

# Dress-up Features

*In this lesson, you will learn how to place dress-up features on parts.*

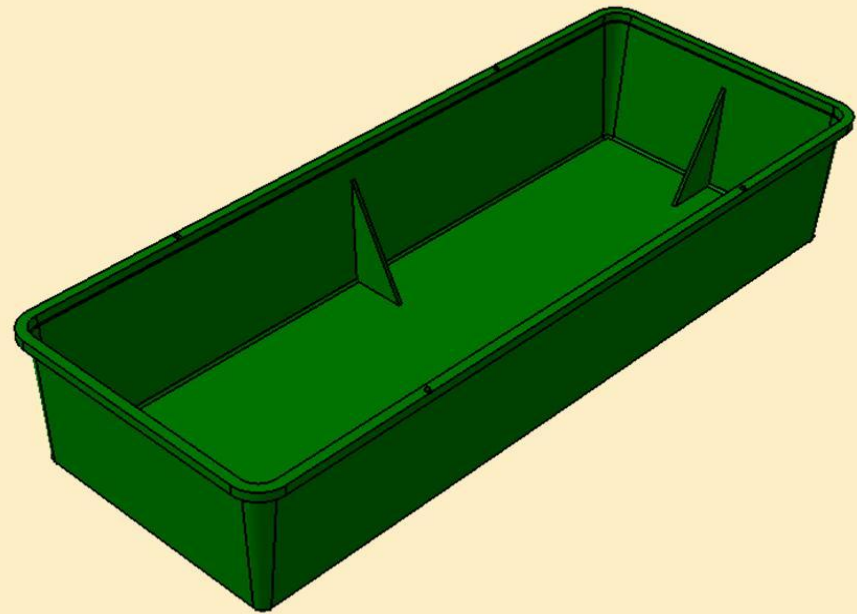
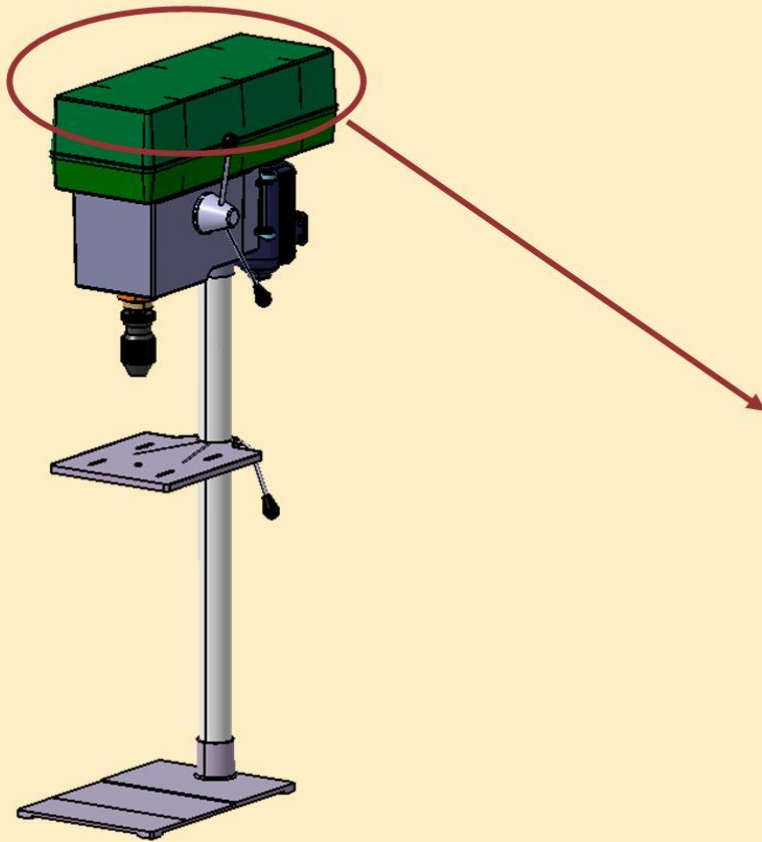
*Lesson content:*

- ▣ **Case Study: Casing**
- ▣ **Design Intent**
- ▣ **Stages in the Process**
- ▣ **Apply a Draft**
- ▣ **Create a Stiffener**
- ▣ **Create Threads and Taps**
- ▣ **Edit Features**

*Duration: Approximately 0.5 day*

# Case Study: Dress-up Features

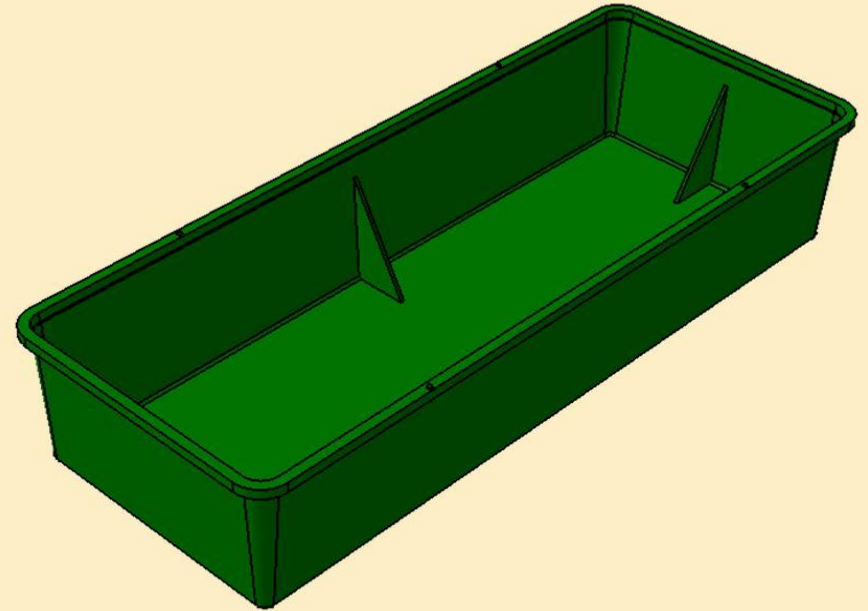
The case study for this lesson is the Casing used in the Drill Press assembly and shown below. The focus of this case study is the creation of the part incorporating the design intent requirements.



# Design Intent

The casing must meet the following design intent requirements:

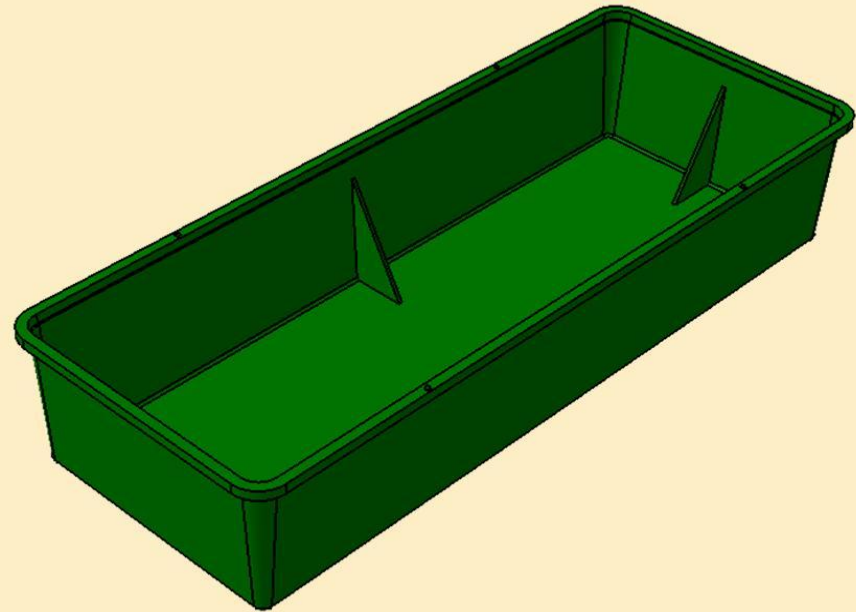
- ✓ The inner ribs should be created using stiffener features.
- ✓ The casing should contain a 4 degree draft.
- ✓ The casing should have taps defined for all holes.



# Stages in the Process

The following steps will be used to create the casing:

1. Apply a draft.
2. Create a stiffener.
3. Create threads and taps.
4. Edit features.





# Dress-up Features

## Step 1: Apply a draft.

*In this section, you will understand what a draft is and how to apply different types to a part.*



To create the Casing, use the following steps:

### 1. Apply a draft.

2. Create a stiffener.
3. Create threads and taps.
4. Edit features.



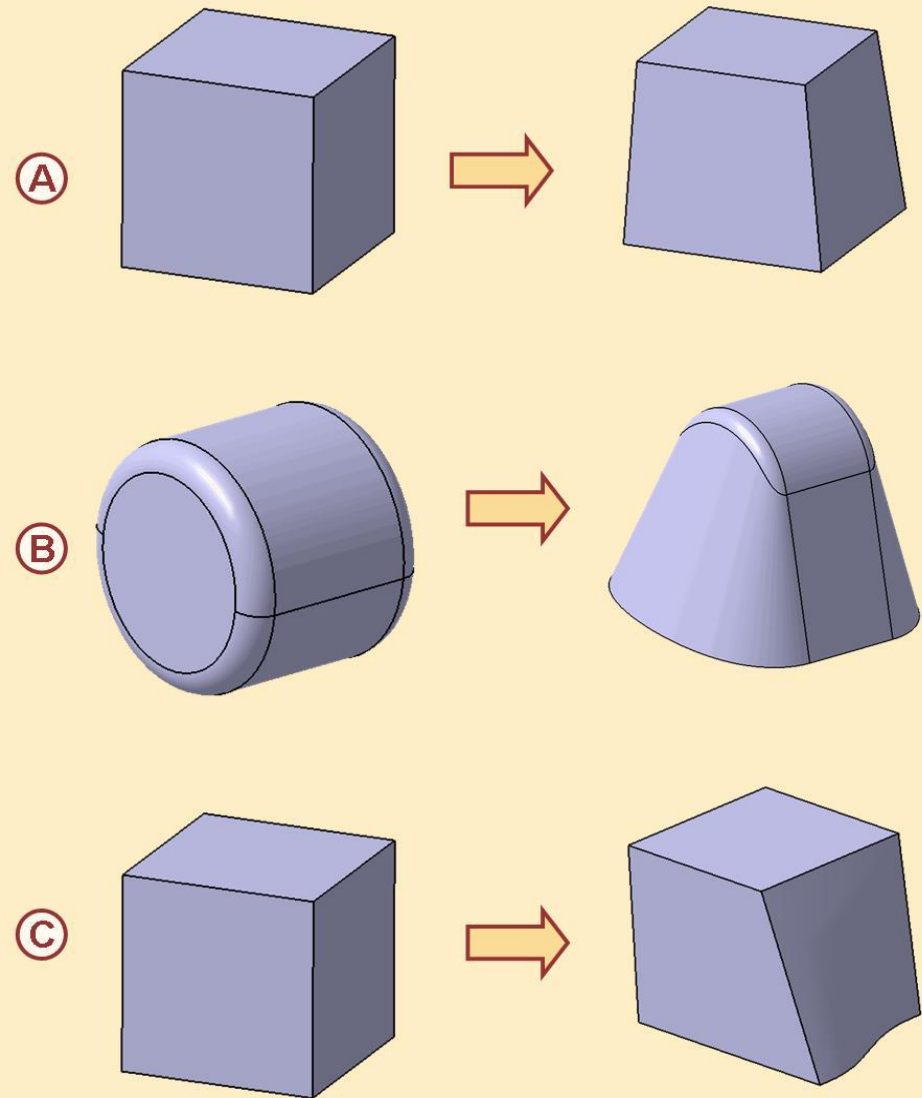
# What is a Draft ? (1/2)

There are three types of drafts that can be created within CATIA:

- A. Basic draft
- B. Reflect draft
- C. Variable draft



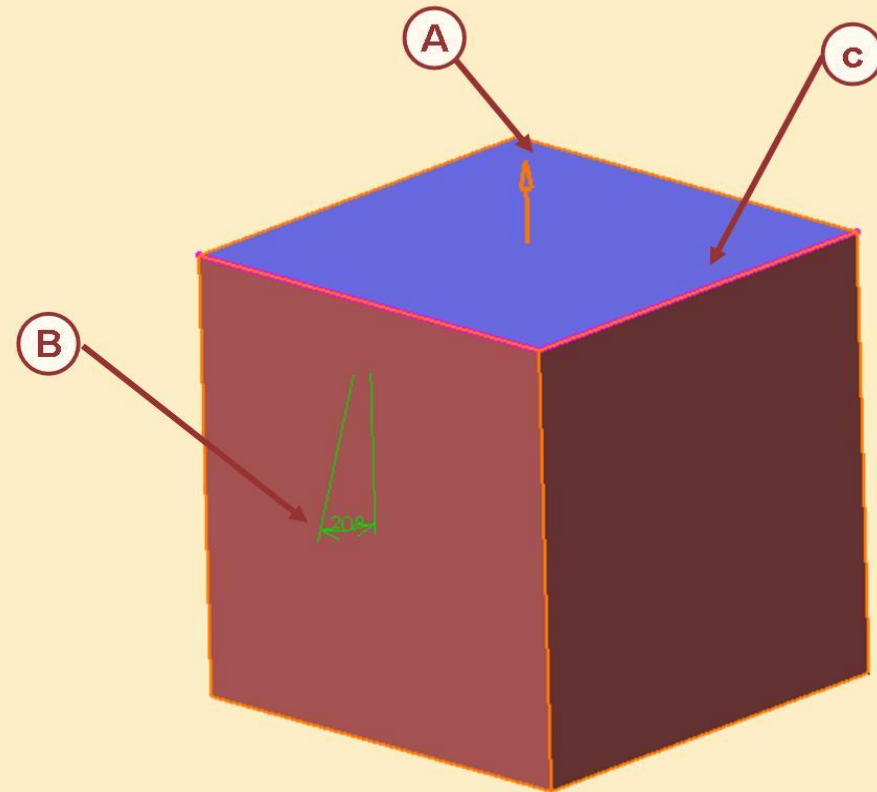
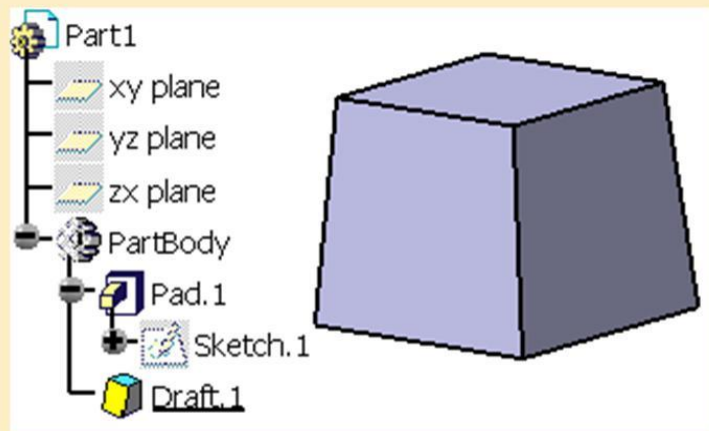
(A) (B) (C)



# What is a Draft ? (2/2)

A basic draft requires three criteria to be defined:

- A. Pulling direction:
- B. Draft angle:
- C. Neutral element:

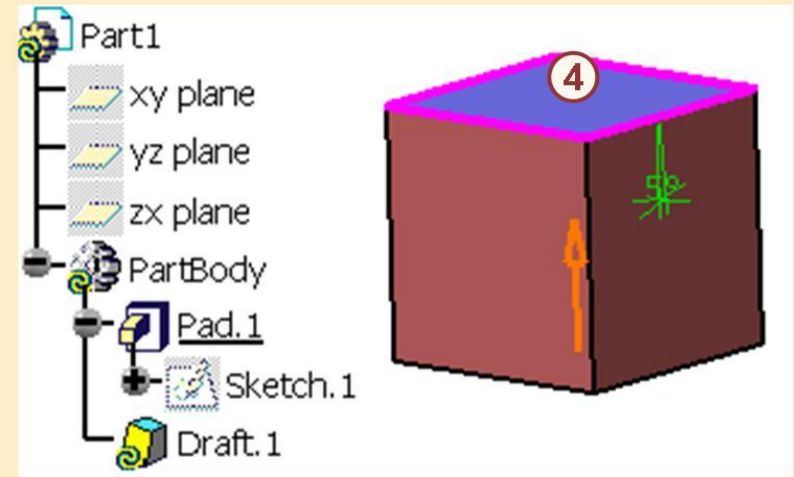


Step1 - Apply a draft

# Basic Drafts

Use the following steps to apply a draft:

1. Select the **Draft Angle** icon.
2. Select the faces to which draft will be applied.
3. Enter an angle value.
4. Specify the Neutral Element.
5. Specify the Pulling Direction.
6. Select **OK**.

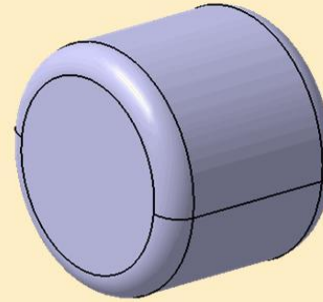




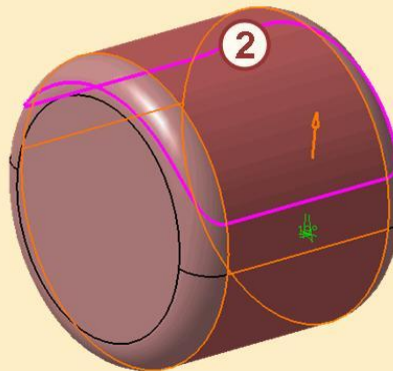
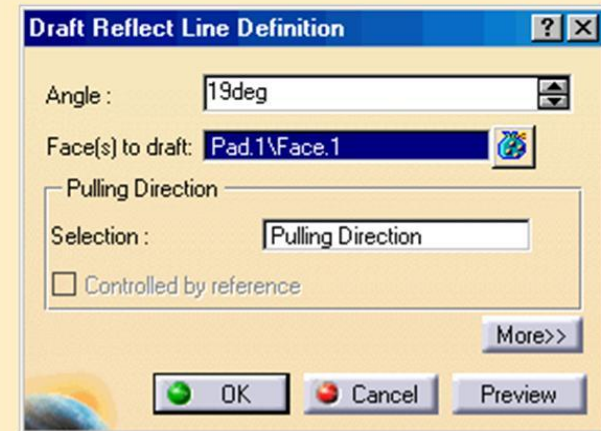
# Reflect Draft (1/2)

Use the following steps to apply a reflect draft:

1. Select the **Reflect draft** icon.
2. Select the surface to which you want to apply the draft.
3. CATIA automatically shows the default pull direction. To specify another direction, highlight the Pulling Direction field and select a new reference.
4. CATIA calculates the reflect lines based on the pull direction.



