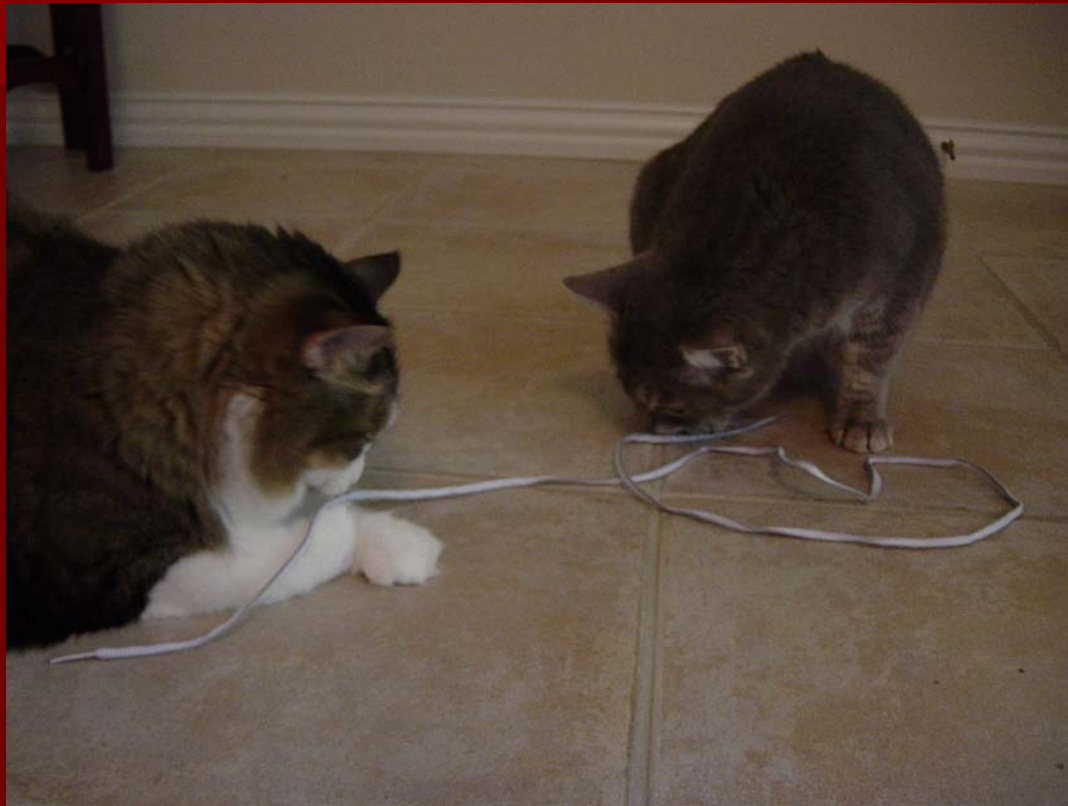


CAATs on a Shoestring



For ISACA – North Texas Chapter
Audit Software SIG – 11/12/09

Learning Objectives

- Limitations in using Microsoft EXCEL for CAATs
- Data tests and data manipulation techniques with Excel
- CAAT control issues in using Excel
- Best practices for control of Excel
- Third party tools to enhance Excel's usefulness with CAATs

Limitations of EXCEL

	Excel 2003	Excel 2007
Max. Rows	65,536	1,048,576
Max. Columns	256	16,385
Max. RAM Used	1 GB	Max. allowed by Windows
Max. Sort Fields	3	64

- Cannot read all file types – EBCDIC
- No audit-specific functions
- No robust history log/audit trail
- Limited scripting with macros

Data Tests

- Statistics with Analysis ToolPak:
 - Descriptive Statistics
 - Sampling
 - Random Number Generation
- Cross tabulation (Pivot Tables)
- Filter
- Duplicates
- Sequence gaps
- Stratification/aging
- Summarize
- Top/Bottom Values
- Benford's Law

Loading the Analysis ToolPak - v2003

Menu Selections:

- Tools
- Add-ins
- Analysis ToolPak

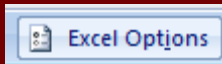
Note: Add-in will automatically re-load with file until you purposely unload.

Loading the Analysis ToolPak – v2007

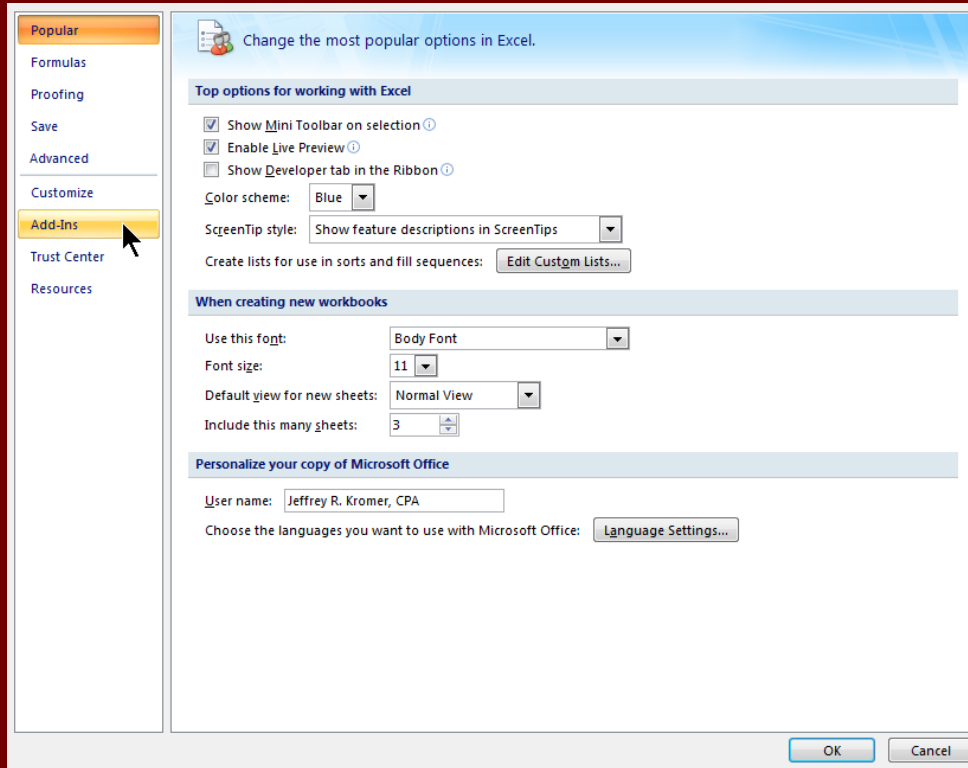
1.



2.

