



AuditSampler

User Guide

v3

Data Analytics
Statistical Sampling

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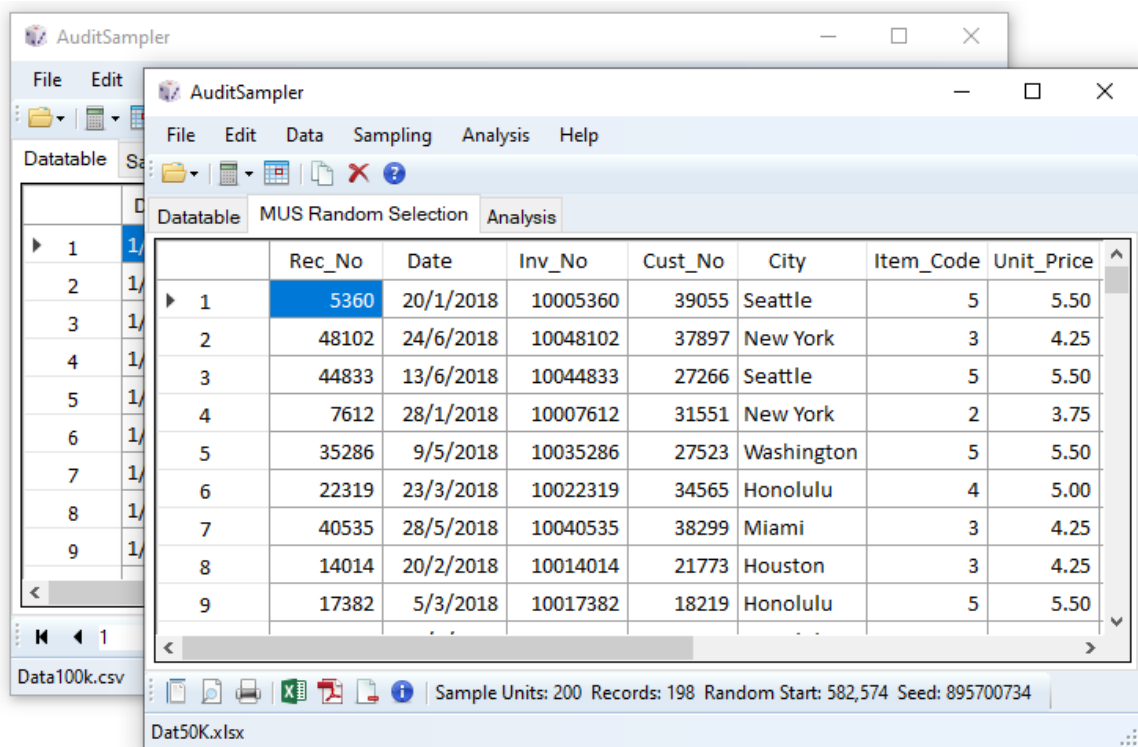
1. Introduction

AuditSampler is a statistical sampling and data analytics software which enables efficient and effective audits based on statistical methods and the auditing standards (ISA/AU-C 530, ISA 315). Easy-to-use audit tool to calculate the sample size, select samples and evaluate the results for Attributes Sampling, Monetary Unit Sampling (MUS) and Classical Variables Sampling (CVS).

The confidence level, tolerable error and expected error can be quantified to determine the required sample size and statistically evaluate the results. Samples can be selected based on random, systematic, cell and value-weighted selection methods.

Query and filter data for exception reporting and analysis. Chart the analysis using graphs. Histogram and boxplot graphs to display the data distribution and detect outliers.

AuditSampler is a Windows desktop application. Multiple windows can be open for multitasking. A temporary SQLite table is created for each user session to query the data and the temporary table is automatically dropped or deleted when that session ends. The application does not store any data.



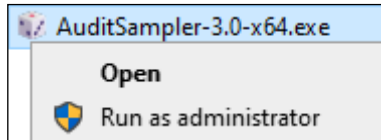
2. Installation

2.1 System Requirements

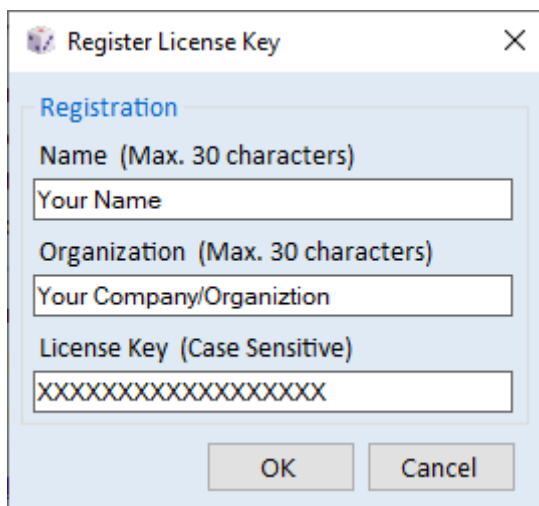
Operating systems: Windows 10, 11 (64-bit), Windows Server 2019

Memory: 4GB RAM or more

2.2 Register and Install License Key



- i. Right-click on the AuditSampler-3.0-x64.exe file and select "Run as administrator".
- ii. Select if you want to install for only you or all users (requires administrator privileges).
- iii. Read and accept the license agreement.
- iv. You will be prompted, "The license is not activated. Would you like to Register now". Click "Yes" to register immediately.
- v. At the "Register License Key" screen, enter your name, company/organization and the licence key (case sensitive). Click "OK" to activate.



2.3 Update License Key

To update or enter a new license key after expiry, right-click the AuditSampler program icon or shortcut and select "Run as administrator". From the Help menu, select Registration Information and click on the link [Register License Key](#). Enter your details and the new license key.

2.4 Uninstall License Key

To uninstall and delete the license key if no longer in use, right-click the AuditSampler program icon or shortcut and select "Run as administrator". From the Help menu, select Registration Information and click on the link [Uninstall License Key](#). Select OK to confirm or Cancel.

3. File

3.1 Import Data

Data can be imported from Excel, Csv/Txt and SQLite files. Import up to 20 million rows and 30 columns.

- Excel workbook (.xlsx)
- Csv comma delimited (.csv)
- Text tab delimited (.txt)
- SQLite database (.db)

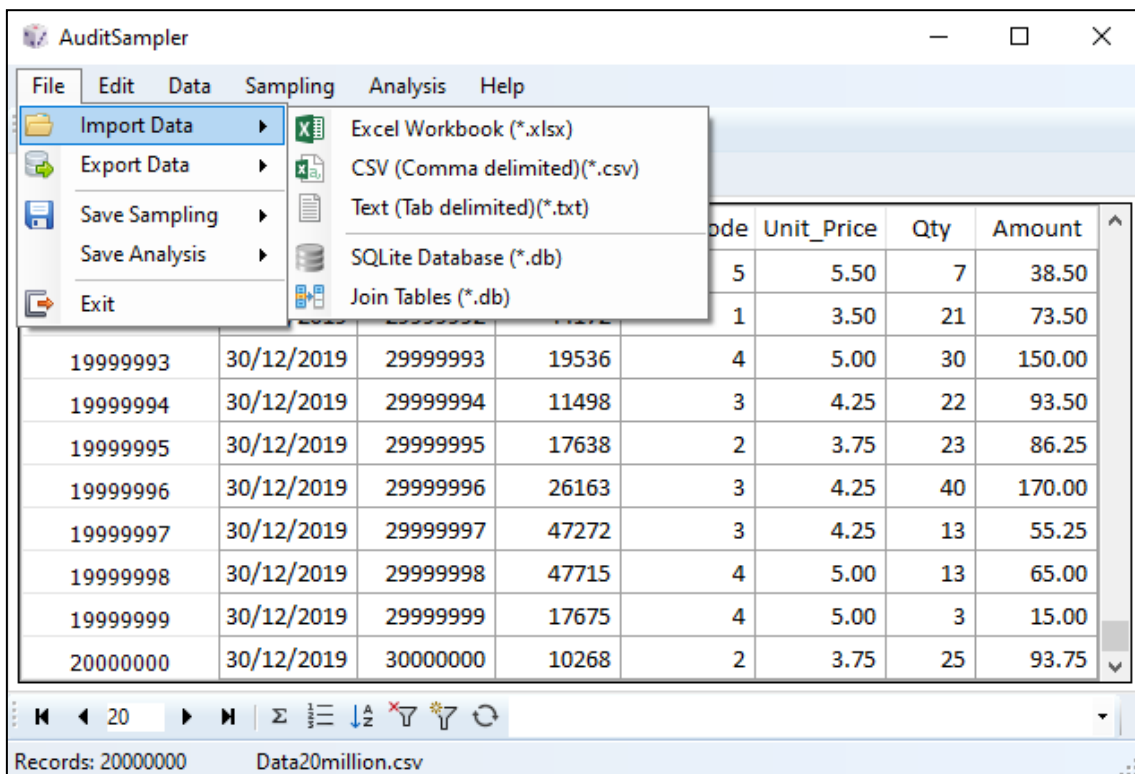
Column name requirements

All files must have a header row that contains names for each of the columns. The column names must meet the data table requirements:

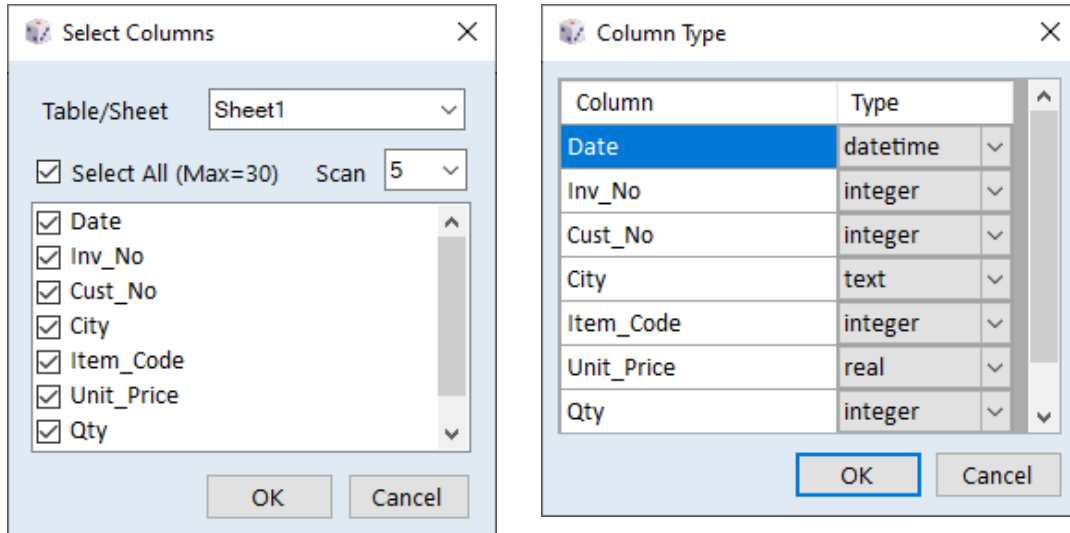
- No special characters such as % . , - & / \ : ; () * % #.
- Does not start with a number.
- Contain only alphanumeric characters and the underscore character “_”.

When the file is imported, any special characters are automatically removed and spaces are replaced with an underscore.

File > Import Data



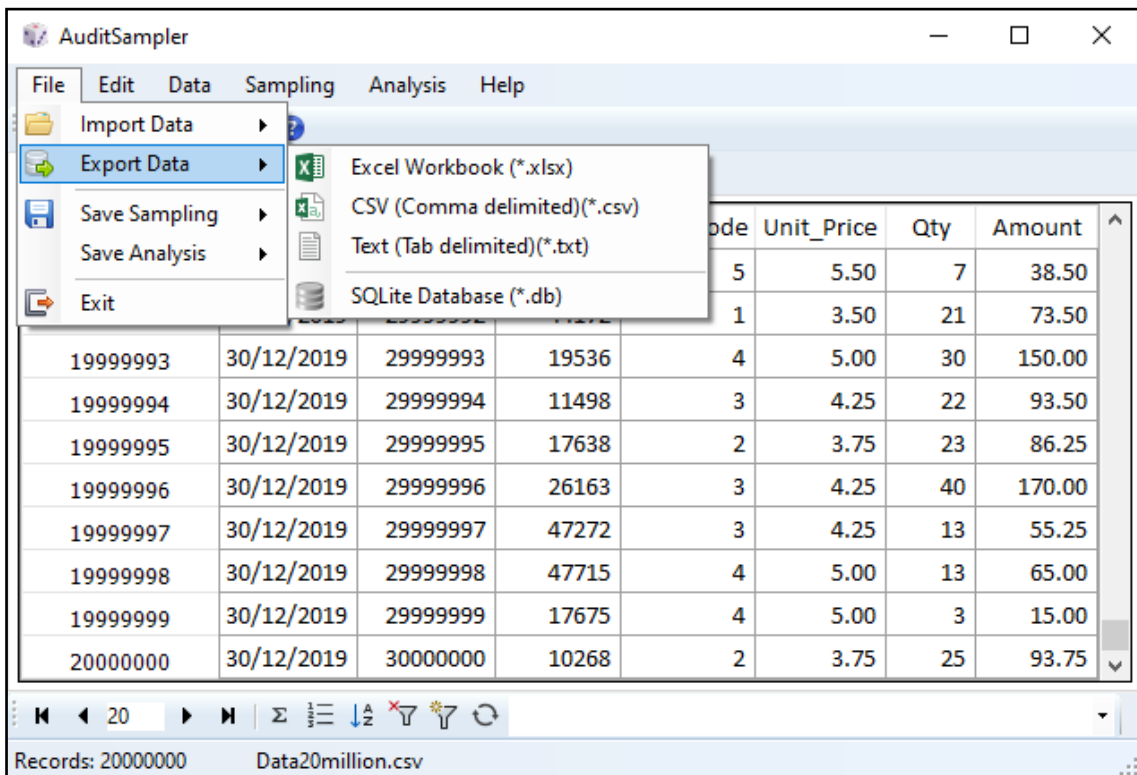
Select Table/Sheet to list the columns in the box. Select up to 30 columns. The Scan setting is to enable automatic detection of the column data types for Excel, Csv and Text files. Scan up to the first 200 rows in the file to detect the column type.



3.2 Export Data

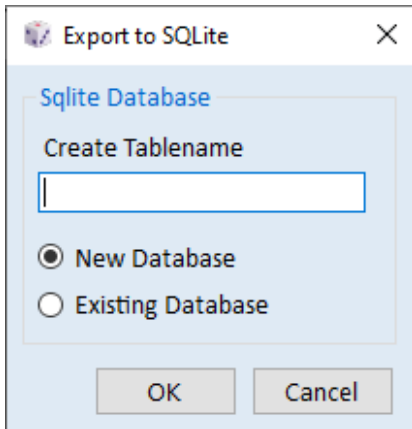
Data imported into AuditSampler can be exported and saved as Excel workbook (.xlsx), Csv comma delimited (.csv) and SQLite database (.db) files.

