User’s Guide
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1.0 Decision for Inputs

1.1 Types of design
DGW generates different types of data depending on the particular design in question. In particular, the following types of data could be generated:
(a) Two-group designs with up to four dependent variables,
(b) Univariate designs with up to 8 independent groups,
(c) 2x2, 2x3, 2x4, and 2x2x2 univariate factorial designs,
(d) Independent group designs with two dependent variables and up to four groups, and
(e) Regression analyses with up to eight variables.

These basic designs are suitable for generating data for
(a) Independent and dependent t-tests,
(b) One-way, two-way, and three-way ANOVA,
(c) One-way MANOVA, MANCOVA, and repeated measures,
(d) split-plot repeated measures,
(e) Multiple regression,
(f) Factor analysis with a small number of variables, and
(g) Discriminant analysis.

1.2. Population parameters
Knowledge about population parameters is necessary. For example average IQ score by definition is 100 normally with a standard deviation of 15.

To set your standard deviation (SD), perhaps, the easiest, reasonable approach is to it to divide the mean by five (5), i.e. set SD to be one-fifth (1/5) as large as the mean (Obviously this does not work for data with a mean of zero. For example, if you want the mean for your variable to be 50, 10 would be a very reasonable SD. Or for GPA data with a mean of 2.5, may be 0.5 makes sense as a standard deviation.

Another not too-difficult approach is to figure out the approximate range you want for your data and divide it by four (4). For example, if you want a range of about 70 to 130 for a variable with a mean of 100, you might choose a standard deviation of 60/4 = 15 (about 95% of your data should be within that range).

1.3. Sample size
Decide and choose your sample sizes. (Use knowledge of sample size determination)

1.4. Decimal places
Decide on the number of decimal places for each continuous variable. For example, typically, you’ll find GPA scores with 2 decimal places.

1.5. Data cut-off points
You may select minimum and maximum values for your data. For example GPA scores may range between 2.00 and 4.00.

1.6. Types of distribution
Options exist for both normal and non-normal distributions. DGW can generate data that approach both normal and non-normal distributions using a known population mean and standard deviation.
1.7. Changing default values
Do you want your data to have some missing values and extreme values? DGW provides you with 3% missing values and 3% extreme values as default. You may change these values to suit your objectives. You may also change your default reliability of 1.00 to any value (appropriate) of your choice. These are available in the option menu.

1.8. Correlation Matrix
You may set correlations among continuous variables for analyses with multiple continuous variables; for example, multicollinearity in regression analysis can be illustrated. Correlations can be set by the user, set at random, set to 0, or set to 0.5.

1.9. Seed
Select your own seed or allow DGW to generate random seed.

1.10. Title for output
Title for output clearly labels your output with the appropriate heading. This is important in case you are generating different sets of data that need to be identified separately.
2.0 Steps for data generation

2.1 Independent t-Test Data:
(1) In the TITLE FOR OUTPUT box, enter a title for your output (optional)
(2) In the SEED box, either enter an integer or click on the RANDOM button to get a random value (a seed is needed to get the data generation started)
(3) In the TYPE OF DATA box, click on the circle before “1 DV” under the “Two Group Designs (# DVs)” section so that the circle becomes black
(4) For the Group 1, set the mean and standard deviation for the population from which you want a sample
(5) For Group 1, enter the size of the sample you would like to draw
(6) For Group 1, change the number of decimals as appropriate to the data
(7) For Group 1, set the minimum and the maximum score values as appropriate for the data and choose the desired distribution
(8) Repeat Steps 4-7 for Group 2
(9) Either click on the GENERATE button or press F9
(10) When the Save As dialog box appears, give your file a name (or use the default DGW_data name)
(11) Two files are created, an information file and the data file - both are shown (in that order) in the Generation Information and Data window

EXAMPLE: To generate realistic exam scores for a 50 item exam, you might choose these population parameters:
Group 1: Mean = 40, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Distribution: -Skew
Group 2: Mean = 35, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Distribution: Normal
Note that the same procedure will work for 2 groups under the “# of Independent Groups (1DV)” section
2.2. Dependent t-Test Data:

(1) In the TITLE FOR OUTPUT box, enter a title for your output (optional)
(2) In the SEED box, either enter an integer or click on the RANDOM button to get a random value (a seed is needed to get the data generation started)
(3) In the TYPE OF DATA box, click on the circle before the “1” under the “2 Dependent Variables (# Groups)” section so that the circle becomes black
(4) You will treat Variable 1 as the first correlated variable (e.g., the pretest); Variable 2 would serve as the second (e.g., the posttest)
(5) For Variable 1, set the mean and standard deviation for the population from which you want a sample
(6) For Variable 1, enter the size of the sample you would like to draw
(7) For Variable 1, change the number of decimals as appropriate to the data
(8) For Variable 1, set the minimum and maximum score values as appropriate for the data and choose the desired distribution
(9) Repeat Steps 5-8 for Variable 2
(10) In the CORRELATION box, set the correlation between V1 & V2 to the expected correlation between measures (or click the All = 0.5 or Random button)
(11) Either click on the GENERATE button or press F9
(12) When the Save As dialog box appears, give your file a name (or use the default DGW_data name)
(13) Two files are created, an information file and the data file – both are shown (in the order) in the Generation Information and Data window

EXAMPLE: To generate realistic pretest and posttest exam scores for a 50-item exam, you might choose these population parameters:
Group 1: Mean = 30, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: Normal
Group 2: Mean = 40, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Distribution: Normal, Correlation: 0.6
2.3 One-Way ANOVA
(1) In the TITLE FOR OUTPUT box, enter a title for your output (optional)
(2) In the SEED box, either enter an integer or click on the RANDOM button to get a random value (a seed is needed to get the data generation started)
(3) In the TYPE of data box, click on the circle “3” or “4”, under the # of Independent Groups” section so that the circle becomes black.
(4) For each Group #, set the mean and standard deviation for the population from which you want sample.
(5) For each Group #, enter the size of the sample you would like to draw
(6) For each Group #, change the number of decimals as appropriate
(7) For each Group #, set the minimum and maximum scores values as appropriate for the data and choose the desired distribution.
(8) Either click on the GENERATE button or press F9
(9) When the Save As dialogue box appears, give your file a name (or use the default DGW_data name)
(10) Two files are created, an information file and the data file- both are shown (in that order) in the Generation information and data window

EXAMPLE: To generate realistic exam scores for a 50-item exam for 3 groups, you might choose these population parameters:

Group 1: Mean = 40, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: - Skew
Group 2: Mean = 35, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: - Normal
Group 3: Mean = 45, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: - Skew
2.4 Two-Way ANOVA Data

(1) In the TITLE FOR OUTPUT box, enter a title for your output (optional)
(2) In the SEED box, either enter an integer or click on the RANDOM button to get a random value (a seed is needed to get the data generation started)
(3) In the TYPE OF DATA box, click on the circle before “2x2” or “2x4” under the “Factorial Design (1 DV)” section so that the circle becomes black
(4) For each Cell #, set the mean and standard deviation for the population from which you want a sample
(5) For each Cell #, enter the size of the sample you would like to draw
(6) For each Cell #, change the number of decimals as appropriate to the data
(7) For each Cell #, set minimum and maximum score values as appropriate for the data and choose the desired distribution
(8) Either click on the GENERATE button or press F9
(9) When the Save As dialog box appears, give your file a name (or use the default DGW_data name)
(10) Two files are created, an information file and the data file- both are shown (in that order) in the Generation Information and Data window

EXAMPLE: To generate realistic exam scores for a 50-item exam for a 2x3 Design, you might choose these population parameters:

Cell (1, 1): Mean = 40, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Cell (1, 2): Mean = 35, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Normal
Cell (1, 3): Mean = 45, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Cell (2, 1): Mean = 40, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Cell (2, 2): Mean = 30, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Normal
Cell (2, 3): Mean = 35, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
2.5 Bivariate Correlation or Regression Data:
(1) In the TITLE FOR OUTPUT box, enter a title for your output (optional)
(2) In the SEED box, either enter an integer or click on the RANDOM button to get a random value (a
seed is needed to get the data generation started)
(3) In the TYPE OF DATA box, click on the circle before the “1” under the “Regression (# predictors)”
section so that the circle becomes black
(4) If you are generating simple correlated data, the choice of Variable 1 (DV) and Variable 2 is arbitrary
(5) For Variable 1 (DV), set the mean and standard deviation for the population from which you want a
sample
(6) For Variable 1 (DV), enter the size of the sample you would like to draw
(7) For Variable 1(DV), change the number of decimals as appropriate to the data
(8) For Variable 1 (DV), set the minimum and maximum score values as appropriate for the data and
choose the desired distribution
(9) Repeat Steps 5-8 for Variable 2 (except that you will not be able to change the sample size, N, for
Variable 2)
(10) In the CORRELATION box, set the correlation between V1 & V2 to the expected correlation between
measures (or click the All = 0.5 or Random button)
(11) Either click on the GENERATE button or press F9
(12) When the Save As dialog box appears, give your file a name (or use the default DGW_data name)
(13) Two files are created, an information file and the data file- both are shown (in that order) in the
Generation Information and Data window

