Integer Constants

[Constants]

Description

Integer constants are numbers that are used directly in a sketch, like 123. By default, these numbers are treated as [int](https://www.arduino.cc/reference/en/language/variables/data-types/int) but you can change this with the U and L modifiers (see below).

Normally, integer constants are treated as base 10 (decimal) integers, but special notation (formatters) may be used to enter numbers in other bases.

| BASE | EXAMPLE | FORMATTER | COMMENT |
| --- | --- | --- | --- |
| 10 (decimal) | 123 | none |  |
| 2 (binary) | B1111011 | leading 'B' | only works with 8 bit values (0 to 255) characters 0&1 valid |
| 8 (octal) | 0173 | leading "0" | characters 0-7 valid |
| 16 (hexadecimal) | 0x7B | leading "0x" | characters 0-9, A-F, a-f valid |

Decimal (base 10)

This is the common-sense math with which you are acquainted. Constants without other prefixes are assumed to be in decimal format.

Example Code:

n = 101; // same as 101 decimal ((1 \* 10^2) + (0 \* 10^1) + 1)

Binary (base 2)

Only the characters 0 and 1 are valid.

Example Code:

n = B101; // same as 5 decimal ((1 \* 2^2) + (0 \* 2^1) + 1)

The binary formatter only works on bytes (8 bits) between 0 (B0) and 255 (B11111111). If it is convenient to input an int (16 bits) in binary form you can do it a two-step procedure such as:

myInt = (B11001100 \* 256) + B10101010; // B11001100 is the high byte`

Octal (base 8)

Only the characters 0 through 7 are valid. Octal values are indicated by the prefix "0" (zero).

Example Code:

n = 0101; // same as 65 decimal ((1 \* 8^2) + (0 \* 8^1) + 1)

It is possible to generate a hard-to-find bug by (unintentionally) including a leading zero before a constant and having the compiler unintentionally interpret your constant as octal.

Hexadecimal (base 16)

Valid characters are 0 through 9 and letters A through F; A has the value 10, B is 11, up to F, which is 15. Hex values are indicated by the prefix "0x". Note that A-F may be upper (A-F) or lower case (a-f).

Example Code:

n = 0x101; // same as 257 decimal ((1 \* 16^2) + (0 \* 16^1) + 1)

Notes and Warnings

**U & L formatters:**

By default, an integer constant is treated as an int with the attendant limitations in values. To specify an integer constant with another data type, follow it with:

* a 'u' or 'U' to force the constant into an unsigned data format. Example: 33u
* a 'l' or 'L' to force the constant into a long data format. Example: 100000L
* a 'ul' or 'UL' to force the constant into an unsigned long constant. Example: 32767ul