1

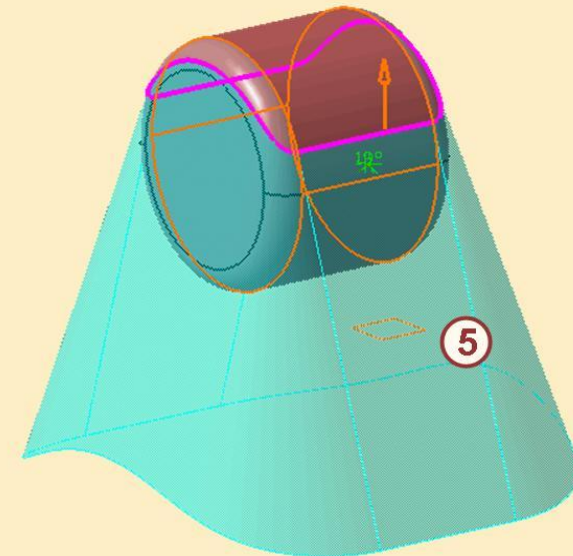
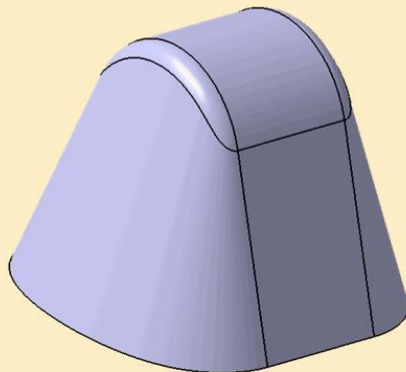
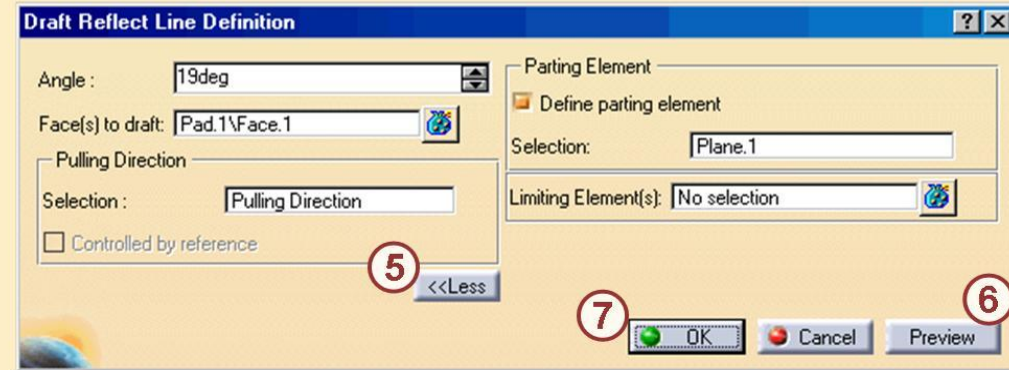




# Reflect Draft (2/2)

Use the following steps to apply a reflect draft (continued):

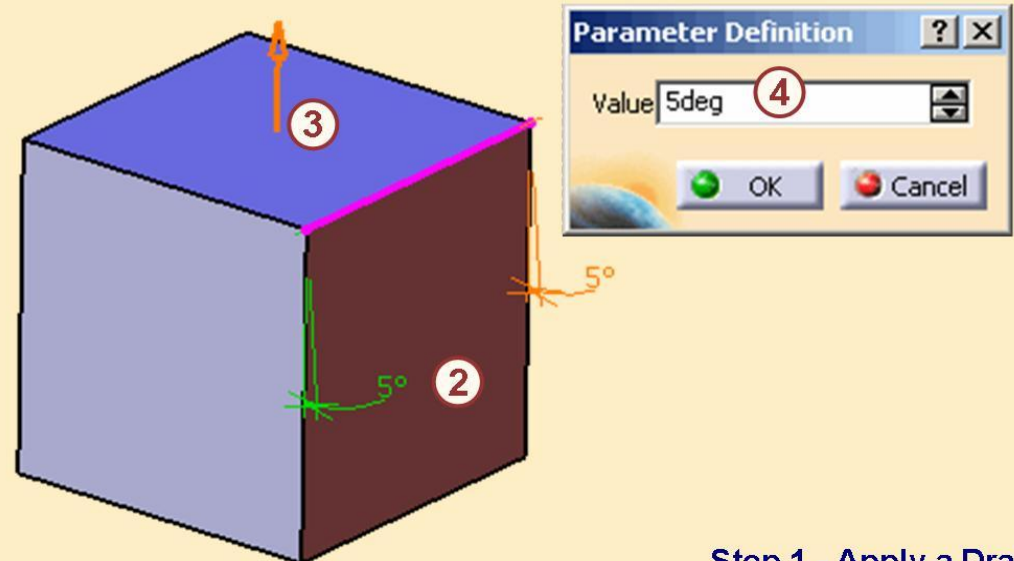
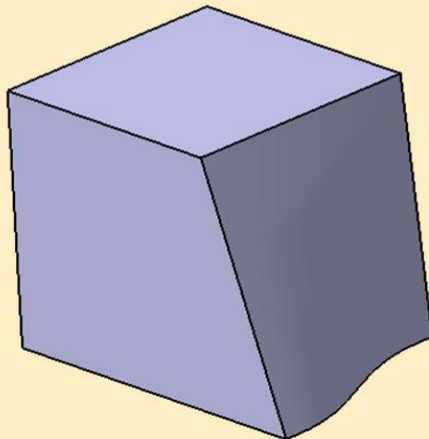
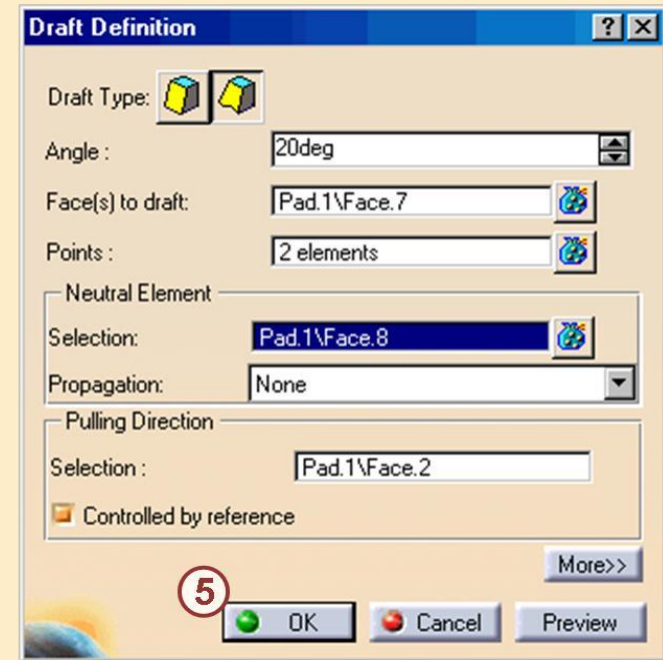
5. In this particular example, the draft could be created indefinitely, therefore a limit needs to be set. Select the **More** button and select the particular plane as a parting element.
6. Select **Preview**.
7. Select **OK** to complete the feature.



# Variable Draft

Use the following steps to create a variable draft:

1. Select the **Variable Draft** icon.
2. Select the face on which the draft should be applied.
3. Select the neutral element.
4. CATIA determines the transition areas that can have different draft angles.
5. Select **OK** to complete the feature.

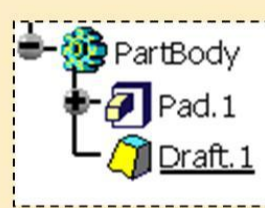


Step 1 - Apply a Draft

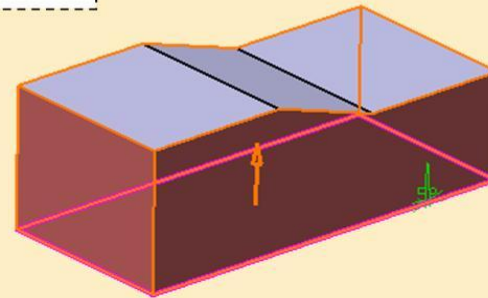
# Selecting Faces to Draft

Draft features can be created on:

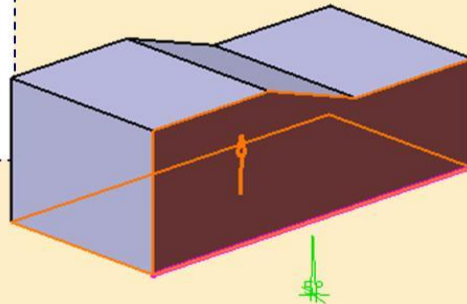
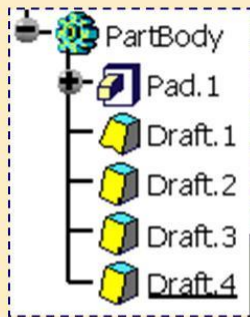
- A. Multiple faces. In this example, one draft feature is applied to the four side faces.
- B. Individual faces. In this example, four separate draft features is created for each of the four side faces.



(A)



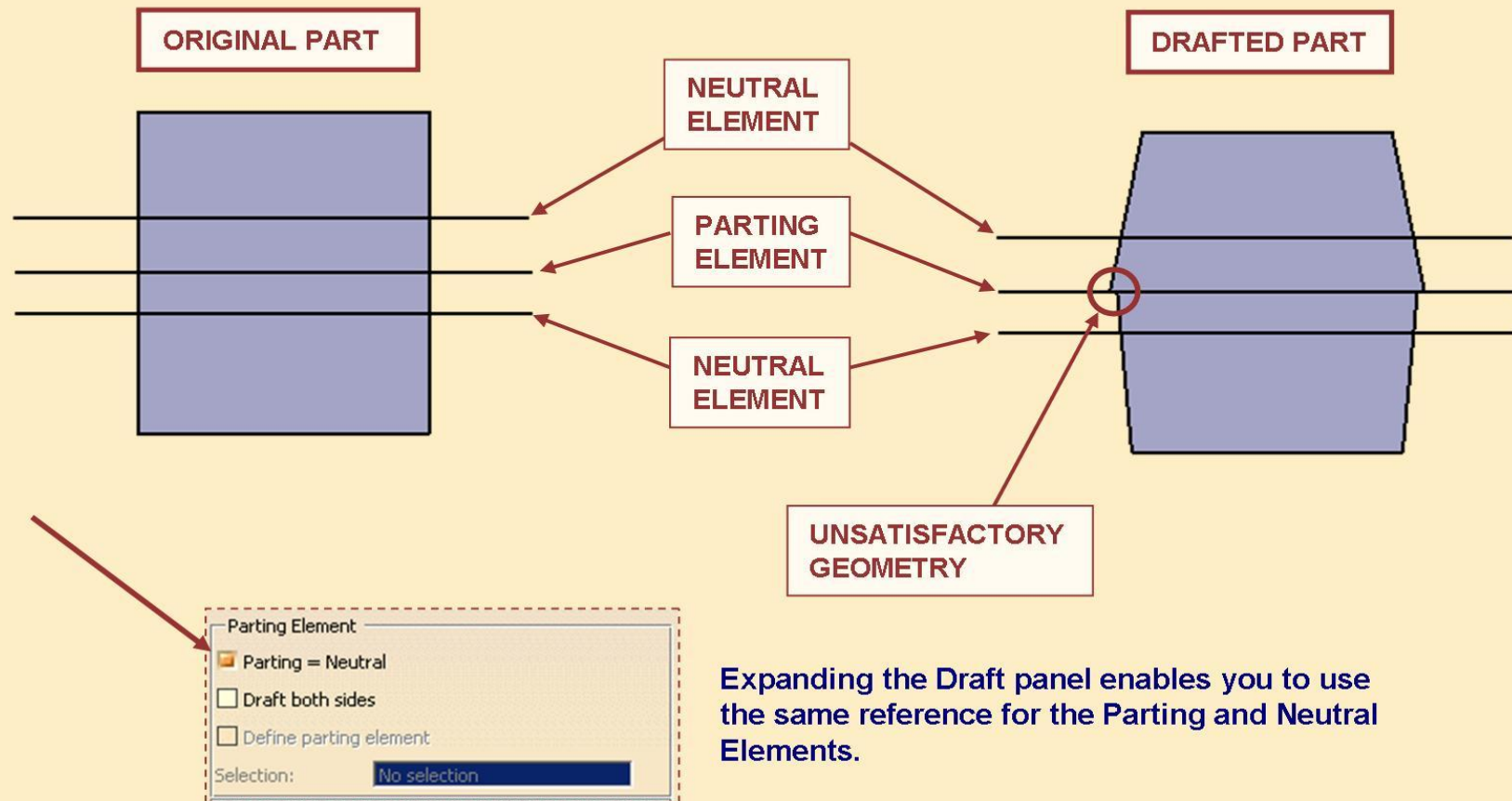
(B)





# Parting and Neutral Elements

- Whenever possible, use the same reference for the parting and neutral elements.

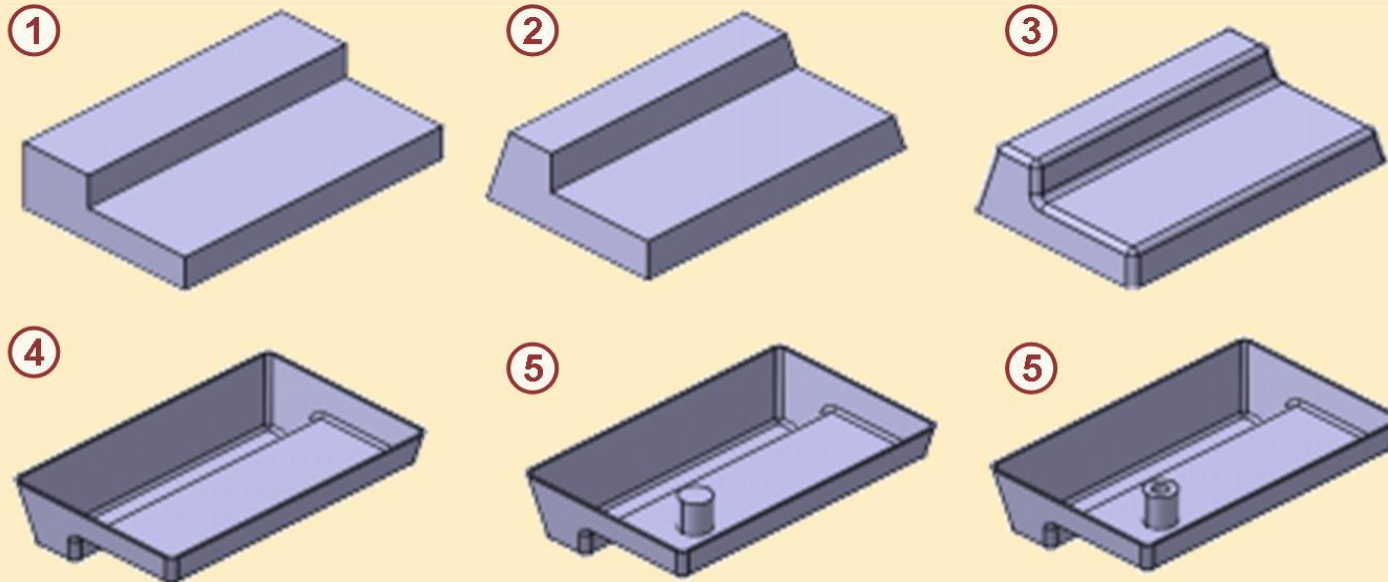


Expanding the Draft panel enables you to use the same reference for the Parting and Neutral Elements.

# Dress-up Feature Order

Whenever possible, create parts in the following general order:

1. Main part features (e.g., pads, pockets, shafts)
2. Drafts
3. Fillets
4. Shells
5. Minor part features (i.e., features that affect only isolated portions of the model)





# Dress-up Features

## Step 2: Create a stiffener.

*In this section, you will understand what a stiffener feature is and how to create one.*



To create the Casing, use the following steps:

- ✓ 1. Apply a draft.
- 2. Create a stiffener.**
3. Create threads and taps.
4. Edit features.