File > Export Data or right click in the gridview



Large datasets (> 1 million rows) can be saved as tables in a SQLite database file for efficient access and reuse.

File > Export Data > SQLite Database

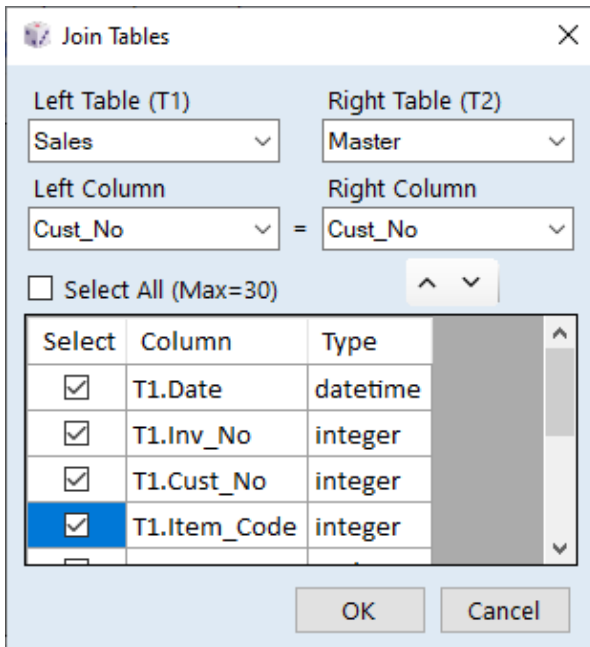


- Create Tablename (specify a new table name).
- Select New or Existing database file.

3.3 Join Tables

Join two tables in the SQLite database file that have a common column (e.g. Cust_No). Return all rows in the Left Table with matching values in the Right Table.

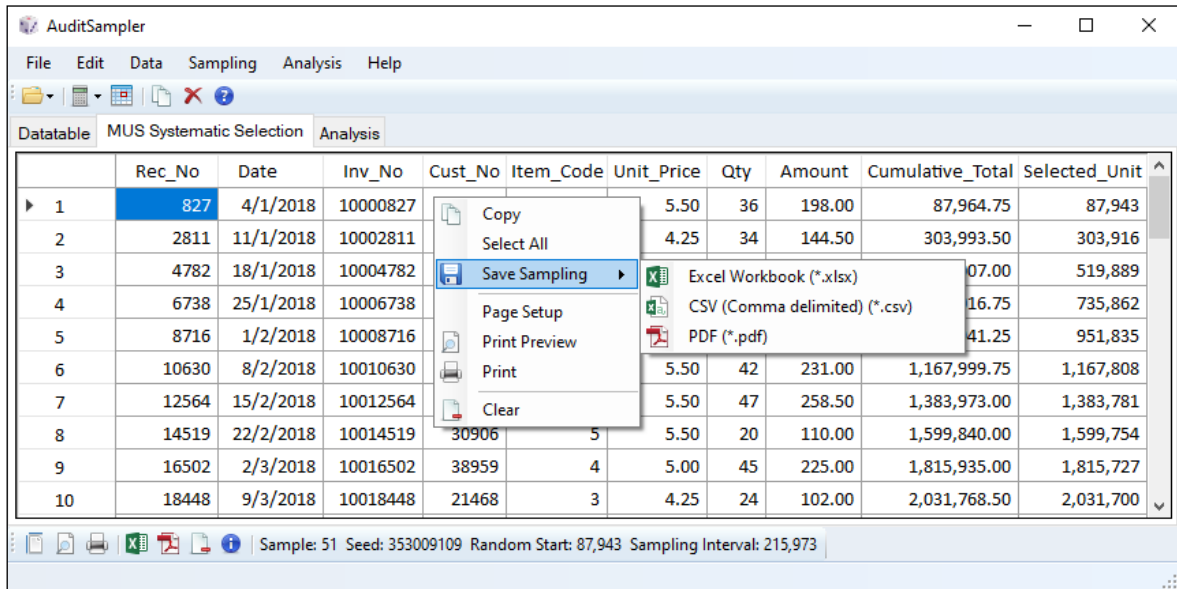
File > Import Data > Join Tables (*.db)



3.4 Save/Print Results

The sample selection results can be saved as Excel workbook (.xlsx), Csv comma delimited (.csv) and PDF (.pdf) files. The results can also be output to printer or copy/paste to Excel and Word.

File > Save Sampling or bottom toolbar options or right click in the gridview

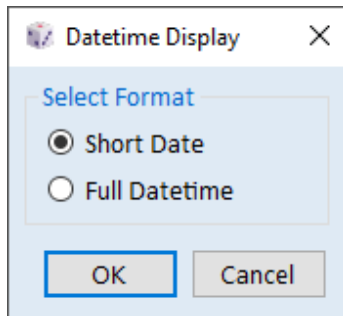


4. Edit

4.1 Datetime Display

Select the datetime display format. The default is Short Date (e.g. MM/dd/yy) or change to Full Datetime (yyyy/MM/dd HH:mm:ss AM/PM).

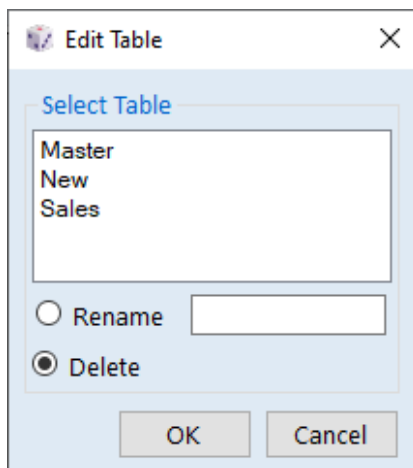
Edit > Datetime Display



4.2 Delete Table

Delete a table in the SQLite database file.

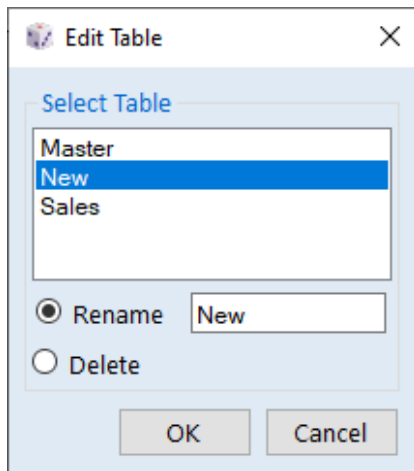
Edit > SQLite Database > Delete Table



4.3 Rename Table

Rename a table in the SQLite database file.

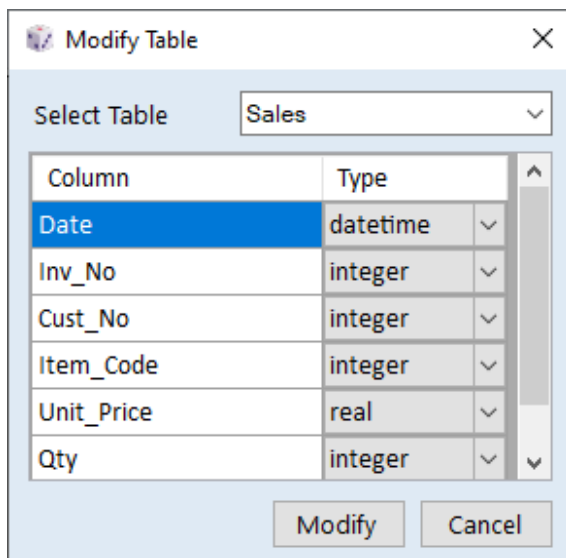
Edit > SQLite Database > Rename Table



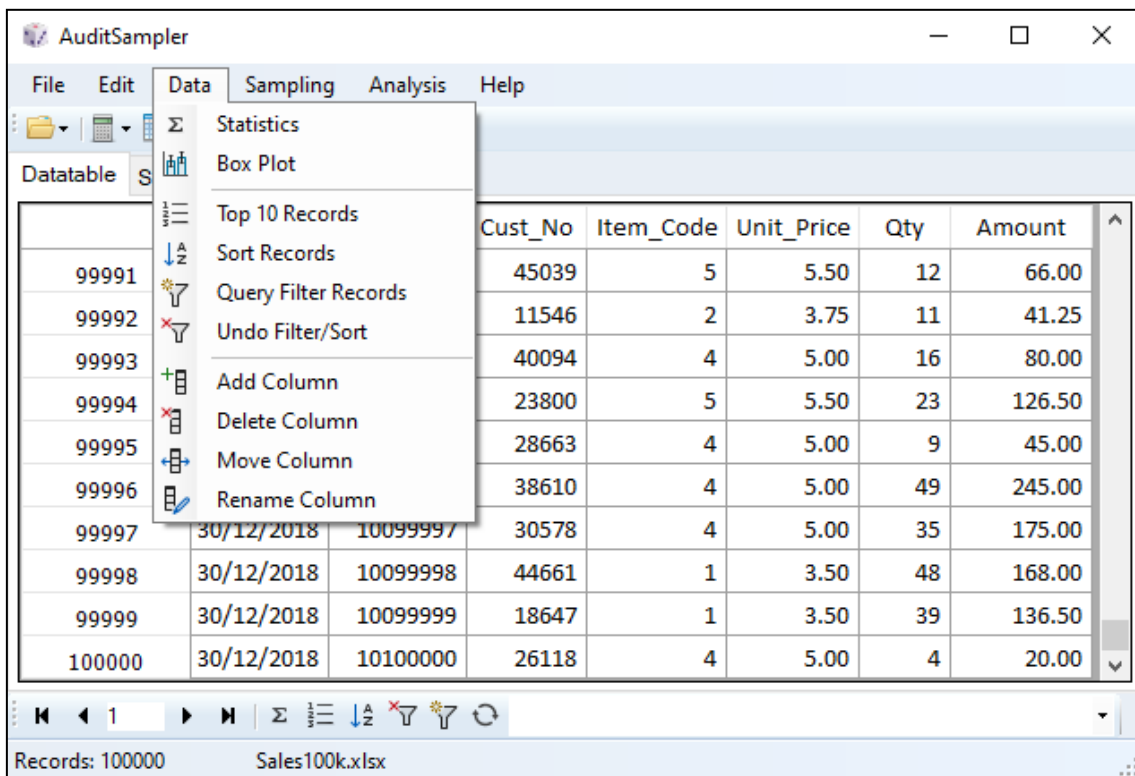
4.4 Modify Table

Change the column type in the SQLite database table.

Edit > SQLite Database > Modify Table



5. Data



5.1 Query Filter/Sort

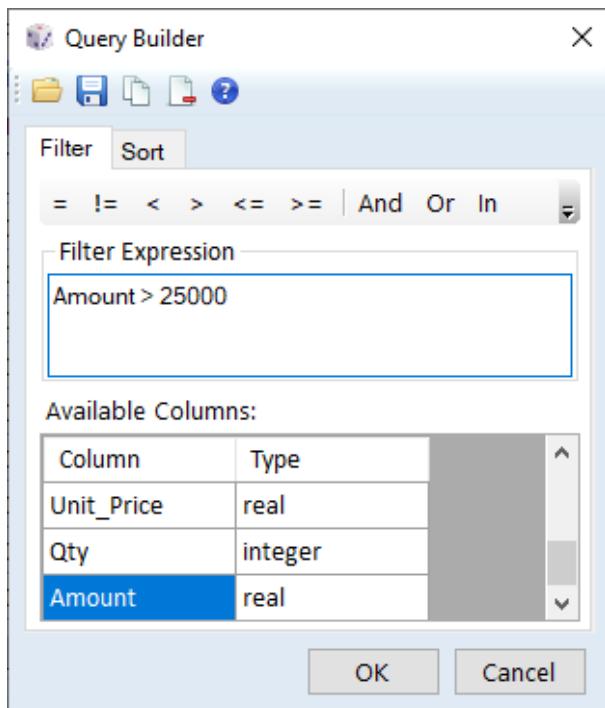
Data can be query and filtered on Numeric/Text/Date columns with the following operators. In SQL queries, datetime and text strings must be enclosed within a pair of single quotes:

Operator	Description	Criteria
>	Greater than	Amount > 5000 Inv_Date > '2017-03-28 00:00:00'
<	Less than	Amount < 500 Inv_Date < '2017-03-28 00:00:00'
>=	Greater than or equal to	Amount >= 5000 Inv_Date >= '2017-03-28 00:00:00'
<=	Less than or equal to	Amount <= 500 Inv_Date <= '2017-03-28 00:00:00'
=	Equal to	Item_Code = 3 City = 'Boston' Inv_Date = '2017-03-28 00:00:00'
!=	Not equal to	Item_Code != 3 City != 'Boston' Inv_Date != '2017-03-28 00:00:00'
Like	Specific pattern in values	Cust_No Like '23%' Cust_No Like '%23'
In	List of values	Item_Code In (1, 3, 5)

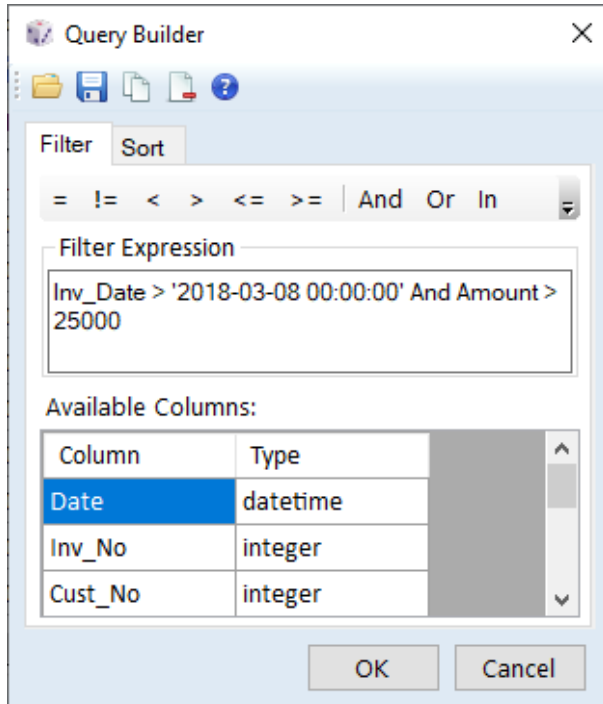
		City In ('Boston', 'New York', 'Miami')
Between	Range of values	Amount Between 3000 And 5000 Inv_Date Between '2017-01-01' And '2017-06-30'
And	Filter more than one condition	Item_Code = 3 And Unit_Price != 4.25 Inv_Date Between '2017-01-01' And '2017-06-30' And Amount > 5000
Or	Filter more than one condition	Amount = 0 Or Amount = " Qty > 100 Or Amount > 5000

Select the column, specify the operator/condition and enter the value to filter. The filter criteria can also be typed directly into the filter expression box.