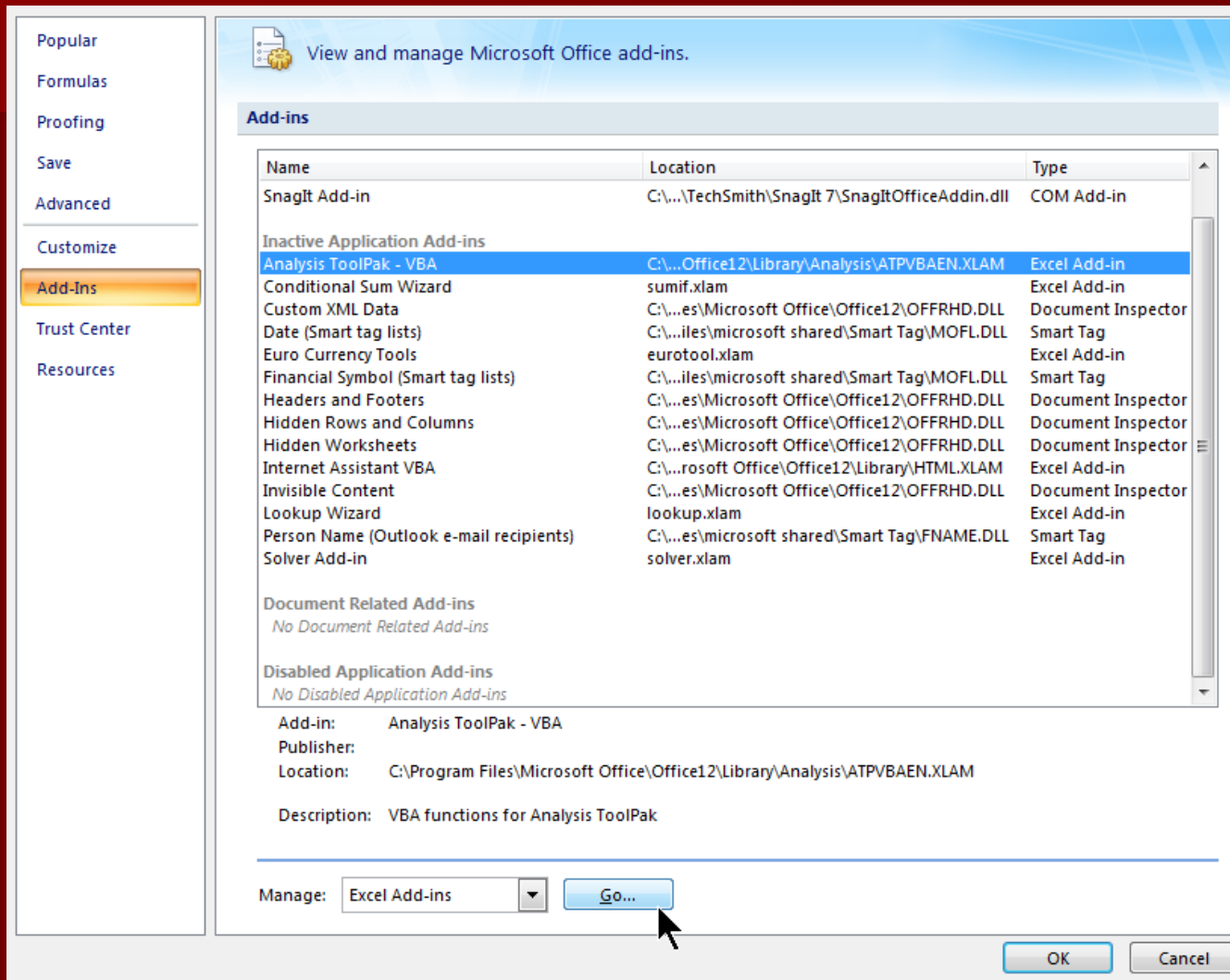


3.



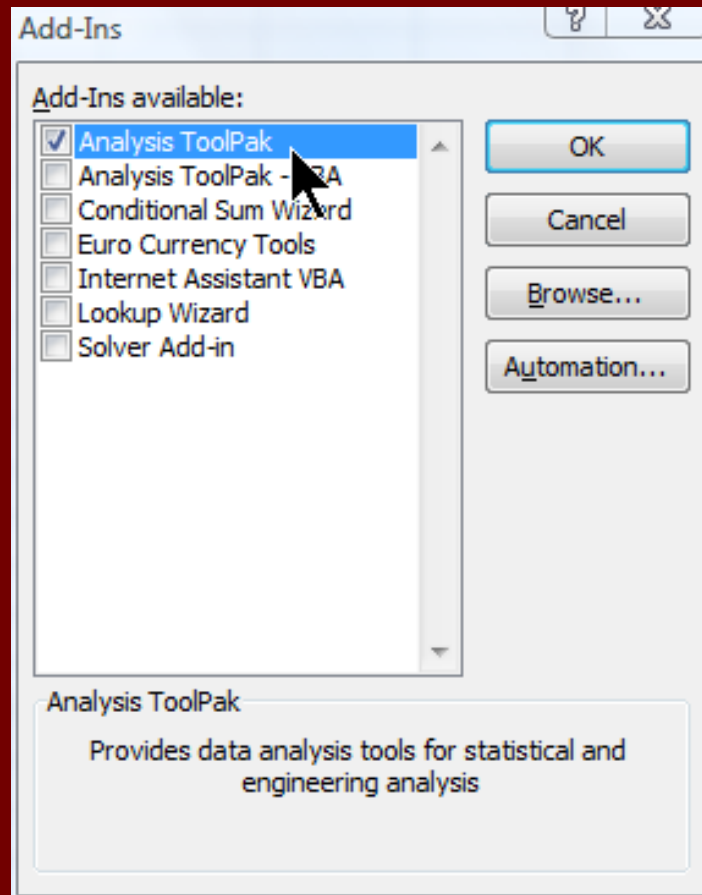
Loading the Analysis ToolPak - v2007

4. Select “Analysis ToolPak – VBA”, then Click “Go” button.



Loading the Analysis ToolPak - v2007

5. Select "Analysis ToolPak, then click OK button.



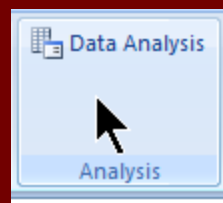
Using The Analysis ToolPak

Menus v2003:

1. Tools
2. Data Analysis

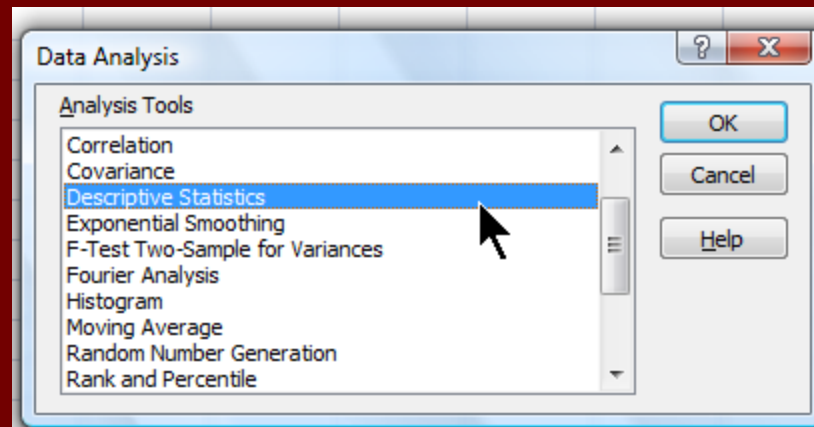
Menus v2007:

