

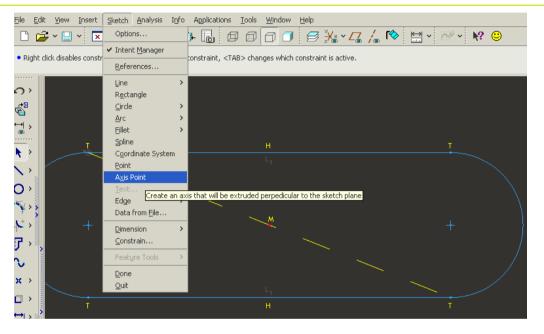
### **#1** Creating Slots With An Axis At The Center

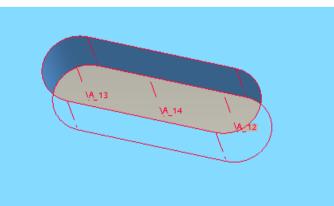
- Create initial cut in part
- Sketch geometry of slot:

 Create a diagonal line through slot and change it to a construction line

Add an Axis Point to the center of the construction line

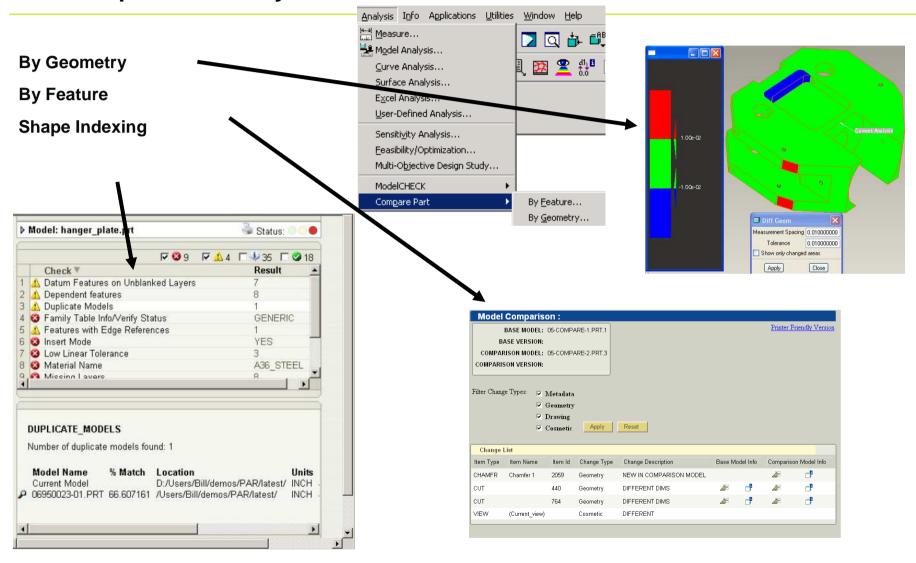
•Finish the feature





**PTC**<sup>®</sup>

#### **#2** Compare Geometry



 . . . . . . .

DTC C

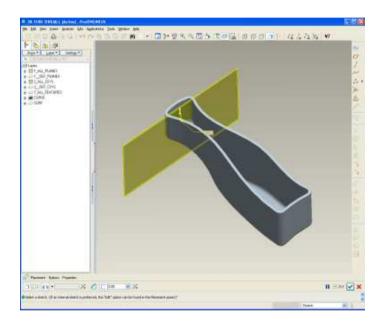
### #3 Thin Thru all for Thin Extrudes

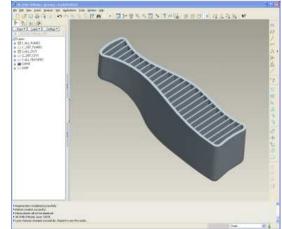
### **⊙** Thin features

- Sketch outside the model
- Thru all option

4

- Automatically trims and adjusts for depth of model
- **⊙** Great for patterning