Data > Query Filter Records

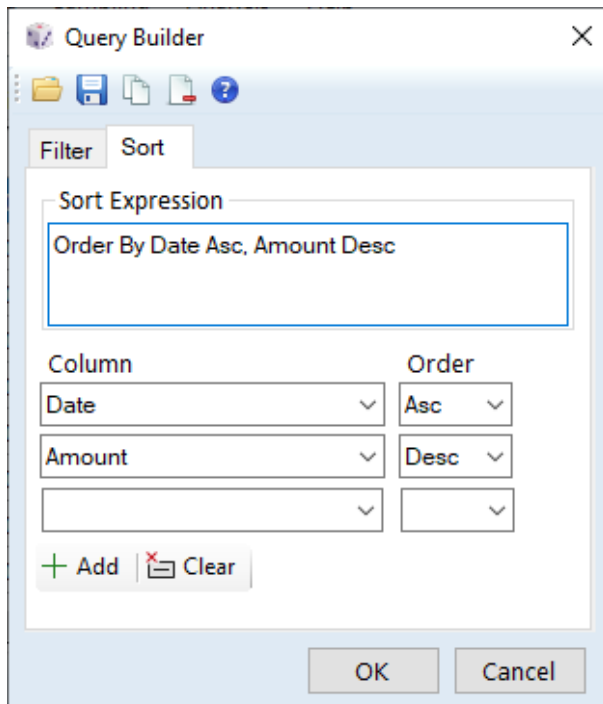


For Date columns the value must be in the datetime format 'yyyy-mm-dd 00:00:00' together with the opening and closing single quotes.



The query can be Sort By column, Asc (Ascending) or Desc (Descending). Select the column and specify the sort order. The sort criteria can also be typed directly into the sort expression box.

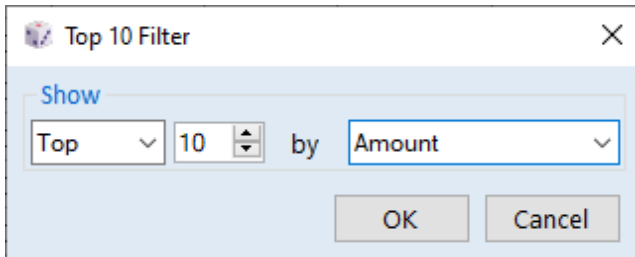
Data > Sort Records



5.2 Top 10 Records

Filter and display the Top or Bottom 10 records.

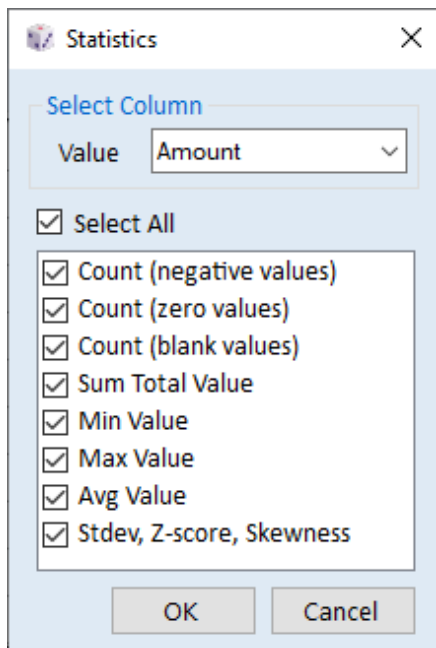
Data > Top 10 Records



5.3 Statistics

Statistics and aggregate functions on numeric/value columns: Count (negative/zero/blank values), Sum (total value), Min (minimum value), Max (maximum value), Avg (average value), Stdev (standard deviation), Z-score (+/- 3 standard deviations from the mean) and Skewness (positive right-skewed or negative left-skewed). The further the skew value is from zero, the greater the skew.

Data > Statistics

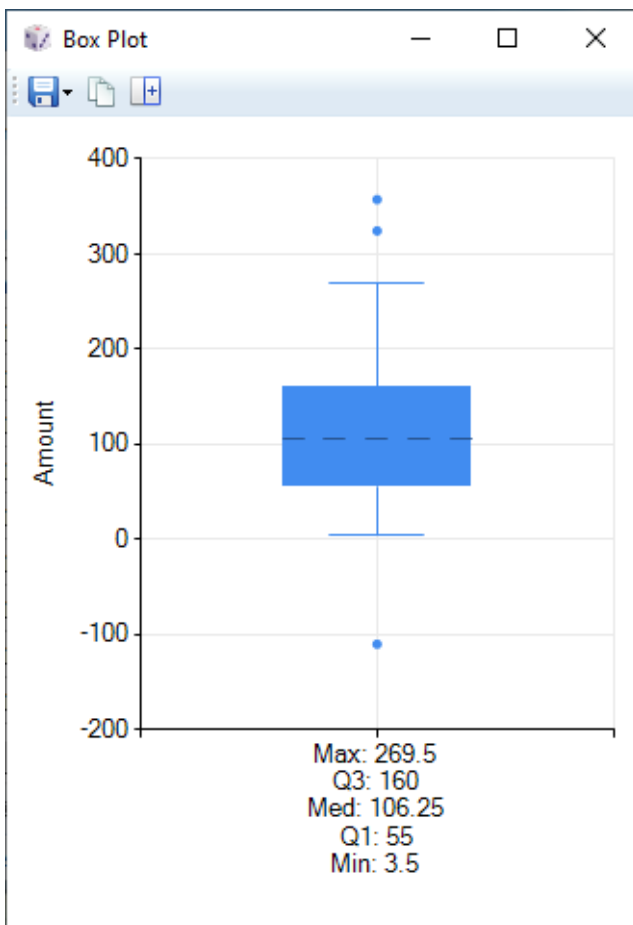
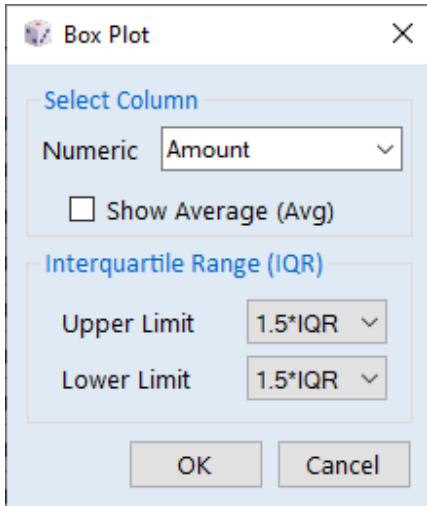


Statistics	Amount
# of Records	100000
# of Negative items	0
# of Zero items	0
# of Blank items	0
Positive value	32703038.5
Negative value	0
Population value	32703038.5
Minimum value (Min)	9.5
Maximum value (Max)	1000
Mean value (Avg)	327.03
Standard Deviation	206.98
Z-Score (+3)	947.97
Z-Score (-3)	-293.91
Skewness	-1.318823

5.4 Box Plot

A boxplot (box and whisker plot) displays the center and spread of a data set based on quartiles and the five-number summary which consists of: the minimum value, lower quartile, median, upper quartile and the maximum value. It can identify outlying values (Outliers) that are very far away from the quartiles and the other values in the data.

Data > Box Plot



- Min: Minimum (lowest value excluding outliers).
- Q1: Lower Quartile (25th percentile).

- Med: Median value (50th percentile).
- Q3: Upper Quartile (75th percentile).
- Max: Maximum (highest value excluding outliers).

A boxplot displays a “box” with the bottom as the lower quartile (Q1), the middle as the median (Q2) and the top as the upper quartile (Q3). The “whiskers” are the lines that extend from the box to the minimum and maximum values (excluding outliers). Extreme values that fall outside the whiskers are designated Outliers and marked as dots in the boxplot.

The boxplot divides the data into 4 equal parts (quartile). The lower whisker represents the bottom 25% of the data, the lower half of the “box” represents the second 25%, the upper half of the “box” represents the third 25% and the upper whisker represents the top 25%.

Lower Quartile (Q1): The first quartile or 25th percentile¹. The bottom 25% of the data fall below this value.

Median (Q2): The second quartile or 50th percentile². The mid-point of the data shown by the dashed line that divides the “box” into two parts. 50% of the data fall below this value and 50% are above.

Upper Quartile (Q3): The third quartile or 75th percentile³. 75% of the data fall below this value and the top 25% are above.

Interquartile Range (IQR): The range between the lower and upper quartiles (Q3 - Q1) is called the interquartile range and is the highlighted “box” area which represents the middle 50% of data.

Lower Whisker: The whisker line that extends below the lower quartile to the minimum value and represents the bottom 25% of data.

Upper Whisker: The whisker line that extends above the upper quartile to the maximum value and represents the top 25% of data.

Minimum (Min): The lowest value that is within $1.5 \times \text{IQR}$ below the lower quartile ($Q1 - 1.5 \times \text{IQR}$) excluding outliers and represents the lower whisker limit.

Maximum (Max): The highest value that is within $1.5 \times \text{IQR}$ above the upper quartile ($Q3 + 1.5 \times \text{IQR}$) excluding outliers and represents the upper whisker limit.

Outliers: An extreme value that lies outside the lower or upper whiskers is designated an “Outlier”. A value less than $(Q1 - 1.5 \times \text{IQR})$ or greater than $(Q3 + 1.5 \times \text{IQR})$ is considered a mild outlier. A value less than $(Q1 - 3 \times \text{IQR})$ or greater than $(Q3 + 3 \times \text{IQR})$ is considered an extreme outlier.

¹ 25th percentile = $.25(N + 1)$ th data point.

² 50th percentile = $.50(N + 1)$ th data point.

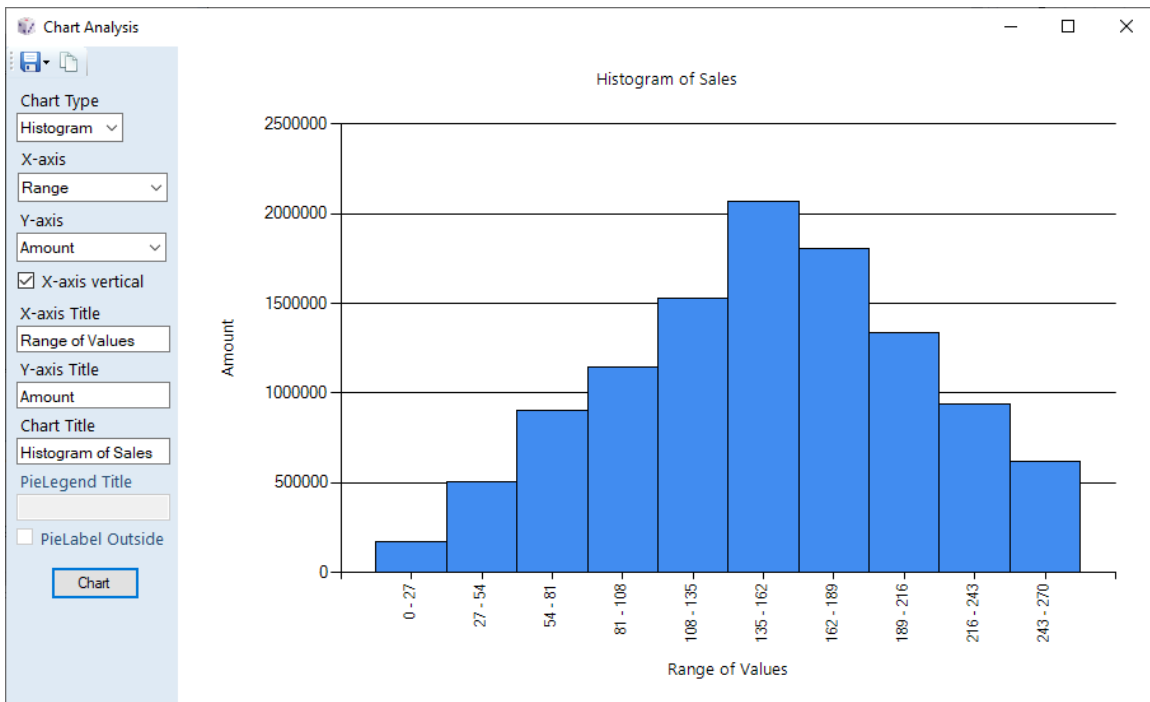
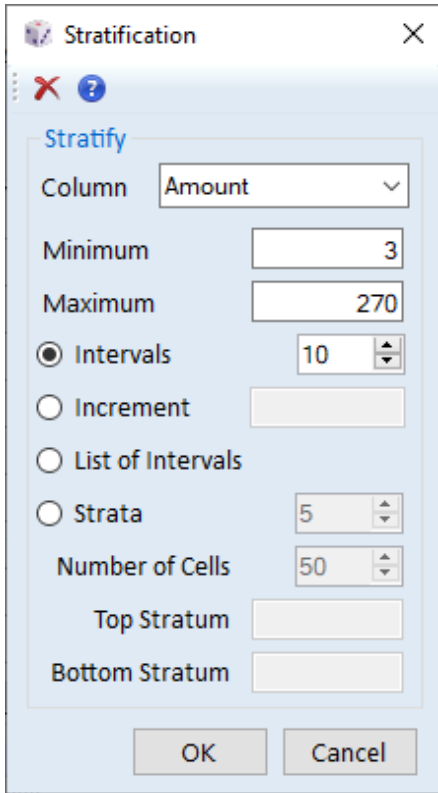
³ 75th percentile = $.75(N + 1)$ th data point.

* N = number of values in the data set (sorted from smallest to largest).

5.5 Histogram

A histogram displays the distribution of a data set by dividing the values into value ranges or intervals and is similar in appearance to a column chart. It can show the frequency of occurrence for each range of values.

Data > Histogram

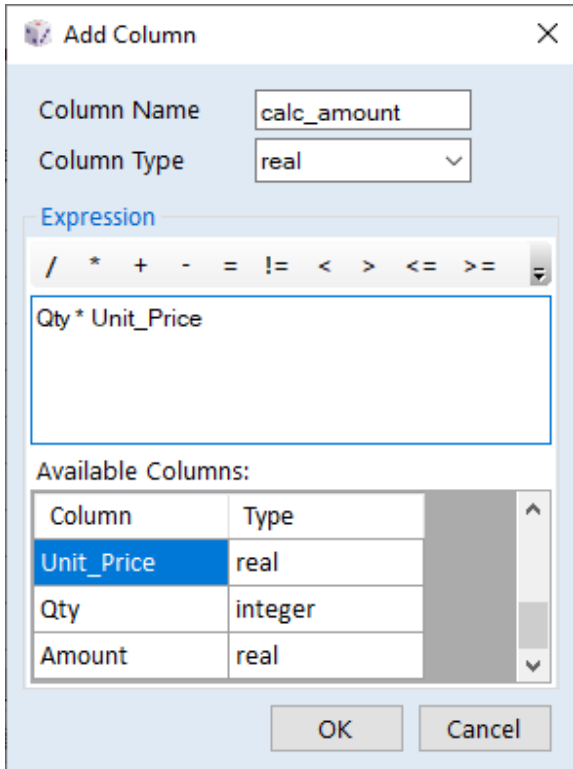


* Range: \geq Lower Limit and $<$ Upper Limit.

5.6 Add Column

Add a calculated column to the data table. Enter the column name and column type. Type Real is for double/decimal values.

