

EXAMPLE - LIST Math Functions

This example describes how to generate random array (list) data and then to apply the following math functions to your arrays.

- **LISTSUM** - Sum all values in the array. See *LISTSUM Function*.
- **LISTMIN** - Minimum value of all values in the array. See *LISTMIN Function*.
- **LISTMAX** - Maximum value of all values in the array. See *LISTMAX Function*.
- **LISTAVERAGE** - Average value of all values in the array. See *LISTAVERAGE Function*.
- **LISTVAR** - Variance of all values in the array. See *LISTVAR Function*.
- **LISTSTDEV** - Standard deviation of all values in the array. See *LISTSTDEV Function*.
- **LISTMODE** - Most common value of all values in the array. See *LISTMODE Function*.

Source:

For this example, you can generate some randomized data using the following steps. First, you need to seed an array with a range of values using the RANGE function:

| | |
|-----------------------------------|--------------------|
| Transformation Name | New formula |
| Parameter: Formula type | Single row formula |
| Parameter: Formula | RANGE(5, 50, 5) |
| Parameter: New column name | 'myArray1' |

Then, unpack this array, so you can add a random factor:

| | |
|---|--|
| Transformation Name | Unnest Objects into columns |
| Parameter: Column | myArray1 |
| Parameter: Paths to elements | '[0]', '[1]', '[2]', '[3]', '[4]', '[5]', '[6]', '[7]', '[8]', '[9]' |
| Parameter: Remove elements from original | true |
| Parameter: Include original column name | true |

Add the randomizing factor. Here, you are adding randomization around individual values: $x-1 < x < x+4$.

| | |
|----------------------------|--|
| Transformation Name | Edit column with formula |
| Parameter: Columns | myArray1_0~myArray1_8 |
| Parameter: Formula | IF(RAND() > 0.5, \$col + (5 * RAND()), \$col - RAND()) |

To make the numbers easier to manipulate, you can round them to two decimal places:

| | |
|----------------------------|--------------------------|
| Transformation Name | Edit column with formula |
| Parameter: Columns | myArray1_0~myArray1_8 |
| Parameter: Formula | ROUND(\$col, 2) |

Renest these columns into an array:

| | |
|-----------------------------------|--|
| Transformation Name | Nest columns into Objects |
| Parameter: Columns | myArray1_0, myArray1_1, myArray1_2, myArray1_3, myArray1_4, myArray1_5, myArray1_6, myArray1_7, myArray1_8 |
| Parameter: Nest columns to | Array |
| Parameter: New column name | 'myArray2' |

Delete the unused columns:

| | |
|----------------------------|--------------------------------|
| Transformation Name | Delete columns |
| Parameter: Columns | myArray1_0~myArray1_8,myArray1 |
| Parameter: Action | Delete selected columns |

Your data should look similar to the following:

| myArray2 |
|--|
| ["8.29","9.63","14.63","19.63","24.63","29.63","34.63","39.63","44.63"] |
| ["8.32","14.01","19.01","24.01","29.01","34.01","39.01","44.01","49.01"] |
| ["4.55","9.58","14.58","19.58","24.58","29.58","34.58","39.58","44.58"] |
| ["9.22","14.84","19.84","24.84","29.84","34.84","39.84","44.84","49.84"] |
| ["8.75","13.36","18.36","23.36","28.36","33.36","38.36","43.36","48.36"] |
| ["8.47","14.76","19.76","24.76","29.76","34.76","39.76","44.76","49.76"] |
| ["4.93","9.99","14.99","19.99","24.99","29.99","34.99","39.99","44.99"] |
| ["4.65","14.98","19.98","24.98","29.98","34.98","39.98","44.98","49.98"] |
| ["7.80","14.62","19.62","24.62","29.62","34.62","39.62","44.62","49.62"] |
| ["9.32","9.96","14.96","19.96","24.96","29.96","34.96","39.96","44.96"] |

Transformation:

These steps demonstrate the individual math functions that you can apply to your list data without unnesting it:

NOTE: The NUMFORMAT function has been wrapped around each list function to account for any floating-point errors or additional digits in the results.

Sum of all values in the array (list):

| | |
|--------------------------------|--------------------------------------|
| Transformation Name | New formula |
| Parameter: Formula type | Single row formula |
| Parameter: Formula | NUMFORMAT(LISTSUM(myArray2), '#.##') |

| | |
|-----------------------------------|------------|
| Parameter: New column name | 'arraySum' |
|-----------------------------------|------------|

Minimum of all values in the array (list):

| | |
|-----------------------------------|--------------------------------------|
| Transformation Name | New formula |
| Parameter: Formula type | Single row formula |
| Parameter: Formula | NUMFORMAT(LISTMIN(myArray2), '#.##') |
| Parameter: New column name | 'arrayMin' |