 $\bigcirc$  **PTC** 

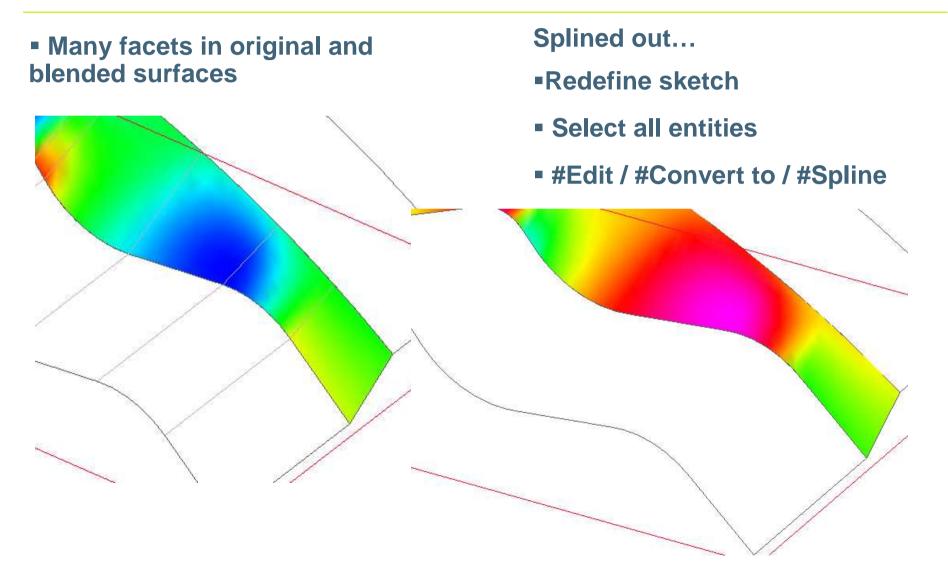


**Transition 1** 

# **Engineers aren't boring people...**

# we just get excited over boring things.

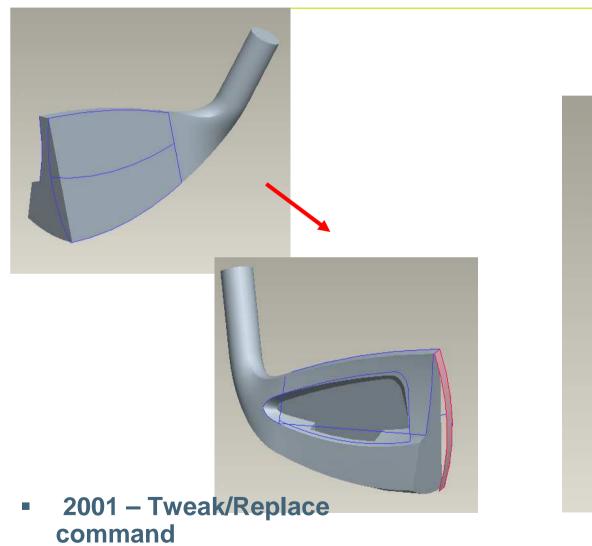
### #4 Sketch – Convert to spline

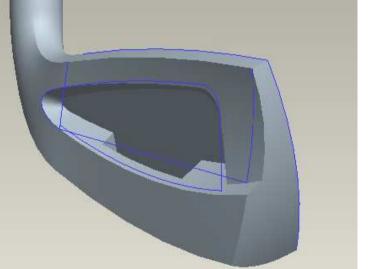


**Ο ΡΤΟ** 



### **#5 Using Offset Replace to Trim/Extend Protrusions**



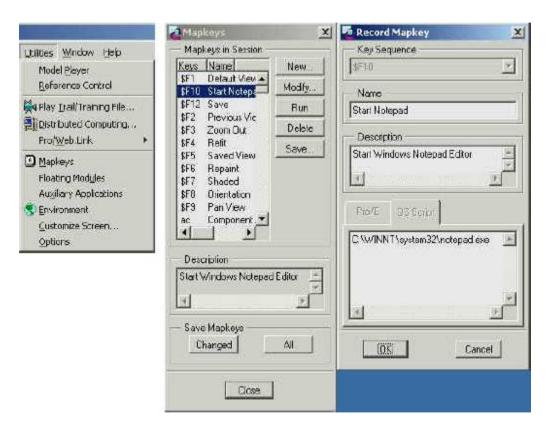


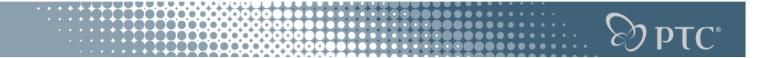
#6 How to Create a Mapkey to Start an Application Outside of Pro/E

