Testing for Round Numbers

A Simplified Procedure

XL Audit Commander
data analysis made easier ...

Testing for Round Numbers

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Round numbers in financial transactions may be an indication of estimates or other inexact amounts. Thus, under some circumstances, their occurrence can be a "red flag" that further review may be warranted.

AU Section 316, "Consideration of Fraud in a Financial Statement Audit" considers testing for round numbers in section .61:

> "The characteristics of fraudulent entries or adjustments. Inappropriate journal entries and other adjustments often have certain unique identifying characteristics. Such characteristics may include entries (a) made to unrelated, unusual, or seldom-used accounts, (b) made by individuals who typically do not make journal entries, (c) recorded at the end of the period or as post-closing entries that have little or no explanation or description, (d) made either before or during the preparation of the financial statements that do not have account numbers, or (e) containing **round numbers** or a consistent ending number." (emphasis added)

The procedures described here are an efficient and effective way to quantify the usage of round numbers and classify the numbers between those which are not round numbers and those which are. Of those which are round numbers, their type may be further classified. The procedure requires the use of the XL Audit Commander, a free tool available for download from http://ezrstats.com/ . The tool is installed as an Excel add-in, and as such, requires Excel 2000 or later. The tool works only on Windows operating systems.

Below is an example chart of the results of a round number test, which quantifies those numbers which are not round (5,869), and of those which are round numbers, classifies them by the number of trailing zeros

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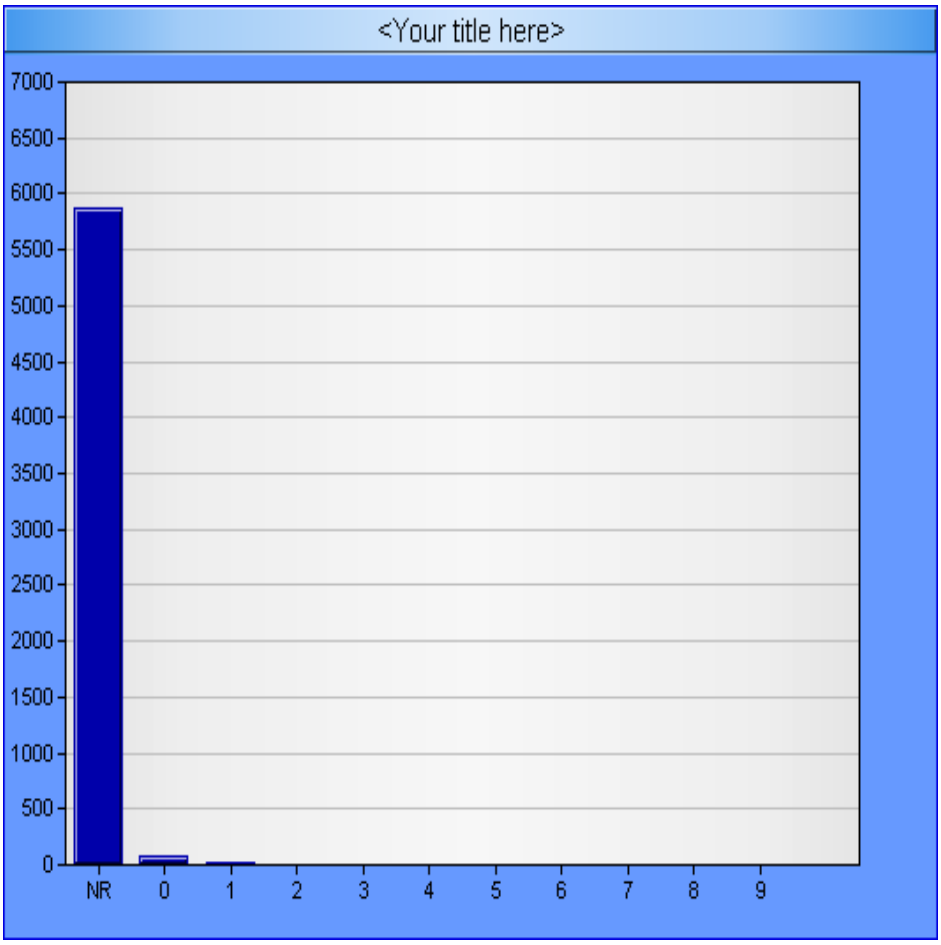

This same information is also included as text in the Excel Sheet as follows:

Round Number report:		
Digits	**Count**	**Pct**
Not Round	5,869	98.32%
0	84	1.41%
1	12	0.20%
2	3	0.05%
3	1	0.02%
4	0	0.00%
5	0	0.00%
6	0	0.00%
7	0	0.00%
8	0	0.00%
9	0	0.00%
10	0	0.00%
Totals	5,969	100.00%

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Testing for Round Numbers

What are round numbers

Round numbers are dollar amounts or unit counts which are an even multiple of 10. Examples include $500, $7,000 etc.

Typical audit areas

Generally, calculated values will not end in an even multiple of 10, and may be indicative of estimates or approximations. There are numerous areas where round numbers would not be expected, including:

- Inventory counts
- Amounts reported on tax returns
- Regulatory filings (unless explicitly stated that amounts are rounded)
- Accounts receivable balances
- Journal entries
- Any measures presumed to be exact

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Classifying and Quantifying occurrences

Identifying round numbers when the number of records to examine is fairly small is a straight forward process and can easily be done visually. However, when the number of items is in the thousands or tens of thousands or more, the process can become tedious. This article describes a fairly simple procedure to analyze and quantify the extent to which round numbers exist (or do not). With such a procedure it becomes easier to obtain a quick overview of a population or perform analytical reviews which otherwise might not be feasible.

For purposes of reporting, a number is classified as a round number if it contains no digits to the right of the decimal point. The degree or extent of the round number is the count of consecutive zeros to the left of the decimal point. This is illustrated in the table below:

Number	Degree of Roundness
6,530.00	1
5,000.00	3
475.00	0
423.12	N/A
1,000,000.00	6

Test data used

The data used in this article is available in the Excel workbook located at http://ezrstats.com/online/inno/QS.xls. The sheet named "JE" contains hypothetical journal entries to be tested.

User Interface

The tool can be used in a combination of four modes:

1. Menu – a graphical system to gather the required information
2. Command Bar – commands are typed as text
3. System registry – commands are stored in the system registry and then loaded for selection, modification and processing
4. $Cmd worksheet – the main processing parameters are stored on a worksheet

The menu system allows the necessary data to be gathered in a graphical manner. Once the data has been gathered, the "Process" button is clicked and the commands are then written to the toolbar for processing. An example of the main menu is shown below (Note the added menu option "XLAC" which appears at the top of the menu bar).