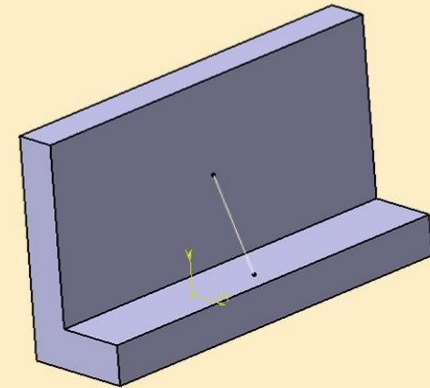
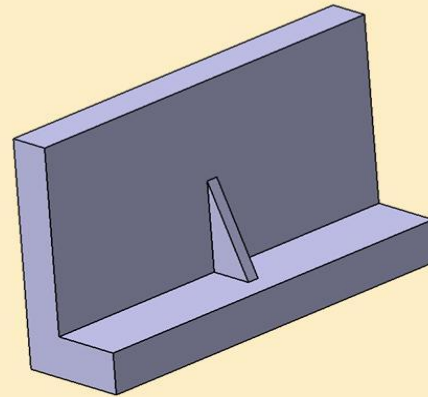
# Introduction to Stiffeners

Stiffeners in CATIA are created by extruding and thickening an open sketched profile. They can be created in two ways:

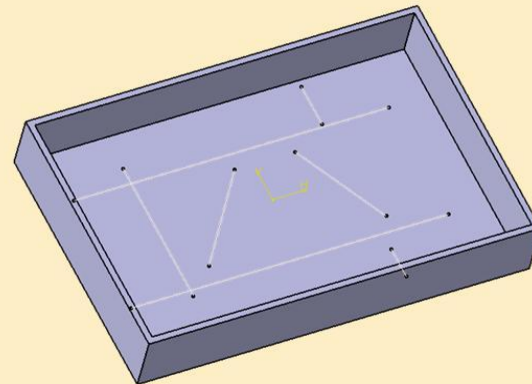
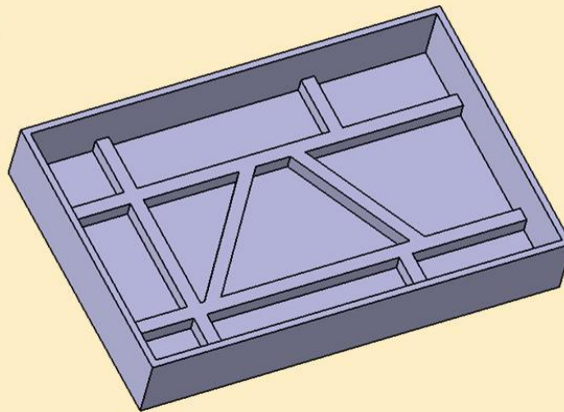
A. From side

B. From Top

A



B

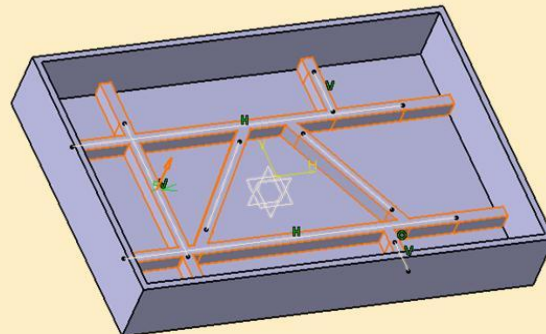
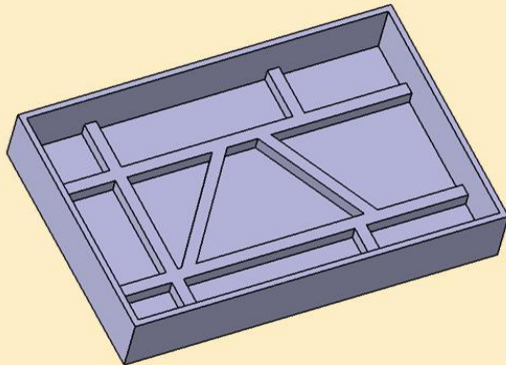
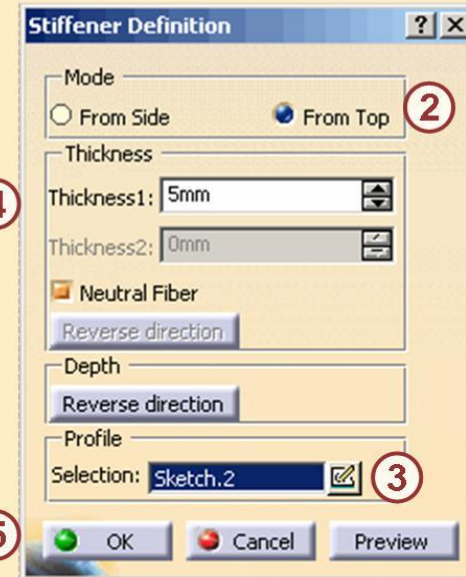


# Create a Stiffener (1/2)

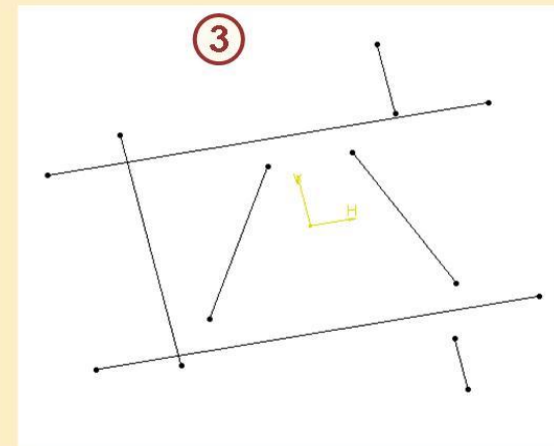
Use the following steps to create a stiffener:

1. Select the **Stiffener** icon.
2. Specify the type of mode.
3. Select the sketch to define the Profile.
4. Enter a thickness value into the Thickness1 field.
5. Select **OK**.

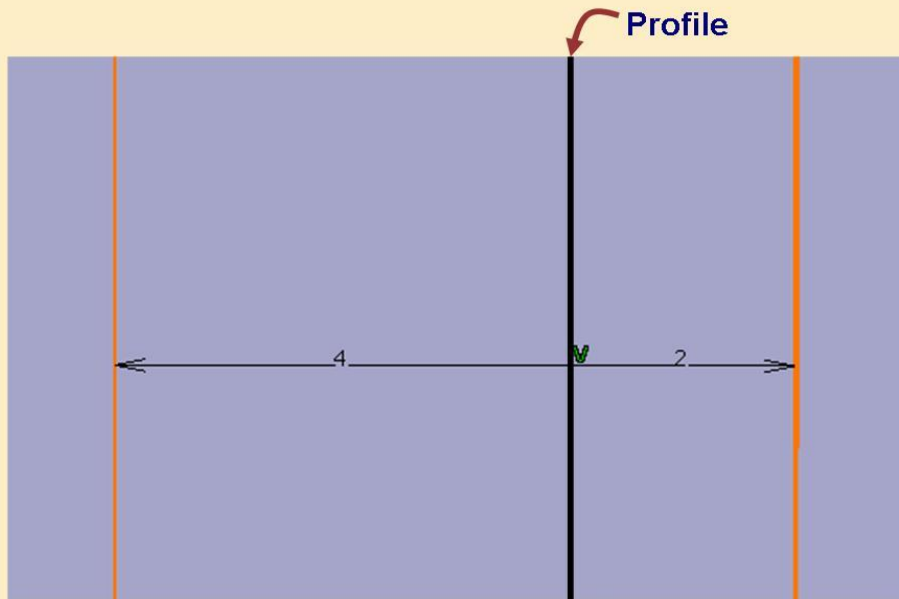
①



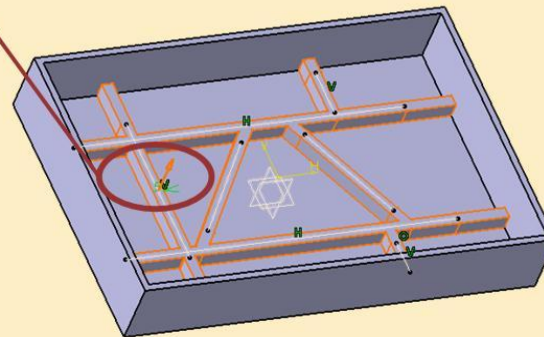
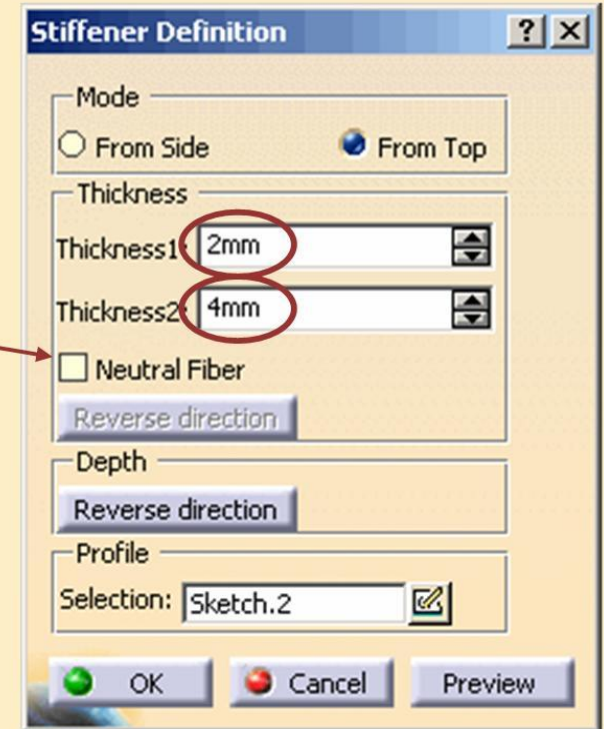
③



# Create a Stiffener (2/2)



Neutral Fiber

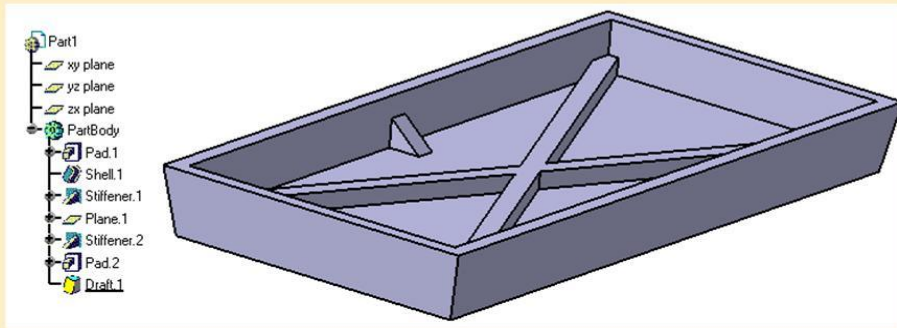




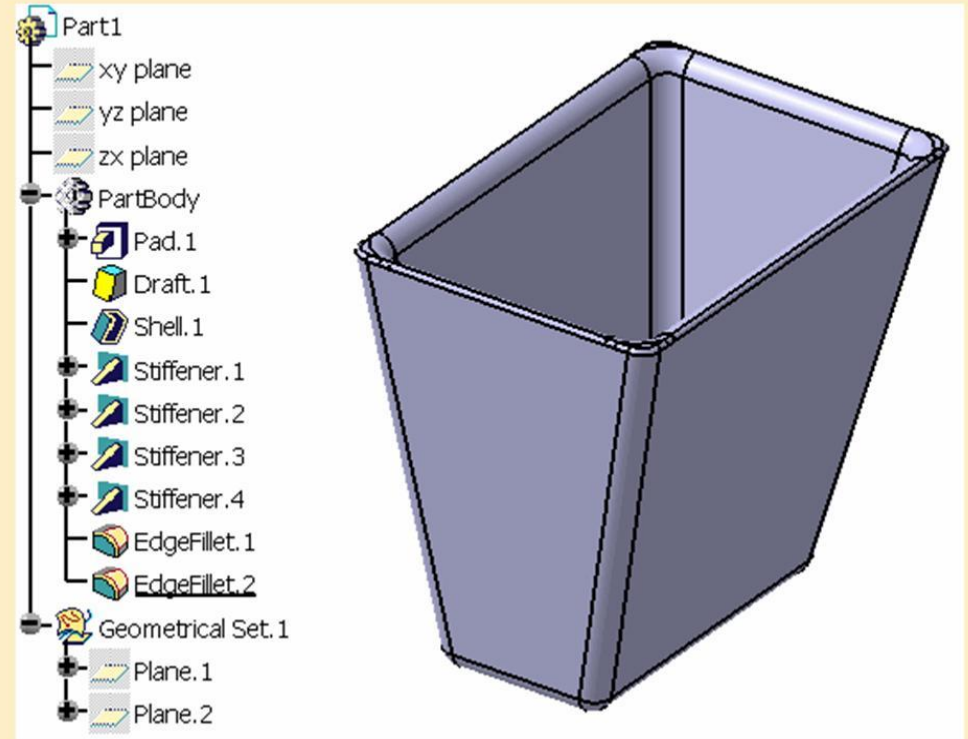
# Exercise Overview

You will practice what you have learned by working through three exercises.