- Select Utilities > Mapkey > New
- Fill in mapkey Name and Description field
- Select OS Script tab and full pathname to desired application

(C:\WINNT\SYSTEM32\notepad.exe)

Select OK, close mapkey dialog box





**#7** New Windows Icons in PRO/E

• 1) Open Microsoft Word.

2) Select #Tools #Customize.

•3) Under the "Toolbars" tab, put a checkmark next to any of the toolbar names. This will bring up a pop-up window of the toolbar that was checked. For example, putting a checkmark next to "Microsoft" will bring up a toolbar with various Microsoft Application icons, such as Excel and Power Point.

•4) From the pop-up window, right click on the desired icon and select "Copy Button Image". This will copy the icon image to the clipboard.

**•**5) In Pro/ENGINEER, create a mapkey. Select #Utilities #Customize Screen.

•6) Select the "Commands" tab and the mapkey icon whose image will be modified

•7) Click on "Modify Selection", then "Paste Button Image". This will replace the default mapkey icon image with the image that was copied to the clipboard.

### **#8 Family Table printing from Excel**

### No formatting/printing from Pro/TABLE

stance Name	S_HEIGHT	d64	d27	d4 PART HEIGHT	d3 PART_DIAMET.	F979 COPIED GRO	F721 [CUT]	F58 TOP_CUTOUT	d44	F39 CE
-EXCEL_TABLE_PLOTTI		0.13	180.0	0.50	2.62	Y	Y	Y	0.05	Y
CLUTCH_BASE_0001	60	0.13	160.0	0.50	2.00	N	Y	N	0.07	Y
CLUTCH_BASE_0002	60	0.13	160.0	0.50	2.00	N	Y	Y	0.07	N
CLUTCH_BASE_0003	20	0.13	160.0	0.20	2.98	Y	Y	N	0.05	Y
CLUTCH_BASE_0004	70	0.28	100.0	0.50	2.00	N	N	N	0.07	N
CLUTCH_BASE_0005	40	0.13	160.0	0.50	2.98	N	N	N	0.05	Y
CLUTCH_BASE_0006	40	0.20	15.0	0.40	2.90	Y	N	Y	0.06	Y
CLUTCH_BASE_0007	60	0.13	160.0	0.50	2.00	N	Y	N	0.07	N
	CLUTCH_BASE_0001 CLUTCH_BASE_0002 CLUTCH_BASE_0003 CLUTCH_BASE_0004 CLUTCH_BASE_0005 CLUTCH_BASE_0006	CLUTCH_BASE_0001         50           CLUTCH_BASE_0002         50           CLUTCH_BASE_0003         20           CLUTCH_BASE_0004         70           CLUTCH_BASE_0005         40           CLUTCH_BASE_0006         40	CLUTCH_BASE_0001         50         0.13           CLUTCH_BASE_0002         50         0.13           CLUTCH_BASE_0003         20         0.13           CLUTCH_BASE_0004         70         0.28           CLUTCH_BASE_0005         40         0.13           CLUTCH_BASE_0006         40         0.20	CLUTCH_BASE_0001         0         0.13         160.0           CLUTCH_BASE_0002         00         0.13         160.0           CLUTCH_BASE_0003         20         0.13         160.0           CLUTCH_BASE_0003         20         0.13         160.0           CLUTCH_BASE_0004         70         0.28         100.0           CLUTCH_BASE_0005         40         0.13         160.0           CLUTCH_BASE_0006         40         0.20         15.0	CLUTCH_BASE_0001         50         0.13         160.0         0.50           CLUTCH_BASE_0002         50         0.13         160.0         0.50           CLUTCH_BASE_0003         20         0.13         160.0         0.20           CLUTCH_BASE_0004         70         0.28         100.0         0.50           CLUTCH_BASE_0005         40         0.13         160.0         0.50           CLUTCH_BASE_0006         40         0.20         15.0         0.40	SLUTCH_BASE_0001         0         0.13         160.0         0.50         2.00           SLUTCH_BASE_0002         0         0.13         160.0         0.50         2.00           SLUTCH_BASE_0003         20         0.13         160.0         0.20         2.98           SLUTCH_BASE_0004         70         0.28         100.0         0.50         2.00           SLUTCH_BASE_0005         40         0.13         160.0         0.50         2.98           SLUTCH_BASE_0005         40         0.13         