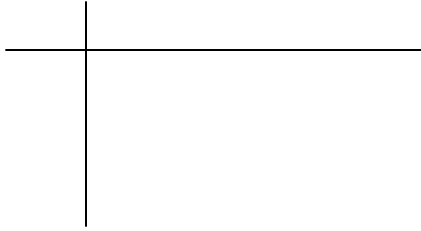
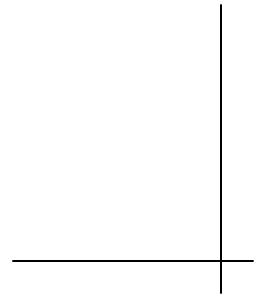


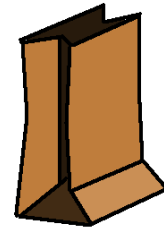
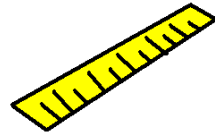
## LUNCH 'N LEARN

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Macros

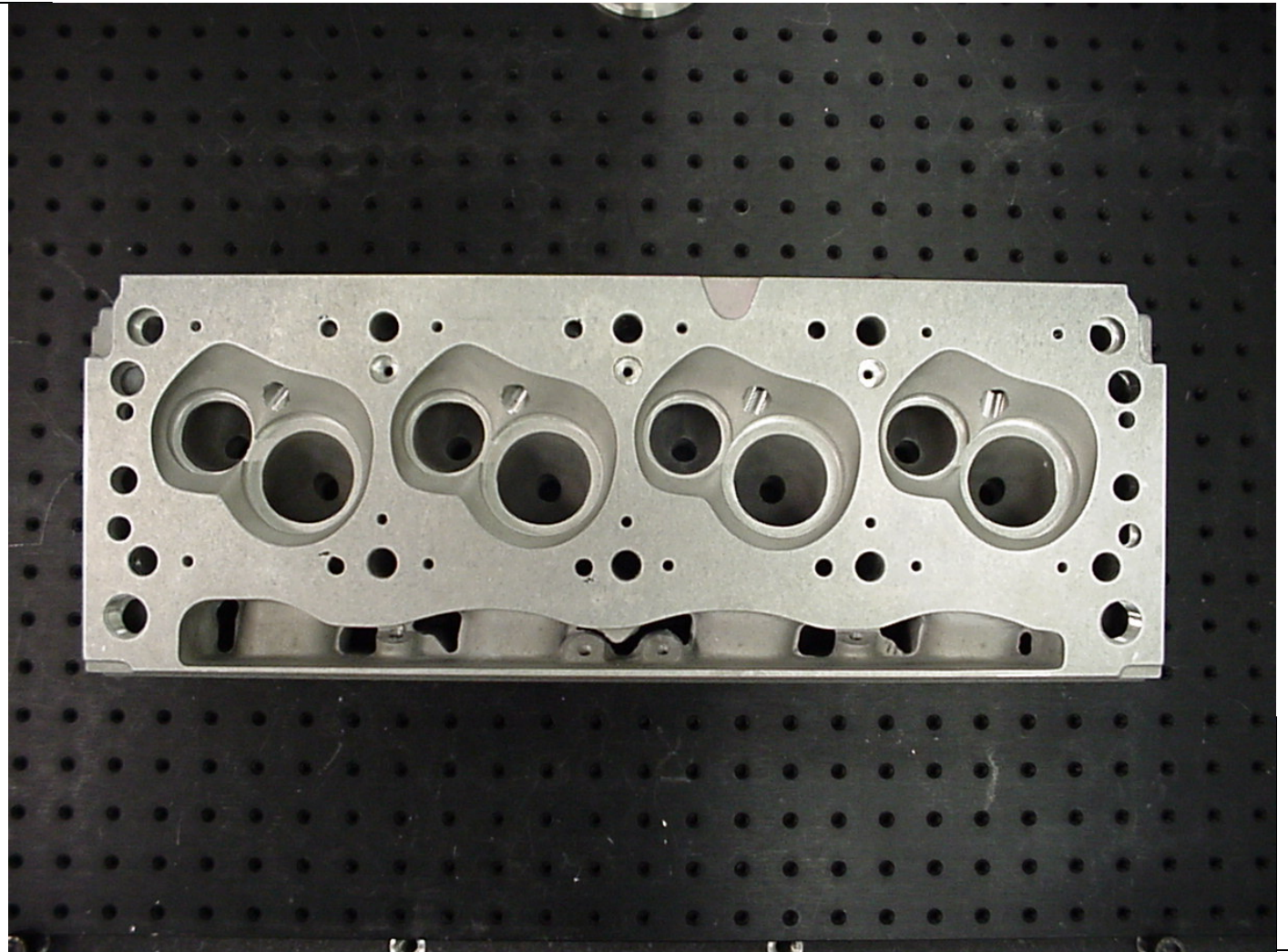


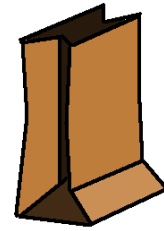
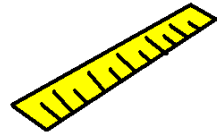


## LUNCH 'N LEARN

Macros are similar to patterns and are used on parts with repeating features and characteristics.

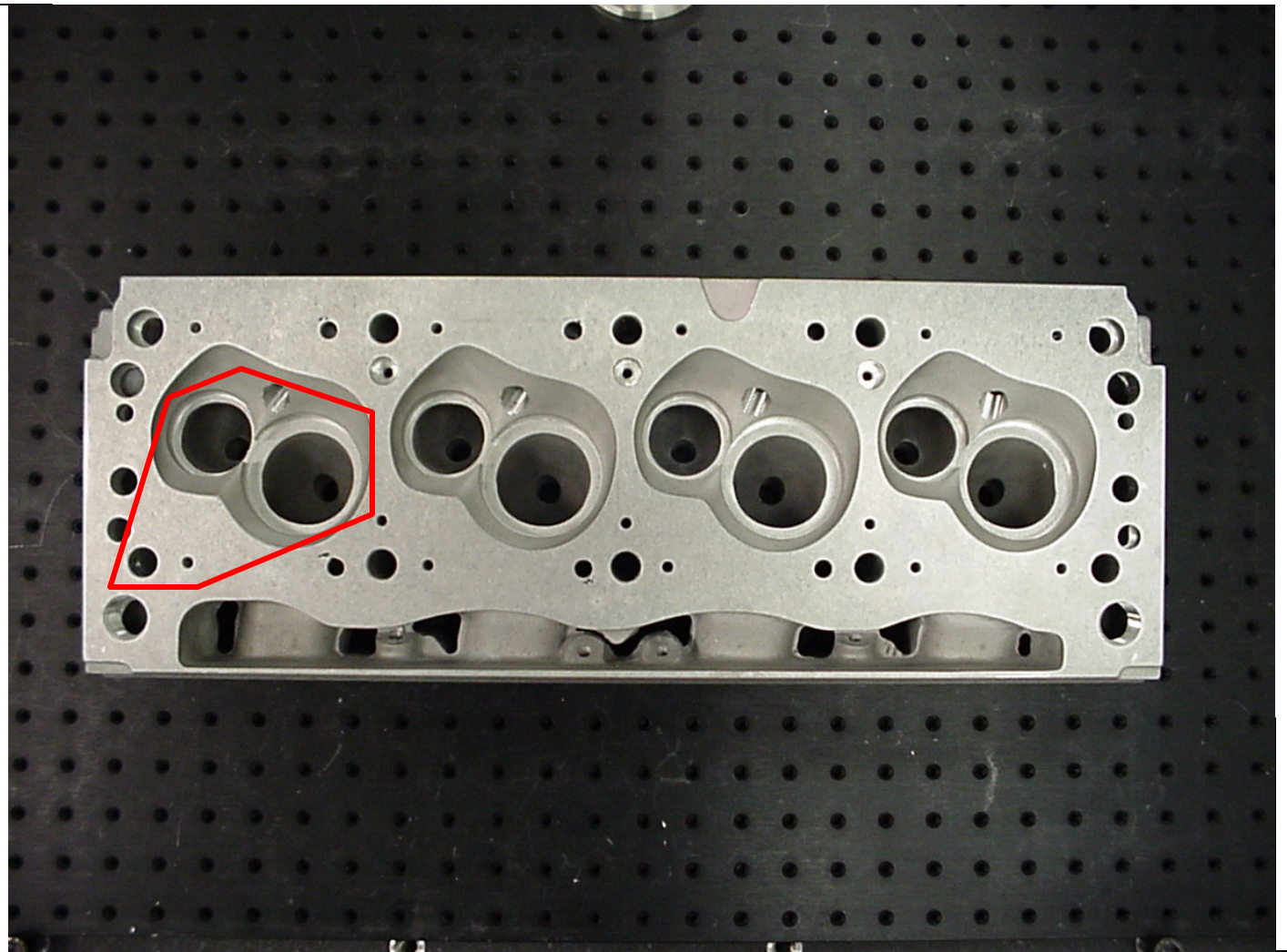
A perfect example is this cylinder head.



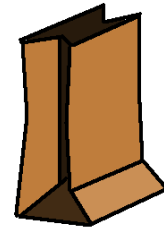
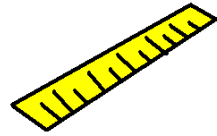


## LUNCH 'N LEARN

Here we see a group of features that are all repeated in a linear pattern.

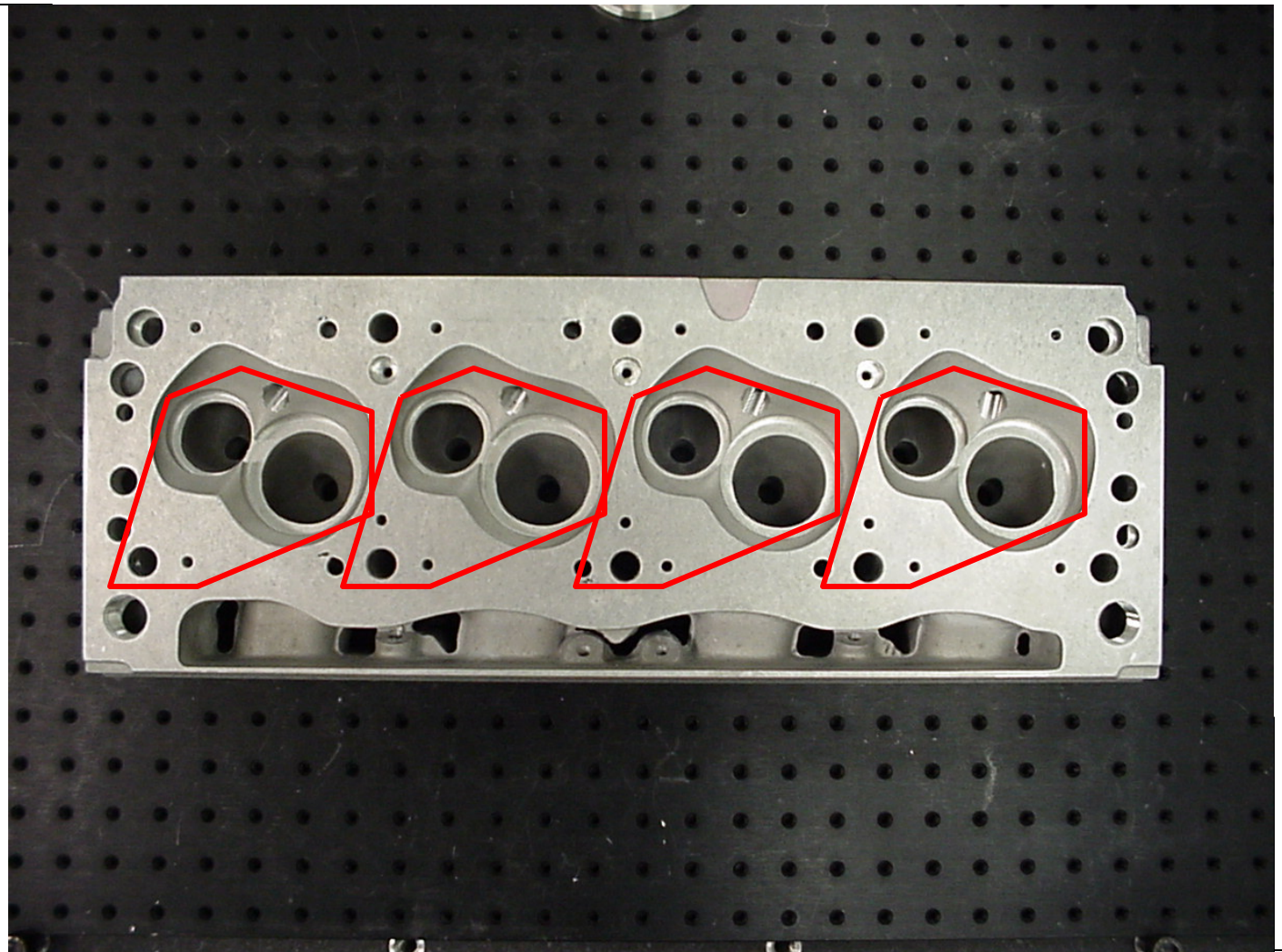


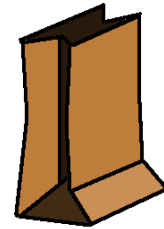
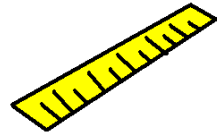




## LUNCH 'N LEARN

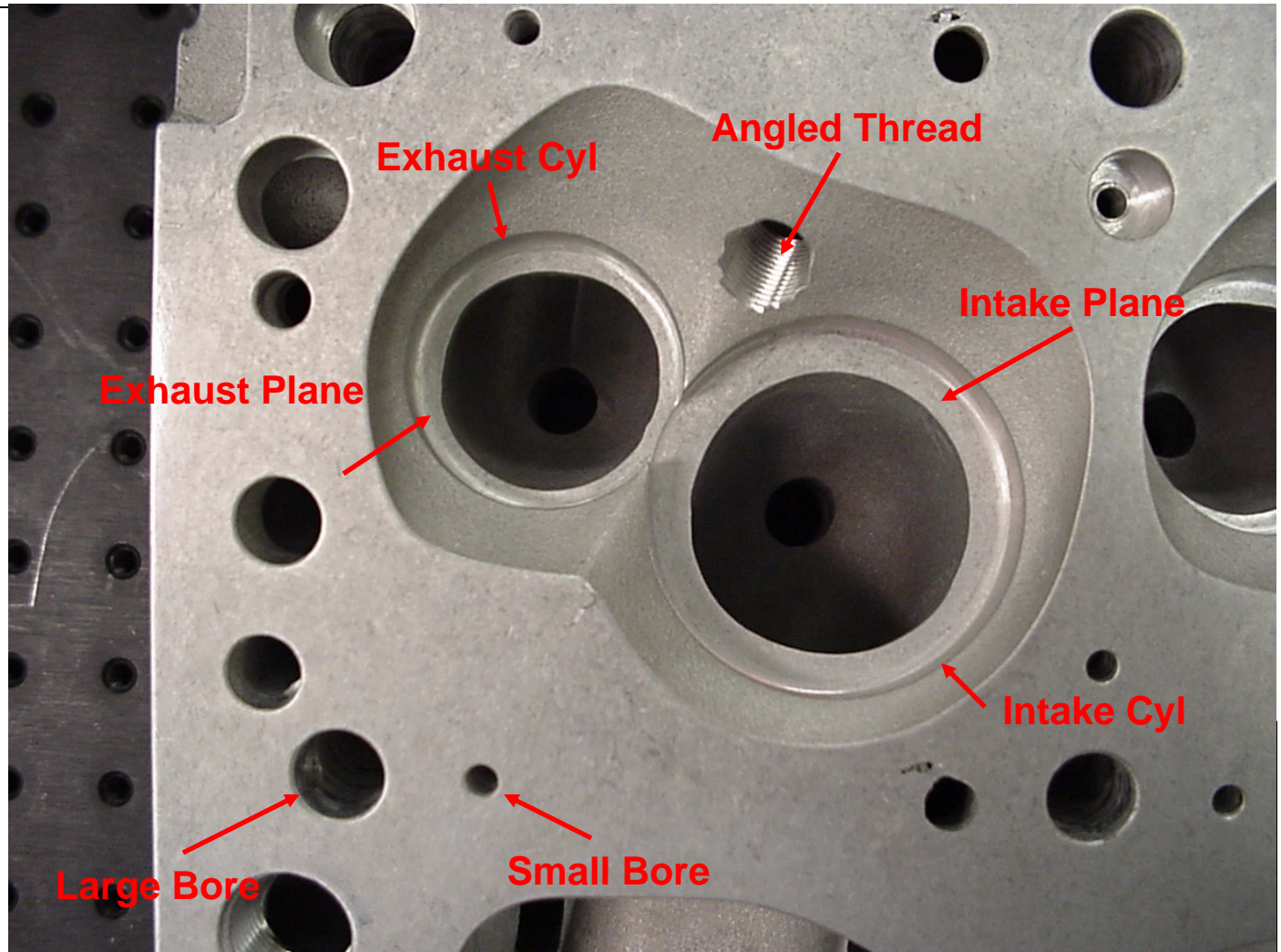
Here we see a group of features that are all repeated in a linear pattern.

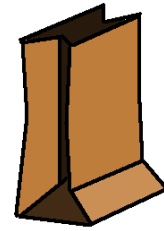
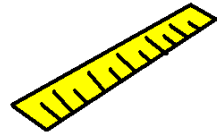




# LUNCH 'N LEARN

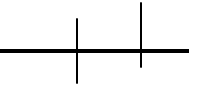
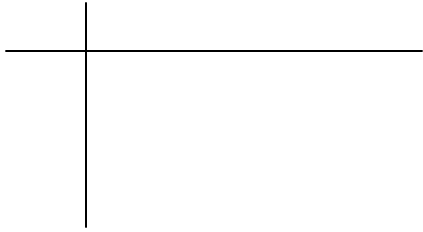
All seven of these features are found in the linear pattern of the cylinder head, and therefore they (along with their characteristics) will make up our Macro.



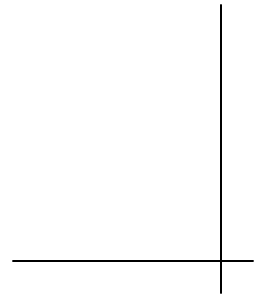


# LUNCH 'N LEARN

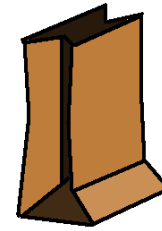
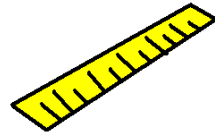
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Macro Set-Up



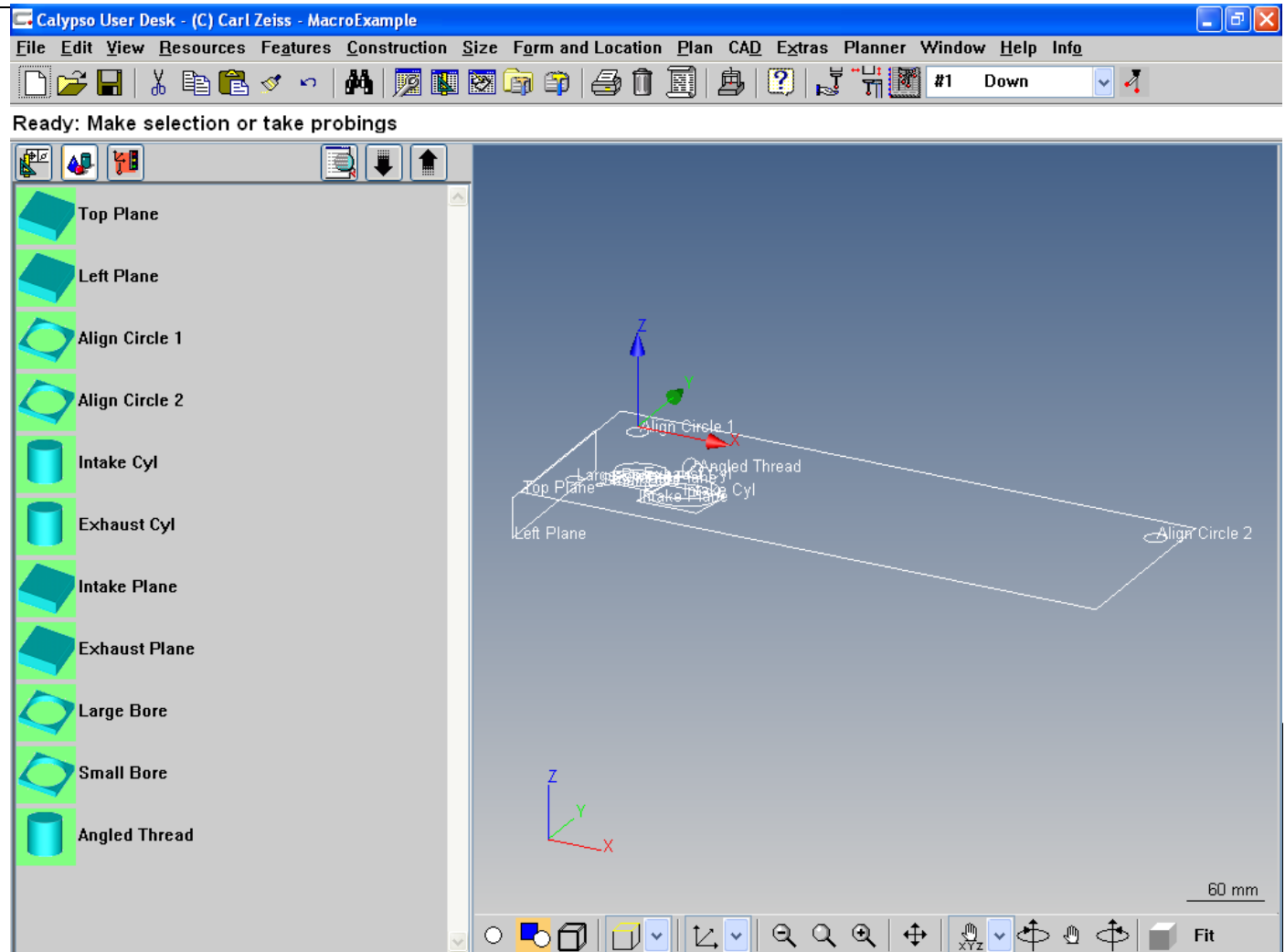


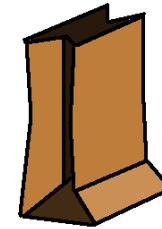
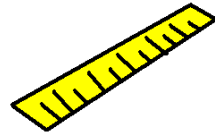


# LUNCH 'N LEARN

We begin by writing a full program including a Base Alignment for the first set of Macro features and characteristics.

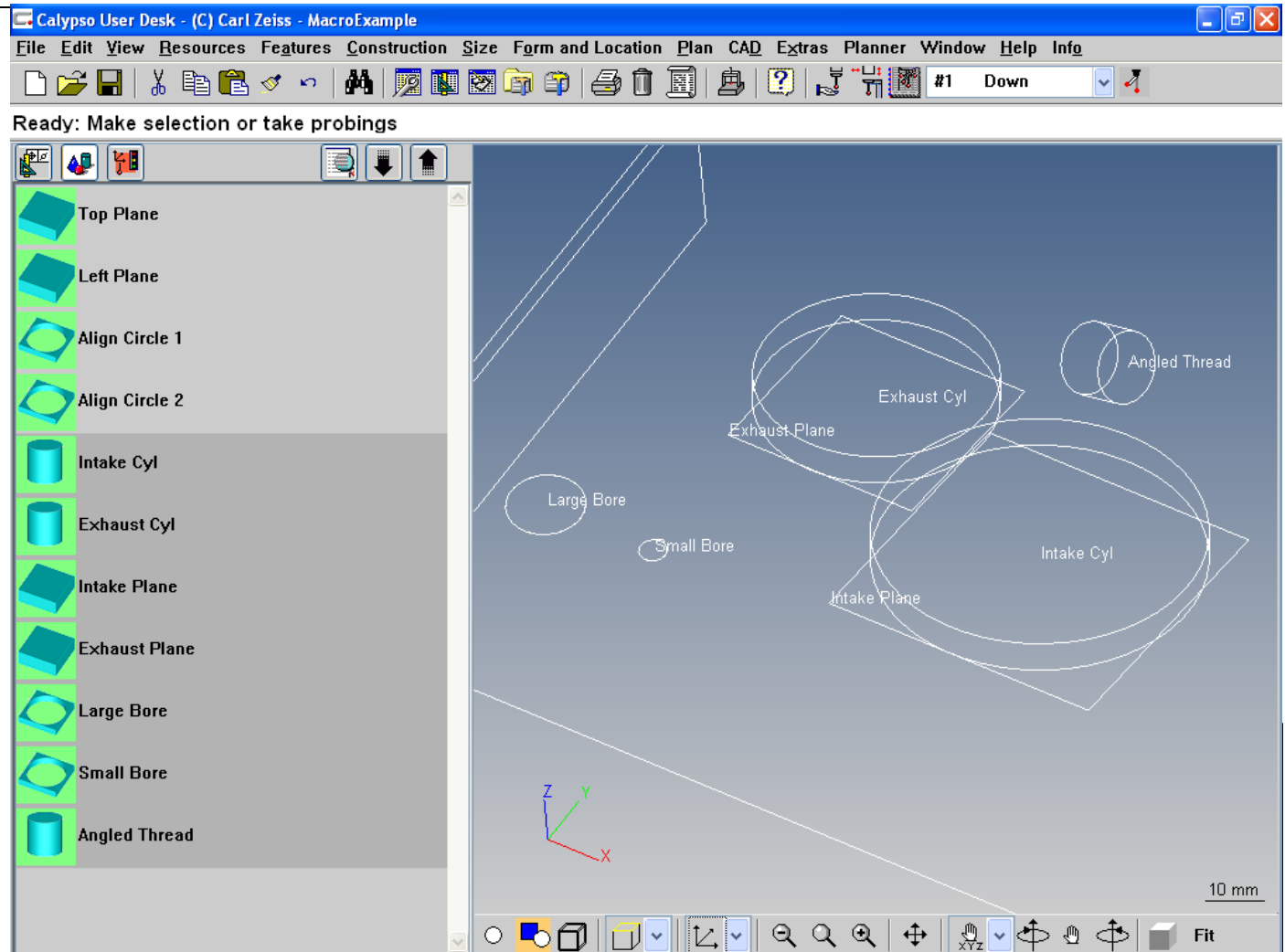
This program will be referred to as the Base Program.



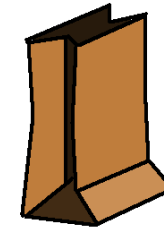
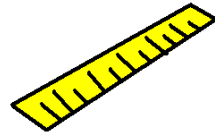


# LUNCH 'N LEARN

These are the seven features that will make up our Macro.

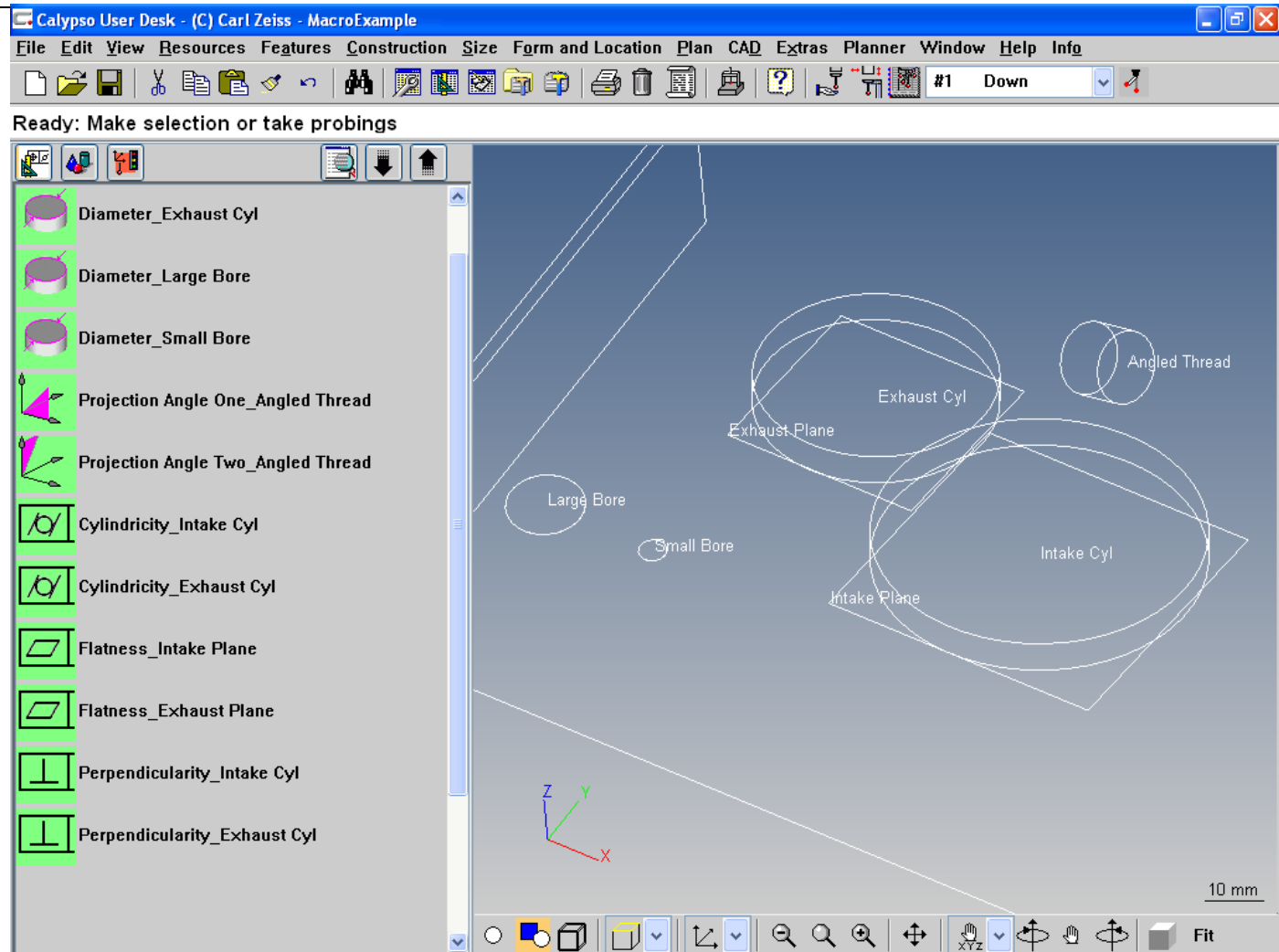


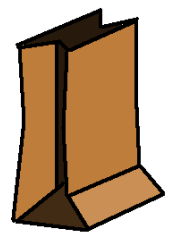
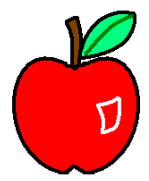
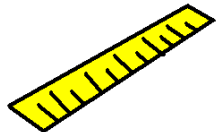




# LUNCH 'N LEARN

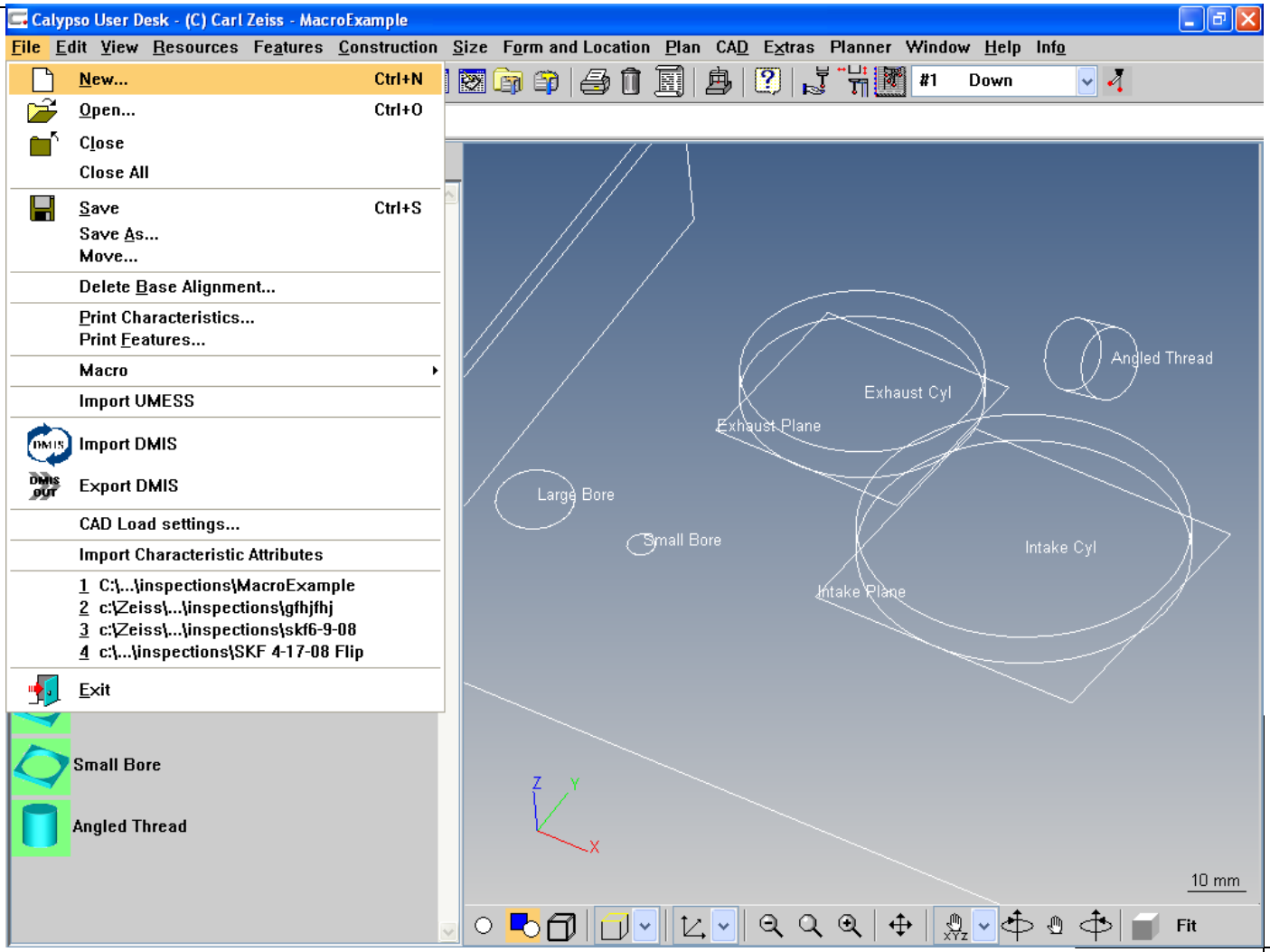
These are the characteristics that are associated with our Macro features.

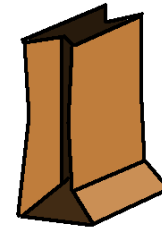
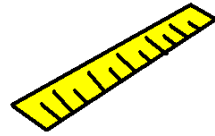




# LUNCH 'N LEARN

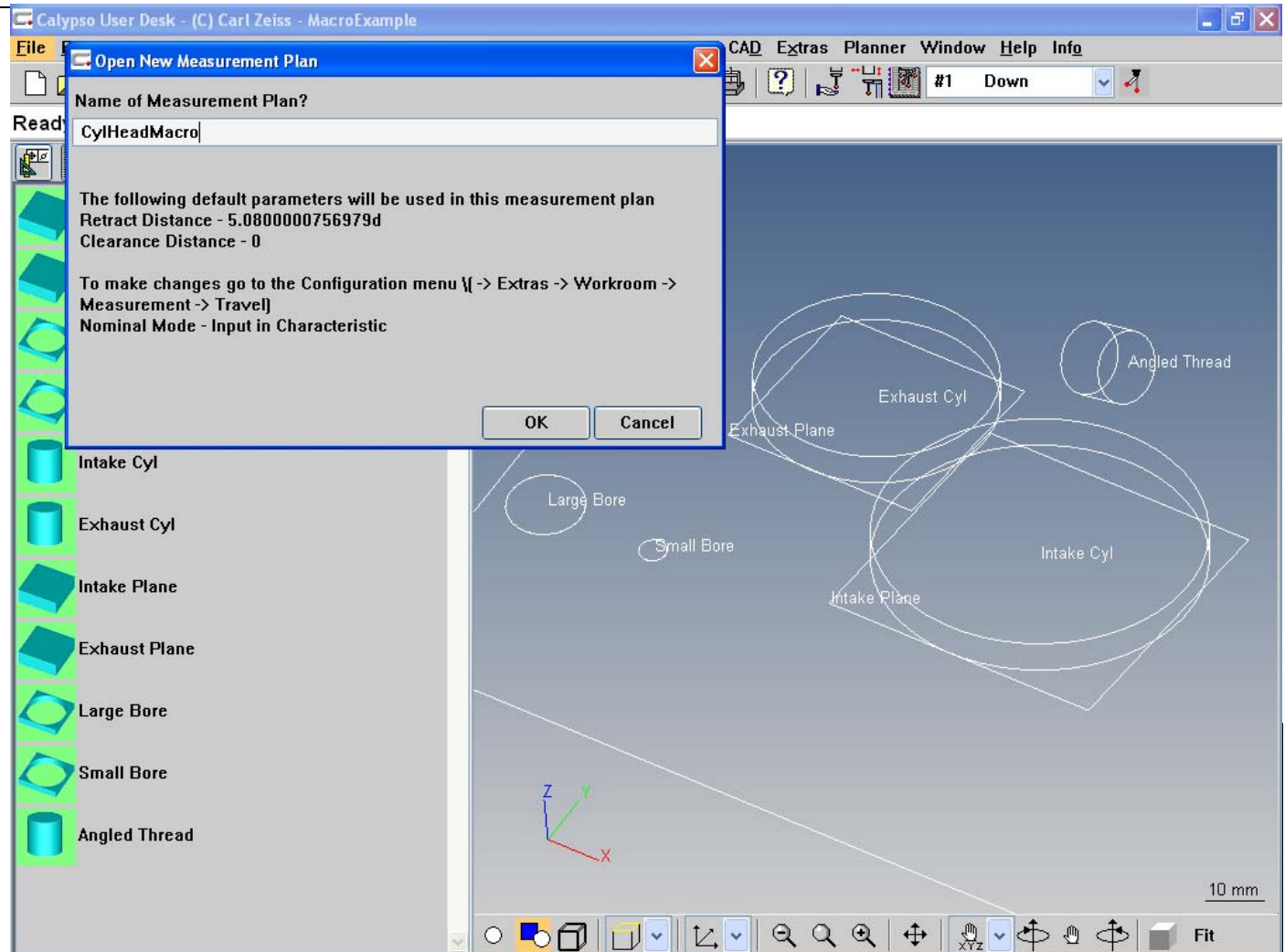
Now, to create our Macro, we start a new measurement plan.



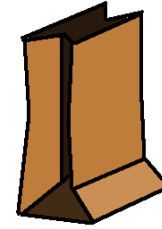
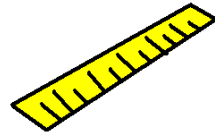


# LUNCH 'N LEARN

The name of the measurement plan will be the name of your Macro.

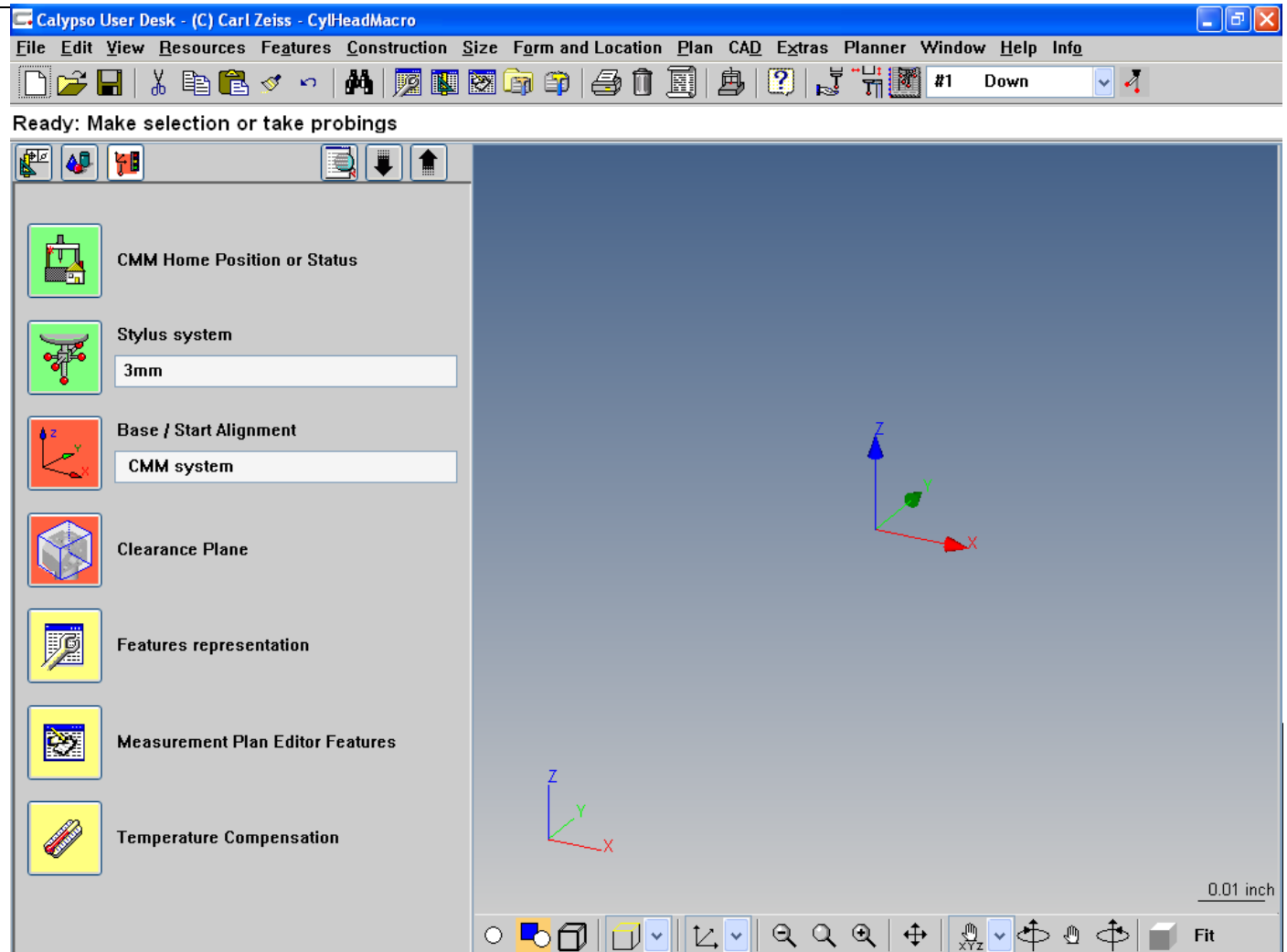


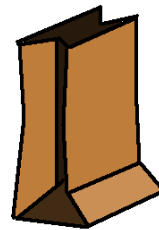
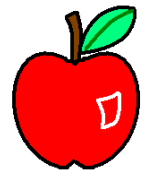
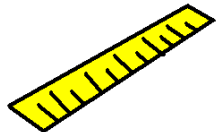




# LUNCH 'N LEARN

This program will be referred to as the Macro Program.

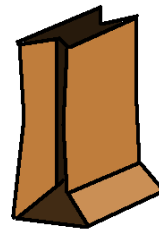
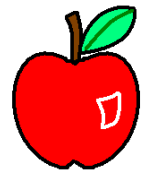
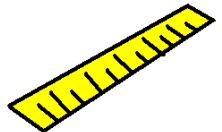




# LUNCH 'N LEARN

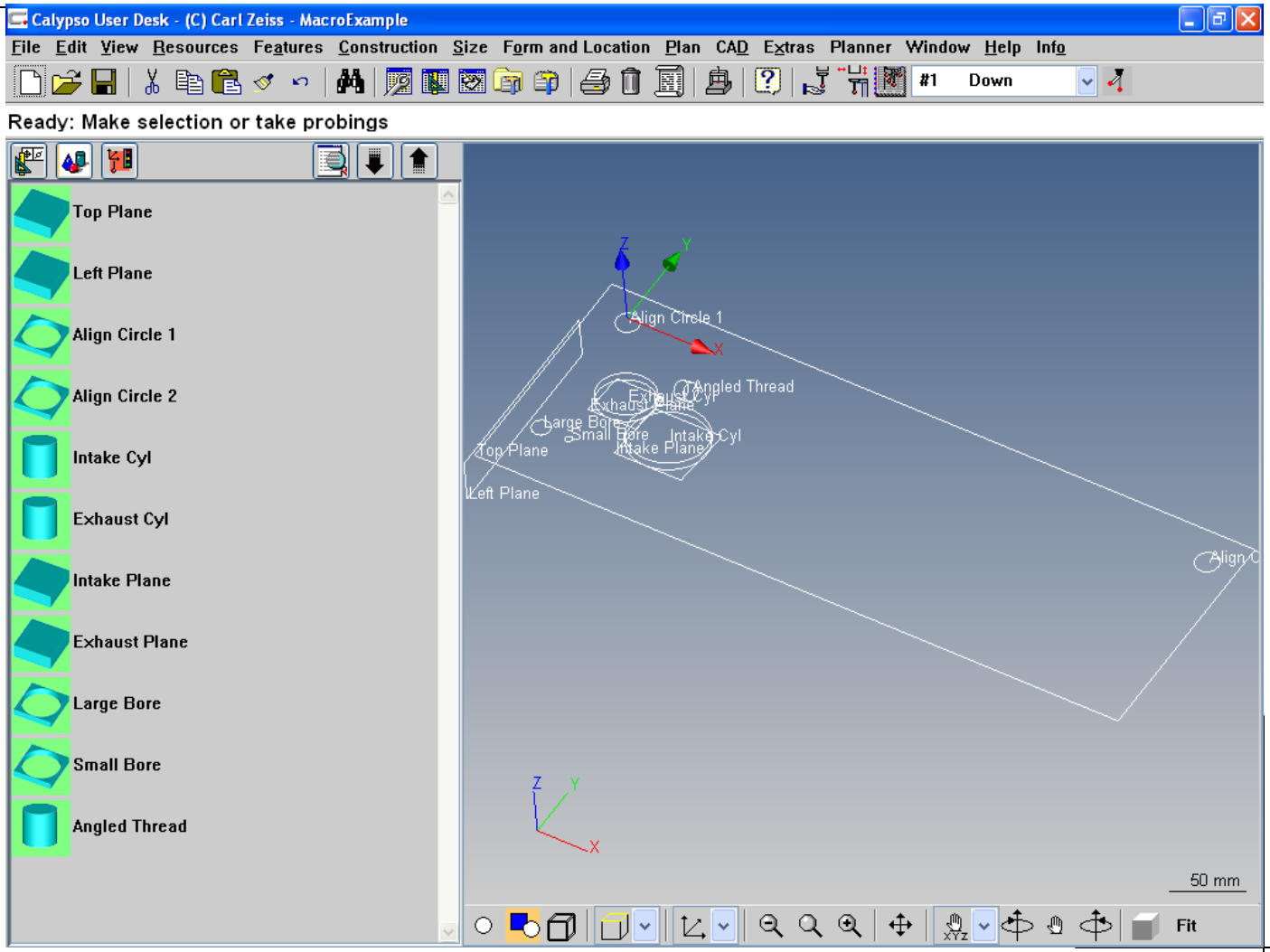
Switch back to your Base Program.

The screenshot shows the Calypso User Desk software interface. The title bar reads "Calypso User Desk - (C) Carl Zeiss - CylHeadMacro". The menu bar includes File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, Help, and Info. The toolbar contains various icons for file operations and tool management. The main workspace is titled "Ready: Make selection or take probings" and features a left-hand sidebar with several functional buttons: "CMM Home Position or Status", "Stylus system" (set to 3mm), "Base / Start Alignment" (set to CMM system), "Clearance Plane", "Features representation", "Measurement Plan Editor Features", and "Temperature Compensation". The central workspace displays a 3D coordinate system with X, Y, and Z axes. A status bar at the bottom right indicates a scale of "0.01 inch". A window menu is open, showing "dave3", "gfdghdghdgh", "MacroExample", and "CylHeadMacro".

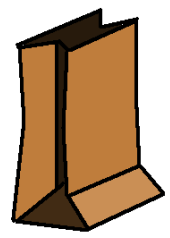
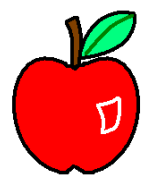
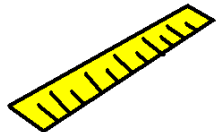


# LUNCH 'N LEARN

Switch back to your Base Program.

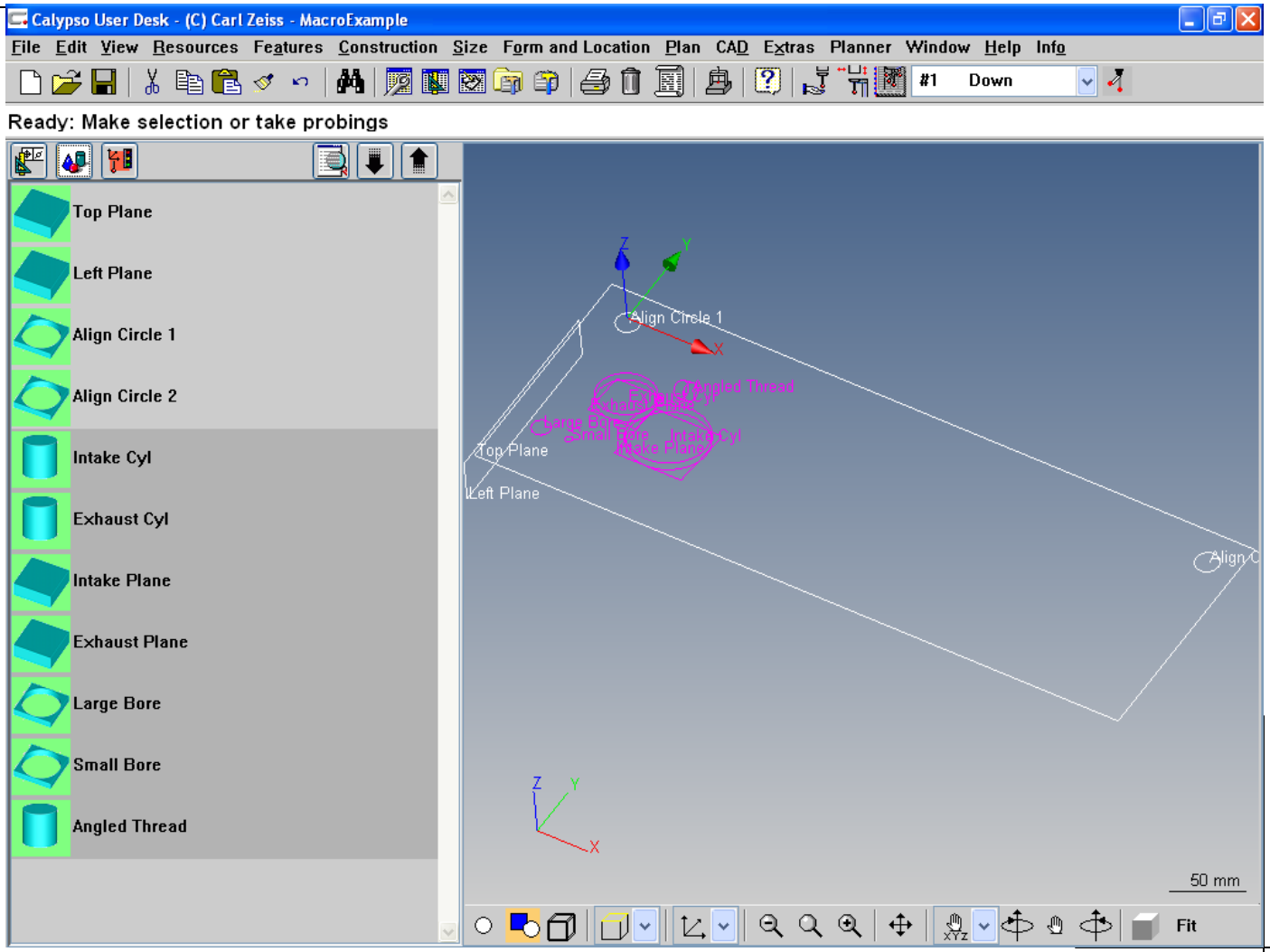


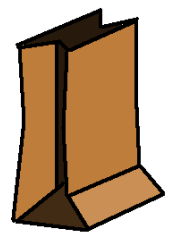
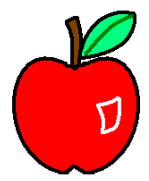
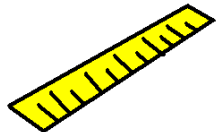




# LUNCH 'N LEARN

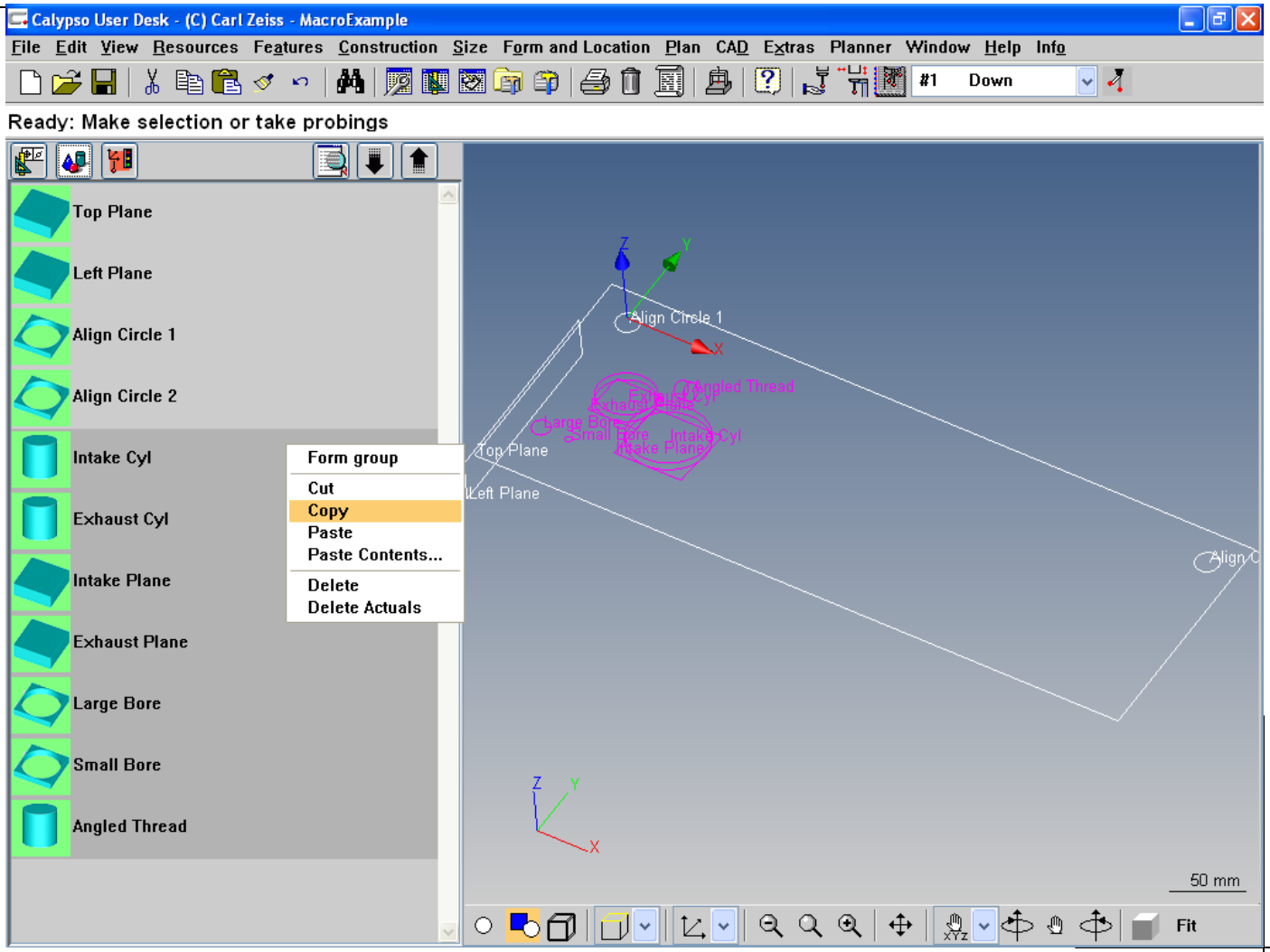
Now we copy our seven features that make up our Macro.