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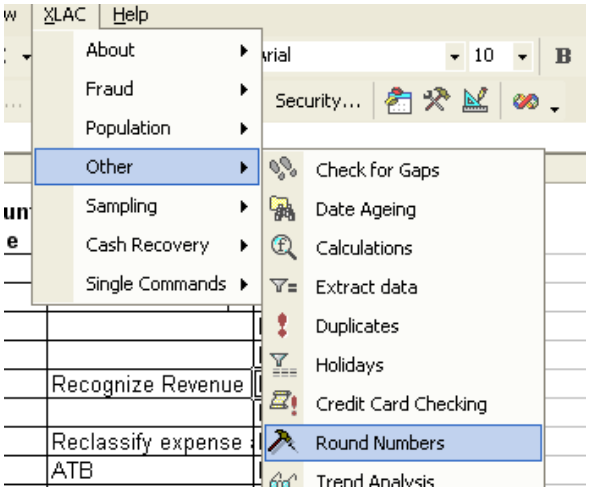
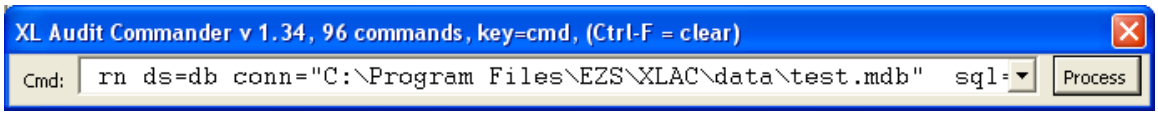


To perform the testing, the needed information can be entered directly using the menu or else typed into the toolbar, which is show below.



Note that if the menu system is used, then the results will be to translate the menu information into an audit command which will then be copied into the toolbar where it can then be processed.

Also note that round number testing can be performed on data in Access databases (see monograph at http://ezrstats.com/online/AuditGuide/Auditing_Data_in_MS_Access_Databases.pdf.

The same testing can also be done on data in tab separated value format or from worksheets (see links to monographs at the end of this article).

Round number testing can be performed on four types of data sources:

1. Data contained on a sheet in an Excel workbook
2. Data contained within a highlighted range of an excel sheet
3. Data contained in text file which is in tab separated value format
4. Data contained in a database.

The first page of the test data being used for illustration in this article is shown below. This data represents journal entries, and contains eight columns of data described as follows:

1. Date – the date of the journal entry
2. Number – the journal entry number

Procedural steps

3. Amount – the amount of the journal entry
4. AcctNo – the posting general ledger account
5. Account Type – an indicator as to the type of general ledger account, i.e. asset, expense, liability, etc.
6. Description – a description of the purpose of the journal entry
7. Source – the person or department initiating or approving the entry
8. Subtotal – a running subtotal used to verify that the net posting amount is zero.

	A	B	C	D	E	F	G	H
1	Date	Number	Amount	AcctNo	Account Type	Desc	Source	SubTot
2	5/31/2007	910	($151.00)	320	L	Accrue Comm Expe	MB	($151.00)
3	5/31/2007	910	($49.00)	347	L	Accrue Comm Expe	MB	($200.00)
4	5/31/2007	910	$200.00	349	L		MB	$0.00
5	5/31/2007	911	$300.00	355	L		MB	$300.00
6	5/31/2007	911	($300.00)	517	R	Recognize Revenue	MB	$0.00
7	5/31/2007	912	$300.00	179	A		MB	$300.00
8	5/31/2007	912	($300.00)	464	X	Reclassify expense	MB	$0.00
9	5/31/2007	913	$300.00	314	L	ATB	MB	$300.00
10	5/31/2007	913	($300.00)	517	R	ATB	MB	$0.00
11	5/31/2007	914	($349.00)	218	X		MB	($349.00)
12	5/31/2007	914	$115.00	248	X	Reclassify expenses	MB	($234.00)
13	5/31/2007	914	$234.00	281	X		MB	$0.00
14	5/31/2007	915	($647.00)	522	R		MB	($647.00)
15	5/31/2007	915	$212.00	534	R	Reclassify revenues	MB	($435.00)
16	5/31/2007	915	$435.00	576	R		MB	$0.00
17	5/31/2007	916	($2,500.00)	218	X	Plug	MB	($2,500.00)
18	5/31/2007	916	($2,500.00)	279	X	Plug	MB	($5,000.00)
19	5/31/2007	916	$5,000.00	459	E	Plug	MB	$0.00
20	5/31/2007	917	$300.00	355	L		XY	$300.00
21	5/31/2007	917	($300.00)	517	R	Holiday journal posti	XY	$0.00
22	5/31/2007	918	($349.00)	218	X	Plug	MB	($349.00)
23	5/31/2007	918	$115.00	248	X	Plug	MB	($234.00)
24	5/31/2007	918	$234.00	281	X	Plug	MB	$0.00
25	5/31/2007	919	($349.00)	218	X	Plug	MB	($349.00)
26	5/31/2007	919	$115.00	248	X	Plug	MB	($234.00)
27	5/31/2007	919	$234.00	281	X	Plug	MB	$0.00
28	5/31/2007	920	$15,000.00	224	X	Round Amount Post	XY	$15,000.00
29	5/31/2007	920	($10,000.00)	320	L		XY	$5,000.00
30	5/31/2007	920	($5,000.00)	347	L		XY	$0.00
31	5/31/2007	1010	$200.00	224	X	Accrue Comm Expe	MB	$200.00

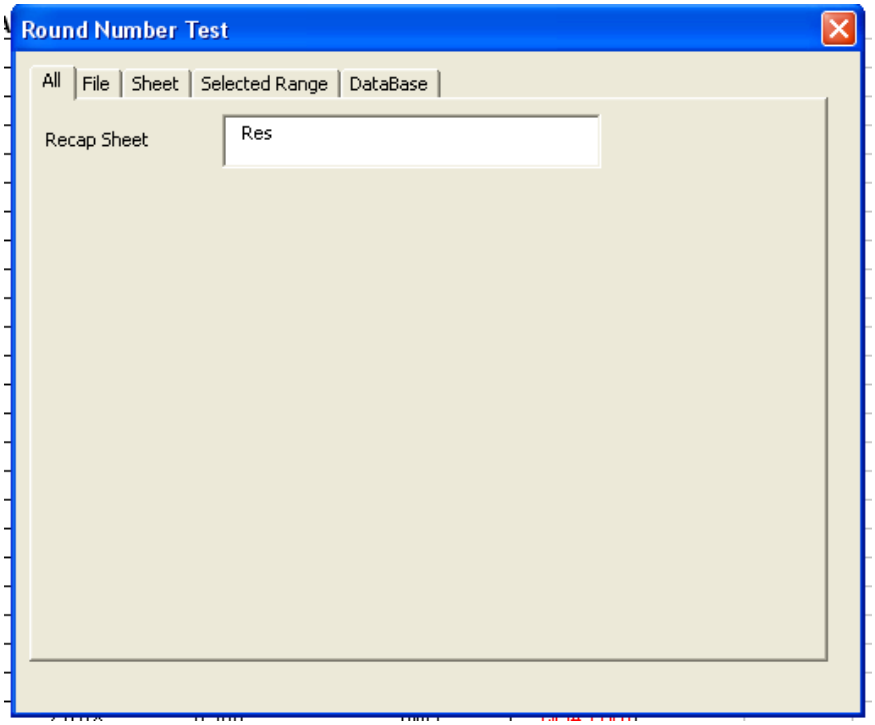
The first test to be performed is to test the extent of round numbers in the third column, which is named Amount. The values on the worksheet named "JE" will be tested starting at the upper left hand corner, i.e. cell "A1" and continuing down to the first blank cell encountered.