160.0         0.50         2.98           SLUTCH_BASE_0006         40         0.20         15.0         0.40         2.90	SLUTCH_BASE_0001         0         0.13         160.0         0.50         2.00         N           SLUTCH_BASE_0002         0         0.13         160.0         0.50         2.00         N           SLUTCH_BASE_0003         20         0.13         160.0         0.50         2.00         N           SLUTCH_BASE_0003         20         0.13         160.0         0.20         2.98         Y           SLUTCH_BASE_0004         70         0.28         100.0         0.50         2.00         N           SLUTCH_BASE_0005         40         0.13         160.0         0.50         2.98         N           SLUTCH_BASE_0006         40         0.20         15.0         0.40         2.90         Y	SLUTCH_BASE_0001         0         0.13         160.0         0.50         2.00         N         Y           SLUTCH_BASE_0002         0         0.13         160.0         0.50         2.00         N         Y           SLUTCH_BASE_0002         0         0.13         160.0         0.50         2.00         N         Y           SLUTCH_BASE_0003         20         0.13         160.0         0.20         2.98         Y         Y           SLUTCH_BASE_0004         70         0.28         100.0         0.50         2.00         N         N           SLUTCH_BASE_0005         40         0.13         160.0         0.50         2.98         N         N           SLUTCH_BASE_0005         40         0.13         160.0         0.50         2.98         N         N           SLUTCH_BASE_0006         40         0.20         15.0         0.40         2.90         Y         N	SLUTCH_BASE_0001         50         0.13         160.0         0.50         2.00         N         Y         N           CLUTCH_BASE_0002         50         0.13         160.0         0.50         2.00         N         Y         Y           CLUTCH_BASE_0003         20         0.13         160.0         0.20         2.98         Y         Y         N           CLUTCH_BASE_0004         70         0.28         100.0         0.50         2.00         N         N         N           CLUTCH_BASE_0005         40         0.13         160.0         0.50         2.98         N         N         N           CLUTCH_BASE_0005         40         0.13         160.0         0.50         2.98         N         N         N           CLUTCH_BASE_0005         40         0.13         160.0         0.50         2.98         N         N         N           CLUTCH_BASE_0006         40         0.20         15.0         0.40         2.90         Y         N         Y	SLUTCH_BASE_0001         50         0.13         160.0         0.50         2.00         N         Y         N         0.07           CLUTCH_BASE_0002         50         0.13         160.0         0.50         2.00         N         Y         Y         0.07           CLUTCH_BASE_0003         20         0.13         160.0         0.50         2.00         N         Y         Y         0.07           CLUTCH_BASE_0003         20         0.13         160.0         0.20         2.98         Y         Y         N         0.05           CLUTCH_BASE_0004         70         0.28         100.0         0.50         2.00         N         N         N         0.07           CLUTCH_BASE_0005         40         0.13         160.0         0.50         2.00         N         N         N         0.05           CLUTCH_BASE_0005         40         0.13         160.0         0.50         2.98         N         N         N         0.05           CLUTCH_BASE_0006         40         0.20         15.0         0.40         2.90         Y         N         Y         0.06