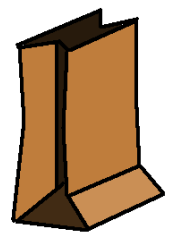
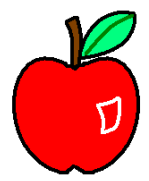
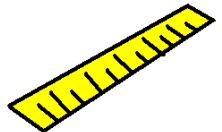




# LUNCH 'N LEARN

Now we copy our seven features that make up our Macro.





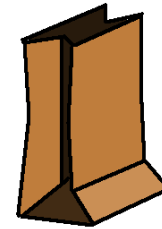
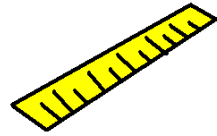
# LUNCH 'N LEARN

Back in the Macro Program...

The screenshot shows the Calypso User Desk interface. The title bar reads "Calypso User Desk - (C) Carl Zeiss - MacroExample". The menu bar includes File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, Help, and Info. The toolbar contains various icons for file operations and tool management. A dropdown menu is open, showing the following items: "dave3", "gfdghdghdgh", "MacroExample" (checked), and "CylHeadMacro".

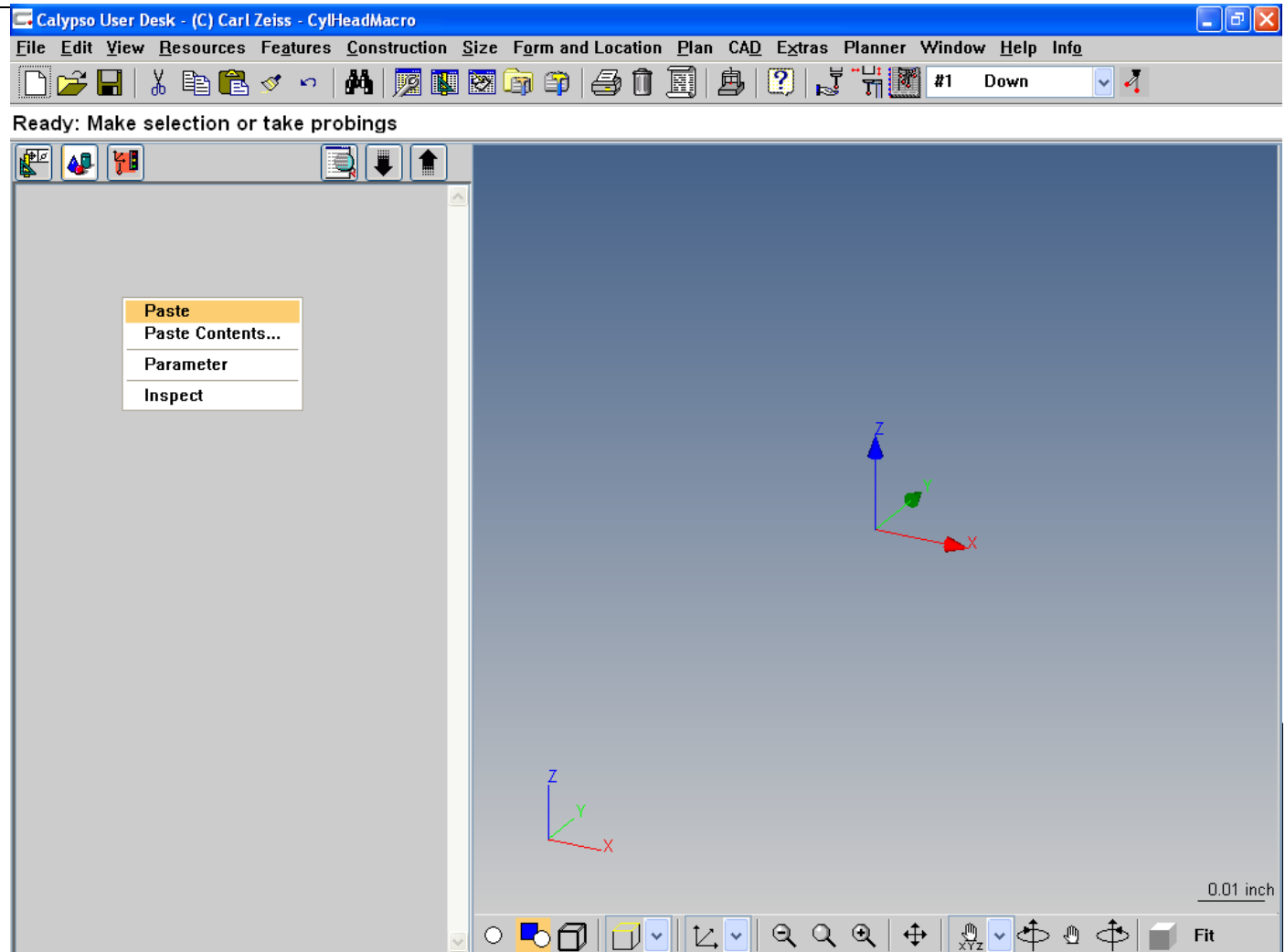
The main workspace displays a 3D model of a part with several features highlighted in pink: "Align Circle 1", "Exhaust Bore", "Intake Cyl", "Change Bore", "Small Bore", "Intake Cyl", "Exhaust Bore", and "Make Plane". The model is oriented with a coordinate system (X, Y, Z) and a scale bar indicating 50 mm. The left sidebar shows a list of macro program features, each with a corresponding icon: Top Plane, Left Plane, Align Circle 1, Align Circle 2, Intake Cyl, Exhaust Cyl, Intake Plane, Exhaust Plane, Large Bore, Small Bore, and Angled Thread.

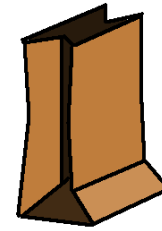
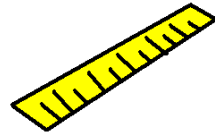




# LUNCH 'N LEARN

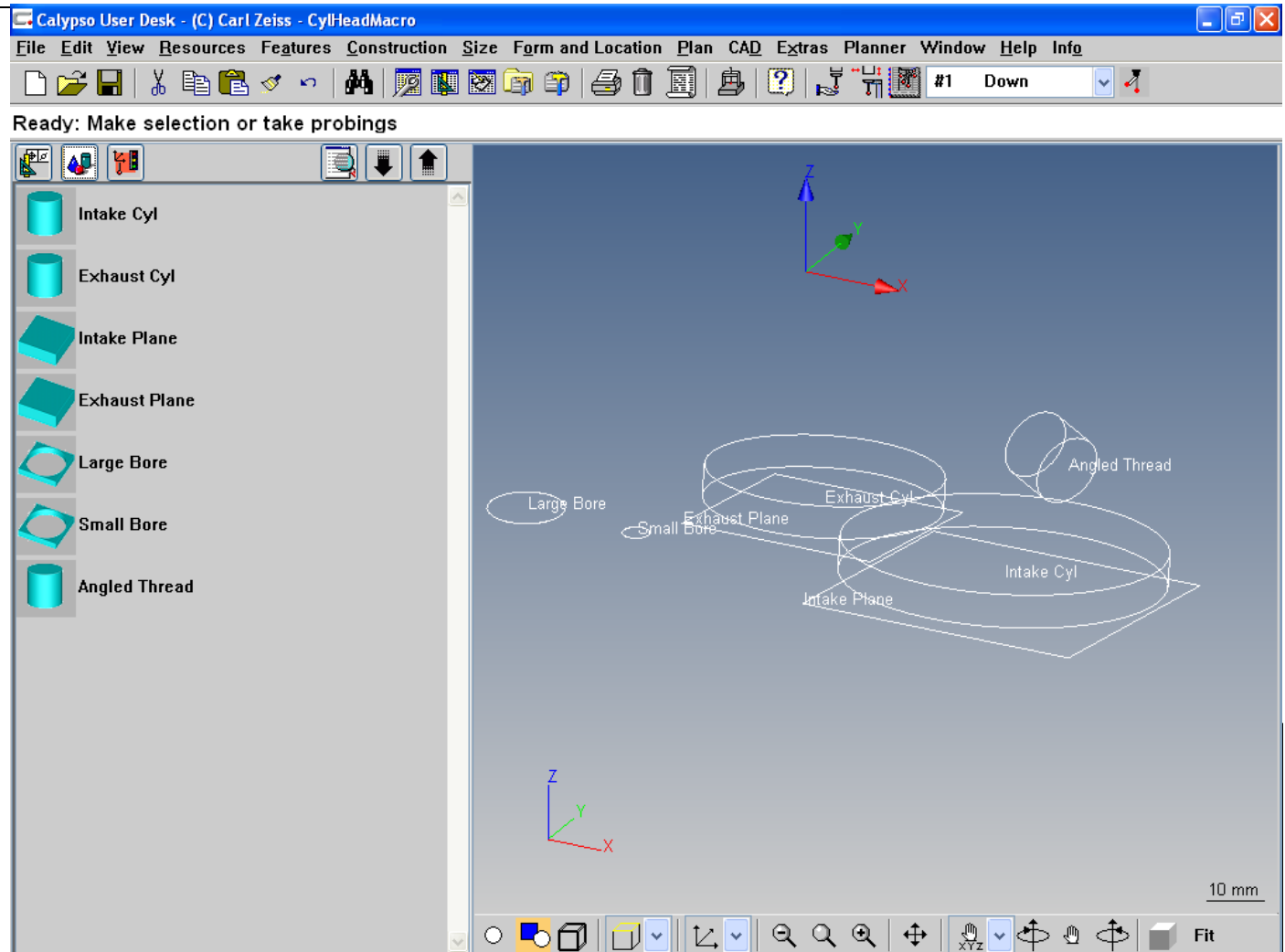
...we paste the features into the feature list of the Macro Program.

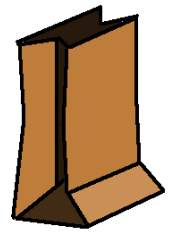
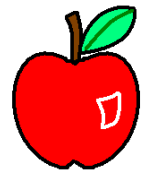
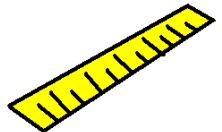




# LUNCH 'N LEARN

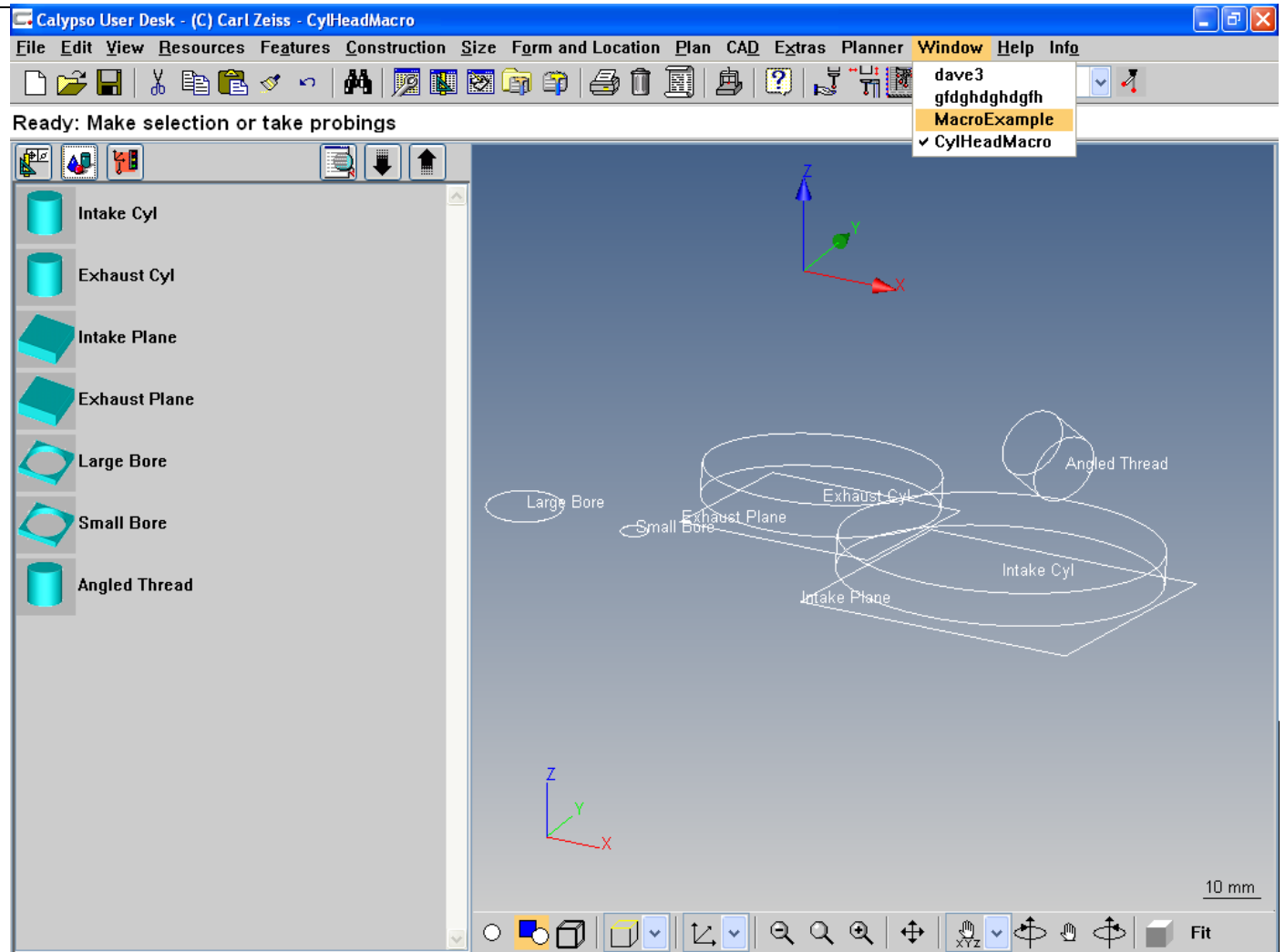
...we paste the features into the feature list of the Macro Program.



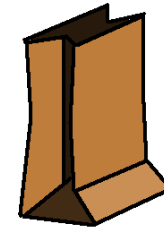
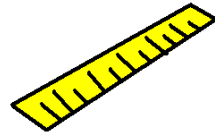


# LUNCH 'N LEARN

Now switch back to the Base Program...

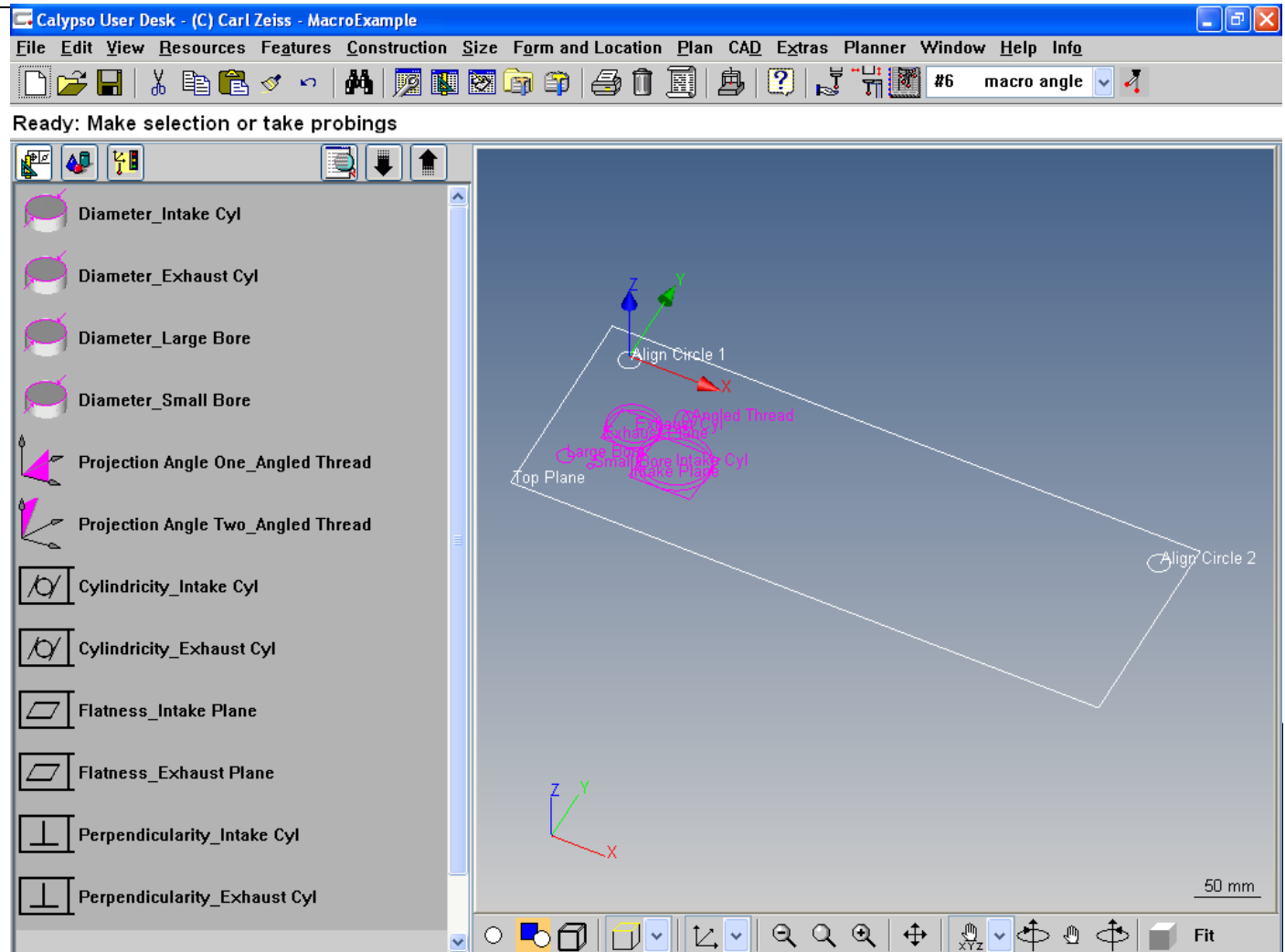


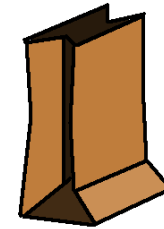
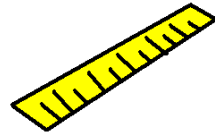




# LUNCH 'N LEARN

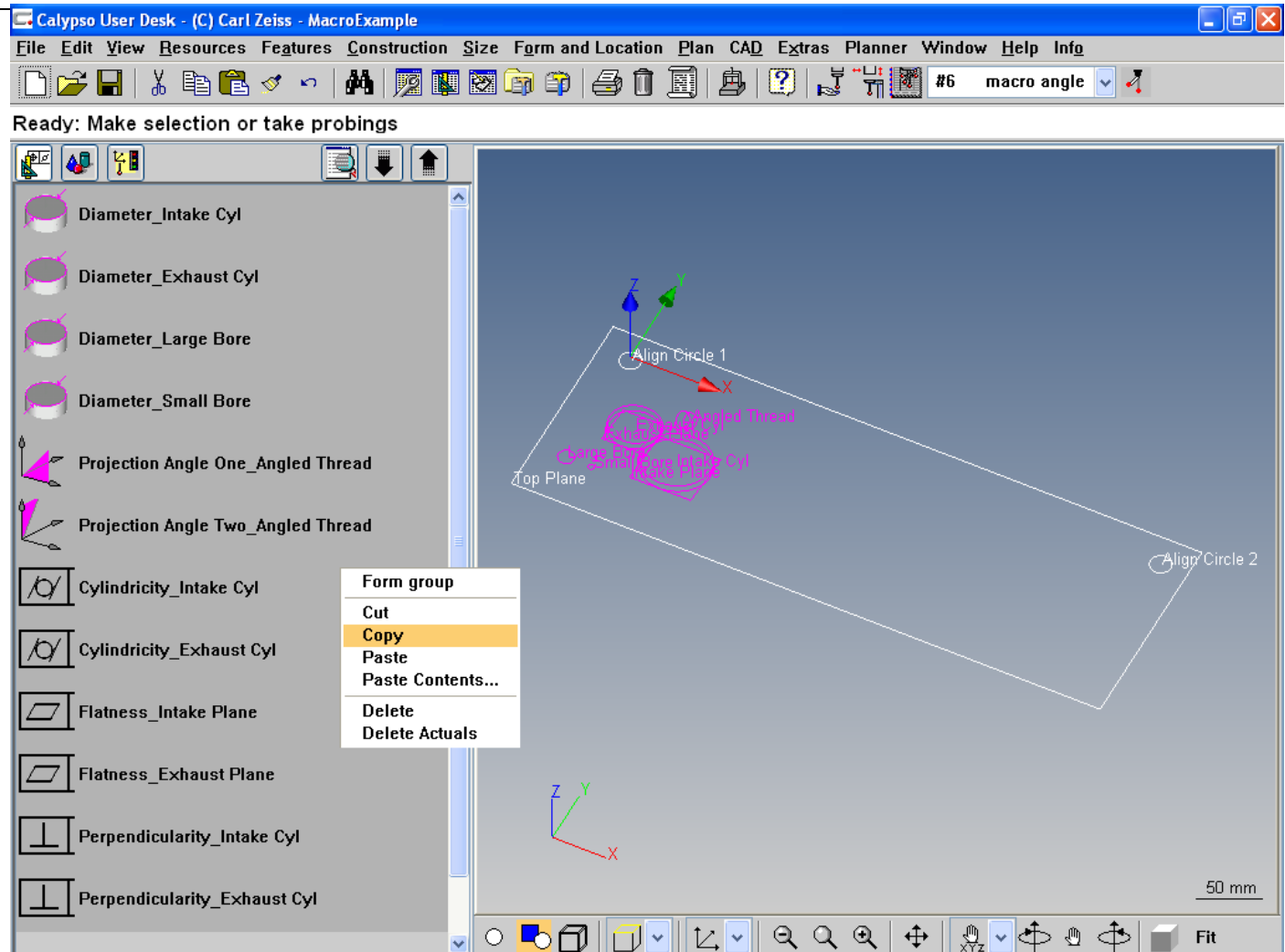
...and do the same with the characteristics associated with the Macro features.

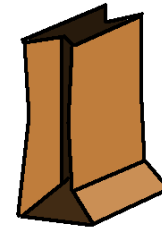
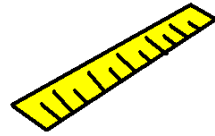




# LUNCH 'N LEARN

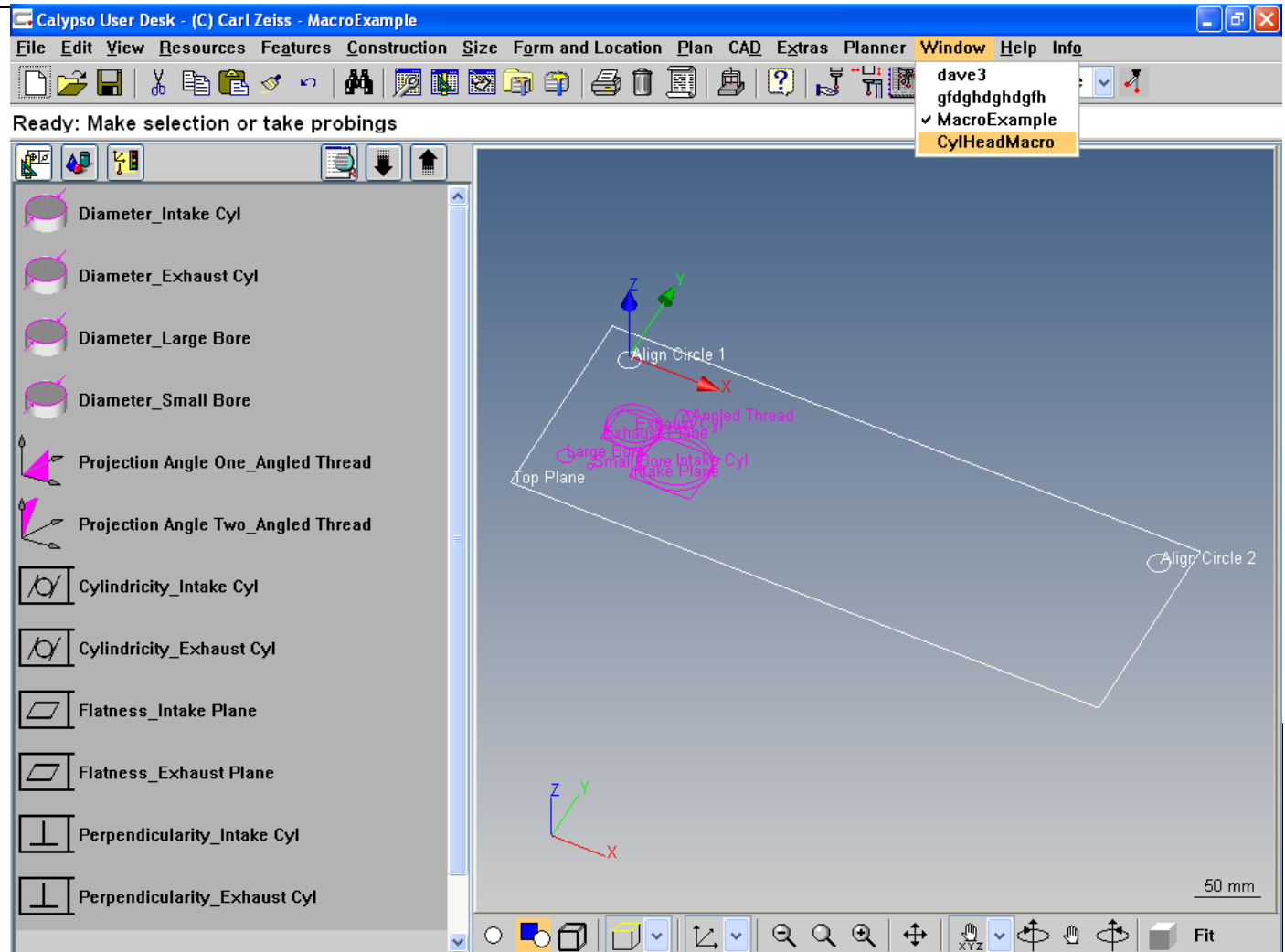
...and do the same with the characteristics associated with the Macro features.

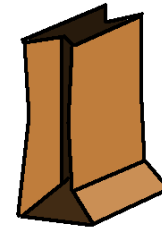
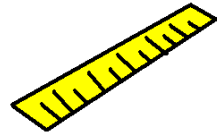




# LUNCH 'N LEARN

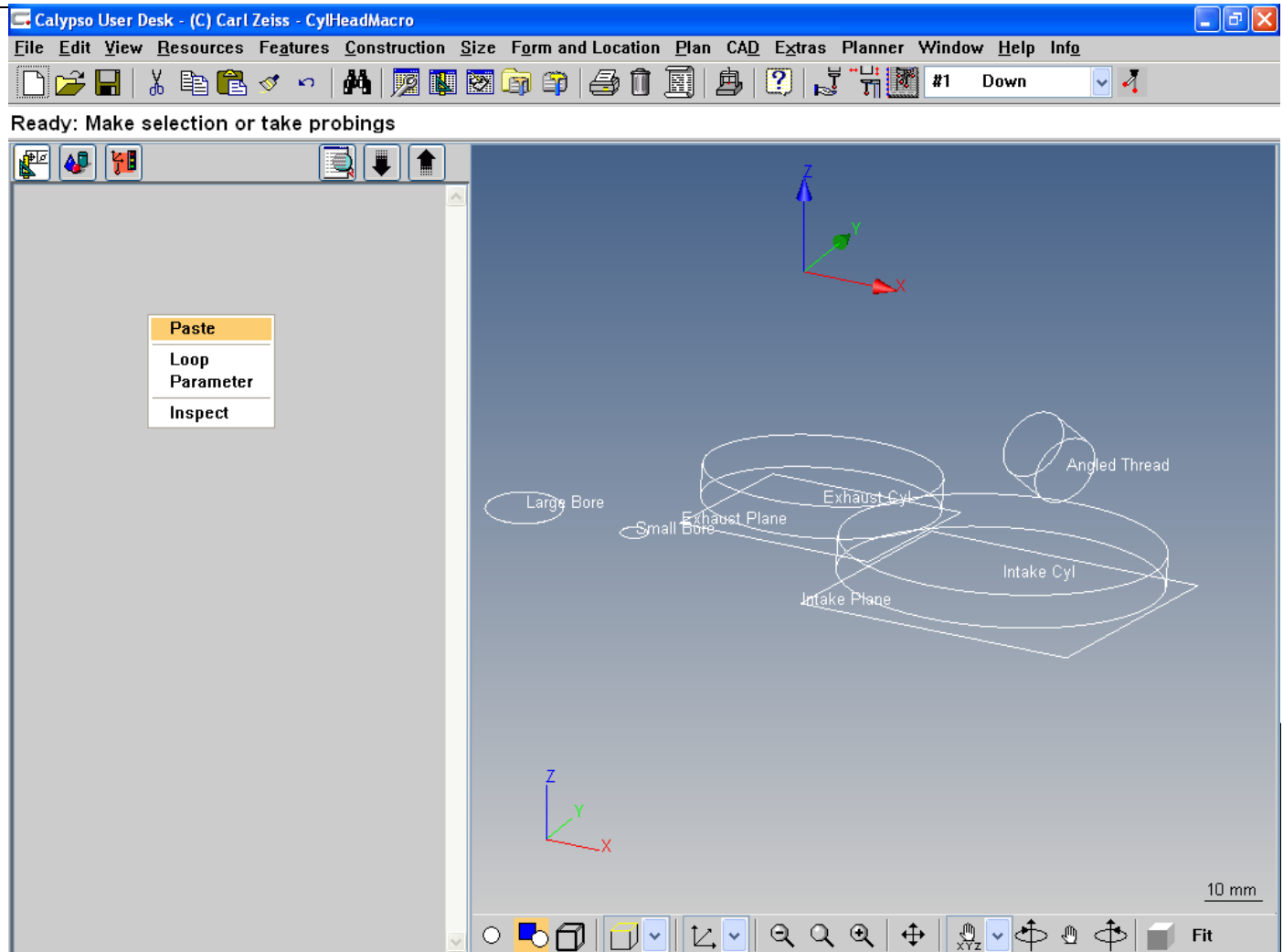
...and do the same with the characteristics associated with the Macro features.



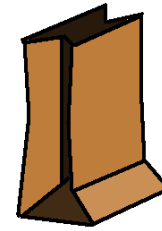
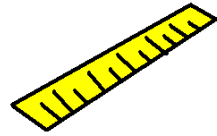


# LUNCH 'N LEARN

...and do the same with the characteristics associated with the Macro features.

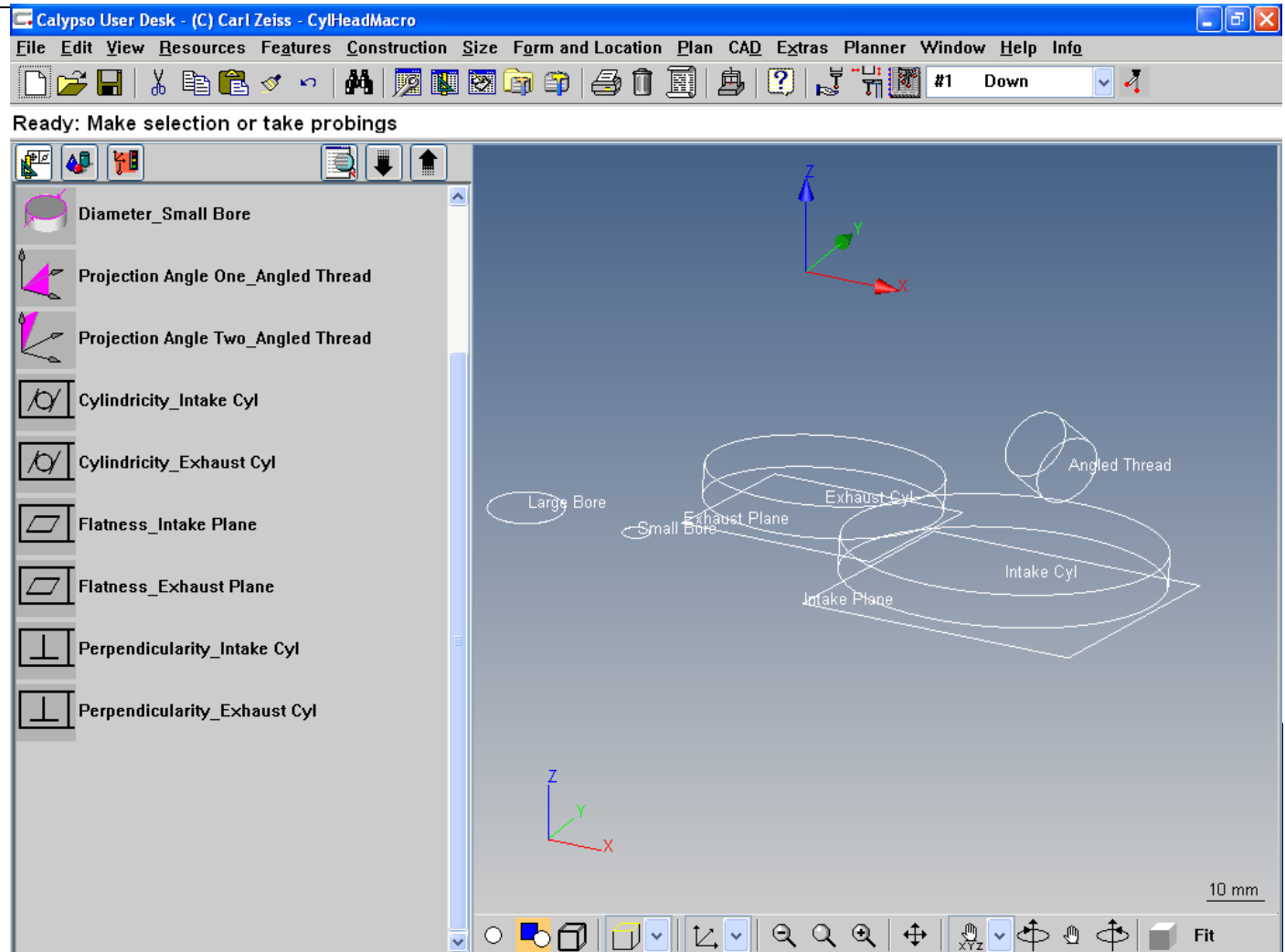


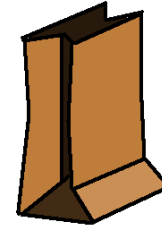
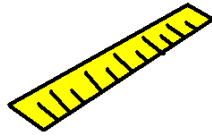




# LUNCH 'N LEARN

Now our Macro program has its features and characteristics.

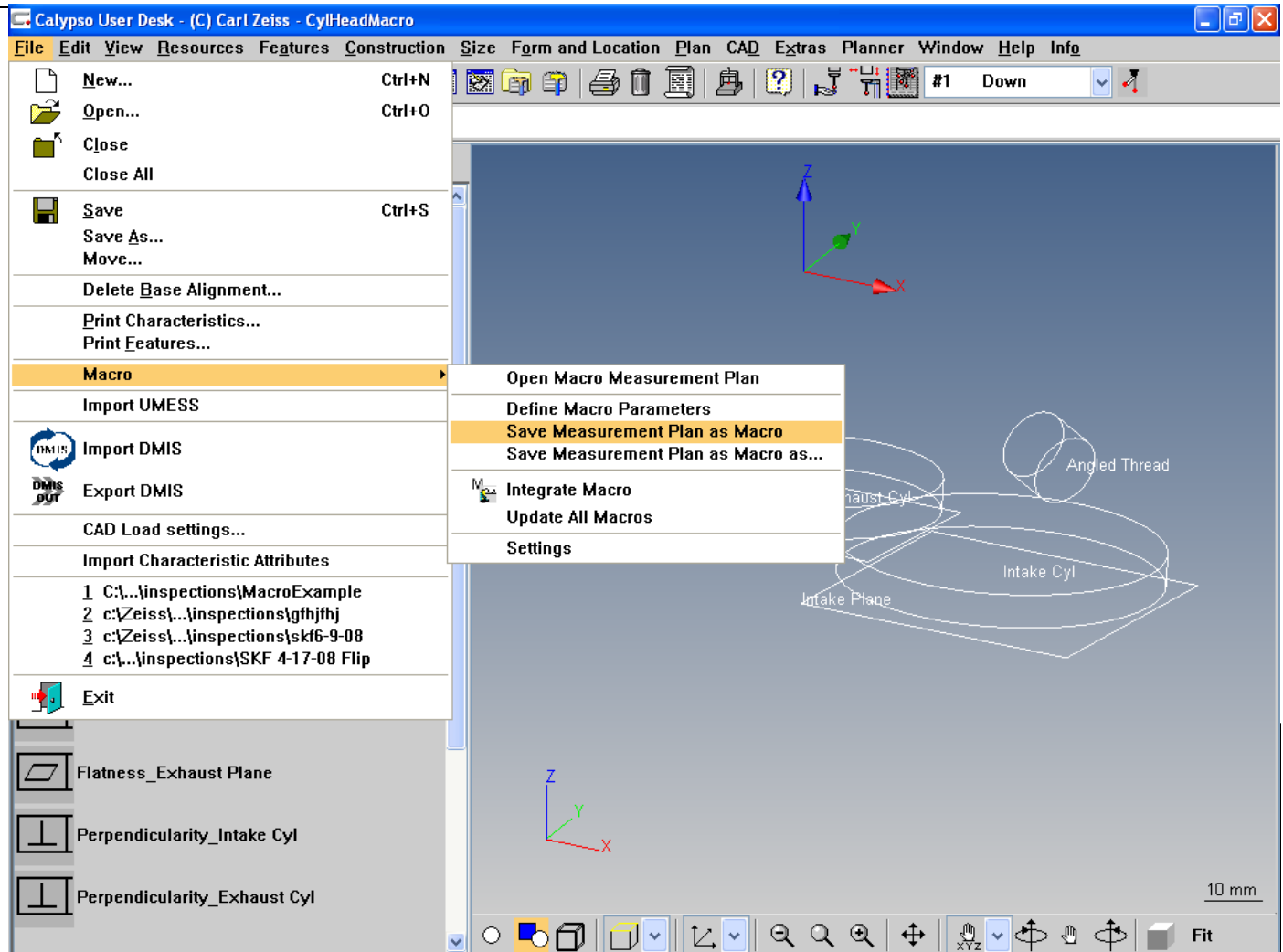


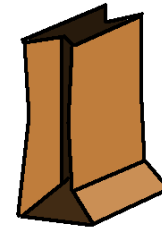
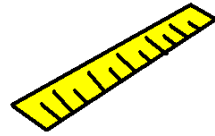


# LUNCH 'N LEARN

Now we save our measurement plan as a Macro:

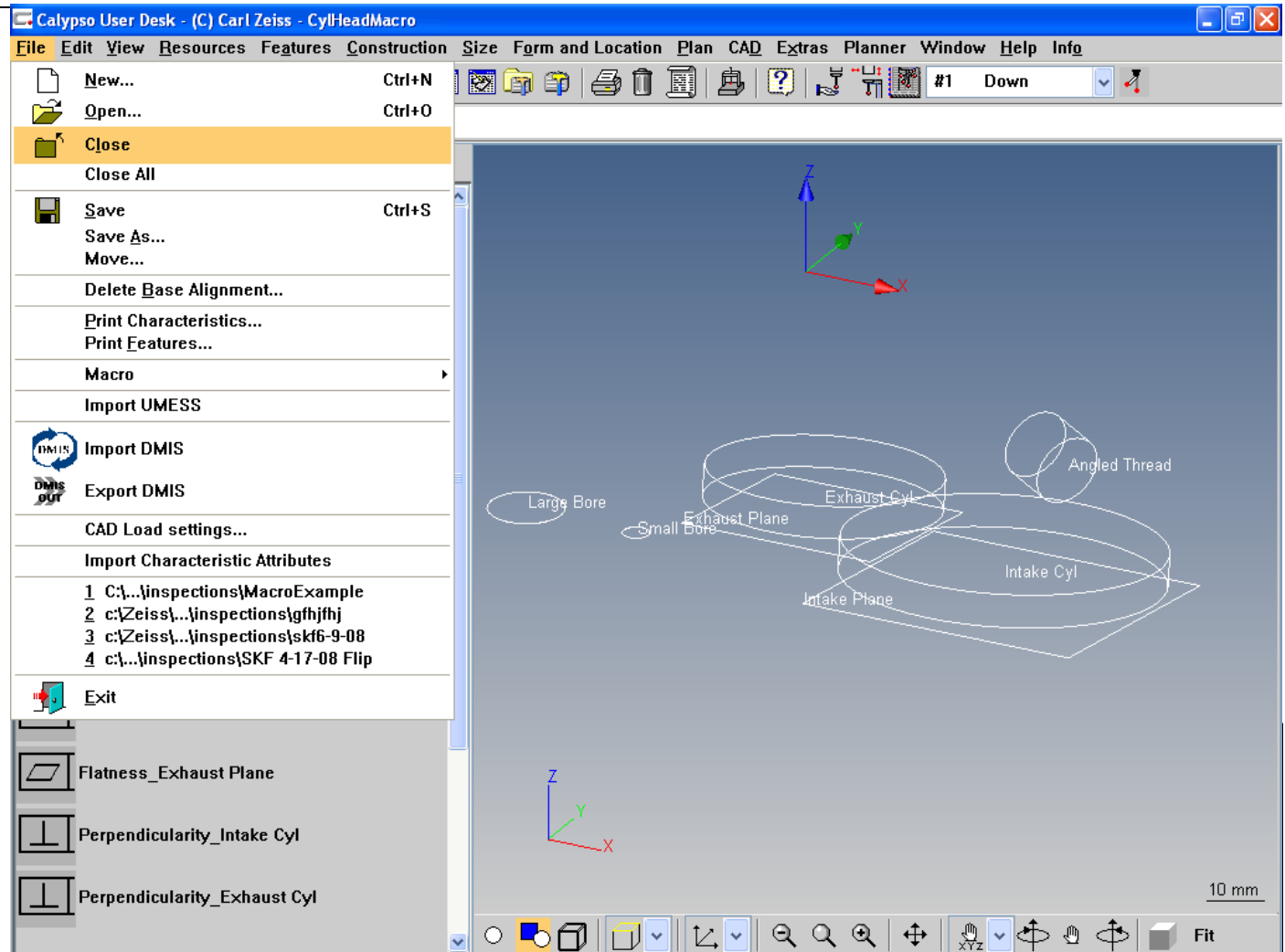
File>Macro>Save Measurement Plan as Macro

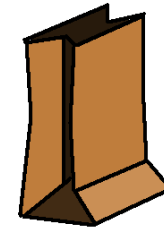
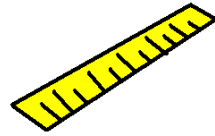




# LUNCH 'N LEARN

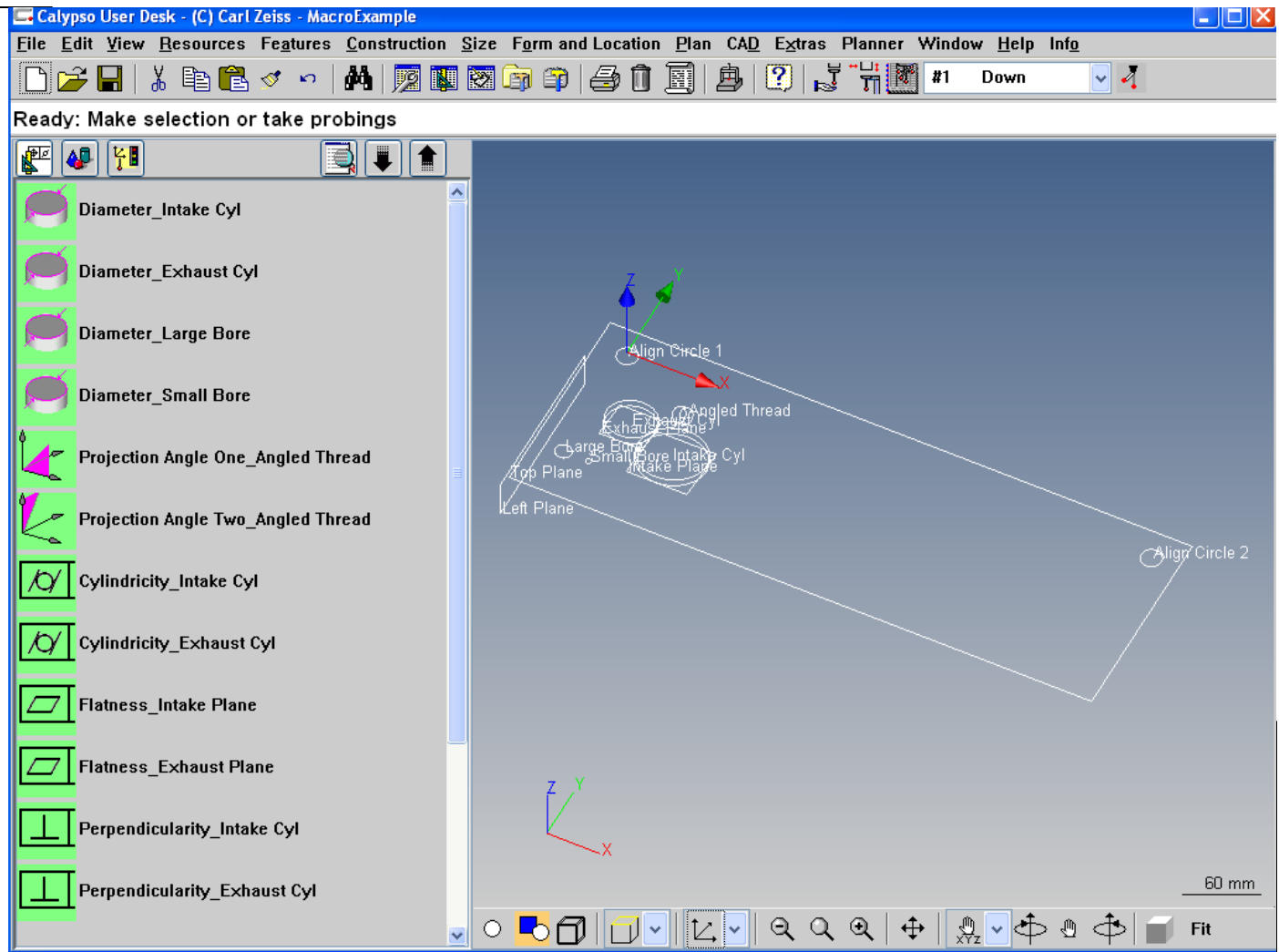
And finally, close the Macro Program.

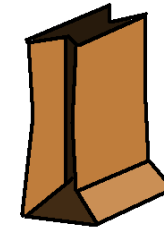
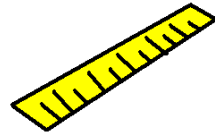




# LUNCH 'N LEARN

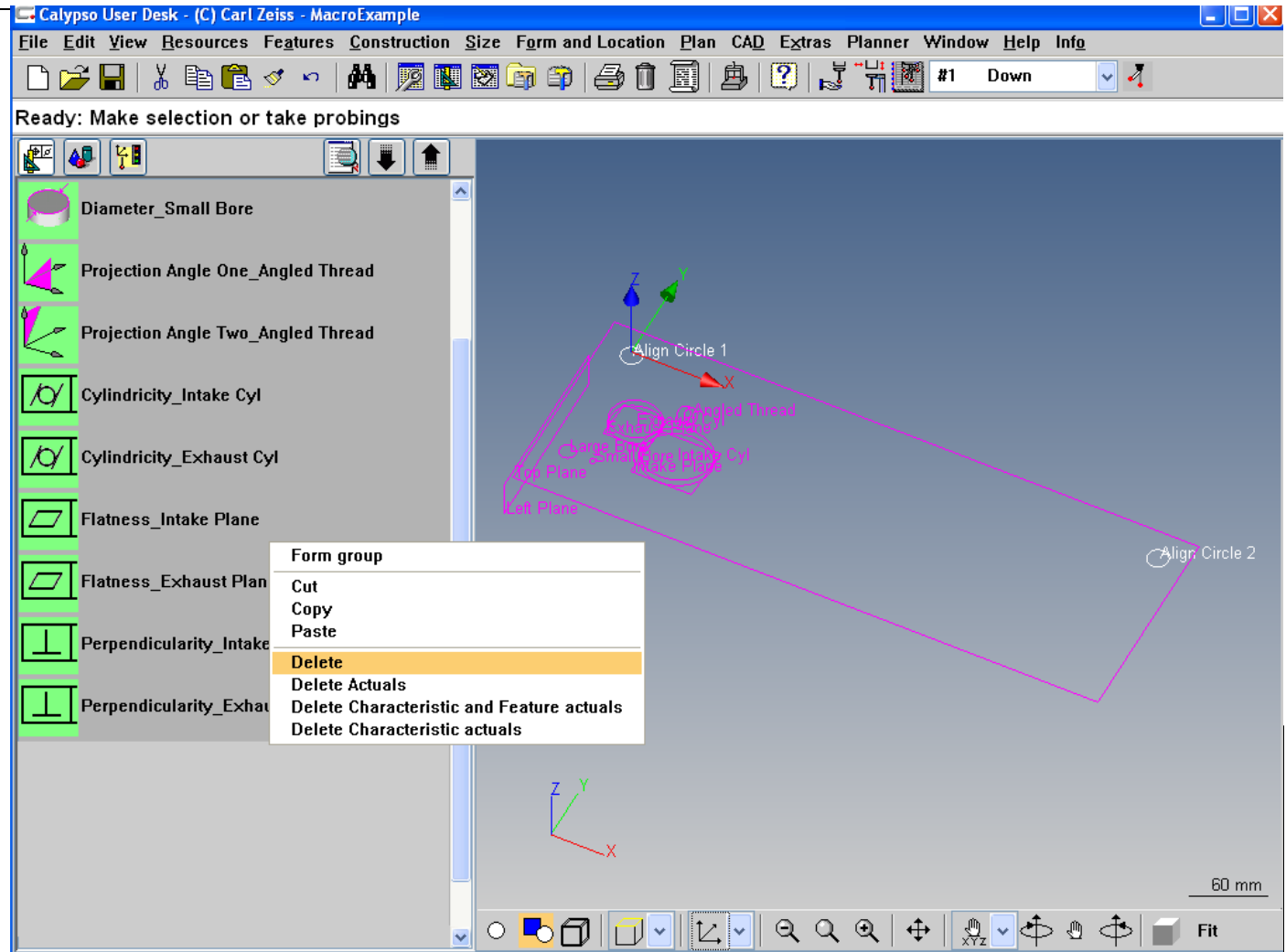
Now we can get rid of the Macro features and characteristics, as they will soon be replaced by our Macro.