For illustration purposes, both the menu options as well as the toolbar commands will be described. First select the first tab labeled "All" and specify the name of the worksheet to

contain the results of the analysis. In this case, a new worksheet named “Res” (results) will be specified. (Res is the default name).

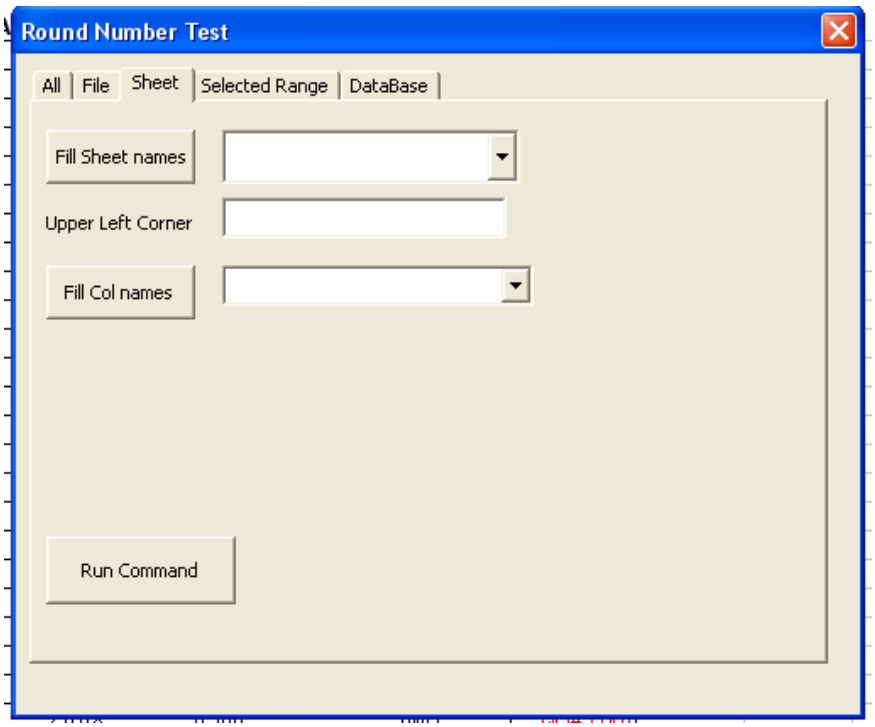
Procedural Steps

Step by step example

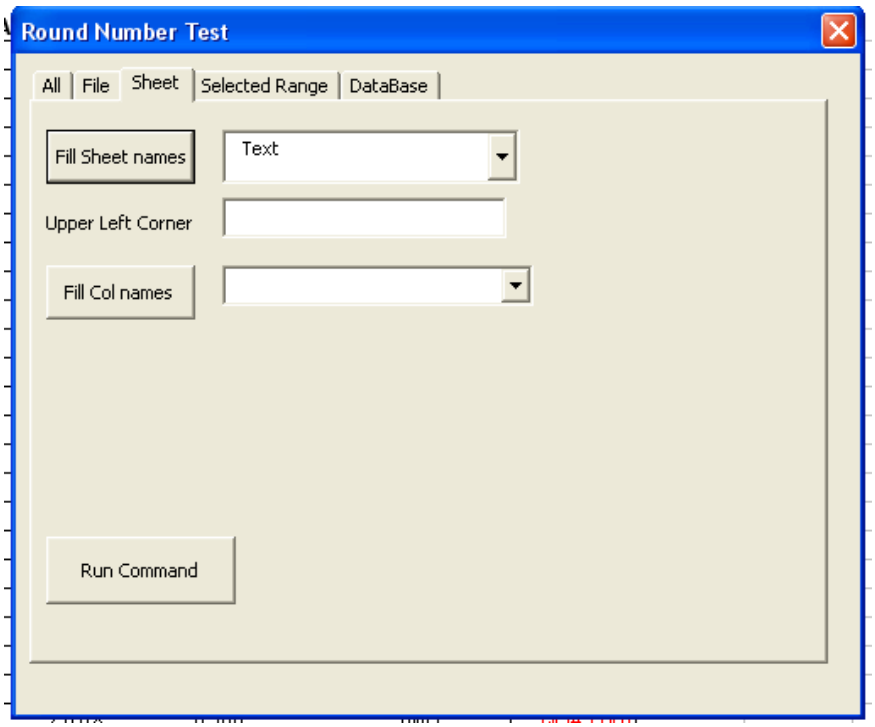


Now click on the tab labeled “Sheet” in order to specify the sheet name, upper left hand corner and column to be analyzed:

Procedural steps

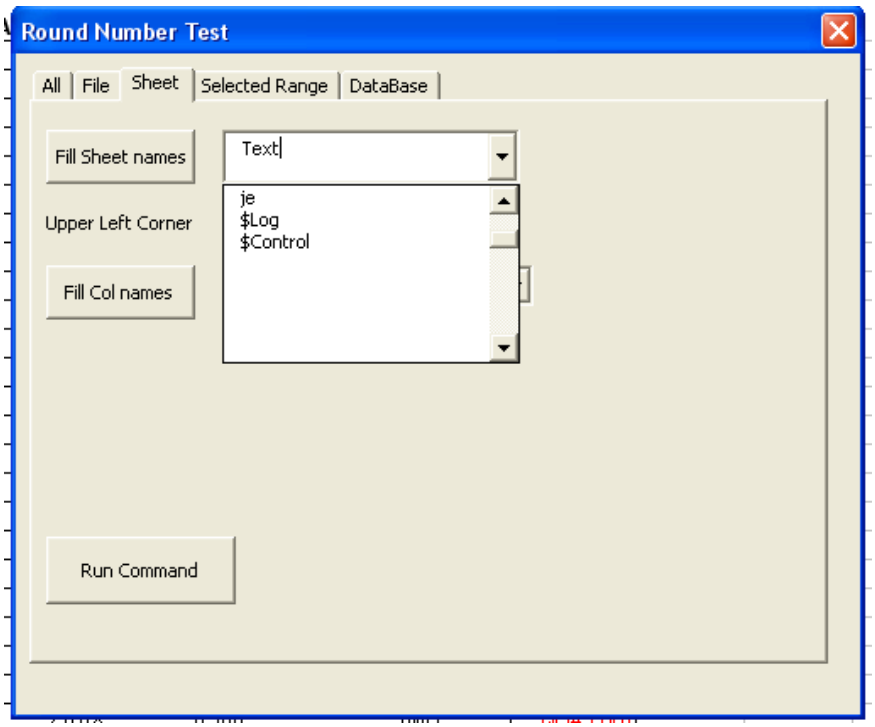


First, have the system fill in all the sheet names into the first drop down list box. This is done by clicking on the button labeled "Fill sheet names":