Dump it to Excel for printing

Pro/E Family Table											
11-EXCEL_TABLE_PLO	TTING										
						F979					
								F58			
	d67			d4		COPIED_GROUP_	F721	TOP_CUTOUT_S		F398	
	BOSS_HEIGHT	d64	d27	PART_HEIGHT	PART_DIAMETER	3	[CUT]	<u>LOT</u>	d44	CENTER_HOLE	DESCRIPTION
IGENERIC	0D6	0.125	180	0.5	2.62	Ϋ́	Y	Ϋ́	0.05		CHOKE DESIGNED TO REPLACE ORIGINAL
4-CLUTCH_BASE_0001	0D6	0.13	160	0.5	2	N	Ϋ́	N	0.07	Y	THERE'S NO WAY THIS CAN ALL LOOK GOOD ON A SCREEN SHOT
4-CLUTCH_BASE_0002	0.06	0.13	160	0.5	2	N	Y	Ϋ́	0.07	N	JUST TOO MUCH INFORMATION IN HERE TO DISPLAY IT ALL ON THE SCREEN
4-CLUTCH_BASE_0003	0.12			0.2	2.98	Y	Ϋ́	N	0.05	Y	ESPECIALLY ON MY TINY LITTLE 19 INCH LCD MONITOR
4-CLUTCH_BASE_0004	0.07	0.28	100	0.5	2	N	N	N N	0.07	N	MAYBE SOMEDAY I'LL GET ONE OF THOSE GREAT M70'S
4-CLUTCH_BASE_0005	0.04	0.13	160	0.5	2.98	N	N	N	0.05	Y	OR PERHAPS A24" LCDMAYBE BOTH . THAT SURE WOULD BE NICE, BUT NOT SURE ITS
4-CLUTCH_BASE_0006		0.2		0.4	2.9	Y	N	Ϋ́	0.06		IN THE BUDGET FOR FYD7. MAYBE IF I DO A REALLY GOOD JOB THIS YEAR I'LL GET
4-CLUTCH_BASE_0007	D D B	D.13	16D	0.5	2	Ň	Υ	† N	007	N	UPGRADED TO THE 21" LCD THAT SOMEONE ELSE ALREADY THREW OUT.

DTC C

### **Transition 2**

Dilbert's "Salary Theorem" states that "Engineers and scientists can never earn as much as business executives, sales people, accountants and especially liberal arts majors."

This theorem can now be supported by a mathematical equation based on the following two well known postulates:



## Postulate 1: Knowledge is Power. Postulate 2: Time is Money.

- As every engineer knows:
- **Power = Work / Time.**

**DTC**<sup>®</sup>

Transition 2 cont....

```
Since: Knowledge = Power,
then
Knowledge = Work / Time,
and Time = Money,
Then -> Knowledge = Work / Money.
```

DTC

Transition 2 cont....

# Solving for Money, we get:

## Money = Work / Knowledge.

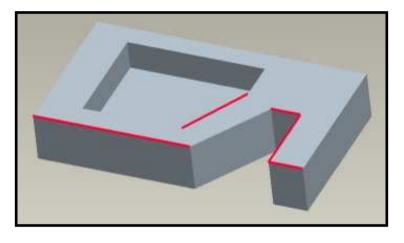
Thus, as Knowledge approaches zero, money approaches infinity, regardless of the amount of work done.

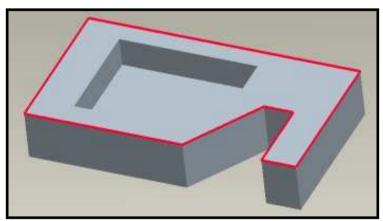
The less you know...the more money you make.

