Language Reference

Arduino programs can be divided in three main parts: structure, values (variables and constants), and functions.

Structure

* [setup](https://www.arduino.cc/en/Reference/Setup)()
* [loop](https://www.arduino.cc/en/Reference/Loop)()

Control Structures

* [if](https://www.arduino.cc/en/Reference/If)
* [if...else](https://www.arduino.cc/en/Reference/Else)
* [for](https://www.arduino.cc/en/Reference/For)
* [switch case](https://www.arduino.cc/en/Reference/SwitchCase)
* [while](https://www.arduino.cc/en/Reference/While)
* [do... while](https://www.arduino.cc/en/Reference/DoWhile)
* [break](https://www.arduino.cc/en/Reference/Break)
* [continue](https://www.arduino.cc/en/Reference/Continue)
* [return](https://www.arduino.cc/en/Reference/Return)
* [goto](https://www.arduino.cc/en/Reference/Goto)

Further Syntax

* [;](https://www.arduino.cc/en/Reference/SemiColon) (semicolon)
* [{}](https://www.arduino.cc/en/Reference/Braces) (curly braces)
* [//](https://www.arduino.cc/en/Reference/Comments) (single line comment)
* [/\* \*/](https://www.arduino.cc/en/Reference/Comments) (multi-line comment)
* [#define](https://www.arduino.cc/en/Reference/Define)
* [#include](https://www.arduino.cc/en/Reference/Include)

Arithmetic Operators

* [=](https://www.arduino.cc/en/Reference/Assignment) (assignment operator)
* [+](https://www.arduino.cc/en/Reference/Arithmetic) (addition)
* [-](https://www.arduino.cc/en/Reference/Arithmetic) (subtraction)
* [\*](https://www.arduino.cc/en/Reference/Arithmetic) (multiplication)
* [/](https://www.arduino.cc/en/Reference/Arithmetic) (division)
* [%](https://www.arduino.cc/en/Reference/Modulo) (modulo)

Comparison Operators

* [==](https://www.arduino.cc/en/Reference/If) (equal to)
* [!=](https://www.arduino.cc/en/Reference/If) (not equal to)
* [<](https://www.arduino.cc/en/Reference/If) (less than)
* [>](https://www.arduino.cc/en/Reference/If) (greater than)
* [<=](https://www.arduino.cc/en/Reference/If) (less than or equal to)
* [>=](https://www.arduino.cc/en/Reference/If) (greater than or equal to)

Boolean Operators

* [&&](https://www.arduino.cc/en/Reference/Boolean) (and)
* [||](https://www.arduino.cc/en/Reference/Boolean) (or)
* [!](https://www.arduino.cc/en/Reference/Boolean) (not)

Pointer Access Operators

* [\* dereference operator](https://www.arduino.cc/en/Reference/Pointer)
* [& reference operator](https://www.arduino.cc/en/Reference/Pointer)

Bitwise Operators

* [&](https://www.arduino.cc/en/Reference/BitwiseAnd) (bitwise and)
* [|](https://www.arduino.cc/en/Reference/BitwiseAnd) (bitwise or)
* [^](https://www.arduino.cc/en/Reference/BitwiseAnd) (bitwise xor)
* [~](https://www.arduino.cc/en/Reference/BitwiseXorNot) (bitwise not)
* [<<](https://www.arduino.cc/en/Reference/Bitshift) (bitshift left)
* [>>](https://www.arduino.cc/en/Reference/Bitshift) (bitshift right)

Compound Operators

* [++](https://www.arduino.cc/en/Reference/Increment) (increment)
* [--](https://www.arduino.cc/en/Reference/Increment) (decrement)
* [+=](https://www.arduino.cc/en/Reference/IncrementCompound) (compound addition)
* [-=](https://www.arduino.cc/en/Reference/IncrementCompound) (compound subtraction)
* [\*=](https://www.arduino.cc/en/Reference/IncrementCompound) (compound multiplication)
* [/=](https://www.arduino.cc/en/Reference/IncrementCompound) (compound division)
* [%=](https://www.arduino.cc/en/Reference/IncrementCompound) (compound modulo)
* [&=](https://www.arduino.cc/en/Reference/BitwiseCompoundAnd) (compound bitwise and)
* [|=](https://www.arduino.cc/en/Reference/BitwiseCompoundOr) (compound bitwise or)

Variables

Constants

* [HIGH](https://www.arduino.cc/en/Reference/Constants) | [LOW](https://www.arduino.cc/en/Reference/Constants)
* [INPUT](https://www.arduino.cc/en/Reference/Constants) | [OUTPUT](https://www.arduino.cc/en/Reference/Constants) | [INPUT\_PULLUP](https://www.arduino.cc/en/Reference/Constants)
* [LED\_BUILTIN](https://www.arduino.cc/en/Reference/Constants)
* [true](https://www.arduino.cc/en/Reference/Constants) | [false](https://www.arduino.cc/en/Reference/Constants)
* [integer constants](https://www.arduino.cc/en/Reference/IntegerConstants)
* [floating point constants](https://www.arduino.cc/en/Reference/Fpconstants)