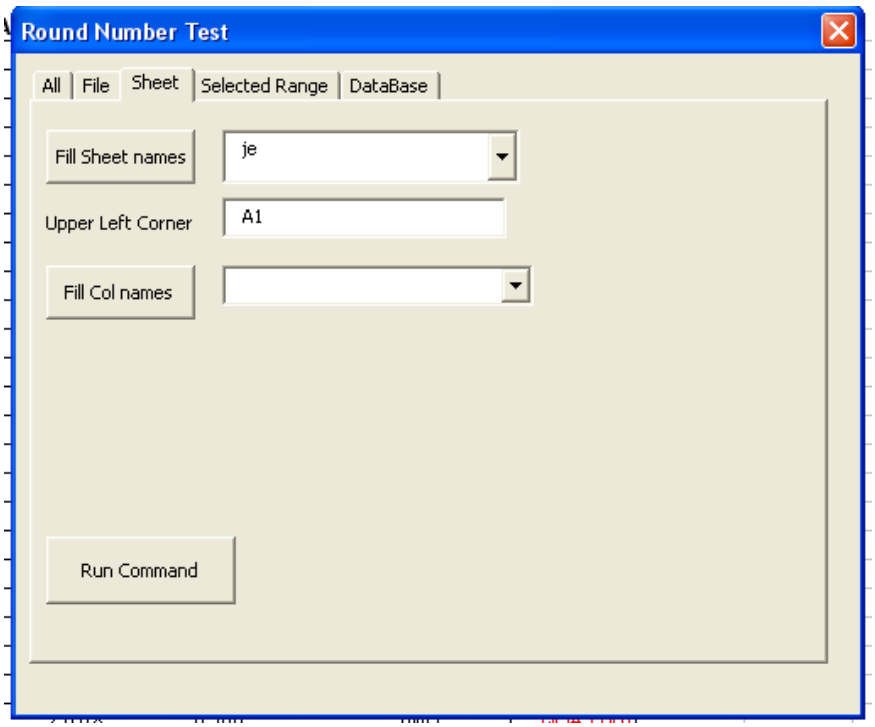


Now, click on the drop down list to select the sheet named "JE":

Procedural steps

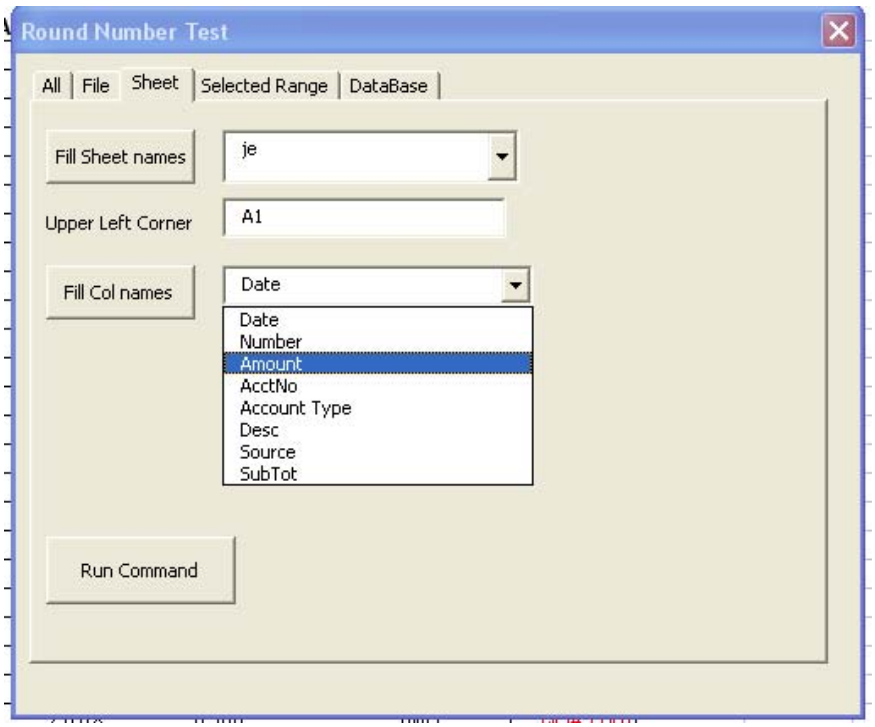


Select "je" and then enter the cell of the upper left hand corner, which is "A1" in this instance:

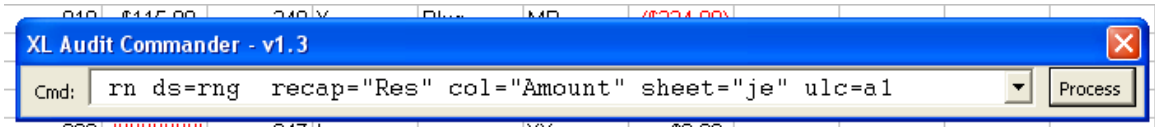


Now the system can fill in all the column names, in order that the numeric column to be tested can be specified:

Procedural steps



The next step is to click the "Run Command" button, in order to construct the command to be placed into the toolbar. The results are shown below:



Then click on the "Process" button in order to perform the analysis which is stored on the sheet named "Res" (if it doesn't exist, it will be created, if it does exist it will be overwritten).

Round Number report:		
Digits	Count	Pct
Not Round	0	0.00%
0	28	46.67%
1	0	0.00%
2	24	40.00%
3	6	10.00%
4	2	3.33%
5	0	0.00%
6	0	0.00%
7	0	0.00%
8	0	0.00%
9	0	0.00%

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10	0	0.00%
Totals	60	100.00%

This report tells us that of the 60 rows in the sheet "JE" under the column "Amount", all were round numbers (i.e. no pennies in any). Then 24 (40%) were of order 2 , i.e.. an even multiple of $100, 6 order 3 (even multiple of $1,000) and 2 were order 4 (even multiple of 10,000.