### **#9 Selecting Edges**

# • Methodology for selecting multiple edges

- One by One
  - Hold Crtl key and select individual edges
- Surface Loop
  - Select edge on surface
  - hold the shift key down while cursor is over that surface or another edge of that loop



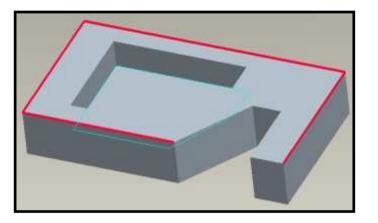


DTC

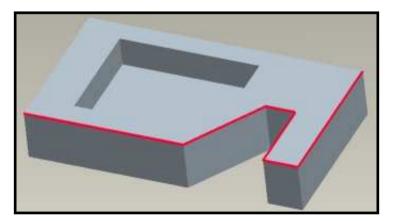
### #9 Selecting Edges (cont.)

# • Methodology for selecting multiple edges

- Surface Loop From-To (Edge Chain)
  - Select starting edge
  - Hold Shift key down
  - Click right mouse button to toggle from Surface Loop to Loop From-To
  - Click right mouse button again to select opposite half of loop
  - One more RMB click toggles back to Surface loop





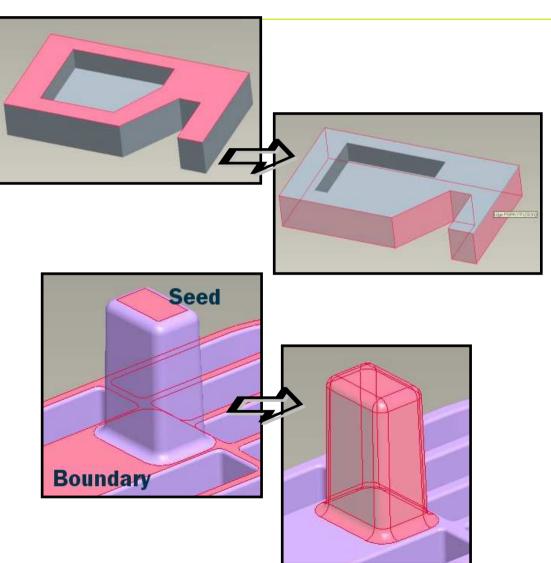


DTC

### **#10 Surface Specific Shortcuts**

# **⊙**There are methods for selecting multiple surfaces

- Loop Surface
  - Selects all surfaces that loop the edge of a surface
  - Select surface to be looped
  - Hold Shift key and pick any edge of first surface
  - Seed and Boundary Surface
    - Selects all surfaces starting with the seed surface, and ending when the boundary is contacted
    - Select surface to be the seed
    - Hold Shift key and select boundary surface