EXAMPLE: To generate realistic correlated heights (inches) and weights (pounds), you might choose
these population parameters:
Variable 1 (DV): Mean = 65, SD = 15, N = 25, # Decimals = 1, Min Score = 40, Max Score = 90,
Distribution: Normal
Variable 2: Mean = 150, SD = 20, N = 25, # Decimals = 0, no Min Score, no Max Score, Dist:
Normal, Correlation: 0.5
2.6. Multiple Regression Data:
(1) In the TITLE FOR OUTPUT box, enter a title for your output (optional)
(2) In the SEED box, either enter an integer or click on the RANDOM button to get a random value (a seed is needed to get the data generation started)
(3) In the TYPE OF DATA box, click on the circle before the “2” or “3” etc, under the “ Regression (# predictors) section so that the circle becomes black
(4) For Variable 1 (DV), set the mean and standard deviation for the population from which you want a sample
(5) For Variable 1 (DV), enter the size of the sample you would like to draw
(6) For Variable 1(DV), change the number of decimals as appropriate to the data
(7) For Variable 1 (DV), set the minimum and maximum score values as appropriate for the data and choose the desired distribution
(8) Repeat Steps 5-8 for the other (predictor) variables (except that you will not be able to change the sample size, N, for the other variables )
(9) In the CORRELATION box, set the correlations between the variables ( or click the All = 0.5 or Random button )
(9) Either click on the GENERATE button or press F9
(10) When the Save As dialog appears, give your file a name ( or use the default DGW_data name)
(11) Two files are created, an information file and the data file- both are shown (in that order) in the Generation Information and Data window

EXAMPLE: To generate realistic data where weight (pounds) is the dependent variable, with height (inches) caloric intake, and waist size (inches) as predictors, you might choose these population parameters:
Variable 1 (DV): Mean = 65, SD = 15, N = 25, # Decimals = 1, Min Score = 40, Max Score = 90, Dist: Normal
Variable 2: Mean = 150, SD = 30, N = 25, # Decimals = 0, no Min Score, no Max Score, Dist: Normal
Variable 3: Mean = 1800, SD = 400, N = 25# Decimals =1, no Min Score, no Max Score, Dist: Normal
Variable 4: Mean = 28, SD = 6, N = 25, # Decimals = 0, Min Score = 15, no Max Score, Dist: + Skew, Click the RANDOM button or the All = .50 button
2.7. One-Way MANOVA data
The following designs are possible
a. 2DV, 2-4 Groups Design (use 2 DV design)
b. 2-4DV 2 Groups (use 2 group design)
(1) In the TITLE FOR OUTPUT box, enter a title for your output (optional)
(2) In the SEED box, either enter an integer or click on the RANDOM button to get a random value (a seed is needed to get the data generation started)
(3) In the TYPE OF DATA box Click on any of the circles before 2, 3, or 4 under “2 dependent variables (# group) to generate data for any of the three designs a, b, or c respectively.
(4) For each group, set the mean and standard deviation for the population from which you want a sample.
(5) For each group, enter the size of the sample you would like to draw
(6) For each group, change the number of decimals as appropriate to the data
(7) For each group, set minimum and maximum score values as appropriate for the data and choose the desired distribution
(8) Note that depending on the number of groups, each group will have the same number of continuous variables (in this case two continuous variables in each group).
(9) In the CORRELATION box, set the correlations between the variables
(10) Either click on the GENERATE button or press F9
(11) When the Save As dialog box appears, give your file a name (or use the default DGW_data name)
(12) Two files are created, an information file and the data file- both are shown (in that order) in the Generation Information and Data window