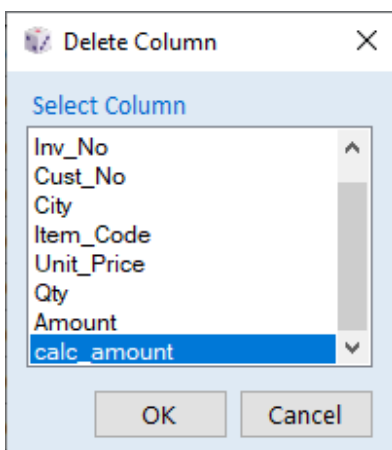
Data > Add Column



5.7 Delete Column

Delete a column from the data table.

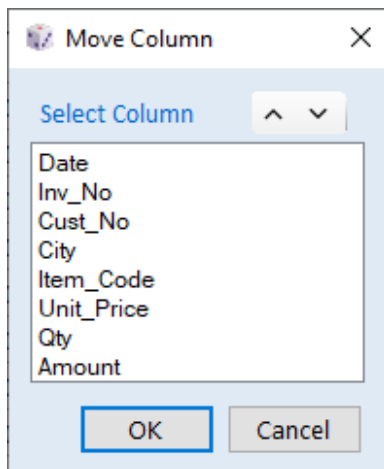
Data > Delete Column



5.8 Move Column

Move and change the column position up or down in the data table.

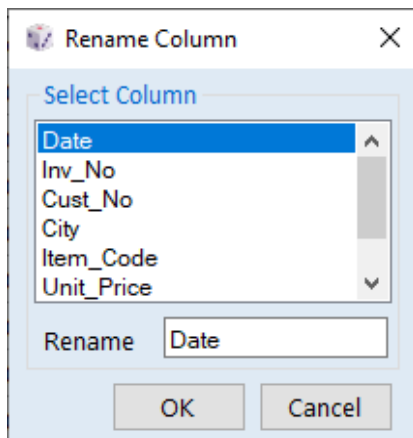
Data > Move Column



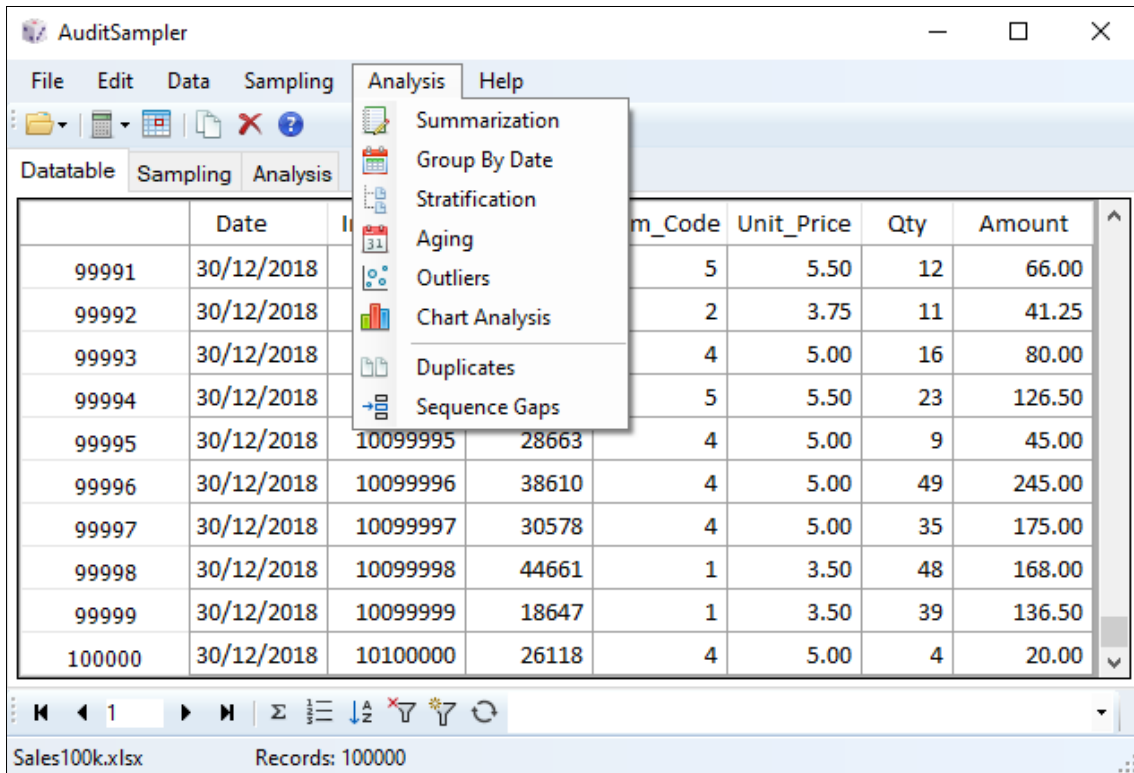
5.9 Rename Column

Rename and change the column name in the data table.

Data > Rename Column



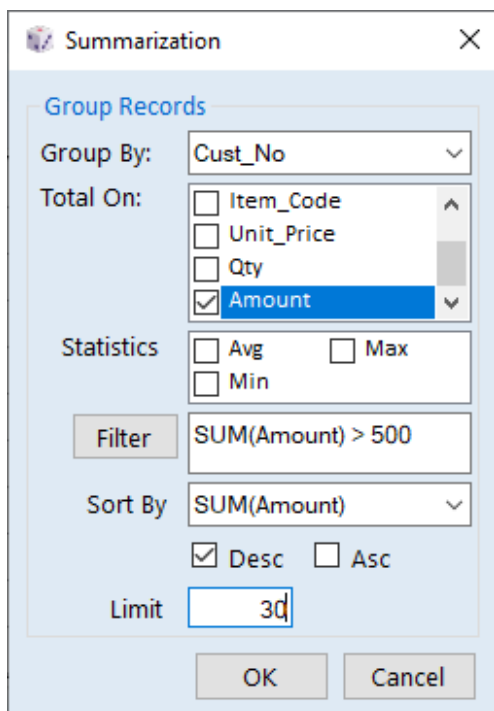
6. Analysis



6.1 Summarization

Summarize and group records. Select the Group By column and Total On column. Options to specify Statistics (Avg, Min, Max), Filter, Sort By (Descending or Ascending) and Limit (rows to display).

Analysis > Summarization



	Cust_No	Count	%Count	SUM(Amount)
▶ 1	26864	8	0.01	4,159.50
2	24638	7	0.01	3,960.75
3	17006	9	0.01	3,952.25
4	13492	7	0.01	3,849.00
5	21295	9	0.01	3,782.75
6	22793	9	0.01	3,758.50
7	30026	7	0.01	3,734.75
8	47129	8	0.01	3,727.50
9	12935	7	0.01	3,724.75
10	32377	9	0.01	3,692.00

6.2 Group By Date

Summarize and group records by date. Select group by Day, Week, Month or Year. Select the Date column, Total On column, month and year.

Analysis > Group By Date

Group By Date

Group By

Day Week Month

Year

Date:

Total On:

Month:

Year:

OK Cancel

	Day	Count	Amount	%Amount
1	2020-01-01	274	92,666.00	3.36
2	2020-01-02	274	89,193.75	3.24
3	2020-01-03	274	88,366.00	3.21
4	2020-01-04	274	90,164.75	3.27
5	2020-01-05	274	89,411.00	3.24
6	2020-01-06	274	88,025.50	3.19
7	2020-01-07	274	92,011.75	3.34
8	2020-01-08	274	91,283.50	3.31
9	2020-01-09	274	84,956.50	3.08
10	2020-01-10	274	78,894.00	2.86

6.3 Stratification

Stratify records based on value ranges (intervals). Select the column to stratify and specify the range using intervals, increment, list or strata options. Strata to determine the optimal boundaries based on the cumulative square root of frequency.

Analysis > Stratification

Stratification

Stratify

Column: Amount

Minimum: -31228

Maximum: 281449

Intervals: 10

Increment

List of Intervals

Strata: 5

Number of Cells: 50

Top Stratum:

Bottom Stratum:

OK Cancel

	Range	Count	%Count	%Amount	Amount	Min	Max	Avg
1	-32000 - 0	1	0.02	-0.03	-31,227.99	-31,227.99	-31,227.99	-31,227.99
2	0 - 32000	4103	82.06	44.54	42,201,078.71	2,002.81	31,981.40	10,285.42
3	32000 - 64000	575	11.50	27.18	25,755,988.46	32,000.14	63,994.89	44,793.02
4	64000 - 96000	274	5.48	23.20	21,985,187.63	64,006.16	95,721.43	80,237.91
5	96000 - 128000	46	0.92	4.81	4,555,655.73	96,013.32	101,962.66	99,035.99
6	128000 - 160000	0	0.00	0.00	0.00	0.00	0.00	0.00
7	160000 - 192000	0	0.00	0.00	0.00	0.00	0.00	0.00
8	192000 - 224000	0	0.00	0.00	0.00	0.00	0.00	0.00
9	224000 - 256000	0	0.00	0.00	0.00	0.00	0.00	0.00
10	256000 - 288000	1	0.02	0.30	281,448.38	281,448.38	281,448.38	281,448.38

* Range: >= Lower Limit and < Upper Limit.

For the List of intervals option, specify the start value of each interval and the end value of the last interval in the textbox (one per line):

Stratification

Stratify

Column: Amount

Minimum: -31228

Maximum: 281449

Intervals: 10

Increment

List of Intervals

Strata: 5

Number of Cells: 50

Top Stratum

Bottom Stratum

Start value of each interval and End value of the last interval. (One per line)

-32000
0
32000
64000
96000
128000
282000

OK Cancel

	Range	Count	%Count	%Amount	Amount	Min	Max	Avg	Stdev
1	-32000 - 0	1	0.02	-0.03	-31,227.99	-31,227.99	-31,227.99	-31,227.99	0.00
2	0 - 32000	4103	82.06	44.54	42,201,078.71	2,002.81	31,981.40	10,285.42	7,107.51
3	32000 - 64000	575	11.50	27.18	25,755,988.46	32,000.14	63,994.89	44,793.02	7,997.31
4	64000 - 96000	274	5.48	23.20	21,985,187.63	64,006.16	95,721.43	80,237.91	9,118.11
5	96000 - 128000	46	0.92	4.81	4,555,655.73	96,013.32	101,962.66	99,035.99	1,807.66
6	128000 - 282000	1	0.02	0.30	281,448.38	281,448.38	281,448.38	281,448.38	0.00

For the Strata option, specify the number of strata, cells and optionally the top/bottom stratum cutoff values.

Strata 5
 Number of Cells 100
 Top Stratum 280000
 Bottom Stratum 0

	Strata	Count	%Count	%Amount	Amount	Min	Max	Avg	Stdev
1	< 0	1	0.02	-0.03	-31,227.99	-31,227.99	-31,227.99	-31,227.99	0.00
2	0 - 8400	2092	41.84	10.83	10,259,404.29	2,002.81	8,393.51	4,904.11	1,721.15
3	8400 - 16800	1287	25.74	16.13	15,284,162.35	8,415.95	16,798.97	11,875.81	2,375.50
4	16800 - 36400	826	16.52	21.26	20,139,258.46	16,823.68	36,355.13	24,381.67	5,394.74
5	36400 - 64400	478	9.56	23.85	22,595,258.37	36,441.62	64,377.33	47,270.42	7,076.00
6	64400 - 103600	315	6.30	27.67	26,219,827.06	64,406.32	101,962.66	83,237.55	10,554.57
7	> 280000	1	0.02	0.30	281,448.38	281,448.38	281,448.38	281,448.38	0.00

6.4 Aging

Age outstanding records based on the due date. Select the Due Date column, Total On column and the report date.

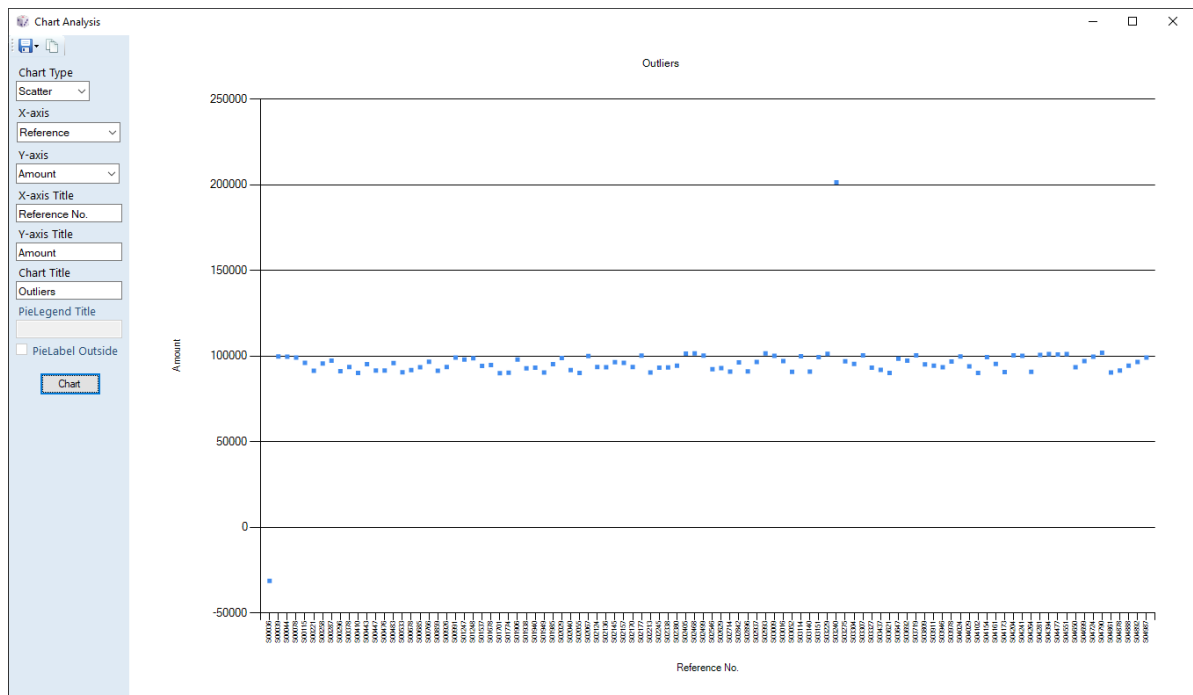
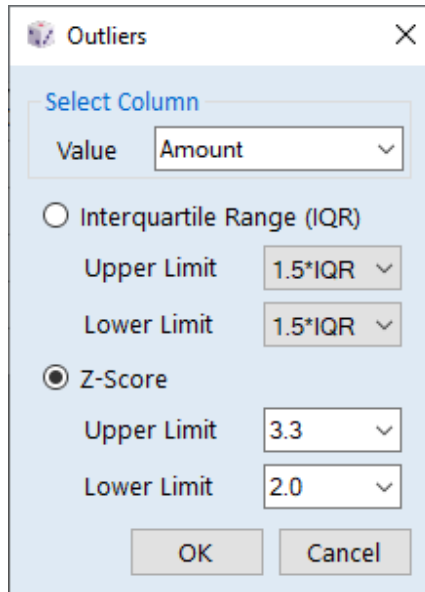
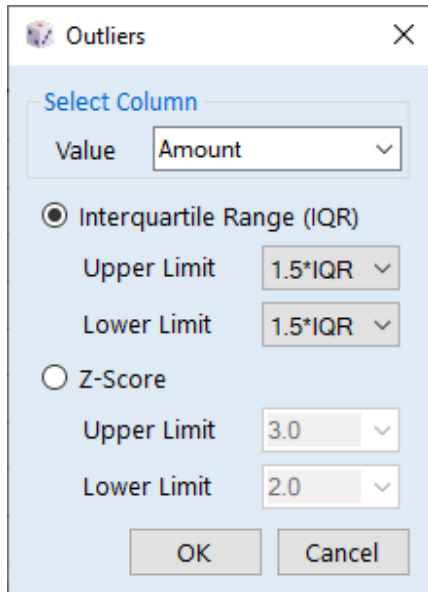
Analysis > Aging

	Days	Count	%Count	%Amount	Amount
1	0 - 30	8150	8.15	8.23	904,833.75
2	31 - 60	8250	8.25	8.16	896,707.75
3	61 - 90	8250	8.25	8.29	911,071.50
4	91 - 120	8250	8.25	8.26	907,864.50
▶ 5	>120	67100	67.10	67.07	7,373,549.00

6.5 Outliers

Select the Value column and the outlier method, Interquartile Range (IQR) or Z-Score. The upper and lower limits for IQR can be set at 1.5*IQR, 1.7*IQR or 3*IQR. The upper and lower limits for Z-Score can be set from 2.0 to 5.

