



Advanced Microsoft Excel
Session 8:

POWER PIVOT

Rich Malloy, Tech Help Today

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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: Macros
- Databases in Excel / Relational Tables
- Linking Tables
 - VLOOKUP, INDEX/MATCH, Get & Transform
- The Data Model in Excel
- Power Pivot Intro
- Use Power Pivot to avoid VLOOKUP
- Review

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Macros: Review

- Short for: Macro Instruction
- Can be recorded and played back
- Can automate text entry or formatting
- Can be stored:
 - In a workbook, or
 - On your PC
- Can be started by command buttons

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Macros: VBA

- Are written with Visual Basic for Applications
- Can use VBA to do complicated tasks
- *More info on VBA: June 24*

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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 & Reports on a separate sheets

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Excel's Database Tools

- Sort
- Filter
- Find
- Subtotal
- Pivot Table
- *And one more...*

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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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Simple Database Example

- We are working for a small school
- Need database for children & parents



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Flat File: 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 (row) 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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Duplicate, Redundant 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 Duplicate Data

- 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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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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Records Can Be Linked

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

Note the common field values

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Relational Databases

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

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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/MATCH
3. Get & Transform Merge
4. A new simple technique
5. A really powerful new technique

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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 Excel Data Model

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. Charts & Advanced Formulas
4. Excel Tables
5. Power Query
6. Dashboards
7. Macros
8. Power Pivot



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Next Time ...

From Power Pivot to ...

... to Power Point

Advanced Power Point

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