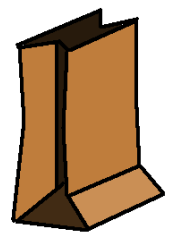
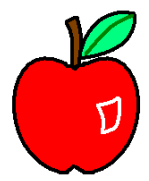
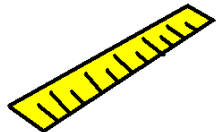




# LUNCH 'N LEARN

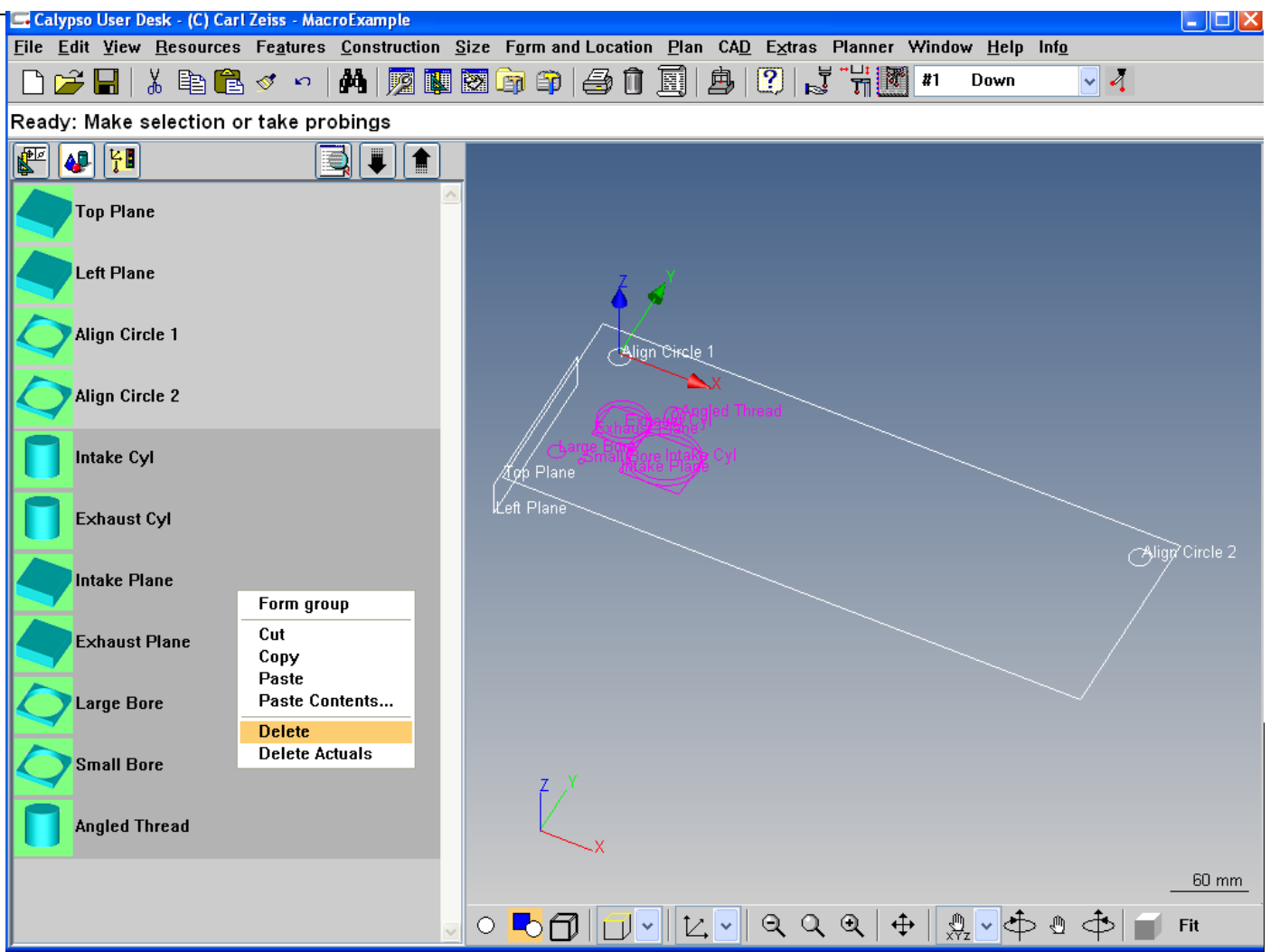
Now we can get rid of the Macro features and characteristics, as they will soon be replaced by our Macro.



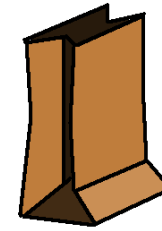
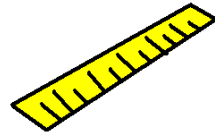


# LUNCH 'N LEARN

Now we can get rid of the Macro features and characteristics, as they will soon be replaced by our Macro.

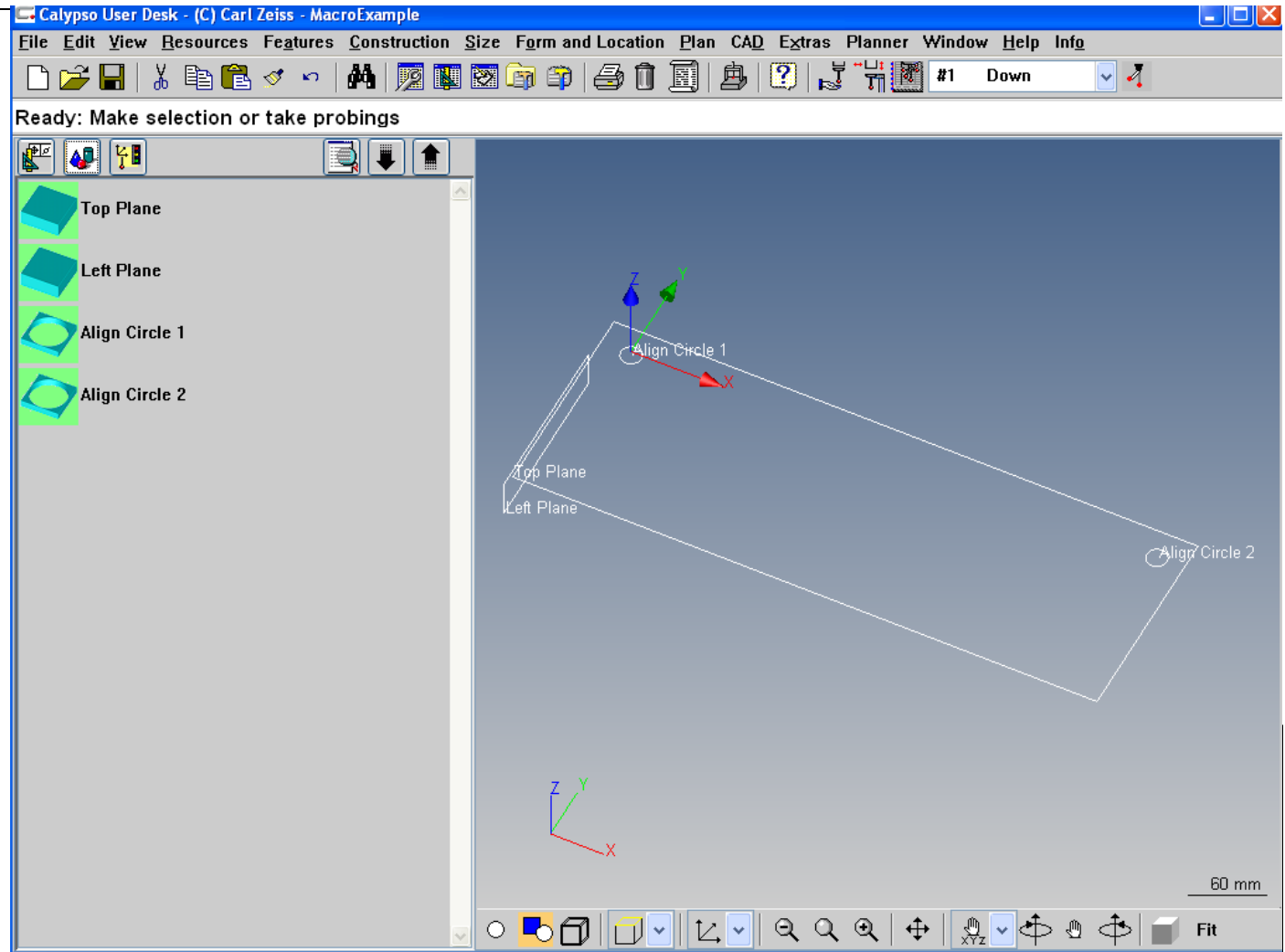


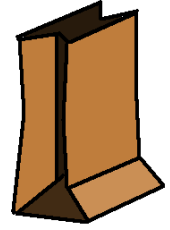
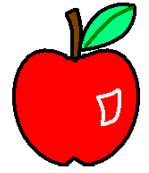
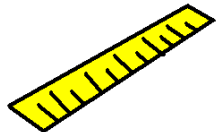




# LUNCH 'N LEARN

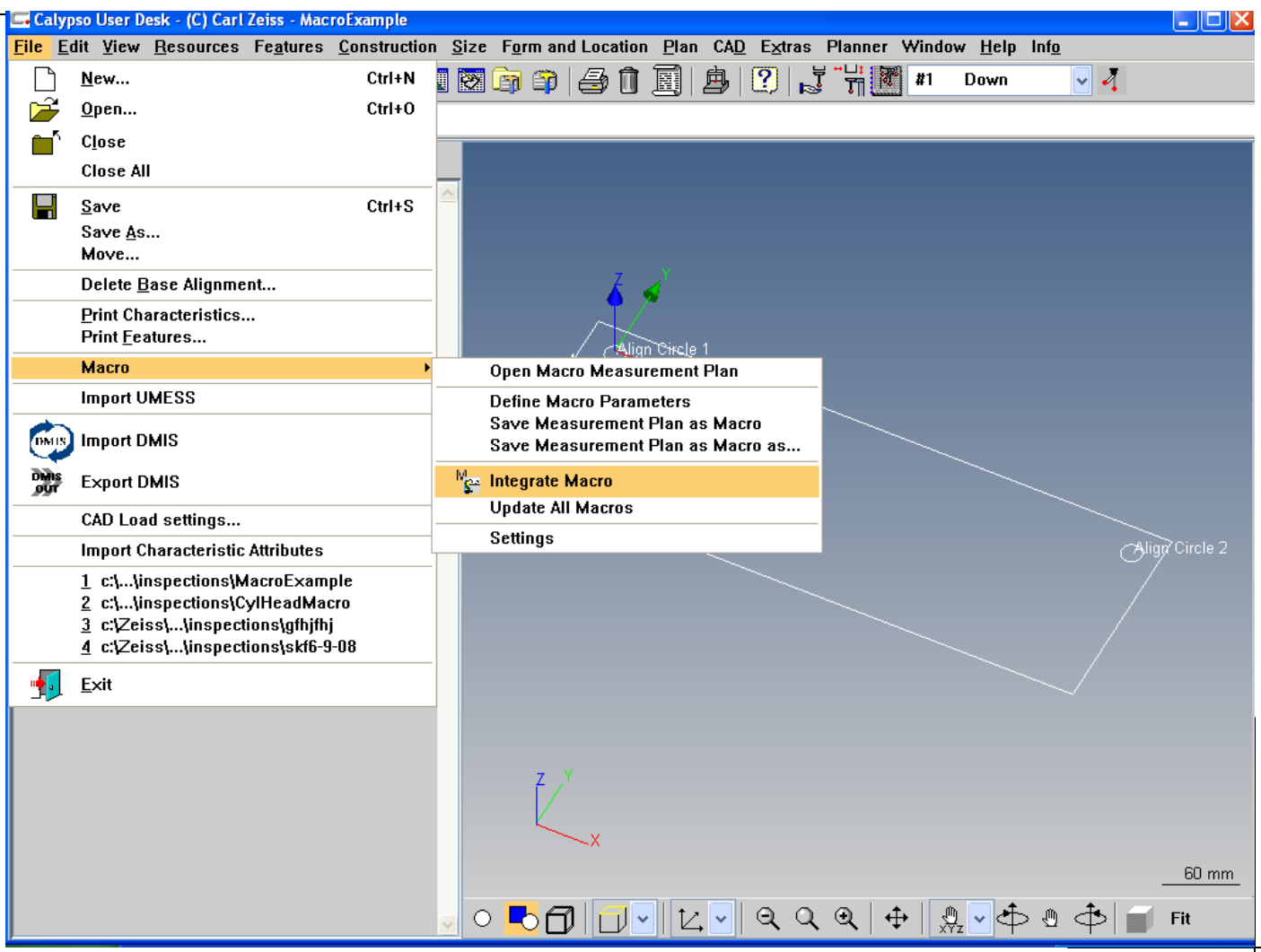
Now with the old Macro features and characteristics gone, we are ready to drop in our Macro.

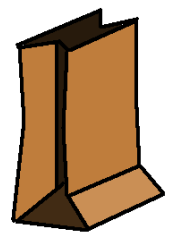
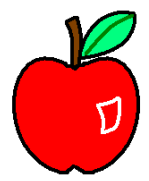
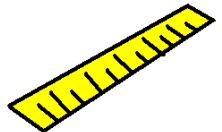




# LUNCH 'N LEARN

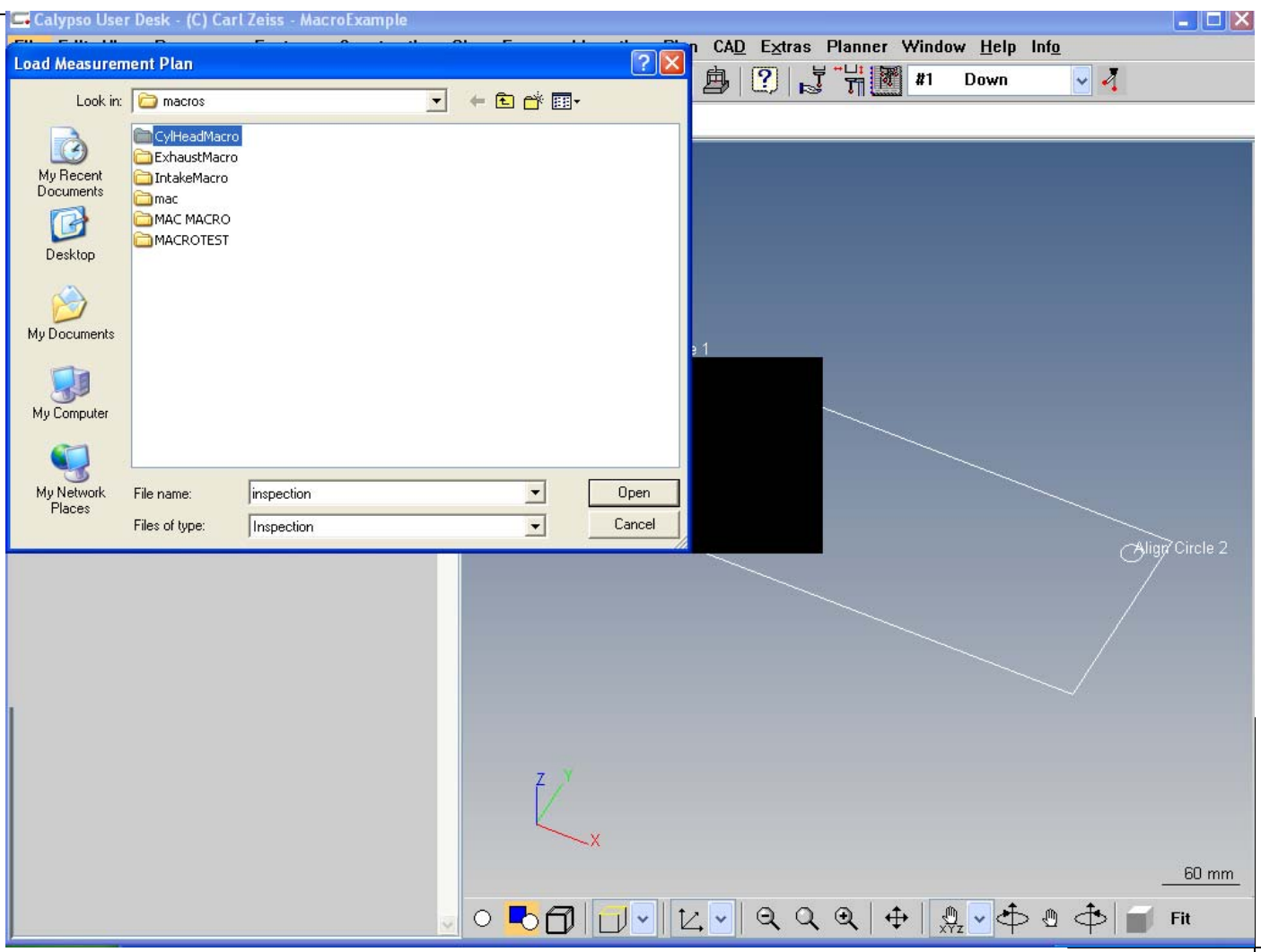
File>Macro>  
Integrate Macro

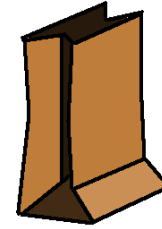
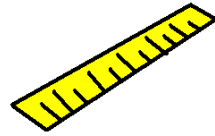




# LUNCH 'N LEARN

Choose the Macro name that was just created.

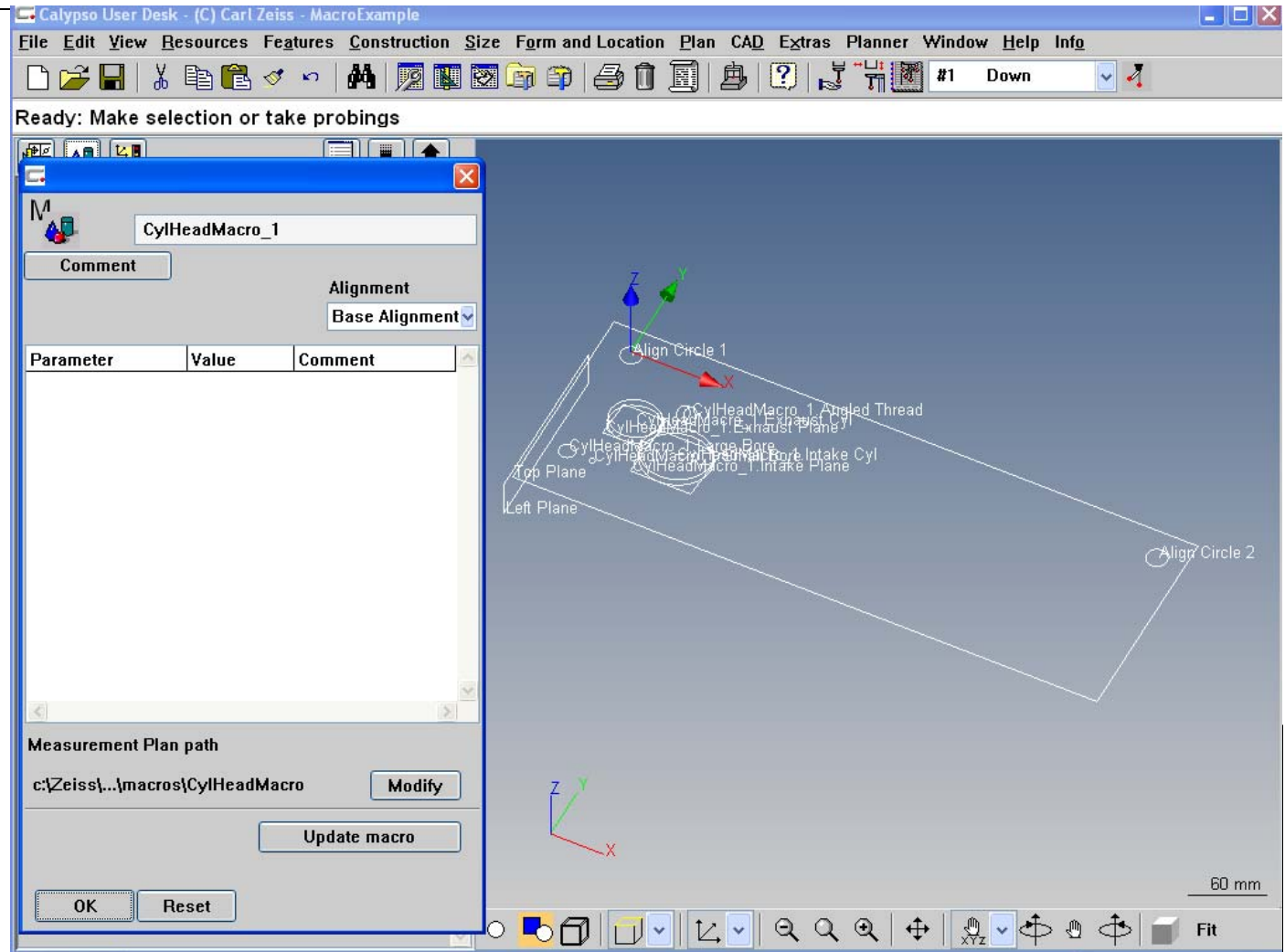


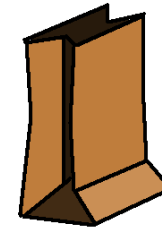
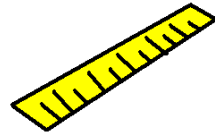


# LUNCH 'N LEARN

Press OK to the Macro screen.

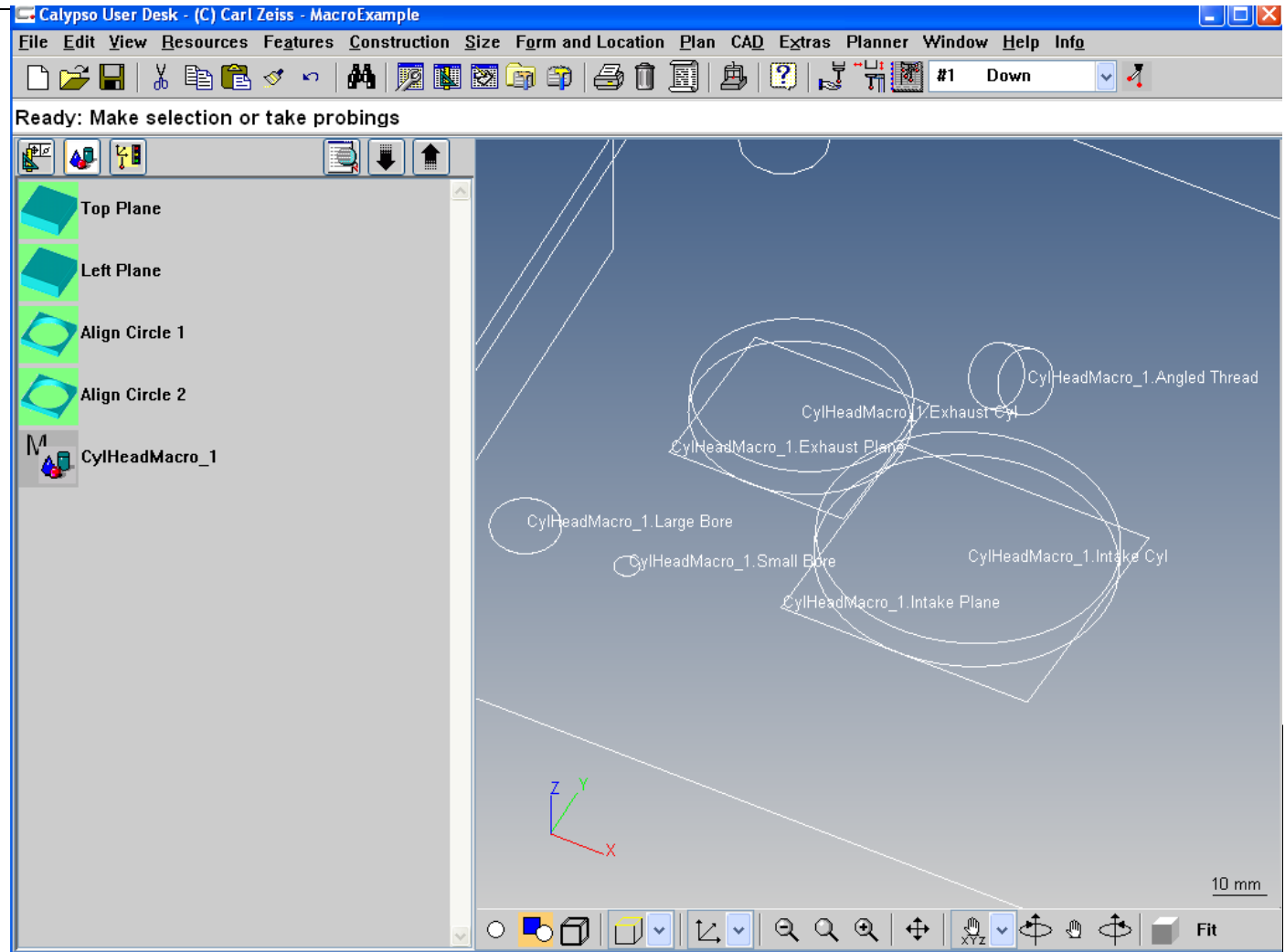
(More on the Macro screen later.)

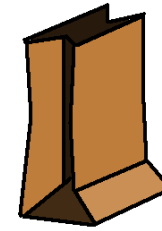
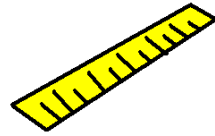




# LUNCH 'N LEARN

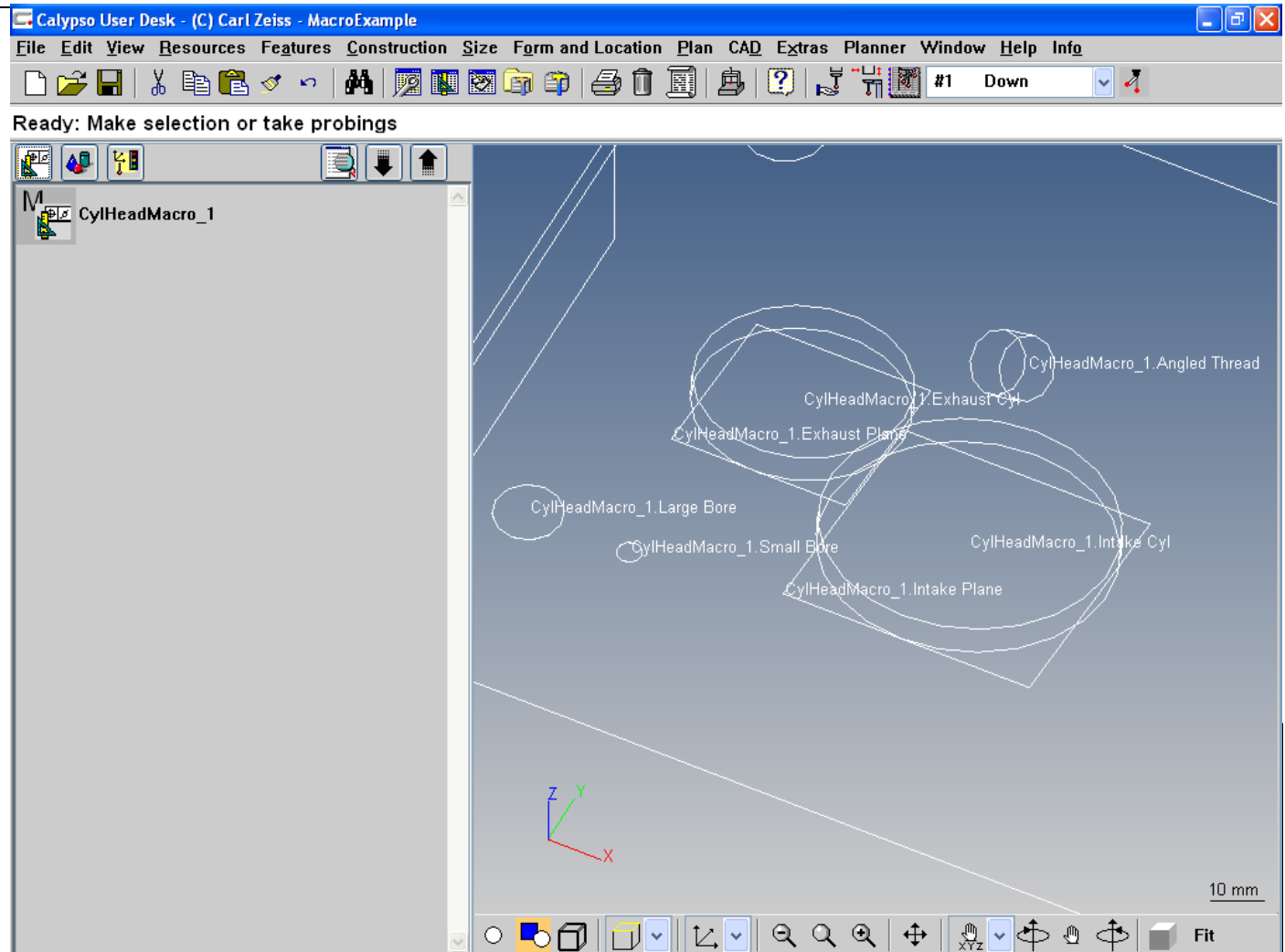
And we find our Macro in our Feature list and our Macro features appear in our CAD window.



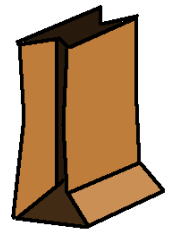
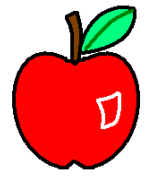
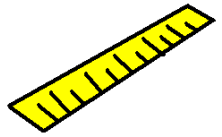


# LUNCH 'N LEARN

Our Macro also appears in the Characteristic list, which holds all of the characteristics tied to our Macro features.

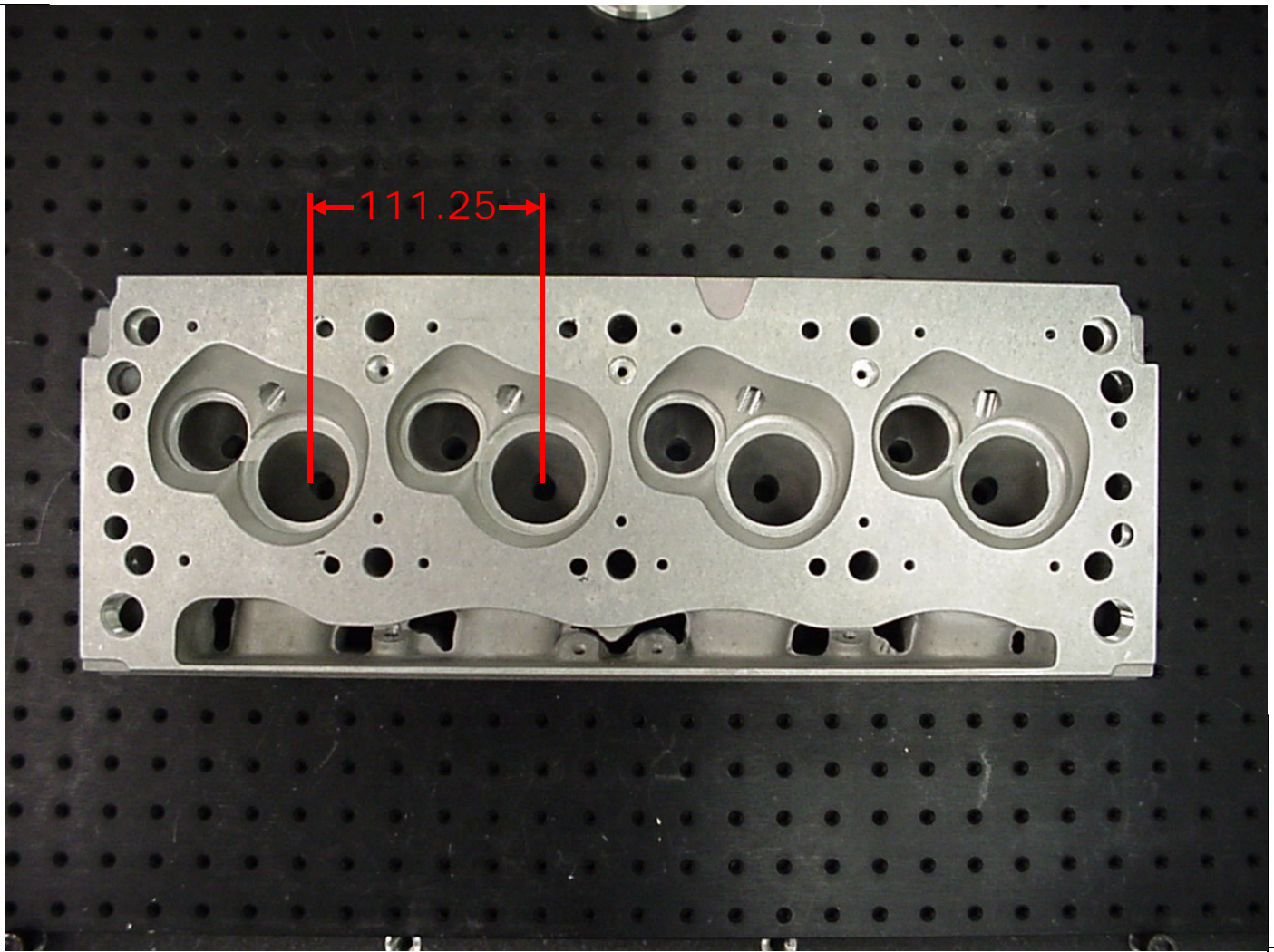


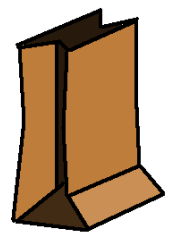
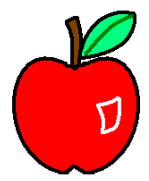
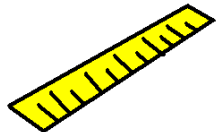




# LUNCH 'N LEARN

The distance between our Macro patterns is found on the print.

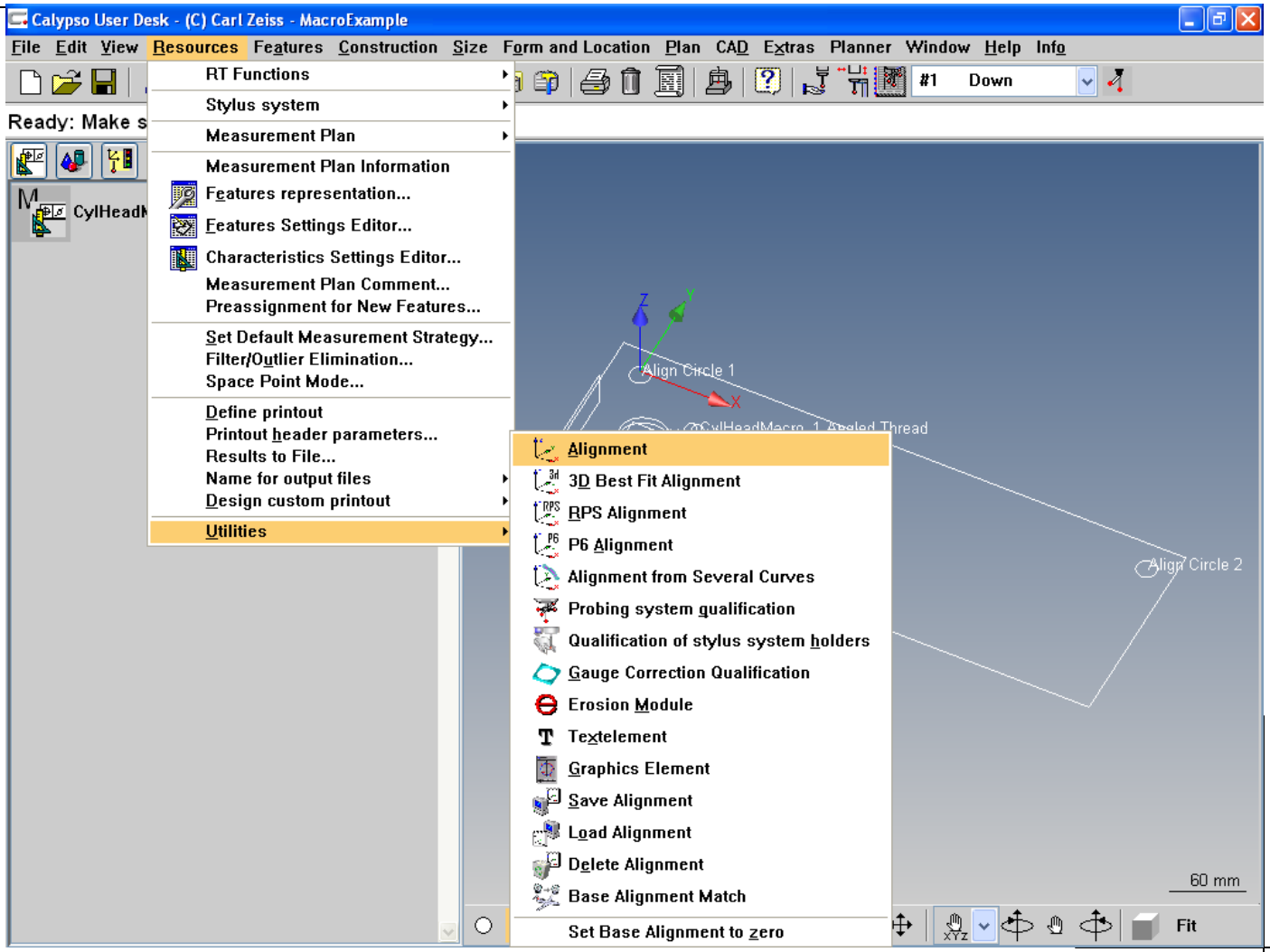


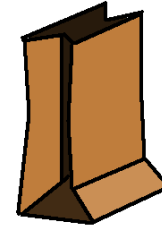
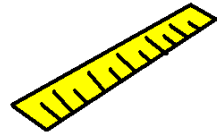


# LUNCH 'N LEARN

In order to offset the next Macro, we use a Secondary Alignment.

Utilities>  
Alignment

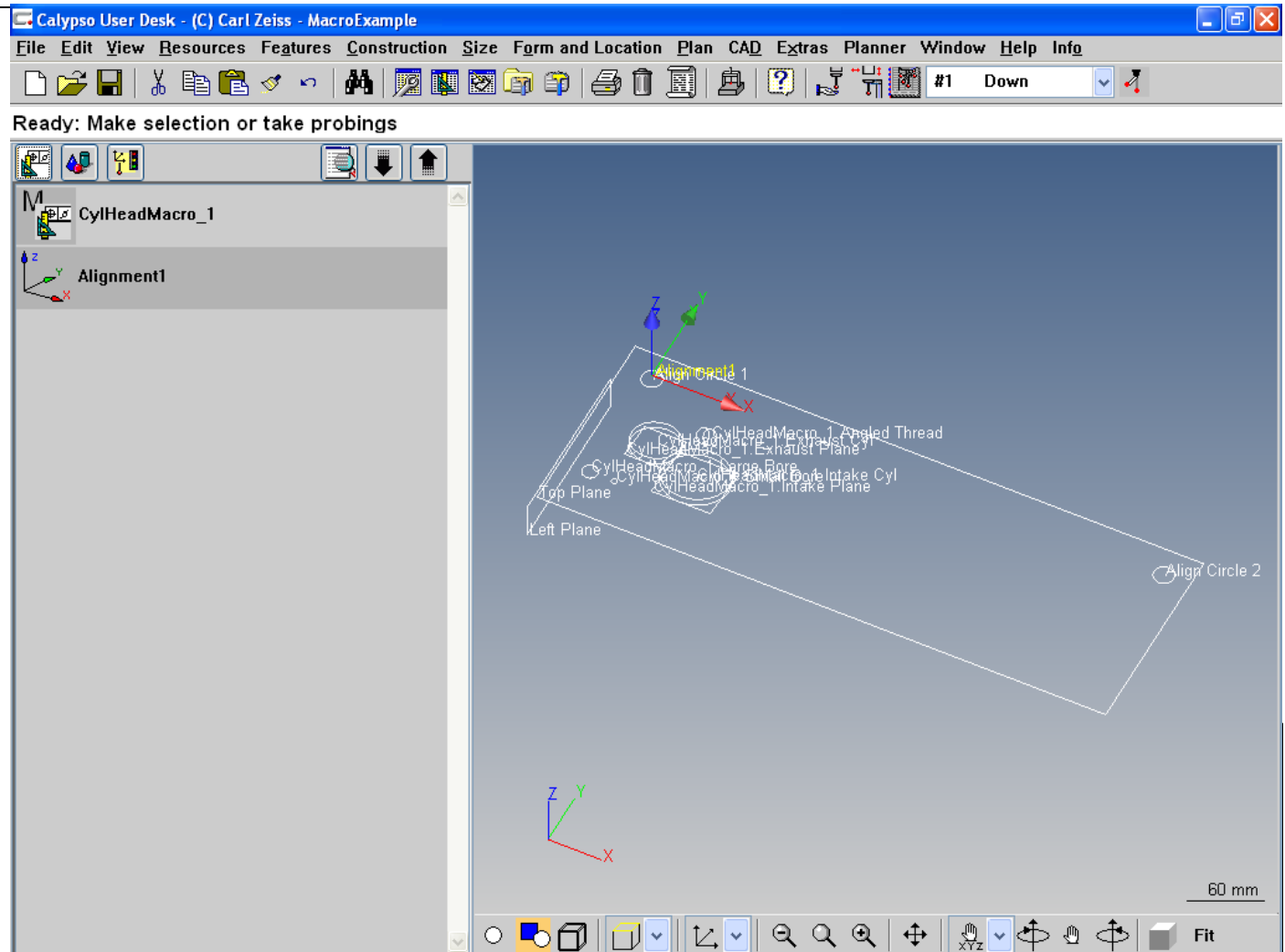


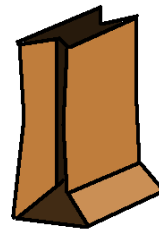
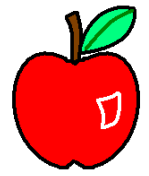
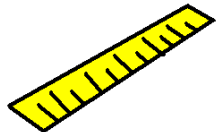


# LUNCH 'N LEARN

In order to offset the next Macro, we use a Secondary Alignment.

Utilities>  
Alignment



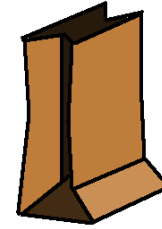
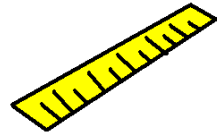


# LUNCH 'N LEARN

In the secondary alignment, click the special button...

The screenshot shows the Calypso User Desk interface. The main window displays a 3D model of a mechanical part with various features labeled, including 'Align Circle 2', 'CylHeadMacro\_1', 'Exhaust Plane', 'Intake Plane', and 'Top Plane'. A coordinate system (X, Y, Z) is visible. The 'Alignment' dialog box is open, showing the 'Special' button highlighted. The dialog box contains the following fields and buttons:

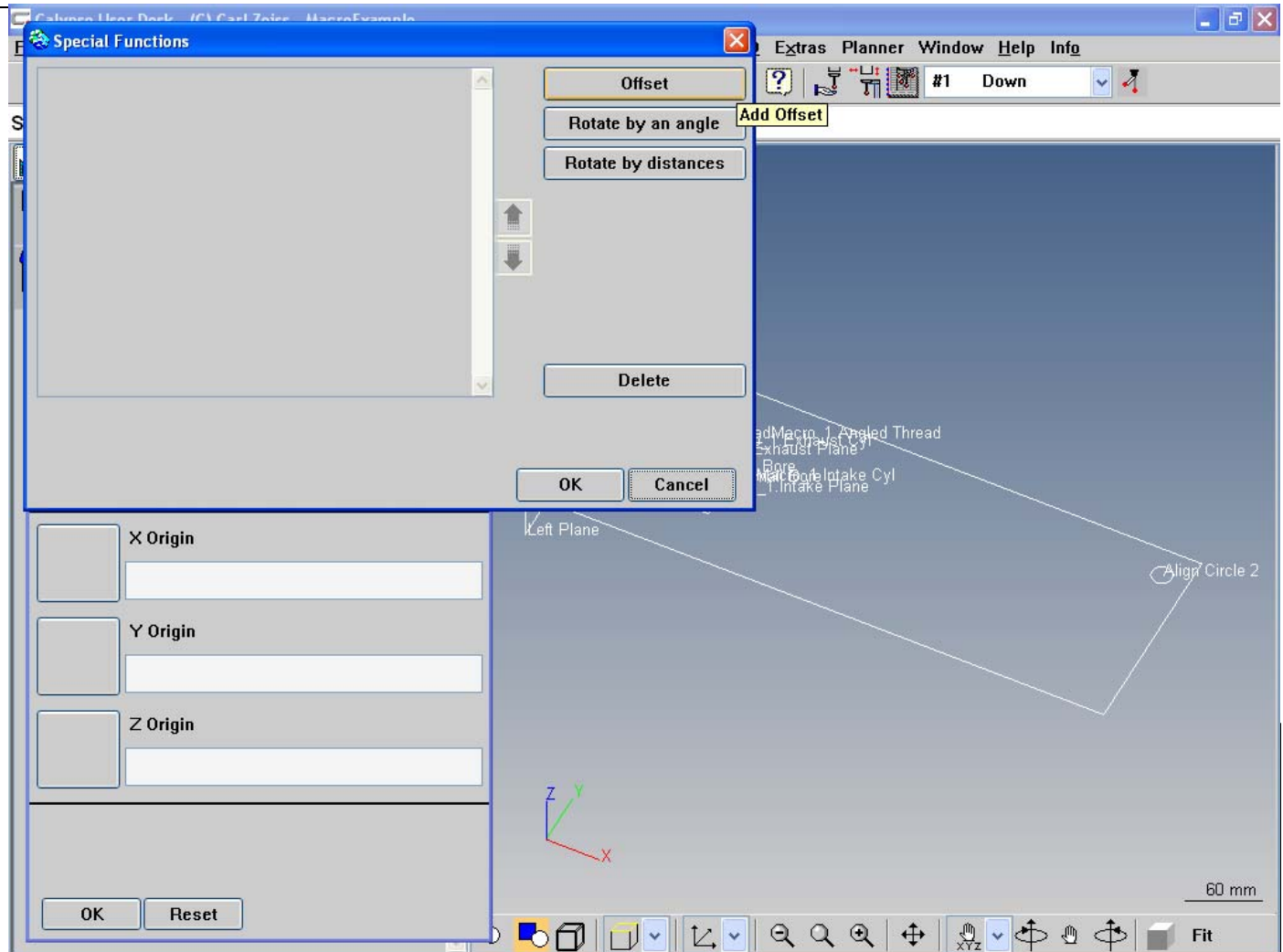
- Alignment1 (Title)
- Special (Button)
- Base Alignment (Dropdown)
- Comment (Text field)
- Add Rotation(s) / Offset(s) (Text field)
- Spatial Rotation (Dropdown)
- Planar Rotation (Dropdown)
- X Origin (Text field)
- Y Origin (Text field)
- Z Origin (Text field)
- OK (Button)
- Reset (Button)



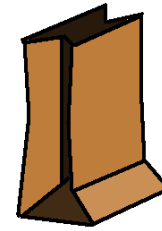
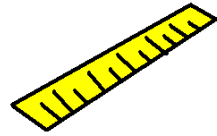
# LUNCH 'N LEARN

...and choose the method needed to offset your next macro.

Macros can be shifted in any combinations of offsets and rotations.

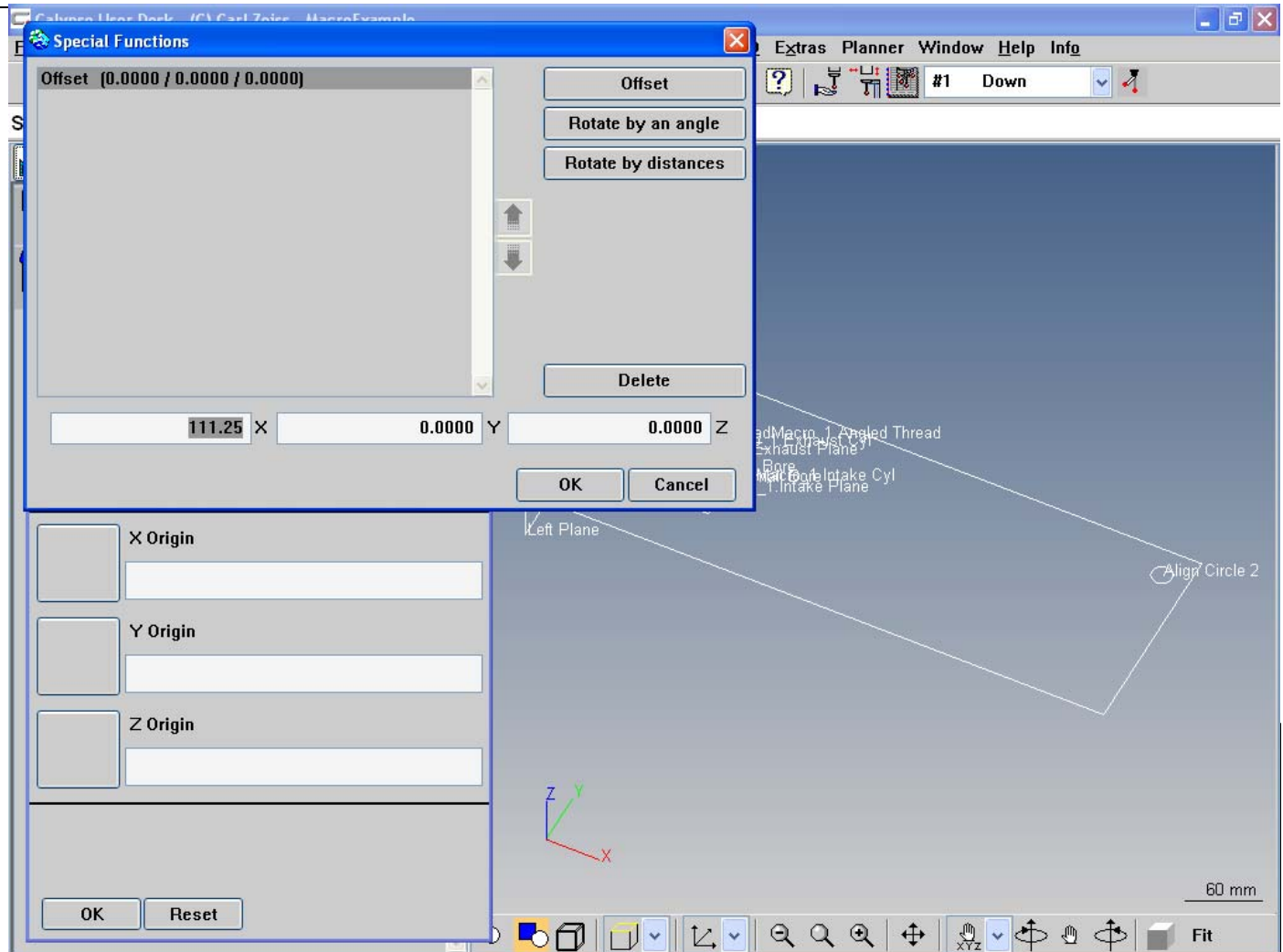




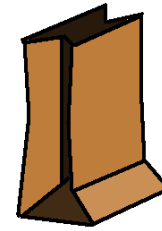
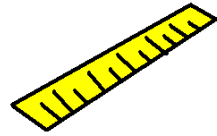


# LUNCH 'N LEARN

In our case, we need to offset by 111.25mm in the X-direction.