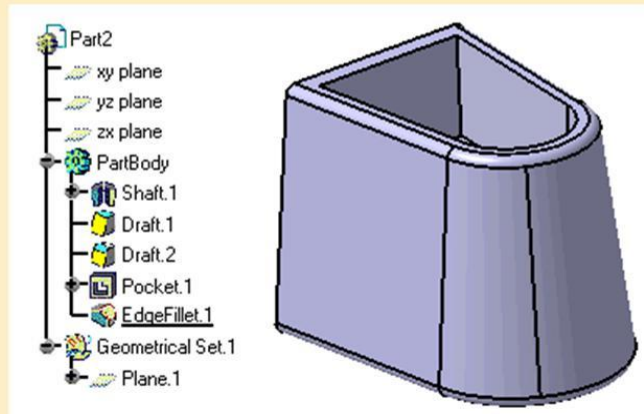
## Exercise 5A



## Exercise 5C



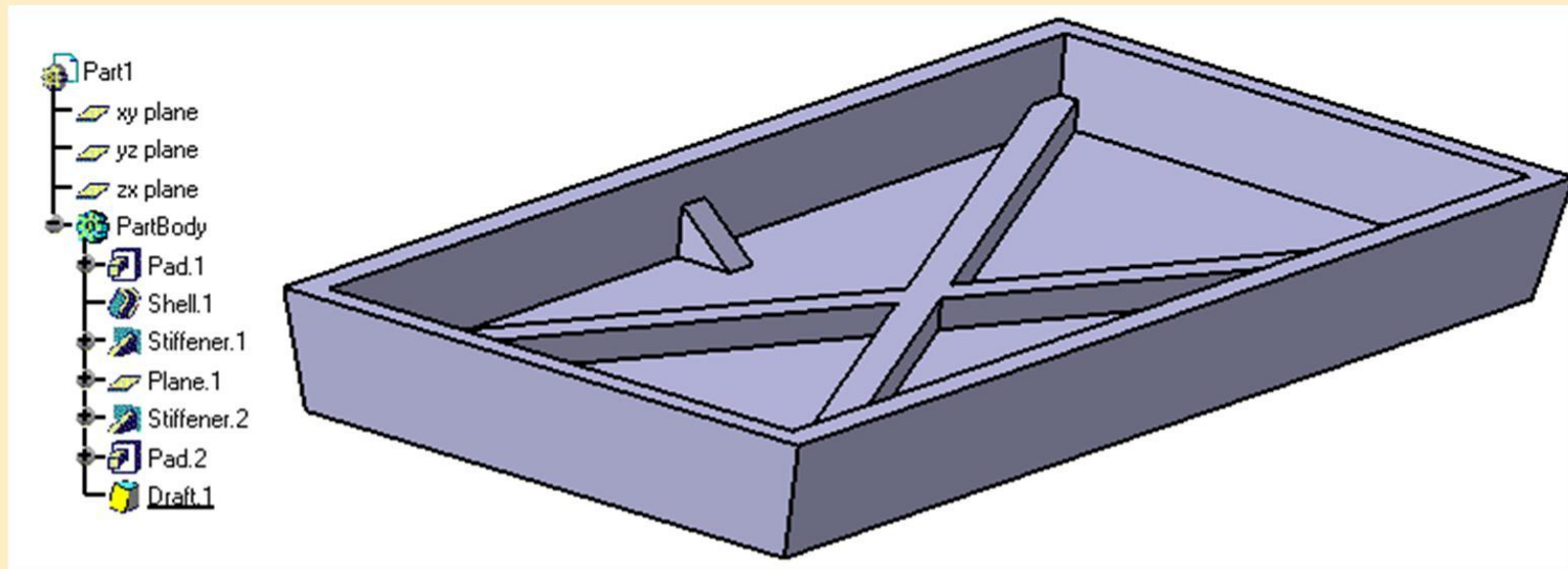
## Exercise 5B





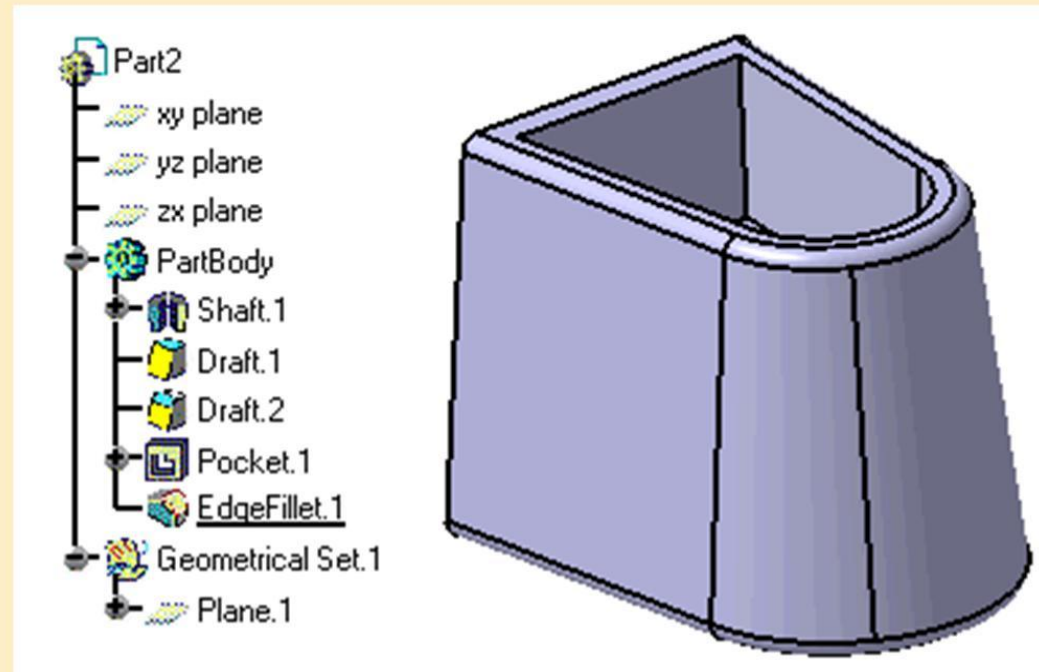
# Exercise 5A: Recap

- ✓ Create stiffeners
- ✓ Create a draft

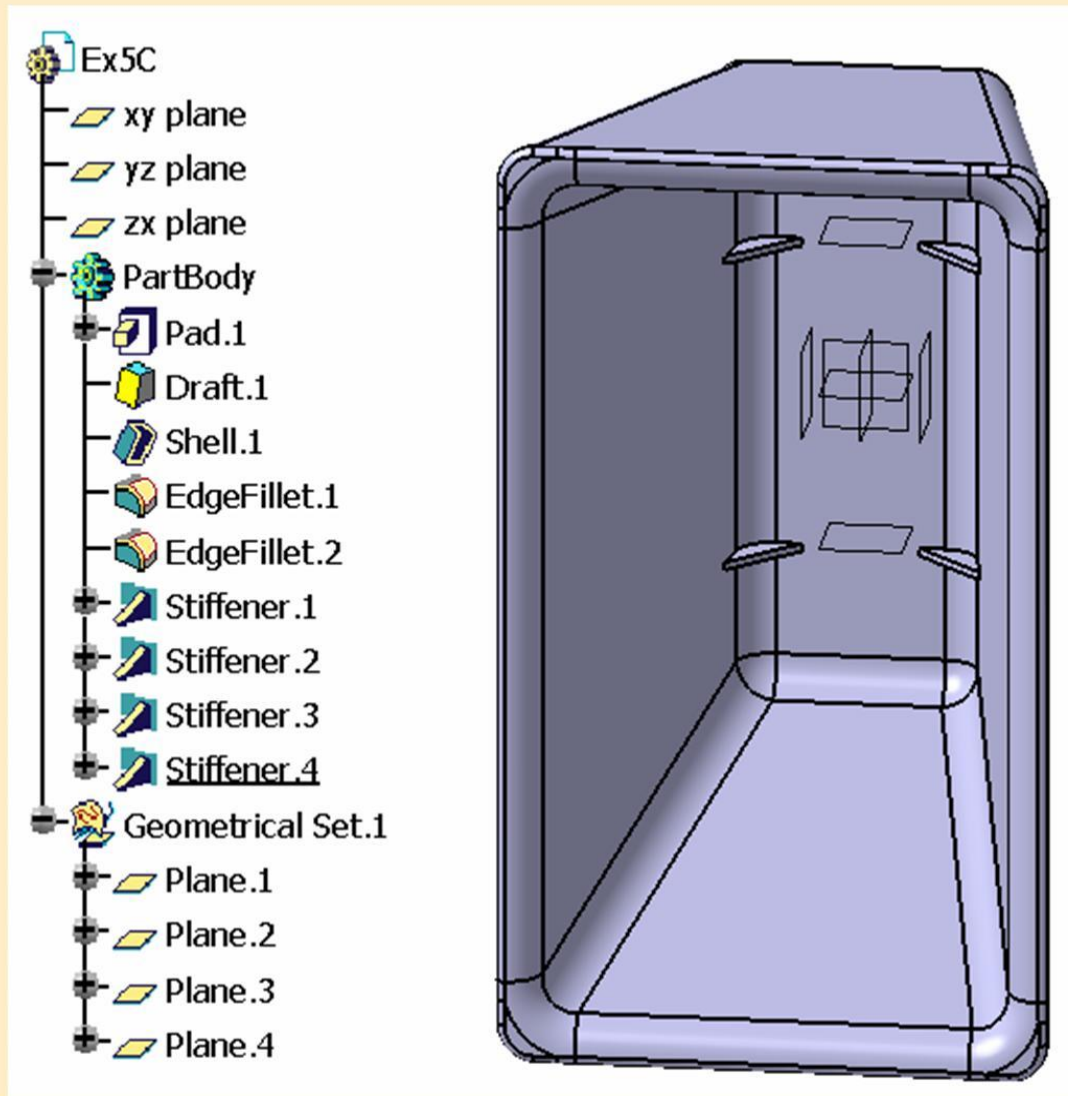


## Exercise 5B: Recap

- ✓ Create a basic draft
- ✓ Create a reflect draft



# Exercise 5C: Recap



- ✓ Create a new part
- ✓ Apply draft to a part
- ✓ Create stiffeners

# Dress-up Features

## Step 3: Create threads and taps.

*In this section, you will learn how to create threads and taps.*

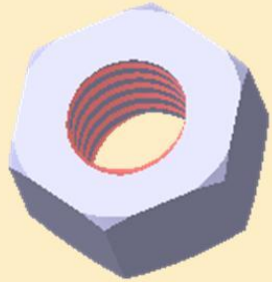


To create the Casing, use the following steps:

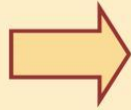
- ✓ 1. Apply a draft.
- ✓ 2. Create a stiffener.
- 3. Create threads and taps.**
4. Edit features.



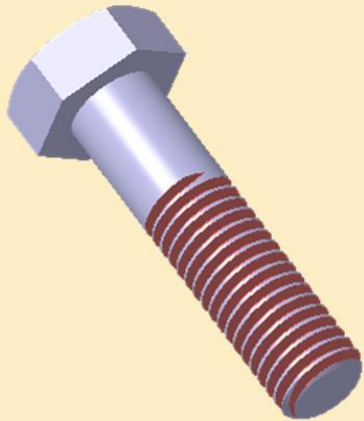
# What are Threads and Taps ?



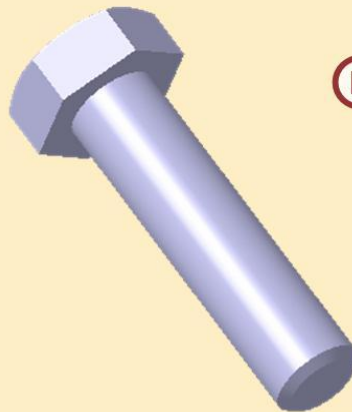
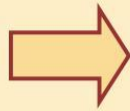
Tap



CATIA representation



Thread



CATIA representation

**Thread/Tap Definition** [?] [X]

Geometrical Definition

Lateral Face:  (A)

Limit Face:  (B)

Numerical Definition

Type:  (C)

Thread Diameter:

Support Diameter:

Thread Depth:

Support height:

Pitch:

Right-Threaded  Left-Threaded (D)

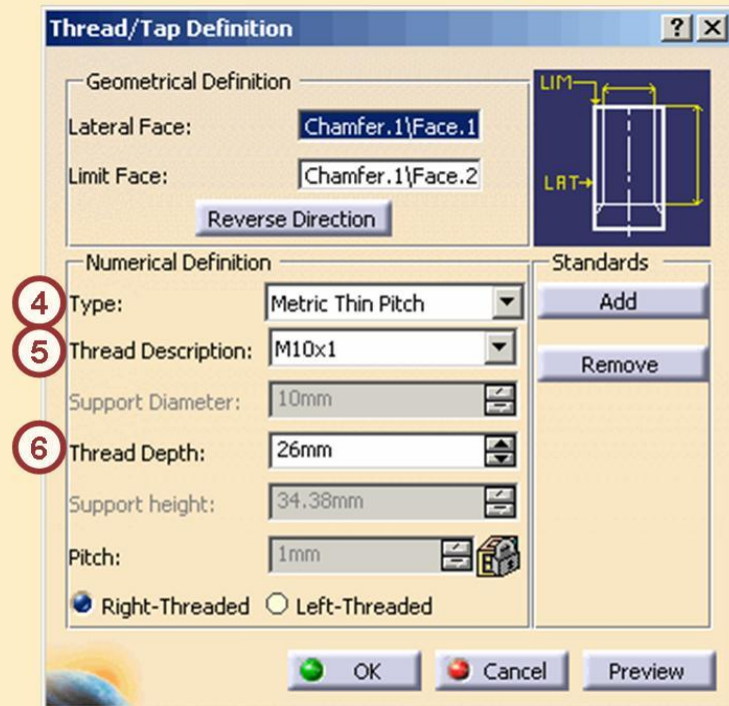
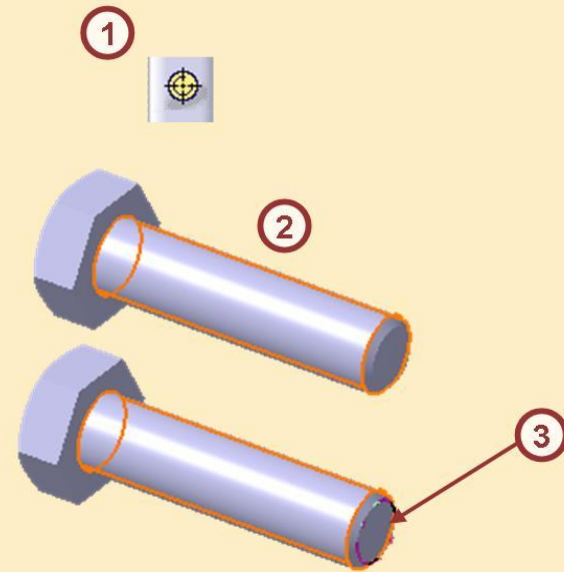
Standards



# Thread and Tap (1/2)

Use the following steps to create a thread/tap:

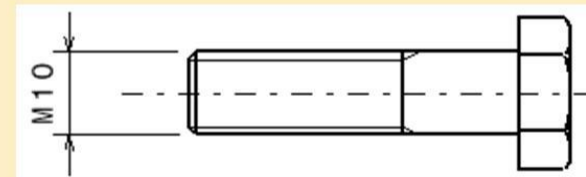
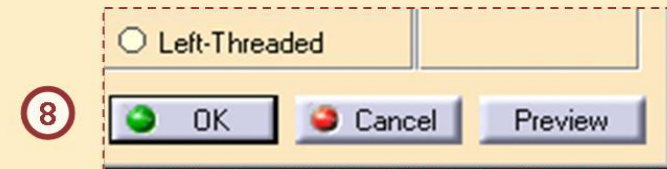
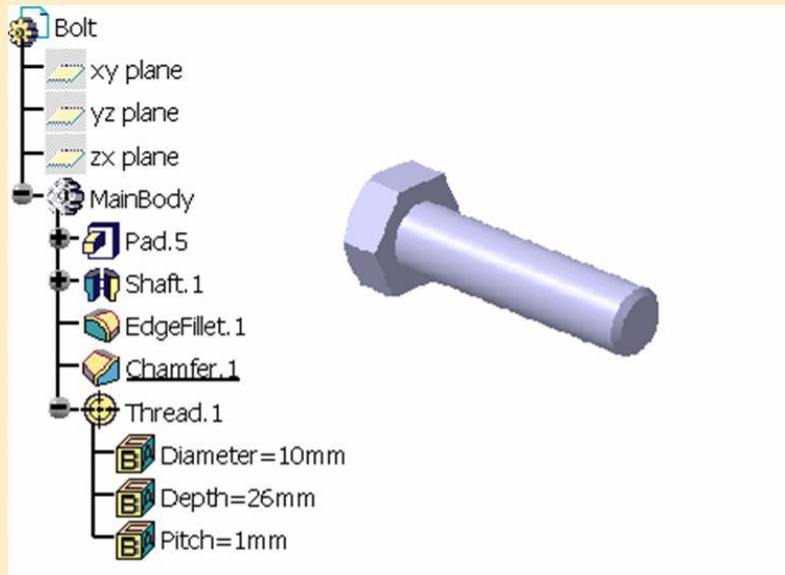
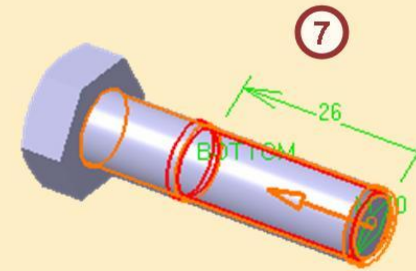
1. Select the **Thread/Tap** icon.
2. Select the Lateral Face on which the thread will be grooved.
3. Select the Reference Face from which the thread will begin.
4. In this example, Metric Thin Pitch is selected as the thread standard.
5. Select the thread diameter.
6. Enter a value in the Thread Depth field.



# Thread and Tap (2/2)

Use the following steps to create a thread/tap (continued):

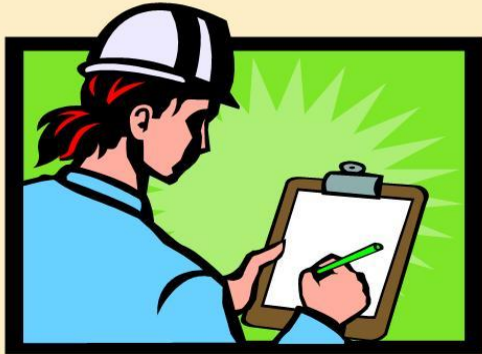
7. Select the **Preview** button in the dialog box.
8. Select the **OK** button to complete the thread.



# Dress-up Features

## Step 4: Edit features.

*In this section, you will learn how to edit features.*



To create the Casing, use the following steps:

- ✓ 1. Apply a draft.
- ✓ 2. Create a stiffener.
- ✓ 3. Create threads and taps.

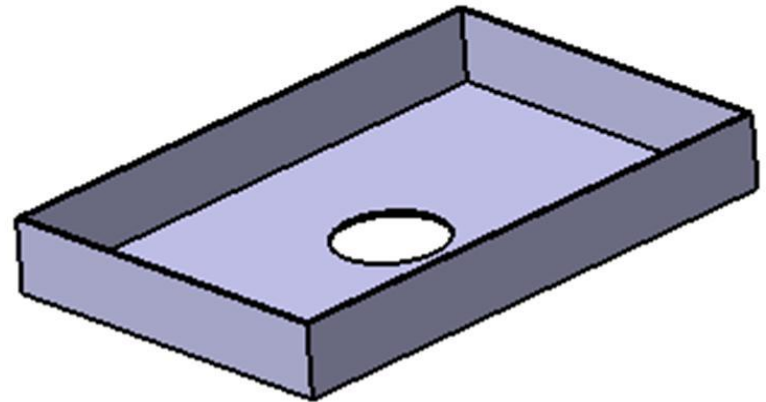
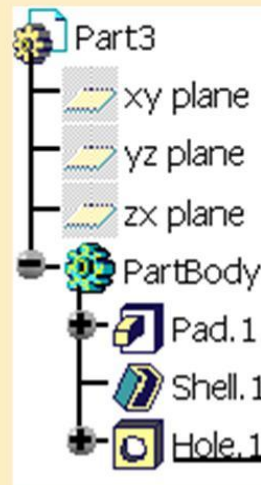
### 4. Edit features.



# Editing features

Feature editing and manipulation, beyond dimension changes, is often required as design intent changes or modeling strategies evolve. CATIA has several tools that enable you to edit features, including the following:

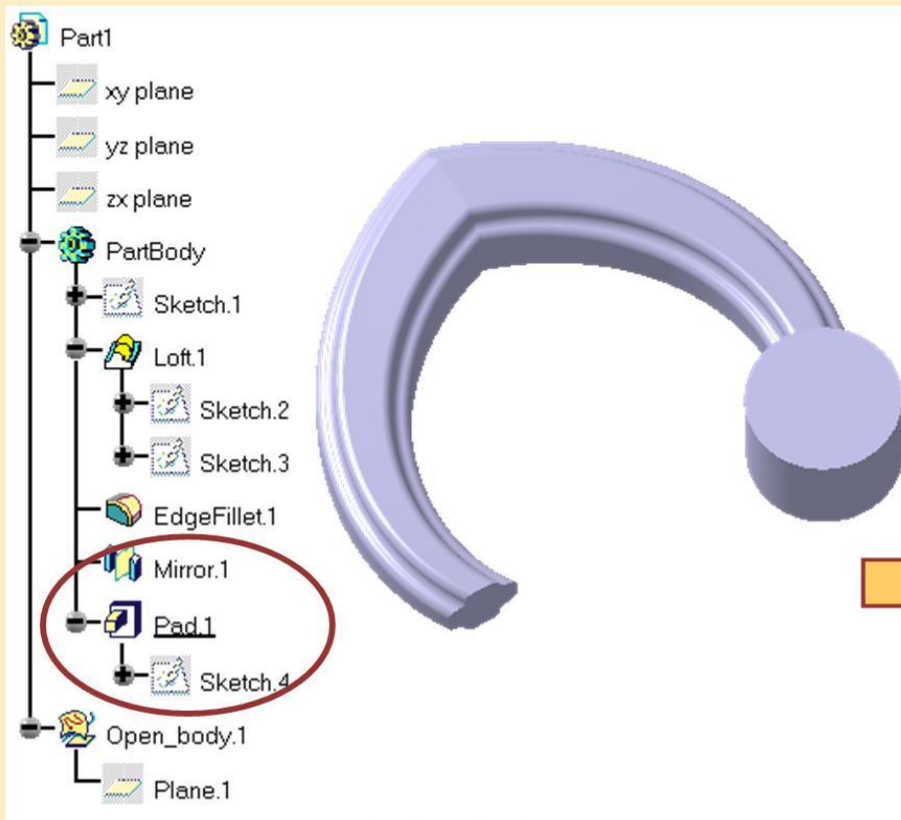
- Reordering features
- Define in work object
- Properties
- Filters (Search)
- Parent-child relationships
- Resolving feature failures