We can then the same report, but just select a range within the sheet. This is done by using a different tab in the menu dialog as shown below:

The first step is to select a range (as shown below):

	A	B	C	D	E	F	G	H
1	**Date**	**Number**	**Amount**	**AcctNo**	**Account T**	**Desc**	**Source**	**SubTot**
2	5/31/2007	910	($151.00)	320	L	Accrue Co	MB	($151.00)
3	5/31/2007	910	($49.00)	347	L	Accrue Co	MB	($200.00)
4	5/31/2007	910	$200.00	349	L		MB	$0.00
5	5/31/2007	911	$300.00	355	L		MB	$300.00
6	5/31/2007	911	($300.00)	517	R	Recognize	MB	$0.00
7	5/31/2007	912	$300.00	179	A		MB	$300.00
8	5/31/2007	912	($300.00)	464	X	Reclassify	MB	$0.00
9	5/31/2007	913	$300.00	314	L	ATB	MB	$300.00
10	5/31/2007	913	($300.00)	517	R	ATB	MB	$0.00
11	5/31/2007	914	($349.00)	218	X		MB	($349.00)
12	5/31/2007	914	$115.00	248	X	Reclassify	MB	($234.00)
13	5/31/2007	914	$234.00	281	X		MB	$0.00
14	5/31/2007	915	($647.00)	522	R		MB	($647.00)
15	5/31/2007	915	$212.00	534	R	Reclassify	MB	($435.00)
16	5/31/2007	915	$435.00	576	R		MB	$0.00
17	5/31/2007	916	##########	218	X	Plug	MB	##########
18	5/31/2007	916	##########	279	X	Plug	MB	##########
19	5/31/2007	916	##########	459	E	Plug	MB	$0.00
20	5/31/2007	917	$300.00	355	L		XY	$300.00
21	5/31/2007	917	($300.00)	517	R	Holiday jou	XY	$0.00
22	5/31/2007	918	($349.00)	218	X	Plug	MB	($349.00)
23	5/31/2007	918	$115.00	248	X	Plug	MB	($234.00)
24	5/31/2007	918	$234.00	281	X	Plug	MB	$0.00
25	5/31/2007	919	($349.00)	218	X	Plug	MB	($349.00)

Now, a column can be selected for analysis by clicking of the "Fill" button:

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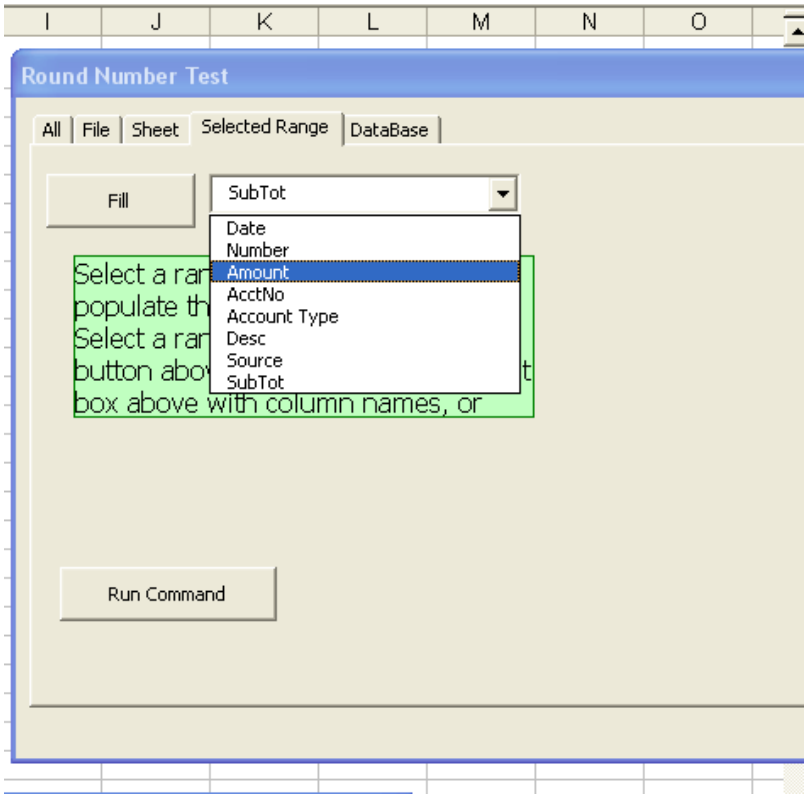
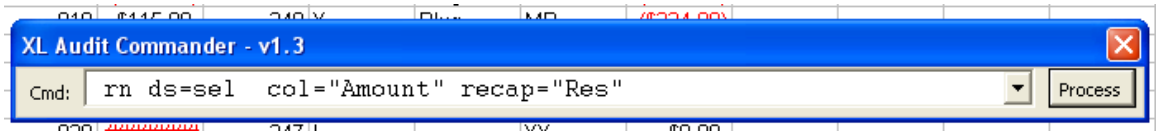


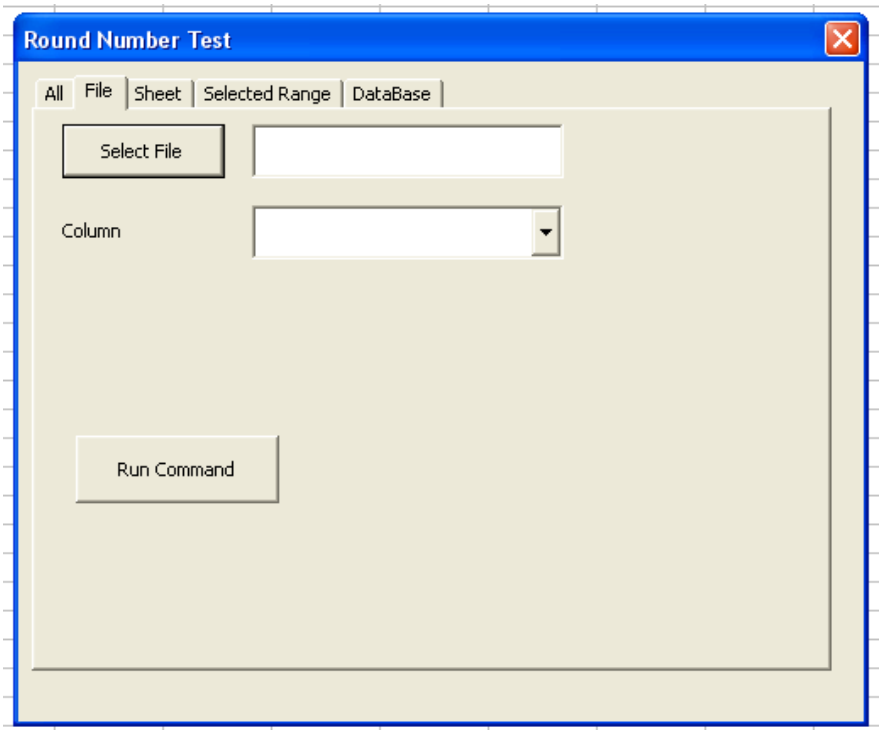
Note that had no range been selected, then no column names would be included in the drop down list. At this point, we can click the command button "Run Command". This will cause the menu dialog box to disappear and the XL Audit Command toolbar to be filled and displayed for processing, as shown below:



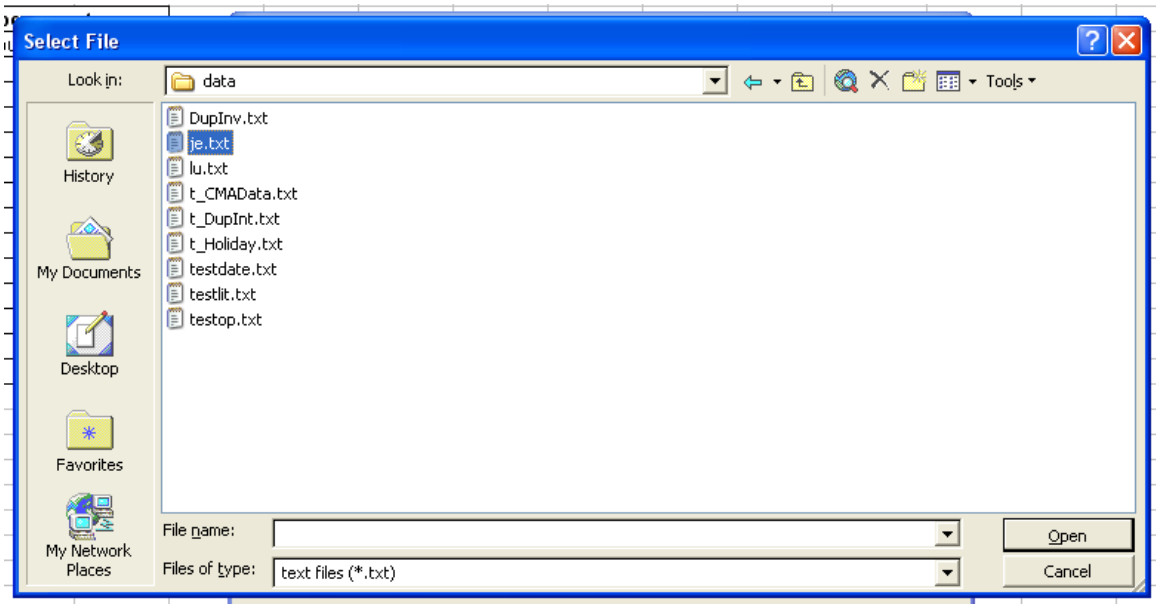
Clicking the "Process" button will result in the analysis being written to the sheet "Res".

Round number analysis can also be performed based upon a file or a database. The basic concepts are the same. To process a file, either type the file name in, or else, click on the "Find File" button. Then select the column name and the destination sheet. A screenshot is shown below:

Procedural steps



In this case, we select the JE file that is provided with the installation (je.txt):



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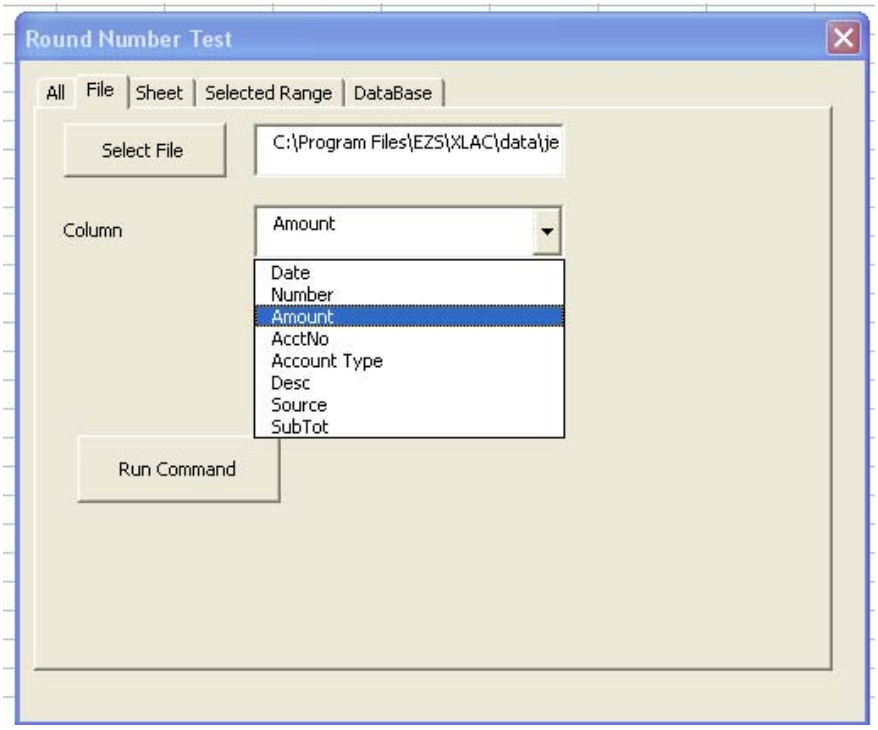
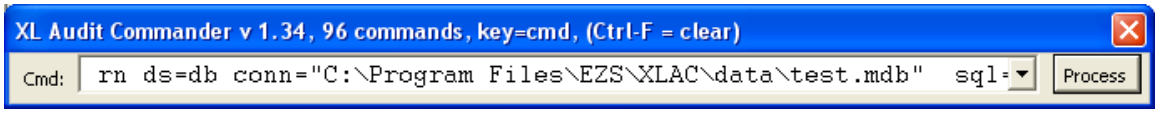
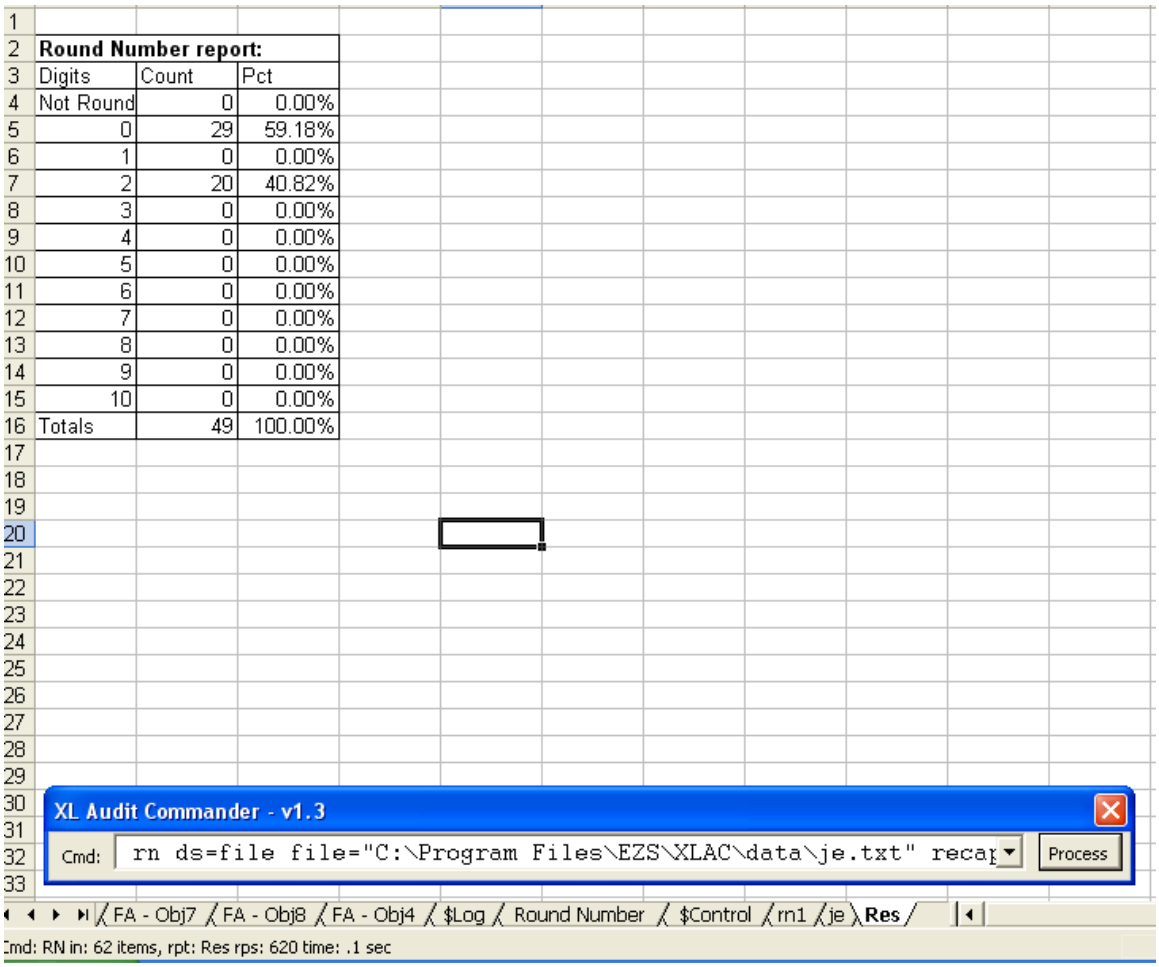