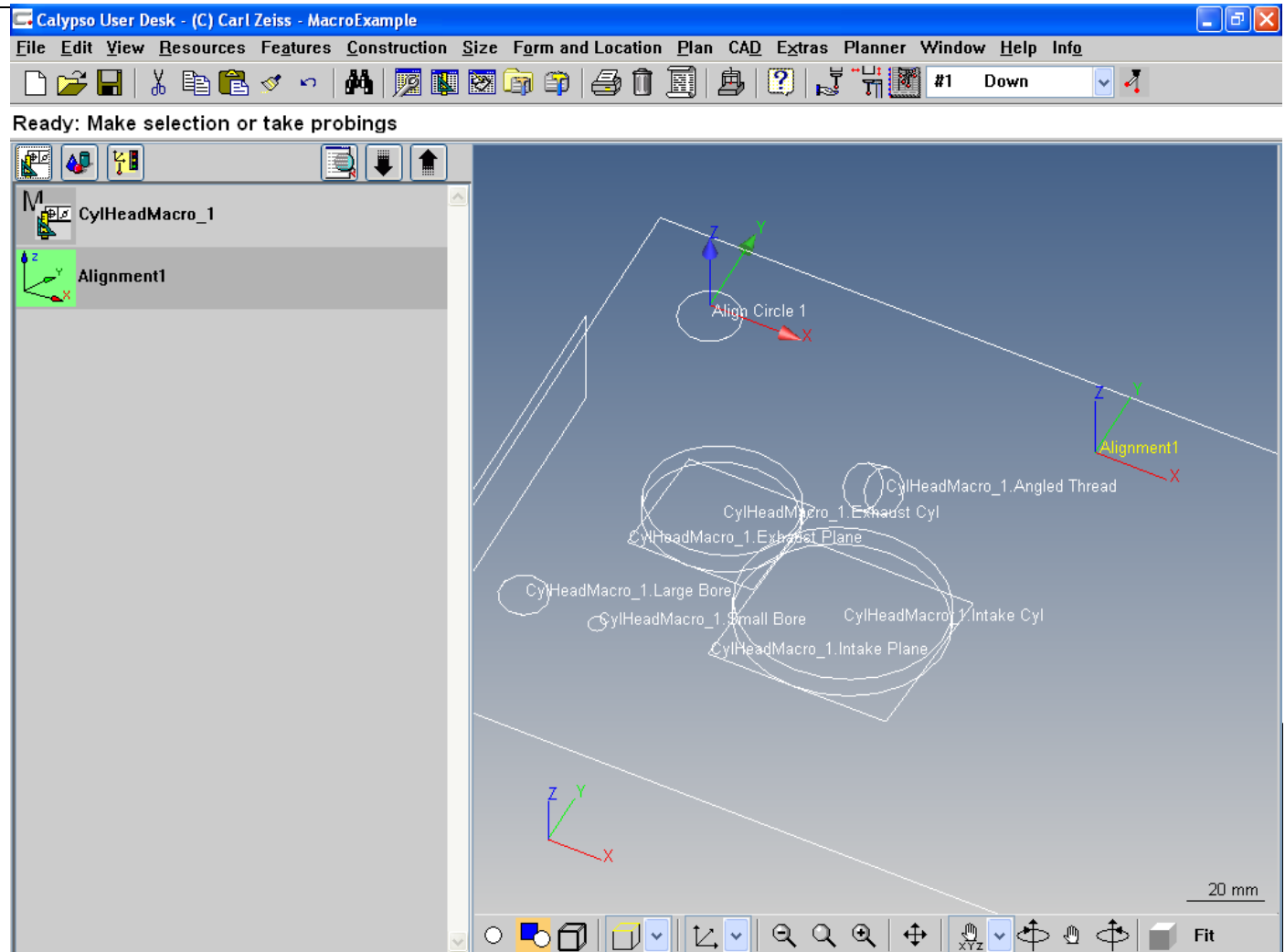


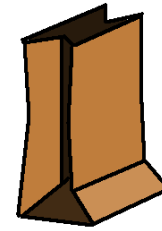
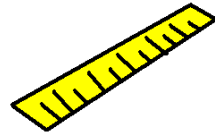




# LUNCH 'N LEARN

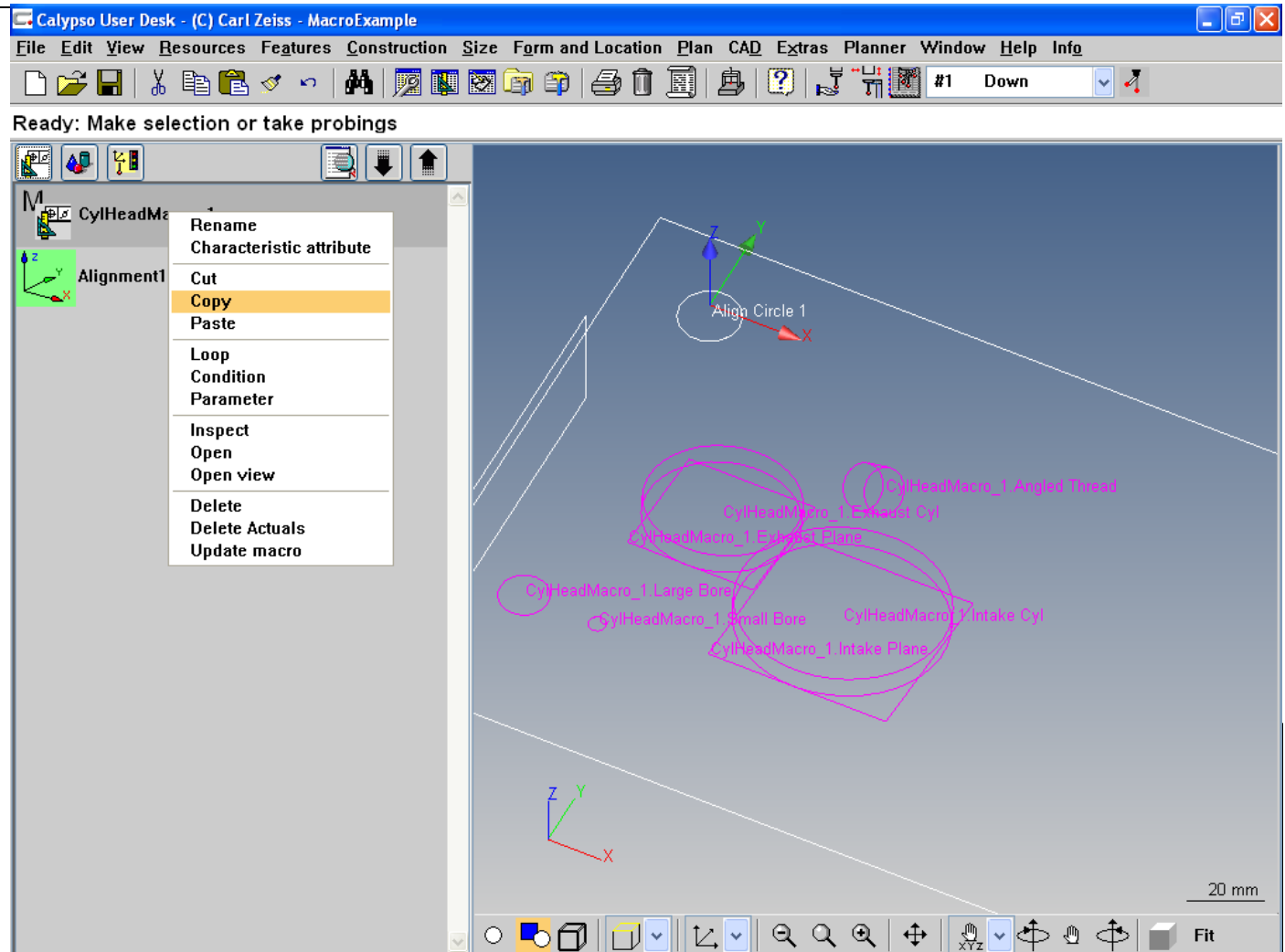
Now with our new alignment created...

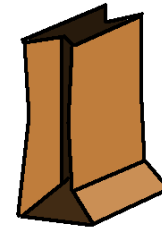
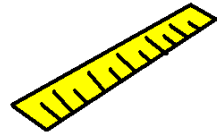




# LUNCH 'N LEARN

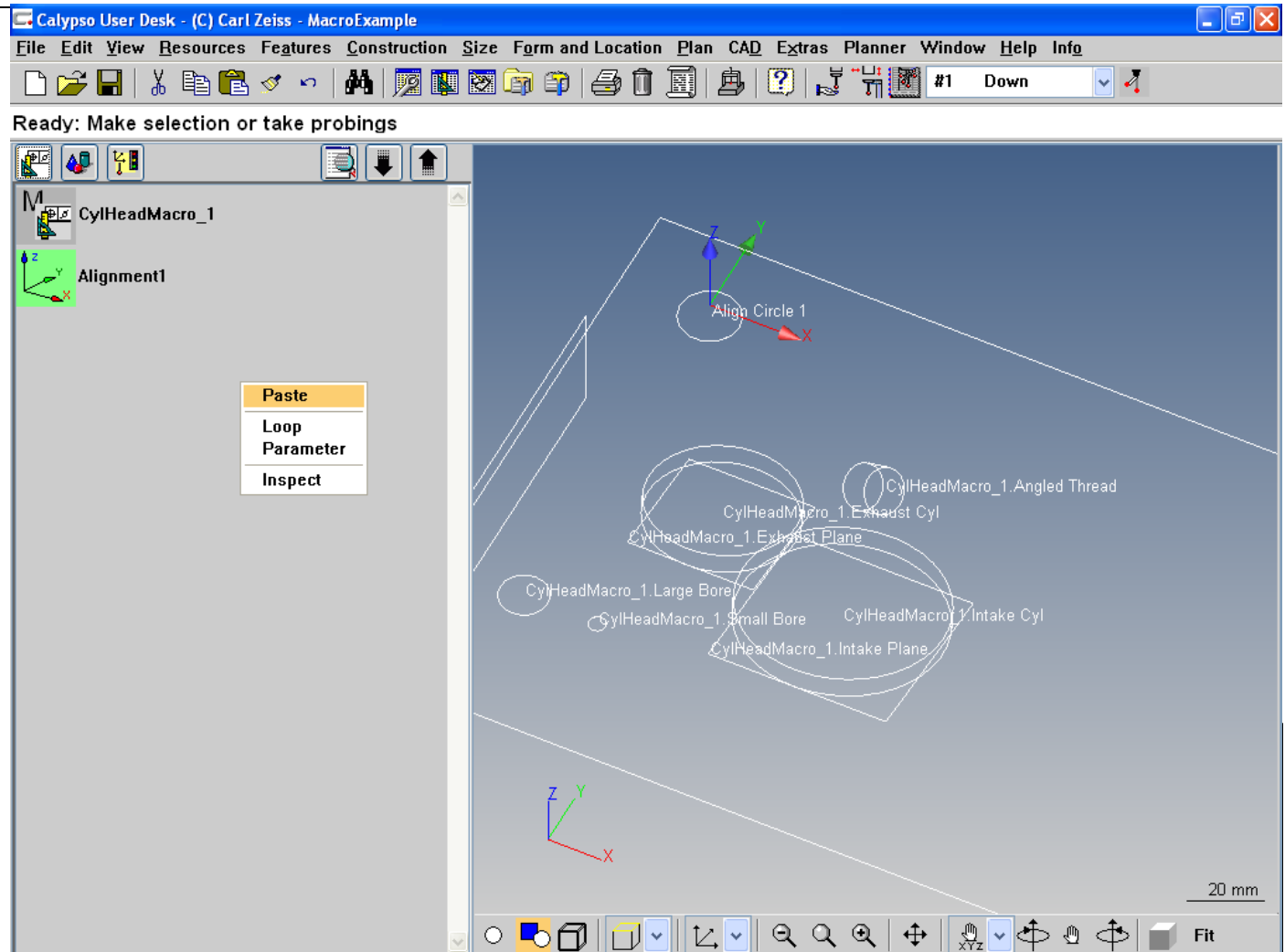
...we can copy-paste  
our Macro...

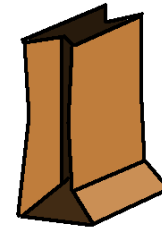
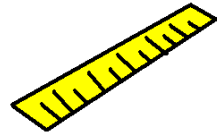




# LUNCH 'N LEARN

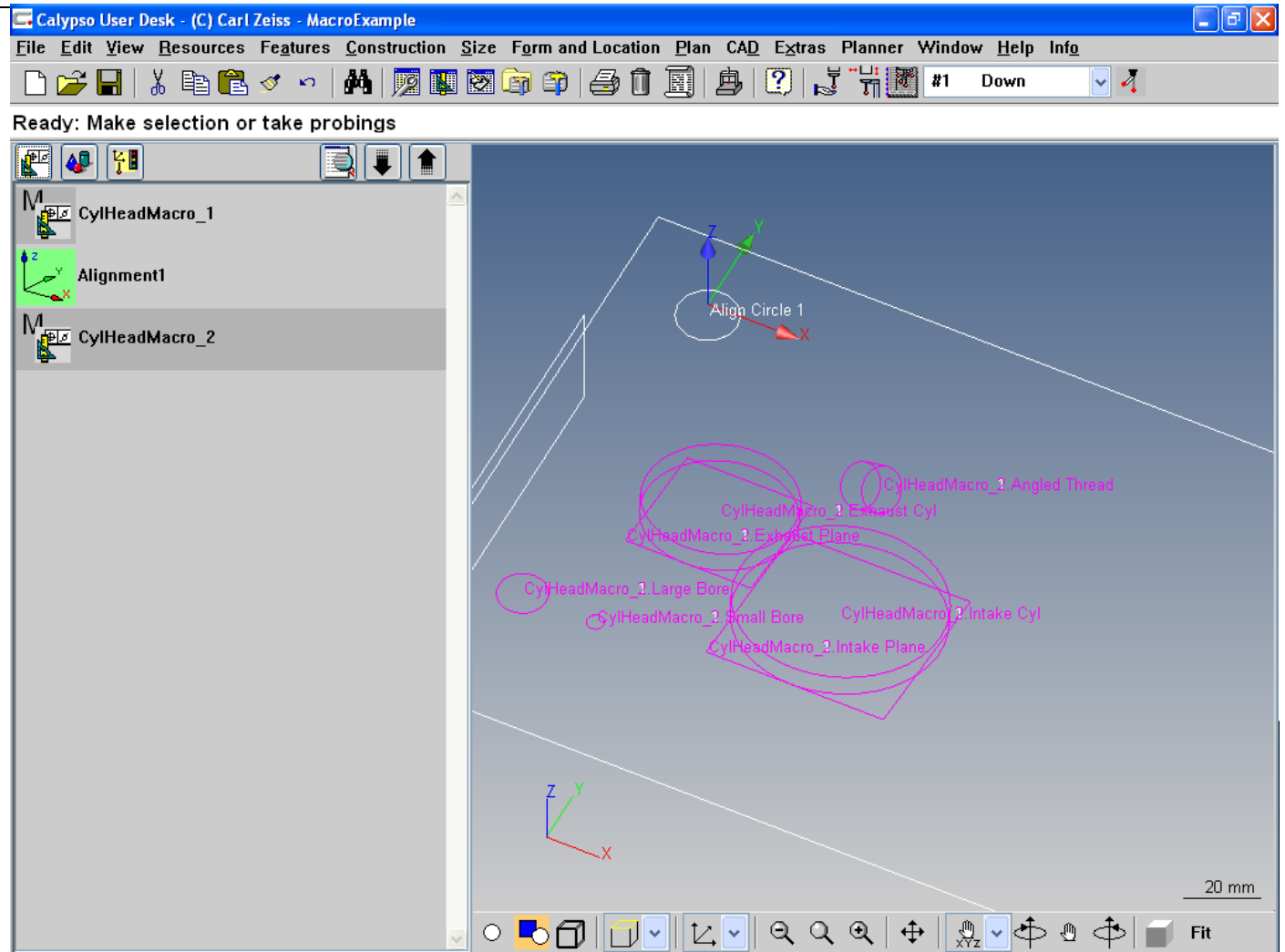
...we can copy-paste  
our Macro...

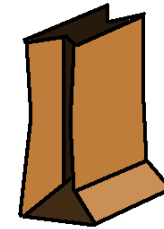
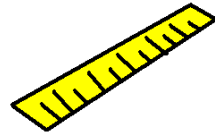




# LUNCH 'N LEARN

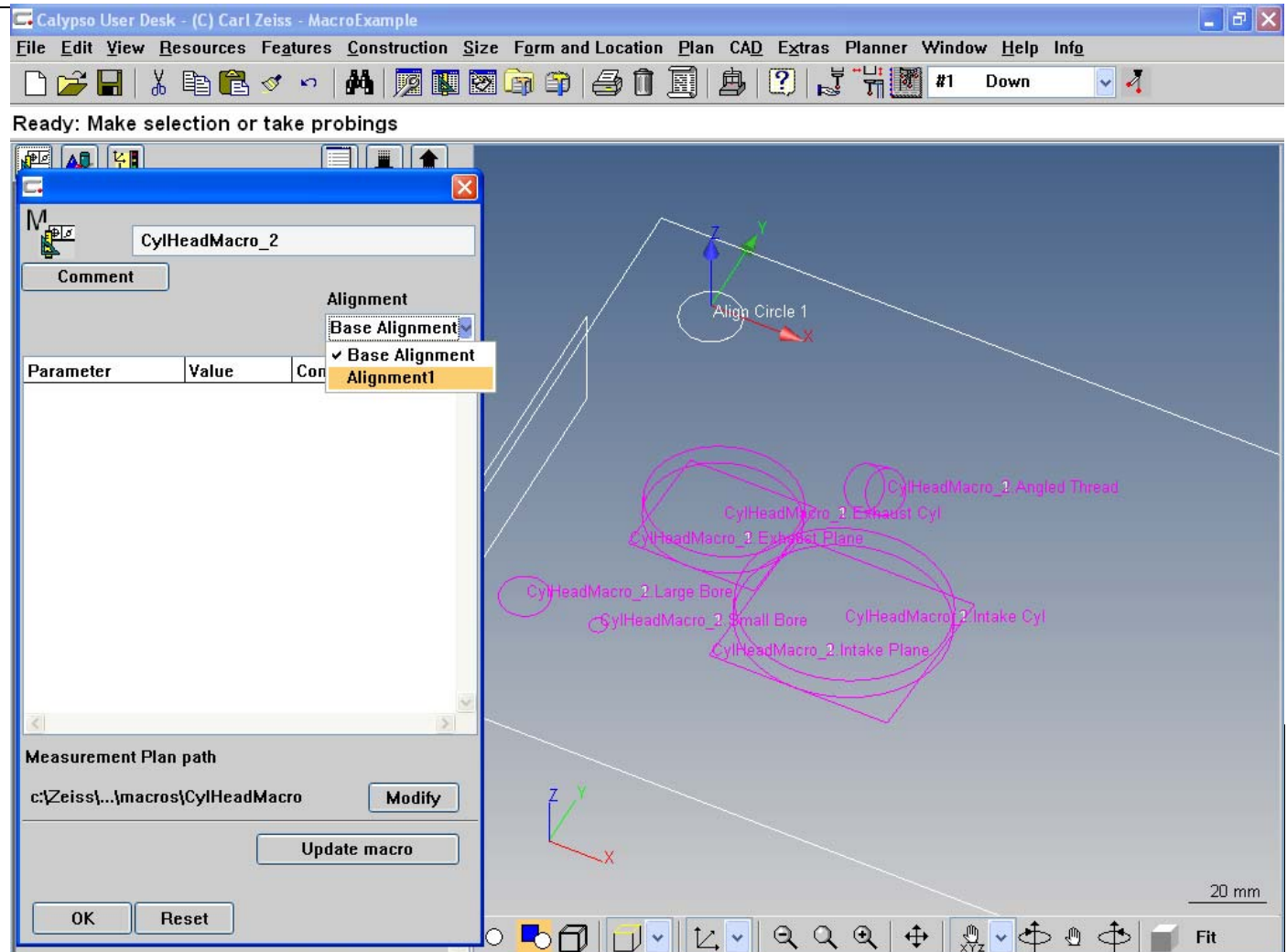
...open it up...

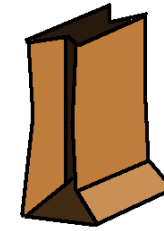
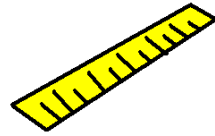




# LUNCH 'N LEARN

...and change the Alignment setting to our new Secondary Alignment.

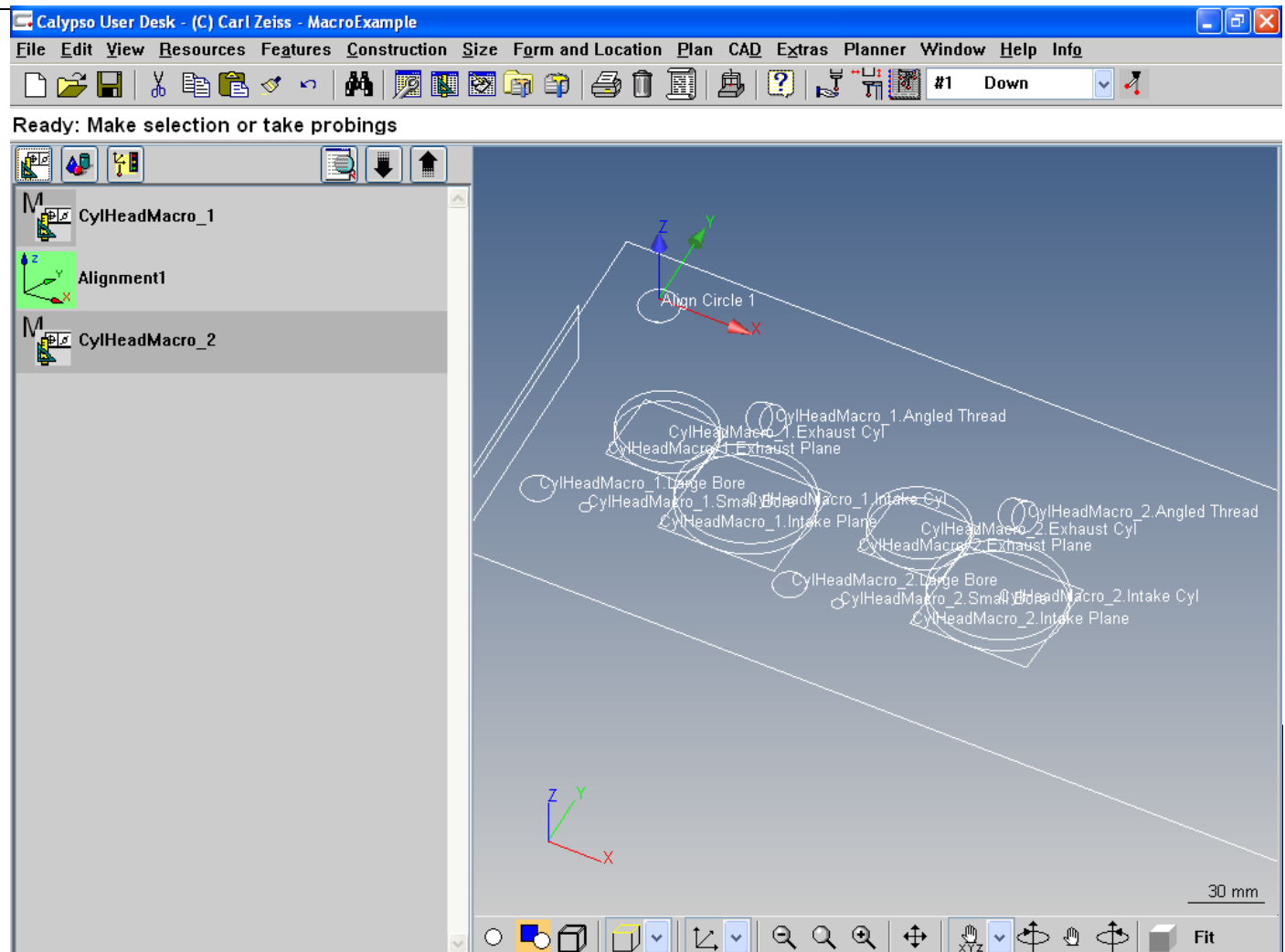




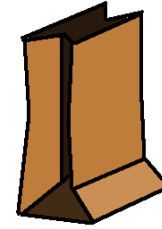
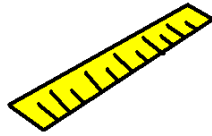
# LUNCH 'N LEARN

As shown, this shifts our new Macro into the desired position.

Now there are two sets of our Macro features, offset from each other just like on the part.

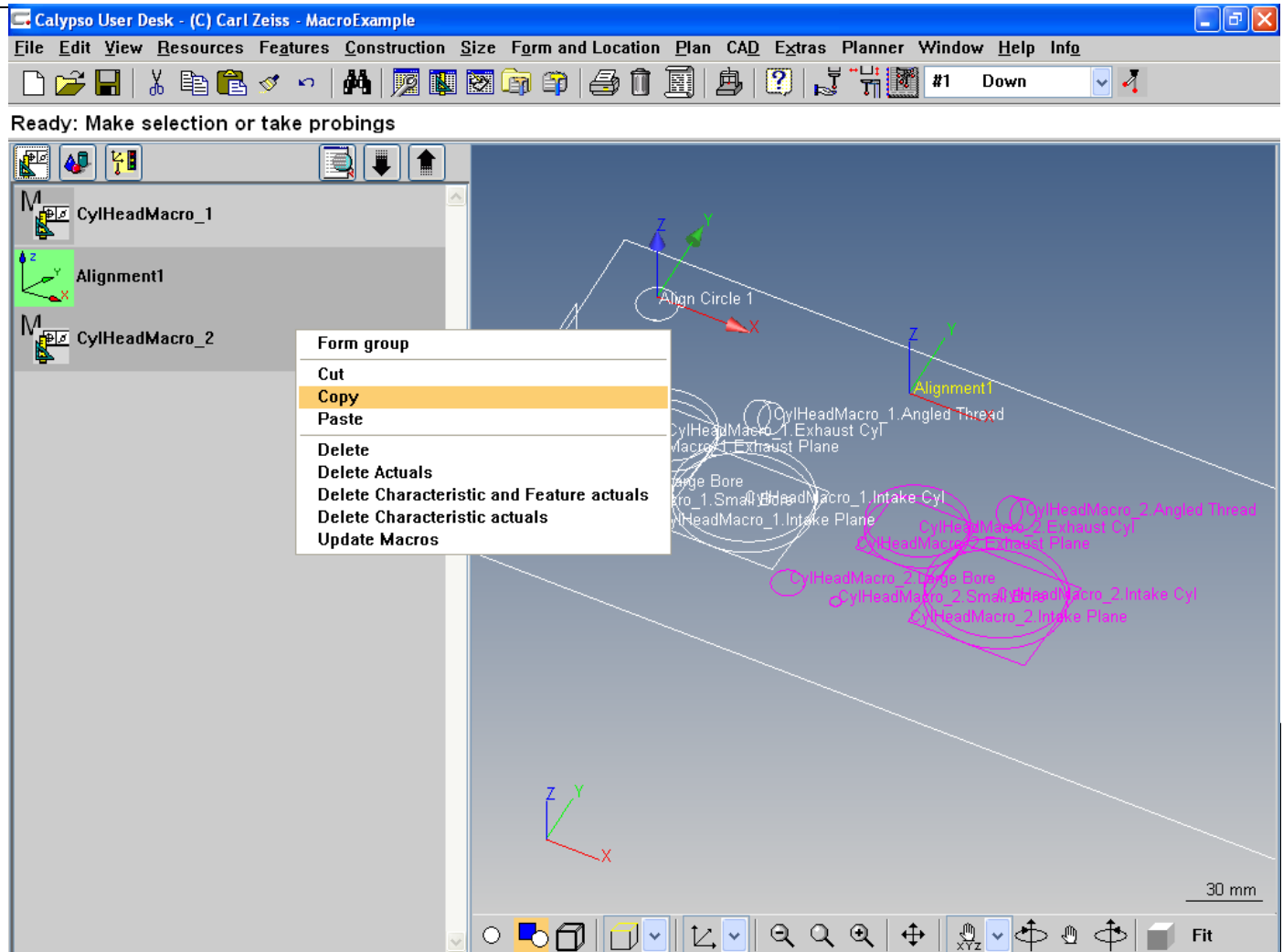


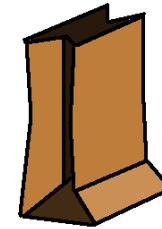
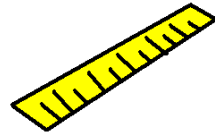




# LUNCH 'N LEARN

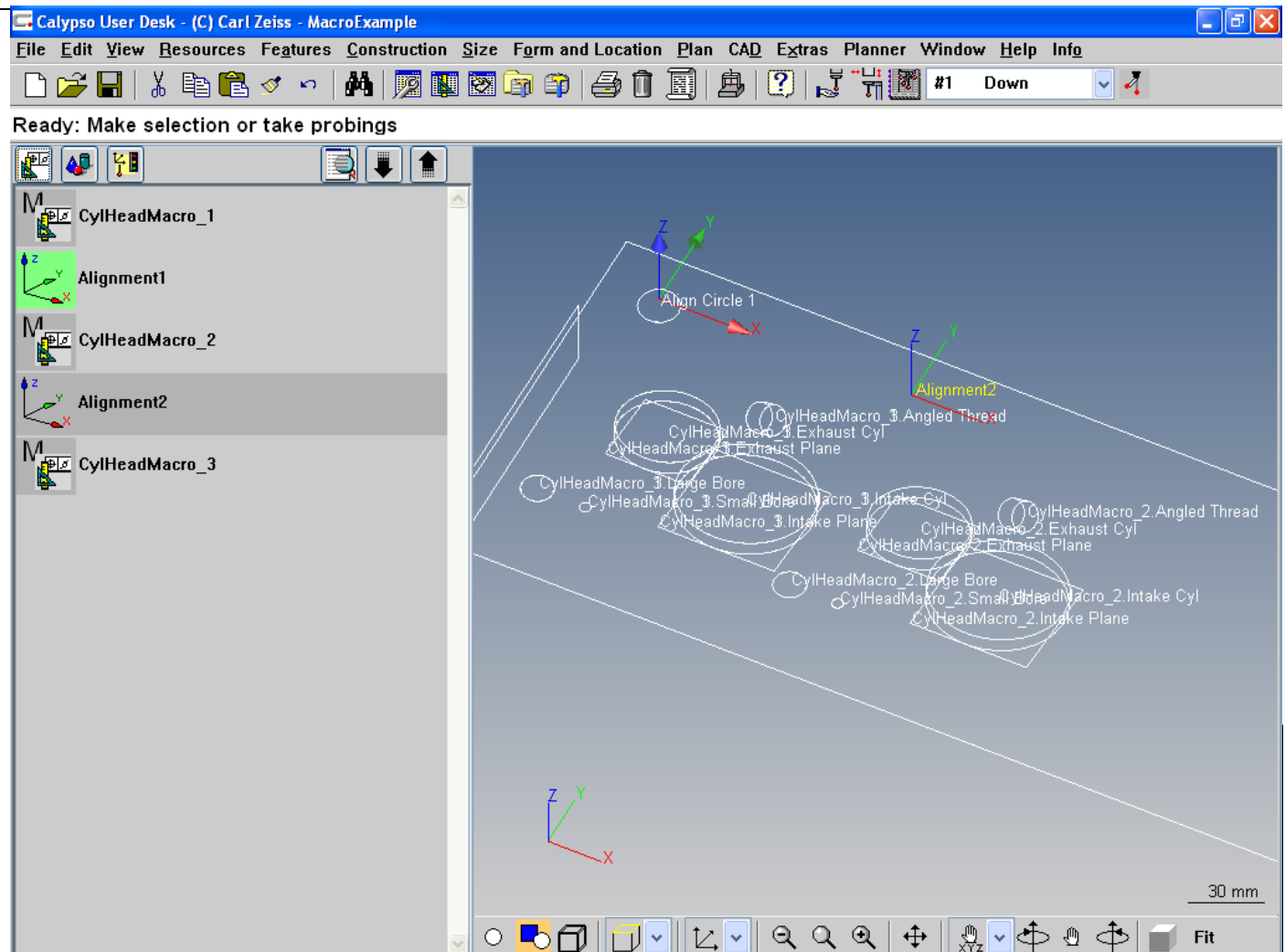
To continue creating additional shifted Macros in the same pattern, simply copy-paste both the Macro and its secondary alignment.

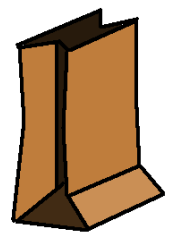
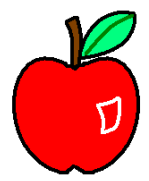
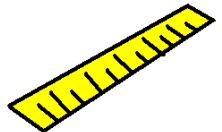




# LUNCH 'N LEARN

To continue creating additional shifted Macros in the same pattern, simply copy-paste both the Macro and its secondary alignment.

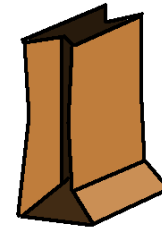
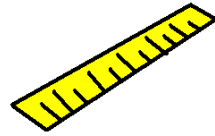




# LUNCH 'N LEARN

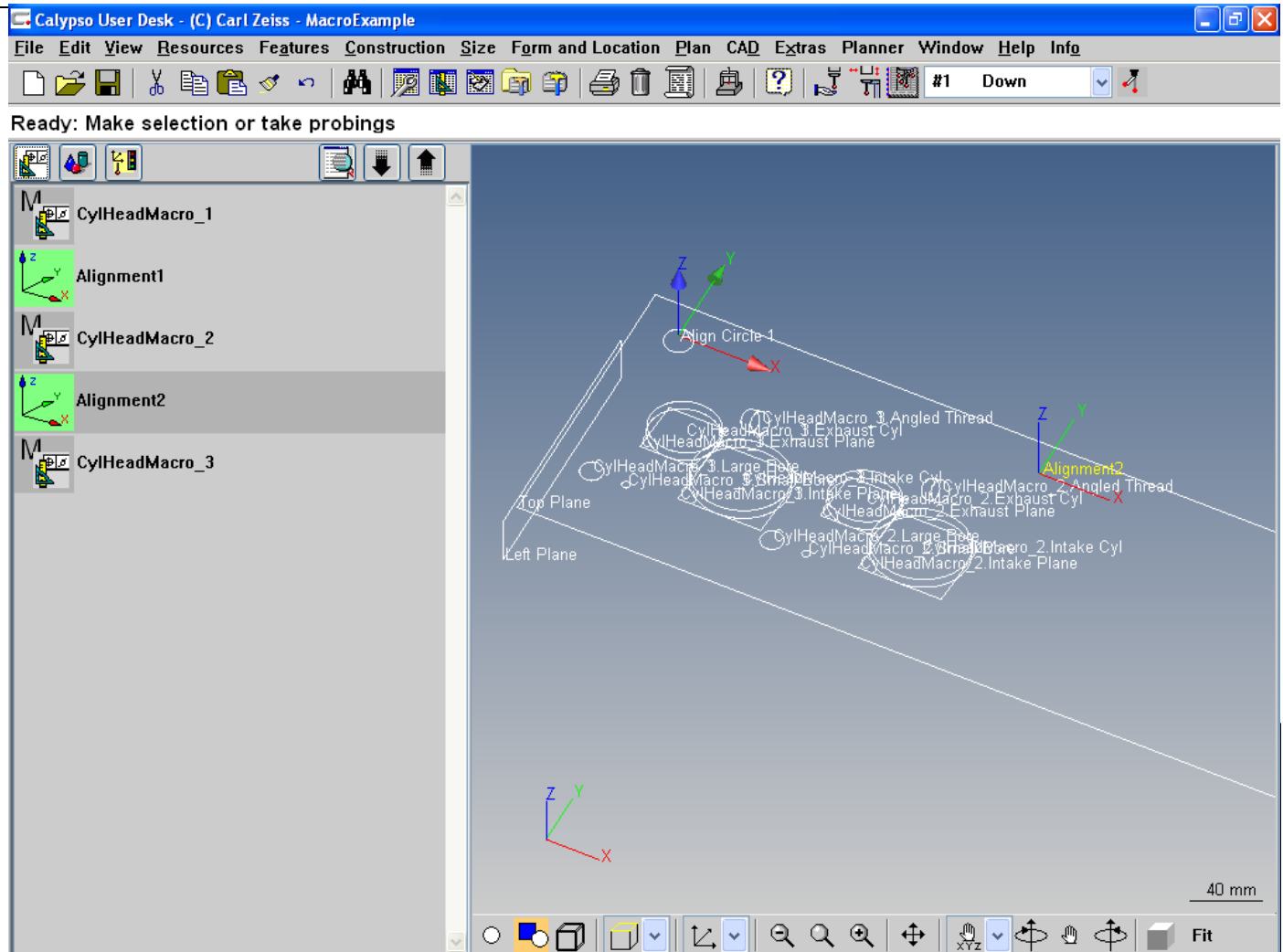
Change the reference of your second alignment to your first alignment.

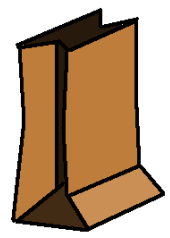
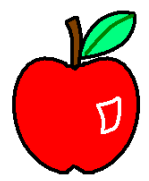
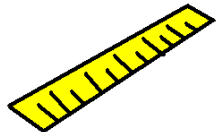
The screenshot shows the Calypso User Desk interface. The main window title is "Calypso User Desk - (C) Carl Zeiss - MacroExample". The menu bar includes File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, Help, and Info. The toolbar contains various icons for file operations and measurement. The "Select Feature" window is open, showing a list of features. The "Alignment" dialog box is open, showing the "Alignment2" configuration. The "Base Alignment" dropdown is set to "Alignment1". The "Planar Rotation" dropdown is set to "Z". The "X Origin", "Y Origin", and "Z Origin" fields are empty. The "Special" and "Comment" buttons are visible. The 3D model in the background shows a cylinder head macro with various features labeled, including "Align Circle 1", "Alignment2", "CylHeadMacro\_3 Angled Thread", "CylHeadMacro\_4 Exhaust Cyl", "CylHeadMacro\_3 Exhaust Plane", "CylHeadMacro\_3 Large Bore", "CylHeadMacro\_3 Small Bore", "CylHeadMacro\_3 Intake Cyl", "CylHeadMacro\_3 Intake Plane", "CylHeadMacro\_2 Angled Thread", "CylHeadMacro\_2 Exhaust Cyl", "CylHeadMacro\_2 Exhaust Plane", "CylHeadMacro\_2 Large Bore", "CylHeadMacro\_2 Small Bore", "CylHeadMacro\_2 Intake Cyl", and "CylHeadMacro\_2 Intake Plane". A scale bar at the bottom right indicates 30 mm.



# LUNCH 'N LEARN

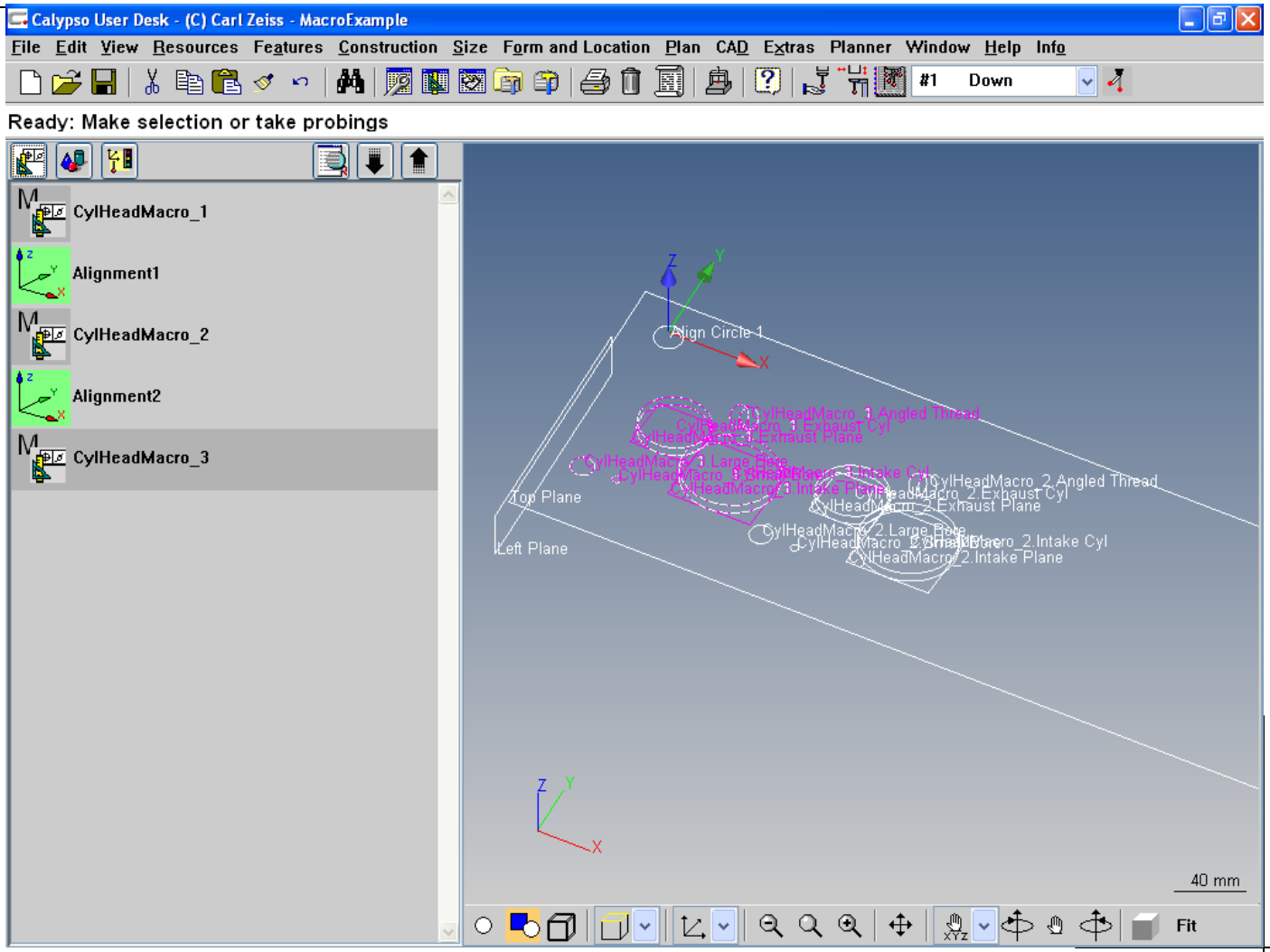
This shifts your second alignment 111.25mm in the X-direction from your first alignment.

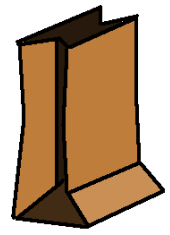
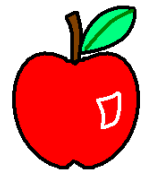
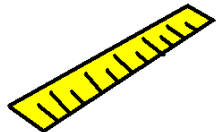




# LUNCH 'N LEARN

Now open your third Macro...





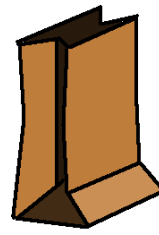
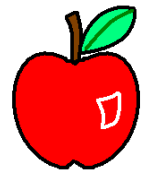
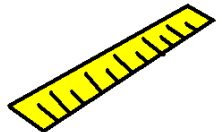
# LUNCH 'N LEARN

...and change its Alignment setting to the newly created alignment.

The screenshot shows the Calypso User Desk interface. The main window title is "Calypso User Desk - (C) Carl Zeiss - MacroExample". The menu bar includes File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, Help, and Info. The status bar shows "Ready: Make selection or take probing".

A dialog box titled "CylHeadMacro\_3" is open, showing a "Comment" field and a table with columns "Parameter", "Value", and "Con". The "Alignment" dropdown menu is open, showing options: "Alignment1", "Base Alignment", "Alignment1" (checked), and "Alignment2".

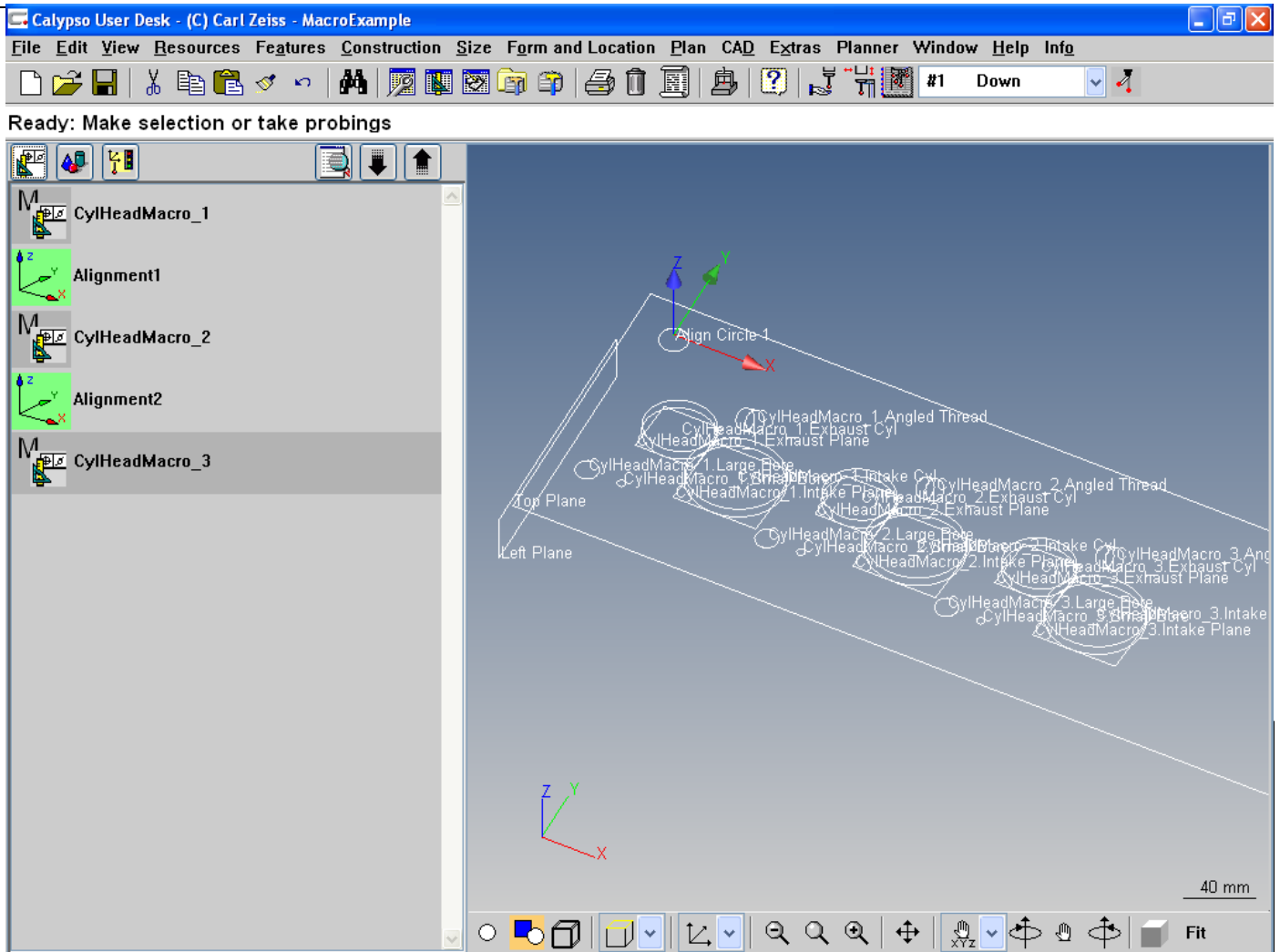
The background shows a 3D CAD model of a mechanical part with various features labeled, including "Align Circle 1", "CylHeadMacro\_1 Angled Thread", "CylHeadMacro\_1 Exhaust Cyl", "CylHeadMacro\_1 Exhaust Plane", "CylHeadMacro\_1 Large Base", "CylHeadMacro\_1 Intake Cyl", "CylHeadMacro\_1 Intake Plane", "CylHeadMacro\_2 Angled Thread", "CylHeadMacro\_2 Exhaust Cyl", "CylHeadMacro\_2 Exhaust Plane", "CylHeadMacro\_2 Large Base", "CylHeadMacro\_2 Intake Cyl", and "CylHeadMacro\_2 Intake Plane". The model is shown in a perspective view with coordinate axes (X, Y, Z) and a scale bar indicating 40 mm.



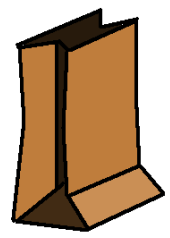
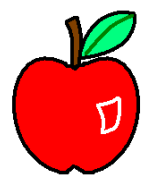
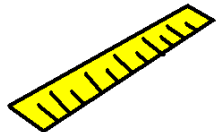
# LUNCH 'N LEARN

Viola!

Now repeat as many times as necessary within a repeating pattern.

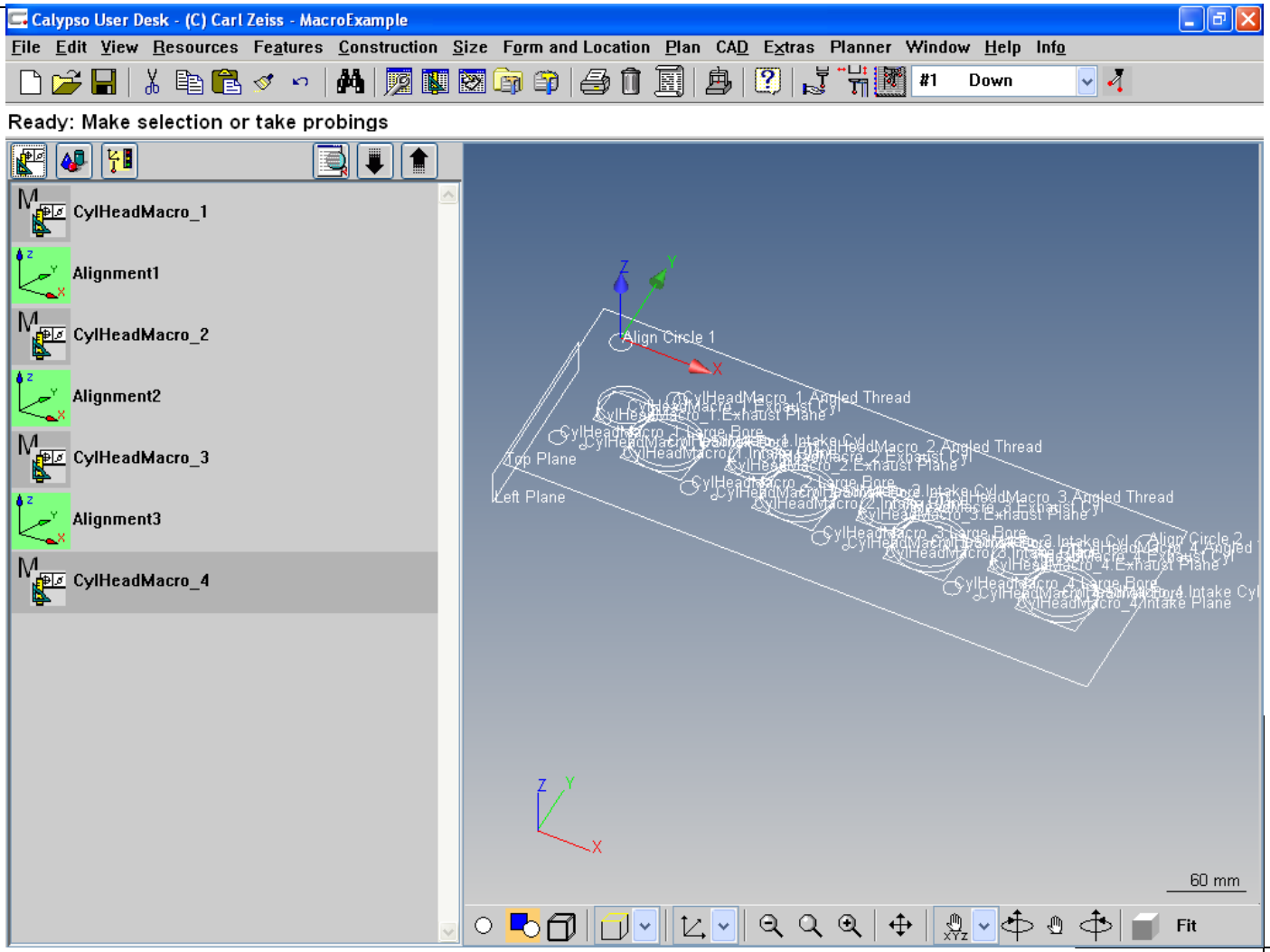


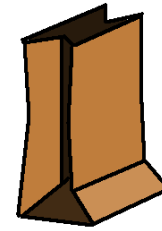
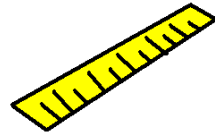




# LUNCH 'N LEARN

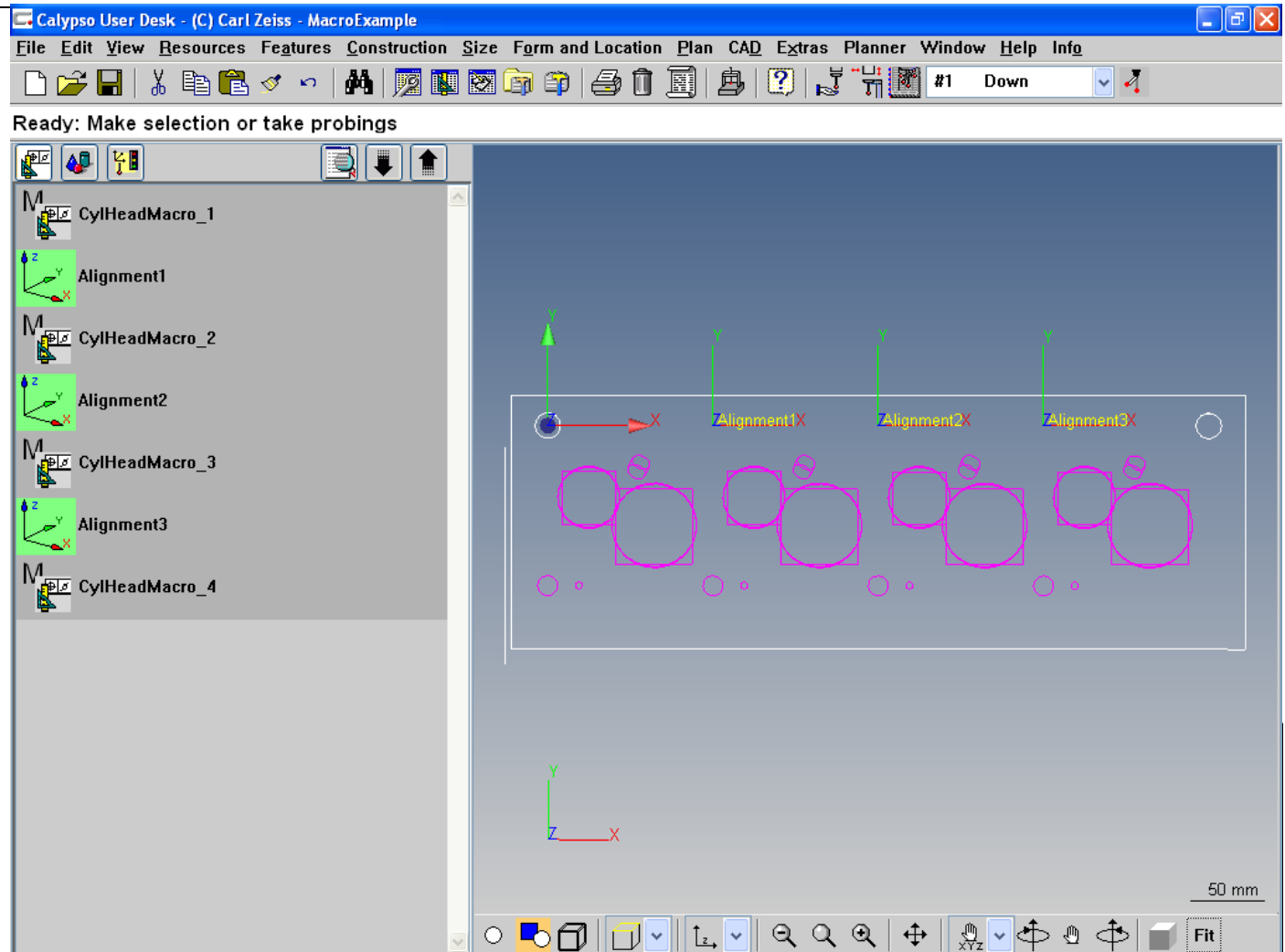
Completed!