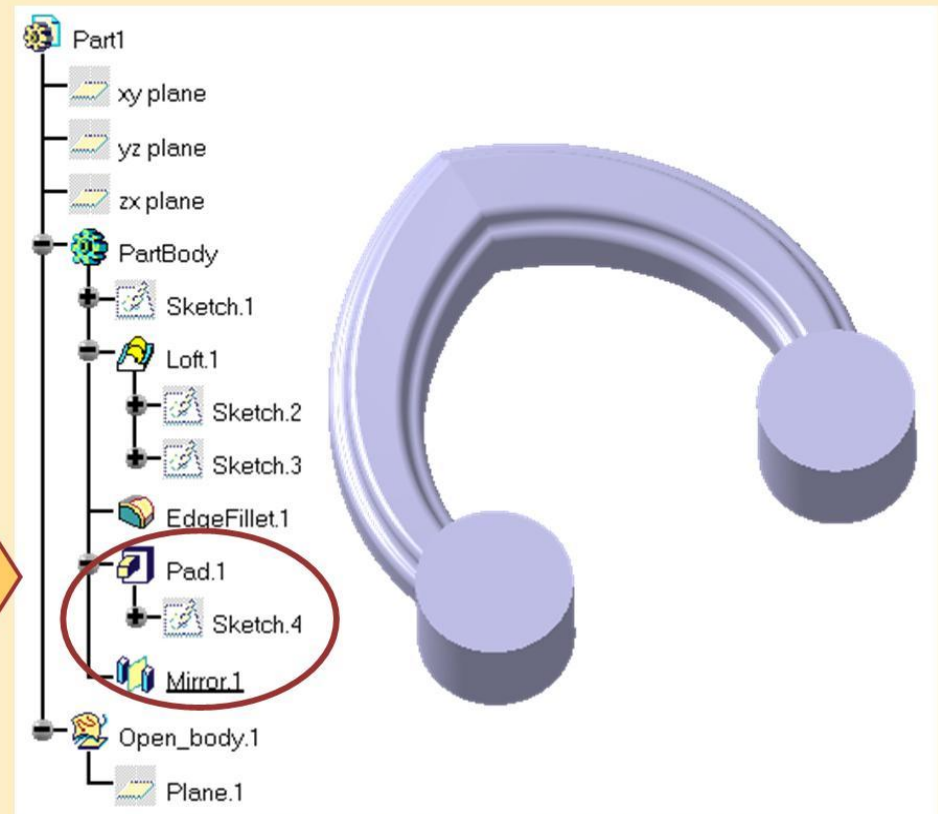


# Why Reorder Features ?

- The order that features and operations appear in the specification tree affect the geometry of the part.
- Changing the order is sometimes necessary because features have been created in the wrong order or perhaps design intent has changed.



One cylinder

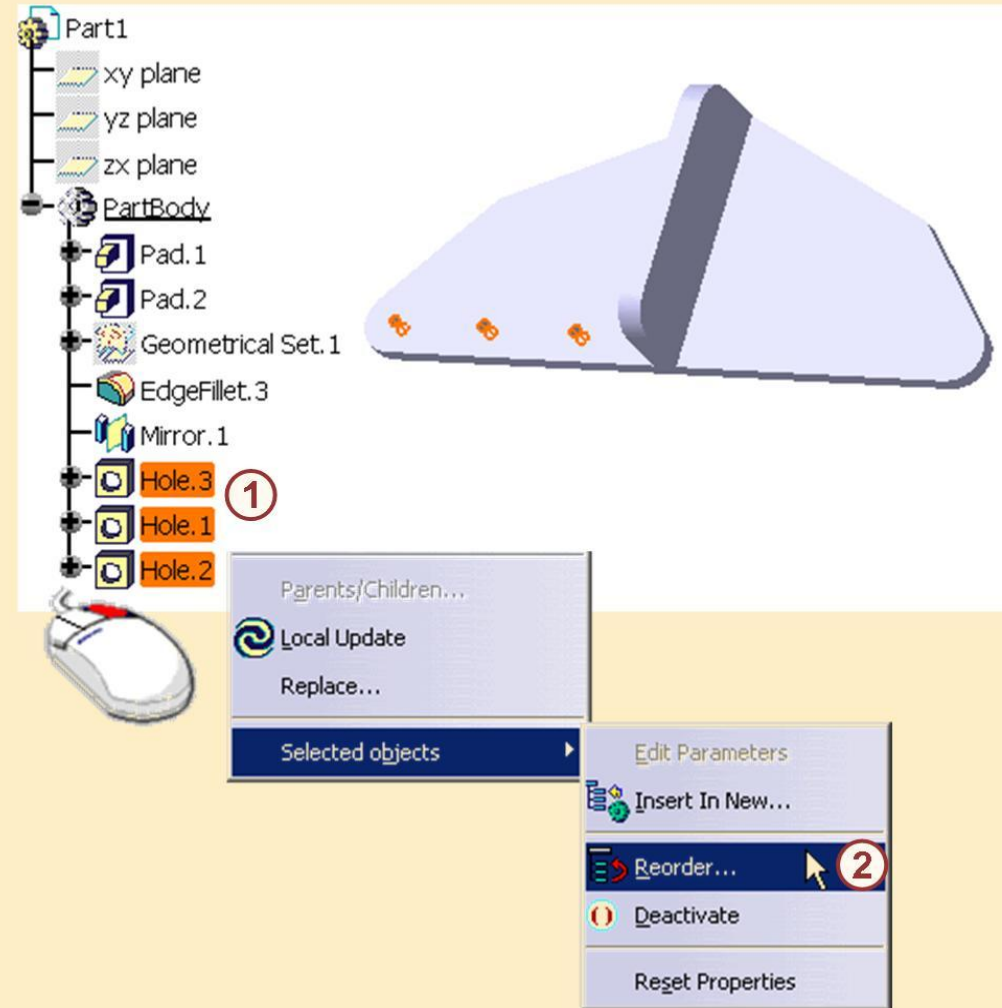


Two cylinders when moved before the mirror operation

# Reordering Features (1/2)

Use the following steps to reorder a feature:

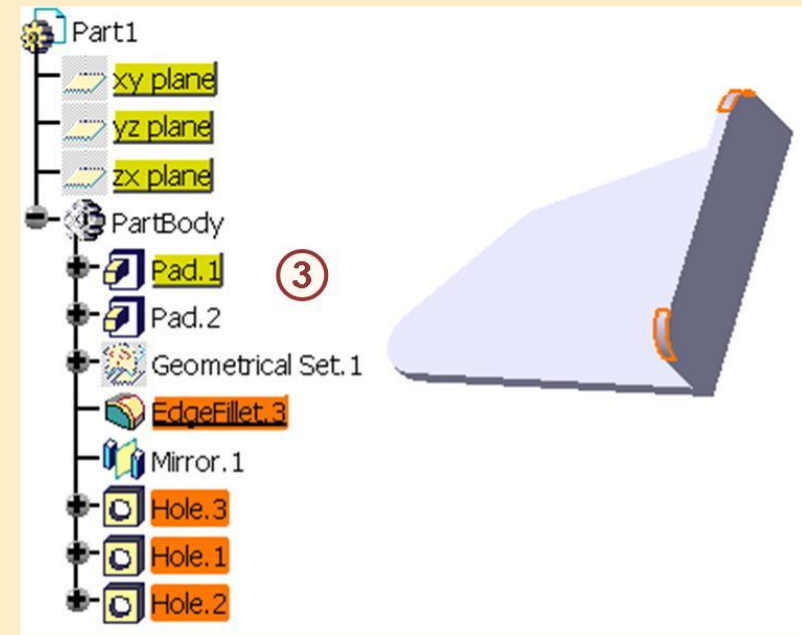
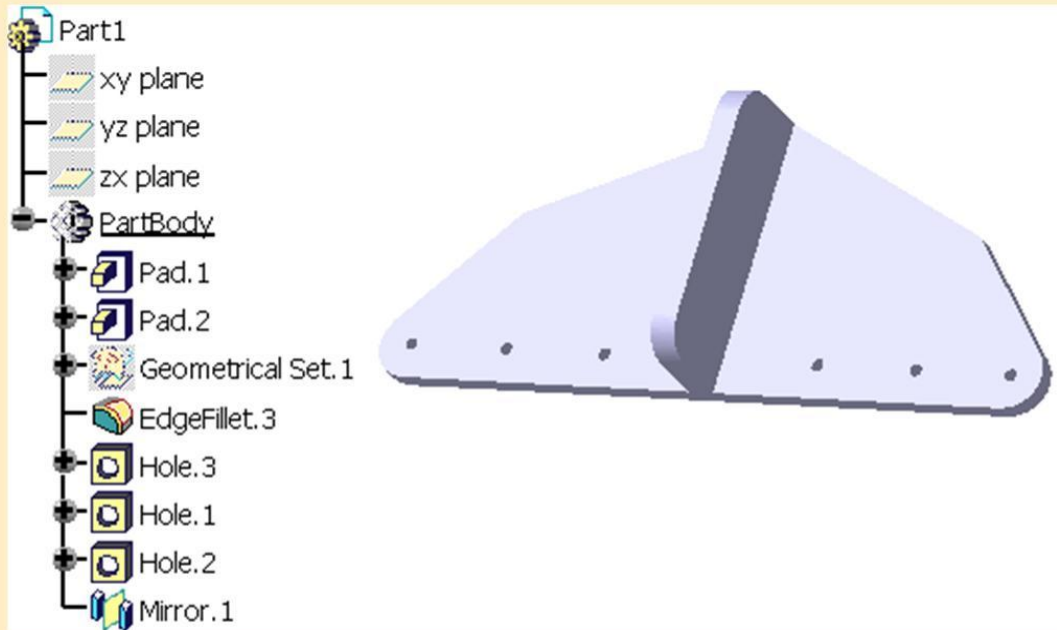
1. Select the feature(s) to be reordered and right mouse click.
2. Click **Reorder** from the contextual menu.



# Reordering Features (2/2)

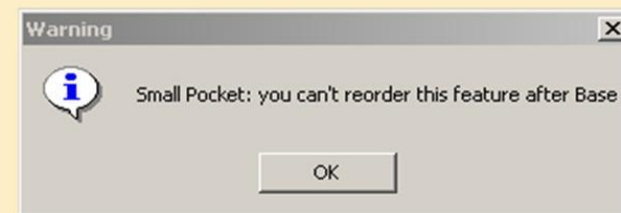
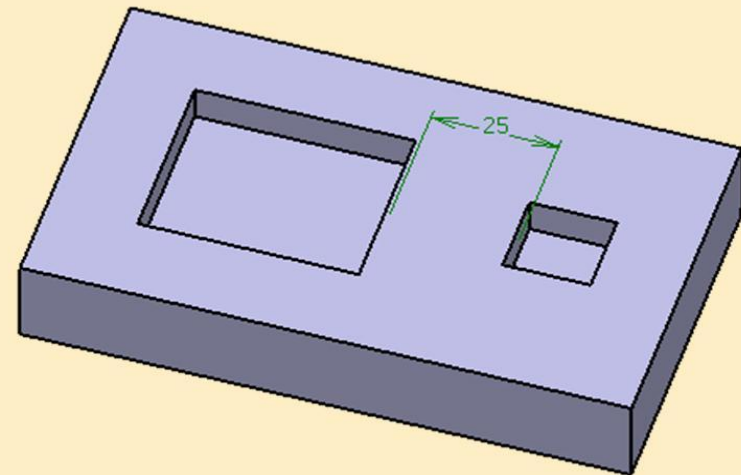
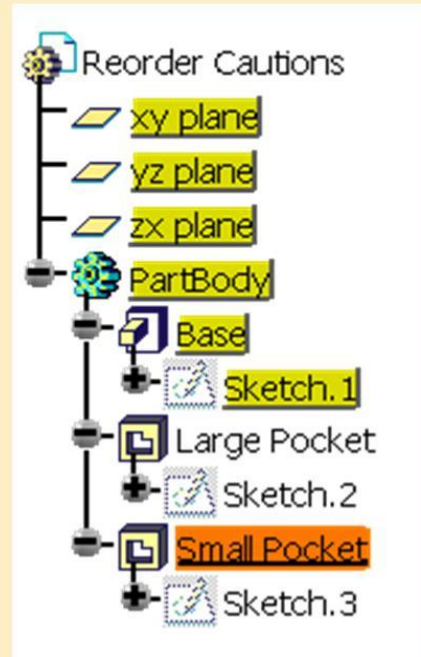
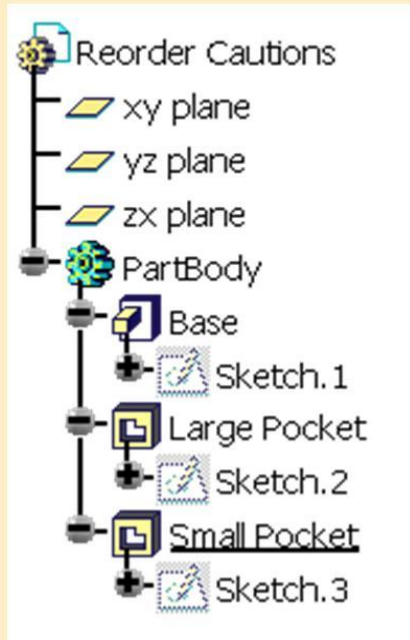
Use the following steps to reorder a feature (continued):

3. Select the feature to reorder after.
4. Select **OK**.



# Limitations on using Reorder

- When a feature is referenced by another during a design, a parent-child relationship is established between the two.

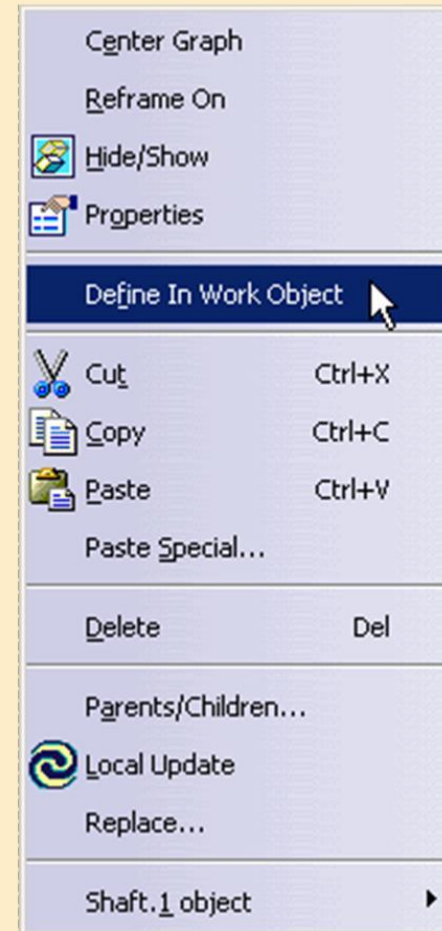




# Define in Work Object (1/2)

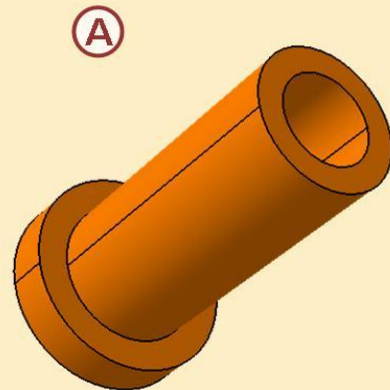
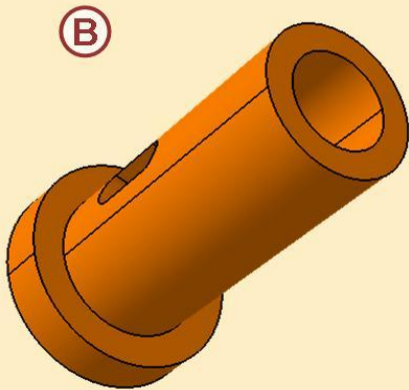
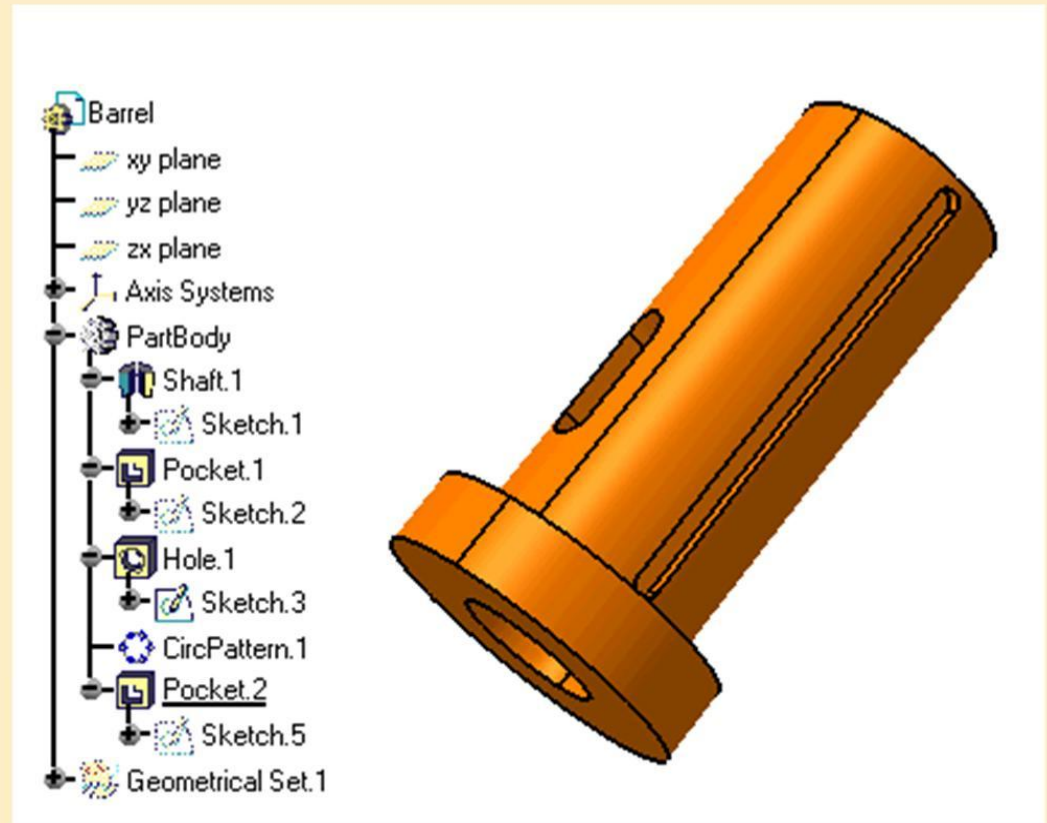
Use the following steps to define a feature as the work object:

1. Select the feature from the specification tree or directly on the model.
2. Right mouse click.
3. Click **Define in Work Object** from the contextual menu.