1. Data ribbon
2. Data Analysis



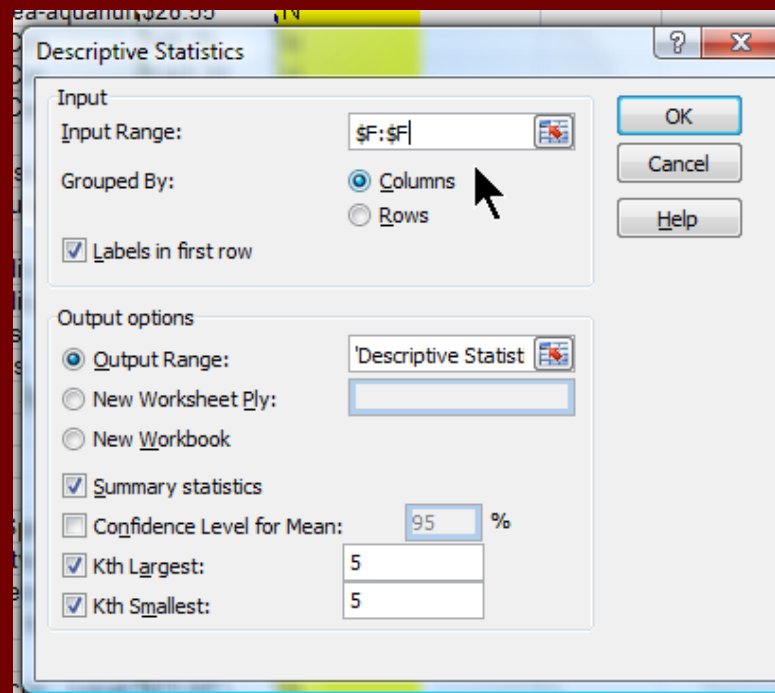
Descriptive Statistics - v2003 or v2007

1. Use Analysis ToolPak
2. Select "Descriptive Statistics"
3. OK



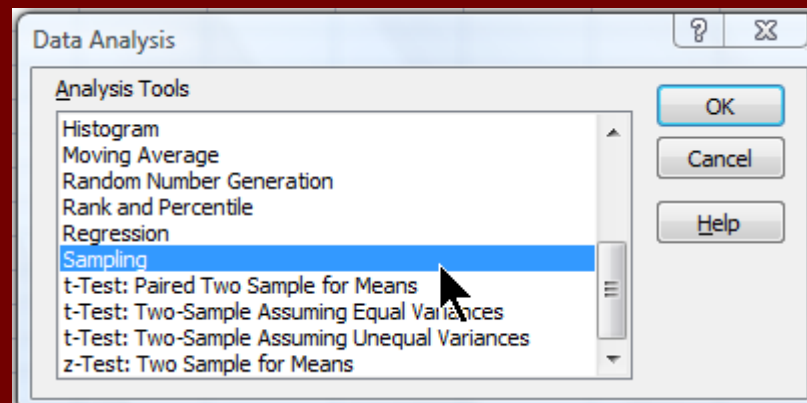
Descriptive Statistics (Cont'd)

4. Select Input Range (must be numeric or date)
5. Select Output Range
6. Select Summary Statistics
7. Specify Kth Largest, Kth Smallest (ordinal position)
8. OK



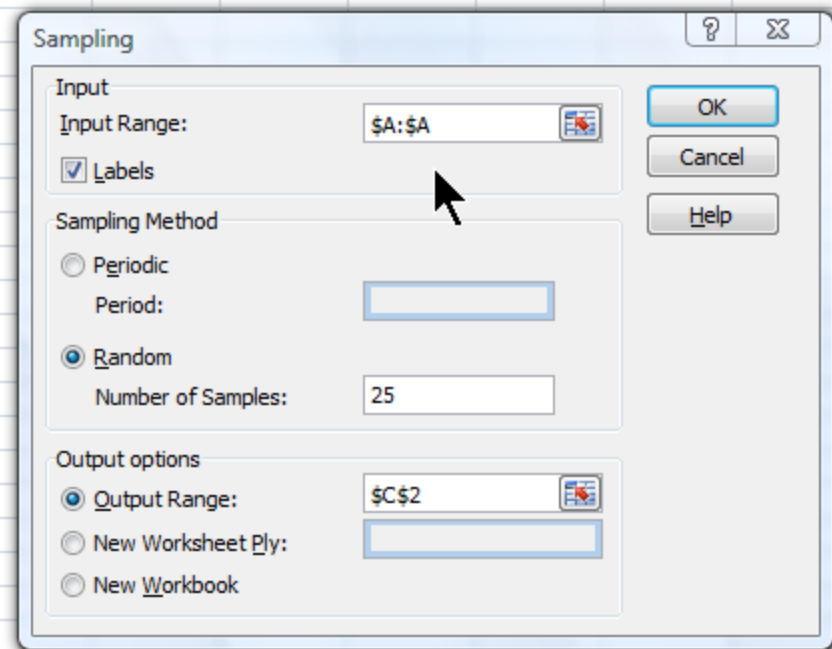
Sampling – v2003 or v2007

1. Use Analysis ToolPak
2. Select "Sampling"
3. OK



Sampling (Cont'd)

4. Select Input Range (numeric), Output Range
5. Select "Random" Sampling Method
6. Input "Number of Samples"
7. OK



The screenshot shows the 'Sampling' dialog box with the following settings:

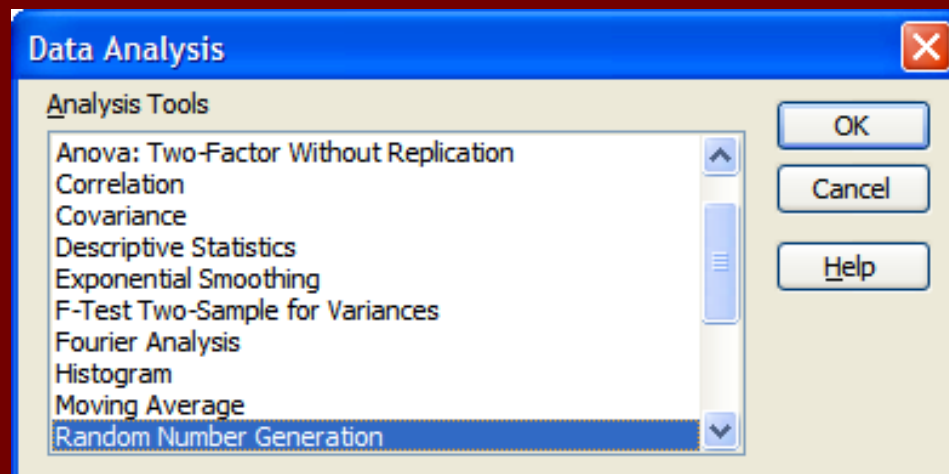
- Input:**
 - Input Range: \$A:\$A
 - Labels
- Sampling Method:**
 - Periodic
 - Period: [Empty text box]
 - Random
 - Number of Samples: 25
- Output options:**
 - Output Range: \$C\$2
 - New Worksheet Ply: [Empty text box]
 - New Workbook

Buttons: OK, Cancel, Help

Note:
Limited to 1 column, so works best if use Record Number or other ID column to identify records sampled.

Random Number Generation – v2003 or v2007

1. Use Analysis ToolPak
2. Select “Random Number Generation”



Random Number Generation (cont'd)

4. Select Number of Random Numbers
5. Select "Uniform" Distribution
6. Input Parameters – 1st and last record of population
7. Select Output Range
8. OK
9. Sort results ascending.

