

GNU Datamash

for version 1.0.6, 29 July 2014

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This manual is for GNU Datamash (version 1.0.6, 29 July 2014), which provides command-line computations on input files.

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1 Overview

The `datamash` program (<http://www.gnu.org/software/datamash>) performs calculation (e.g. *sum*, *count*, *min*, *max*, *skewness*, *standard deviation*) on input files. A simple example: sum up the values in the first column of the input:

```
$ seq 10 | datamash sum 1
55
```

`datamash` can group input data and perform operations on each group. It can sort the file, and read header lines. An example: Finding the average score in statistics course of college students, grouped by their college major:

The input file has three fields: Name, Major, Score:

```
$ cat scores.txt
Name      Major      Score
Bryan     Arts       68
Isaiah    Arts       80
Gabriel   Health-Medicine 100
Tysza     Business   92
Zackery   Engineering 54
...
```

Sorting the input file and group by the second column (Major), then calculating the mean score (third column) and sample-standard-deviation:

```
$ datamash --sort --headers --group 2 mean 3 sstdev 3 < scores.txt
GroupBy(Major)  mean(Score)  sstdev(Score)
Arts            68.9474     10.4215
Business        87.3636     5.18214
Engineering     66.5385     19.8814
Health-Medicine 90.6154     9.22441
Life-Sciences   55.3333     20.606
Social-Sciences 60.2667     17.2273
```

`datamash` is designed for interactive exploration of textual data, and for automating tasks in shell scripts.

`datamash` has a rich set of statistical functions to quickly assess information in textual input files. An example of calculating basic statistic (mean, 1st quartile, median, 3rd quartile, IQR, sample-standard-deviation, and p-value of Jarque-Bera test for normal distribution:

```
$ datamash -H mean 1 q1 1 median 1 q3 1 iqr 1 sstdev 1 jarque 1 < FILE
mean(x)  q1(x)  median(x)  q3(x)  iqr(x)  sstdev(x)  jarque(x)
45.32    23     37         61.5   38.5    30.4487    8.0113-09
```

2 Invoking `datamash`

The format for running the `datamash` program is:

```
datamash [option]... op1 column1 [op2 column2 ...]
```

Where *op1* is the operation to perform on the values in *column1*. `datamash` reads input from stdin and performs one or more operations on the input data. If `--group` is used, each operation is performed on every group. If `--group` is not used, each operation is performed on all the values in the input file.

`datamash` supports the following operations:

File operations:

`transpose`, `reverse`

Numeric operations:

`sum`, `min`, `max`, `absmin`, `absmax`

Textual/Numeric operations:

`count`, `first`, `last`, `rand`, `unique`, `collapse`, `countunique`

Statistical operations:

`mean`, `median`, `q1`, `q3`, `iqr`, `mode`, `antimode`, `pstdev`, `sstdev`, `pvar`, `svar`, `mad`, `madraw`, `sskew`, `pskew`, `skurt`, `pkurt`, `jarque`, `dpo`

Grouping options:

`--full`

`-f` Print entire input line before op results (default: print only the grouped keys).

`--group=X[,Y,Z]`

`-g X[,Y,Z]`

Group input via fields *X[,Y,Z]*. By default, fields are separated by TABs. Use `--field-separator` to change the delimiter character. Input file must be sorted by the same fields *X[,Y,Z]*. Use `--sort` to automatically sort the input. If `--group` is not specified, each operation is performed in the entire input file.

`--header-in`

Indicates the first input line is column headers, and should not be used for any calculations.

`--header-out`

Print column headers as first line. If the column header names are known (i.e. the input file had a header line, and the `command` was invoked with `--header-in`, `-H` or `--headers`), prints the operation and the name of the field (e.g. `'mean(X)'`). Otherwise, prints the number operation and the field number (e.g. `'mean(field-3)'`).

--headers
-H Same as ‘`--header-in --header-out`’. A short option indicating the input file has a header line, and the output should contain a header line as well.

--ignore-case
-i Ignore upper/lower case when comparing text for grouping, sorting, and comparing unique values in the ‘`countunique`’ and ‘`unique`’ operations.