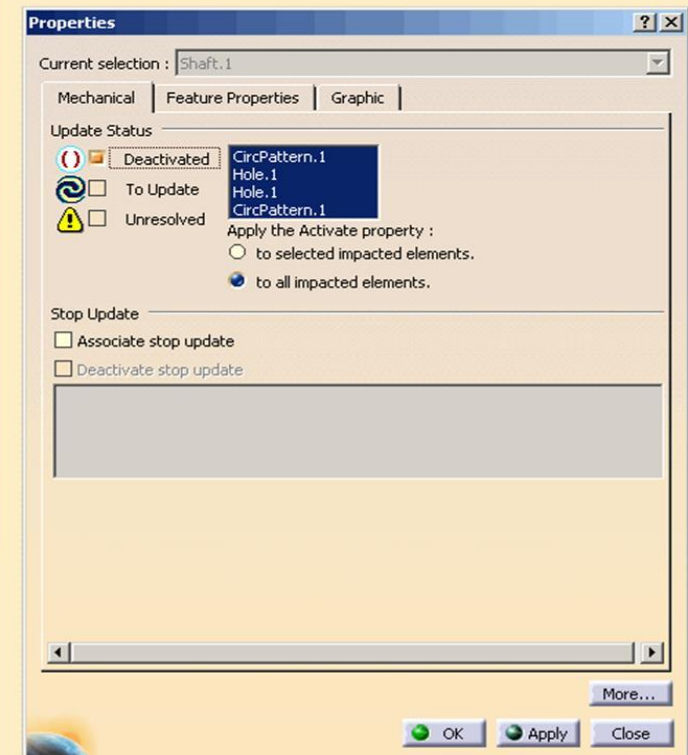
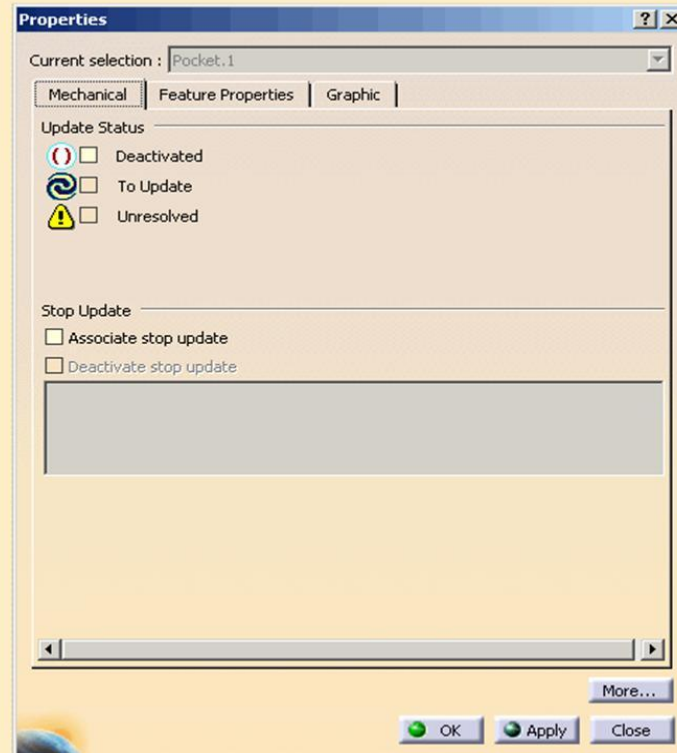
## Define in Work Object (2/2)

- The current work object is underlined in the specification tree.
- By setting the work object to particular features, the model can be captured at various stages of design.

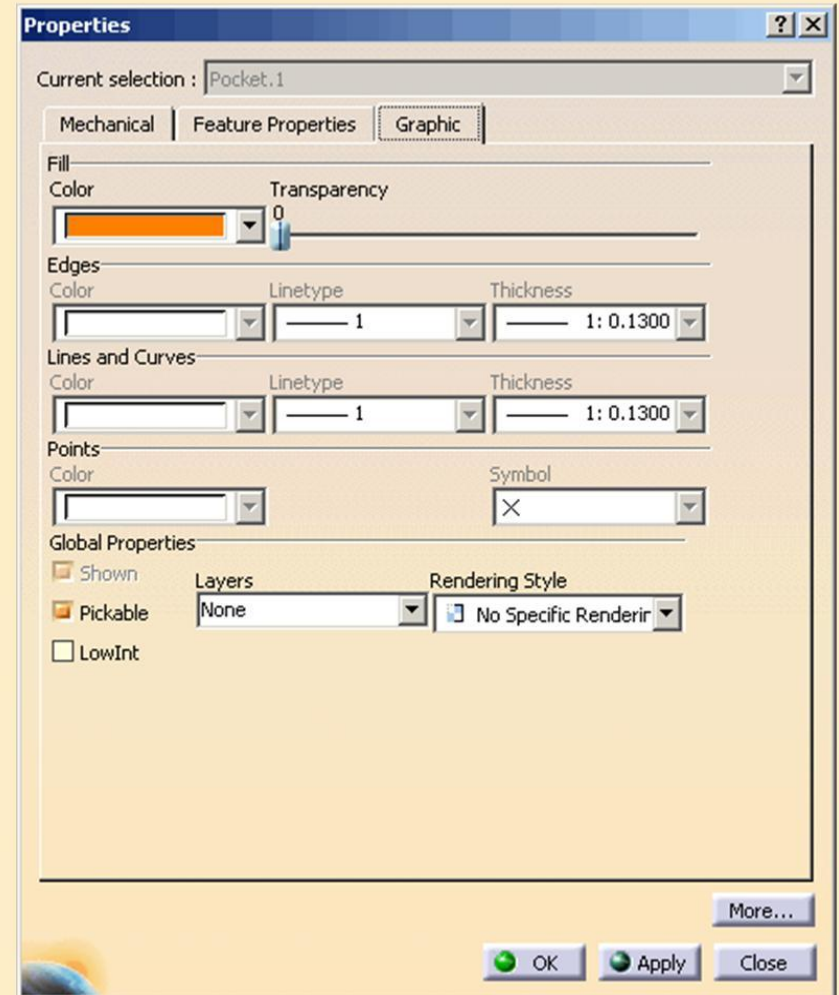
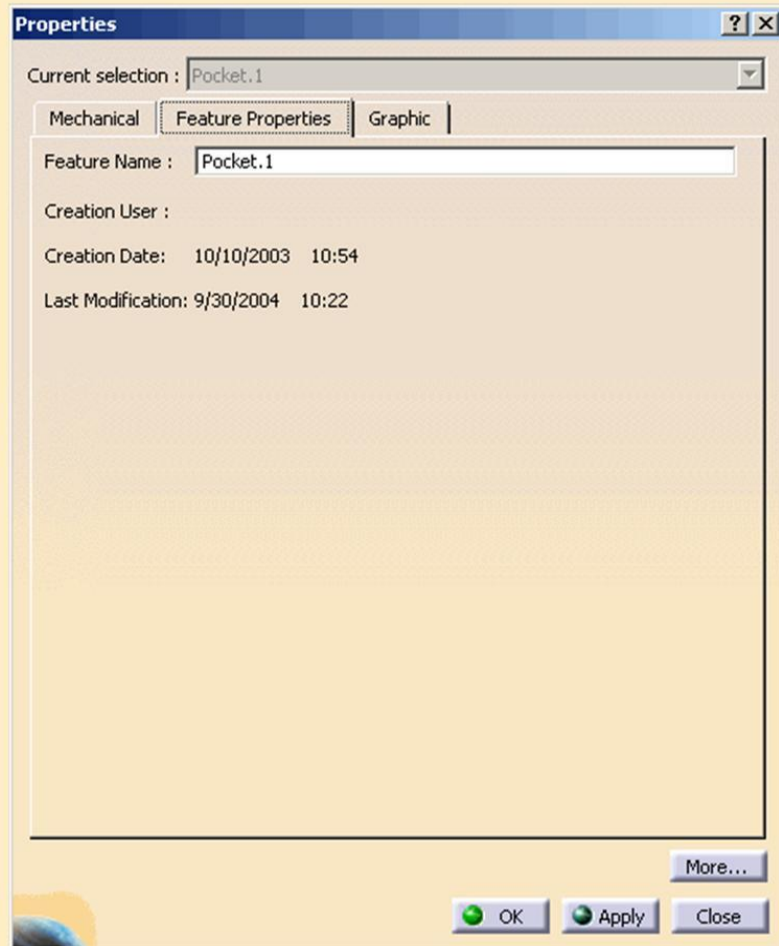


# Properties (1/2)

- Features can be individually customized in both appearance and function by the **Properties** menu option.



# Properties (2/2)

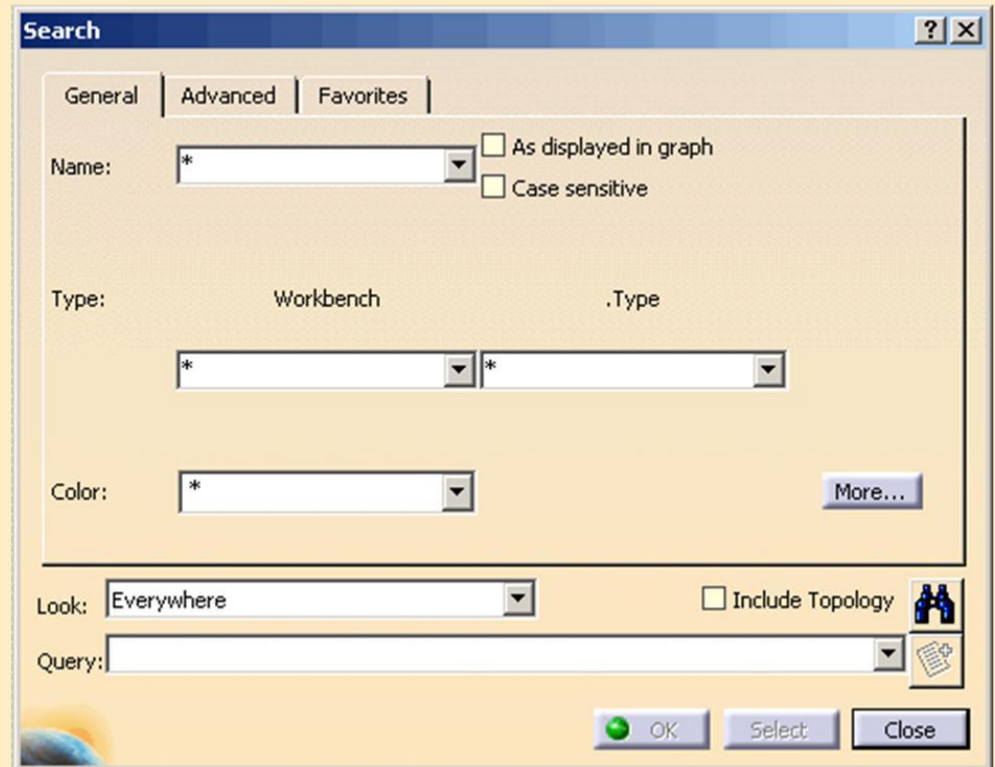




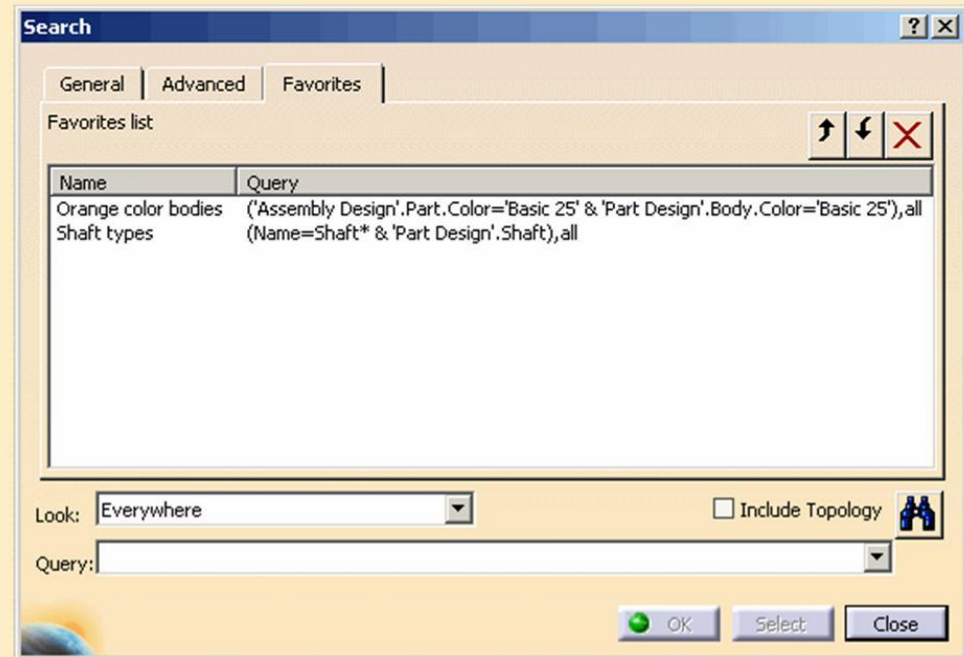
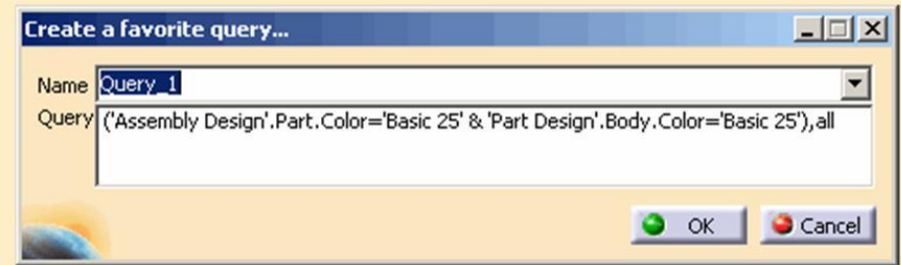
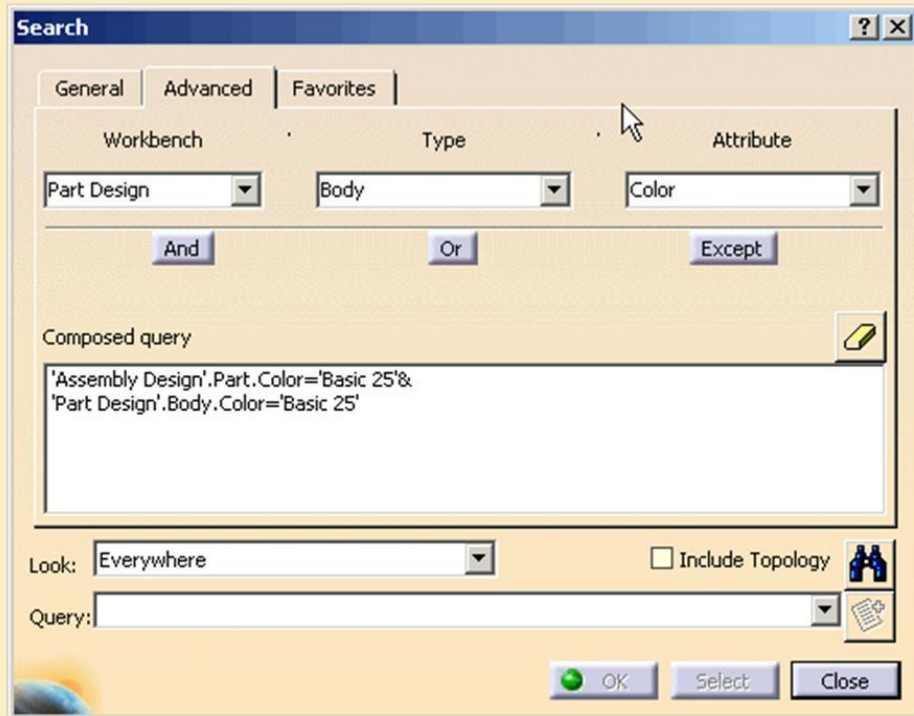
# Filters (1/2)

The search window contains three tabs that define three types of search methods:

- General
- Advanced
- Favorites

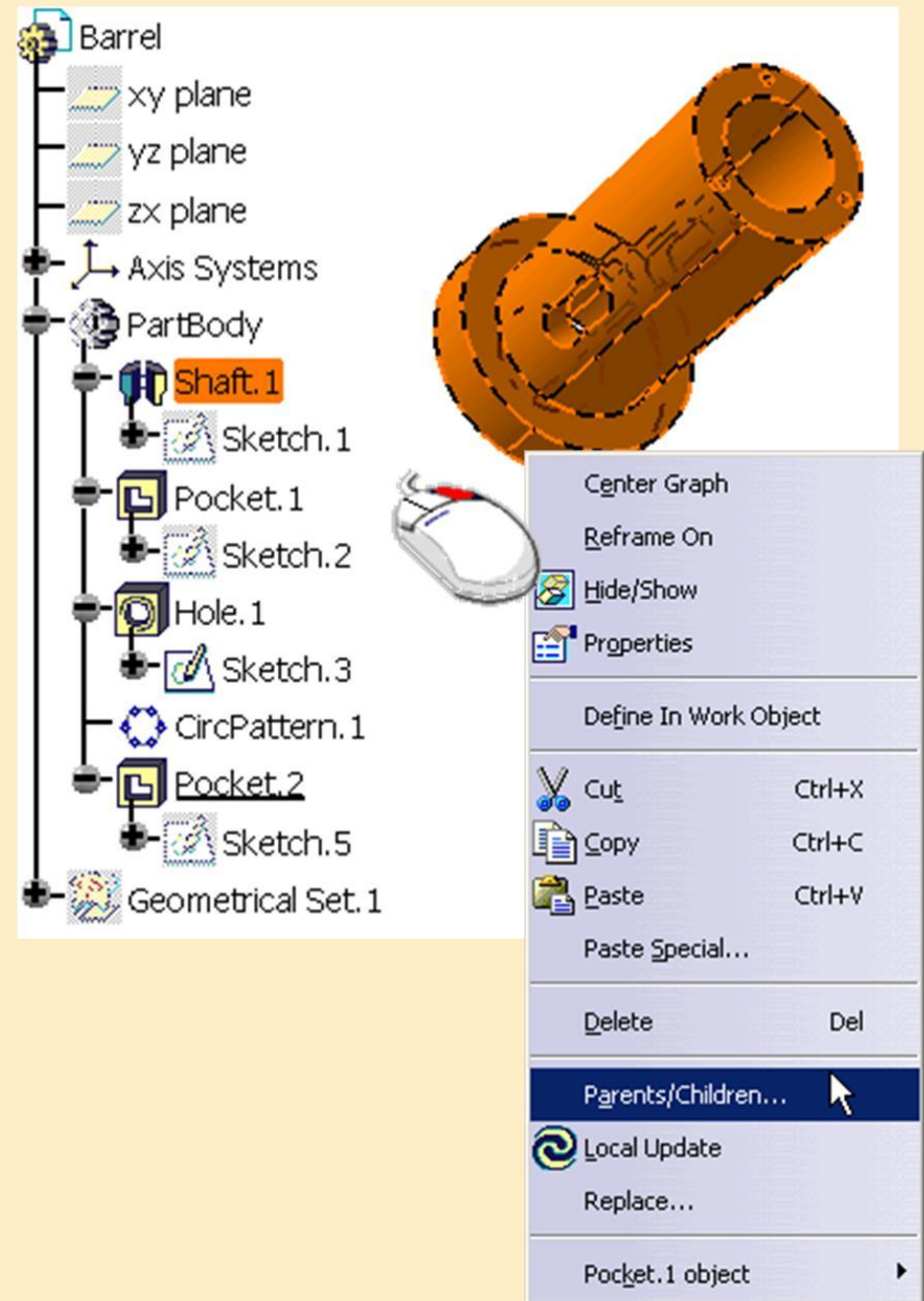
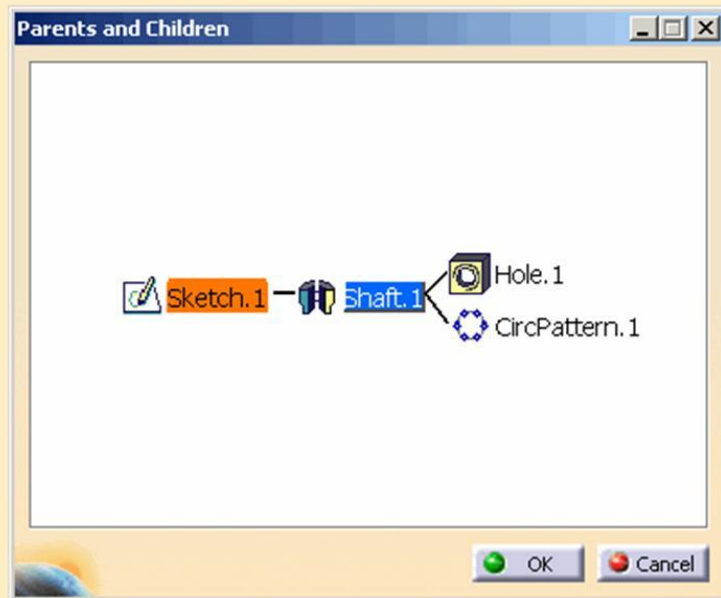


# Filters (2/2)



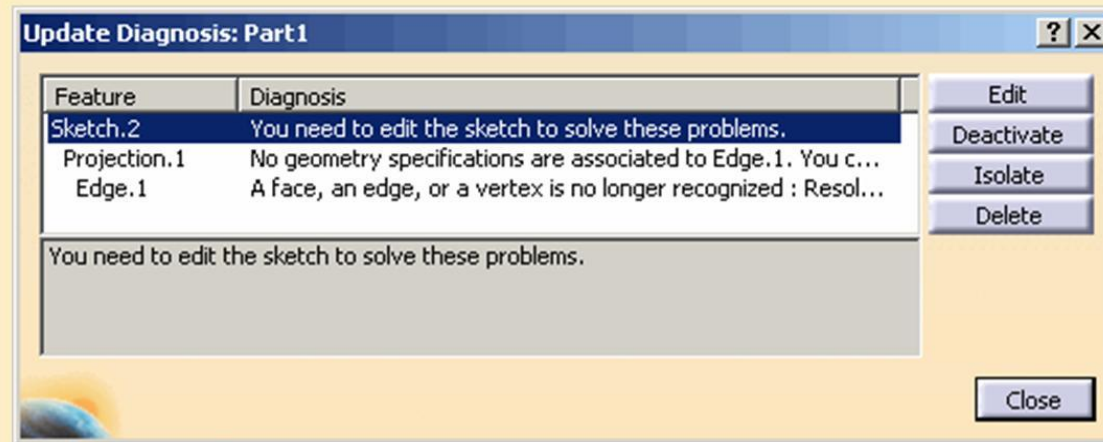
# Parent-Child Relationships

The references that exist between features either through the process of creation or by association are called parent-child relationships.



# Resolving Feature Failures (1/4)

- Creating or modifying features can sometimes result in feature failures.
- When a feature fails due to reasons other than the inability to create geometry, an Update Diagnosis window appears that gives information on why the failure has occurred.

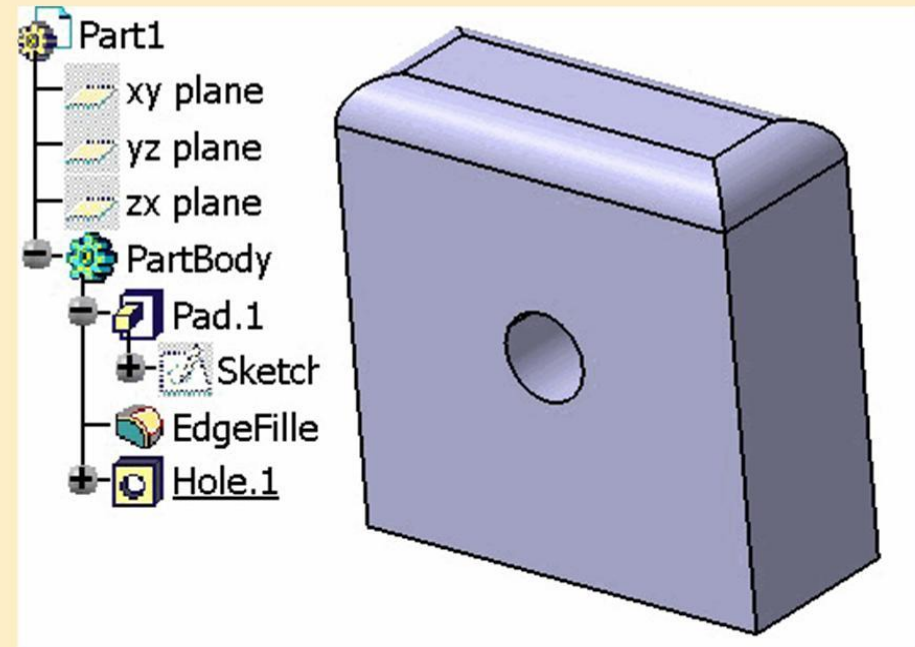




## Resolving feature failures (2/4)

Use the following steps to resolve a feature failure:

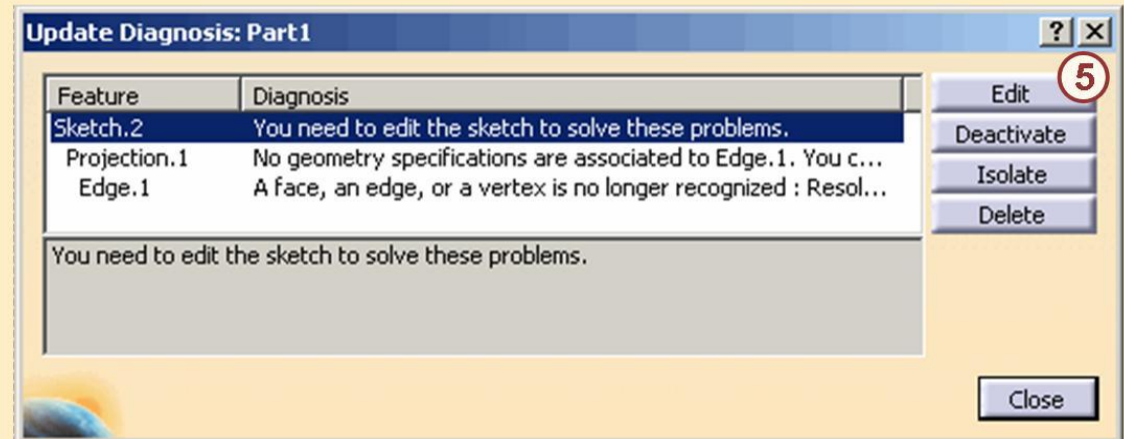
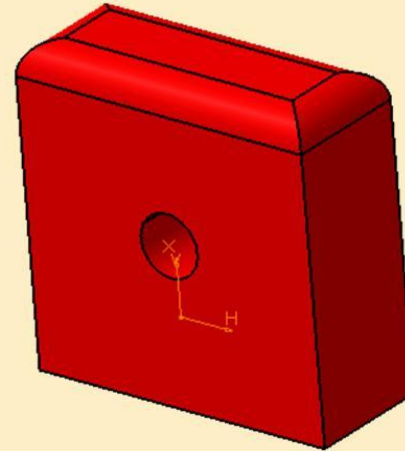
1. Select the Edgefillet feature, right-click and click **Delete**.
2. In the delete window, make sure the **Delete all children** option is not selected, since you do not want to remove anything except the edge fillet.
3. Select **OK**.



## Resolving feature failures (3/4)

Use the following steps to resolve a feature failure (continued):

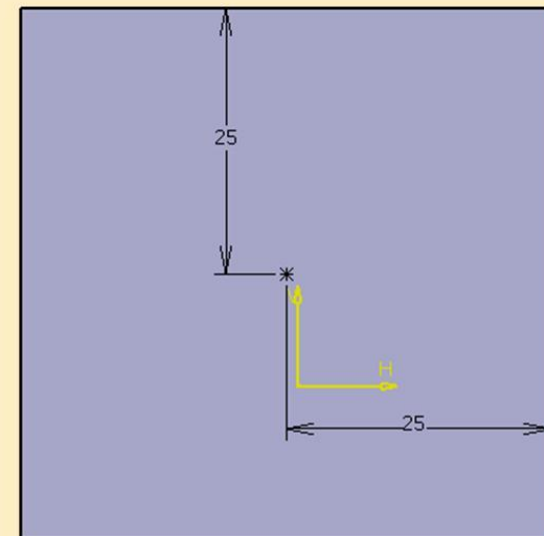
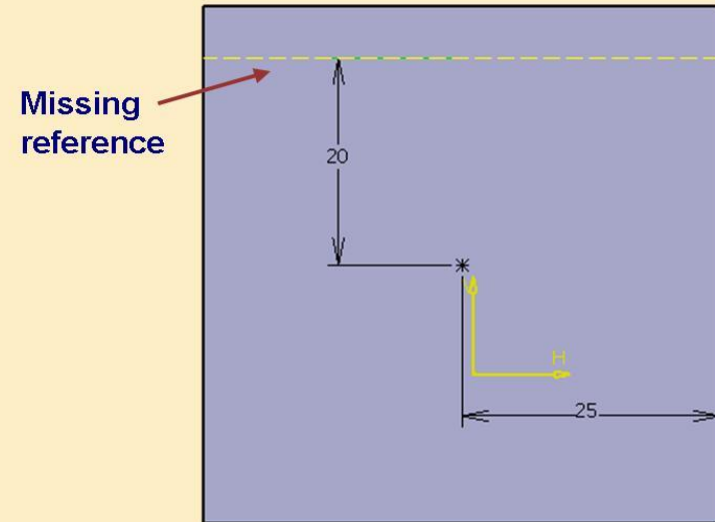
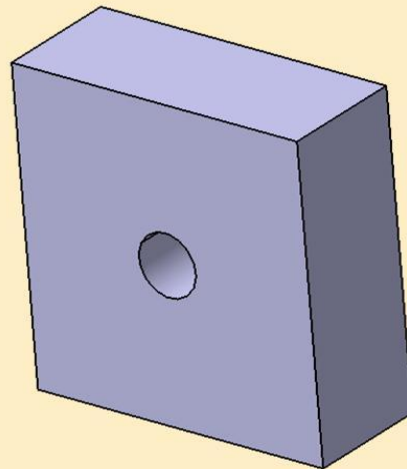
4. Once the feature is deleted, the Update Diagnosis window appears, and the model appears in red to show that it is not fully updated
5. The Update Diagnosis indicates a problem with Sketch.2, and that an edge is no longer recognized.
6. Select the **Edit** icon.



# Resolving feature failures (4/4)

Use the following steps to resolve a feature failure (continued):

7. The sketcher environment is launched to edit Sketch.2.
8. Review the sketch and notice that the hole placement was dimensioned to the previous edge fillet edge. The hole placement reference was also deleted when the edge fillet was deleted.
9. Delete and recreate the dimension to an existing edge and exit sketcher. The failure is resolved.

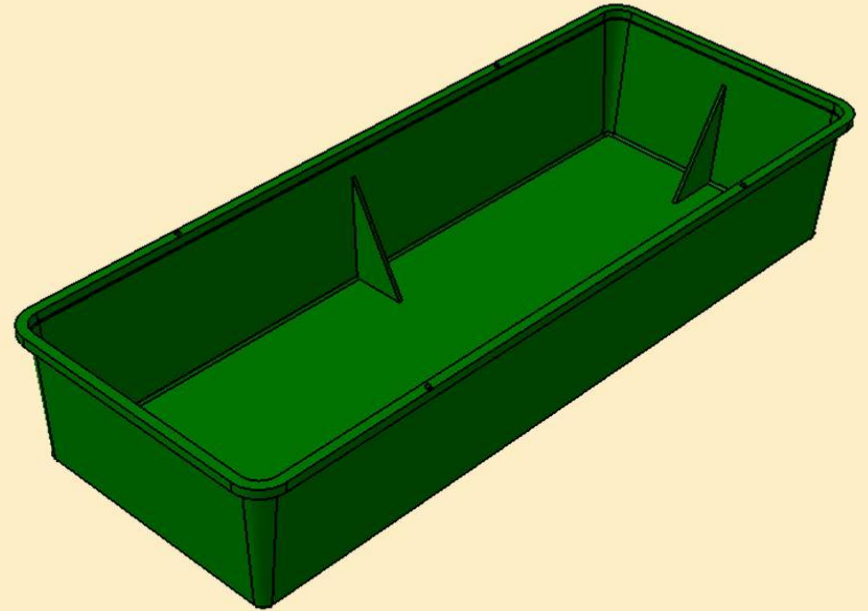


# To Sum up...

Using the knowledge learned in this lesson, you will create the Casing shown on the right.

The Casing will require the following:

- ✓ Creation of a draft feature
- ✓ Creation of stiffeners
- ✓ Editing of feature properties
- ✓ Creation of taps

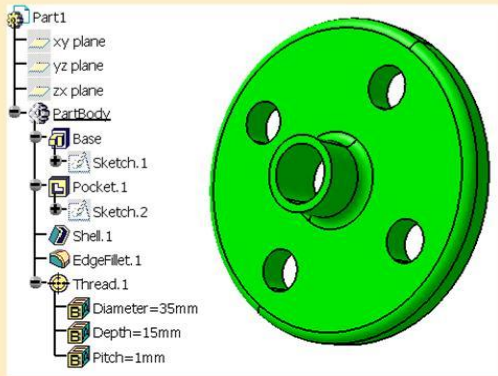




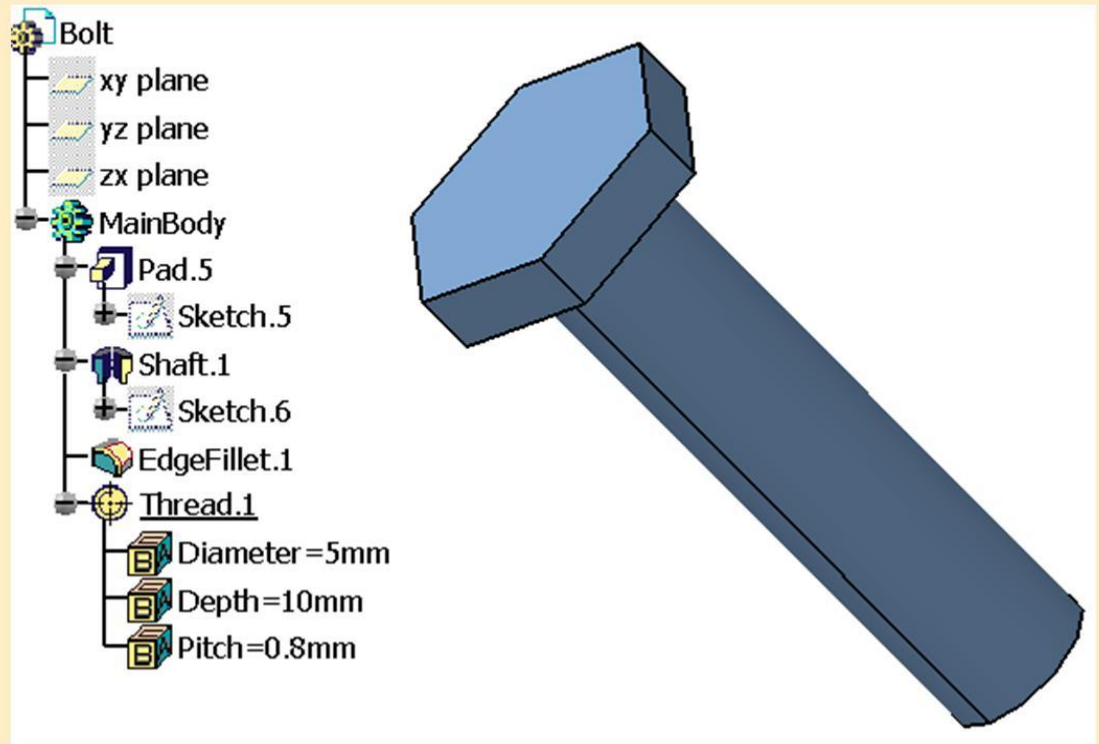
# Exercise Overview

You will practice what you have learned by working through three exercises.