Random Number Generation

Number of Variables:

Number of Random Numbers:

Distribution:

Parameters

Between and

Random Seed:

Output options

Output Range:

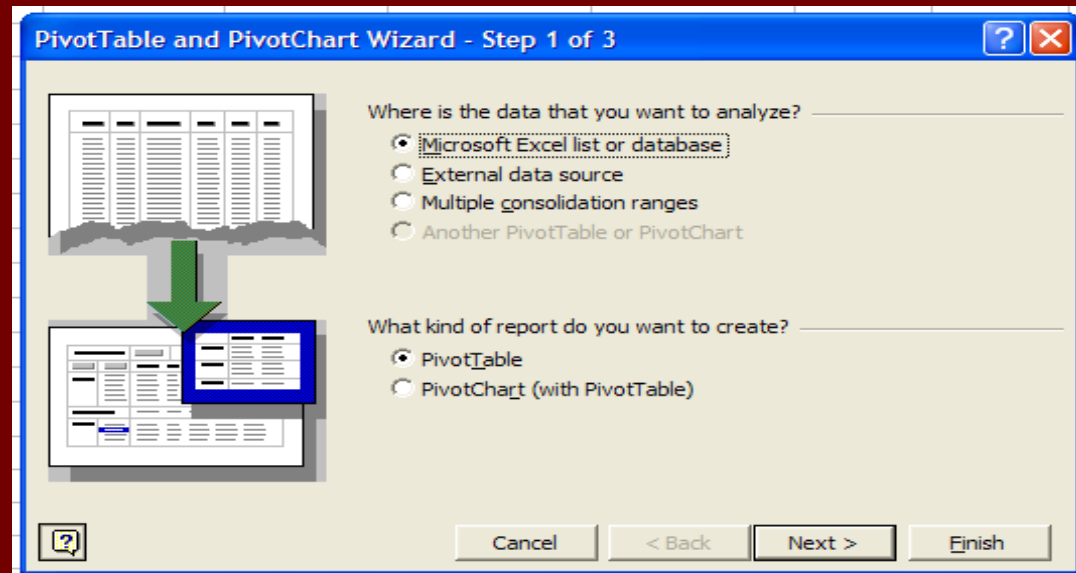
New Worksheet Ply:

New Workbook

OK Cancel Help

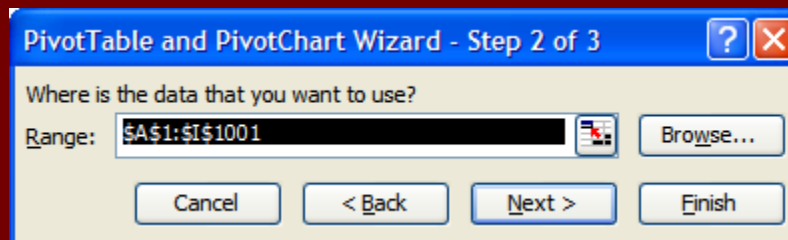
Cross Tabulation (Pivot Table) – v2003

- DATA Menu
- PIVOT TABLE
- Wizard Step 1 - Click Next

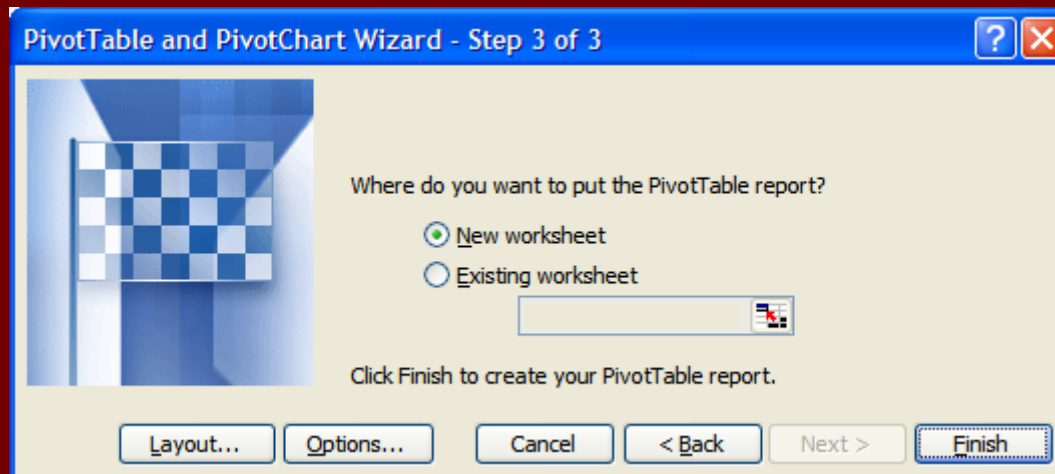


Pivot Table – v2003 (cont'd)