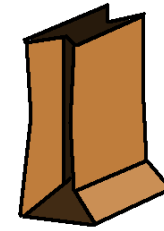
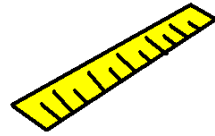




# LUNCH 'N LEARN

As you see, each Macro has its own Alignment, with the first Macro's alignment being the Base Alignment, and all others being a Secondary Alignment.

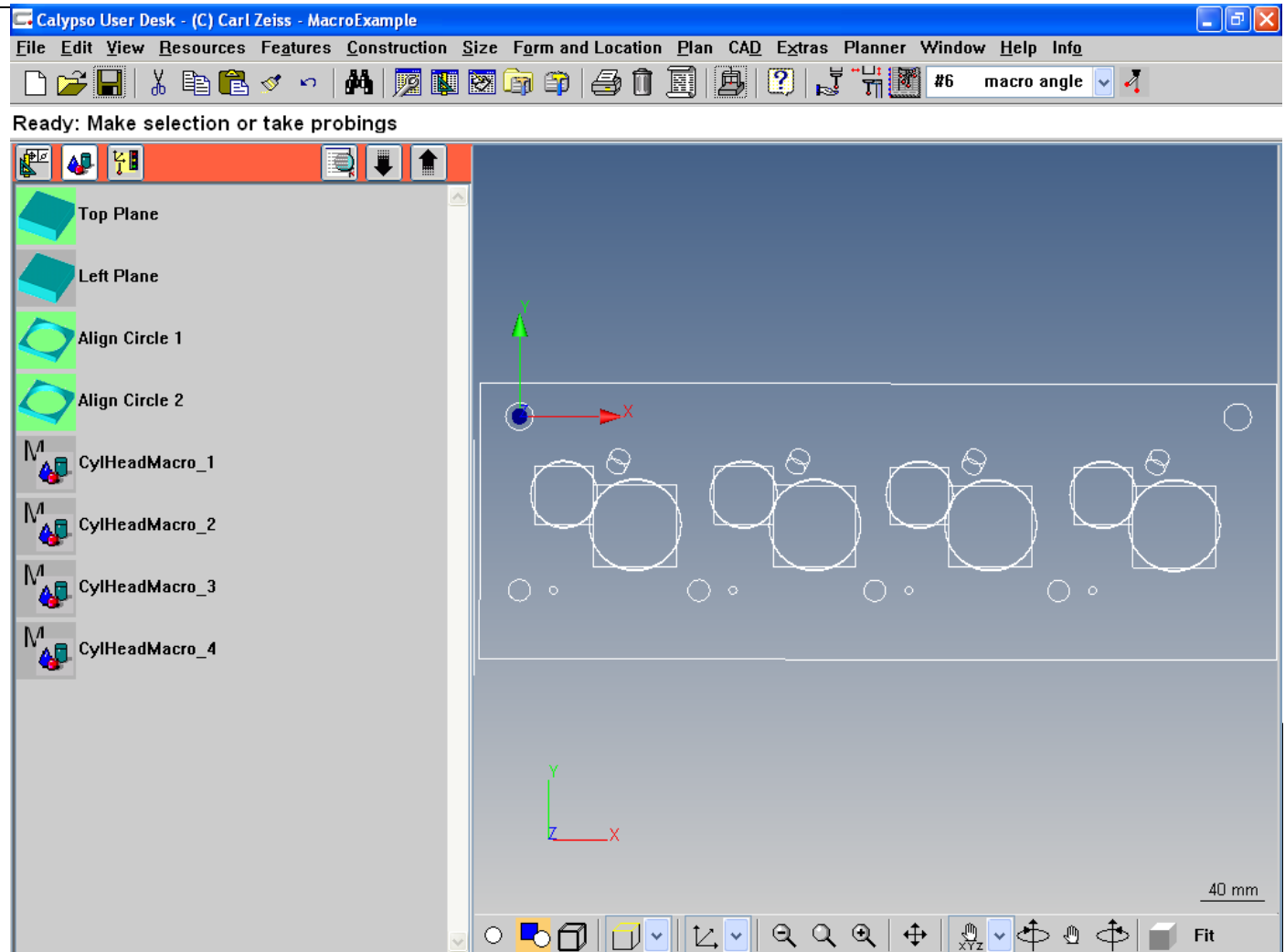


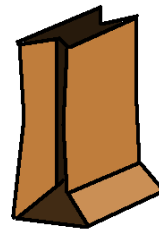
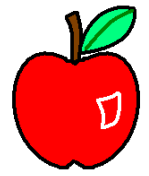
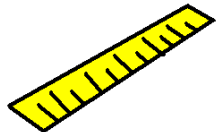


# LUNCH 'N LEARN

Each Macro exists independently in both the feature list and characteristic list.

Deleting one will also delete the other.



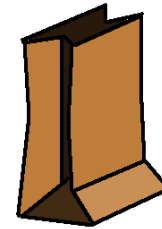
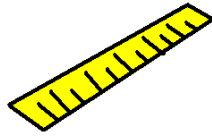


# LUNCH 'N LEARN

As seen in the features settings editor, each feature inside of a Macro also exists individually in our Base Program as well. This means we can change individual settings for specific Macro features if needed.

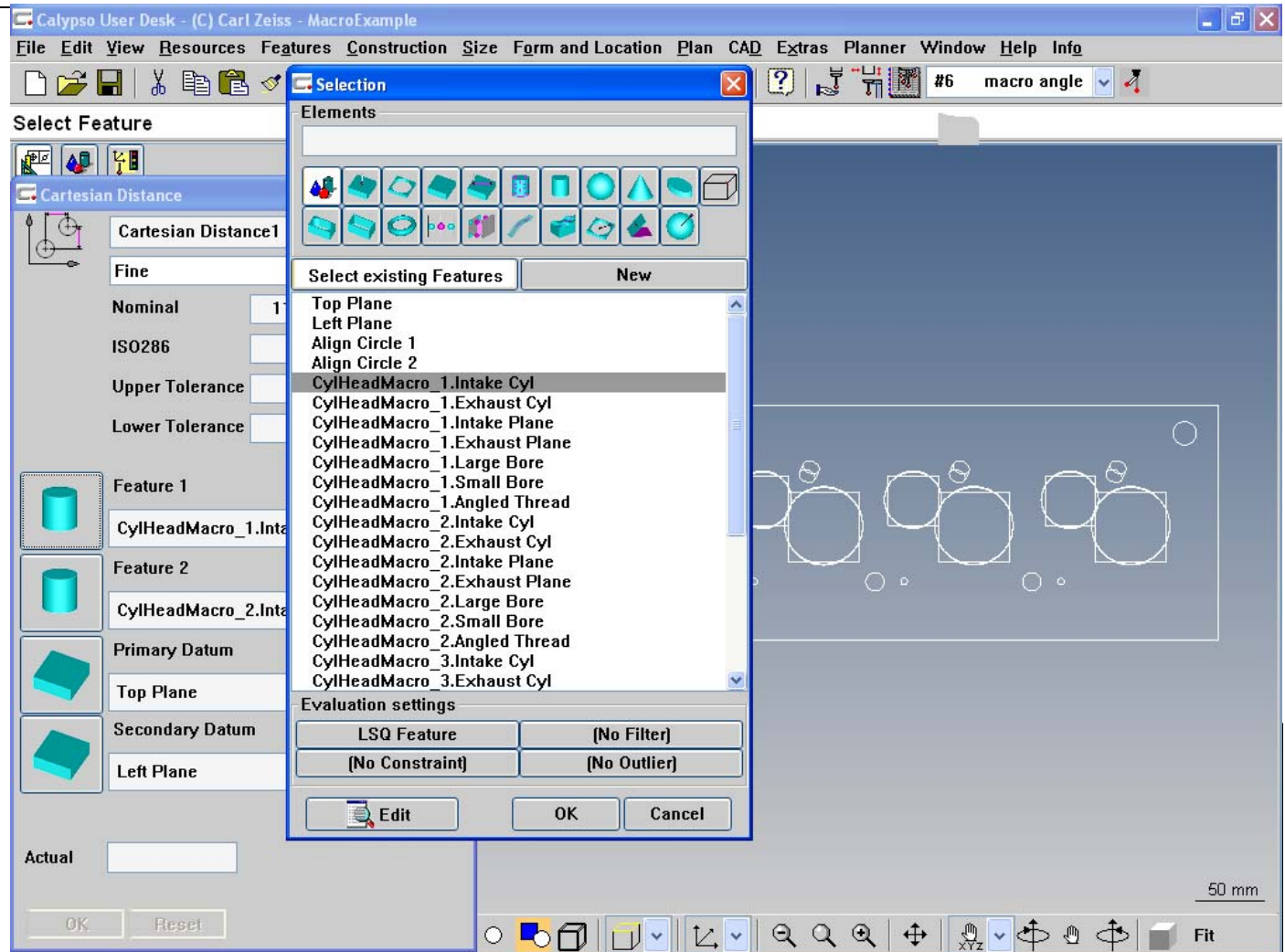
The screenshot shows the 'Measurement Plan Editor Features' dialog box in the Calypso User Desk. The dialog is titled 'Measurement Plan Editor Features' and has a 'Stylus' dropdown menu at the top left. Below the dropdown is a list of features with their respective settings. The 'Stylus' dropdown is set to 'Stylus system'. The 'Accept for:' section has two radio buttons: 'Measurement Plan' (unselected) and 'selected features' (selected). The 'Set To' dropdown is empty. The main table lists features with columns for Name, Type, and Value.

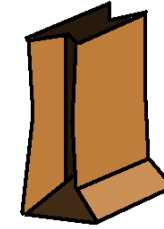
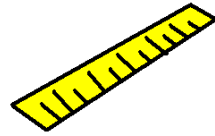
Name	Type	Value
Top Plane	Plane	#1 Down (3mm) [SP +Z]
Left Plane	Plane	#1 Down (3mm) [SP +Z]
Align Circle 1	Circle	#1 Down (3mm) [SP +Z]
Align Circle 2	Circle	#1 Down (3mm) [SP +Z]
<b>CylHeadMacro_1</b>	-	-
CylHeadMacro_1.Intake Cyl	Cylinder	#1 Down (3mm) [SP +Z]
CylHeadMacro_1.Exhaust Cyl	Cylinder	#1 Down (3mm) [SP +Z]
CylHeadMacro_1.Intake Plane	Plane	#1 Down (3mm) [SP +Z]
CylHeadMacro_1.Exhaust Plane	Plane	#1 Down (3mm) [SP +Z]
CylHeadMacro_1.Large Bore	Circle	#1 Down (3mm) [SP +Z]
CylHeadMacro_1.Small Bore	Circle	#1 Down (3mm) [SP +Z]
CylHeadMacro_1.Angled Thread	Cylinder	#6 macro angle (3mm) [SP +Z]
<b>CylHeadMacro_2</b>	-	-
CylHeadMacro_2.Intake Cyl	Cylinder	#1 Down (3mm) [SP +Z]
CylHeadMacro_2.Exhaust Cyl	Cylinder	#1 Down (3mm) [SP +Z]
CylHeadMacro_2.Intake Plane	Plane	#1 Down (3mm) [SP +Z]
CylHeadMacro_2.Exhaust Plane	Plane	#1 Down (3mm) [SP +Z]
CylHeadMacro_2.Large Bore	Circle	#1 Down (3mm) [SP +Z]
CylHeadMacro_2.Small Bore	Circle	#1 Down (3mm) [SP +Z]
CylHeadMacro_2.Angled Thread	Cylinder	#6 macro angle (3mm) [SP +Z]
<b>CylHeadMacro_3</b>	-	-
CylHeadMacro_3.Intake Cyl	Cylinder	#1 Down (3mm) [SP +Z]
CylHeadMacro_3.Exhaust Cyl	Cylinder	#1 Down (3mm) [SP +Z]
CylHeadMacro_3.Intake Plane	Plane	#1 Down (3mm) [SP +Z]
CylHeadMacro_3.Exhaust Plane	Plane	#1 Down (3mm) [SP +Z]



# LUNCH 'N LEARN

This also means that we can reference individual Macro features in new characteristics, in recalled features, and in formulas.

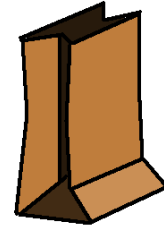
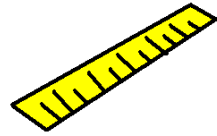




# LUNCH 'N LEARN

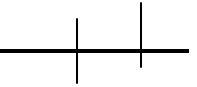
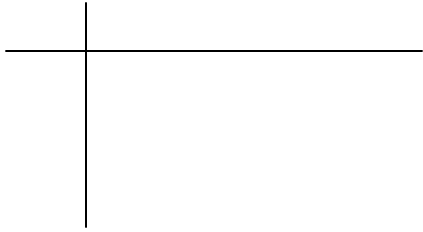
Each characteristic of a Macro feature is displayed individually in the Calypso printouts as well, using an easily understandable naming method.

Calypso Custom Printout MacroExample 1					Calypso Custom Printout MacroExample 1						
ZEISS Calypso					ZEISS						
Measurement Plan MacroExample		Date June 23, 2008			Plan Name MacroExample		Operator Master		Time 4:45:38 pm		Date June 23, 2008
Drawing No. * drawingno *		Time 4:45:38 pm			Order * order *						
Operator Master		CMM C32Bit			Incremental Part Number 4						
	Actual	Nominal	Upper Tol.	Lower Tol.		Actual	Nominal	Upper Tol.	Lower Tol.	Deviation	
CylHeadMacro_1.Flatness_Exhaust Plane	0.0400	0.0000	0.0050	-0.0050		0.0350				0.0400	
CylHeadMacro_1.Perpendicularity_Intake Cyl	0.0032	0.0000	0.0500	-0.0500		0.0032				0.0032	
CylHeadMacro_1.Perpendicularity_Exhaust Cyl	0.0075	0.0000	0.0500	-0.0500		0.0075				0.0075	
CylHeadMacro_1.Diameter_Intake Cyl	57.0139	56.9798	0.1500	-0.1500							
CylHeadMacro_1.Diameter_Exhaust Cyl	41.7058	41.6890	0.1500	-0.1500							
CylHeadMacro_1.Diameter_Large Bore	13.5452	13.5534	0.1000	-0.1000							
CylHeadMacro_1.Diameter_Small Bore	4.8503	4.8514	0.0500	-0.0500							
CylHeadMacro_1.Projection Angle One_Angled Thread	-23.6881	-23.5867	0.5000	-0.5000							
CylHeadMacro_1.Projection Angle Two_Angled Thread	-42.5286	-42.3302	0.5000	-0.5000							
CylHeadMacro_1.Cylindricity_Intake Cyl	0.0404	0.0000	0.0500	-0.0500							
CylHeadMacro_1.Cylindricity_Exhaust Cyl	0.0481	0.0000	0.0500	-0.0500							
CylHeadMacro_1.Flatness_Intake Plane	0.0267	0.0000	0.0050	-0.0050							
CylHeadMacro_2.Diameter_Intake Cyl	57.0159	56.9798	0.1500	-0.1500						0.0361	
CylHeadMacro_2.Diameter_Exhaust Cyl	41.7068	41.6890	0.1500	-0.1500						0.0178	
CylHeadMacro_2.Diameter_Large Bore	13.5426	13.5534	0.1000	-0.1000						-0.0108	
CylHeadMacro_2.Diameter_Small Bore	4.8346	4.8514	0.0500	-0.0500						-0.0168	
CylHeadMacro_2.Projection Angle One_Angled Thread	-23.7884	-23.5867	0.5000	-0.5000						-0.2017	
CylHeadMacro_2.Projection Angle Two_Angled Thread	-42.5110	-42.3302	0.5000	-0.5000						-0.1808	
CylHeadMacro_2.Cylindricity_Intake Cyl	0.0525	0.0000	0.0500	-0.0500						0.0025	
CylHeadMacro_2.Cylindricity_Exhaust Cyl	0.0505	0.0000	0.0500	-0.0500						0.0005	
CylHeadMacro_2.Flatness_Intake Plane	0.0838	0.0000	0.0050	-0.0050						0.0788	

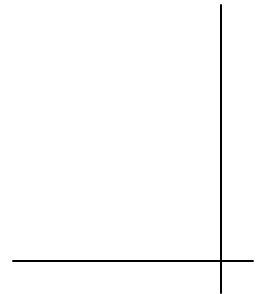


## LUNCH 'N LEARN

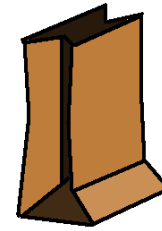
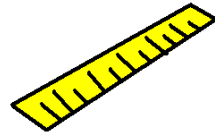
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Editing a Macro

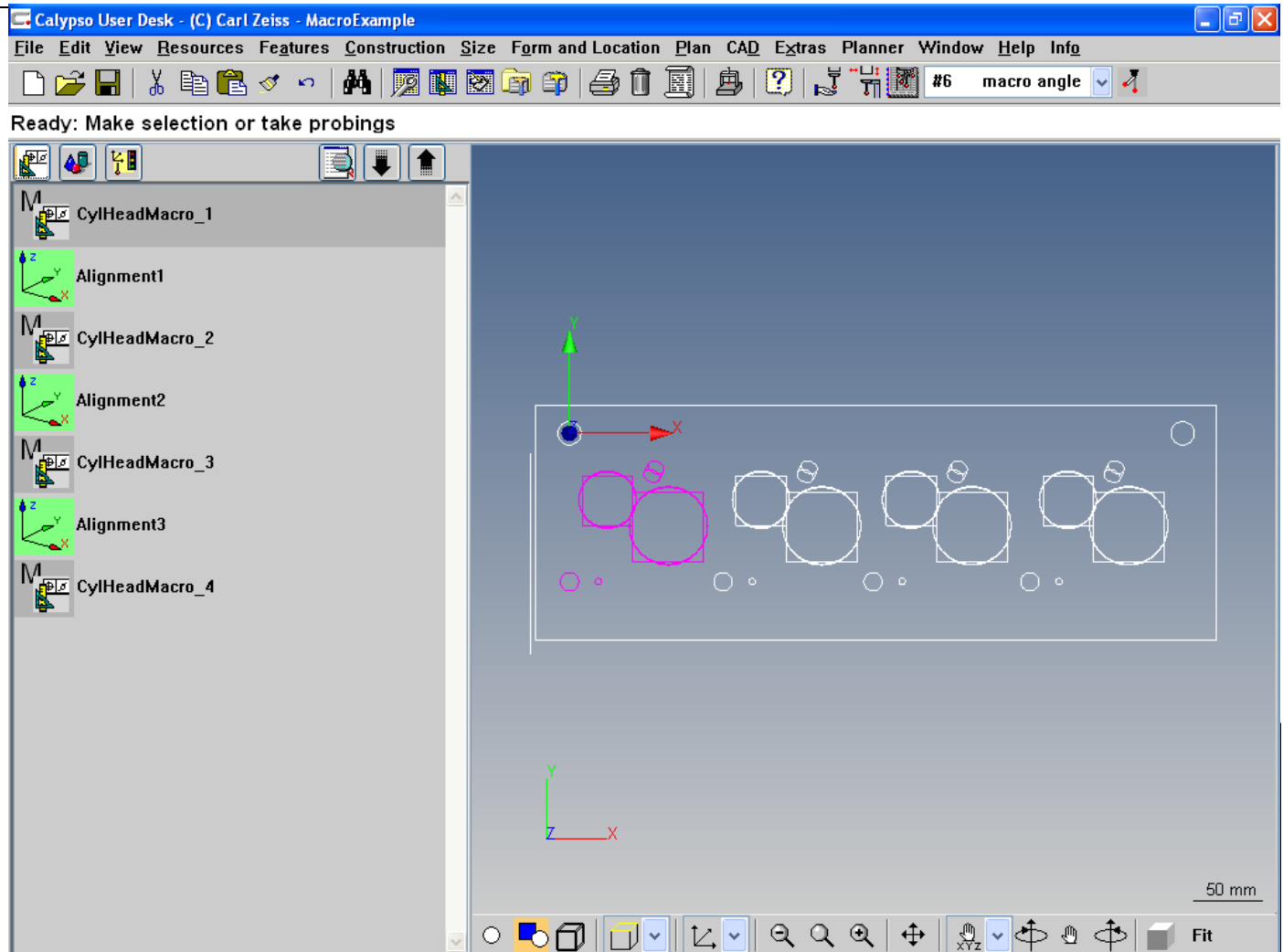


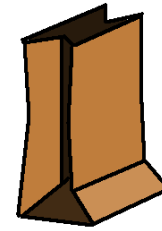
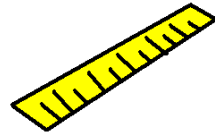




# LUNCH 'N LEARN

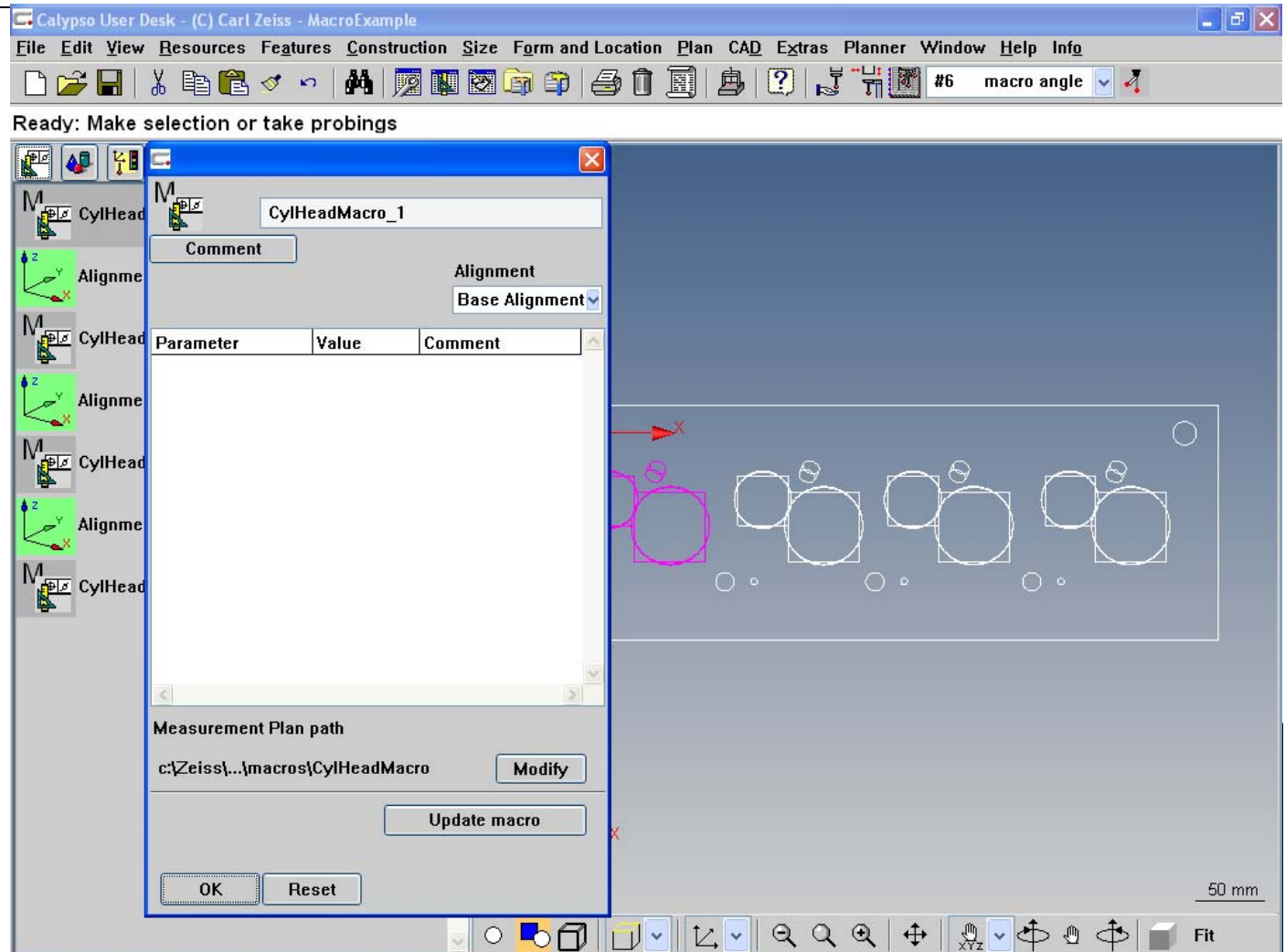
But what happens if we need to edit a feature or characteristic within the Macro?

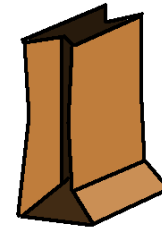
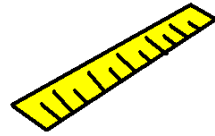




# LUNCH 'N LEARN

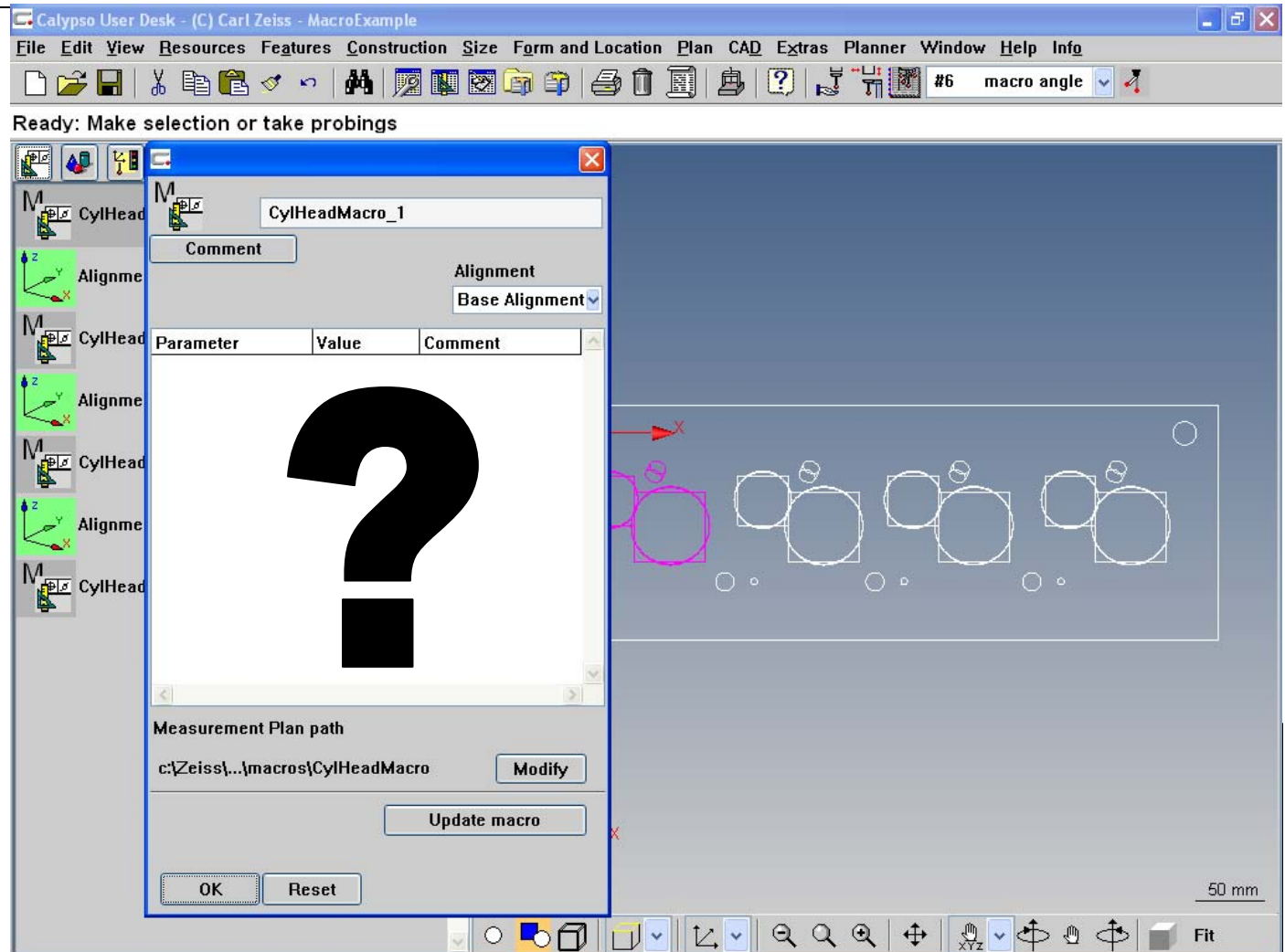
Can we access the features and characteristics by opening the Macro feature in our program?

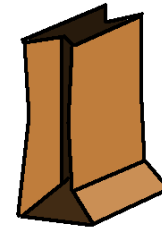
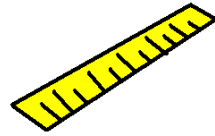




# LUNCH 'N LEARN

Can we access the features and characteristics by opening the Macro feature in our program?

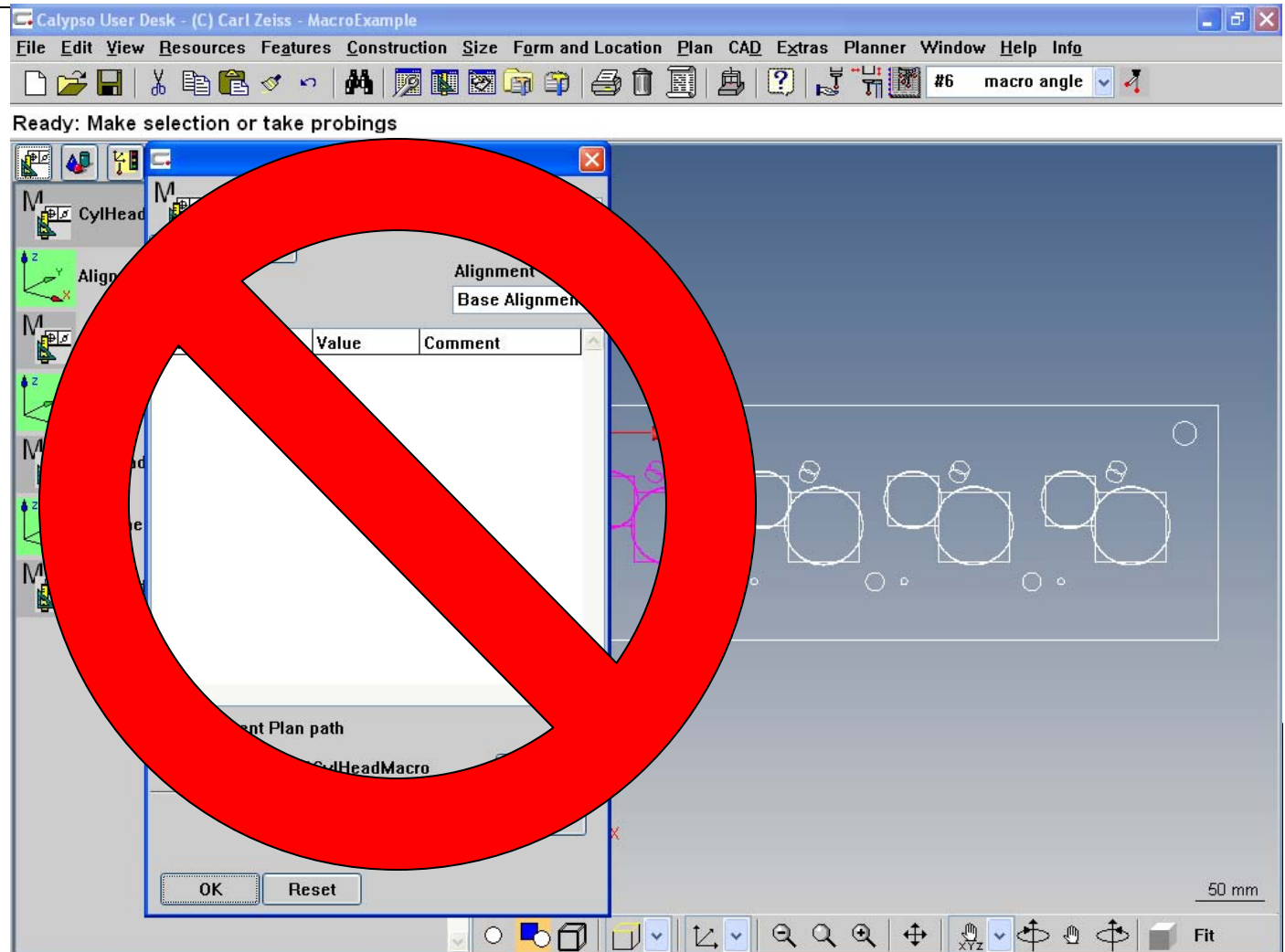


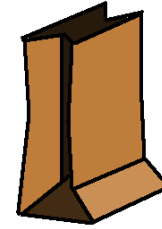
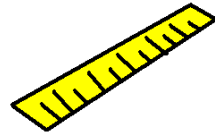


# LUNCH 'N LEARN

Can we access the features and characteristics by opening the Macro feature in our program?

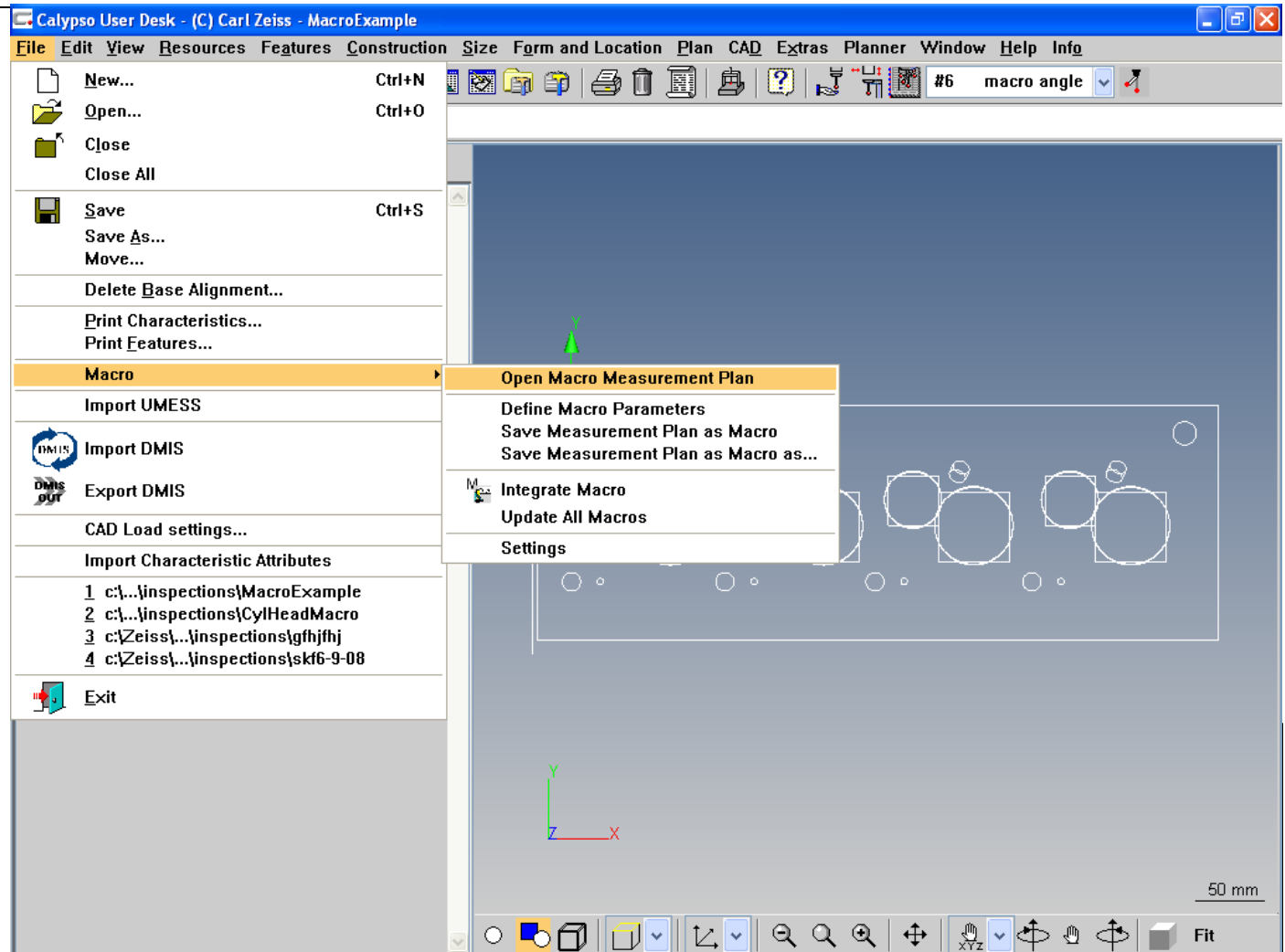
**Not quite...**

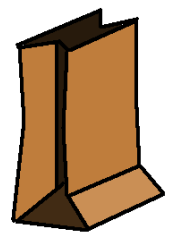
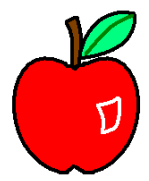
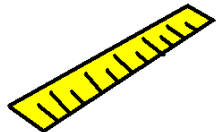




# LUNCH 'N LEARN

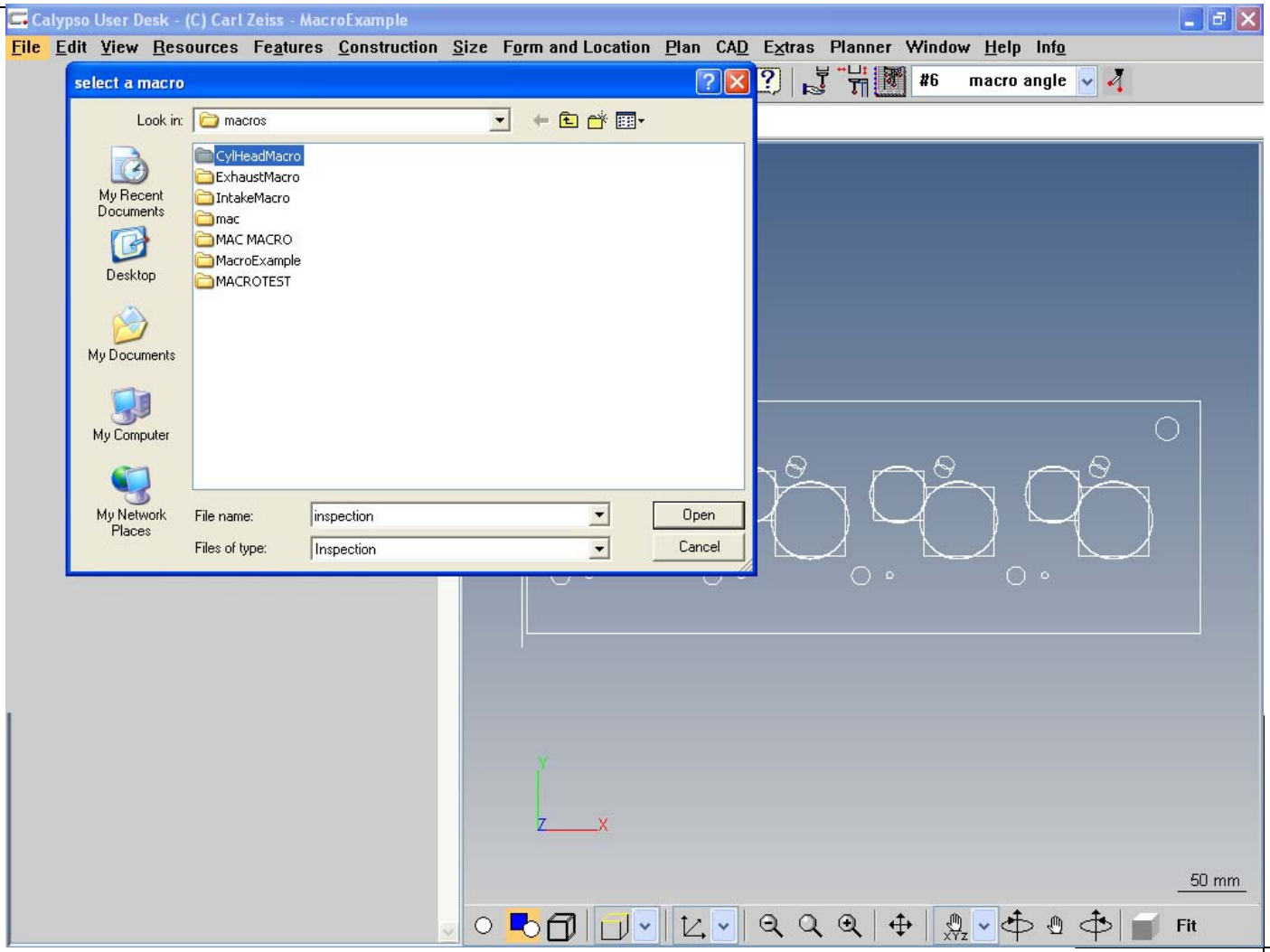
But we can go to Macro>Open Macro Measurement Plan and make the changes to our Macro program.

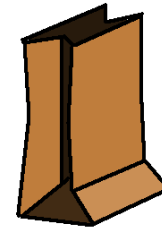
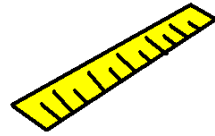




# LUNCH 'N LEARN

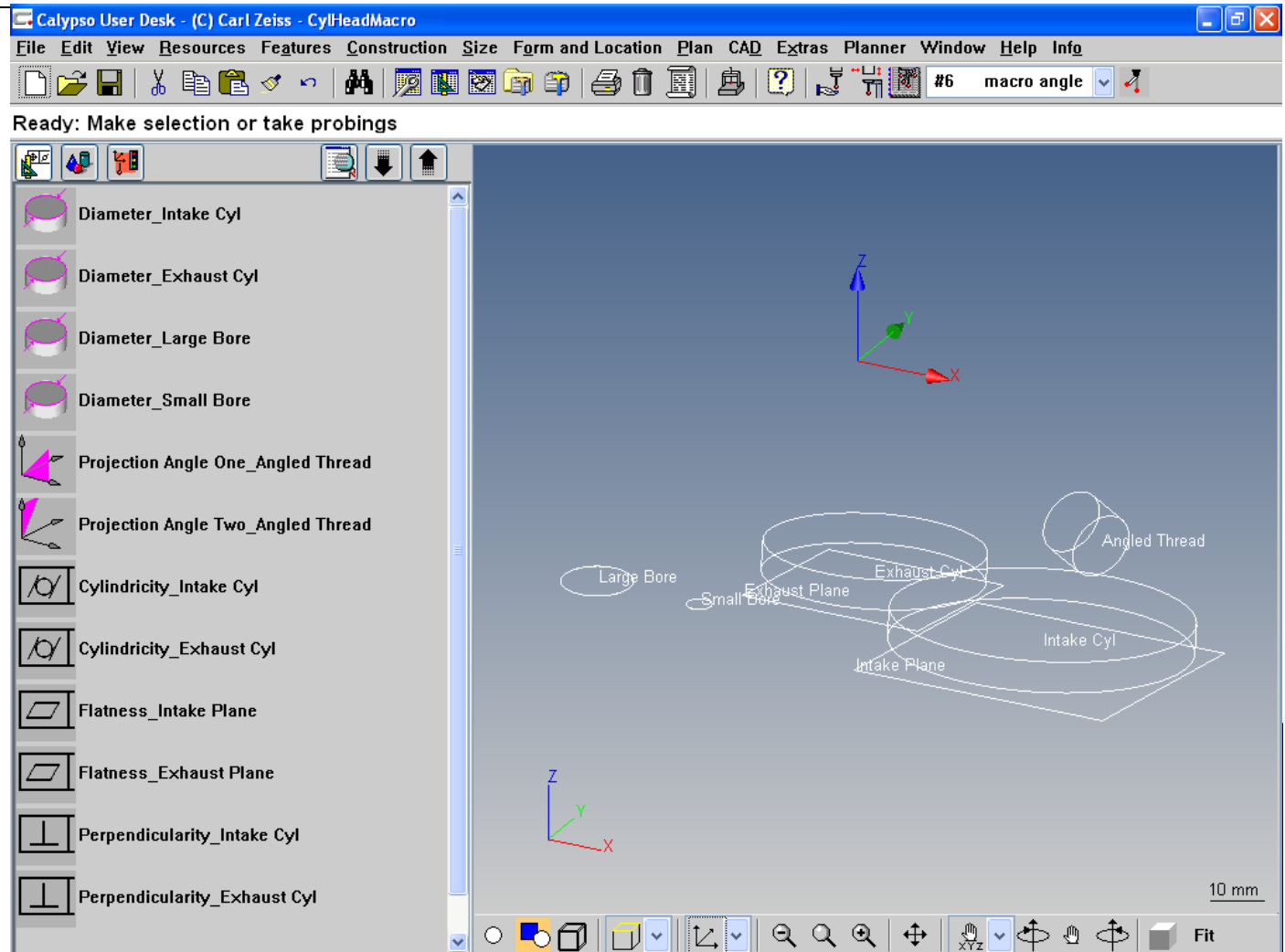
Choose your Macro program...



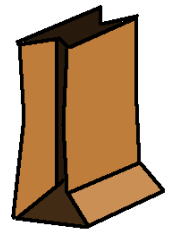
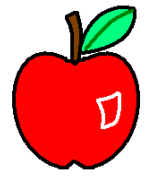
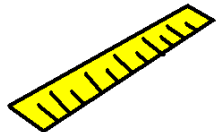


# LUNCH 'N LEARN

...open it up and make any changes you need to make.







# LUNCH 'N LEARN

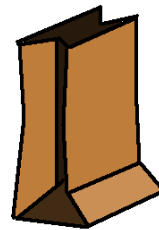
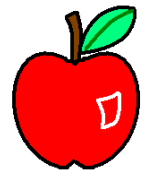
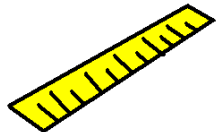
...open it up and make any changes you need to make.

The screenshot shows the Calypso User Desk interface. The main window title is "Calypso User Desk - (C) Carl Zeiss - CylHeadMacro". The menu bar includes File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, Help, and Info. The toolbar contains various icons for file operations and measurement. The "Select Feature" dropdown is set to "#6 macro angle".

A "Diameter" dialog box is open, showing the following settings:

- Diameter\_Small Bore
- Comment
- Fine
- Nominal: 4.8514
- ISO286
- Upper Tolerance: 0.0500  None
- Lower Tolerance: -0.0500  None
- Feature 1: Small Bore
- Actual: [ ]
- Buttons: OK, Reset

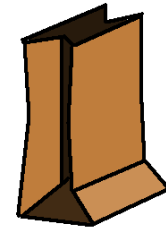
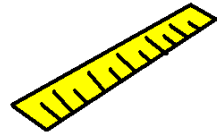
The 3D model in the background shows a part with several features labeled: Large Bore, Small Bore, Exhaust Plane, Exhaust Cyl, Intake Plane, Intake Cyl, and Angled Thread. A coordinate system (X, Y, Z) is visible in the bottom left of the model area. The scale bar at the bottom right indicates 10 mm.



# LUNCH 'N LEARN

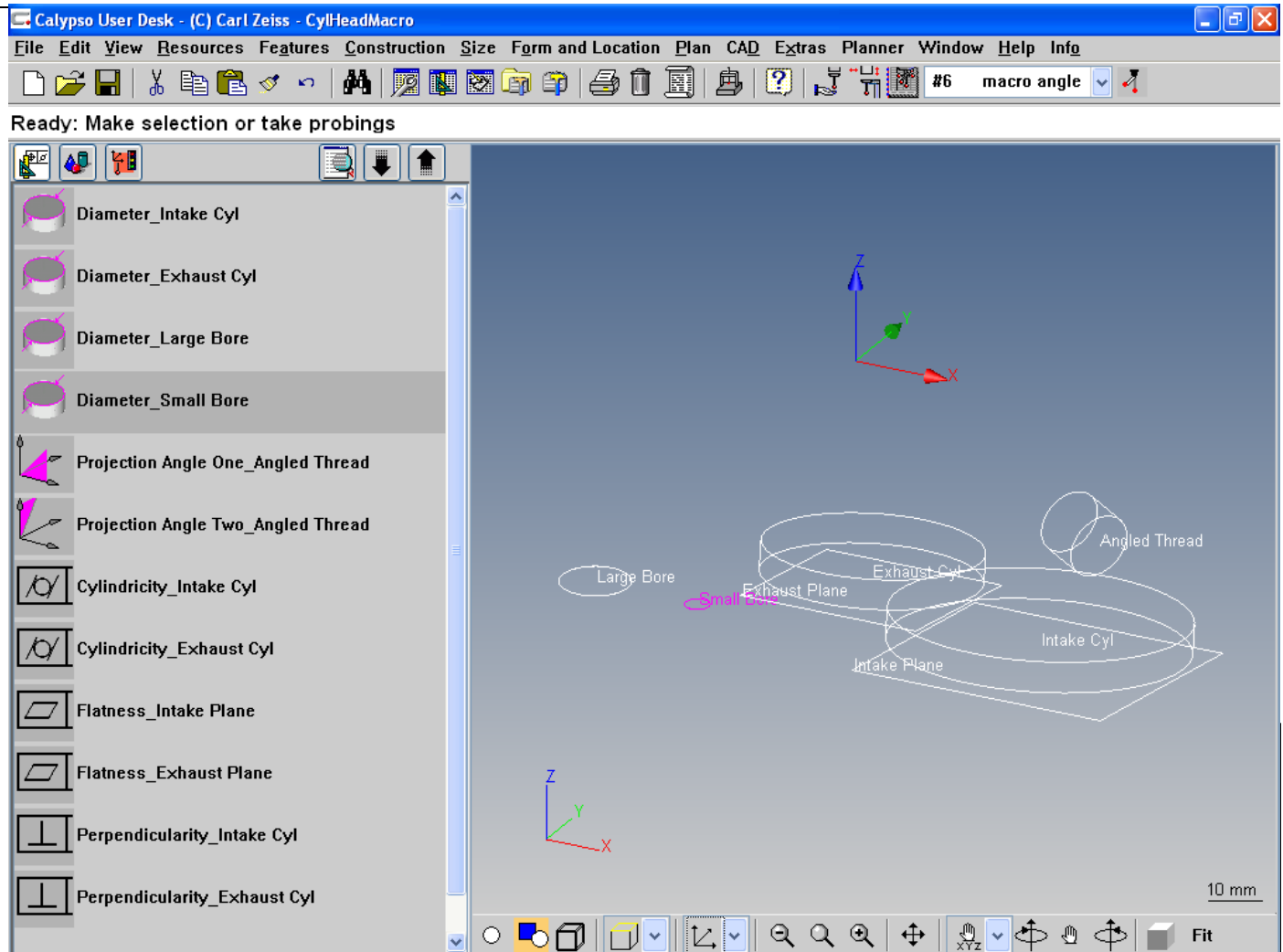
...open it up and make any changes you need to make.

