Rich Malloy, Tech Help Today

Advanced Microsoft Excel
Session 6:

POWER PIVOT

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Power Pivot is the best thing to happen to Excel in 20 years.

— Bill Jelen, AKA "Mr. Excel"

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Agenda

- Review: Dashboards
- Goal Seek & Solver
- Databases in Excel / Relational Tables
- Linking Tables
  - VLOOKUP, INDEX/MATCH, Get & Transform
- The Data Model in Excel
- Counting Unique Values in Data Model
- Power Pivot Intro
- Use Power Pivot to avoid VLOOKUP
- Review

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Review: Dashboards

Procedure:
- Create a Pivot Table
- Create Slicers for the Pivot Table
- Make copies of the Pivot Table
- Alter the copies
- Make Pivot Charts from the Pivot Tables
- Move the Pivot Charts and Slicers to a new sheet

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Review: BI Desktop Dashboard

- Must download Power BI Desktop
- Accepts many types of data

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Review: BI Desktop Dashboard

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Solving Problems

- Goal Seek
  - Find a solution by changing one cell
- Solver
  - Find a solution by changing several cells

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DATABASES IN EXCEL

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Simple Spreadsheets

- Small amount of data
- Only one worksheet is needed
- All data is stored on the report

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Larger Spreadsheets

- Too much data to fit on the report
- Two or more worksheets needed
- Report shows a summary of data
- Data is on a separate worksheet

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Excel's Database Tools

- Sort
- Filter
- Find
- Subtotal
- Pivot Table

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The "Flat File" Database

- Data is in a single table
- Advantages:
  - Simple
- Problems:
  - Lots of redundant duplicate data
  - Wastes storage space
  - Increases likelihood of discrepancies

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Is There a Better Way?

- Instead of one large table…

    …Divide data into several tables

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What Are the Advantages?

- Data divided logically into two or more tables
- Data is better organized
- Less duplication
- Less storage needed

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How Are the Tables Linked?

- The Tables are *Related*
- Linked by a common column
  - Called the "key"

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Relational Databases

- 2 or more tables linked together
- Design used by most large databases
  - Oracle
  - SQL Server
  - Microsoft Access

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Problem: A Table of Families

Last name	Mother	Father	Child 1	Child 2
Adams	Ann	Adam	Ava	
Beck	Barbara	Bob	Ben	Beverly

A "Flat File" Data Model

A Simple table — May also include address

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What about the Cruz family?

- Parents:
  - Carol and Carl

- Children
  - Charles
  - Carly
  - Cathy

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Have to Redesign Table

Last name	Mother	Father	Child 1	Child 2	Child 3
Adams	Ann	Adam	Ava		
Beck	Barbara	Bob	Ben	Beverly	
Cruz	Cathy	Carl	Charles	Carly	Cathy

Question: What about families with 10+ children?

Have to Add Column

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Problems with Flat File Models

Last name	Mother	Father	Child 1	Child 2	Child 3
Adams	Ann	Adam	Ava		
Beck	Barbara	Bob	Ben	Beverly	
Cruz	Cathy	Carl	Charles	Carly	Carlotta

- Inflexible design: What if more children?
- Wasted space for blank fields

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Better: A Table of Children

Child	Last Name	Age	Mother	Father	City
Ava	Adams	8	Ann	Adam	Ames
Ben	Beck	9	Barbara	Bob	Boston
Betty	Beck	7	Barbara	Bob	Boston
Charles	Cruz	11	Carol	Carl	Canton
Carly	Cruz	9	Carol	Carl	Canton
Cathy	Cruz	10	Carol	Carl	Canton

One record for each child

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But, What's Wrong with This?

Child	Last Name	Age	Mother	Father	City
Ava	Adams	8	Ann	Adam	Ames
Ben	Beck	9	Barbara	Bob	Boston
Betty	Beck	7	Barbara	Bob	Boston
Charles	Cruz	11	Carol	Carl	Canton
Carly	Cruz	9	Carol	Carl	Canton
Cathy	Cruz	10	Carol	Carl	Canton

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Redundant, Duplicate Data

Child	Last Name	Age	Mother	Father	City
Ava	Adams	8	Ann	Adam	Ames
Ben	Beck	9	Barbara	Bob	Boston
Betty	Beck	7	Barbara	Bob	Boston
Charles	Cruz	11	Carol	Carl	Canton
Carly	Cruz	9	Carol	Carl	Canton
Cathy	Cruz	10	Carol	Carl	Canton