4. Wizard Step 2 - Select data range

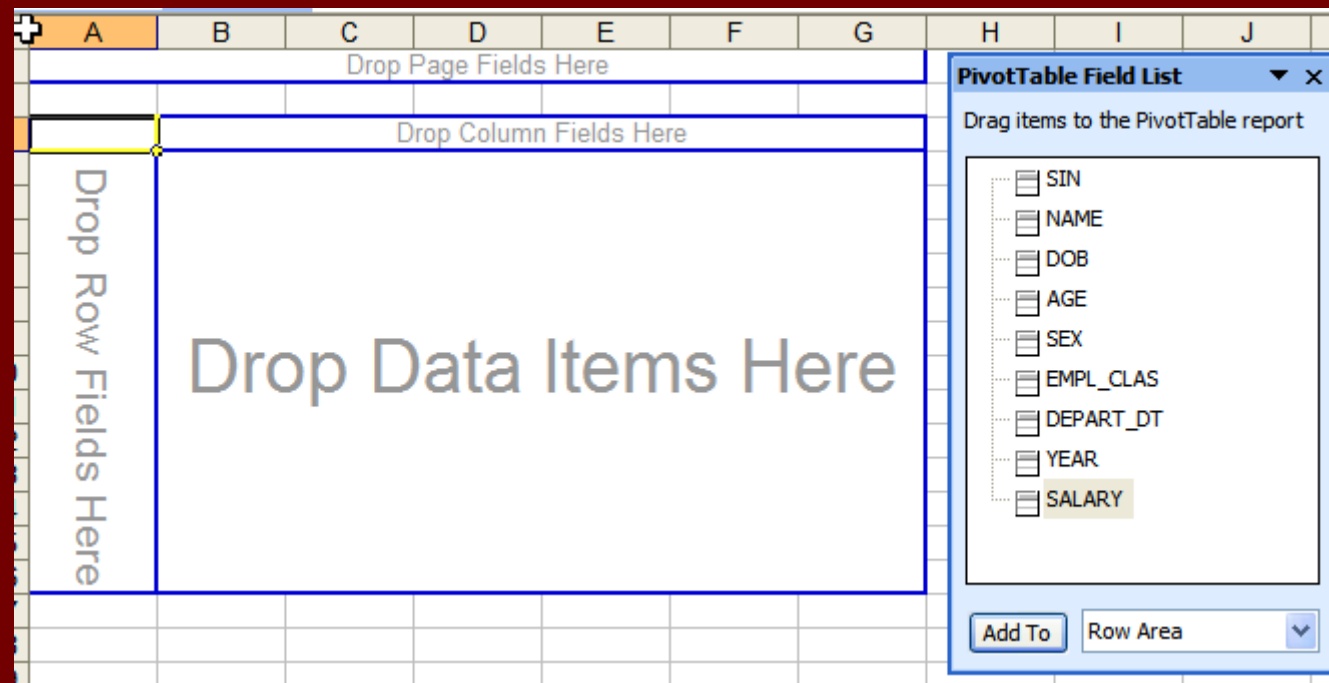


5. Wizard Step 3 - Select Output Range



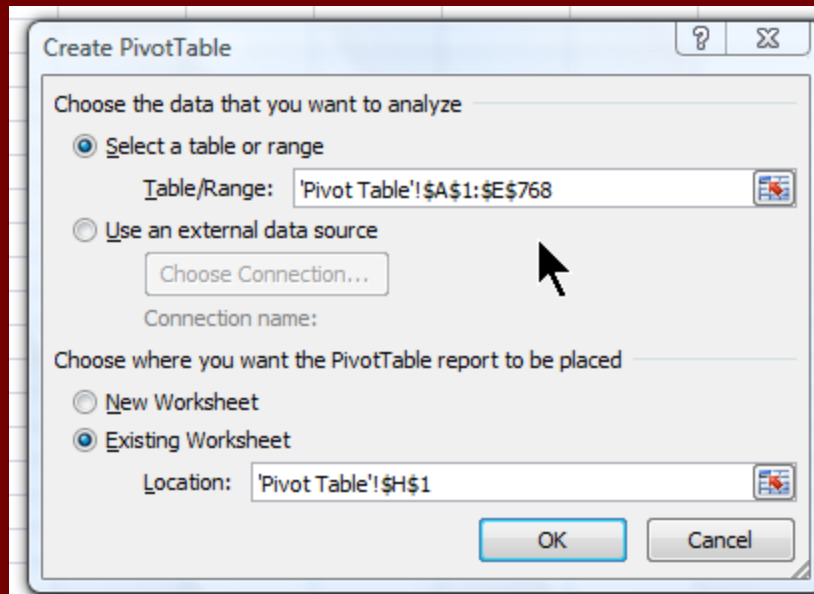
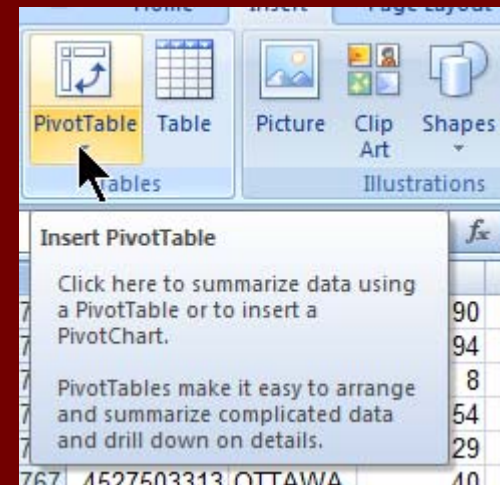
Pivot Table – v2003 (cont'd)

6. Drag and drop fields to each area: Columns, Rows, Data Items.



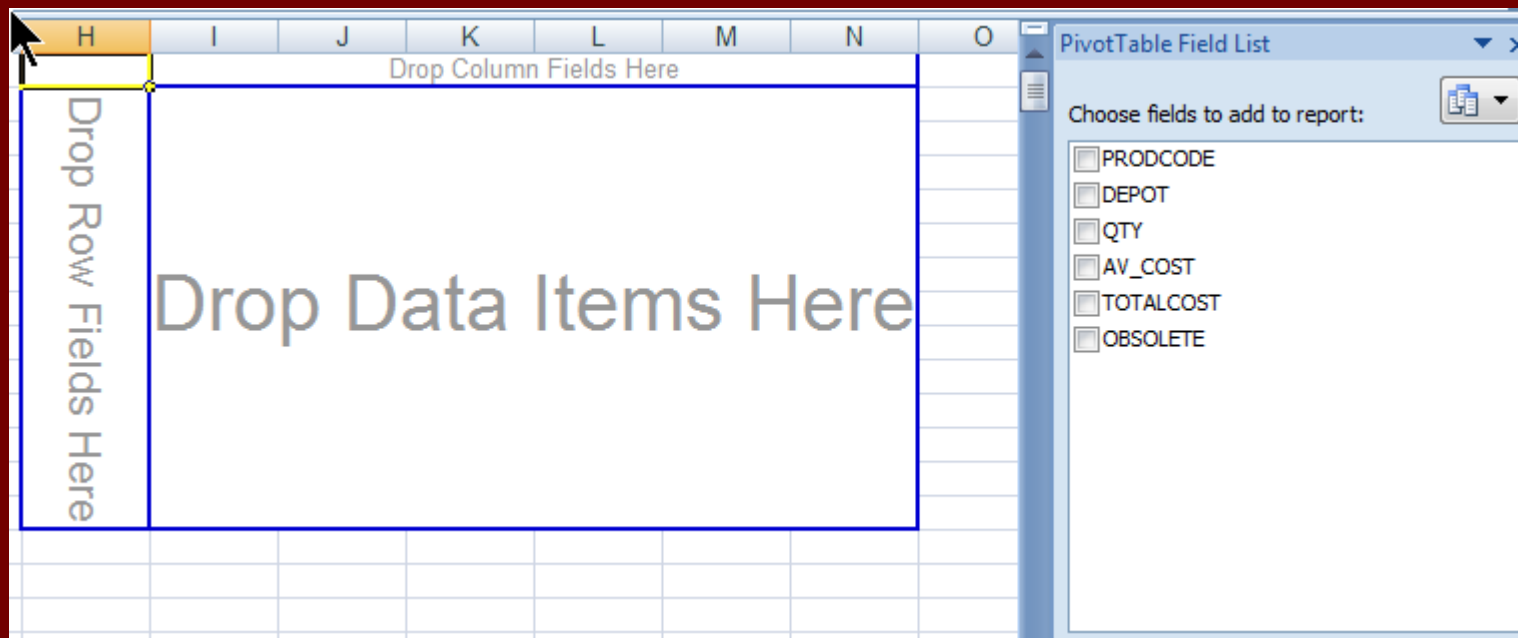
Pivot Table – v2007

1. Insert ribbon > Pivot Table
2. Select Input Range
3. Select output range, OK



Pivot Table – v2007 (cont'd)

4. Drag & drop fields to each area: Columns, Rows, Data Items.



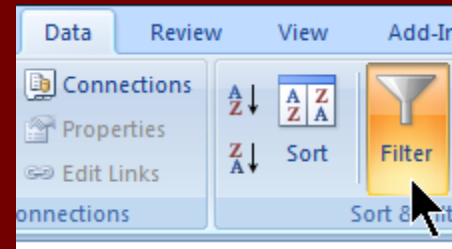
Filter – v2003

1. Select a column
2. DATA > FILTER > AUTOFILTER
3. Select a value from drop-down list

	A	B	C	D	E	F
1	CARDNUM	CODES	DATE	CUSTNO	DESCRIPTION	AMOUNT
32	8590123361284174	3737	5/12/2003	284354	Northwest	\$281.85
60	8590127855367963	7941	5/15/2003	778088	Office, Photographic, Photocopy, and Microfilm Equipment	\$288.49
88					Plumbing and Heating Equipment	
89					Public Golf Courses	
90					Radisson	
91					Ramada Inn	
92					Restaurants	
93					Riviera Hotel And Casino	
94					Schools and Educational Services (Not Elsewhere Classified)	
95					Service Station	
96					Southwest	
97					Stationery Stores, Office and School Supply Stores	
98					Stationery, Office Supplies, Printing	
99					Taxis/Limousines	
100					Testing Laboratories (non-medical)	
101					Toll and Bridge Fees	