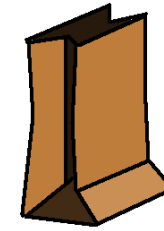
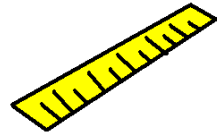
The screenshot shows the Calypso User Desk interface. The main window title is "Calypso User Desk - (C) Carl Zeiss - CylHeadMacro". The menu bar includes File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, Help, and Info. The toolbar contains various icons for file operations, navigation, and measurement. The "Select Feature" dialog box is open, showing the "Diameter" feature type. The "Diameter" dialog box has the following fields: "Diameter\_Small Bore" (selected), "Comment", "Fine" (dropdown), "Nominal" (4.8514), "ISO286", "Upper Tolerance" (0.1000) with a "None" checkbox, and "Lower Tolerance" (-0.0500) with a "None" checkbox. The "Feature 1" section shows "Small Bore". The "Actual" field is empty. "OK" and "Reset" buttons are at the bottom. The 3D model in the background shows a part with features labeled: "Large Bore", "Small Bore", "Exhaust Plane", "Exhaust Cyl", "Intake Plane", "Intake Cyl", and "Angled Thread". A coordinate system (X, Y, Z) is visible. The bottom right corner shows a scale of "10 mm".



# LUNCH 'N LEARN

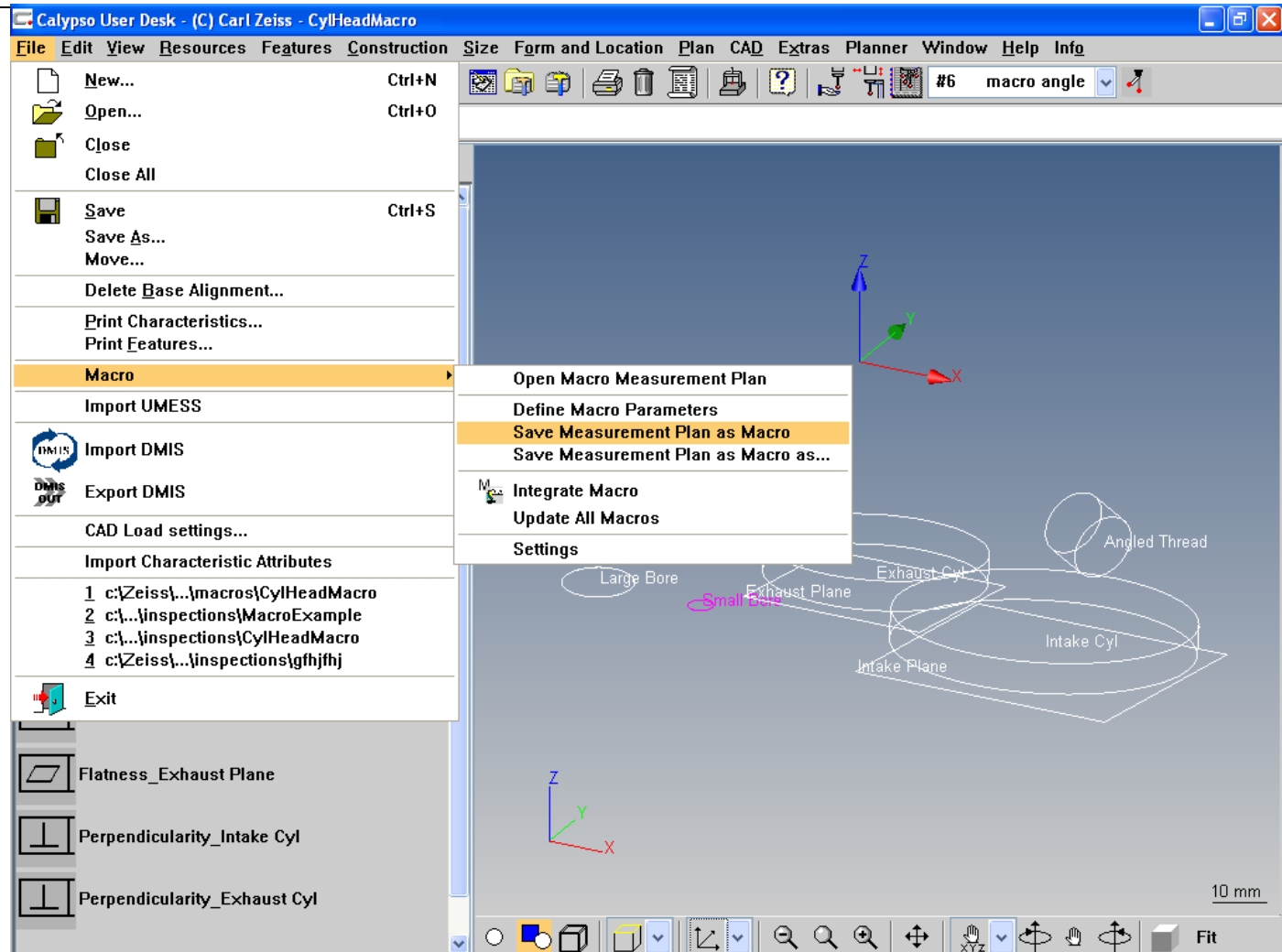
...open it up and make any changes you need to make.

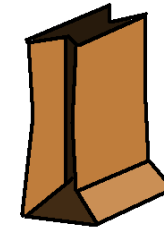
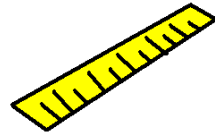




# LUNCH 'N LEARN

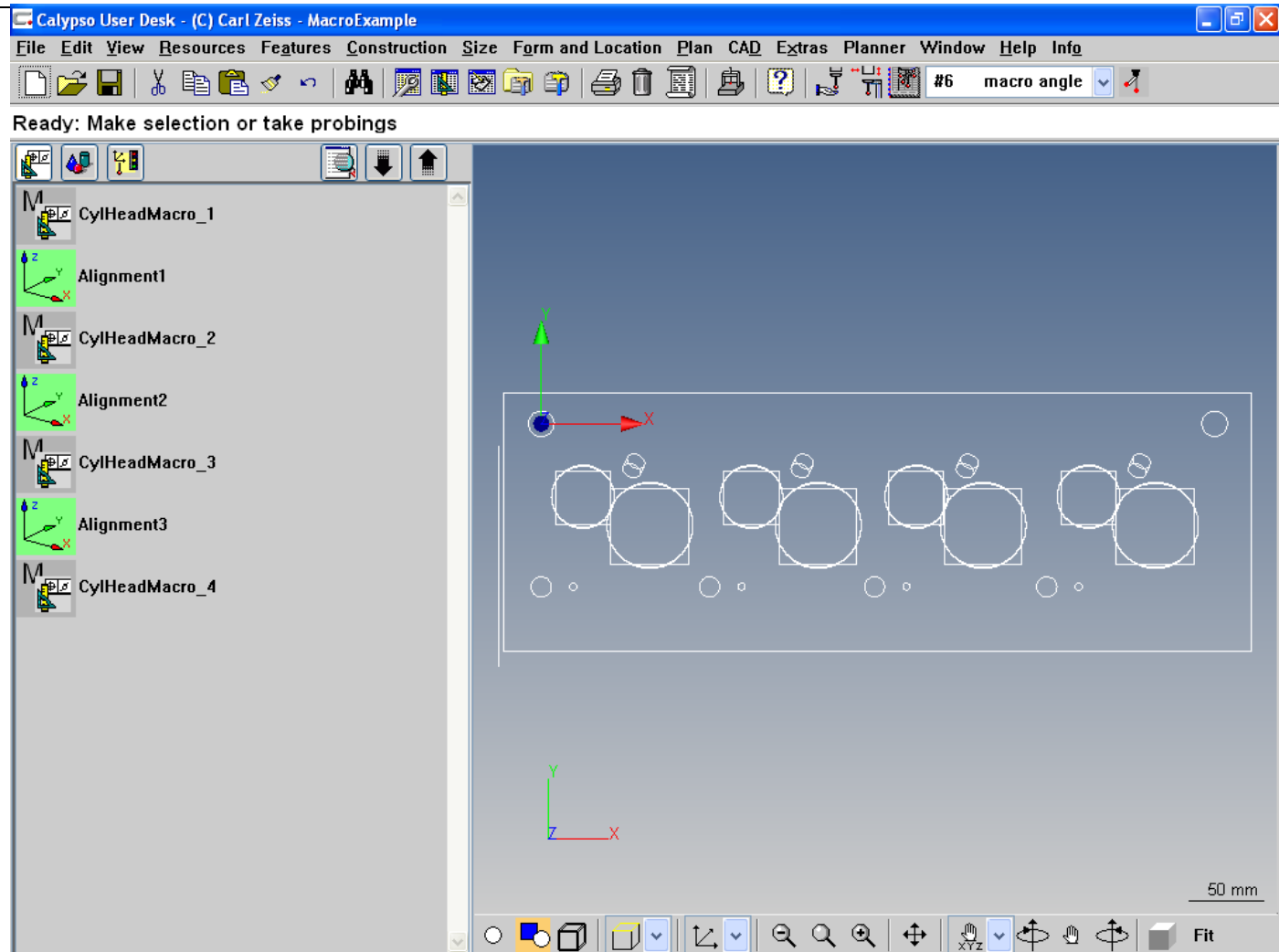
Now be sure to save your updated Macro by going to Macro>Save Measurement Plan as Macro.

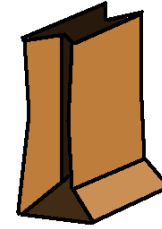
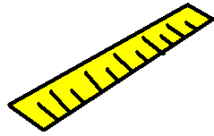




# LUNCH 'N LEARN

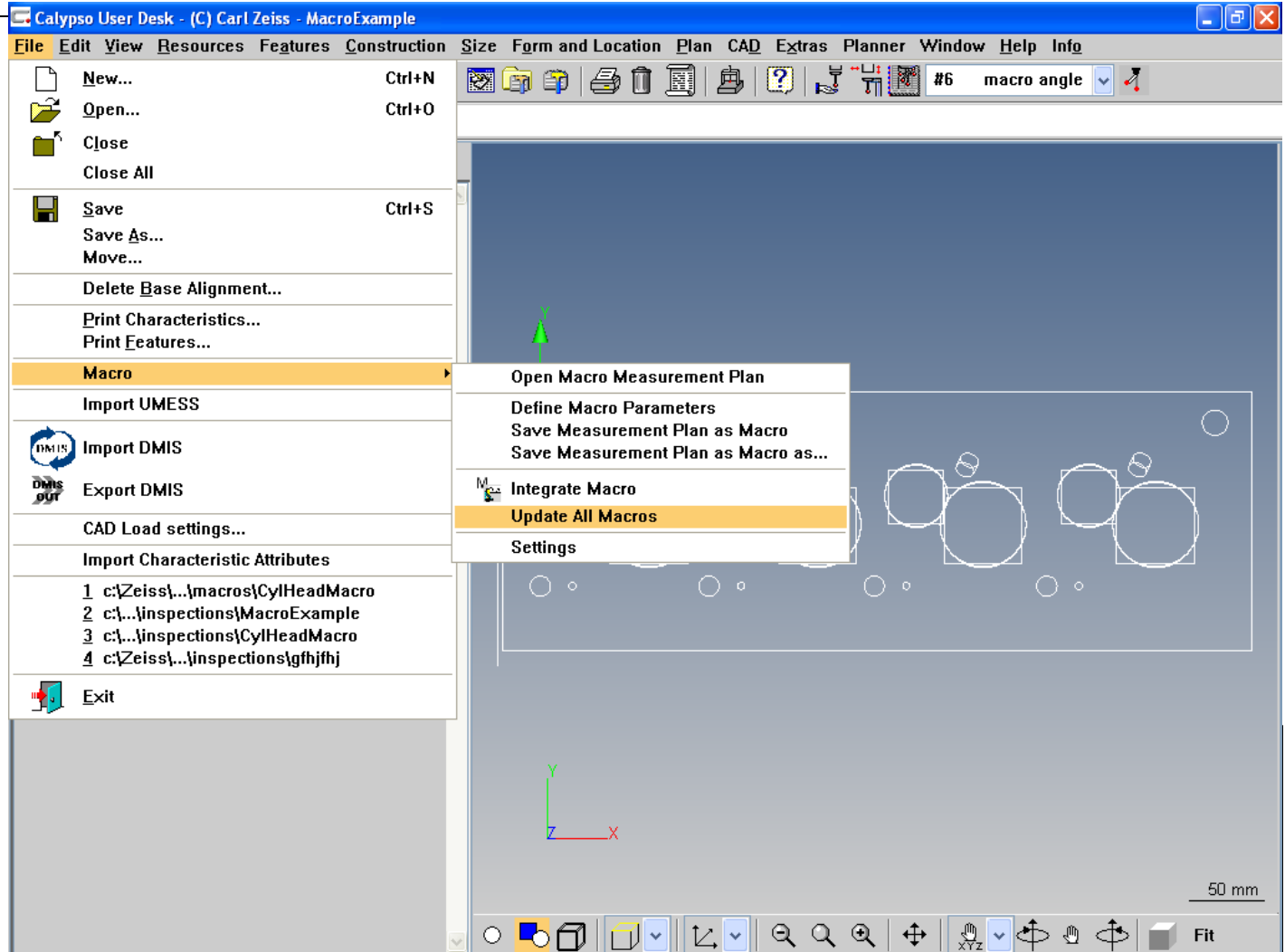
Back in our Base Program, we need to update all of our Macros with the most recent revised version.

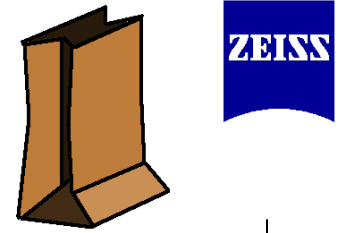




# LUNCH 'N LEARN

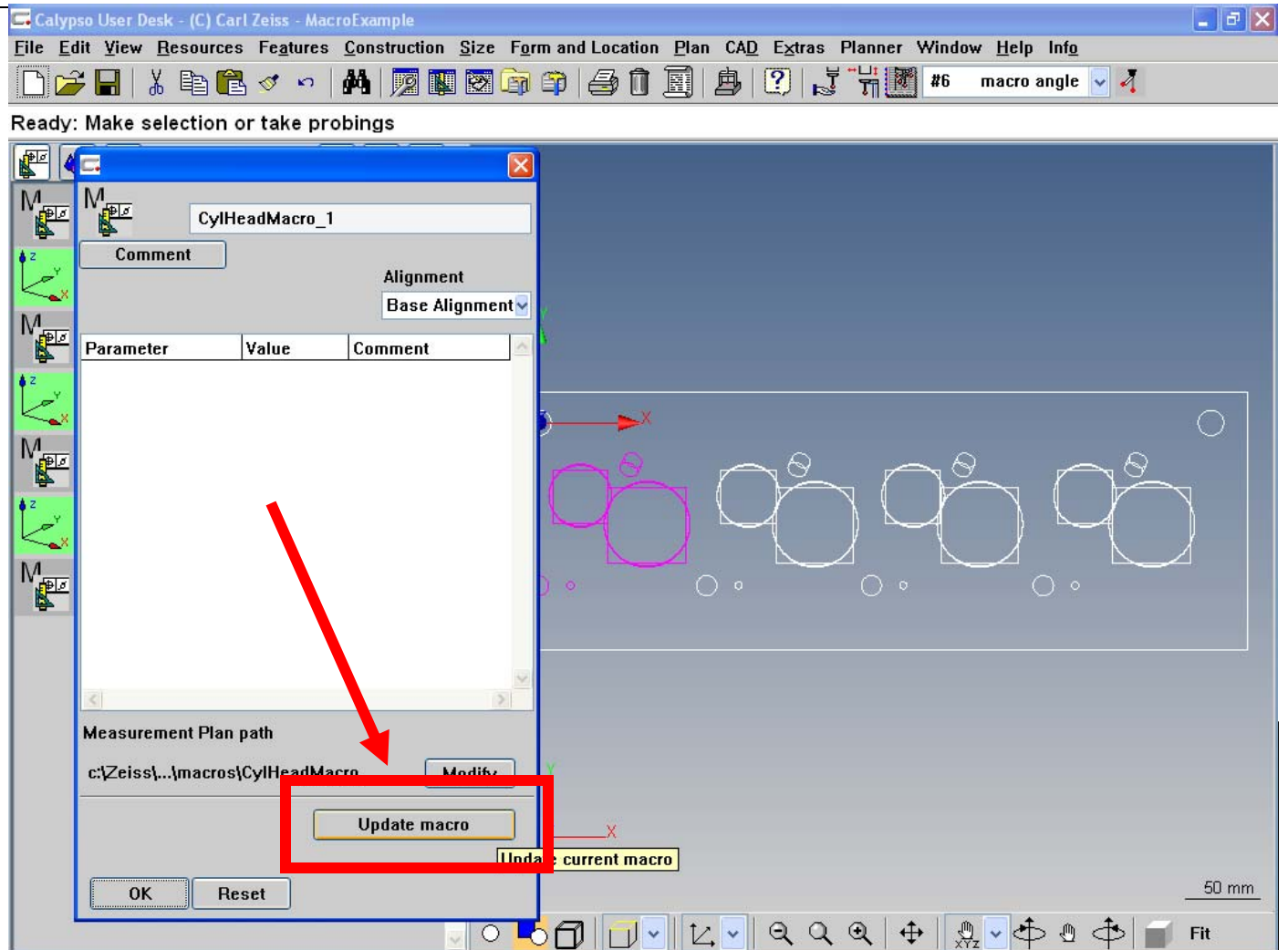
The easiest and fastest way to do this is to go to Macro>Update all Macros  
This will update all Macros that are used in the current program.



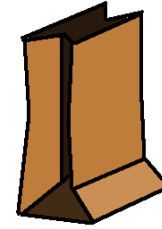
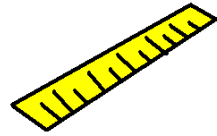


# LUNCH 'N LEARN

An alternative way is to open up the single Macro you wish to update and press the "Update Macro" button.



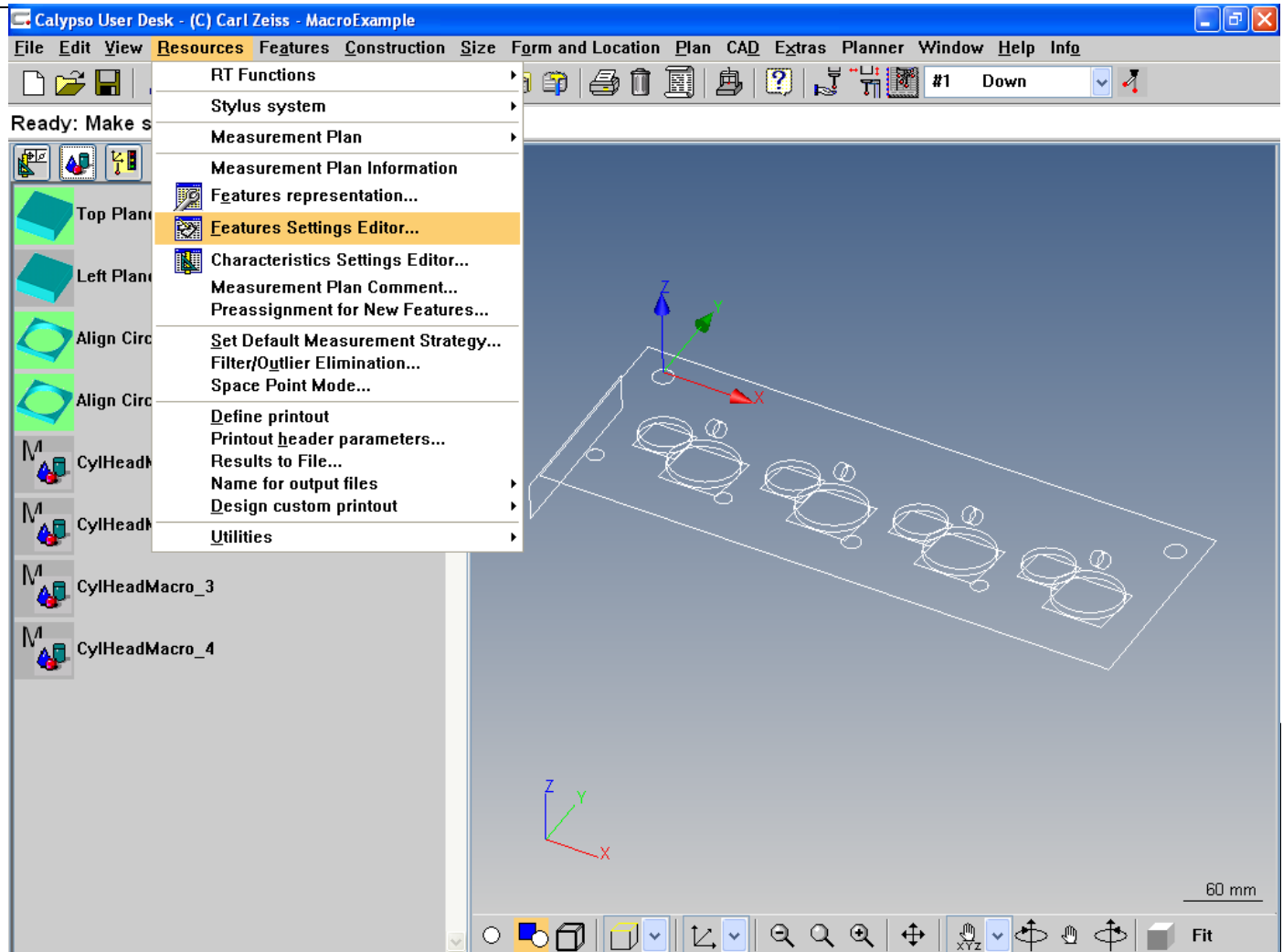


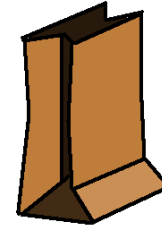
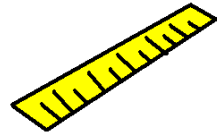


# LUNCH 'N LEARN

There is also a way to make all Macros automatically update when a program is run.

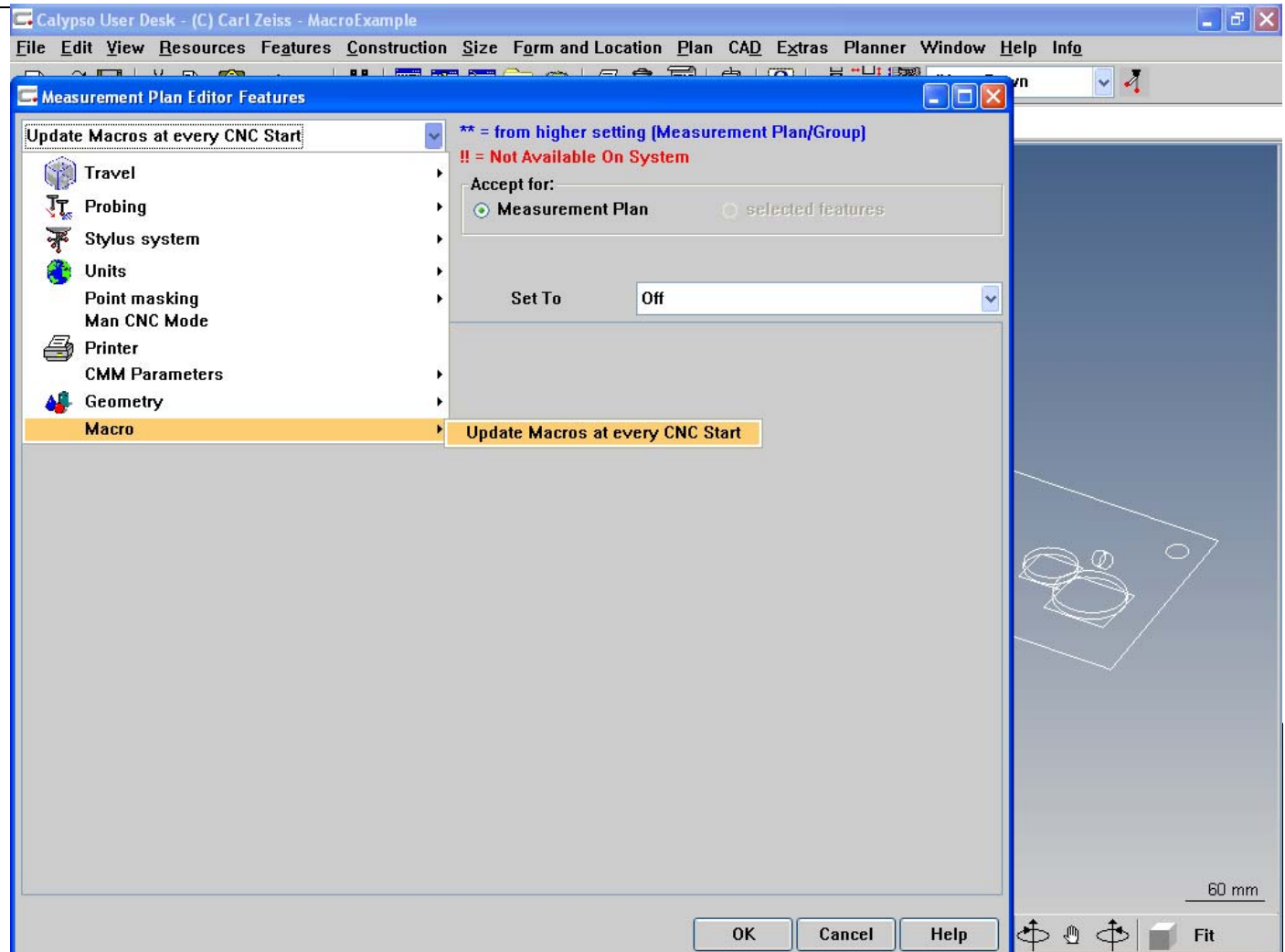
In the Features Settings Editor...

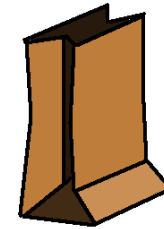
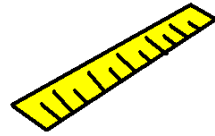




# LUNCH 'N LEARN

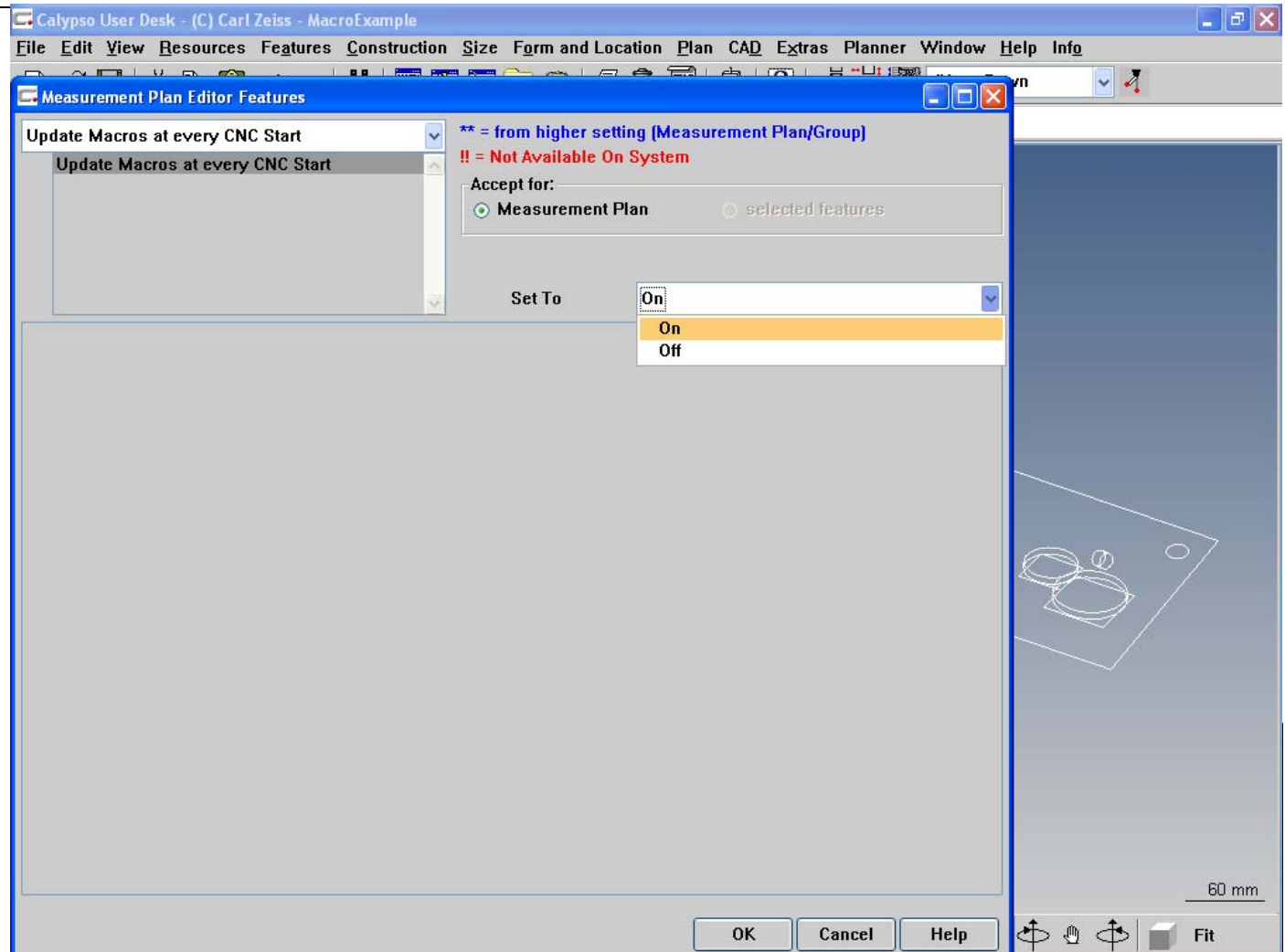
...under the main drop down choose Macro>Update Macro at every CNC Start.

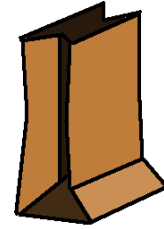
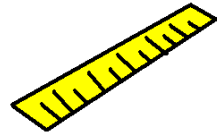




# LUNCH 'N LEARN

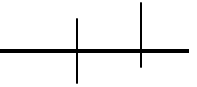
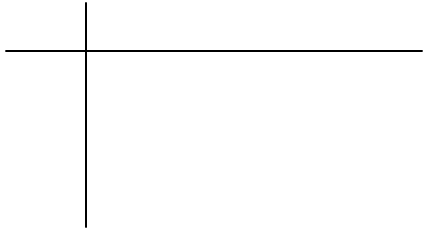
Then change the *Set to* menu to On. This will make every Macro in your measurement plan automatically update when the measurement plan is run.



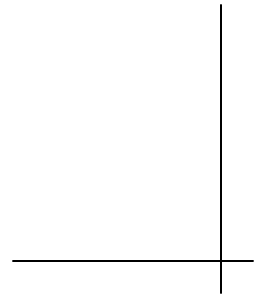


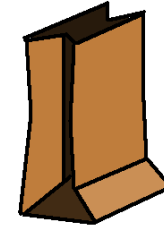
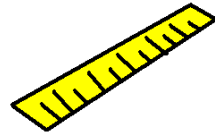
# LUNCH 'N LEARN

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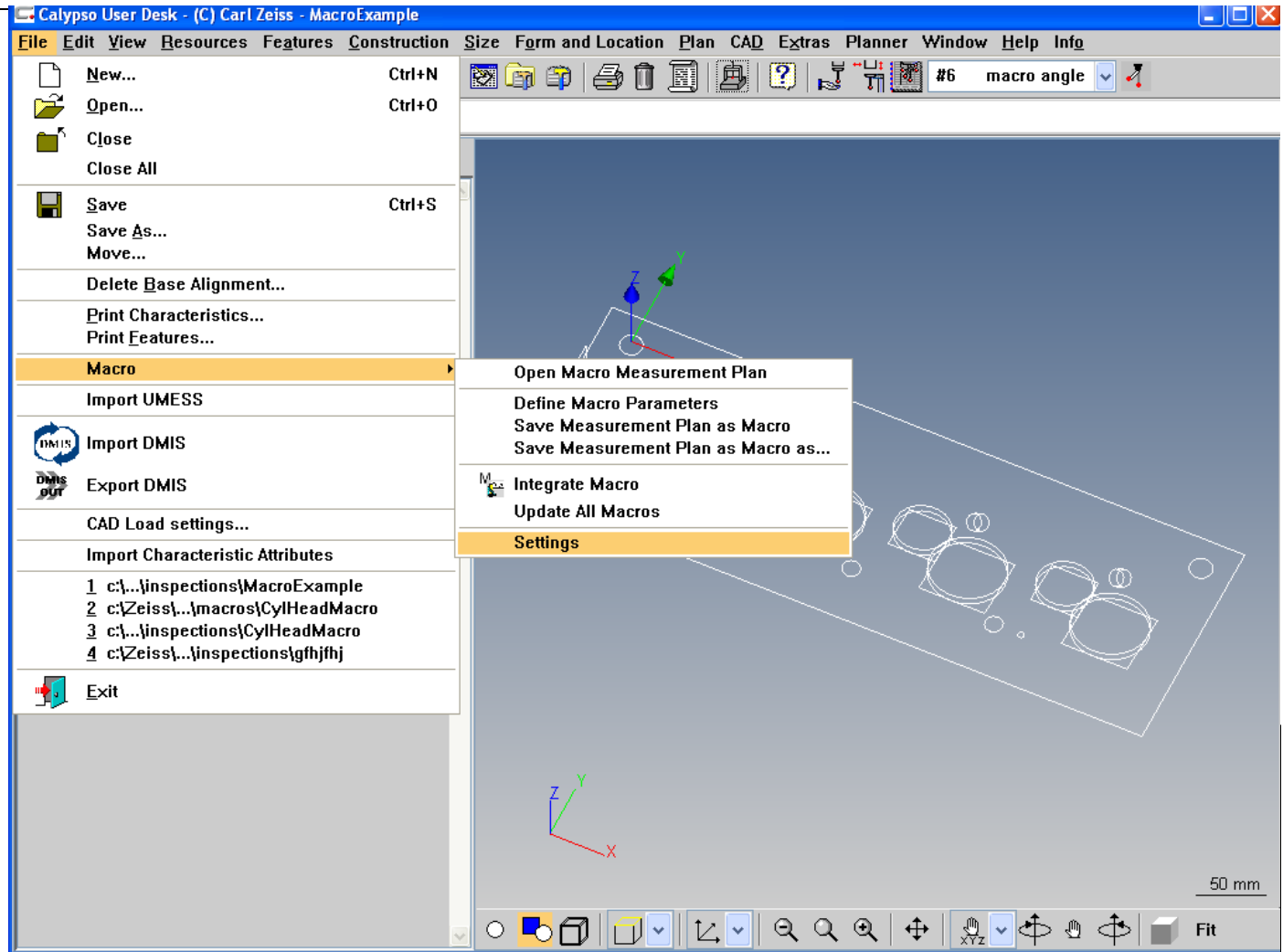
Macro Settings

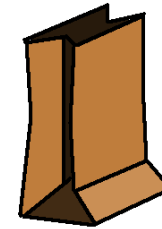
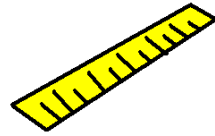




# LUNCH 'N LEARN

Settings for updating, saving, and naming Macros can be found under Macros>Settings

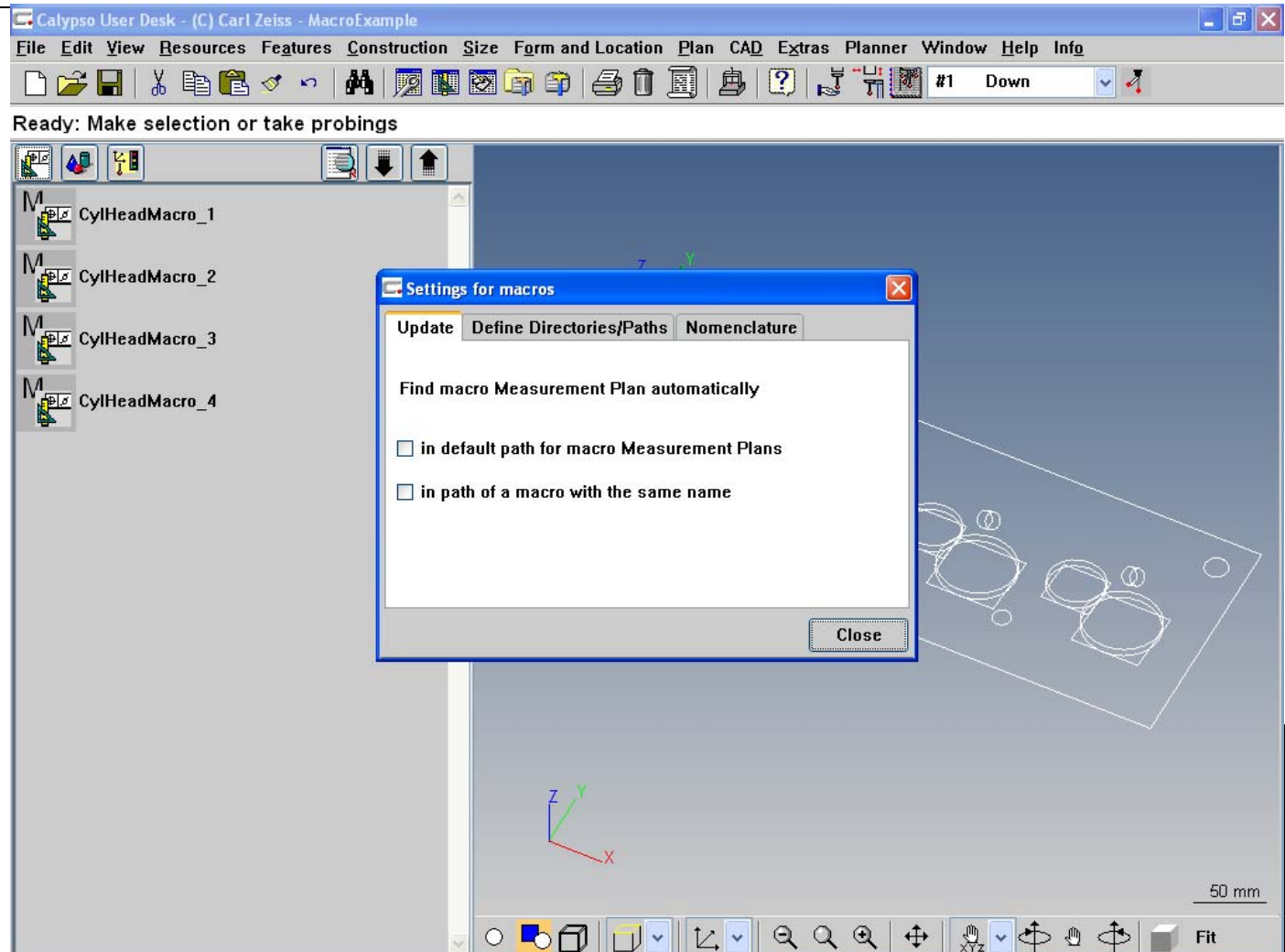


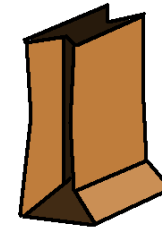
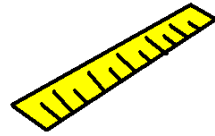


## LUNCH 'N LEARN

The Update tab in the settings window controls how Calypso automatically looks for an Updated Macro.

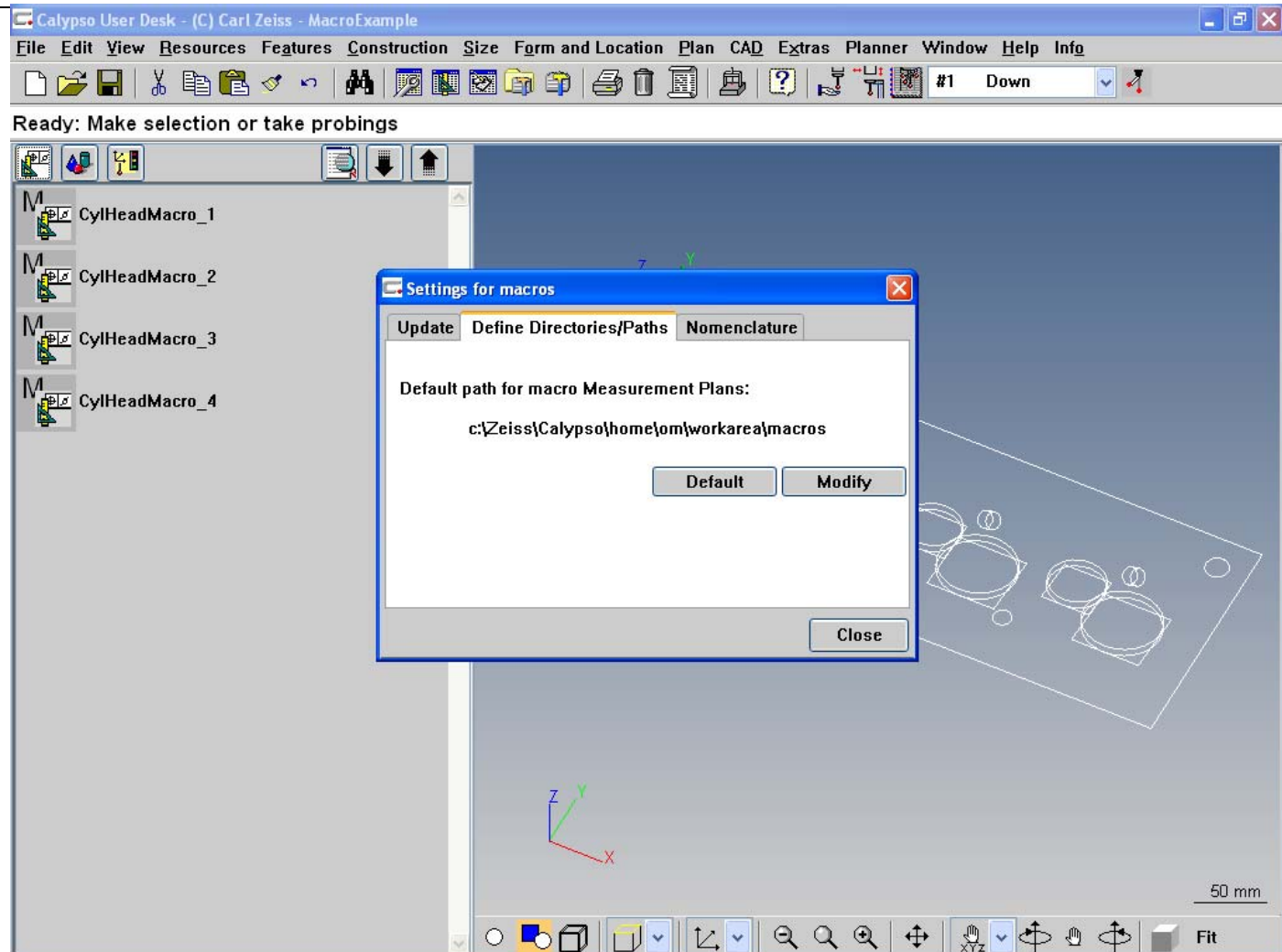
Calypso can automatically search in the standard path for macro measurement plans, or it can automatically search for a Macro with the same name.



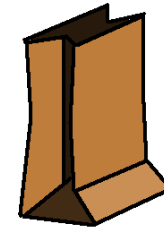
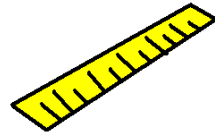


# LUNCH 'N LEARN

The Define Directories/Paths tab allows you to change the default path for saving and loading Macros.

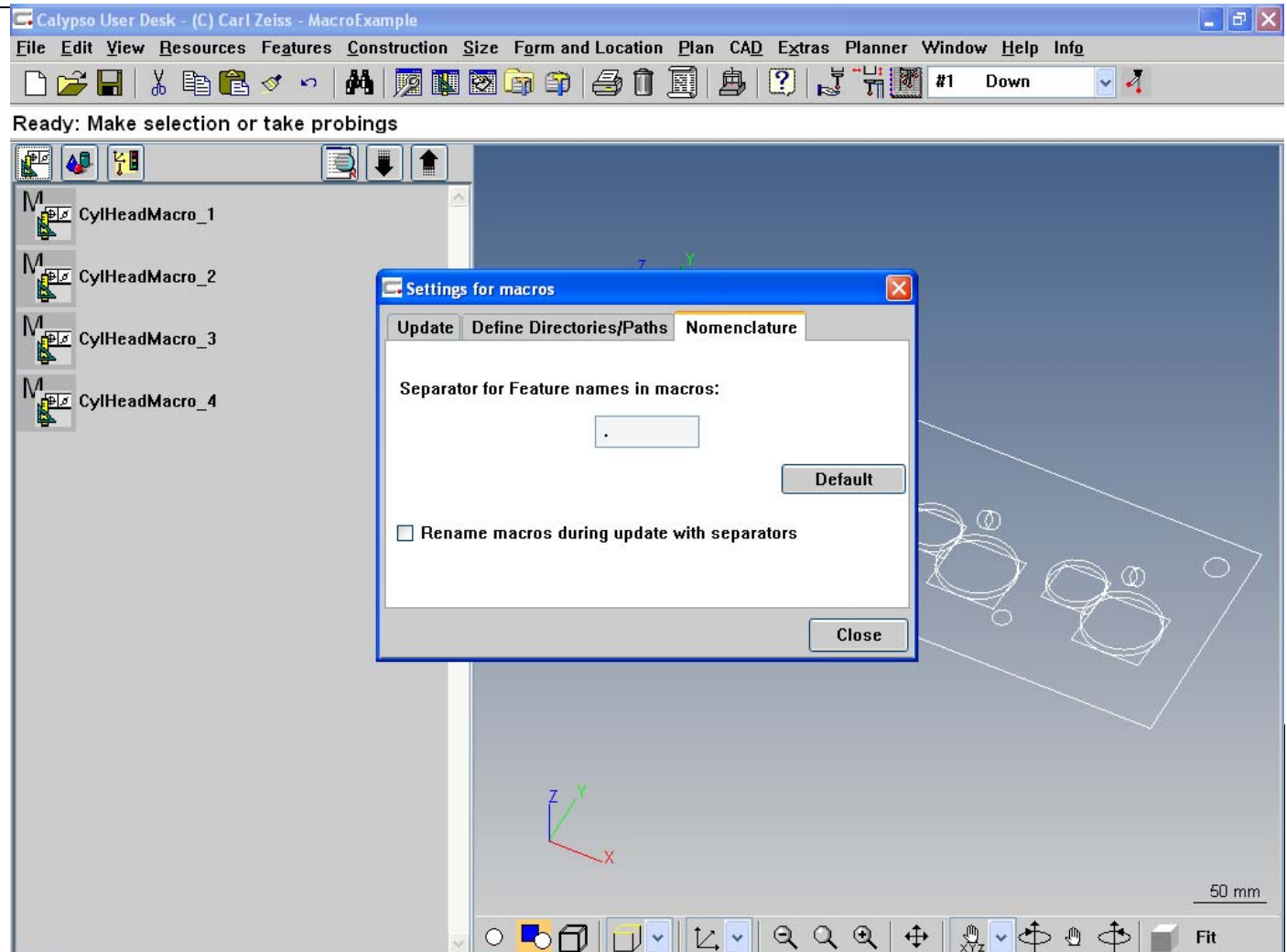


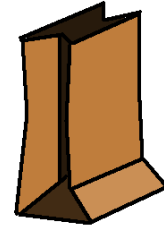
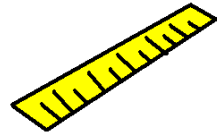




# LUNCH 'N LEARN

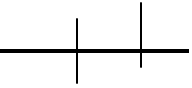
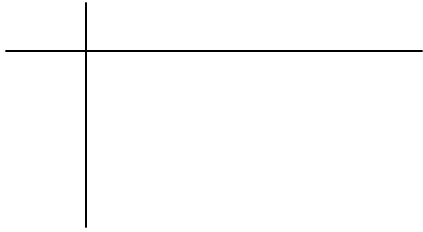
The Nomenclature tab allows you to define the separator symbol for feature names in Macros.



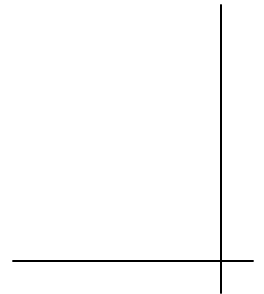


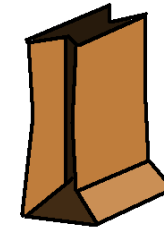
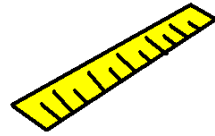
# LUNCH 'N LEARN

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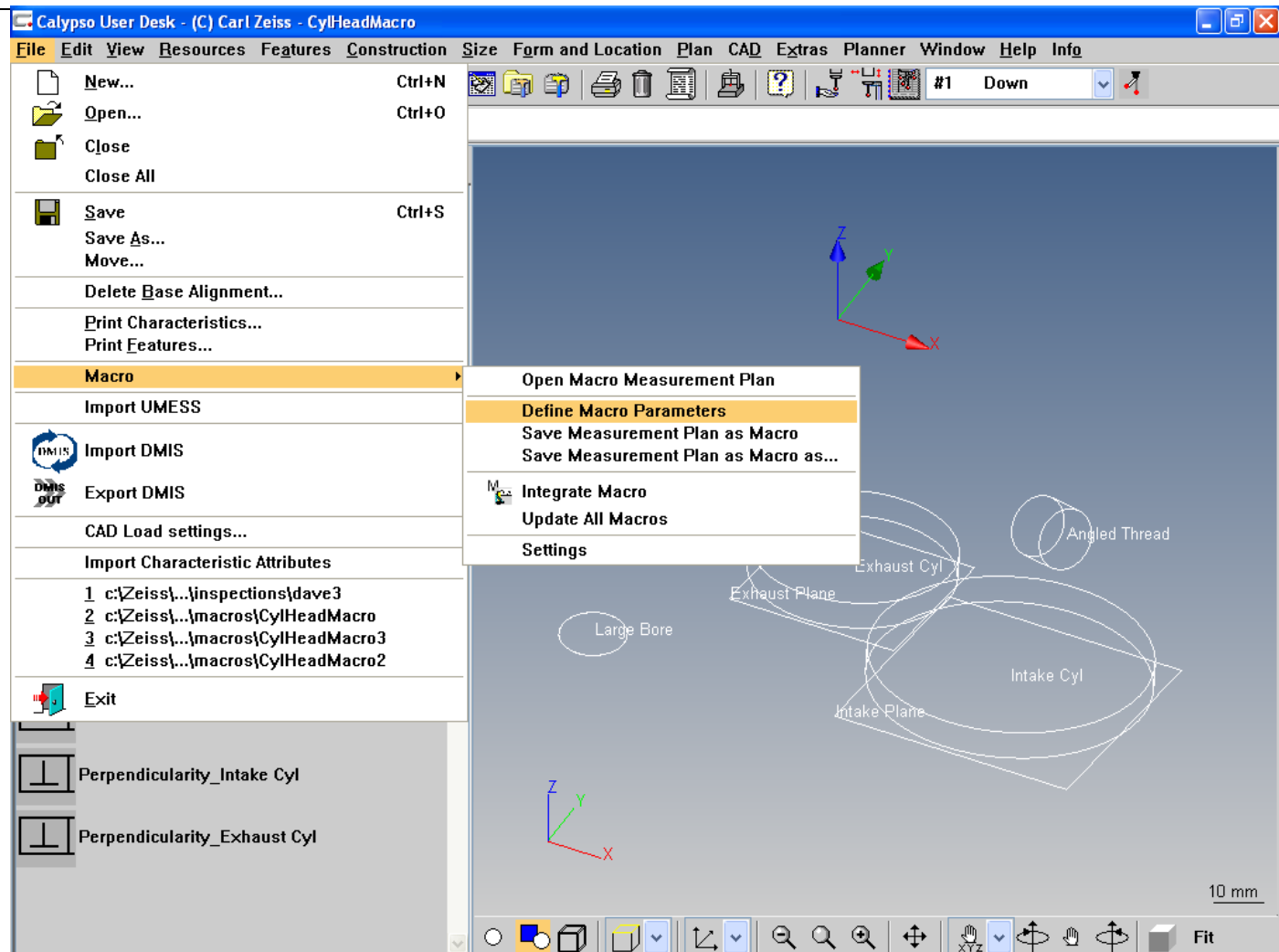
## Macro Parameters

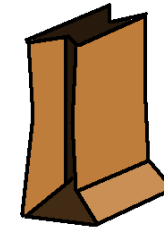
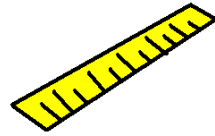




# LUNCH 'N LEARN

A useful option within Macros is the ability to define Macro parameters. This allows a set of variables to be defined within each specific instance of a Macro. This increases a Macro's flexibility and ease of use.