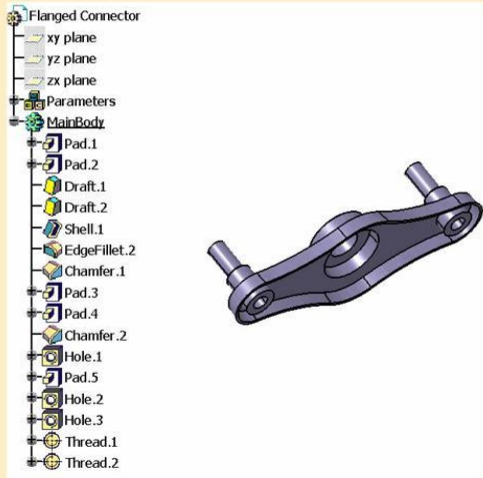
## Exercise 5D



## Exercise 5F



## Exercise 5E

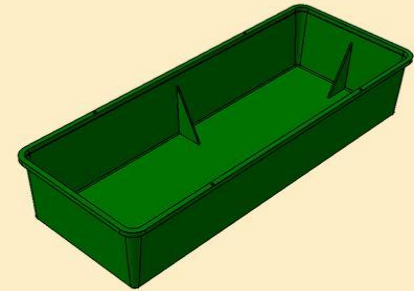


# Case Study: Dress-up Features

*You will practice what you learned by completing the case study model.  
Recall the design intent of this model:*

*Recall the design intent of this model:*

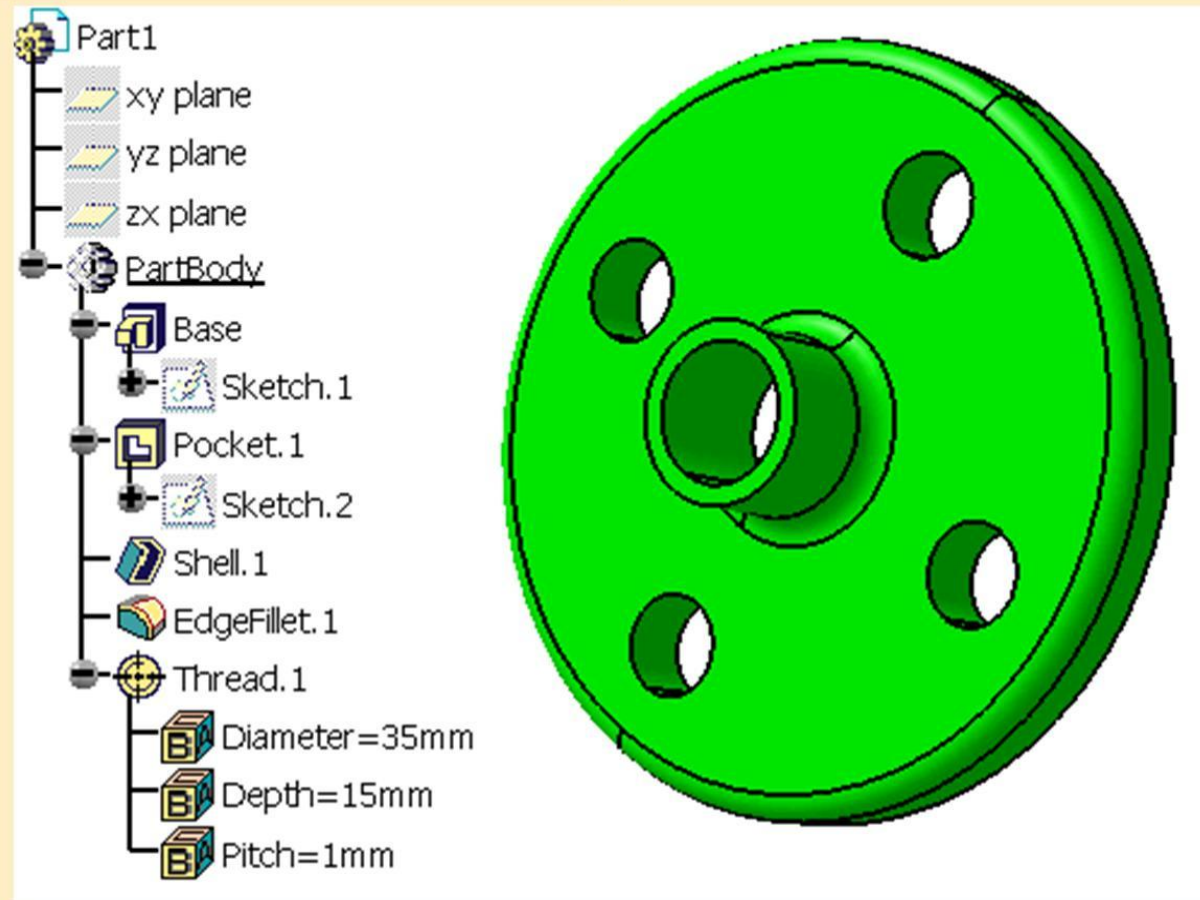
- ✓ The inner ribs should be created using stiffener features
- ✓ The casing should contain a 4 degree draft
- ✓ The casing should have taps defined for any holes



*Using the techniques you have learned in this and previous lessons  
create the model without detailed instruction.*

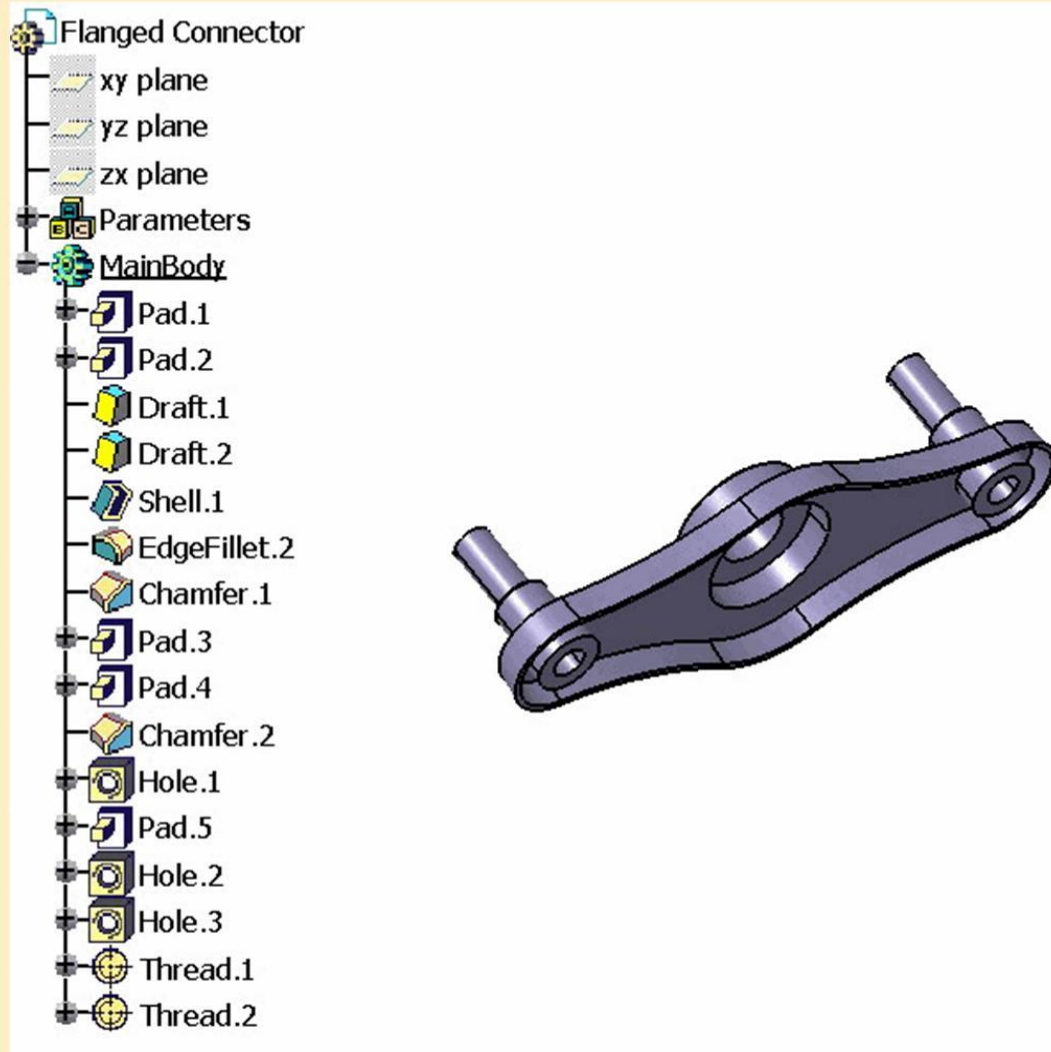
# Exercise 5D: Recap

- ✓ Create a thread/tap
- ✓ Reorder a feature
- ✓ Change the properties of a feature



# Exercise 5E: Recap

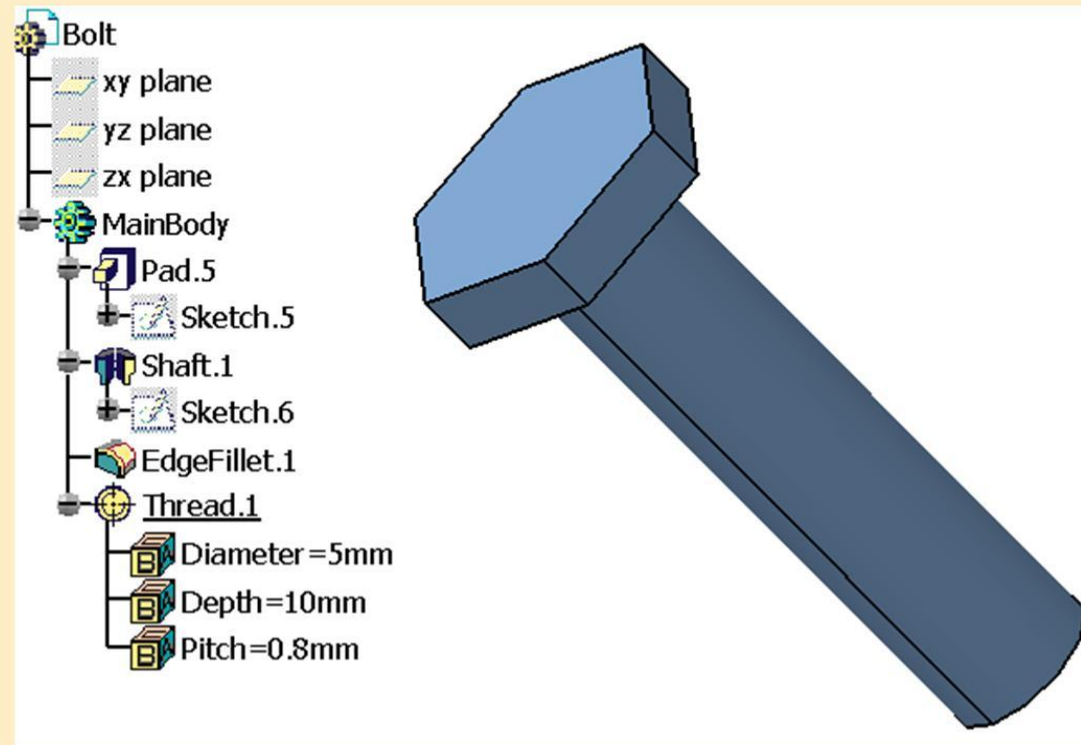
- ✓ Troubleshoot a part that contains features that fail.



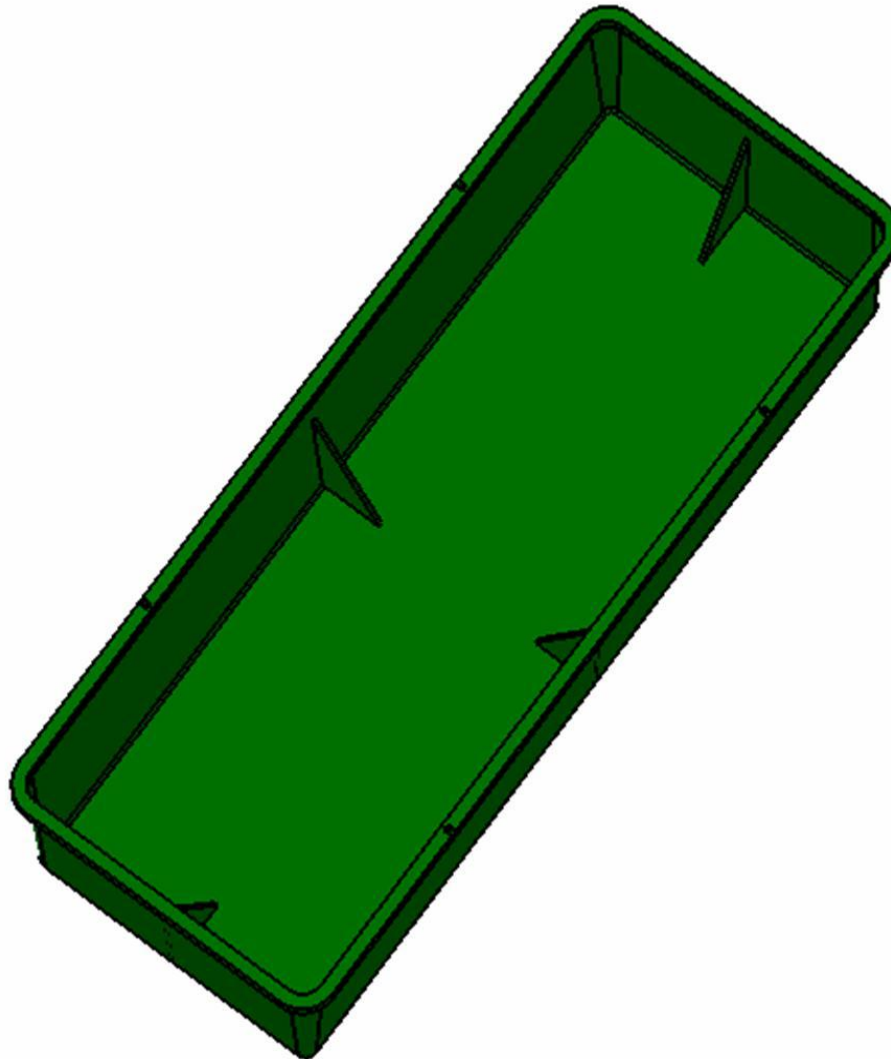
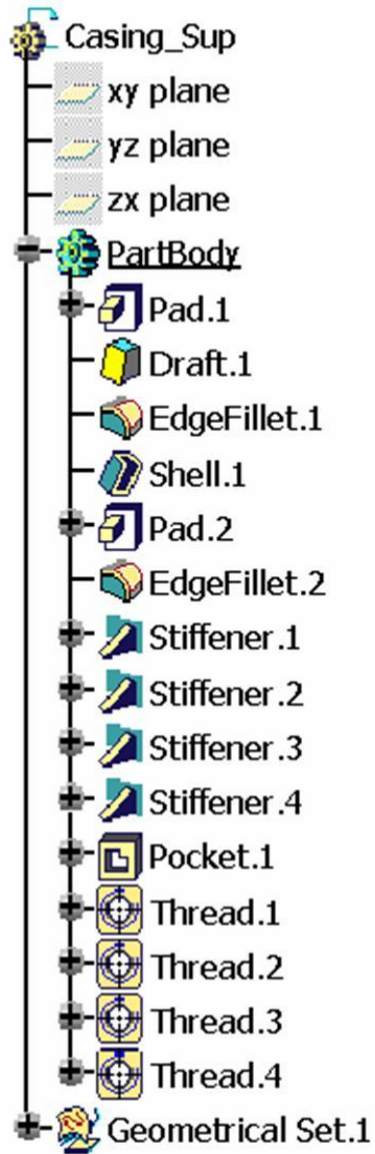


# Exercise 5F: Recap

✓ Create a thread.



# Case Study: Casing Recap



- ✓ The inner ribs should be created using stiffener features.
- ✓ The casing should contain a 4 degree draft.
- ✓ The casing should have taps defined for any holes.