Filter – v2007

1. Select a column
2. DATA ribbon > FILTER
3. Select values from Drop-down



	A	B	C	D	E	F
1	CARDNUM	CODES	DATE	CUSTNO	DESCRIPTION	AMOUNT
2	8590 1252 7244 7003	4131	3/31/2003	051593	Tour Buses	\$390.33
3	8590128346463420	4214	5/1/2003	051593	Air Canada	\$387.68
4	8590124910032035	5811	5/3/2003	051593	Plumbing and H	\$89.50
5	8590126686866268	4121	5/5/2003	051593	Stationery, Offic	\$189.67
6	8590128043675284	7277	5/6/2003	051593	Howard Johnson	\$176.29
7	8590125049097710	8734	5/8/2003	051593	Membership Clu	\$97.58
8	8590124535028843	4121	5/10/2003	051593	Business and S	\$262.26
9	8590129571378016	5812	5/14/2003	051593	Books, Periodic	\$17.68
10	8590123855538829	3063	5/16/2003	051593	Hilton	\$164.36
11	8590126683120264	3520	5/22/2003	051593	Motel 6	\$333.62
12	8590128977644129	3005	5/26/2003	051593	Hilton	\$272.10
13	8590127015016937	5964	5/28/2003	051593	Delivery Service	\$71.57
14	8590128263176714	4784	5/1/2003	202028	Hyatt	\$295.75
15	8590128006917664	5992	5/1/2003	202028	Office, Photogra	\$169.57
16	8590121044024386	3640	5/2/2003	202028	Department Stor	\$190.03
17	8590120923083354	3638	5/3/2003	202028	Membership Clu	\$356.46
18	8590121121460384	4121	5/6/2003	202028	Metal Service C	\$62.08
19	8590121873994032	3032	5/7/2003	202028	Aquariums, Sea	\$28.55
20	8590124183859322	3060	5/21/2003	202028	Fast food restau	\$9.67
21	8590121410137479	5813	5/25/2003	202028	Southwest	\$114.63
22	8590124238361165	5812	5/25/2003	202028	Public Golf Cour	\$307.17

04/02/09

Duplicates

- Duplicate Y/N calculated field:
 1. Sort columns compared in Ascending order
 2. =IF(AND(A3=A2,B3=B2),"Y","N")

	A	B	C	D	E	F	G
1	CARDNUM	CODES	DATE	CUSTNO	DESCRIPTION	AMOUNT	
2	8590 1252 7244 7003	4131	3/31/2003	051593	Tour Buses	\$390.33	N
3	8590128346463420	4214	5/1/2003	051593	Air Canada	\$387.68	N
4	8590128263176714	4784	5/1/2003	202028	Hyatt	\$295.75	N
5	8590128006917664	5992	5/1/2003	202028	Office, Photographic, Pho	\$169.57	Y
6	8590 1284 0066 5510	4131	5/1/2003	062252	Direct marketing, hotels	\$221.70	N

Sequence Gaps

- Gap calculated field:
 1. Sort sequence column ascending
 2. =IF(A3-A2<>1,(A3-A2)-1,0)

	A	B	C	D	E	F	G
1	CARDNUM	CODES	DATE	CUSTNO	DESCRIPTION	AMOUNT	
2	8590 1252 7244 7003	4131	3/31/2003	051593	Tour Buses	\$390.33	
3	8590128346463420	4214	5/1/2003	051593	Air Canada	\$387.68	-1
4	8590124910032035	5811	5/3/2003	051593	Plumbing and Heating Ec	\$89.50	-1
5	8590126688888888	4131	5/5/2003	051593	Plumbing and Heating Ec	\$188.67	-1

Stratifications

- Step 1 - Calculate strata:

=IF(A2>1000,"3",IF(A2>100,"2",IF(A2>0,"1","0")))

- Step 2 – Count and summarize by strata:

- Count column: =COUNTIF(B2:Bn,1)

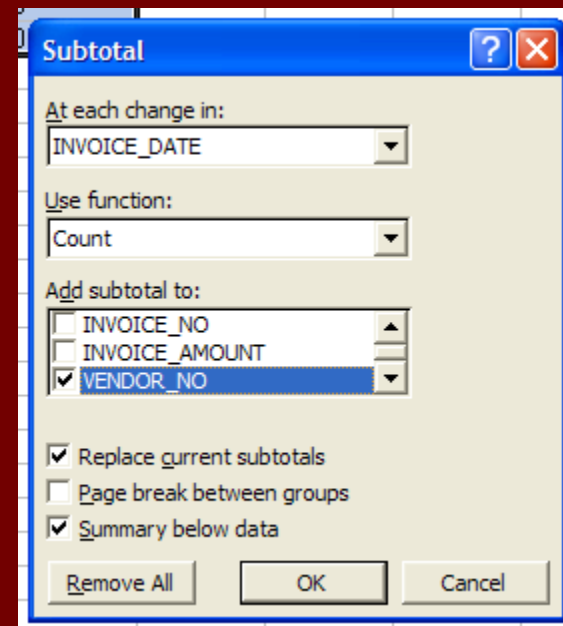
- Sum column: =SUMIF(B2:Bn,1,sum range)

- Etc.

Summarize (Subtotal) - v2003

1. Select a range
2. Sort data by "At each change in" column first!
3. DATA Menu > Subtotals
4. Select "At each change in"
5. Select function
6. Select "Add subtotal to" field
7. OK

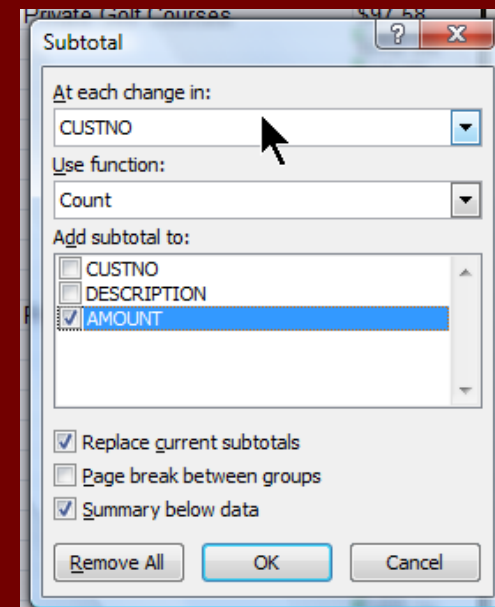
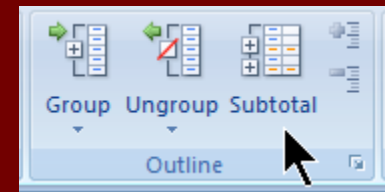
Note: Can't do both counts and subtotals.



Summarize (Subtotal) - v2007

1. Select a range
2. Sort data by "At each change in" column first!
3. DATA ribbon (Outline group) > Subtotal
4. Select "At each change in"
5. Select function
6. Select "Add subtotal to" field
7. OK

Note: Can't do both counts and subtotals.



Top & Bottom Values

- LARGE function returns kth largest value
 - =LARGE(range, 1)
 - =BIG(range, 2)
 - Etc.
- SMALL function returns kth smallest value
 - =SMALL(range, 1)
 - =SMALL(range, 2)
 - Etc.
- Use FIND on value column to identify records

Benford's Law

- STEP 1: Calculate 1st digits (column B)
 - =LEFT(A2,1)
 - Repeat for 2 through 9
- STEP 2: Count occurrence of 1st digits and % of total (column C)
 - =A2/An [total]
- STEP 3: Input Benford's 1st digits table (column D)
- STEP 4: Calculate variance (column E)
 - =C2-D2
- STEP 5: Paste results to "Sample_Basic_Digit_Tests.xls" (courtesy of Mark Nigrini)