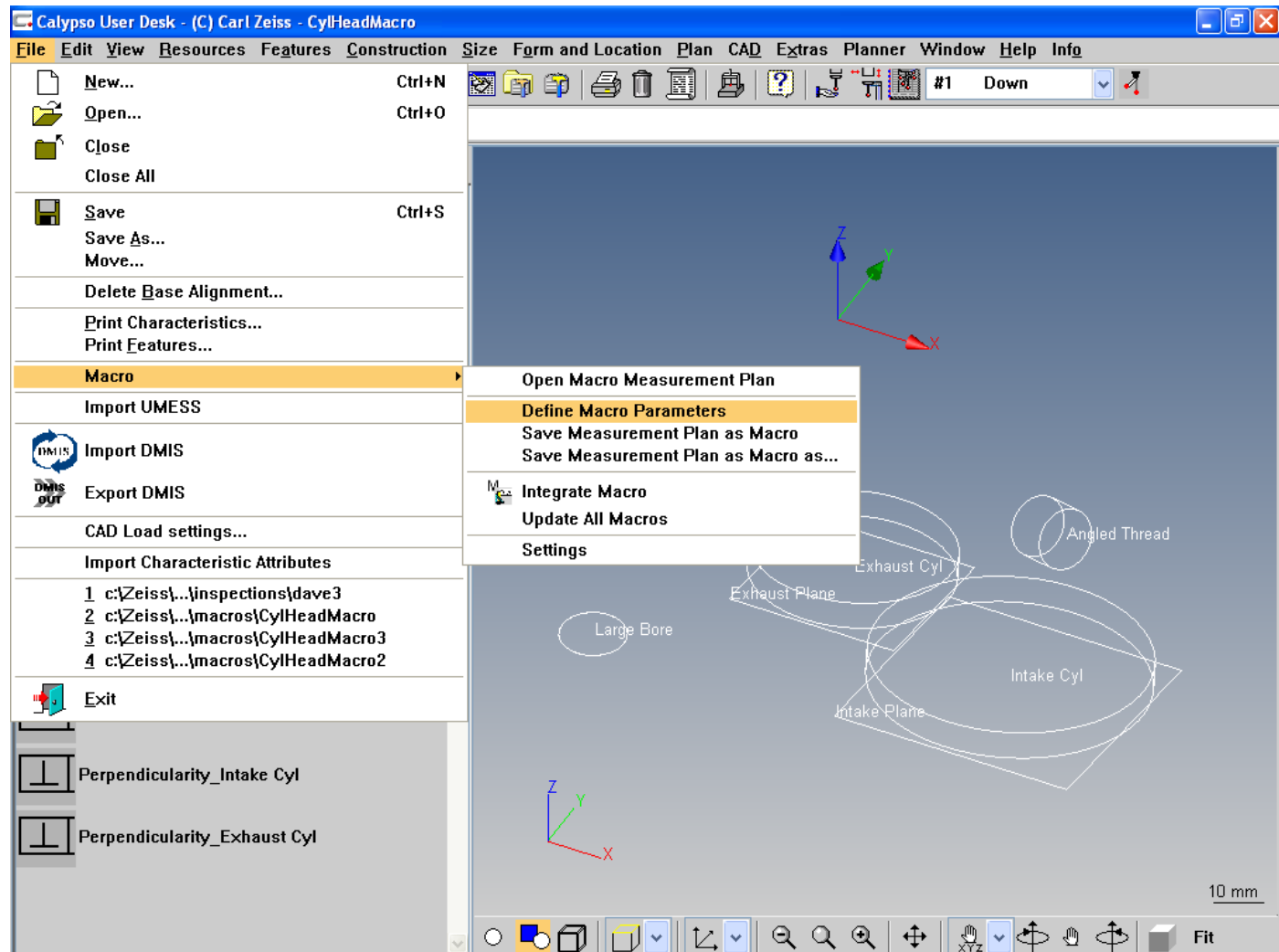


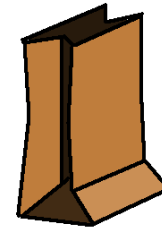
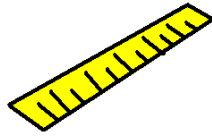
# LUNCH 'N LEARN

As an example, we will use Macro parameters to create the offset between instances without using secondary alignments.

First we Define our parameter (name the variable) within our Macro program.

Macro>Define Macro Parameters





# LUNCH 'N LEARN

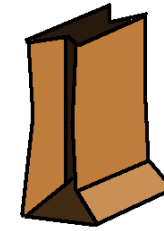
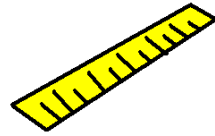
The Parameter is the name of our variable.

Initial value is the value of our variable in the first instance of the Macro.

Comment is optional.

The screenshot shows the Calypso User Desk interface. A 'Parameter Definition' dialog box is open, displaying a 'Parameter List' table with three columns: 'Parameter', 'Initial value', and 'Comment'. The table is currently empty. Below the table is an 'Info File' section with a text input field and a 'Find...' button. At the bottom of the dialog are buttons for 'Automatic', 'OK', 'Cancel', and 'Help'. The background shows a CAD model with features like 'Exhaust Cyl', 'Intake Cyl', and 'Angled Thread' highlighted.

Parameter	Initial value	Comment
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# LUNCH 'N LEARN

The Parameter is the name of our variable.

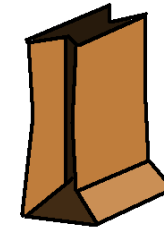
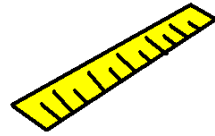
Initial value is the value of our variable in the first instance of the Macro.

Comment is optional.

The screenshot shows the Calypso User Desk interface. A 'Parameter Definition' dialog box is open, displaying a table with the following data:

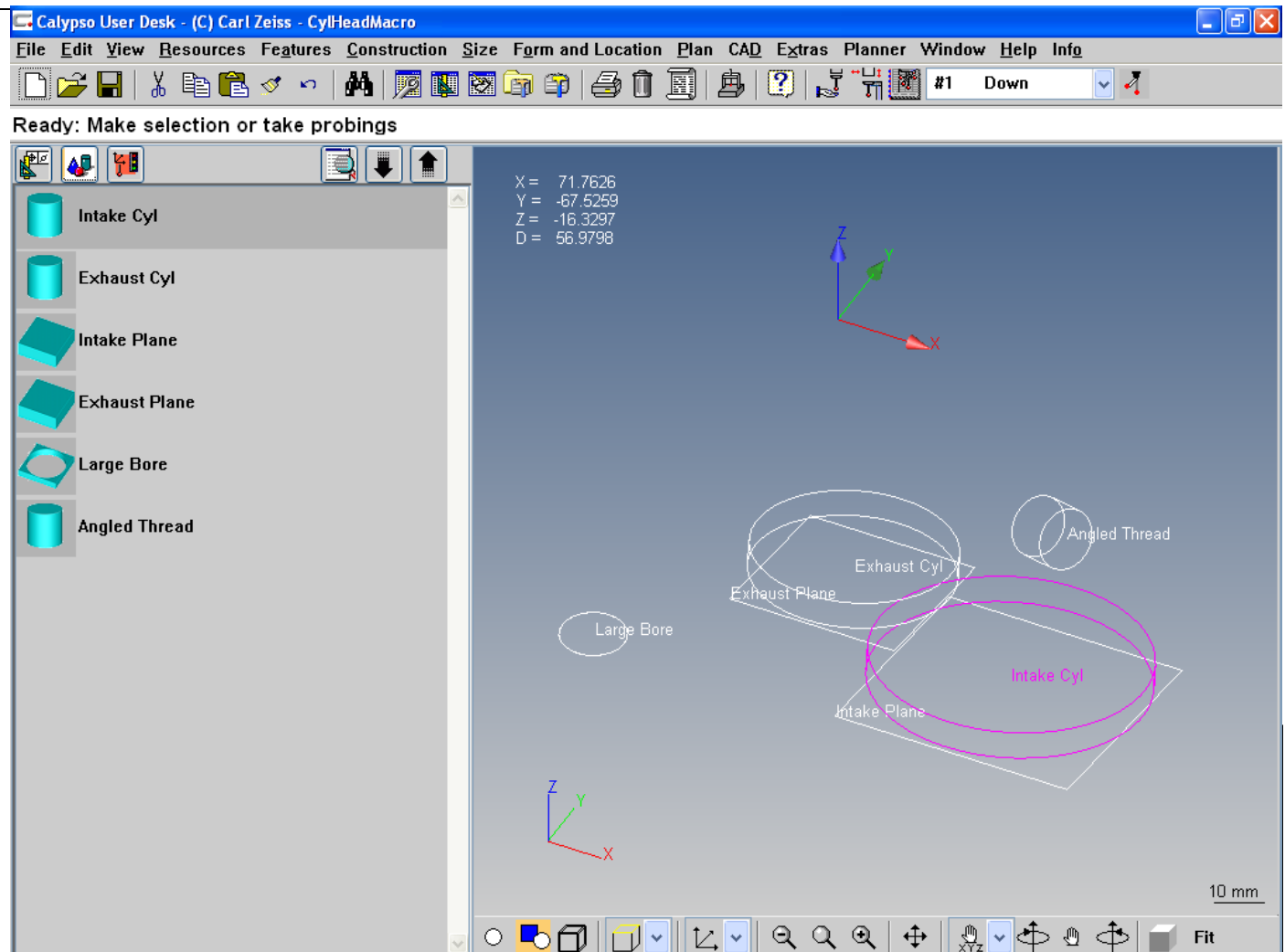
Parameter	Initial value	Comment
offset	0	Macro Offset

The background shows a CAD model with features labeled: Intake Cyl, Exhaust Cyl, Angled Thread, and Intake Plane. The software interface includes a menu bar (File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, Help, Info) and a toolbar with various icons. The status bar at the bottom indicates a scale of 10 mm.

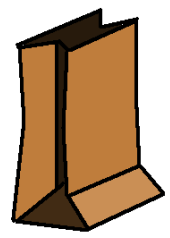
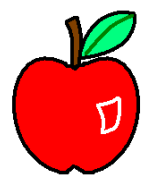
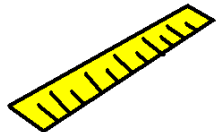


# LUNCH 'N LEARN

Now, while still in the Macro program, we need to set our offset variable to our X-values of all our features in order to make them shift when desired.



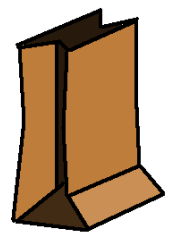
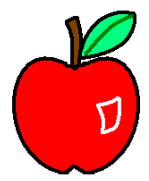
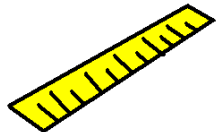




# LUNCH 'N LEARN

We open each feature and in the Nominal X-value, we create a formula...

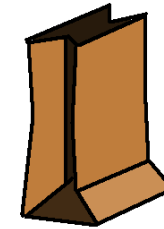
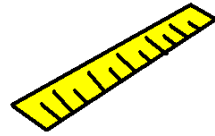
Tolerance For:	Nominal	Actual
<input type="checkbox"/> X	71.7621	
<input type="checkbox"/> Y	-67.5254	
<input type="checkbox"/> Z	-16.3297	
<input checked="" type="checkbox"/> D	56.9798	
<input type="checkbox"/> A1 X/Z	-0.0635	
<input type="checkbox"/> A2 Y/Z	7.1628	



# LUNCH 'N LEARN

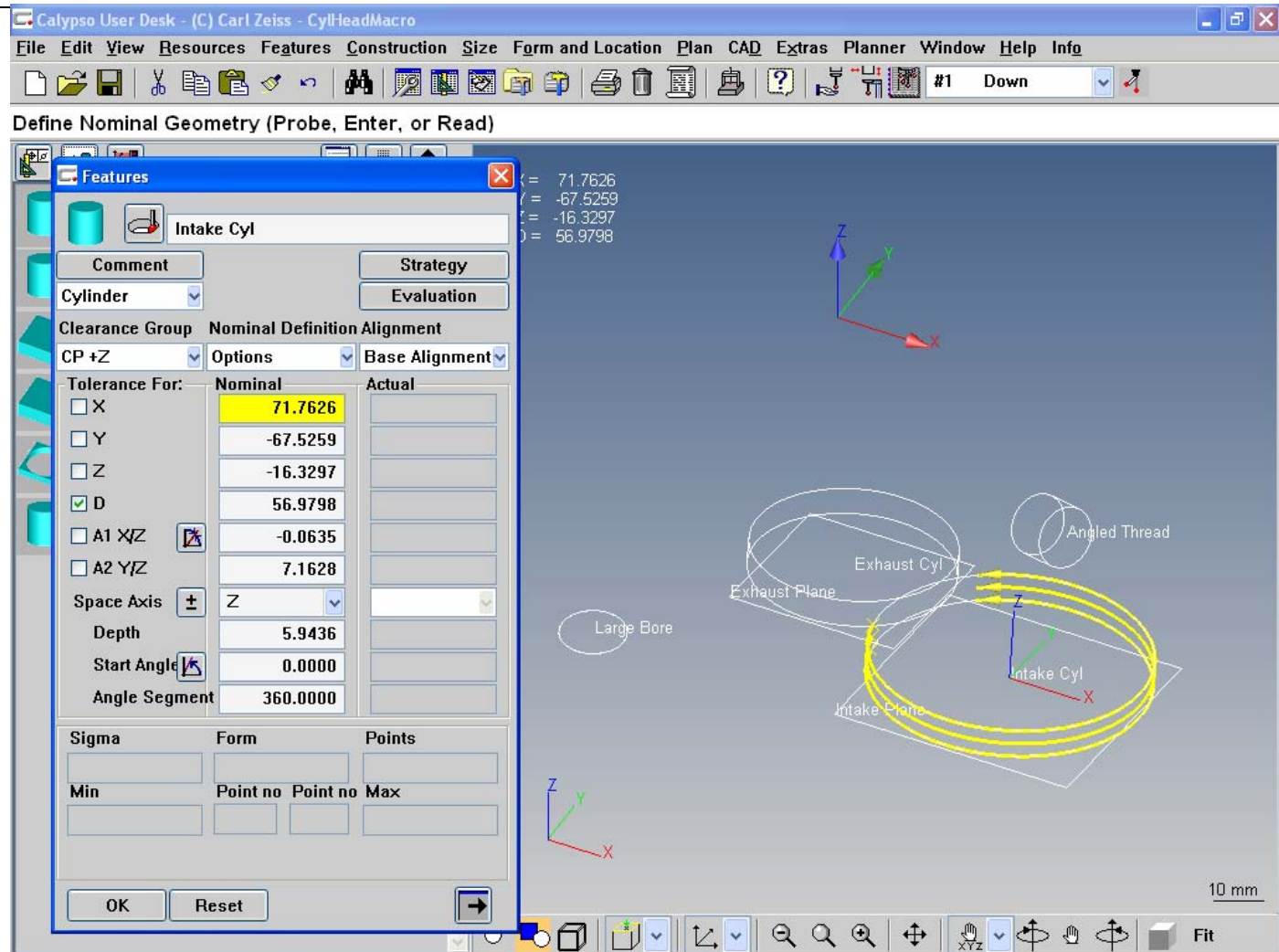
...which reads our current X-value plus our offset variable.

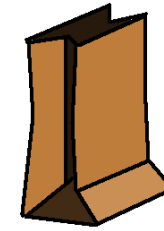
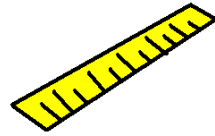
The screenshot shows the Calypso User Desk software interface. The main window title is "Calypso User Desk - (C) Carl Zeiss - CylHeadMacro". The menu bar includes File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, Help, and Info. The toolbar contains various icons for file operations and measurement. The main workspace displays a 3D model of a part with a coordinate system (X, Y, Z) and a scale bar of 10 mm. A dialog box titled "Formula..." is open, showing the formula "Length in mm" with the value "71.7626+offset". The dialog has tabs for Function, Loop, Nominal, and Actual, with "Actual" selected. Below the formula field are three columns: Characteristics, Features, and Attributes. The Characteristics column lists various geometric features like Diameter\_Intake Cyl, Diameter\_Exhaust Cyl, etc. The Features column lists Intake Cyl, Exhaust Cyl, Intake Plane, Exhaust Plane, Large Bore, and Angled Thread. The Attributes column is empty. At the bottom of the dialog are buttons for OK, Cancel, and Help. The main window also has a "Define Nominal Geometry (Probe, Enter, or Read)" dialog box open, with a "Features" list on the left and a "Compute" button on the right.



# LUNCH 'N LEARN

Now the X-position of our feature will vary as we change our offset variable's value in our Base Program. An offset value of 0 will leave the features in their current position, while an offset value of 111.25 mm will shift them to the correct location of the second Macro.





# LUNCH 'N LEARN

Create the same formula for each feature's X-value in the Macro program...

Calypso User Desk - (C) Carl Zeiss - CylHeadMacro

File Edit View Resources Features Construction Size Form and Location Plan CAD Extras Planner Window Help Info

Define Nominal Geometry (Probe, Enter, or Read)

**Features**

Exhaust Plane

Comment Strategy Evaluation

Clearance Group Nominal Definition Alignment

CP +Z Options Base Alignment

Tolerance For: Nominal Actual

<input type="checkbox"/> X	9.5275	
<input type="checkbox"/> Y	-66.8452	
<input type="checkbox"/> Z	-18.8671	
<input type="checkbox"/> A1 XYZ	0.0127	
<input type="checkbox"/> A2 YIZ	7.9324	

Space Axis ± Z

Length 1 36.2788

Length 2 36.1264

Start Angle 0.0000

Sigma Form Points

Min Point no Point no Max

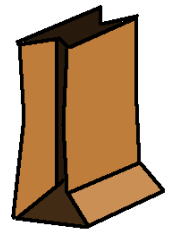
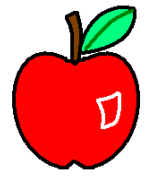
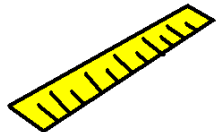
OK Reset

X = 9.5275  
Y = -66.8452  
Z = -18.8671

Large Bore  
Exhaust Plane  
Exhaust Cyl  
Intake Plane  
Intake Cyl  
Angled Thread

10 mm

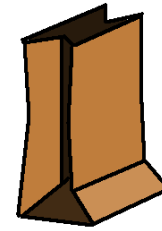
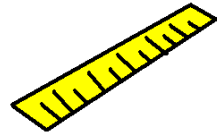




# LUNCH 'N LEARN

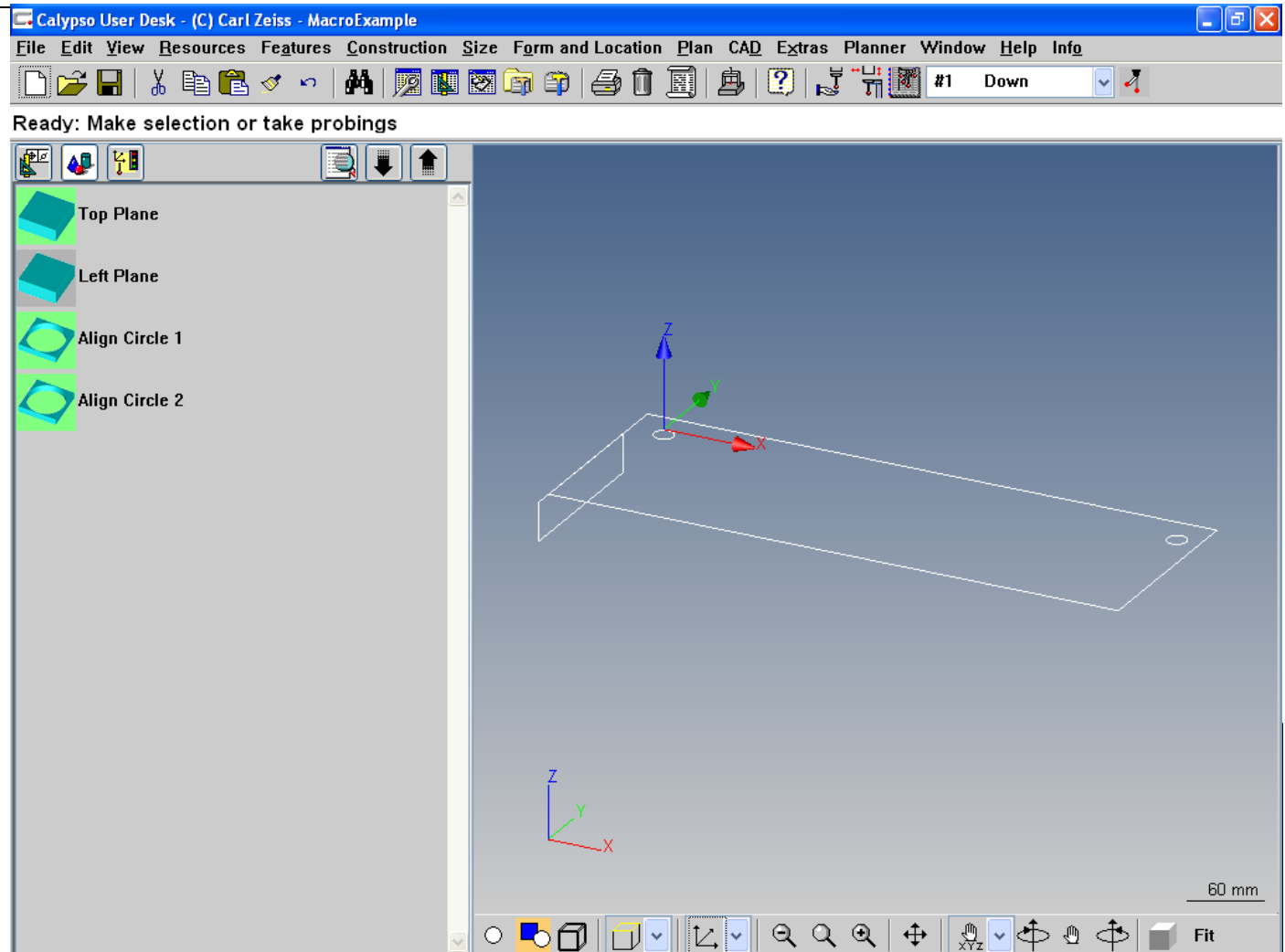
...and save your Macro program.

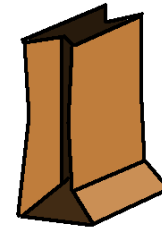
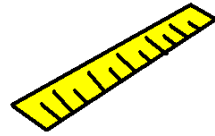
The screenshot shows the Calypso User Desk software interface. The title bar reads "Calypso User Desk - (C) Carl Zeiss - CylHeadMacro". The menu bar includes File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, Help, and Info. The File menu is open, showing options like New..., Open..., Close, Save, and Macro. The Macro menu is also open, showing options like Open Macro Measurement Plan, Define Macro Parameters, Save Measurement Plan as Macro, Integrate Macro, and Settings. The main workspace displays a 3D model of a cylinder head with various features labeled: Large Bore, Exhaust Plane, Exhaust Cyl, Intake Plane, Intake Cyl, and Angled Thread. A coordinate system is visible in the top right and bottom left of the workspace. The status bar at the bottom right shows a scale of 10 mm.



# LUNCH 'N LEARN

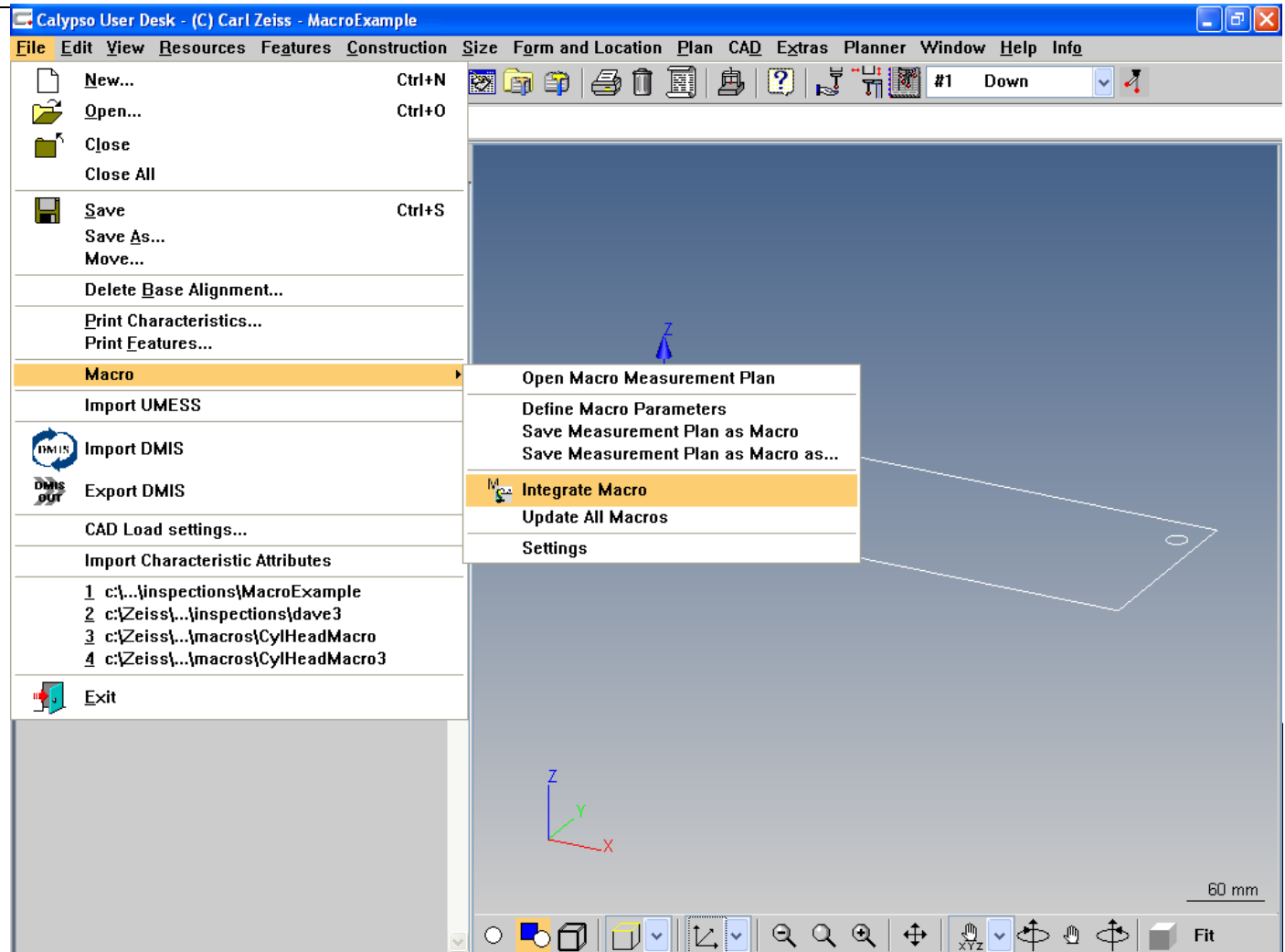
Now back in our blank Base Program...



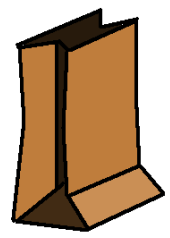
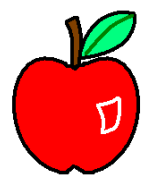
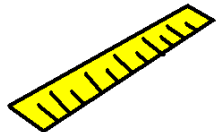


# LUNCH 'N LEARN

...we integrate our first Macro...

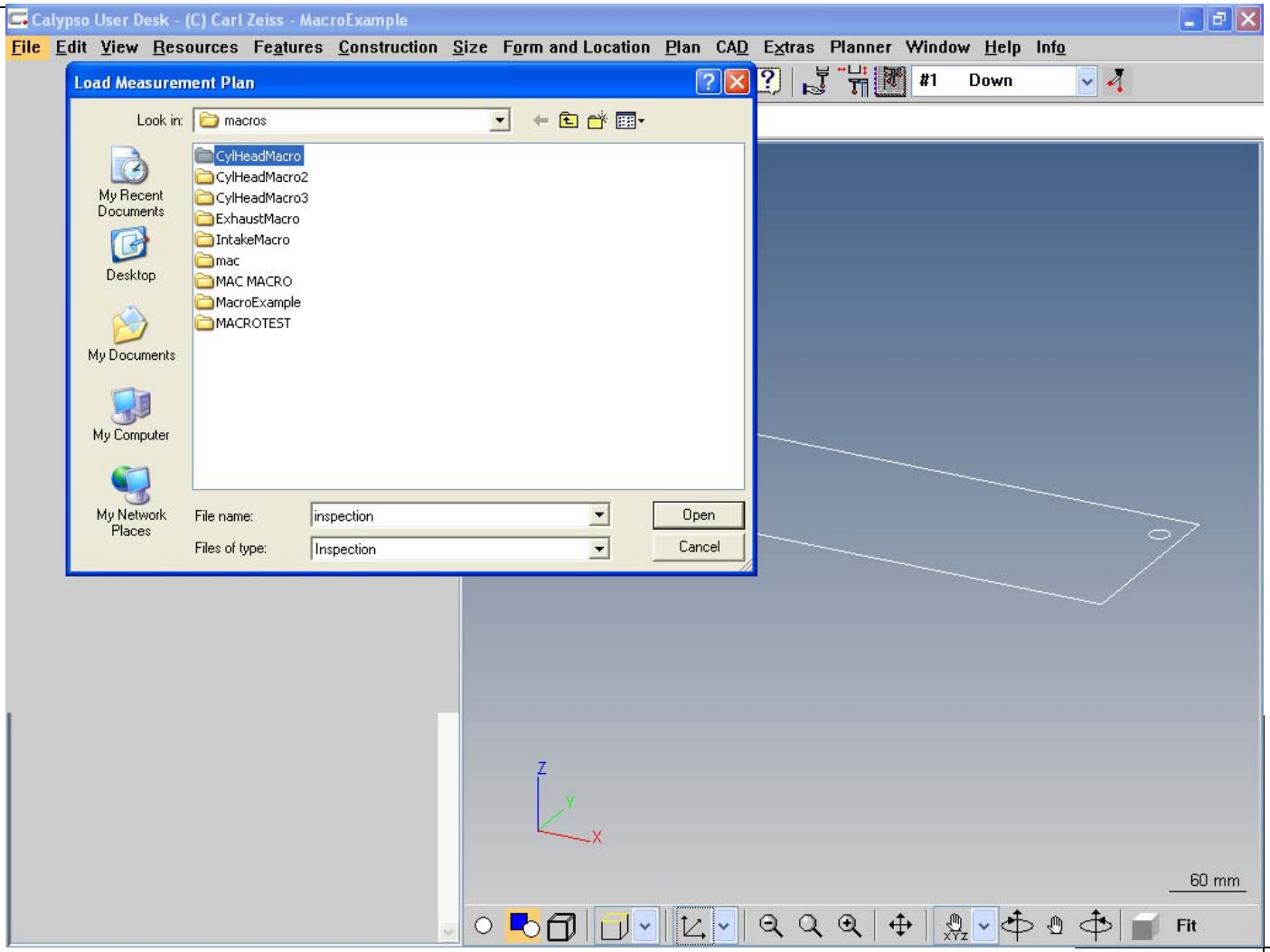


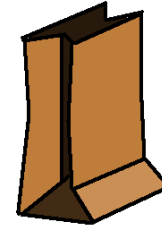
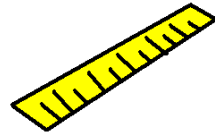




# LUNCH 'N LEARN

...we integrate our first Macro...





# LUNCH 'N LEARN

...and make sure our offset variable's value is set to 0.

Calypso User Desk - (C) Carl Zeiss - MacroExample

File Edit View Resources Features Construction Size Form and Location Plan CAD Extras Planner Window Help Info

Ready: Make selection or take probings

CylHeadMacro\_1

Comment

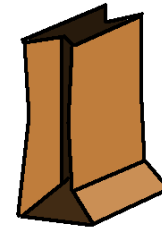
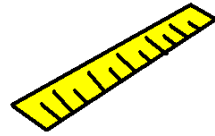
Alignment  
Base Alignment

Parameter	Value	Comment
offset	0	Macro Offset

Measurement Plan path  
c:\Zeiss\...\macros\CylHeadMacro Modify

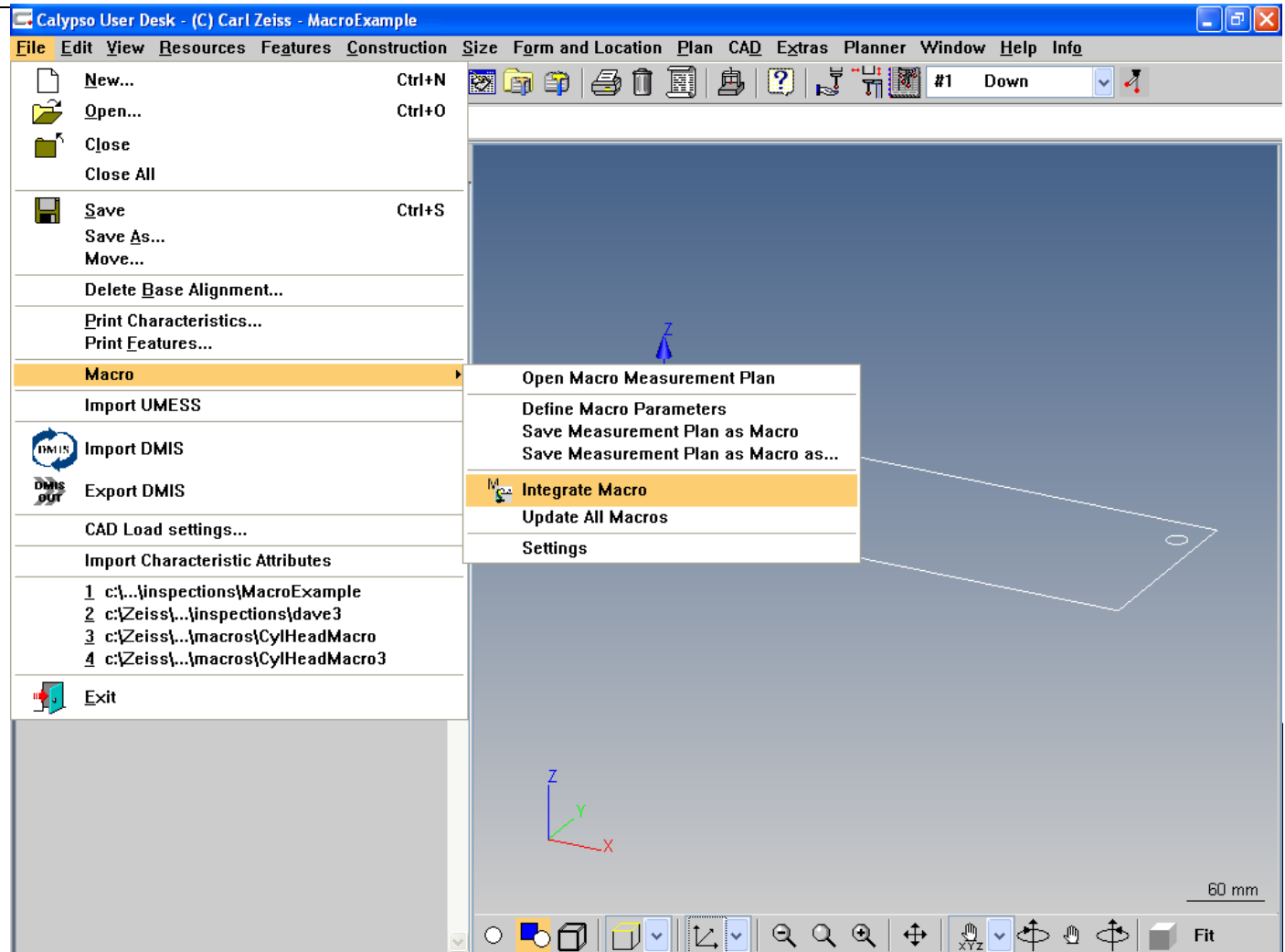
Open Parameter Update macro

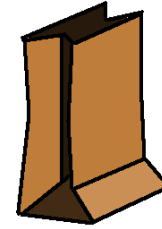
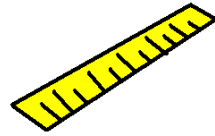
OK Reset



# LUNCH 'N LEARN

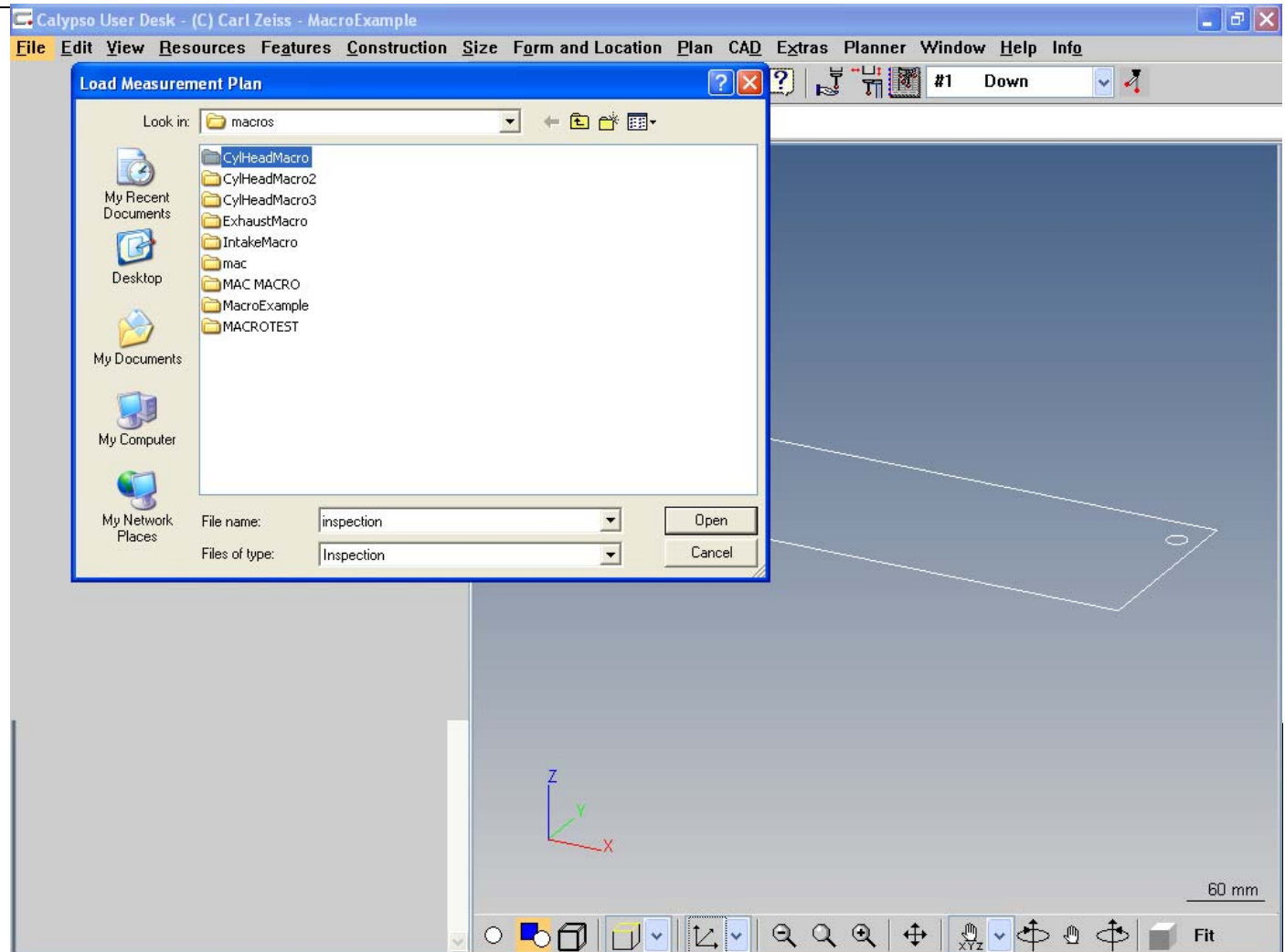
Now integrate the second Macro...

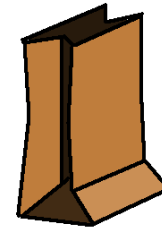
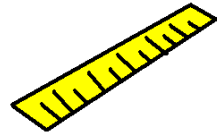




# LUNCH 'N LEARN

Now integrate the second Macro...





# LUNCH 'N LEARN

...and set its offset value to 111.25 mm.

Calypso User Desk - (C) Carl Zeiss - MacroExample

File Edit View Resources Features Construction Size Form and Location Plan CAD Extras Planner Window Help Info

Ready: Make selection or take probings

CylHeadMacro\_2

Comment

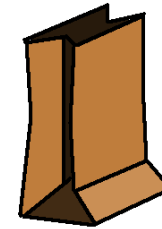
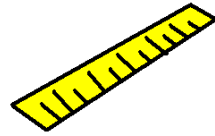
Alignment  
Base Alignment

Parameter	Value	Comment
offset	111.25	Macro Offset

Measurement Plan path  
c:\Zeiss\...\macros\CylHeadMacro Modify

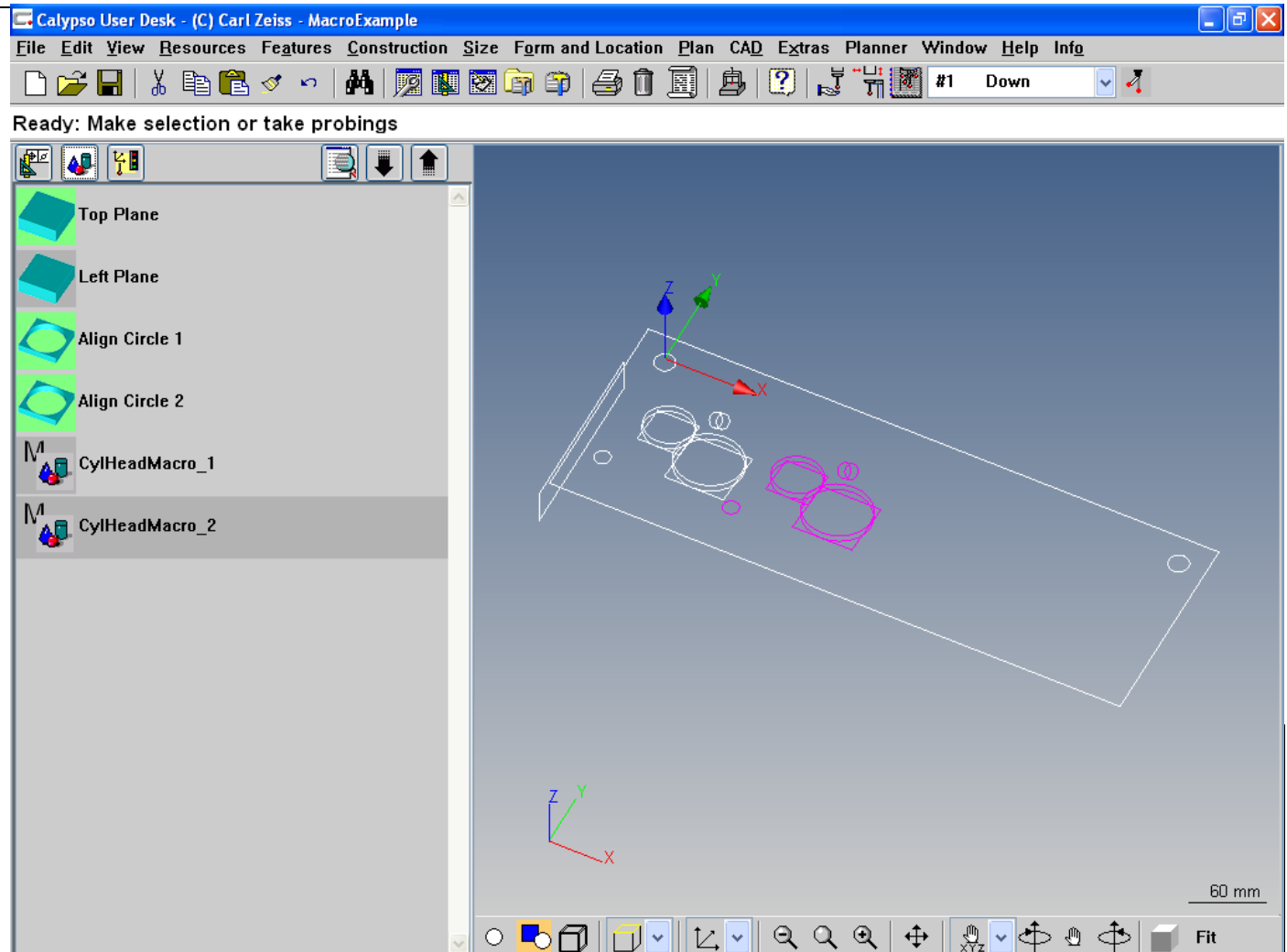
Open Parameter Update macro

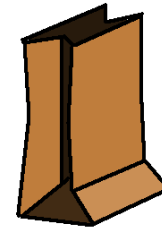
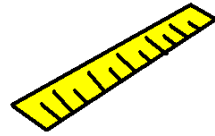
OK Reset



# LUNCH 'N LEARN

As you can see, our offset variable has cause all of our Macro features to shift by the specified amount, just as planned!





# LUNCH 'N LEARN

Repeat again with an offset value of 222.50 mm (2\*111.25).

Calypso User Desk - (C) Carl Zeiss - MacroExample

File Edit View Resources Features Construction Size Form and Location Plan CAD Extras Planner Window Help Info

Ready: Make selection or take probings

CylHeadMacro\_3

Comment

Alignment  
Base Alignment

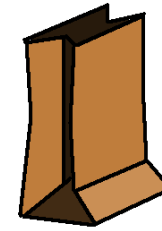
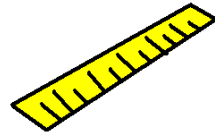
Parameter	Value	Comment
offset	222.5	Macro Offset

Measurement Plan path  
c:\Zeiss\...\macros\CylHeadMacro Modify

Open Parameter Update macro

OK Reset





# LUNCH 'N LEARN

And again with an offset value of 333.75 mm (111.25\*3).

Calypso User Desk - (C) Carl Zeiss - MacroExample

File Edit View Resources Features Construction Size Form and Location Plan CAD Extras Planner Window Help Info

Ready: Make selection or take probings

CylHeadMacro\_4

Comment

Alignment  
Base Alignment

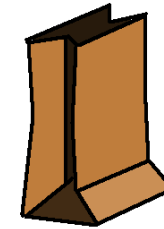
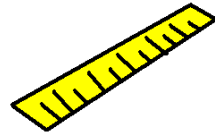
Parameter	Value	Comment
offset	333.75	Macro Offset

Measurement Plan path  
c:\Zeiss\...\macros\CylHeadMacro Modify

Open Parameter Update macro

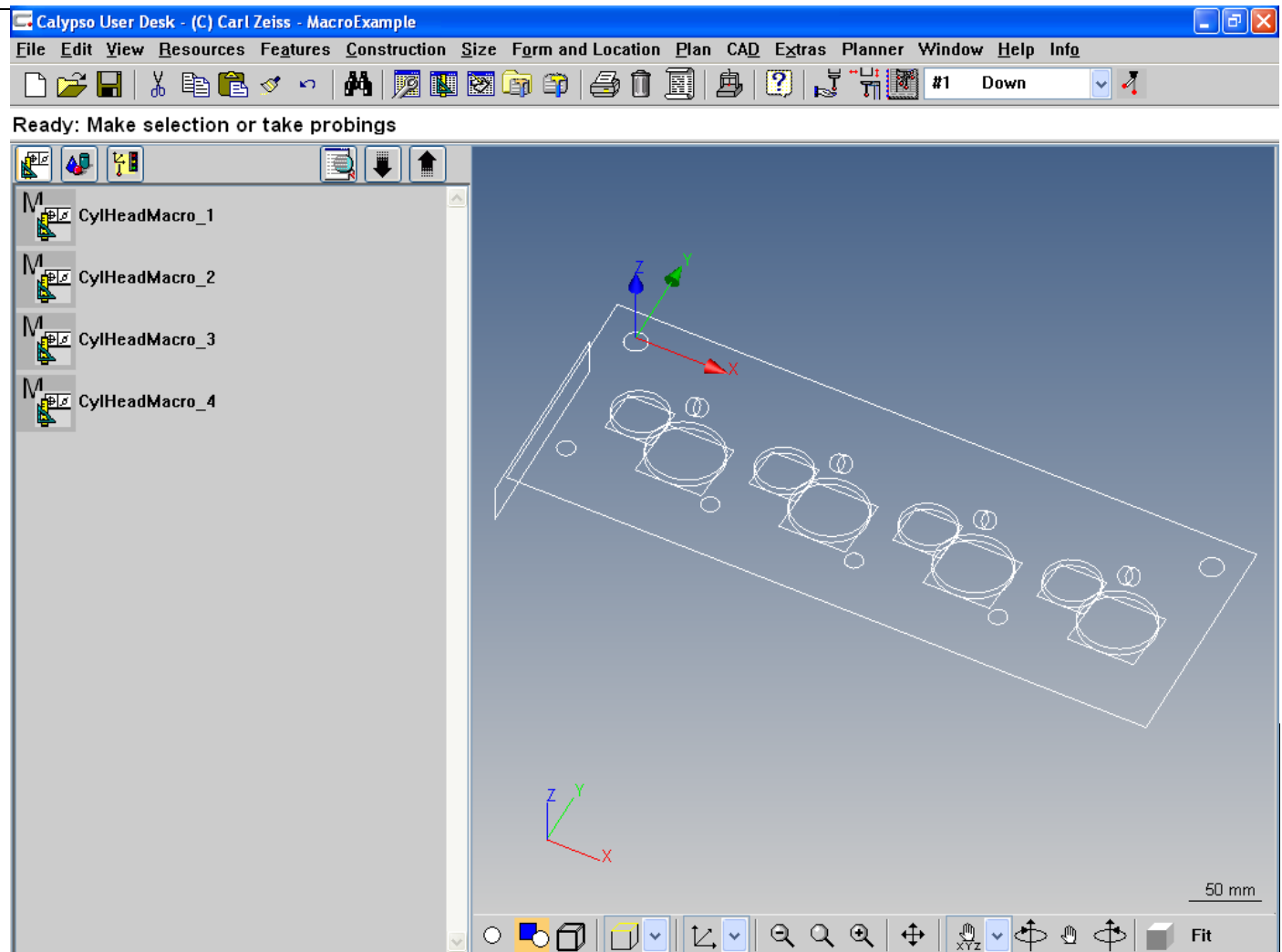
OK Reset

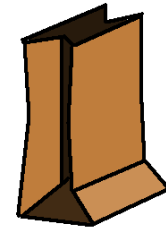
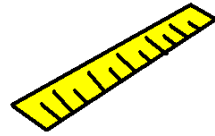
60 mm



# LUNCH 'N LEARN

Now we have our full program with four Macros using no secondary alignments.

