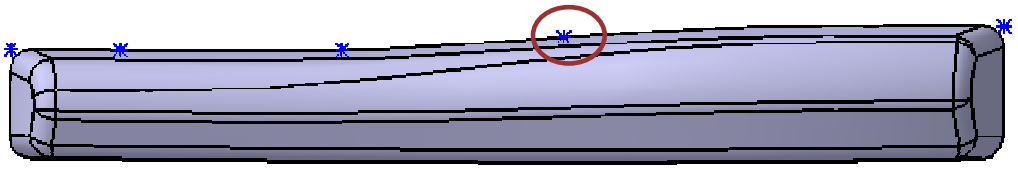


Student Notes:

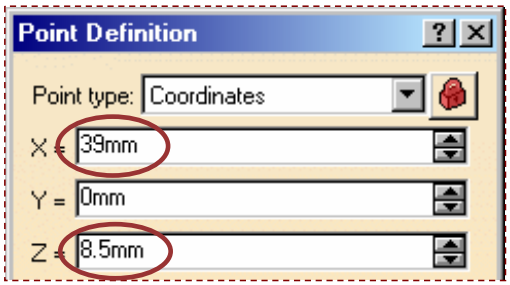
Do It Yourself

Load the part “Mobile_Phone_Step_5_Start.CATPart”

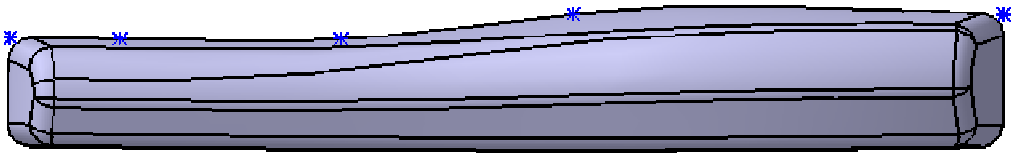
- Modify the position of Point.2 used for creation of Spline.
- Change its X and Z Coordinates.The New co-ordinates (39,0,8.5)



Before Modification



After Modification



To see Final Part Load the part “Mobile_Phone_Step_5_End.CATPart”