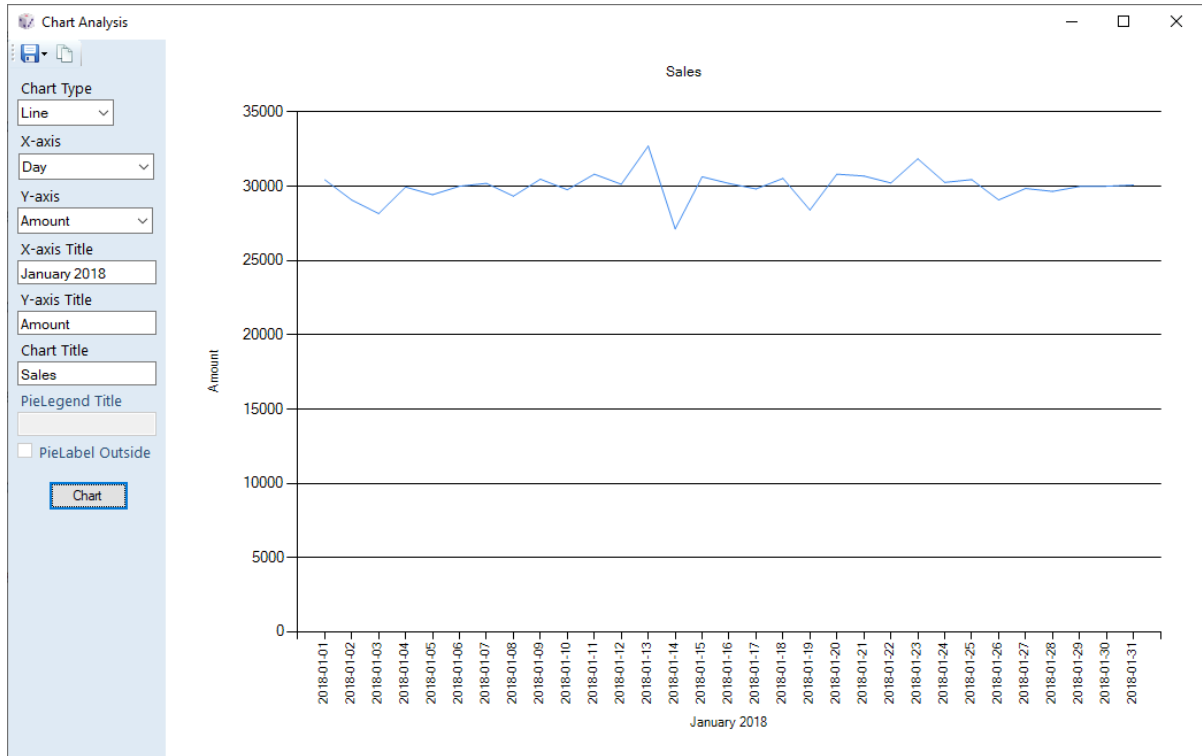
Analysis > Outliers



6.6 Chart Analysis

Select the chart type (Column, Histogram, Line, Scatter, Pie, Doughnut), X-axis and Y-axis. Define the chart and axis titles.

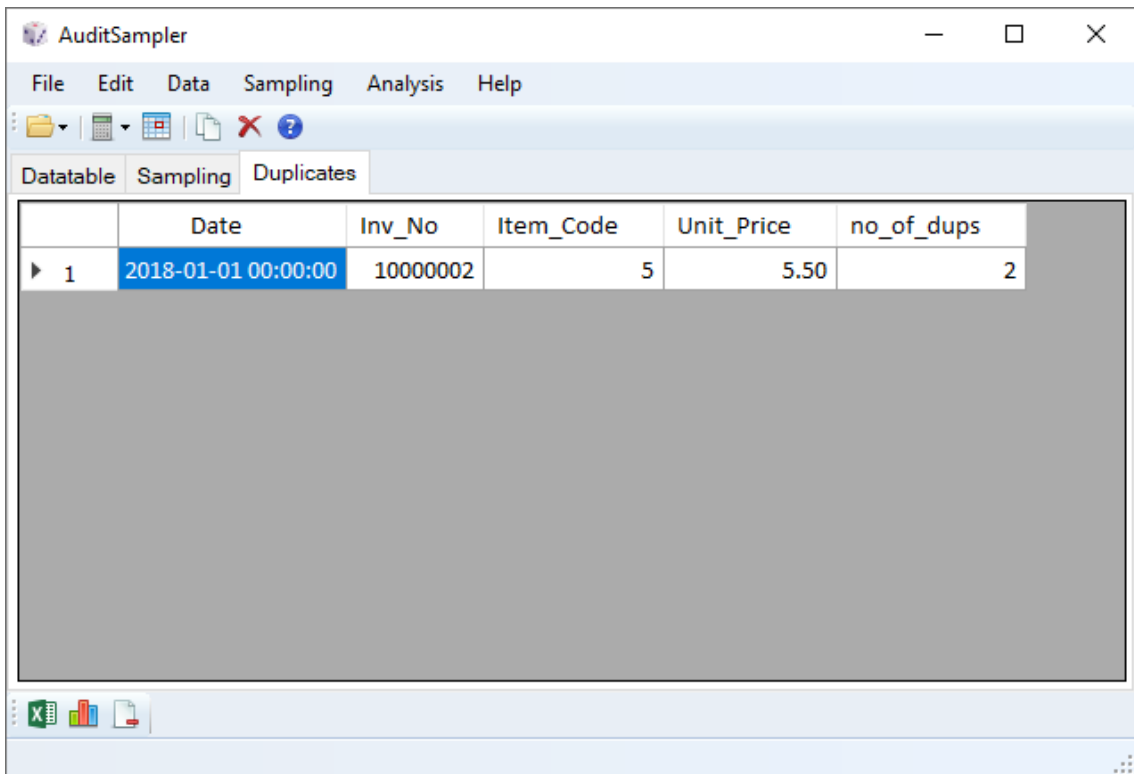
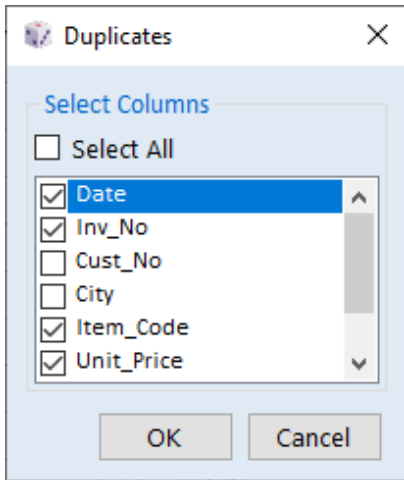
Analysis > Chart Analysis



6.7 Duplicates

Select one or more columns to check for duplicate entries or values.

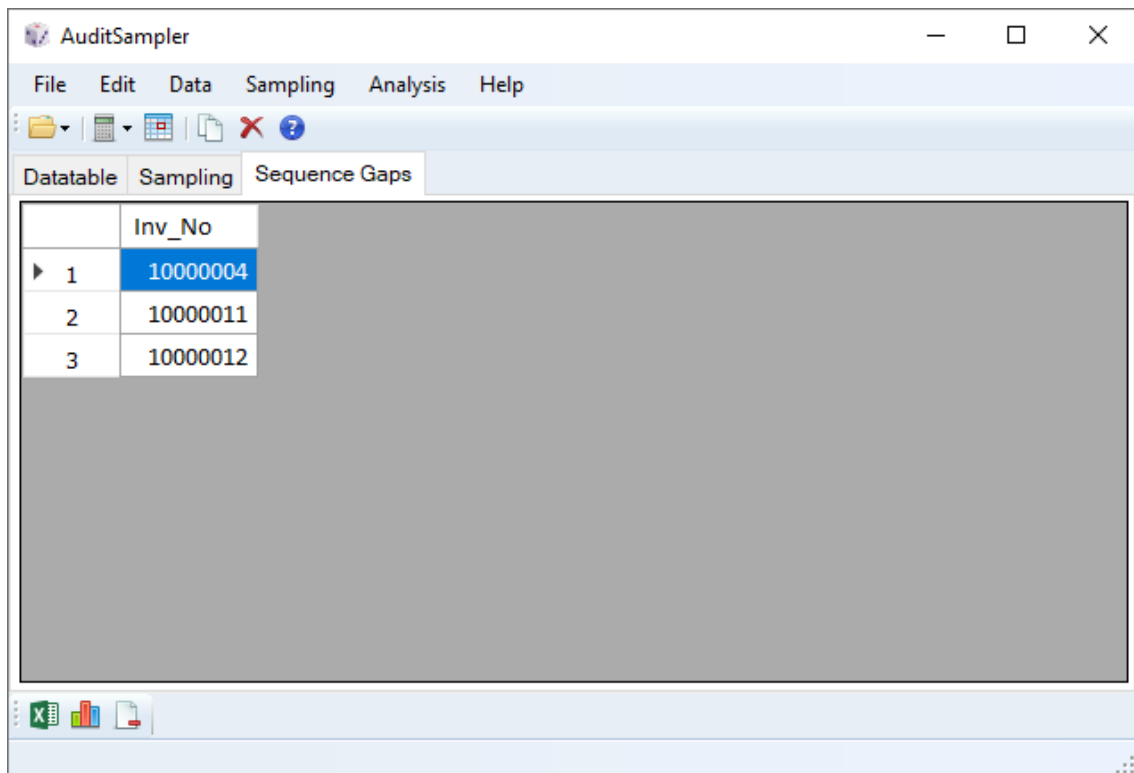
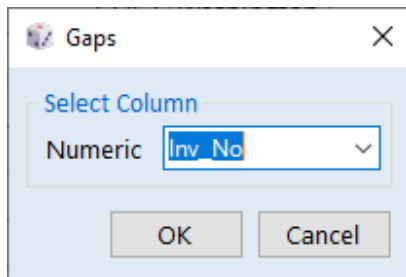
Analysis > Duplicates



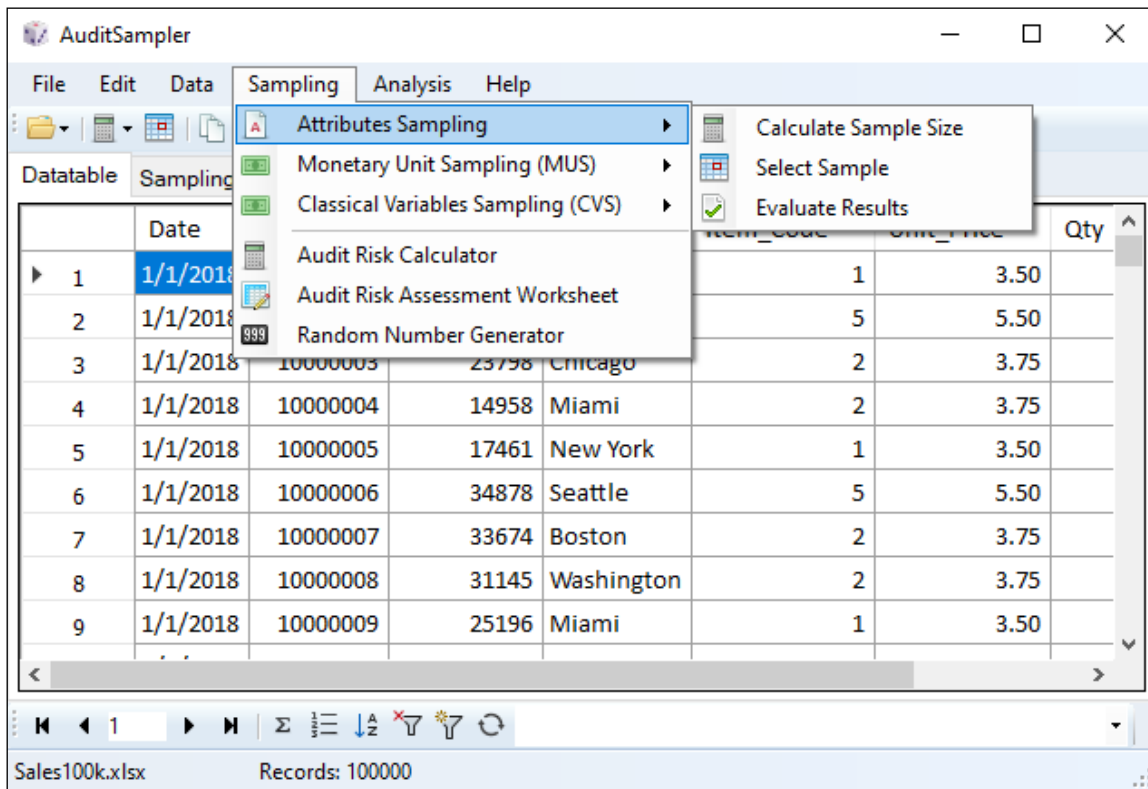
6.8 Sequence Gaps

Select a numeric column to check for gaps in the number sequence.