--sort
-s Sort the input before grouping. `datamash` requires sorted input. If the input is not sorted, using `--sort` will automatically sort the input before processing it further. Sorting will be performed based on the specified `--group` parameter, and respecting case `--ignore-case` option (if used). The following commands are equivalent:

```
$ cat FILE | sort -k1,1 | datamash --group 1 sum 1
$ cat FILE | datamash --sort --group 1 sum 1
```

File Operation Options:

--no-strict
Allow lines with varying number of fields. By default, `transpose` and `reverse` will fail with an error message unless all input lines have the same number of fields.

--filler=x
When use `--no-strict` option, missing fields will be filled with this value.

General options:

--field-separator=x
-t x Use character `X` instead of `TAB` as field delimiter.

--whitespace
-W Use whitespace (one or more spaces and/or tabs) for field delimiters. `TAB` character will be used as output field separator.

--zero-terminated
-z end lines with 0 byte, not newline

--help
-h Print an informative help message on standard output and exit successfully.

--version
-v Print the version number and licensing information of `Hello` on standard output and then exit successfully.

3 Available operations in `datamash`

File operations:

<code>transpose</code>	transpose rows, columns of a text file
<code>reverse</code>	reverse fields in each line of a text file

Numeric operations:

<code>sum</code>	sum the of values
<code>min</code>	minimum value
<code>max</code>	maximum value
<code>absmin</code>	minimum of the absolute values
<code>absmax</code>	maximum of the absolute values

Textual/Numeric operations:

<code>count</code>	count number of elements in the group
<code>first</code>	the first value of the group
<code>last</code>	the last value of the group
<code>rand</code>	one random value from the group
<code>unique</code>	comma-separated sorted list of unique values
<code>collapse</code>	comma-separated list of all input values
<code>countunique</code>	number of unique/distinct values

Statistical operations:

<code>mean</code>	mean of the values
<code>median</code>	median value
<code>q1</code>	1st quartile value
<code>q3</code>	3rd quartile value
<code>iqr</code>	inter-quartile range
<code>mode</code>	mode value (most common value)
<code>antimode</code>	anti-mode value (least common value)
<code>pstdev</code>	population standard deviation
<code>sstdev</code>	sample standard deviation
<code>pvar</code>	population variance
<code>svar</code>	sample variance
<code>mad</code>	Median Absolute Deviation, scaled by a constant 1.4826 for normal distributions

<code>madraw</code>	Median Absolute Deviation, unscaled
<code>sskew</code>	skewness of the (sample) group
<code>pskew</code>	skewness of the (population) group
<code>skurt</code>	Excess Kurtosis of the (sample) group
<code>pkurt</code>	Excess Kurtosis of the (population) group
<code>jarque</code>	p-value of the Jarque-Beta test for normality
<code>dpo</code>	p-value of the D'Agostino-Pearson Omnibus test for normality.

4 Statistical Operations

Equivalent R functions

GNU Datamash is designed to closely follow R project's (<http://www.r-project.org/>) statistical functions. See the `files/operators.R` file for the R equivalent code for each of datamash's operators. When building `datamash` from source code on your local computer, operators are compared to known results of the equivalent R functions.

5 Reporting bugs

To report bugs, suggest enhancements or otherwise discuss GNU Datamash, please send electronic mail to bug-datamash@gnu.org.

For bug reports, please include enough information for the maintainers to reproduce the problem. Generally speaking, that means:

- The version numbers of Datamash (which you can find by running ‘`datamash --version`’) and any other program(s) or manual(s) involved.
- Hardware and operating system names and versions.
- The contents of any input files necessary to reproduce the bug.
- The expected behavior and/or output.
- A description of the problem and samples of any erroneous output.
- Options you gave to `configure` other than specifying installation directories.
- Anything else that you think would be helpful.

When in doubt whether something is needed or not, include it. It’s better to include too much than to leave out something important.

Patches are welcome; if possible, please make them with ‘`diff -c`’ (see Section “Overview” in *Comparing and Merging Files*) and include `ChangeLog` entries (see Section “Change Log” in *The GNU Emacs Manual*). Please follow the existing coding style.

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