Clicking the "Run Command" button results in the menu dialog being hidden and the command bar displayed for processing:



The results are as follows:

Procedural steps



Round Number report:		
Digits	Count	Pct
Not Round	0	0.00%
0	29	59.18%
1	0	0.00%
2	20	40.82%
3	0	0.00%
4	0	0.00%
5	0	0.00%
6	0	0.00%
7	0	0.00%
8	0	0.00%
9	0	0.00%
10	0	0.00%
Totals	49	100.00%

A total of 49 round numbers were identified. The command status is shown on the application status bar and indicates that processing took .1 of a second.

For a database application we will use the application provided. Which is an MS Access database.

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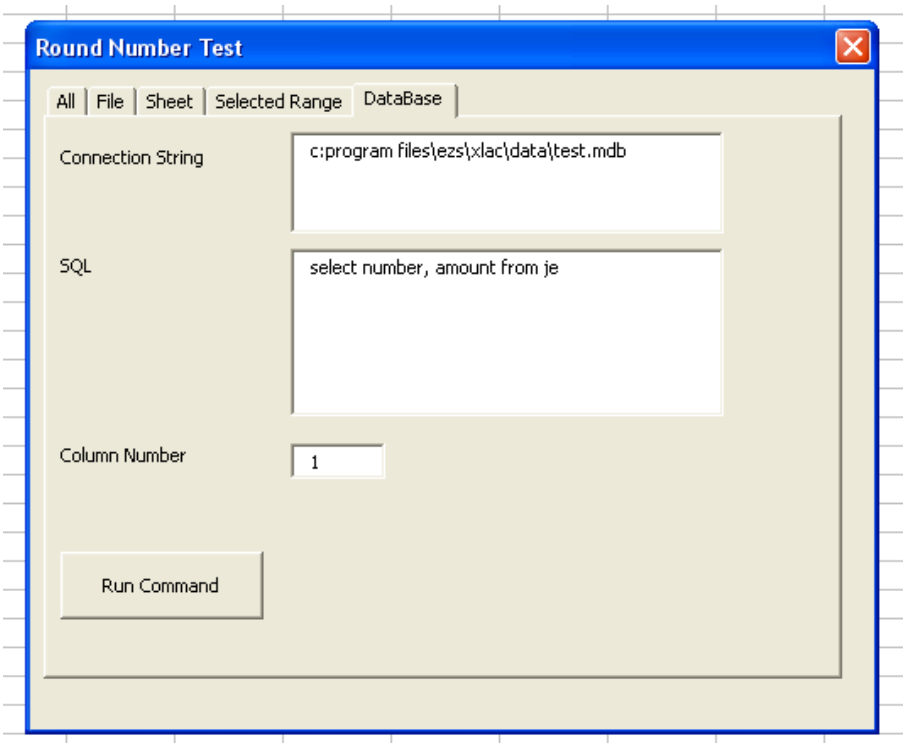


The toolbar command is as follows:

rn ds=db conn="c:\program files\ezs\xlac\data\test.mdb" sql="Select number, amount from je" recap="Resdb" fldno=1

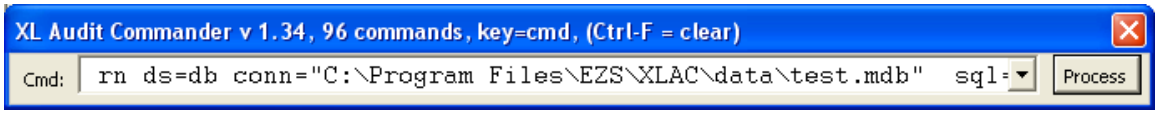
Note that the fldno parameter is the sequence number of the column to be tested in the SQL statement, and that the numbering starts at 0. Thus even though amount is the second column in the SQL, it is numbered 1 (not 2).

The resulting report appears as follows:

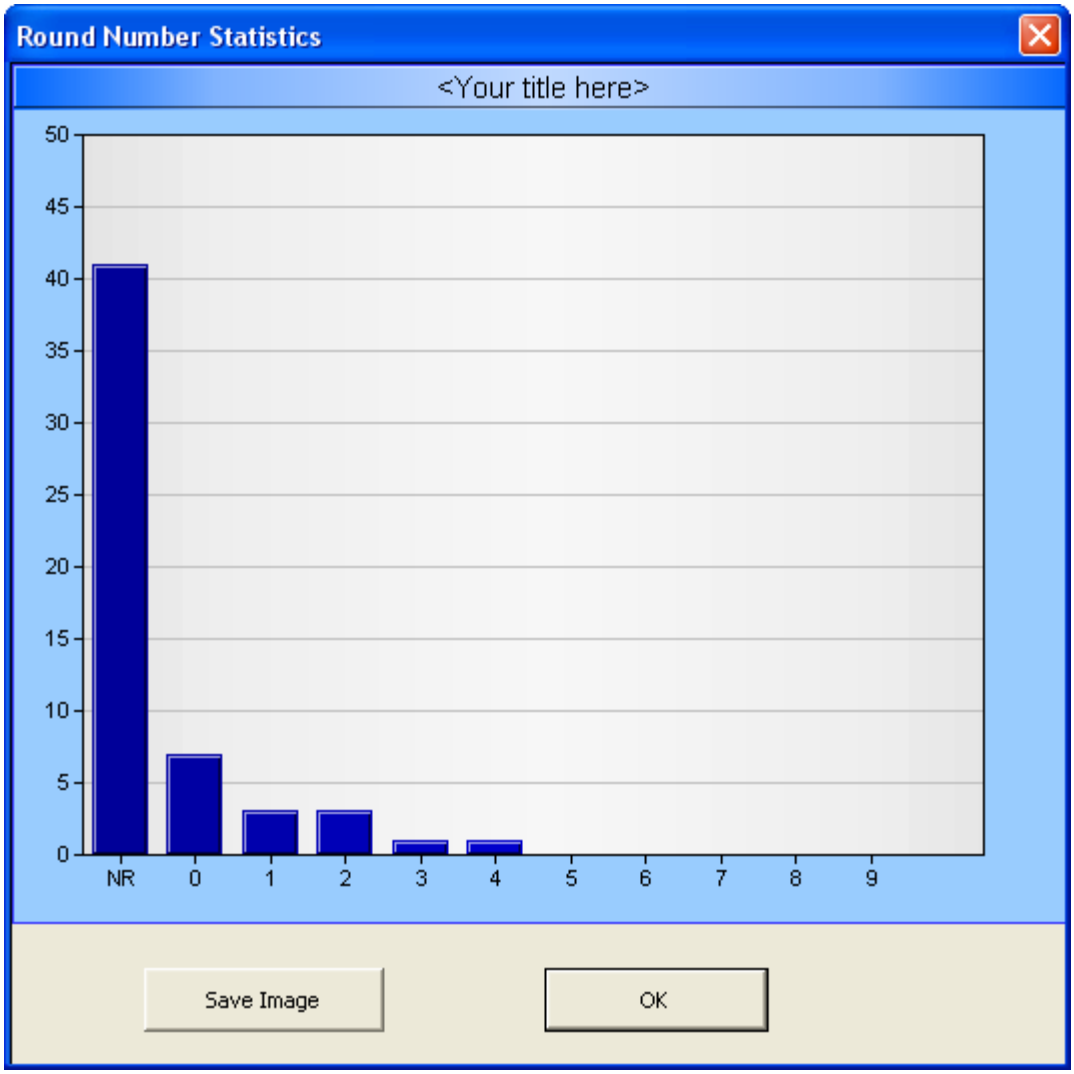
Round Number report:		
Digits	Count	Pct
Not Round	0	0.00%
0	28	46.67%
1	0	0.00%
2	24	40.00%
3	6	10.00%
4	2	3.33%
5	0	0.00%
6	0	0.00%
7	0	0.00%
8	0	0.00%
9	0	0.00%

10	0	0.00%
Totals	60	100.00%

The command bar alternative is to use just the command bar and type the commands directly. An example is shown below



Graphic Output



Procedural steps

Related Areas of Interest

Other related documents/guides of possible interest include:

Topic	Description
Auditing Data in Access	An easier way to perform 18 audit tests on data in Microsoft Access®
http://ezrstats.com/online/AuditGuide/Auditing_Data_in_MS_Access_Databases.pdf	
Auditing Data in Worksheets	18 audit tests for data stored in Excel worksheets
http://ezrstats.com/online/AuditGuide/Auditing_Data_in_Workbooks.pdf	
Auditing Data in Files	18 audit tests to perform on data files in tab separated value format
http://ezrstats.com/online/AuditGuide/Auditing_Data_in_Files.pdf	
Round Numbers	Why to check for "round" numbers and how
http://ezrstats.com/online/AuditGuide/Testing_For_Round_Numbers.pdf	
Holidays	Identification of holiday dates, e.g. in Journal entries, invoices, etc.
http://ezrstats.com/online/AuditGuide/Testing_For_Holidays.pdf	
Data Stratification	Stratification as a planning and audit tool
http://ezrstats.com/online/AuditGuide/Procedures_For_Data_Stratification.pdf	
Cross tabulations	Use of cross tabulations in audits
http://ezrstats.com/online/AuditGuide/Cross_Tabulations_As_An_Audit_Technique.pdf	
Benford's law	Test conformity with Benford's Law
http://ezrstats.com/doc/Auditors_Guide_to_Tests_using_Benfords_Law.pdf	
Basic Data Extraction	Extracting data based upon criteria, and performing calculations
http://ezrstats.com/online/AuditGuide/Basic_Data_Extraction_Techniques.pdf	
Data Classification	Basic techniques for classifying data Software Installation
http://ezrstats.com/online/AuditGuide/Basic_Data_Classification_Procedures.pdf	
Setup.exe	Setup file - double click to install (6.0 MB)
http://ezrstats.com/online/inno/XLACSetup.exe	
Install Instructions	Installation Guide (PDF document) (.7 MB)
http://ezrstats.com/online/inno/XL_Audit_Commander_Installation_Guide.pdf	

Procedural steps

Operation Guide	Operation Guide (PDF document) (2.5 MB)
http://ezrstats.com/online/inno/XL_Audit_Commander.pdf	
Quick Start	Quick Start Module (Excel Workbook - open after install) (3.1 MB)
http://ezrstats.com/online/inno/QS.xls	
Help	Shows list of help links in the current workbook
http://ezrstats.com/helpxlac/he.php	
Single Commands	Commands of just two letters for a selected range on a single worksheet
http://ezrstats.com/helpxlac/single.php	
Population	Population statistics (univariate, stratify, population, duplicates)
http://ezrstats.com/helpxlac/ndxpop.php	
Sampling	Sampling procedures (cma, interval, sample size calculation, precision calculation)
http://ezrstats.com/helpxlac/ndxsamp.php	
Fraud	Fraud investigation tools (test Benford's Law, duplicates)
http://ezrstats.com/helpxlac/ndxfraud.php	
Cash Recovery	Cash Recovery procedures ("Near miss" invoices, split invoices)
http://ezrstats.com/helpxlac/ndxcr.php	
Other	Other Commands (ageing, gaps, credit card validation, analytic review procedures, dates on federal holidays, etc.)
http://ezrstats.com/helpxlac/ndxoth.php	

Summary and conclusion

Testing for round numbers should be a common audit procedure, especially when the data to be tested has already been converted to electronic format. The procedure should not take long, and may yield some interesting results for follow-up!

There are a host of other audit procedures which may also be of interest. There is an index to the procedures at http://ezrstats.com/helpxlac/index.php. Software and documentation can be downloaded from http://ezrstats.com/online/inno/XLACSetup.exe, and from http://ezrstats.com/online/inno/XL_Audit_Commander.pdf.