Analysis > Sequence Gaps

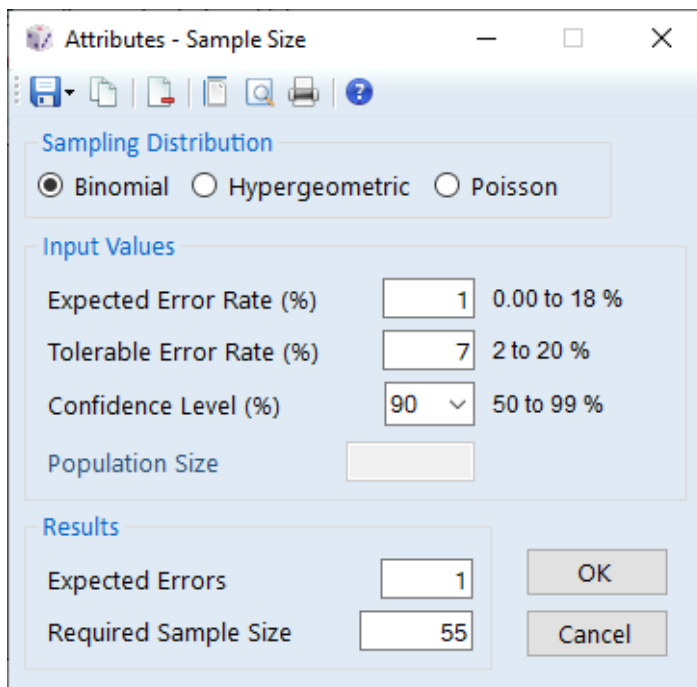


7. Attributes Sampling



7.1 Sample Size

Sampling > Attributes > Calculate Sample Size



Sample size can be calculated based on Binomial, Hypergeometric or Poisson distributions.

[Input Values](#)

[Description](#)

Expected Error Rate (%)	Expected rate of error in the population. From 0.00 to 18%.
Tolerable Error Rate (%)	Maximum acceptable rate of error in the population. From 2% to 20%.
Confidence Level (%)	The required level of assurance (1 - <i>risk of incorrect acceptance</i>). From 50 to 99%.
Population Size (Hypergeometric only)	Population size from 100 to 8 Million.

Results

Description

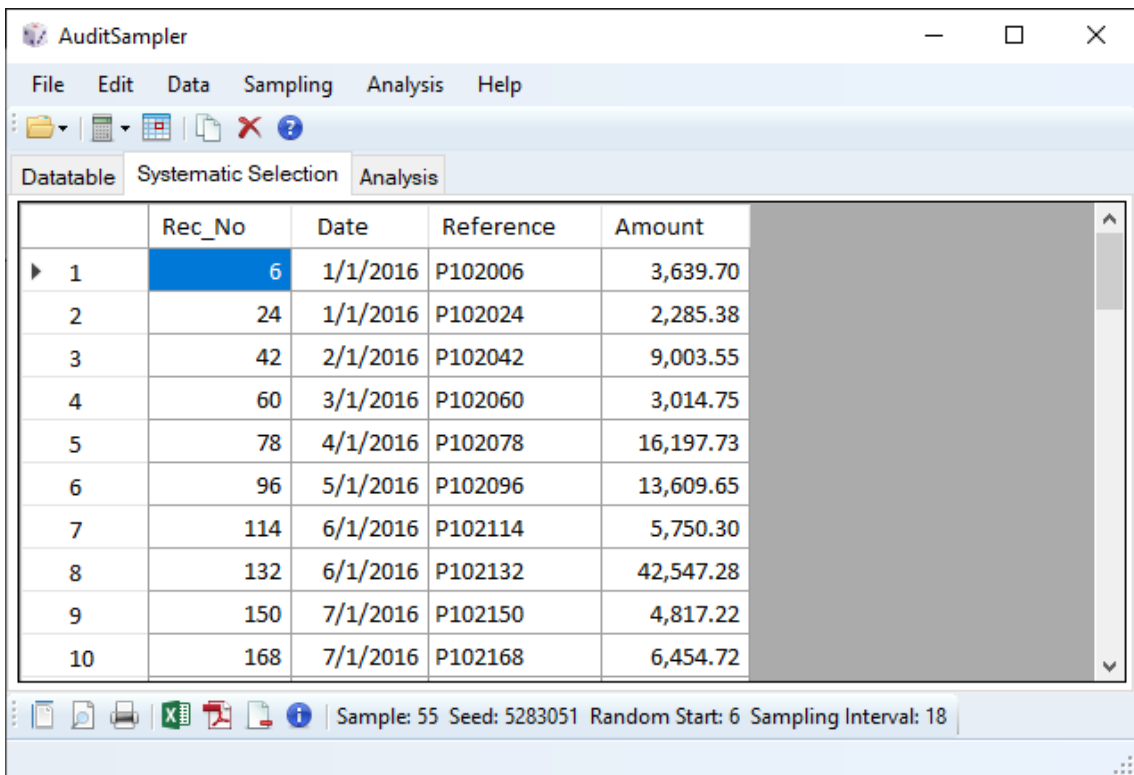
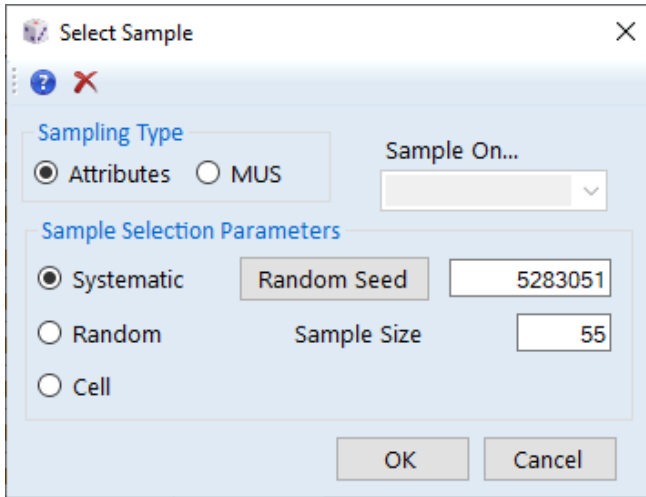
Number of Expected Errors	Expected number of errors in the sample.
Required Sample Size	Calculated number of items or records to sample. Maximum size is 3000.

7.2 Select Sample

Samples can be selected based on Systematic, Random or Cell selection methods.

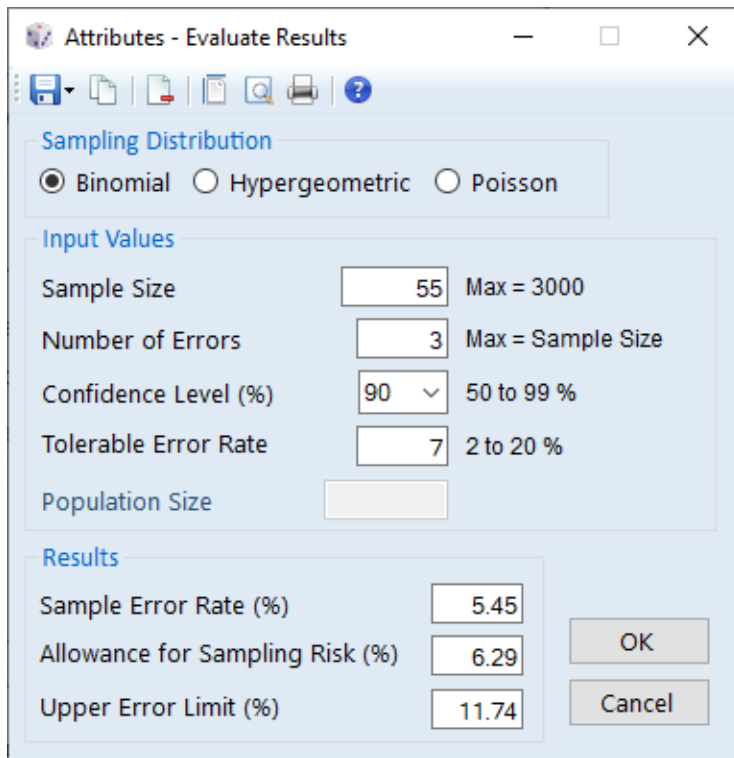
Parameters	Description
Systematic	Based on a sampling interval which is calculated by dividing the number of items in the population with the sample size. A random start between 1 and the sampling interval is selected as the first sample. Subsequently, every n th item in the population which equals each increment of the sampling interval is selected.
Random	Random numbers between 1 and the total population size are picked as the selected items. The samples are the items in the population that match the selected random numbers.
Cell	Based on a cell interval which is used to divide the population into cells of equal size and a random number is picked from each cell as the sample item. The cell interval is calculated by dividing the number of items in the population with the sample size.
Sample Size	Number of samples to select. Maximum size is 3000.
Random Seed	A random seed value is used to generate the random values for the sample selection. The seed for a previous sample can be used to recalculate the same results for that sample.

Sampling > Attributes > Select Sample



7.3 Evaluate Results

Sampling > Attributes > Evaluate Results



Sample results can be evaluated based on Binomial, Hypergeometric or Poisson distributions.

The results are evaluated by comparing the Upper Error Limit (UEL) to the Tolerable Error Rate (TER). The upper error limit equals the sample error rate plus an allowance for sampling risk.

- If $UEL \leq TER$, the sample results indicate that the controls are effective.
- If $UEL > TER$, the sample results indicate that the controls are not effective.

Input Values

Sample Size
 Number Errors in Sample
 Confidence Level (%)
 Tolerable Error Rate (%)
 Population Size
 (Hypergeometric only)

Description

Number of samples selected. Maximum size is 3000.
 Number of errors found in the samples selected.
 The required level of assurance (1 - risk of incorrect acceptance). From 50 to 99%.
 Maximum acceptable rate of error for the sample results. From 2 to 20%.
 Population size from 100 to 8 Million.

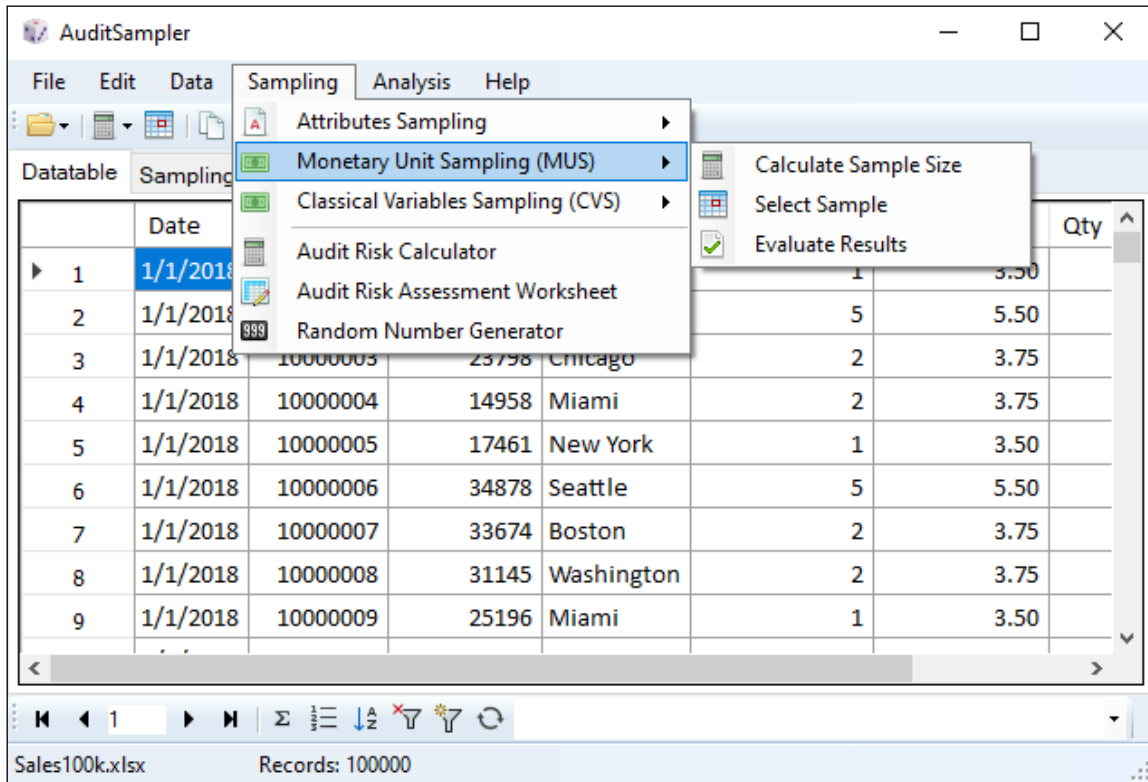
Results

Sample Error Rate (%)
 Allowance for Sampling Risk (%)
 Upper Error Limit (%)

Description

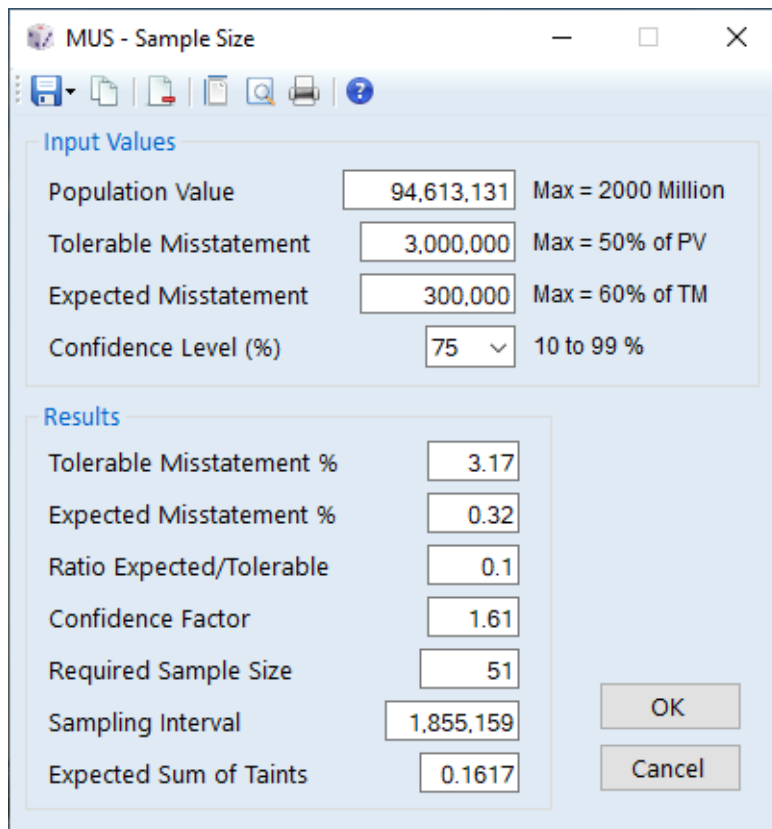
The percentage of errors detected in the sample size.
 The allowance for projection of the sample errors to the population.
 The sample error rate plus an allowance for sampling risk.

8. Monetary Unit Sampling (MUS)



8.1 Sample Size

Sampling > MUS > Calculate Sample Size



The MUS sample size is calculated based on the formula $n = R/P$, which is derived from the Poisson probability distribution: where n is the sample size, R is the reliability factor (confidence factor) and P is the precision (tolerable misstatement rate).

