

# MATH AND FORMULAS

## DESCRIPTION

$$\bar{x} = \text{mean} = \frac{1}{n} \sum_{i=1}^n x_i = \frac{1}{n} (x_1 + \dots + x_n).$$

The image is a composite illustrating mathematical concepts in an industrial context. On the left, a red lion HMI screen displays a 'Data Information' table with various production metrics. In the center, a list of tags is shown, including 'Cycle', 'DwtIndex', 'DwtReasonList', 'FilesInFolder', 'Form1', 'GreenTime', 'OnTime', 'Percenton1', and 'MailAlarm'. On the right, a sine wave graph is plotted on a coordinate system with x-axis labels  $-\pi$ ,  $-\frac{1}{2}\pi$ ,  $0$ ,  $\frac{1}{2}\pi$ , and  $\pi$ , and y-axis labels  $1$  and  $-1$ . Below the graph, a formula data field is shown with the expression  $(\text{ProdLine1} + \text{ProdLine2} + \text{ProdLine3}) / 3$ . The background features mathematical formulas for the mean and the sine function.

Data Information	
Total % Run Time	10.2%
MeanRun	150
Green Time	1020
Total % Run Time	0.2%
Standard	12
Total % Up Time	0.1%
Standard	87
Total % Prog Time	1.7%
Standard	26
Total % Mount Time	0.9%
Standard	16
Total % Misc Time	0.2%
Standard	0

Formula Data

Tag Value:  (ProdLine1 + ProdLine2 + ProdLine3) / 3

Using 32-bit floating-point math, you can calculate downtime efficiency, production rates, process measurements for statistical analysis and operational equipment effectiveness (OEE).

## BENEFITS

- Manage your production by knowing its status.
- Easily calculate your system ratio, percentage and efficiency values.
- Control the G3 behavior from the HMI, making PLC programming easier.

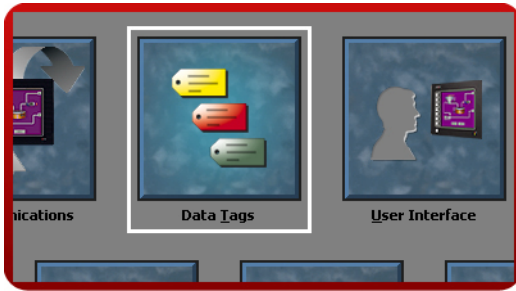
## EXAMPLE

A production manager is interested in the efficiency of his soldering robots. Each robot is linked to a G3 that logs the robot status and actions. Calculations are then possible to find total downtime, number of solder joints per minute, robot efficiency, percentages on efficient usage, etc. An email is sent to the manager at the end of each day for his review.

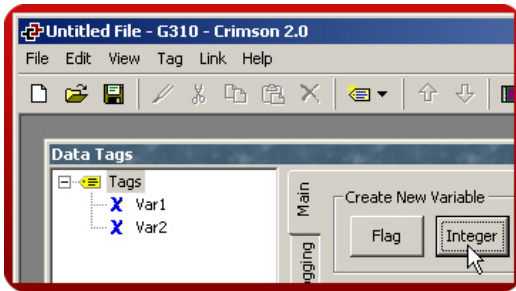
# CREATING AND USING FORMULAS IN 6 STEPS

Simple average calculation.

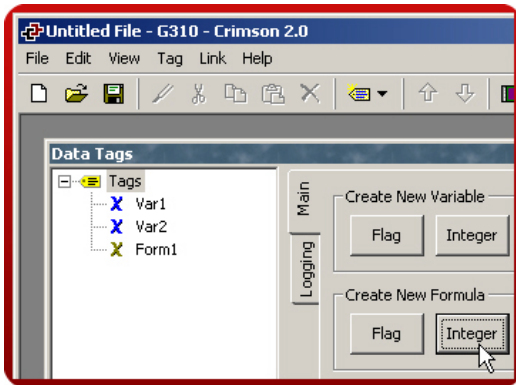
**Step 1** Enter the "Data Tags" module.



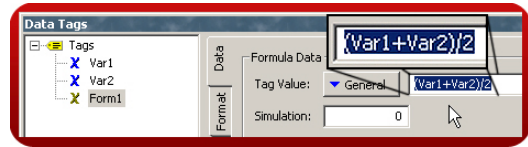
**Step 2** Create two integer tags.



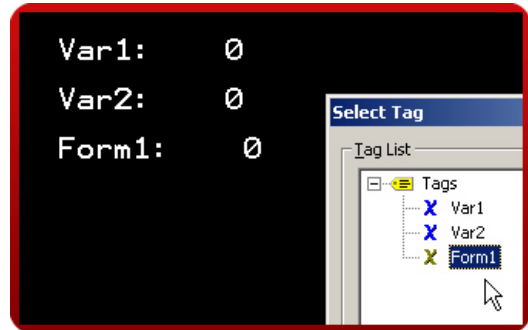
**Step 3** Create a formula integer.



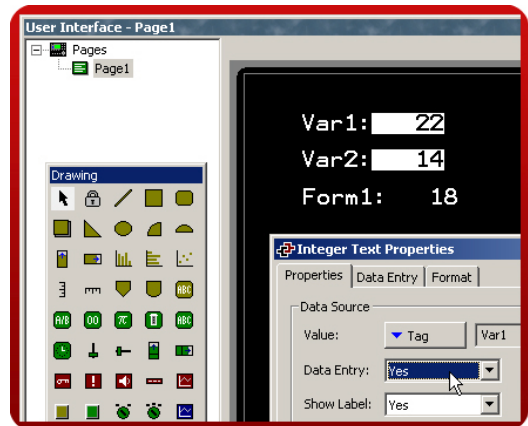
**Step 4** Enter the equation.



**Step 5** Insert tags and formulas on the user interface.



**Step 6** Set up tags as Data Entry.



When the tag values change, the formula result follows.

Formula setup complete!

Reference: [http://www.redlion.net/g3features/G3\\_Feature\\_-\\_Math\\_and\\_Formula.html](http://www.redlion.net/g3features/G3_Feature_-_Math_and_Formula.html)

For more information on Crimson 2.0, refer to the manual.