float

[Data Types]

Description

Datatype for floating-point numbers, a number that has a decimal point. Floating-point numbers are often used to approximate analog and continuous values because they have greater resolution than integers. Floating-point numbers can be as large as 3.4028235E+38 and as low as -3.4028235E+38. They are stored as 32 bits (4 bytes) of information.

Syntax

float var = val;

Parameters

var: variable name.  
val: the value you assign to that variable.

Example Code

float myfloat;

float sensorCalbrate = 1.117;

int x;

int y;

float z;

x = 1;

y = x / 2; // y now contains 0, ints can't hold fractions

z = (float)x / 2.0; // z now contains .5 (you have to use 2.0, not 2)

Notes and Warnings

If doing math with floats, you need to add a decimal point, otherwise it will be treated as an int. See the [Floating point](https://www.arduino.cc/reference/en/language/variables/constants/floatingpointconstants) constants page for details.

The float data type has only 6-7 decimal digits of precision. That means the total number of digits, not the number to the right of the decimal point. Unlike other platforms, where you can get more precision by using a double (e.g. up to 15 digits), on the Arduino, double is the same size as float.

Floating point numbers are not exact, and may yield strange results when compared. For example 6.0 / 3.0 may not equal 2.0. You should instead check that the absolute value of the difference between the numbers is less than some small number.

Conversion from floating point to integer math results in truncation:

float x = 2.9; // A float type variable

int y = x; // 2

If, instead, you want to round off during the conversion process, you need to add 0.5:

float x = 2.9;

int y = x + 0.5; // 3

or use the round() function:

float x = 2.9;

int y = round(x); // 3

Floating point math is also much slower than integer math in performing calculations, so should be avoided if, for example, a loop has to run at top speed for a critical timing function. Programmers often go to some lengths to convert floating point calculations to integer math to increase speed.