Data Manipulation

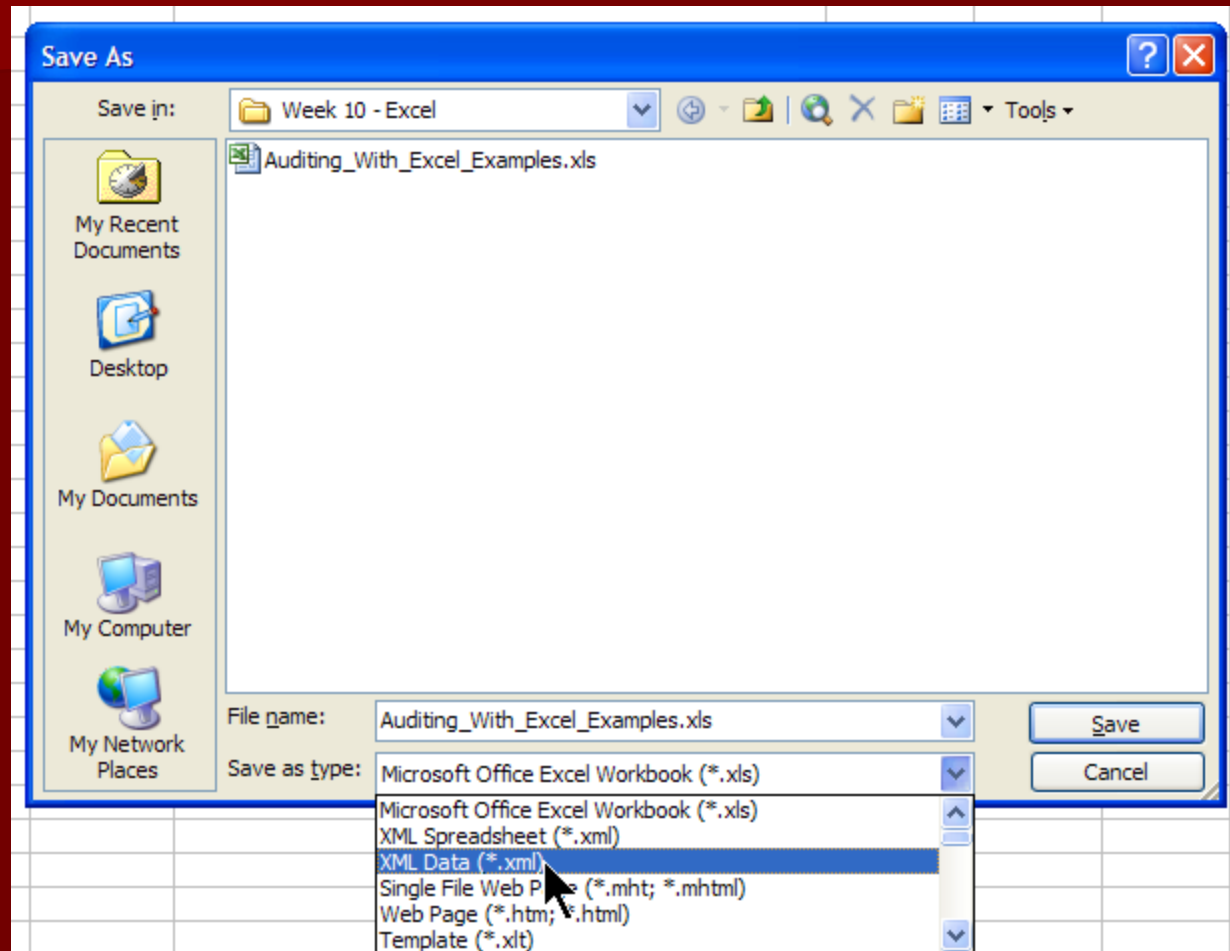
- Append/Merge
- Export
- Sort
- Calculated fields