EXAMPLE: To generate realistic exam scores for a 50-item exam for a 3 group two variable Design, you might choose these population parameters:
Group1Var1: Mean = 40, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Group1Var 2: Mean = 35, SD = 10, N =25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: - Normal
Group2Var1: Mean = 45, SD = 10, N =25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Group2 Var2: Mean = 40, SD = 10, N =25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Group3 Var1: Mean = 30, SD = 10, N =25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Normal
Group3 Var2: Mean = 35, SD = 10, N =25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
2.8. One-Way MANCOVA data

The following designs are possible
(a) 2 DV, 2 Groups, 1 Covariate (use two groups design, click on 3DV)
(b) 3 DV, 2 Groups, 1 Covariate (use two groups design, click on 4DV)
(c) 2 DV, 2 Groups, 2 Covariate (use two groups design, click on 4DV)

(1) In the TITLE FOR OUTPUT box, enter a title for your output (optional)
(2) In the SEED box, either enter an integer or click on the RANDOM button to get a random value (a seed is needed to get the data generation started)
(3) In the TYPE OF DATA box, for design (a), click on the circle before 3DV under “2 group design (#DVs).
(4) For each group, set the mean and standard deviation for the population from which you want a sample.
(5) For each group, enter the size of the sample you would like to draw
(6) For each group, change the number of decimals as appropriate to the data
(7) For each group, set minimum and maximum score values as appropriate for the data and choose the desired distribution
(8) In the CORRELATION box, set the correlations between the variables (or click the All = 0.5 or Random button)
(9) Either click on the GENERATE button or press F9
(10) When the Save As dialog box appears, give your file a name (or use the default DGW_data name)
(11) Two files are created, an information file and the data file- both are shown (in that order) in the Generation Information and Data window

Note: In the case of (b) and (c), click on the circle before 4DV and repeat steps all other steps.

EXAMPLE: To generate realistic exam scores for a 50-item exam for a 2 groups, 2DV, 1 covariate Design, you might choose these population parameters:
Group1 Var1: Mean = 40, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Group1 Var2: Mean = 35, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Normal
Group1 Var3: Mean = 45, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Group2 Var1: Mean = 40, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Group2 Var2: Mean = 30, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Normal
Group2 Var3: Mean = 35, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew

Note: use variable 3 in the two groups as your covariate.
2.9. One-Way ANCOVA data
(a) 1DV, 2 Groups, 1-3 covariates (use 2 group design)
(b) 2DV 2-4 groups 1 covariate (use 2 DV design)

(1) In the TITLE FOR OUTPUT box, enter a title for your output (optional)
(2) In the SEED box, either enter an integer or click on the RANDOM button to get a random value (a seed is needed to get the data generation started)
(3) In the TYPE OF DATA box, Click on the circle before 2DV under “2 groups Designs (# DVs). This is for 2 Groups, 1DV 1 Covariate.
(4) For each group, set the mean and standard deviation for the population from which you want a sample.
(5) For each group, enter the size of the sample you would like to draw
(6) For each group, change the number of decimals as appropriate to the data
(7) For each group, set minimum and maximum score values as appropriate for the data and choose the desired distribution
(8) In the CORRELATION box, set the correlations between the variables (or click the All = 0.5 or Random button )
(9) Either click on the GENERATE button or press F9
(10) When the Save As dialog box appears, give your file a name (or use the default DGW_data name)
(11) Two files are created, an information file and the data file- both are shown (in that order) in the Generation Information and Data window

EXAMPLE: To generate realistic exam scores for a 50-item exam for a 2 groups, 1DV, 1 covariate Design, you might choose these population parameters:
Group1 Var1: Mean = 40, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: - Skew
Group1 Var 2: Mean = 35, SD = 10, N =25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: - Normal
Group2 Var1: Mean = 40, SD = 10, N =25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: - Skew
Group2 Var2: Mean = 30, SD = 10, N =25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: - Normal

Note: You may use variable 1 as your dependent variable and variable 2 as your covariate
2.10. Factor Analysis data- Up to 8 items/variables