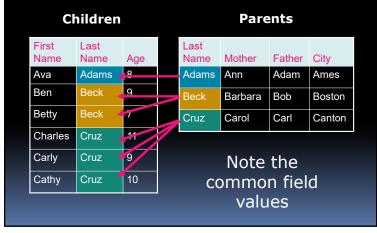Wastes space; Wastes time; Possible errors

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The Problems with Redundancy

- It wastes data storage space
- It lowers productivity
  - Have to type same data over and over
- It increases risk of errors
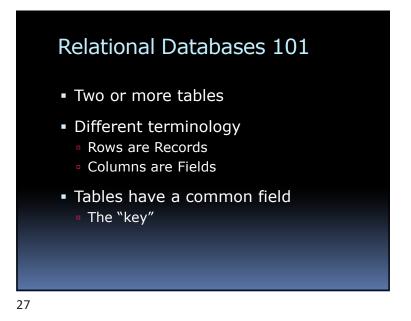 - The more your type, the more errors

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Slide 25: Solution: Separate Tables

Children

First Name	Last Name	Age
Ava	Adams	8
Ben	Beck	9
Betty	Beck	7
Charles	Cruz	11
Carly	Cruz	9
Cathy	Cruz	10

Parents

Last Name	Mother	Father	City
Adams	Ann	Adam	Ames
Beck	Barbara	Bob	Boston
Cruz	Carol	Carl	Canton

Note: Fewer cells

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Slide 26: Records Can Be Linked

Children

First Name	Last Name	Age
Ava	Adams	8
Ben	Beck	9
Betty	Beck	7
Charles	Cruz	11
Carly	Cruz	9
Cathy	Cruz	10

Parents

Last Name	Mother	Father	City
Adams	Ann	Adam	Ames
Beck	Barbara	Bob	Boston
Cruz	Carol	Carl	Canton

Note the common field values

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Slide 27: Relational Databases 101

- Two or more tables
- Different terminology
  - Rows are Records
  - Columns are Fields
- Tables have a common field
  - The "key"

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Slide 28: The Problem of Separated Data

- That which you separate …
  - … You will later have to re-combine

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Combining Data in Excel

5 Ways to Merge Separate Tables:

1. VLOOKUP
2. INDEX/MERGE
3. Get & Transform Merge
4. A new simple technique
5. A really powerful new technique

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Review: Get & Transform Merge

- Merges two tables

- Procedure:
  - Create a "Connection" for each table
  - Create a Merge of the two connections

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A New Way to Merge Tables

- The Excel Data Model

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The Excel Data Model

- Added in Excel 2013

- Enables links between tables

- Available in Pivot Tables

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The Data Model: Advantages

- Can link tables

- Handles millions of rows of data

- "Easier, faster than VLOOKUP"

- Powerful new functions
  - E.g., Distinct Counts

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The Data Model: 2 Approaches:

Two Approaches:

- Excel

- *Power Pivot*

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Create a Data Model in Excel:

Procedure:

1. Convert data into Excel Tables
   - Use the Format as Table tool

2. Use one table to create a Pivot Table
   - Click check box: **Add to Data Model**

3. Field List: All (instead of Active)

4. Choose a field from each table

5. Create a relationship: Auto-Detect

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Power Pivot

- Formerly an extra-cost option

- Now a free add-in for Excel 2016

- Runs on the Power Pivot Engine
  - Also known as the **Data Model**

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PowerPivot Advantages

- Can import data from multiple sources
- Millions of rows
- Create table relationships visually
- Can create Key Performance Indicators
- DAX calculations

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Power Pivot Disadvantages

- Cannot edit individual cell data
- Cannot use VBA to automate tasks

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Power Pivot Resources

- Mike Girvin (ExcelIsFun)
  - Power Pivot Intro
    - https://www.youtube.com/watch?v=yjASjwJCIxA
- Leila Gharani (#MsExcel)
  - Great Excel Power Query, Power Pivot & Power BI Resources
    - https://www.youtube.com/watch?v=1YoniIrPSAA

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REVIEW

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Review of Advanced Excel

1. 50 Tips and Tricks

2. Pivot Tables and VLOOKUP

3. Advanced Formulas

4. Tables and Power Query

5. Dashboards and Macros

6. Databases and Power Pivot

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Next Time …

From Power Pivot to —

— to Power Point

Advanced Power Point

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