Input Values	Description
Population Value	Book value or monetary value of the population. Maximum value of 2000 Million.
Tolerable Misstatement	Maximum acceptable amount of monetary misstatement in the population. Maximum limit is 50% of population value.
Expected Misstatement	Expected amount of monetary misstatement in the population. Maximum limit is 60% of tolerable misstatement.
Confidence Level (%)	The required level of assurance (1 - <i>risk of incorrect acceptance</i>). From 10 to 99%.
Results	Description
Tolerable Misstatement %	The tolerable misstatement divided by the population value.
Expected Misstatement %	The expected misstatement divided by the population value.
Ratio Expected/Tolerable	The expected misstatement divided by the tolerable misstatement.
Confidence Factor	The reliability factor that reflects the confidence level and the expected amount of misstatement.
Required Sample Size	The calculated number of monetary units to sample. Maximum size is 5000.
Sampling Interval	The population value divided by sample size. Interval used to systematically select the sample items.
Expected Sum of Taints	The expected misstatement (%) multiplied by the sample size.

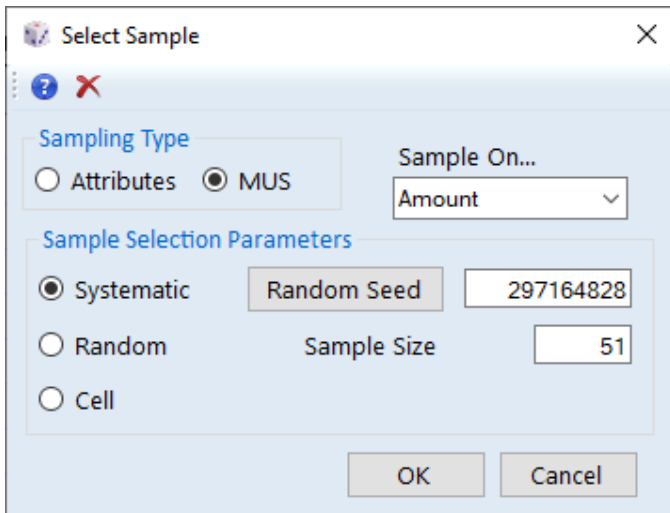
8.2 Select Sample

Samples can be selected based on Systematic, Random or Cell selection methods.

Parameters	Description
Systematic	Based on a sampling interval which is calculated by dividing the population value with the sample size. A random start between \$1 and the sampling interval is selected as the first sampling unit. Each amount in the population is added to a cumulative subtotal. The first amount whose balance results in the subtotal equalling or exceeding the random start is selected as the first sample. Subsequently, each amount which causes the subtotal to equal or exceed each increment of the sampling interval is selected.
Random	Random values between \$1 and the total population value are picked as the selected dollar units. The samples are the amount balances in the population that contain the selected dollar units.
Cell	Based on a cell interval which is calculated by dividing the population value with the sample size. The cell interval is used to divide the population value into cells of equal size and a random value is picked from each cell as the selected dollar unit. The samples are the amount balances in the population that contain the selected dollar units.

Sample On	The monetary amount column to sample on.
Sample Size	The number of samples to select. Maximum size is 5000.
Random Seed	A random seed value is used to generate the random values for the sample selection. The seed for a previous sample can be used to recalculate the same results for that sample.

Sampling > MUS > Select Sample



	Rec_No	Date	Reference	Amount	Cumulative_Total	Selected_Unit
▶ 1	39	2/1/2016	S00039	99,746.16	692,720.29	668,048
2	131	6/1/2016	S00131	4,524.19	2,523,533.77	2,523,207
3	258	11/1/2016	S00258	95,721.43	4,451,076.51	4,378,366
4	365	14/1/2016	S00365	78,957.94	6,257,242.78	6,233,525
5	447	17/1/2016	S00447	91,640.10	8,131,306.43	8,088,684
6	550	20/1/2016	S00550	52,715.28	9,946,157.38	9,943,843
7	646	24/1/2016	S00646	38,408.49	11,820,243.48	11,799,002
8	738	27/1/2016	S00738	66,959.58	13,683,351.76	13,654,161
9	820	30/1/2016	S00820	47,863.15	15,528,832.67	15,509,320
10	916	4/2/2016	S00916	45,254.73	17,376,758.98	17,364,479

Sample Units: 51 Records: 51 Random Start: 668,048 Interval: 1,855,159 Seed: 297164828

8.3 Evaluate Results

Sampling > MUS > Evaluate Results

Input Values

Population Value: 94,613,131
 Tolerable Misstatement: 3,000,000
 Sample Size: 51
 Confidence Level (%): 75

Misstatements (Max=50)

	Book Value	Audited Value
▶ 1	60,000.00	50,000.00
2	85,000.00	75,000.00
3	99,000.00	89,000.00

Results

#	Book Value	Audited Value	Tainted %	Sampling Interval	Projected Misstatement	Incremental Confidence Factor	Misstatement Bound
Overstatements:							
#0				1,855,159		1.39	2,578,671
#1	60,000.00	50,000.00	16.67	1,855,159	309,255	1.31	405,124
#2	85,000.00	75,000.00	11.76	1,855,159	218,167	1.23	268,345
#3	99,000.00	89,000.00	10.10	1,855,159	187,371	1.18	221,098
Total Overstatement Bou...							3,473,238
(-) Projected Understate...							

Lower Misstatement Bound (LMB): 1,863,878 Upper Misstatement Bound (UMB): 3,473,238

UMB > TM, the account balance is materially misstated (overstated).

The sample results are evaluated by comparing the Upper Misstatement Bound (UMB) and Lower Misstatement Bound (LMB) to the Tolerable Misstatement (TM). The upper and lower misstatement bound equals the upper error limit for overstatements and understatements.

- If UMB and $LMB \leq TM$, the sample results indicate that the account balance is not materially misstated.
- If UMB or $LMB > TM$, the sample results indicate that the account balance is materially misstated.

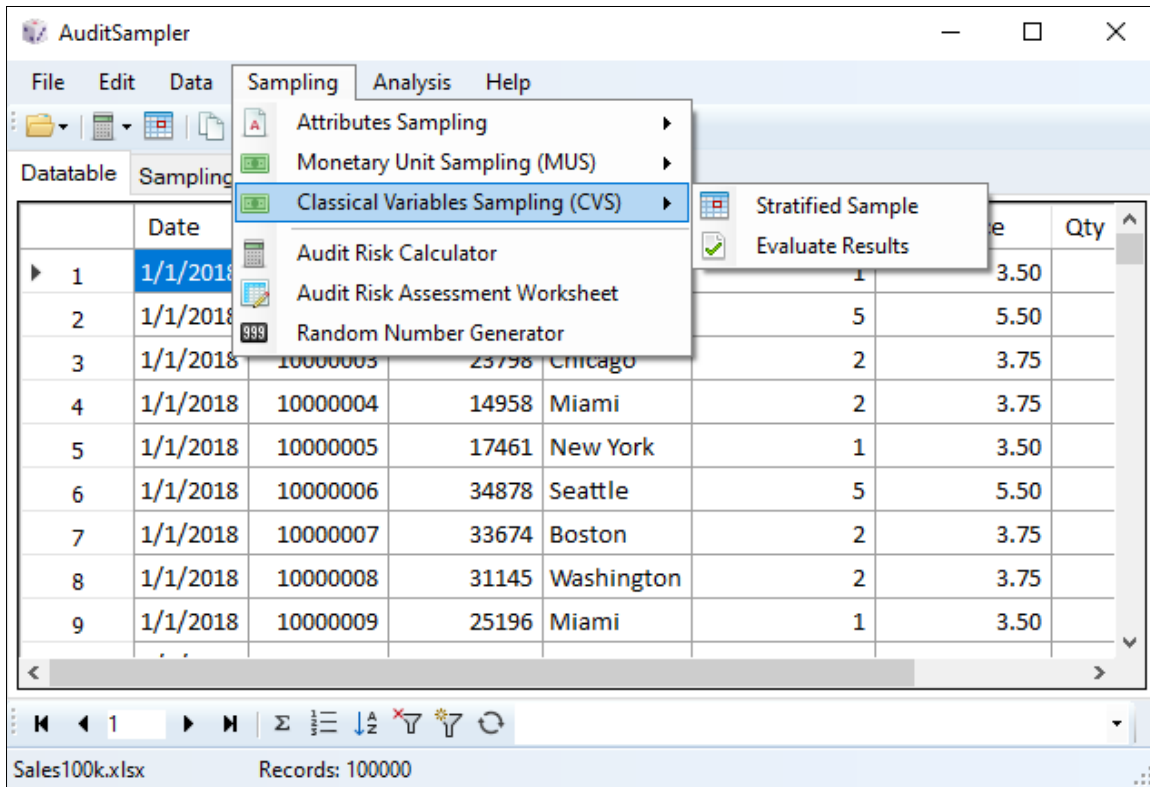
Input Values

Input Values	Description
Population Value	Book value or monetary value of the population. Maximum value of 2000 Million.
Tolerable Misstatement	Maximum acceptable amount of misstatement for the sample results. Maximum limit is 50% of population value.
Sample Size	The number of samples selected. Maximum size is 5000.
Confidence Level (%)	The required level of assurance (1 - <i>risk of incorrect acceptance</i>). From 10 to 99%.
Misstatements	Sample items with a difference between the book value and the audited value (overstatement or understatement). Maximum number of misstatements is 50.

Results

Results	Description
Tainting %	The misstatement amount divided by the sample item's book value. A tainting % is calculated for each misstatement if its book value is less than the sampling interval. If the book value is greater than the sampling interval, the projected misstatement and bound will equal the error/misstatement amount.
Sampling Interval	The population value divided by sample size.
Projected Misstatement	The tainting % multiplied with the sampling interval.
Incremental Confidence Factor	The incremental change in the confidence factor for each misstatement, e.g. the increment in the confidence factor from misstatement #1 to #2.
Misstatement Bound	The projected misstatement multiplied by the incremental confidence factor.
Upper Misstatement Bound	Total overstatement bound (basic precision + misstatement bound for each overstatement) less any projected understatement.
Lower Misstatement Bound	Total understatement bound (basic precision + misstatement bound for each understatement) less any projected overstatement.

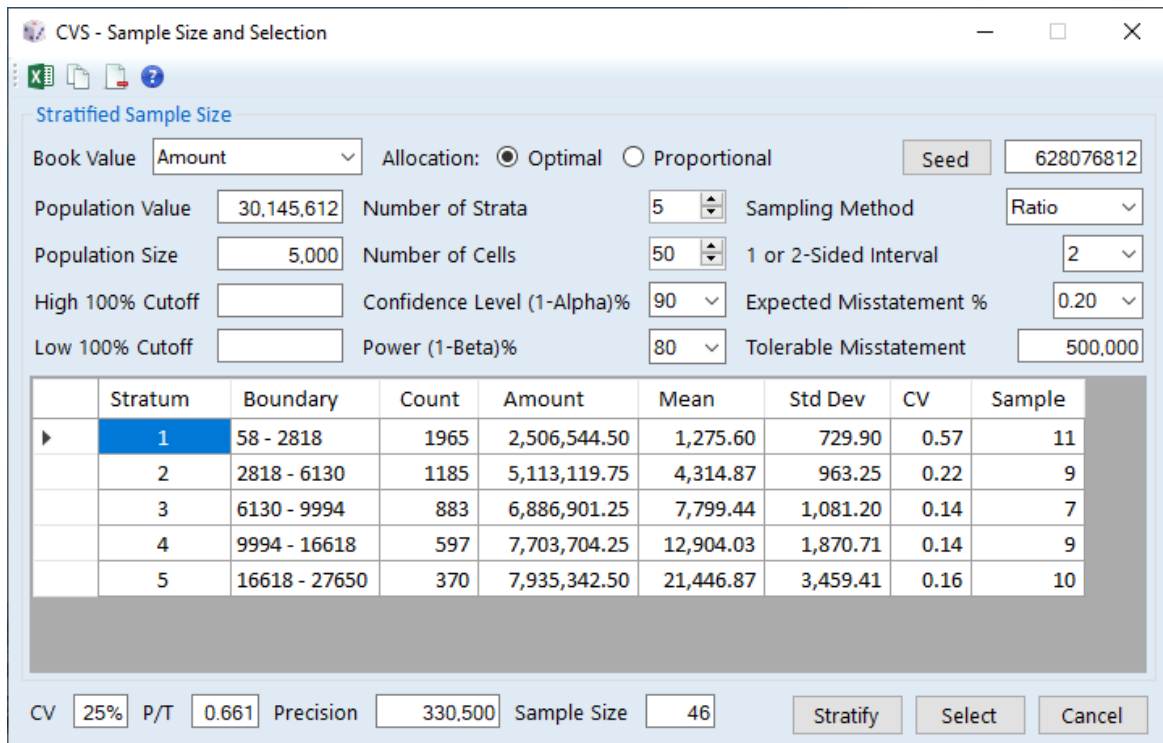
9. Classical Variables Sampling (CVS)



Classical Variables Sampling (CVS) is used to estimate the total audited amount or the total misstatement of a population. Each amount or item in the population is a sampling unit and the population is stratified by value for random sampling. CVS uses the normal distribution theory, standard deviation and confidence interval to evaluate the characteristics of the population.

9.1 Sample Size and Selection

Sampling > CVS > Sample Size and Selection



The sample size can be calculated based on stratified difference, ratio or mean estimation. The stratum boundaries or intervals for the stratification are determined using the cumulative square root of frequency method. The sample size is allocated to the strata using either the optimum Neyman allocation or proportional to the stratum total value.

Note: The sample size must be greater than the number of strata (e.g. number of strata = 5, sample size > 5).

Input Values

Description

Book Value	Book value column to select for sampling.
Sampling Method	Estimation method to compute sample size (difference, ratio or mean-per-unit estimation).
Allocation	Allocation of sample size based on the Optimal (Neyman) method or Proportional to Total Value.
Population Value	Book value or monetary value of the population. Maximum value of 2000 Million.
Population Size	Total number of items in the population
Minimum Value	Minimum value of the recorded amounts in the population.
Maximum Value	Maximum value of the recorded amounts in the population.
Number of Strata	Number of intervals for the stratification. From 1 to 12.
Number of Cells	Number of cells (smaller in size than intervals) used for preliminary stratification. From 20 to 100.
Confidence Level (1-Alpha)	The level of confidence that the sample estimate is accurate (1 – alpha risk of incorrect rejection). 1 or 2-sided (80 to 99%).
Power (1-Beta)	The power of the test to detect a significant difference (1 – beta risk of incorrect acceptance). From 50 to 99%.
1 or 2-sided Interval	1 or 2-sided confidence interval (lower/upper tails).

High 100% Cutoff	Upper 100% cutoff. All items above this limit are selected.
Low 100% Cutoff	Lower 100% cutoff. All items below this limit are selected.
Expected Misstatement %	Estimated proportion of misstatement in the population. From 0.05 to 20%. An error rate must be entered for the calculation.
Tolerable Misstatement	Maximum acceptable amount of monetary misstatement in the population. Maximum limit is 50% of population value.
Seed	A random seed value is used to generate the random values for the sample selection. The seed for a previous sample can be used to recalculate the same results for that sample.