(1) In the TITLE FOR OUTPUT box, enter a title for your output (optional)
(2) In the SEED box, either enter an integer or click on the RANDOM button to get a random value (a seed is needed to get the data generation started)
(3) In the TYPE OF DATA box, click on the circle before the “7” under the “Regression (# predictors) section so that the circle becomes black
(4) For Variable 1 (DV), set the mean and standard deviation for the population from which you want a sample
(5) For Variable 1(DV), enter the size of the sample you would like to draw
(6) For Variable 1 (DV), change the number of decimals as appropriate to the data
(7) Repeat Steps 5-8 for the other (predictor) variables (except that you will not be able to change the sample size, N, for the other variables)
(8) In the CORRELATION box, set the correlations between the variables (or click the All = 0.5 or Random button)
(9) Either click on the GENERATE button or press F9
(10) When the Save As dialog appears, give your file a name (or use the default DGW_data name)
(11) Two files are created, an information file and the data file- both are shown (in that order) in the Generation Information and Data window

EXAMPLE: To generate realistic exam scores for a 50-item exam for a factor analysis Design, you might choose these population parameters:
Variable 1: Mean = 40, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Variable 2: Mean = 35, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Normal
Variable 3: Mean = 45, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Variable 4: Mean = 50, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Variable 5: Mean = 40, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Variable 6: Mean = 30, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Normal
Variable 7: Mean = 35, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Variable 8: Mean = 45, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
2.11. Discriminant Analysis data
(a) 2 Scores (continuous variables) 2-4 groups (use 2DV design)
(b) 3-4 scores (continuous variables) 2 groups (use 2 group design)

(1) In the TITLE FOR OUTPUT box, enter a title for your output (optional)
(2) In the SEED box, either enter an integer or click on the RANDOM button to get a random value (a seed is needed to get the data generation started)
(3) In the TYPE OF DATA box, for design (b), click on the circle before “3DV” or “4DV” under “2 group design (#DV s).
(4) For each group, set the mean and standard deviation for the population from which you want a sample.
(5) For each group, enter the size of the sample you would like to draw
(6) For each group, change the number of decimals as appropriate to the data
(7) For each group, set minimum and maximum score values as appropriate for the data and choose the desired distribution
(8) In the CORRELATION box, set the correlations between the variables (or click the All = 0.5 or Random button)
(9) Either click on the GENERATE button or press F9
(10) When the Save As dialog box appears, give your file a name (or use the default DGW_data name)
(11) Two files are created, an information file and the data file- both are shown (in that order) in the Generation Information and Data window

EXAMPLE: To generate realistic exam scores for a 50-item exam for a 3 scores, 2 groups Design, you might choose these population parameters:
Group1 Var1: Mean = 40, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Group1 Var 2: Mean = 35, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Normal
Group1 Var3: Mean = 45, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Group2 Var1: Mean = 40, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Group2 Var2: Mean = 30, SD = 10, N = 25, Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Normal
Group2 Var3: Mean = 35, SD = 10, N = 25, # Decimals = 0, Min Score = 0, Max Score = 50, Dist: -Skew
Note: You could use variables 1, 2 and 3 to predict group membership (for two groups).

3.0. Output Information
3.1. Viewing/Printing generated data and summary information

When you click on “generate data (F9)”, the “Save As” window pops up, giving you the option to save the file either on the desktop or at any other location.

The default filename is DGW_data (you may change it). DGW save your files as text files.

Click on “save” to save your data and file information at your chosen location. The data is named “DGW_data” and the information file is named as “DGW_info”. In this case your files are saved on the desktop.

You may view your information and data files by double clicking at the location they were saved. The data file at this location is the one you will import into SPSS.

After you saved your data, you can also view and print the saved data and information by choosing “view data & info” under the file menu (or press F2).
Click on file for "view data"
The window below (summary information) pops up when you click on “view data & info” as shown above. Here, you have the option to view/print data and information together or view/print only data.

You will view only data as shown in the next.
Data comes up when you click on view data only.
3.2. Importing generated data into SPSS

Open the SPSS program and click on “Read Text Data” under the File menu as shown below.

Go to the location where you saved the generated data (In this case on the desktop). DGW_data and GDW_info are located here. Click on the data file and click open.
Text Import Wizard (step 1) comes up. The question “Does your text file match a predetermined format?” should be left at “No” and click “Next” for step 2.

At step 2, click on “Yes” for the question “Are variable names included at the top of your file”? Keep on clicking on “Next” ignoring steps 3, 4, and 5 until you get to step 6.
At step 6, click on “Finish” to view your data.
Change your var1……. to reflect the appropriate variable names.

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<th>var1</th>
<th>var2</th>
<th>var3</th>
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