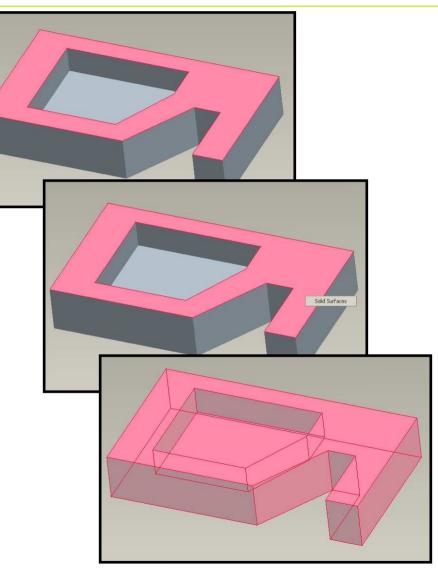


DTC<sup>®</sup>

### **#10** Surface Specific Shortcuts (cont.)

# **⊙**There are methods for selecting multiple surfaces

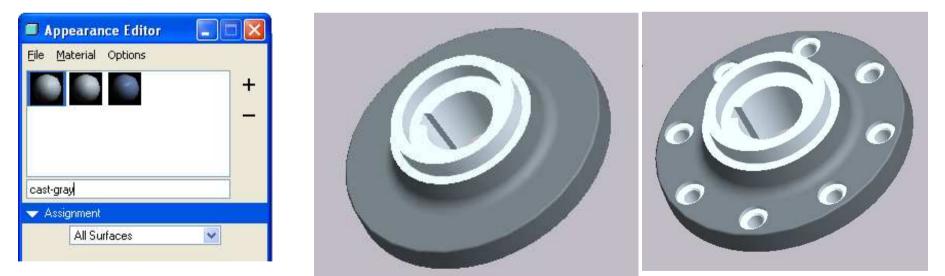
- Solid Surface
  - Select a surface from the model
  - Right mouse click over that surface
  - Select the solid surface box that pops up
  - The entire model surface is selected
- The entire surface can be used to create a copy



**PTC**<sup>®</sup>

#11 How to Automatically Add Color to Machined Features in a Casting

- Before machined features are added, color the part (Ex. White)
- Paint the outside surfaces of the casting a different color (Ex. Gray)
- As you add cuts to the model representing machined features, outer skin color will be removed exposing inner model color



•Alternative: - Use the Find Tool to find Hole surfaces, or cut surfaces and apply the color.

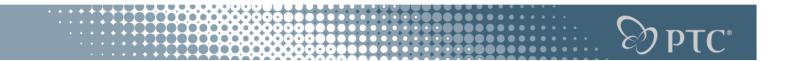
**PTC**<sup>®</sup>

Transition 3 – Engineering terminology revealed What we Hear....What it means.....

# The entire concept will have to be abandoned.

# The only guy who understood the thing quit.

DTC<sup>®</sup>



**Transition 3 – Engineering terminology revealed** 

## The test results were extremely gratifying.

### It works and boy are we surprised.

### 

### #12 Finding Help

### **⊙** Help is under your fingertips

### • The trick is knowing how to search the Help Center. Lets search for hole.

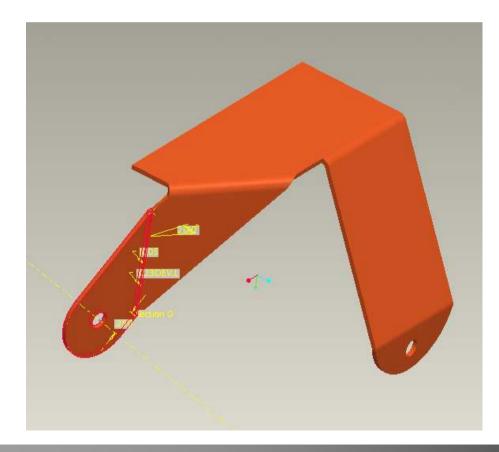
Pro/ENGINEER					
File Edit View Insert Analysis Info Applications Tools V	Window Help				
	Help Center What's This? Menu Mapper Online Resources		🗐 🗇 🗇 🚺 🕰 🋵 🔧	¥?	
C → → Ø P ▲ ↓ Select A bookmark ···	What's New? Technical Support Info About Pro/ENGINEER		Search for: hole	Search Help Selected Functional Areas	
Select Function Free Select Map PTC Com     Home Global Search Help Site Map PTC Com     Quick Links Welc     Choose Your Language The He     Pro/ENGINEER Wildfire 3.0     Resource Center Using		ER Help, tutorials,	Fundamentals Data Management Assembly Design Welding Design Data Exchange Detailed Drawings Electrical Design Manufacturing Model Analysis Mold Design and Casting 💌	Part Modeling	
a second de la companya de la	NGINEER Functional Areas		Search Results		
• Documentation recuback	<u>Fundamentals</u> Data Management Part Modeling		Search Query: hole Search Results: 81		Ē
	Assembly Design Wolding Design		About the Hole Feature User In	terface	,

**PTC**<sup>®</sup>

### **#13 Get to know BMX – Wagon bracket**

### **⊙** Analysis features solve problem for you

- What angle do I need to make angle = zero
- Lets use the excel equation from tip # 6-7