Results	Description
Stratum	Sequence number for each stratum.
Boundary	The lower and upper limits (boundaries) for the stratum.
Count	Number of items or records in the stratum.
Amount	Total value of the recorded amounts in the stratum.
Mean	Average value of the recorded amounts in the stratum.
Std Dev	Standard deviation of the recorded amounts in the stratum.
CV	Coefficient of variation (ratio of the standard deviation to the mean).
Sample	The number of items or records to sample in the stratum.
Ratio P/T	Precision as a fraction of tolerable misstatement related to α and β . ($P/T = Z_{\alpha} / Z_{\alpha} + Z_{\beta}$)
Precision	Allowance for sampling risk (P/T * tolerable misstatement).
Sample Size	The total number of items to sample. Maximum size is 5000.

The samples are randomly selected from each stratum based on a random seed (stratified random selection).

AuditSampler

File Edit Data Sampling Analysis Help

Datatable Stratified Random Selection Analysis

	Stratum	Rec_No	Date	Inv_No	Cust_No	City	Item_Code	Unit_Price	Qty	Amount
31	4	1574	23/4/2021	10001574	22110	Boston	5	170.25	60	10,215.00
32	4	2934	29/7/2021	10002934	17808	Houston	7	350.00	43	15,050.00
33	4	263	19/1/2021	10000263	13248	Honolulu	5	170.25	62	10,555.50
34	4	2857	24/7/2021	10002857	42832	Chicago	7	350.00	34	11,900.00
35	4	658	16/2/2021	10000658	31212	Chicago	5	170.25	62	10,555.50
36	4	4592	24/11/2021	10004592	24535	Honolulu	7	350.00	31	10,850.00
37	5	3485	6/9/2021	10003485	21441	Miami	7	350.00	76	26,600.00
38	5	4674	30/11/2021	10004674	37568	Washington	6	230.50	78	17,979.00
39	5	797	26/2/2021	10000797	19275	Houston	7	350.00	78	27,300.00
40	5	1319	5/4/2021	10001319	28478	Miami	7	350.00	52	18,200.00
41	5	4572	23/11/2021	10004572	16023	Honolulu	6	230.50	77	17,748.50
42	5	3201	17/8/2021	10003201	48901	Houston	7	350.00	69	24,150.00
43	5	740	22/2/2021	10000740	11496	Chicago	7	350.00	66	23,100.00
44	5	3701	22/9/2021	10003701	41277	Chicago	6	230.50	74	17,057.00
45	5	2591	5/7/2021	10002591	23256	New York	7	350.00	57	19,950.00
46	5	3229	19/8/2021	10003229	19548	New York	7	350.00	65	22,750.00

Sample Size: 46 Seed: 923718250

testdata.csv

9.2 Evaluate Results

Sampling > CVS > Evaluate Results

CVS - Evaluate Results

Confidence Level (%) 80 Precision Limits Both Evaluation Method Ratio

Strata

Stratum	Total Items	Population Value
1	1,965	2,506,545
2	1,185	5,113,120
3	883	6,886,901
4	597	7,703,704

Samples (Book/Audit Value)

	Stratum	Book Value	Audited Value	Difference
1	1	1,811.25	1,811.25	0.00
2	1	1,014.00	1,014.00	0.00
3	1	468.00	468.00	0.00

Results

Stratum	Sample Ratio	Sample Estimate	Standard Deviation	Standard Error
1	0.996452	2,497,651.28	15.48	9,145.73
2	0.999586	5,111,002.92	18.45	7,260.02
3	0.998599	6,877,252.70	29.66	9,859.49
4	0.997872	7,687,310.77	39.10	7,722.03
5	0.999573	7,931,954.11	18.88	2,178.98
All		30,105,171.78		36,166.25
T-value df=41				1.30
Precision				47,108.11

Summary	Total
Population Value	30,145,612.25
Audited Amount:	
Lower Limit	30,058,063.67
Point Estimate	30,105,171.78
Upper Limit	30,152,279.89
Misstatement:	
Lower Limit	-87,548.58
Point Estimate	-40,440.47
Upper Limit	6,667.64

OK Cancel

The sample results are evaluated by determining if the population value falls within the audited amount precision limits or the misstatement precision limits do not exceed the tolerable misstatement:

- If the population value falls within the audited amount precision limits, conclude that the account is likely fairly stated;
- If the misstatement precision limits do not exceed the tolerable misstatement, conclude that the account is not materially misstated;
- If the lower or upper misstatement precision limit is greater than tolerable misstatement, conclude that the account is materially misstated.

Input Values	Description
Population Value	Book value or monetary value of the population. Maximum value of 2000 Million.
Confidence Level (%)	The desired level of confidence (1 - <i>risk of incorrect acceptance</i>). From 50 to 99%.
Precision Limits	Evaluate both precision limits (2-sided) or upper limit (1-sided) or lower limit (1-sided).
Evaluation Method	Estimation method to evaluate sample results (difference, ratio or mean-per-unit estimation).
Strata	Stratum number, total items in the stratum and population value. Maximum is 20 rows.
Samples (Book/Audit Value)	The book and audited values for all the samples (including the High 100% and Low 100% cutoff items). Maximum number of items is 5000.

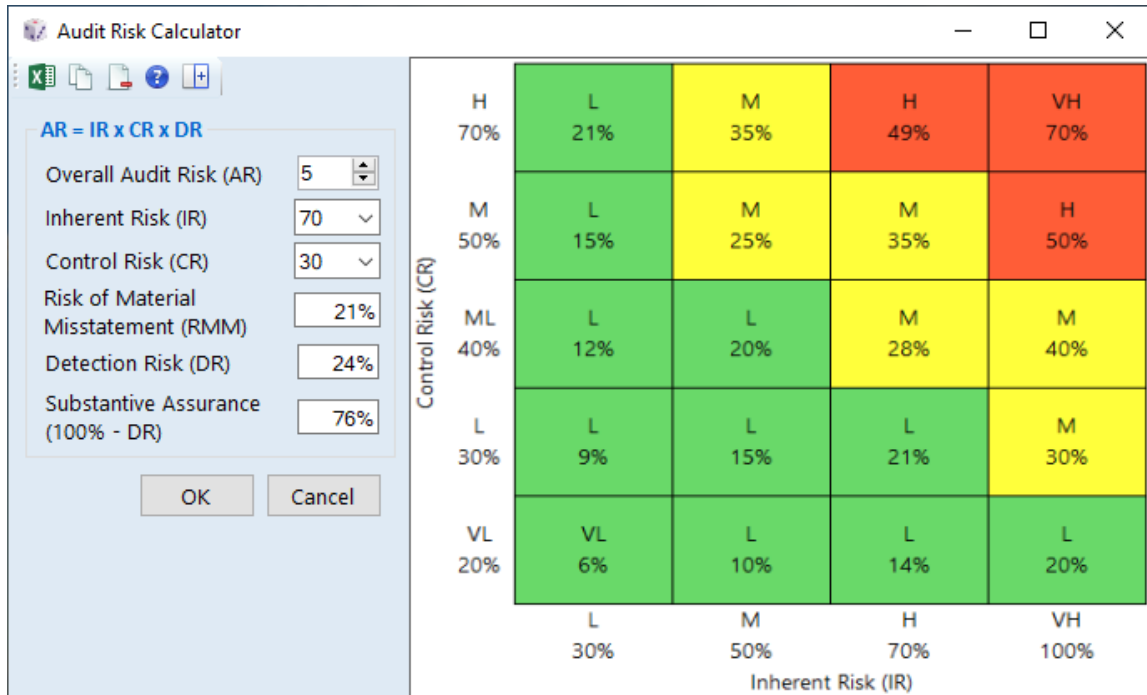
Results	Description
Stratum	Sequence number for each stratum.
Difference	Non-zero differences in the sample (audited value - book value).
Mean Difference	Mean of the sample differences (misstatements / sample size).
Sample Ratio	Ratio of the sample differences (misstatements / audited amounts).
Sample Mean	Mean of the audited amounts (audited amounts / sample size).
Sample Estimate	Sample estimate of the misstatement or audited amount (total items * sample mean).
Standard Deviation	Standard deviation of the sample (measure of the variance within the sample).
Standard Error	Standard deviation of the sampling distribution (standard error of the estimate).
Precision	Allowance for sampling risk (standard error * critical T-value for the confidence level).
Point Estimate: Audited Value	Sample estimate of audited amounts (or population book value + sample estimate of misstatement).
Point Estimate: Misstatement	Sample estimate of misstatement + High 100% + Low 100%.
Lower Limit	Lower precision limit (point estimate - precision value).

Upper Limit

Upper precision limit (point estimate + precision value).

10. Audit Risk Calculator

Sampling > Audit Risk Calculator



The calculation is based on the Audit Risk Model ($AR = IR \times CR \times DR$), where the audit risk consists of three components i.e. inherent, control and detection risks.

Input Values

Audit Risk (AR)

Description

The overall acceptable level of audit risk. From 1 to 5% (default at 5%).

Inherent Risk (IR)

The susceptibility of an account balance or class of transactions to material misstatement, assuming there are no related controls. From 30 to 100%.

Control Risk (CR)

The risk that the internal controls will fail to prevent or detect material misstatements. From 20 to 100%.

Results

Detection Risk (DR)

Description

The risk that the audit procedures will fail to detect material misstatements.

Substantive Assurance

The assurance required from substantive tests (complement of detection risk i.e. $100\% - DR$).

11. Audit Risk Assessment Worksheet

Sampling > Audit Risk Assessment Worksheet

Account Balance/Class of Transactions	Assertions	Identified Risks	Information System	Control Activities	AR	IR	CR	RMM	DR
Fixed Assets - Land & Buildings	CEAVO	Susceptibility of land titles to loss or theft Changes in market value or fair value	Non-complex commercial application Simple automated reporting	Safekeeping of land and property titles Annual review of property fair value	5	30	30	9%	56%
Fixed Assets - Furniture & Computer Equipment	CEAV	Susceptibility of assets to loss or theft Subjective recognition of depreciation	Non-complex commercial application Simple automated reporting	Fixed asset register and asset tagging Asset movement control procedures Depreciation policies in accounting manual	5	50	30	15%	33%
Inventory	CEAV	Susceptibility of assets to loss or theft Susceptibility of assets to obsolescence	Non-complex commercial application Simple automated reporting	Physical safeguards over inventory Stock-take and reconciliation of inventory	5	50	30	15%	33%
Accounts Receivable	AV	Size of account balances Subjective allocation of credit limits Subjective provision for doubtful debts	Non-complex commercial application Simple automated reporting	Credit control procedures Monitoring of overdue accounts and debtors aging	5	50	50	25%	20%
Investments - Certificates of Deposit	AV	Size and volume of transactions Susceptibility of assets to loss or theft	Mid-size and moderately complex commercial application	Safekeeping of negotiable certificates of deposit Stock-count and reconciliation of certificates	5	50	20	10%	50%
Investments - Bonds	AV	Size and volume of transactions Changes in market value or fair value	Mid-size and moderately complex commercial application	Mark-to-market valuation Monitoring of bond performance and ratings	5	50	50	25%	20%
Investments - Securities	AV	Size and volume of transactions Changes in market value or fair value Volatility in stock market	Mid-size and moderately complex commercial application	Mark-to-market valuation Monitoring of profit and loss position	5	50	50	25%	20%
Investments - Foreign Exchange	AV	Size and volume of transactions Changes in market value or fair value Volatility in FX market	Mid-size and moderately complex commercial application	Mark-to-market valuation Monitoring of profit and loss position Monitoring of cut-loss position	5	70	50	35%	14%
Investments - Derivatives	AV	Significant complex financial instruments Changes in market value or fair value Volatility in derivatives market	Complex commercial application	Mark-to-market valuation Monitoring of profit and loss position Monitoring of portfolio value-at-risk	5	100	70	70%	7%

Input Values

Account Balance / Class of Transactions

Assertions (CEAVO)

Identified Risks

Information System

Control Activities

Audit Risk (AR)

Inherent Risk (IR)

Control Risk (CR)

Description

The significant account balances (e.g. receivables, inventory) or classes of transactions (e.g. sales, purchases).

The relevant assertions for the account balance which include Completeness, Existence, Accuracy, Valuation and Ownership.

The identified inherent and potential risks for the relevant assertions before considering any related controls.

The information system or IT environment used to process and record the financial transactions and prepare financial reports.

The controls related to the identified risks such as authorizations and approvals, reconciliations, physical or logical access controls to computer programs and data files, and segregation of duties.

The overall acceptable level of audit risk. From 1 to 5%.

The susceptibility of an account balance or class of transactions to material misstatement, assuming there are no related controls. From 30 to 100%.

The risk that the internal controls will fail to prevent or detect material misstatements. From 20 to 100%.

Results

Risks of Material Misstatement (RMM)

Detection Risk (DR)

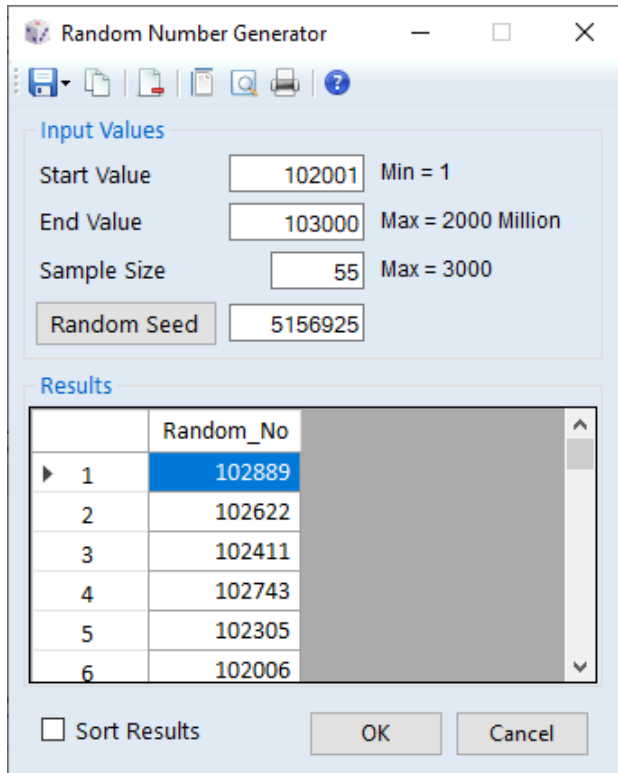
Description

The combined inherent and control risks (RMM = IR x CR).

The risk that the audit procedures will fail to detect material misstatements. The amount of substantive assurance required is the inverse of detection risk, i.e. 100% – DR.

12. Random Number Generator

Sampling > Random Number Generator



The random numbers are generated based on a random seed to ensure that each set of numbers is randomly generated.

Input Values

Start Value

Description

The starting value to randomly generate unique numbers. Must be greater than 0 and less than the end value.

End Value

The ending value to randomly generate unique numbers. Must be greater than the start value and not exceed 2000 Million.

Required Sample Size

The number of samples to select. Maximum size is 3000.

Random Seed

A random seed value is used to generate the random numbers for the sample selection. The seed for a previous sample can be used to recalculate the same results for that sample.

Results

Sort Results

Description

Determines if the results are sorted in sequential order when displayed. The default is not to sort the results.