Append/Merge

1. Select range
2. EDIT > COPY
(Cntl+C)
3. EDIT > PASTE
(Cntl+V)

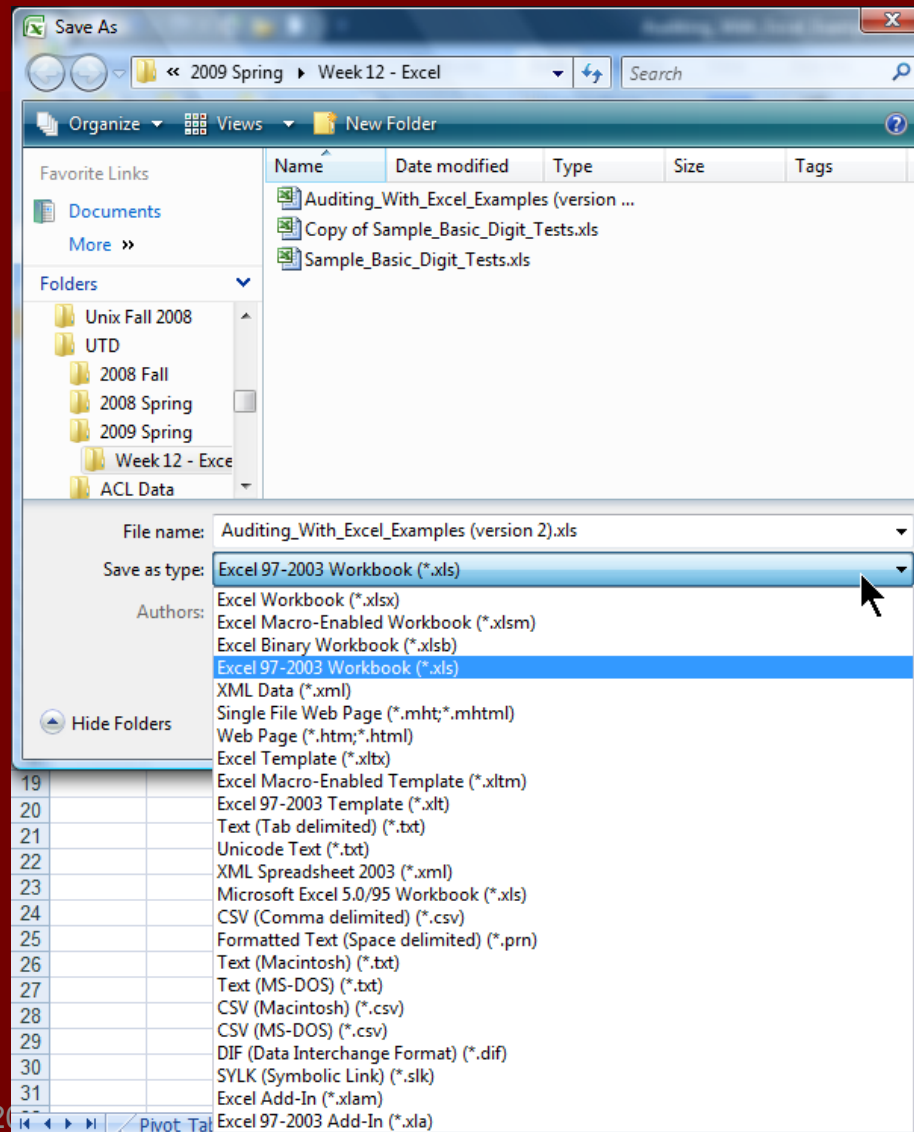
Export – v2003

1. FILE
2. SAVE AS



Export – v2007

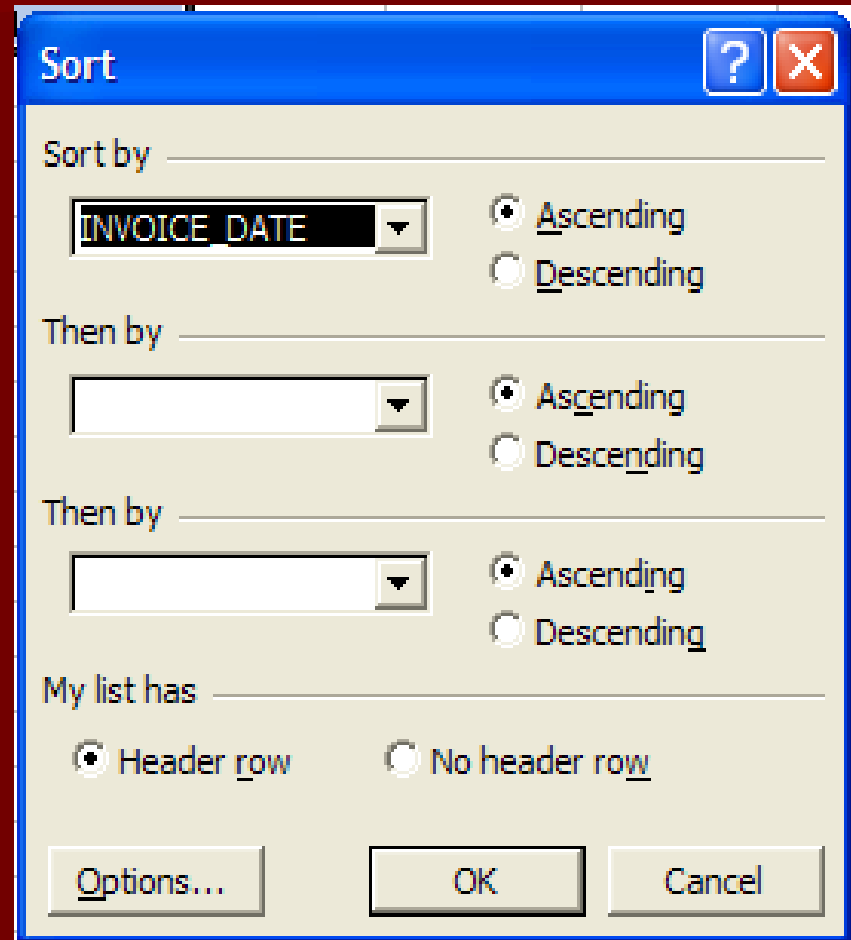
1. Office Button 
2. SAVE AS



Sort – v2003

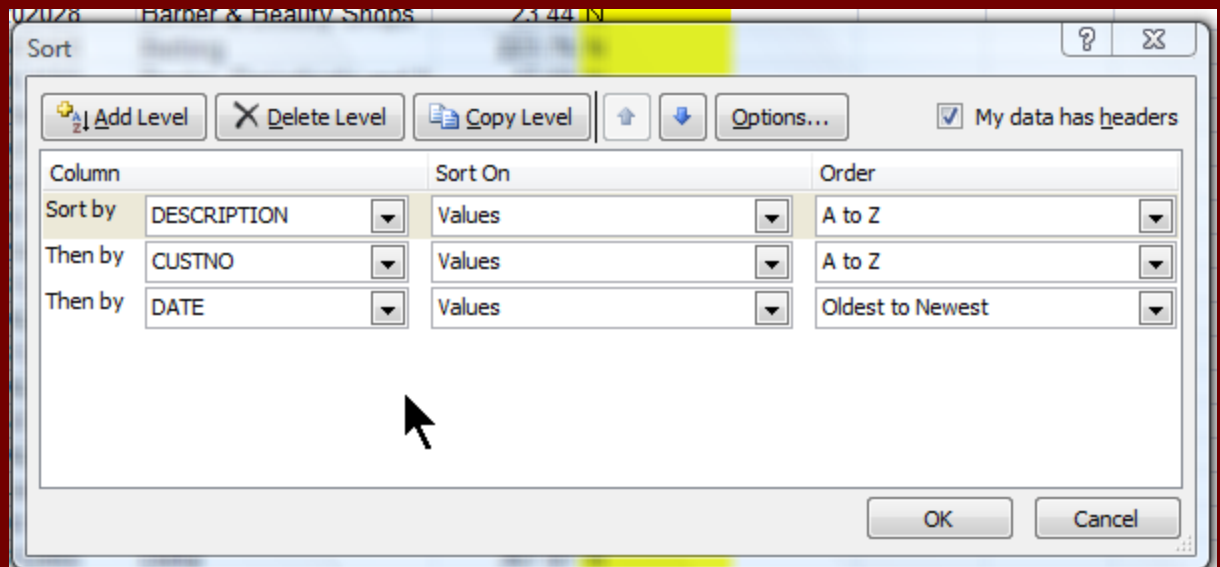
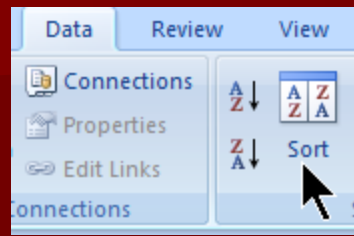
1. DATA
2. SORT

- Limited to 3 columns
- HINT: Use Concatenate() function for more than 3.



Sort – v2007

1. Select range
2. DATA ribbon > Sort
3. Click “My data has headers” per range selected
4. Select “Sort by”, “Sort on”, “Order”
5. Add levels if needed (up to 64)



Join/Relate

- HLOOKUP()

- HLOOKUP(lookup_value,table_array,row_index_num,range_lookup)

- VLOOKUP()

- VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Calculated Fields – Use Functions

- SUM()
- WEEKDAY()
- ROUND()
- LEFT()
- VALUE()
- CONCATENATE()
- TRIM()
- UPPER()
- LOWER()
- RIGHT()
- MID()

EXCEL Control Issues

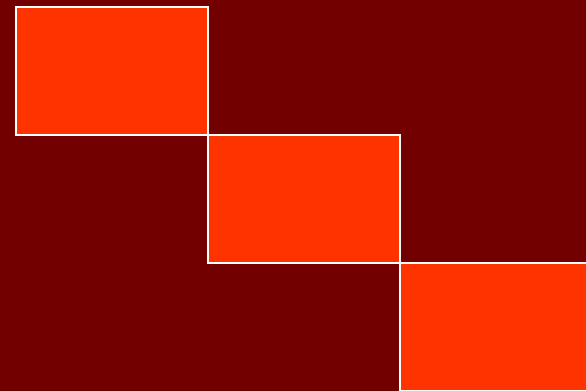
- Requires write access to data
 - Solution: Protect/Unprotect cells, then Protect worksheet
 - v2003: TOOLS > PROTECTION > PROTECT WORKBOOK
 - v2007: Review Ribbon > Protect and Share Workbook
- No multi-user security
- No built-in version control
 - Solution: Track metadata
 - v2003: FILE > PROPERTIES > STATISTICS tab
 - v2007: Office Button > Prepare > Properties > Document Properties drop-down > Advanced Properties > Statistics tab

EXCEL Control Issues (cont'd)

- No audit trail in v2003, Track Changes in v2007
 - v2007: Review Ribbon > Track Changes
- Computational errors:
 - Formulas – overlooked or not audited
 - Numbers or dates mistaken for or entered as TEXT data types
 - Formulas mistaken for values
 - Solution: Note warning flags in upper left corner of cell

Control Best Practices

- Add cross-footing formulas (sum of rows and sum of columns should be equal)
- Protect worksheet
- Stagger ranges
- SUM(A1:A30)
- SUM(A31:D31)



Control Best Practices (cont'd)

- Inventory critical spreadsheets
- Use formal SDLC:
 - Documentation
 - Verify formulas & links
 - Testing
 - Version control
 - Change control

Third Party Tools

AUDIT TRAILS

- Compassoft
 - ExChecker - auditing
 - DaCS – audit trail
- Prodiance
 - Spreadsheet Compliance Manager
 - ECM, BPM

UTILITIES

- Password Remover

VERSION CONTROL

- CS-ExcelDiff
- ComplyXL
- DiffEngineX
- EasyVersionControl

ANALYSIS TOOLS

- ActiveData for Excel
- EZ-Pivot for Excel

For More Information

- European Spreadsheet Risks Interest Group
 - <http://www.EuSpRIG.org>
- PWC – “The Use of Spreadsheets: Considerations for Section 404 of the Sarbanes-Oxley Act” – July 2004