Language Reference

*See the **extended reference** for more advanced features of the Arduino languages and the **libraries page** for interfacing with particular types of hardware.*

Arduino programs can be divided in three main parts: *structure*, *values* (variables and constants), and *functions*. The Arduino language is based on C/C++.

Structure

- void setup()
- void loop()

Control Structures

- if
- if...else
- for
- switch case
- while
- do... while
- break
- continue
- return
- goto

Further Syntax

- ; (semicolon)
- {} (curly braces)
- // (single line comment)
- /* */ (multi-line comment)

Arithmetic Operators

- = (assignment)
- + (addition)
- - (subtraction)
- * (multiplication)
- / (division)
- % (modulo)

Comparison Operators

- == (equal to)
- != (not equal to)
- < (less than)
- > (greater than)
- <= (less than or equal to)
- >= (greater than or equal to)

Boolean Operators

- && (and)
- || (or)
- ! (not)

Compound Operators

- ++ (increment)
- -- (decrement)
- += (compound addition)
- -= (compound subtraction)
- *= (compound multiplication)
- /= (compound division)

Variables

Variables are expressions that you can use in programs to store values, such as a sensor reading from an analog pin.

Functions

Digital I/O

- pinMode(pin, mode)
- digitalWrite(pin, value)
- int digitalRead(pin)

Analog I/O

- int analogRead(pin)
- analogWrite(pin, value) - *PWM*

Advanced I/O

- shiftOut(dataPin, clockPin, bitOrder, value)
- unsigned long pulseIn(pin, value)

Time

- unsigned long millis()
- delay(ms)
- delayMicroseconds(us)

Math

- min(x, y)
- max(x, y)
- abs(x)
- constrain(x, a, b)
- map(value, fromLow, fromHigh, toLow, toHigh)
- pow(base, exponent)
- sq(x)
- sqrt(x)

Trigonometry

- sin(rad)
- cos(rad)
- tan(rad)

Random Numbers

- randomSeed(seed)
- long random(max)
- long random(min, max)

Serial Communication

Used for communication between the Arduino board and a computer or other devices. This communication happens via the Arduino board's serial or USB connection and on digital pins 0 (RX) and 1 (TX). Thus, if you use these functions, *you cannot also use pins 0 and 1 for digital i/o.*

- Serial.begin(speed)
- int Serial.available()
- int Serial.read()
- Serial.flush()
- Serial.print(data)
- Serial.println(data)

Constants

Constants are particular values with specific meanings.

- HIGH | LOW
- INPUT | OUTPUT
- true | false

- Integer Constants

Data Types

Variables can have various types, which are described below.

- boolean
- char
- byte
- int
- unsigned int
- long
- unsigned long
- float
- double
- string
- array
- void

Conversion

- char()
- byte()
- int()
- long()
- float()

Reference

- ASCII chart

Didn't find something? Check the extended reference or the libraries. Or see the list of community-contributed code.

Reference Home

Corrections, suggestions, and new documentation should be posted to the Forum.