Maximum of all values in the array (list):

| | |
|-----------------------------------|--------------------------------------|
| Transformation Name | New formula |
| Parameter: Formula type | Single row formula |
| Parameter: Formula | NUMFORMAT(LISTMAX(myArray2), '#.##') |
| Parameter: New column name | 'arrayMax' |

Average of all values in the array (list):

| | |
|-----------------------------------|--|
| Transformation Name | New formula |
| Parameter: Formula type | Single row formula |
| Parameter: Formula | NUMFORMAT(LISTAVERAGE(myArray2), '#.##') |
| Parameter: New column name | 'arrayAvg' |

Variance of all values in the array (list):

| | |
|-----------------------------------|--------------------------------------|
| Transformation Name | New formula |
| Parameter: Formula type | Single row formula |
| Parameter: Formula | NUMFORMAT(LISTVAR(myArray2), '#.##') |
| Parameter: New column name | 'arrayVar' |

Standard deviation of all values in the array (list):

| | |
|-----------------------------------|--|
| Transformation Name | New formula |
| Parameter: Formula type | Single row formula |
| Parameter: Formula | NUMFORMAT(LISTSTDEV(myArray2), '#.##') |
| Parameter: New column name | 'arrayStDv' |

Mode (most common value) of all values in the array (list):

| | |
|-----------------------------------|--|
| Transformation Name | New formula |
| Parameter: Formula type | Single row formula |
| Parameter: Formula | NUMFORMAT (LISTMODE (myArray2) , ' # . ## ') |
| Parameter: New column name | 'arrayMode' |

Results:

Results for the first four math functions:

| myArray2 | arrayAvg | arrayMax | arrayMin | arraySum |
|--|----------|----------|----------|----------|
| ["8.29","9.63","14.63","19.63","24.63","29.63","34.63","39.63","44.63"] | 25.04 | 44.63 | 8.29 | 225.33 |
| ["8.32","14.01","19.01","24.01","29.01","34.01","39.01","44.01","49.01"] | 28.93 | 49.01 | 8.32 | 260.4 |
| ["4.55","9.58","14.58","19.58","24.58","29.58","34.58","39.58","44.58"] | 24.58 | 44.58 | 4.55 | 221.19 |
| ["9.22","14.84","19.84","24.84","29.84","34.84","39.84","44.84","49.84"] | 29.77 | 49.84 | 9.22 | 267.94 |
| ["8.75","13.36","18.36","23.36","28.36","33.36","38.36","43.36","48.36"] | 28.4 | 48.36 | 8.75 | 255.63 |
| ["8.47","14.76","19.76","24.76","29.76","34.76","39.76","44.76","49.76"] | 29.62 | 49.76 | 8.47 | 266.55 |
| ["4.93","9.99","14.99","19.99","24.99","29.99","34.99","39.99","44.99"] | 24.98 | 44.99 | 4.93 | 224.85 |
| ["4.65","14.98","19.98","24.98","29.98","34.98","39.98","44.98","49.98"] | 29.39 | 49.98 | 4.65 | 264.49 |
| ["7.80","14.62","19.62","24.62","29.62","34.62","39.62","44.62","49.62"] | 29.42 | 49.62 | 7.8 | 264.76 |
| ["9.32","9.96","14.96","19.96","24.96","29.96","34.96","39.96","44.96"] | 25.44 | 44.96 | 9.32 | 229 |

Results for the statistical functions:

| myArray2 | arrayMode | arrayStDv | arrayVar |
|--|-----------|-----------|----------|
| ["8.29","9.63","14.63","19.63","24.63","29.63","34.63","39.63","44.63"] | | 12.32 | 151.72 |
| ["8.32","14.01","19.01","24.01","29.01","34.01","39.01","44.01","49.01"] | | 13.03 | 169.78 |
| ["4.55","9.58","14.58","19.58","24.58","29.58","34.58","39.58","44.58"] | | 12.92 | 166.8 |
| ["9.22","14.84","19.84","24.84","29.84","34.84","39.84","44.84","49.84"] | | 13.02 | 169.46 |
| ["8.75","13.36","18.36","23.36","28.36","33.36","38.36","43.36","48.36"] | | 12.84 | 164.95 |
| ["8.47","14.76","19.76","24.76","29.76","34.76","39.76","44.76","49.76"] | | 13.14 | 172.56 |
| ["4.93","9.99","14.99","19.99","24.99","29.99","34.99","39.99","44.99"] | | 12.92 | 166.93 |
| ["4.65","14.98","19.98","24.98","29.98","34.98","39.98","44.98","49.98"] | | 13.9 | 193.16 |
| ["7.80","14.62","19.62","24.62","29.62","34.62","39.62","44.62","49.62"] | | 13.23 | 175.08 |
| ["9.32","9.96","14.96","19.96","24.96","29.96","34.96","39.96","44.96"] | | 12.21 | 149.17 |

Since all values are unique within an individual array, there is no most common value in any of them, which yields empty values for the arrayMode column.