Optimization/Feasibility								
<u>File R</u> un <u>O</u> ptions								
🗅 🚔 🔛 ! 🗸								
— Study Type/Name								
🔘 Optimization			💿 Feasibility					
Name FEAS1								
Goal								
None 💉 ANGLE:	ANALY	SIS1	~					
Design Constraints								
	Op	Value						
ANGLE:ANALYSIS1	=	0.000000						
Add								
Design Variables								
Variable Min	000	Max 45.000000						
d43:16-FRONT_AXLE 5.000	000	45.000000						
	_							
Add Dimension	Add P	arameter	Delete					
Compute	Undo		Close					

### **#14 Round surf-surf**

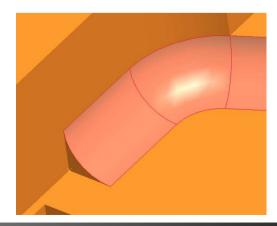
⊙ Surf – Surf Round for adding space in gap

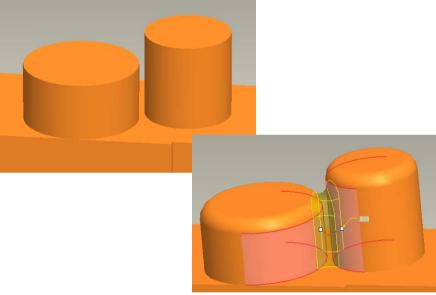
 One feature instead of many for adding geometry into gap

**⊙**Drag handle + Shift to vertex

- **⊙** Round un-force tangency
- Use SHIFT to override "Tangent Chain" with "From-To"







**PTC**<sup>®</sup>

### **#15 PTC University eLearning Subscription**

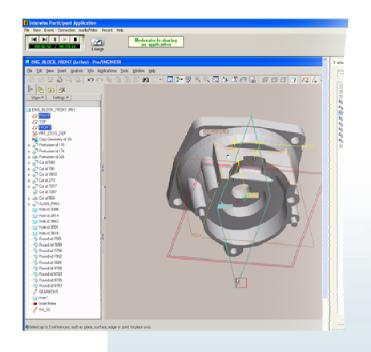
### www.ptc.com/learning

### eLearning content

- Web-based training courses
- Recorded virtual classes
- Skill assessments
- Communities of Practice
- eKnowledge Assets

### PTC University Learning Management System

- Create student curriculum paths and timelines
- Monitor individual and team development on-line
- Private domain for personalized content





Transition 4 – You might be an engineer if.... You might be an engineer if....

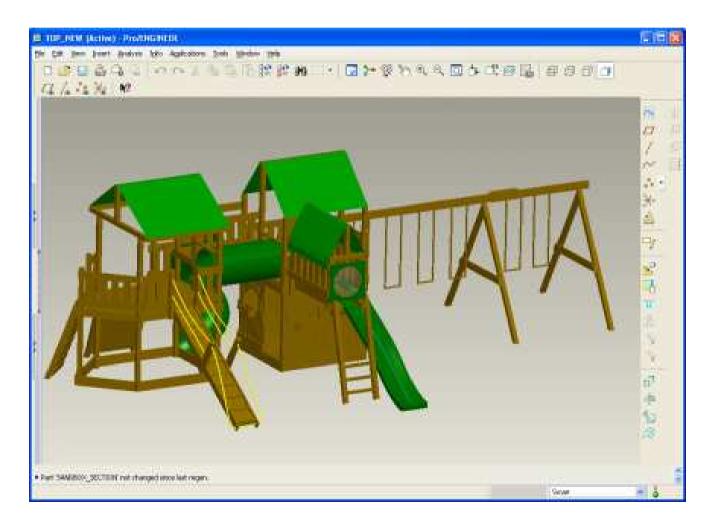
## you've ever tried to repair a \$5 radio.

# you use Pro/ENGINEER to design your son's Pine Wood Derby car.

DTC<sup>®</sup>

Transition 4 – You might be an engineer if....

### ...or your kids' swingset!



DTQ (S



### Transition 4 – You might be an engineer if....



