LANGUAGE
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IOT CLOUD API

GLOSSARY

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map()

[Math]

Description

Re-maps a number from one range to another. That is, a value of **fromLow** would get mapped to **toLow**, a value of **fromHigh** to **toHigh**, values in-betv to values in-between, etc.

Does not constrain values to within the range, because out-of-range values sometimes intended and useful. The `constrain()` function may be used eith before or after this function, if limits to the ranges are desired.

Note that the "lower bounds" of either range may be larger or smaller than "upper bounds" so the `map()` function may be used to reverse a range of numbers, for example

```
y = map(x, 1, 50, 50, 1);
```

The function also handles negative numbers well, so that this example

```
y = map(x, 1, 50, 50, -100);
```

is also valid and works well.

The `map()` function uses integer math so will not generate fractions, when th math might indicate that it should do so. Fractional remainders are truncate and are not rounded or averaged.

Syntax

```
map(value, fromLow, fromHigh, toLow, toHigh)
```

Parameters

`value`: the number to map.
`fromLow`: the lower bound of the value's current range.
`fromHigh`: the upper bound of the value's current range.

Help

Returns

The mapped value.

Example Code

```
/* Map an analog value to 8 bits (0 to 255) */
void setup() {}

void loop() {
  int val = analogRead(0);
  val = map(val, 0, 1023, 0, 255);
  analogWrite(9, val);
}
```

Appendix

For the mathematically inclined, here's the whole function

```
long map(long x, long in_min, long in_max, long out_min, long out_max) {
  return (x - in_min) * (out_max - out_min) / (in_max - in_min) + out_min;
}
```

Notes & Warnings

As previously mentioned, the map() function uses integer math. So fractions might get suppressed due to this. For example, fractions like 3/2, 4/3, 5/4 w be returned as 1 from the map() function, despite their different actual valu So if your project requires precise calculations (e.g. voltage accurate to 3 decimal places), please consider avoiding map() and implementing the calculations manually in your code yourself.

See also