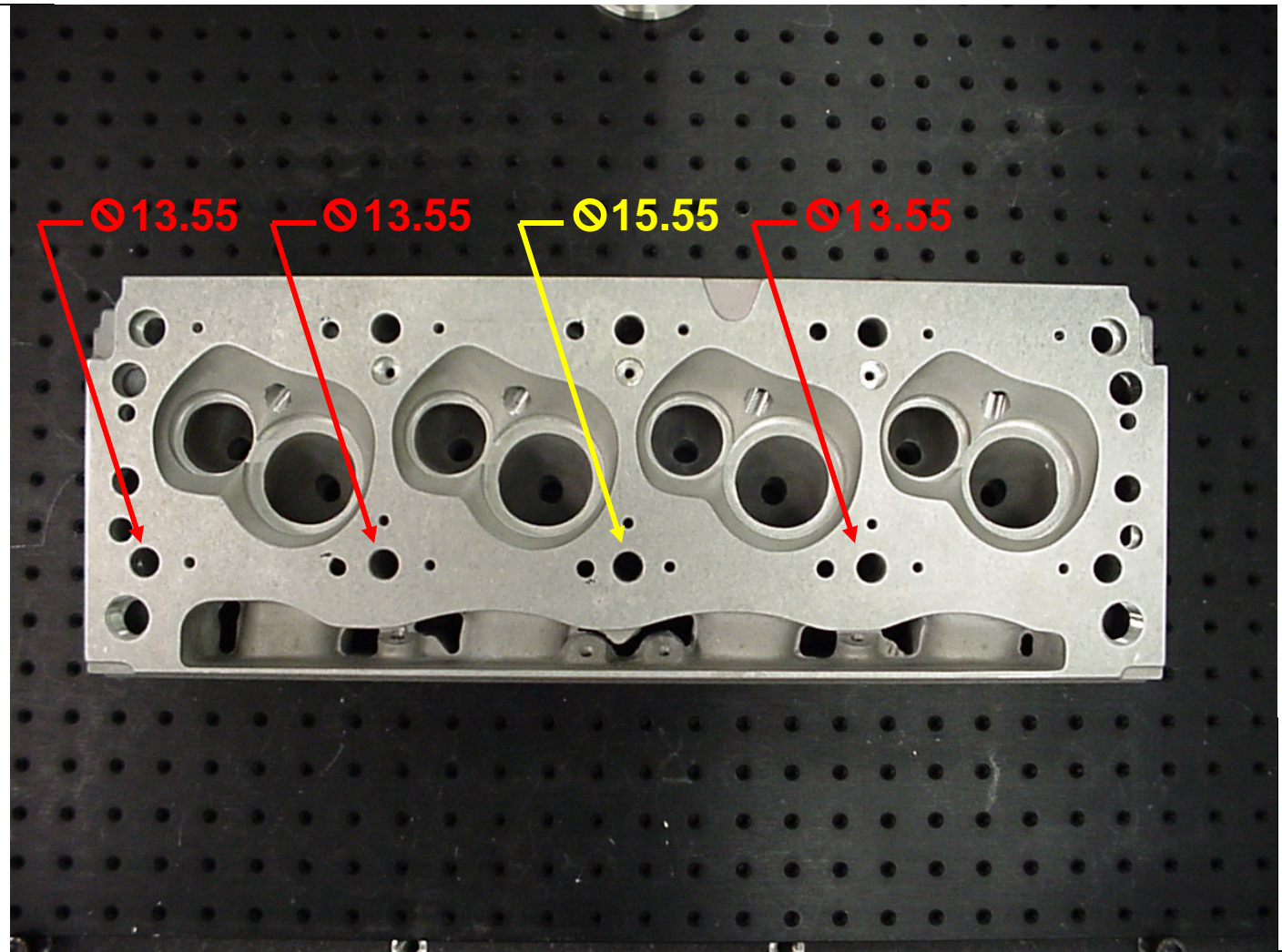


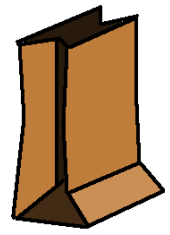
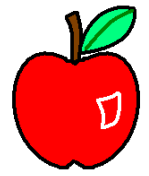
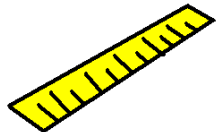


## LUNCH 'N LEARN

Another use of the Macro Parameters is compensating for inconsistencies between Macro instances.

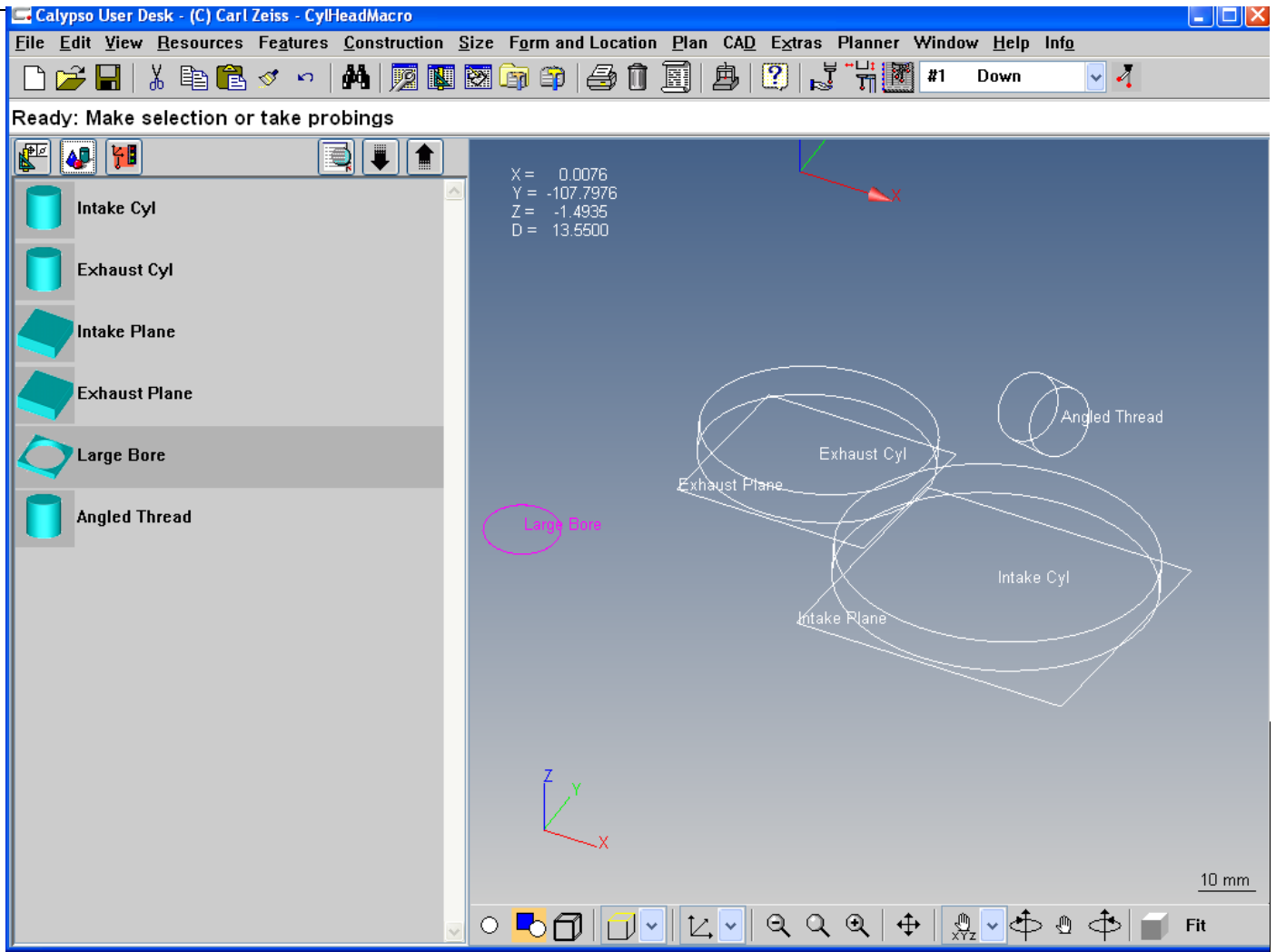
Let's say that the third Macro instance's Large Bore feature had a diameter of 15.55 instead of the standard 13.55.

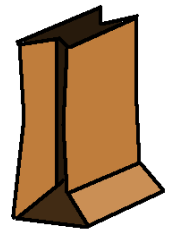
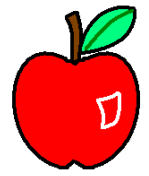
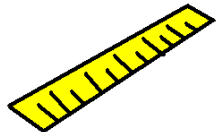




# LUNCH 'N LEARN

Back in our Macro Program...

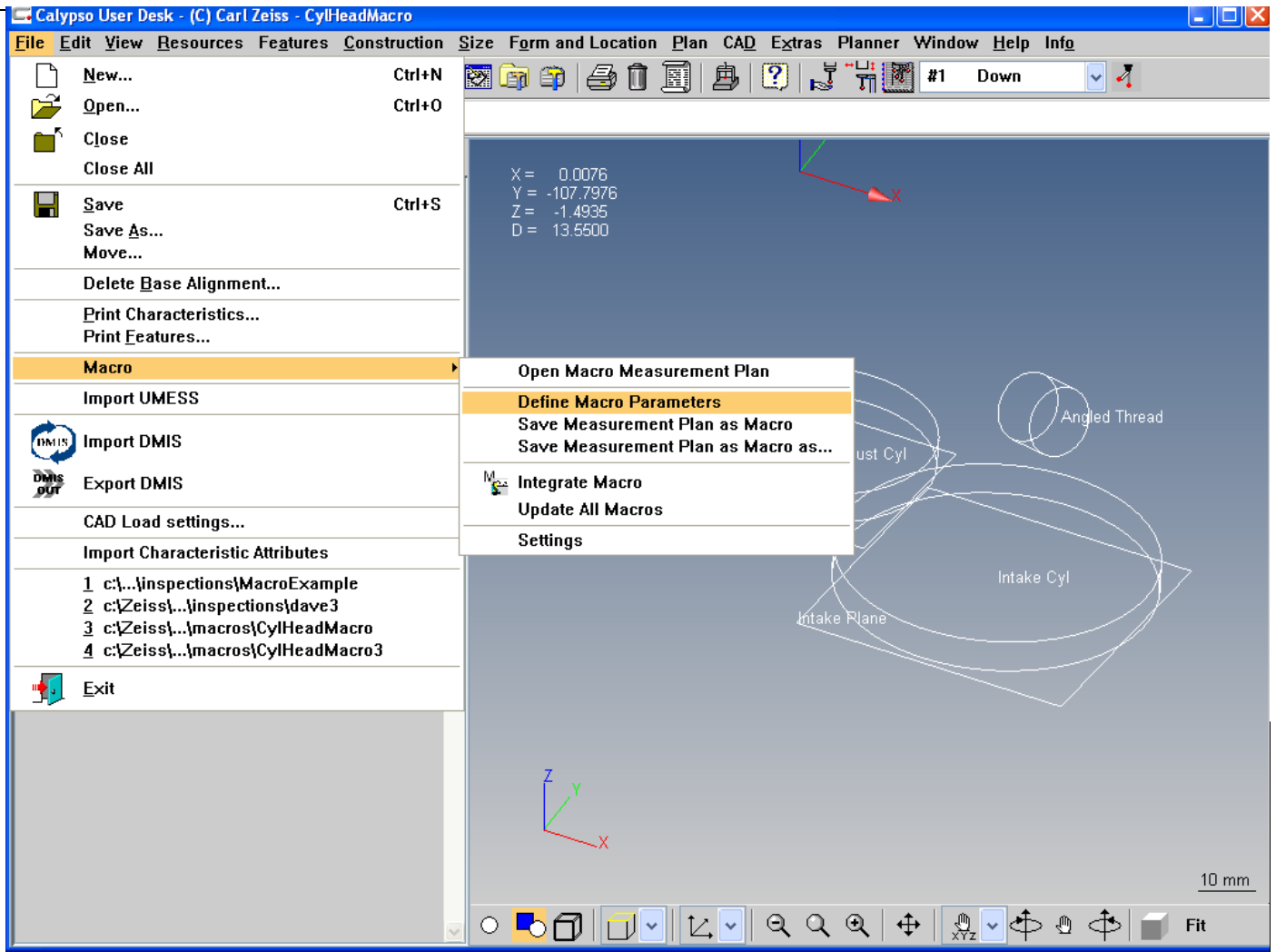




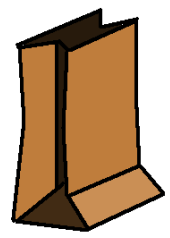
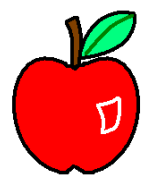
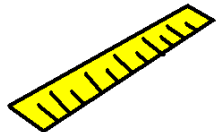
# LUNCH 'N LEARN

...we define another Macro Parameter.

Macro>Define Macro Parameter





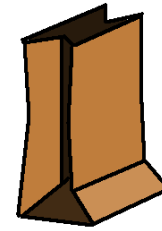
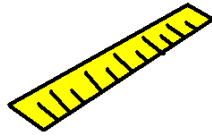


# LUNCH 'N LEARN

In addition to our offset variable, we will add a diameter change variable.

The screenshot shows the Calypso User Desk interface. A 'Parameter Definition' dialog box is open, displaying a 'Parameter List' table. The table contains one entry: 'offset' with an initial value of '0' and a comment of 'Macro Offset'. The background shows a CAD model of a cylinder with features like 'Intake Cyl', 'Exhaust Cyl', 'Intake Plane', 'Exhaust Plane', 'Large Bore', and 'Angled Thread'. The 'Intake Cyl' feature is highlighted with a red arrow.

Parameter	Initial value	Comment
offset	0	Macro Offset



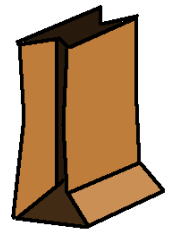
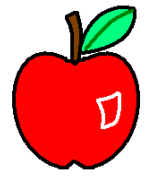
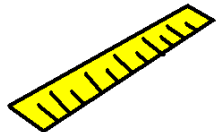
# LUNCH 'N LEARN

In addition to our offset variable, we will add a diameter change variable with initial value of zero.

The screenshot shows the Calypso User Desk interface. A 'Parameter Definition' dialog box is open, displaying a 'Parameter List' table. The table has three columns: 'Parameter', 'Initial value', and 'Comment'. It lists two parameters: 'offset' with an initial value of 0 and comment 'Macro Offset', and 'dia\_chg' with an initial value of 0 and comment 'Diameter Change'. The 'dia\_chg' parameter is selected with a mouse cursor. Below the table is an 'Info File' field with a 'Find...' button and a checkbox for 'Copy info file to Measurement Plan directory'. At the bottom of the dialog are buttons for 'Automatic', 'OK', 'Cancel', and 'Help'. The background shows a 3D model of a cylinder with various features like 'Intake Cyl', 'Exhaust Cyl', and 'Angled Thread' labeled.

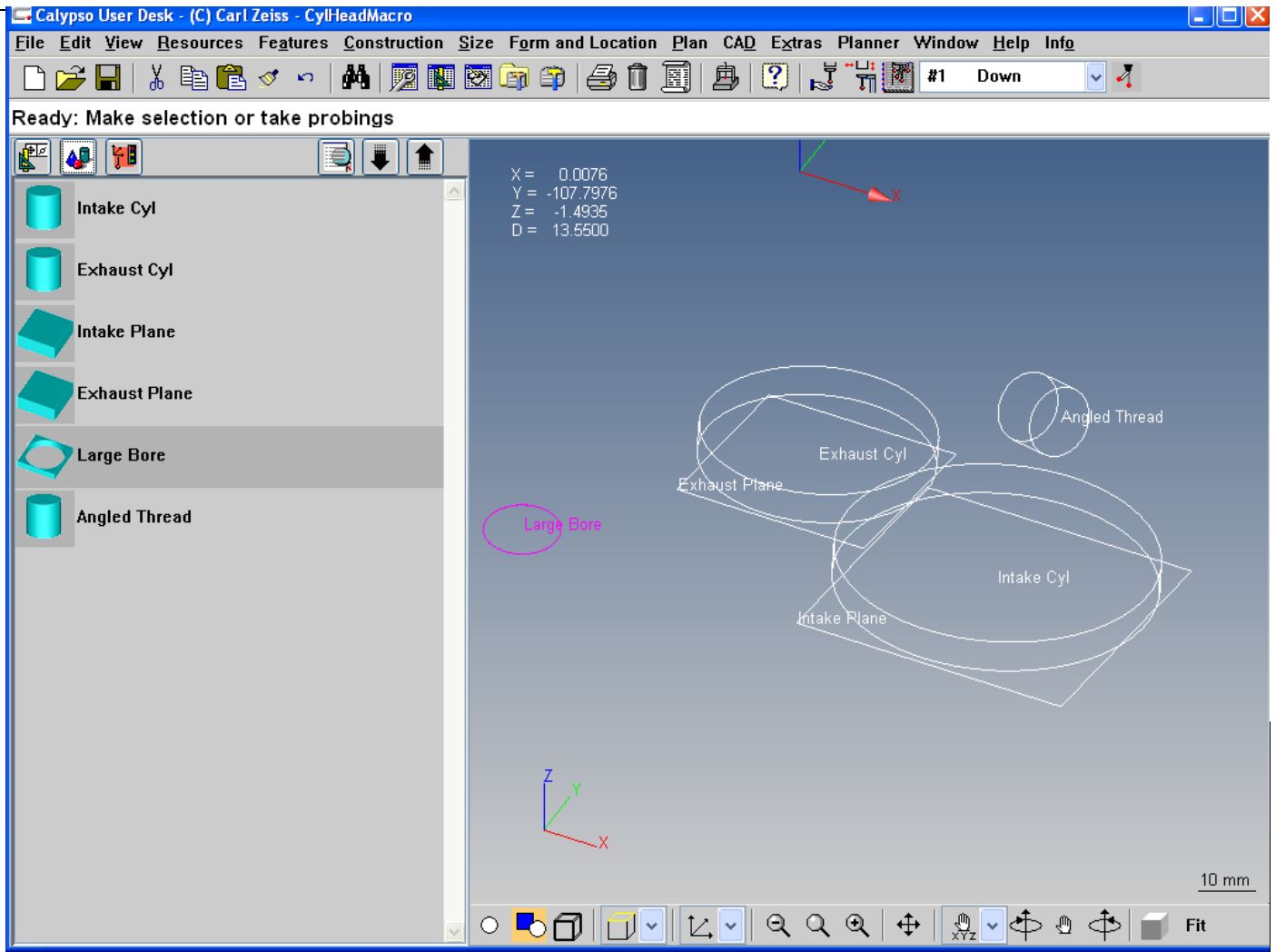
Parameter	Initial value	Comment
offset	0	Macro Offset
▶ dia_chg	0	Diameter Change

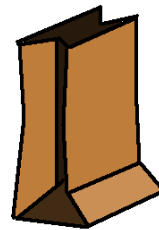
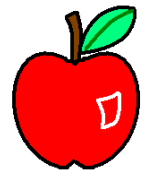
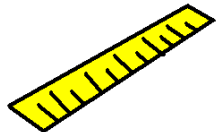




# LUNCH 'N LEARN

Now we open our Large Bore feature...



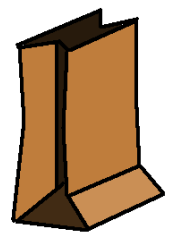
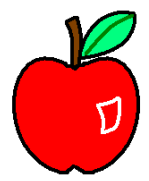
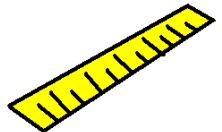


# LUNCH 'N LEARN

...and set up a formula on its nominal diameter.

The screenshot shows the 'Define Nominal Geometry' dialog box in the Calypso User Desk software. The 'Features' panel is open, showing the 'Large Bore' feature configuration. The 'Nominal' column has a value of 13.5500, and a context menu is open over this value with options: Formula..., Input Field, Cut, Copy, and Paste. The 'Actual' column is empty. The 'Tolerance For' section has 'D' checked. The 'Space Axis' is set to 'Z'. The 'Depth' is 0.0000, 'Start Angle' is 0.0000, and 'Angle Segment' is 360.0000. The 'Sigma' section is empty. The 'Min' section has 'Point no' and 'Max' fields. The 'Form' and 'Points' sections are also empty. The background shows a 3D model of a part with features labeled: Exhaust Cyl, Angled Thread, Exhaust Plane, Intake Cyl, and Intake Plane. A coordinate system is visible with X, Y, and Z axes. The status bar at the bottom right shows a scale of 10 mm.

Tolerance For:	Nominal	Actual
<input type="checkbox"/> X	0.0076	
<input type="checkbox"/> Y	-107.7976	
<input type="checkbox"/> Z	-1.4935	
<input checked="" type="checkbox"/> D	13.5500	
A1 X/Z	0.0000	
A2 Y/Z	0.0000	
Depth	0.0000	
Start Angle	0.0000	
Angle Segment	360.0000	



# LUNCH 'N LEARN

Our formula is the standard diameter (13.55 mm) plus our diameter change variable.

The screenshot shows the Calypso User Desk software interface. The main window title is "Calypso User Desk - (C) Carl Zeiss - CylHeadMacro". The menu bar includes File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, and Help. The toolbar contains various icons for file operations and measurement. The main area is titled "Define Nominal Geometry (Probe, Enter, or Read)".

A "Features" dialog box is open, showing a list of features. The "Large Bore" feature is selected. The coordinates for this feature are: X = 0.0076, Y = -107.7976, Z = -1.4935, and D = 13.5500.

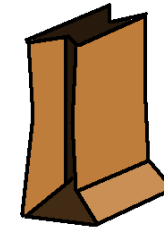
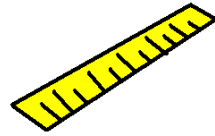
A "Formula..." dialog box is open, showing the formula "Length in mm" defined as "13.55+dia\_chg". The "Actual" tab is selected. The "Compute" button is visible. The dialog box also has sections for "Characteristics", "Features", and "Attributes".

The "Characteristics" section lists: Diameter\_Intake Cyl, Diameter\_Exhaust Cyl, Diameter\_Large Bore, Projection Angle One\_Angled Thread, Projection Angle Two\_Angled Thread, Cylindricity\_Intake Cyl, Cylindricity\_Exhaust Cyl, Flatness\_Intake Plane, Flatness\_Exhaust Plane, Perpendicularity\_Intake Cyl, and Perpendicularity\_Exhaust Cyl.

The "Features" section lists: Intake Cyl, Exhaust Cyl, Intake Plane, Exhaust Plane, Large Bore, and Angled Thread.

The "Attributes" section is currently empty.

At the bottom of the software interface, there are buttons for "OK", "Reset", and "Fit". A 10 mm scale bar is visible in the bottom right corner.



# LUNCH 'N LEARN

Now our diameter will remain the standard 13.55 mm unless we change the dia\_chg variable to a value other than zero.

Calypso User Desk - (C) Carl Zeiss - CylHeadMacro

File Edit View Resources Features Construction Size Form and Location Plan CAD Extras Planner Window Help Info

Define Nominal Geometry (Probe, Enter, or Read)

Features

Large Bore

Comment	Projection	Strategy
Circle	None	Evaluation

Clearance Group: CP +Z

Nominal Definition Alignment: Options Base Alignment

Tolerance For:	Nominal	Actual
<input type="checkbox"/> X	0.0076	
<input type="checkbox"/> Y	-107.7976	
<input type="checkbox"/> Z	-1.4935	
<input checked="" type="checkbox"/> D	13.5500	
A1 X/Z	0.0000	
A2 Y/Z	0.0000	
Space Axis	Z	
Depth	0.0000	
Start Angle	0.0000	
Angle Segment	360.0000	

Sigma Form Points

Min	Point no	Point no	Max

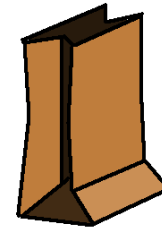
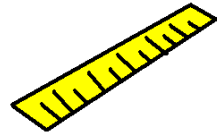
OK Reset

X = 0.0076  
Y = -107.7976  
Z = -1.4935  
D = 13.5500

Exhaust Cyl  
Intake Cyl  
Exhaust Plane  
Intake Plane  
Angled Thread

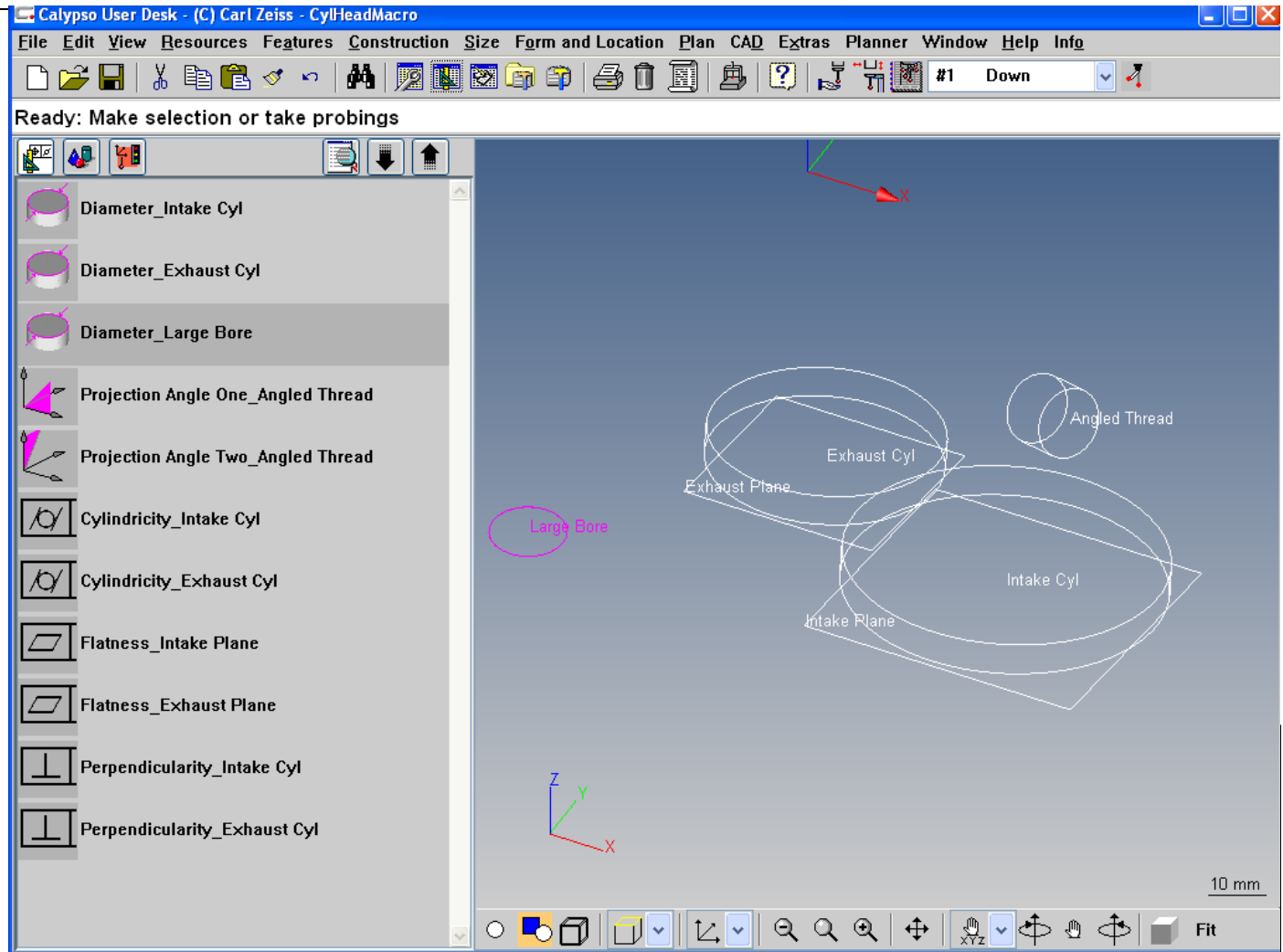
Large Bore

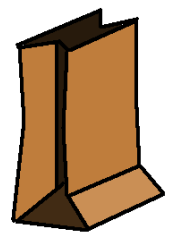
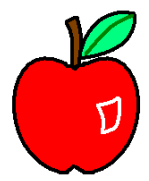
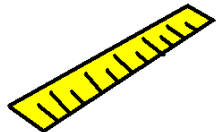
10 mm



# LUNCH 'N LEARN

Now we must make sure that our diameter characteristic for the Large Bore is pulling the nominal information from the feature.



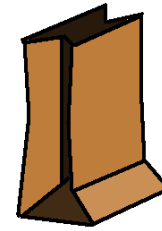
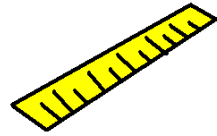


# LUNCH 'N LEARN

In the Characteristics Settings Editor...

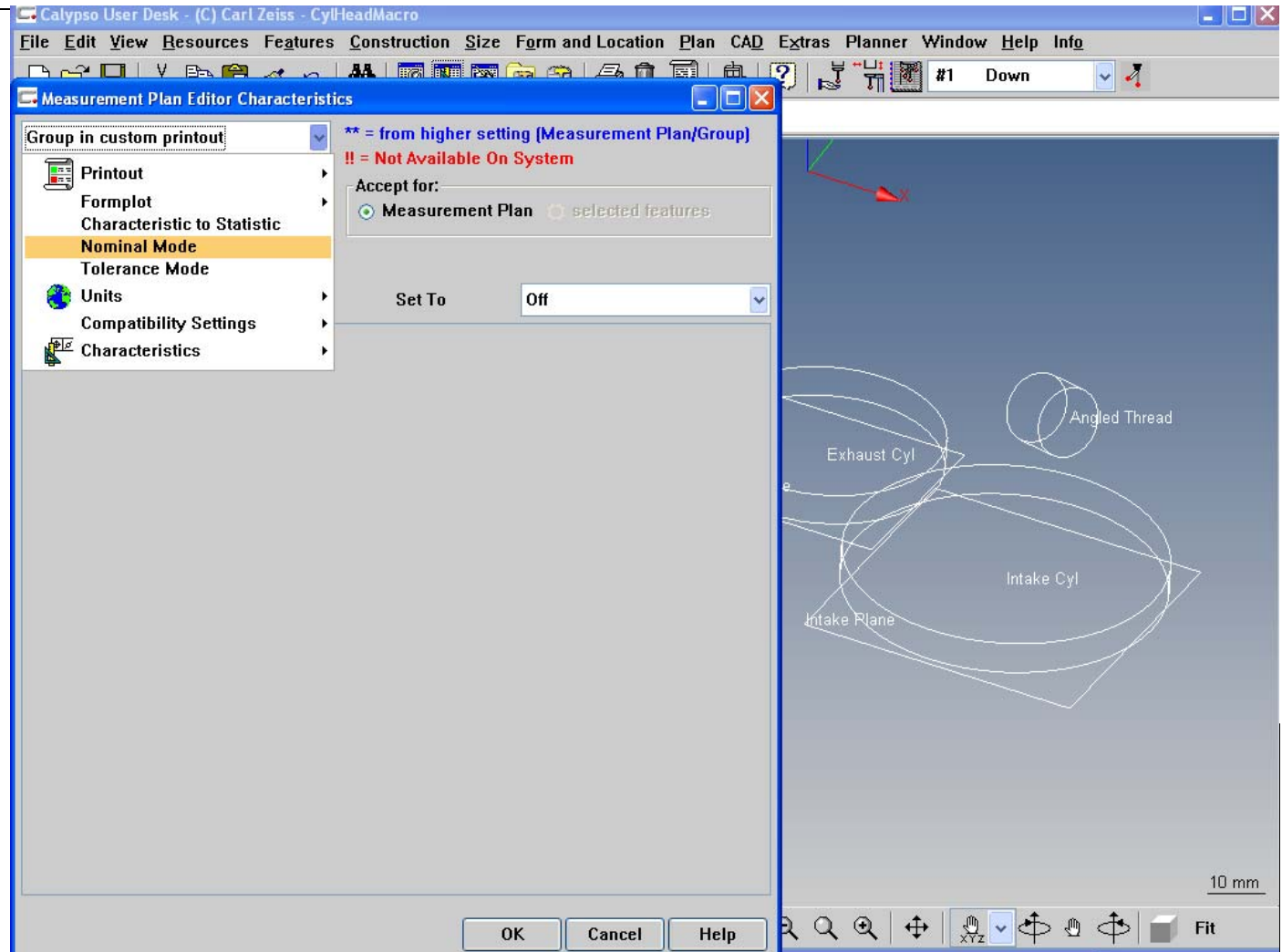
The screenshot shows the Calypso User Desk interface. The menu bar includes File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, Help, and Info. The Resources menu is open, listing options such as RT Functions, Stylus system, Measurement Plan, Measurement Plan Information, Features representation..., Features Settings Editor..., Characteristics Settings Editor... (highlighted), Measurement Plan Comment..., Preassignment for New Features..., Set Default Measurement Strategy..., Filter/Outlier Elimination..., Space Point Mode..., Define printout, Printout header parameters..., Results to File..., Name for output files, Design custom printout, and Utilities. The main workspace displays a 3D model of an engine part with features labeled: Exhaust Plane, Exhaust Cyl, Angled Thread, Intake Plane, and Intake Cyl. A pink circle highlights the 'Large Data' button in the bottom right corner of the workspace. The status bar at the bottom right shows a scale of 10 mm.



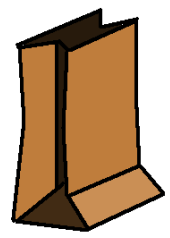
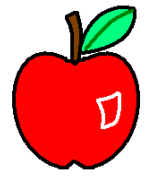
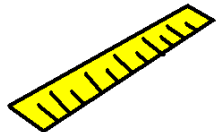


# LUNCH 'N LEARN

...we choose Nominal Mode from the drop-down menu...







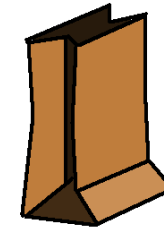
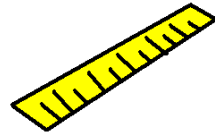
# LUNCH 'N LEARN

...choose Selected Features...

The screenshot shows the 'Measurement Plan Editor Characteristics' dialog box in the Calypso software. The 'Accept for:' section has two radio buttons: 'Measurement Plan' (selected) and 'selected features' (highlighted with a red box). A red arrow points from the text '...choose Selected Features...' to the 'selected features' radio button. Below this, a table lists various characteristics and their values.

Name	Type	Value
[-] Diameter_Intake Cyl	D	** Input in Characteris
[-] Diameter_Exhaust Cyl	D	** Input in Characteris
Diameter_Large Bore	D	** Input in Characteris
[-] Projection Angle One_Angled Thread	A1	** Input in Characteris
[-] Projection Angle Two_Angled Thread	A2	** Input in Characteris
[-] Cylindricity_Intake Cyl	GDT Cyl	** Input in Characteris
[-] Cylindricity_Exhaust Cyl	GDT Cyl	** Input in Characteris
[-] Flatness_Intake Plane	GDT Flat	** Input in Characteris
[-] Flatness_Exhaust Plane	GDT Flat	** Input in Characteris
[-] Perpendicularity_Intake Cyl	GDT Perp	** Input in Characteris
[-] Perpendicularity_Exhaust Cyl	GDT Perp	** Input in Characteris

The background shows a 3D model of a mechanical part with features labeled: Exhaust Cyl, Angled Thread, Intake Cyl, and Intake Plane. A scale bar at the bottom right indicates 10 mm.



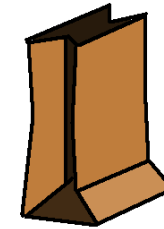
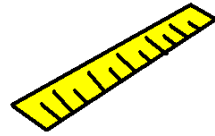
# LUNCH 'N LEARN

...and with our characteristic selected, switch the mode to *Automatically from nom. Geometry.*

The screenshot shows the 'Measurement Plan Editor Characteristics' dialog box in the Calypso software. The 'Nominal Mode' dropdown is set to 'Nominal Mode'. The 'Accept for:' section has 'selected features' selected. The 'Set To' dropdown is set to 'Input in Characteristic'. A table lists various characteristics and their types, with a tooltip for 'Input in Characteristic' showing 'Automatically from nom. geometry' as an option.

Name	Type	Input in Characteristic
Diameter_Intake Cyl	D	** Input in Characteristic
Diameter_Exhaust Cyl	D	** Input in Characteristic
Diameter_Large Bore	D	** Input in Characteristic
Projection Angle One_Angled Thread	A1	** Input in Characteristic
Projection Angle Two_Angled Thread	A2	** Input in Characteristic
Cylindricity_Intake Cyl	GDT Cyl	** Input in Characteristic
Cylindricity_Exhaust Cyl	GDT Cyl	** Input in Characteristic
Flatness_Intake Plane	GDT Flat	** Input in Characteristic
Flatness_Exhaust Plane	GDT Flat	** Input in Characteristic
Perpendicularity_Intake Cyl	GDT Perp	** Input in Characteristic
Perpendicularity_Exhaust Cyl	GDT Perp	** Input in Characteristic

Input in Characteristic options:  
\*\* Default  
Automatically from nom. geometry  
Input in Characteristic



# LUNCH 'N LEARN

This means that our nominal value for our diameter characteristic will pull directly from the nominal value of the feature, so both the feature and characteristic will have our parameter applied to them.

Calypso User Desk - (C) Carl Zeiss - CylHeadMacro

File Edit View Resources Features Construction Size Form and Location Plan CAD Extras Planner Window Help Info

Measurement Plan Editor Characteristics

Nominal Mode

\*\* = from higher setting (Measurement Plan/Group)  
!! = Not Available On System

Accept for:  
 Measurement Plan  selected features

Set To: Automatically from nom. ge...

Name	Type	Value
Diameter_Intake Cyl	D	** Input in Characteris
Diameter_Exhaust Cyl	D	** Input in Characteris
Diameter_Large Bore	D	Automatically from nom. ge...
Projection Angle One_Angled Thread	A1	** Input in Characteris
Projection Angle Two_Angled Thread	A2	** Input in Characteris
Cylindricity_Intake Cyl	GDT Cyl	** Input in Characteris
Cylindricity_Exhaust Cyl	GDT Cyl	** Input in Characteris
Flatness_Intake Plane	GDT Flat	** Input in Characteris
Flatness_Exhaust Plane	GDT Flat	** Input in Characteris
Perpendicularity_Intake Cyl	GDT Perp	** Input in Characteris
Perpendicularity_Exhaust Cyl	GDT Perp	** Input in Characteris

Exhaust Cyl

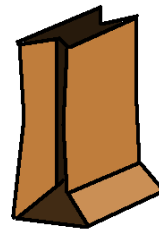
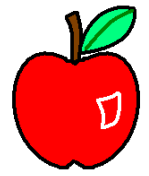
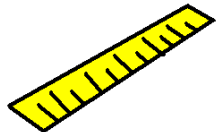
Intake Cyl

Intake Plane

Angled Thread

10 mm

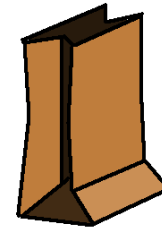
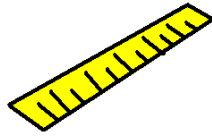
OK Cancel Help



# LUNCH 'N LEARN

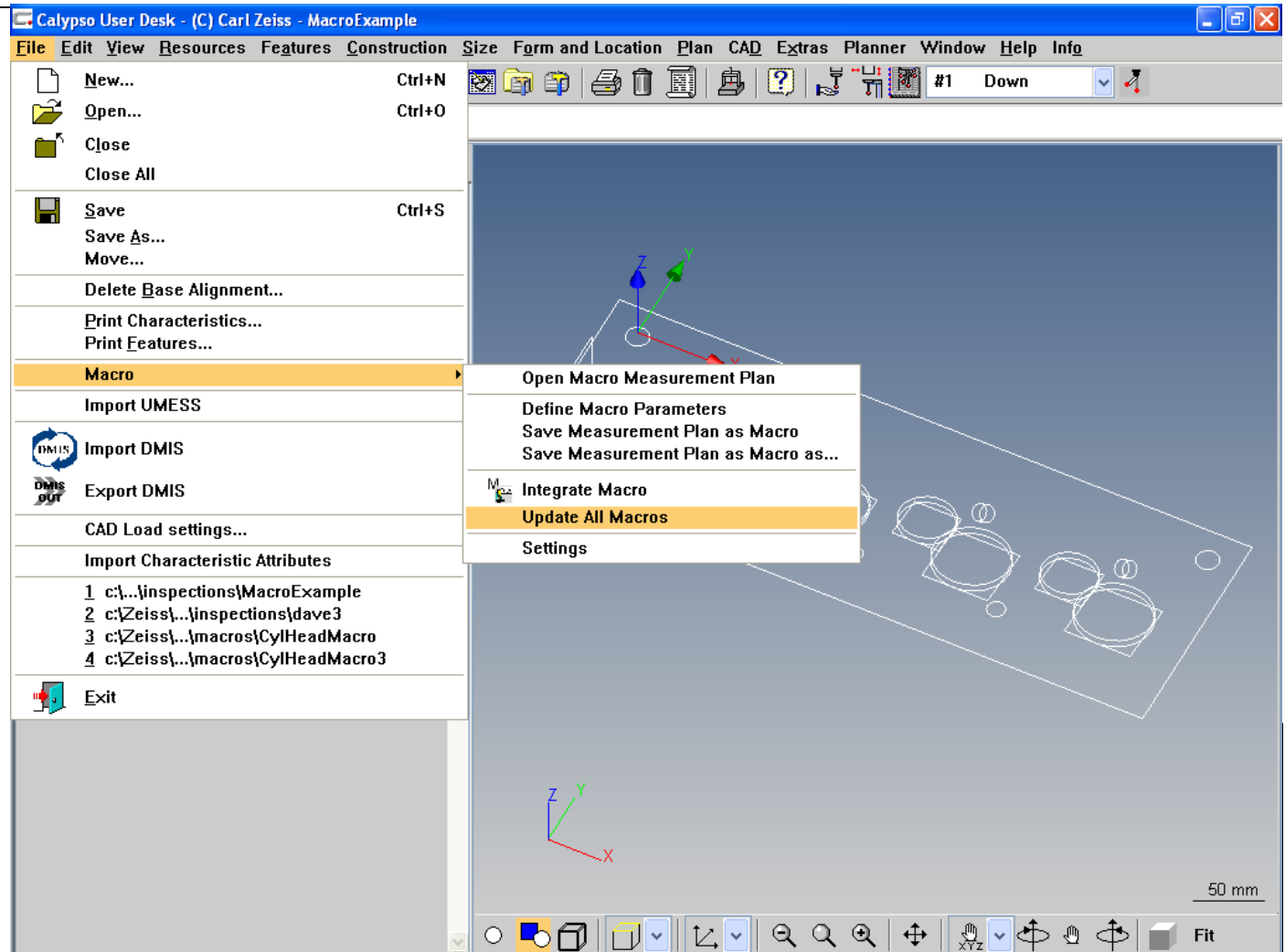
Now, making sure to save our Macro...

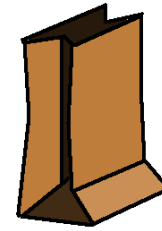
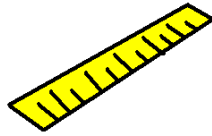
The screenshot shows the Calypso User Desk software interface. The title bar reads "Calypso User Desk - (C) Carl Zeiss - CylHeadMacro". The menu bar includes File, Edit, View, Resources, Features, Construction, Size, Form and Location, Plan, CAD, Extras, Planner, Window, Help, and Info. The File menu is open, showing options like New..., Open..., Close, Save, and Macro. The Macro submenu is also open, highlighting "Save Measurement Plan as Macro". The main workspace displays a 3D model of a part with measurement features labeled: Intake Plane, Intake Cyl, Exhaust Cyl, and Angled Thread. A coordinate system is visible in the top right of the workspace with values: X = 0.0076, Y = -107.7976, Z = -1.4935, D = 13.5500. A 10 mm scale bar is at the bottom right. The bottom toolbar contains various icons for navigation and measurement.



# LUNCH 'N LEARN

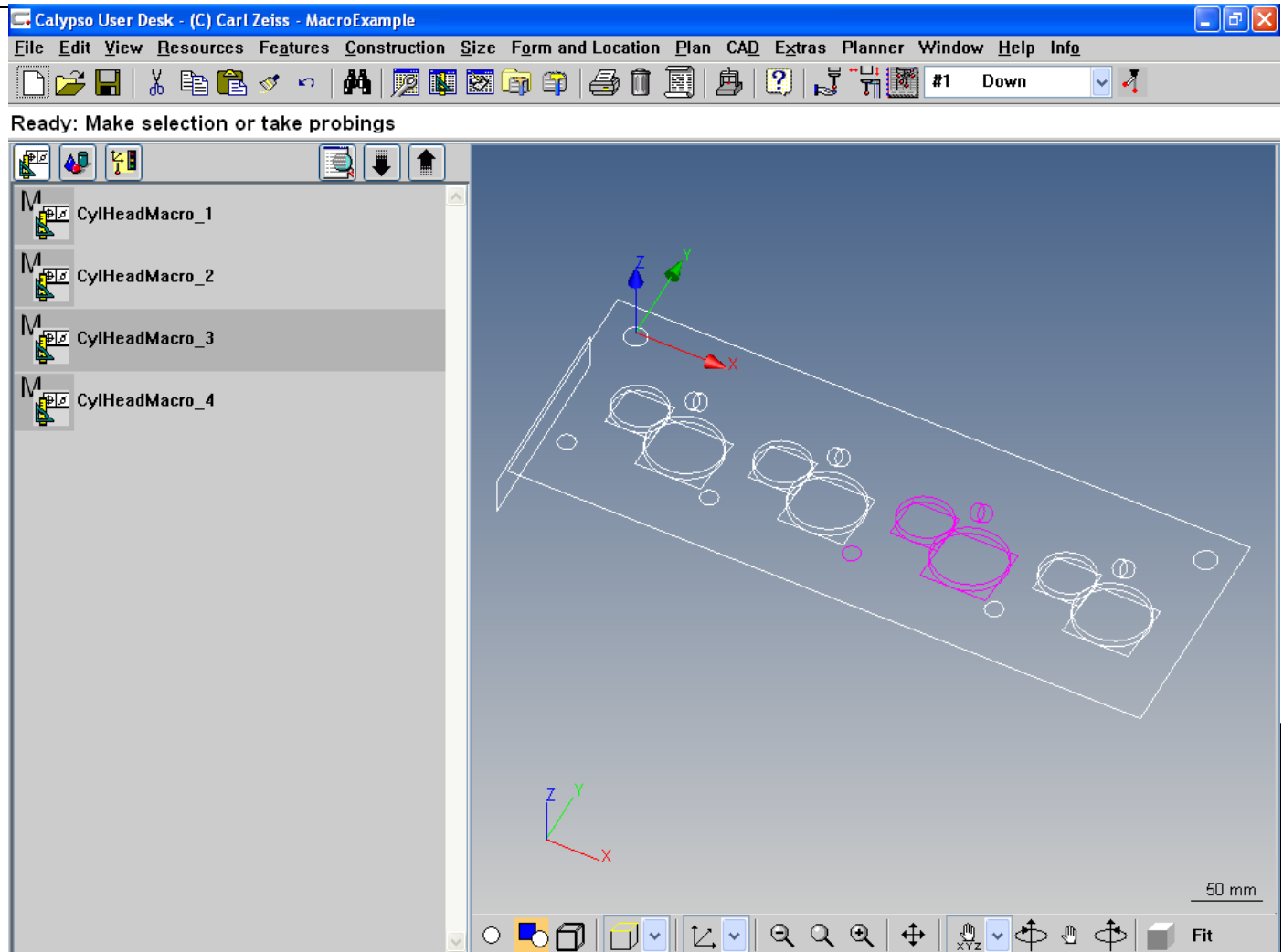
...we switch back to our Base Program and update all of our Macros.



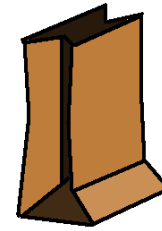
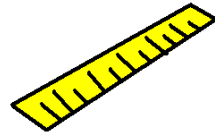


# LUNCH 'N LEARN

Now to set the third Macro's Large Bore feature to the larger size, we open the third Macro...







# LUNCH 'N LEARN

...and set our diameter change variable to 2.00 mm.

Calypso User Desk - (C) Carl Zeiss - MacroExample

File Edit View Resources Features Construction Size Form and Location Plan CAD Extras Planner Window Help Info

Ready: Make selection or take probings

CylHeadMacro\_3

Comment

Alignment  
Base Alignment

Parameter	Value	Comment
offset	222.5	Macro Offset
dia_chg	2.00	Diameter Change

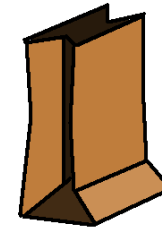
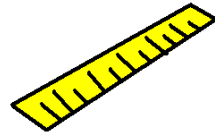
Measurement Plan path  
c:\Zeiss\...\macros\CylHeadMacro Modify

Open Parameter Update macro

OK Reset

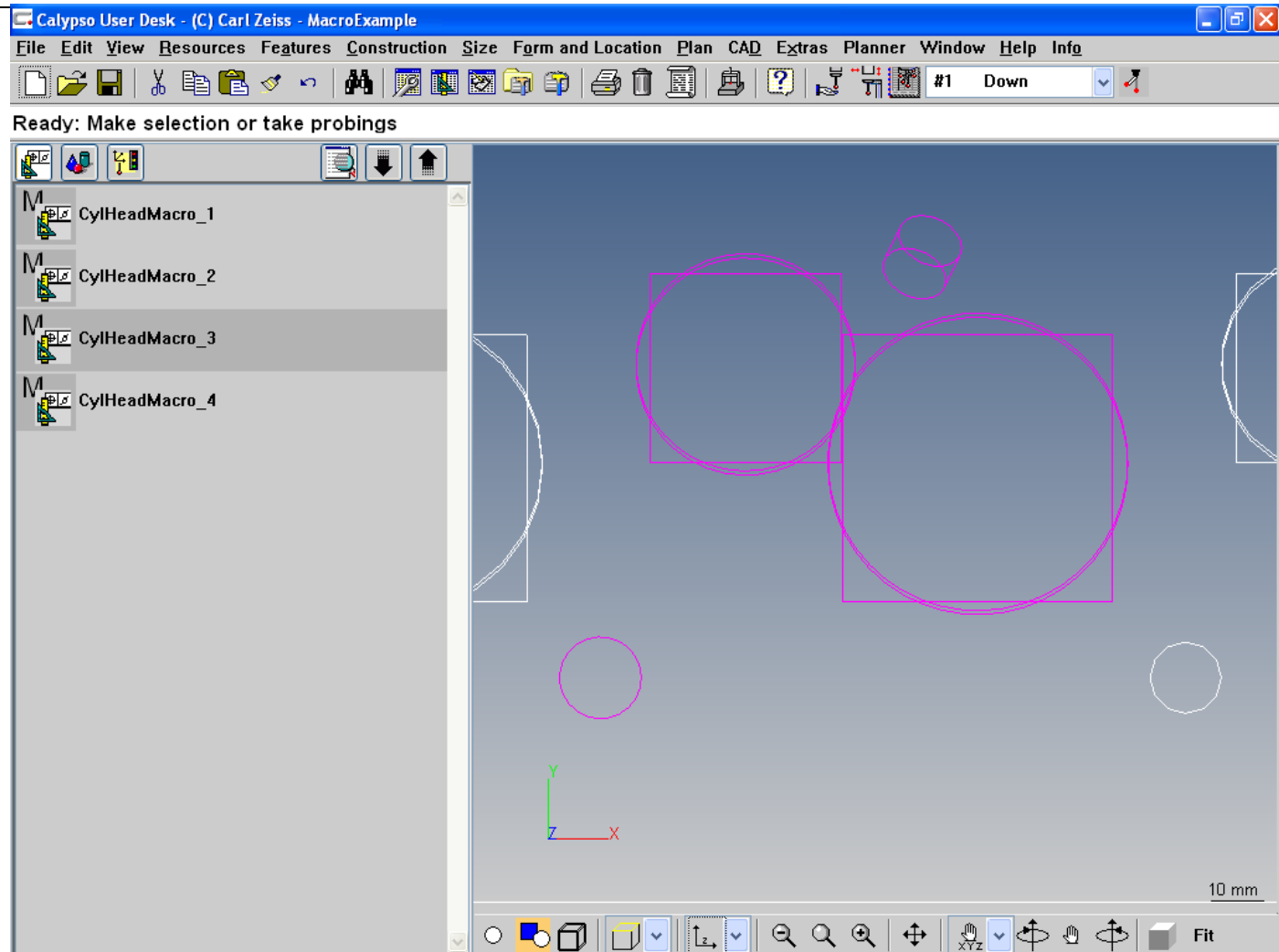
50 mm

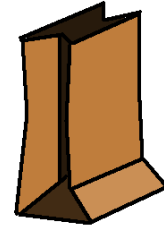
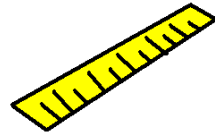




# LUNCH 'N LEARN

This changes our third Macro's Large Bore feature to a diameter of  $(13.55+2.00)$ , or 15.55 mm.



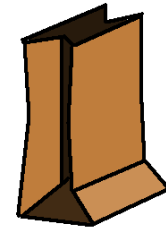
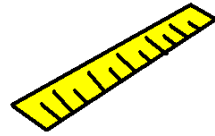


## LUNCH 'N LEARN

# Macros

**Macros make it easier for you to create and handle recurring measuring jobs:**

- You can measure several identical components in assemblies.  
*(intake/exhaust ports, valve seats in an engine block)*
- You can measure multiple features, i.e. features with recurring but varying fundamental quantities.  
*(stepped cylinders, rows of holes with increasing radius)*
- You can program measuring jobs that are repeated on different workpieces.  
*(same macro, different main program)*



## LUNCH 'N LEARN

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You've got Questions, We have answers.

Macros