Data Types

* [void](https://www.arduino.cc/en/Reference/Void)
* [boolean](https://www.arduino.cc/en/Reference/BooleanVariables)
* [char](https://www.arduino.cc/en/Reference/Char)
* [unsigned char](https://www.arduino.cc/en/Reference/UnsignedChar)
* [byte](https://www.arduino.cc/en/Reference/Byte)
* [int](https://www.arduino.cc/en/Reference/Int)
* [unsigned int](https://www.arduino.cc/en/Reference/UnsignedInt)
* [word](https://www.arduino.cc/en/Reference/Word)
* [long](https://www.arduino.cc/en/Reference/Long)
* [unsigned long](https://www.arduino.cc/en/Reference/UnsignedLong)
* [short](https://www.arduino.cc/en/Reference/Short)
* [float](https://www.arduino.cc/en/Reference/Float)
* [double](https://www.arduino.cc/en/Reference/Double)
* [string](https://www.arduino.cc/en/Reference/String) - char array
* [String](https://www.arduino.cc/en/Reference/StringObject) - object
* [array](https://www.arduino.cc/en/Reference/Array)

Conversion

* [char()](https://www.arduino.cc/en/Reference/CharCast)
* [byte()](https://www.arduino.cc/en/Reference/ByteCast)
* [int()](https://www.arduino.cc/en/Reference/IntCast)
* [word()](https://www.arduino.cc/en/Reference/WordCast)
* [long()](https://www.arduino.cc/en/Reference/LongCast)
* [float()](https://www.arduino.cc/en/Reference/FloatCast)

Variable Scope & Qualifiers

* [variable scope](https://www.arduino.cc/en/Reference/Scope)
* [static](https://www.arduino.cc/en/Reference/Static)
* [volatile](https://www.arduino.cc/en/Reference/Volatile)
* [const](https://www.arduino.cc/en/Reference/Const)

Utilities

* [sizeof](https://www.arduino.cc/en/Reference/Sizeof)()
* [PROGMEM](https://www.arduino.cc/en/Reference/PROGMEM)

[Functions](http://arduino.cc/en/Reference/FunctionDeclaration)

Digital I/O

* [pinMode](https://www.arduino.cc/en/Reference/PinMode)()
* [digitalWrite](https://www.arduino.cc/en/Reference/DigitalWrite)()
* [digitalRead](https://www.arduino.cc/en/Reference/DigitalRead)()

Analog I/O

* [analogReference](https://www.arduino.cc/en/Reference/AnalogReference)()
* [analogRead](https://www.arduino.cc/en/Reference/AnalogRead)()
* [analogWrite](https://www.arduino.cc/en/Reference/AnalogWrite)() - PWM

Due & Zero only

* [analogReadResolution](https://www.arduino.cc/en/Reference/AnalogReadResolution)()
* [analogWriteResolution](https://www.arduino.cc/en/Reference/AnalogWriteResolution)()

Advanced I/O

* [tone](https://www.arduino.cc/en/Reference/Tone)()
* [noTone](https://www.arduino.cc/en/Reference/NoTone)()
* [shiftOut](https://www.arduino.cc/en/Reference/ShiftOut)()
* [shiftIn](https://www.arduino.cc/en/Reference/ShiftIn)()
* [pulseIn](https://www.arduino.cc/en/Reference/PulseIn)()

Time

* [millis](https://www.arduino.cc/en/Reference/Millis)()
* [micros](https://www.arduino.cc/en/Reference/Micros)()
* [delay](https://www.arduino.cc/en/Reference/Delay)()
* [delayMicroseconds](https://www.arduino.cc/en/Reference/DelayMicroseconds)()

Math

* [min](https://www.arduino.cc/en/Reference/Min)()
* [max](https://www.arduino.cc/en/Reference/Max)()
* [abs](https://www.arduino.cc/en/Reference/Abs)()
* [constrain](https://www.arduino.cc/en/Reference/Constrain)()
* [map](https://www.arduino.cc/en/Reference/Map)()
* [pow](https://www.arduino.cc/en/Reference/Pow)()
* [sqrt](https://www.arduino.cc/en/Reference/Sqrt)()

Trigonometry

* [sin](https://www.arduino.cc/en/Reference/Sin)()
* [cos](https://www.arduino.cc/en/Reference/Cos)()
* [tan](https://www.arduino.cc/en/Reference/Tan)()

Characters

* [isAlphaNumeric](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isAlpha](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isAscii](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isWhitespace](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isControl](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isDigit](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isGraph](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isLowerCase](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isPrintable](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isPunct](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isSpace](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isUpperCase](https://www.arduino.cc/en/Reference/CharacterAnalysis)()
* [isHexadecimalDigit](https://www.arduino.cc/en/Reference/CharacterAnalysis)()

Random Numbers

* [randomSeed](https://www.arduino.cc/en/Reference/RandomSeed)()
* [random](https://www.arduino.cc/en/Reference/Random)()

Bits and Bytes

* [lowByte](https://www.arduino.cc/en/Reference/LowByte)()
* [highByte](https://www.arduino.cc/en/Reference/HighByte)()
* [bitRead](https://www.arduino.cc/en/Reference/BitRead)()
* [bitWrite](https://www.arduino.cc/en/Reference/BitWrite)()
* [bitSet](https://www.arduino.cc/en/Reference/BitSet)()
* [bitClear](https://www.arduino.cc/en/Reference/BitClear)()
* [bit](https://www.arduino.cc/en/Reference/Bit)()

External Interrupts

* [attachInterrupt](https://www.arduino.cc/en/Reference/AttachInterrupt)()
* [detachInterrupt](https://www.arduino.cc/en/Reference/DetachInterrupt)()

Interrupts

* [interrupts](https://www.arduino.cc/en/Reference/Interrupts)()
* [noInterrupts](https://www.arduino.cc/en/Reference/NoInterrupts)()

Communication

* [Serial](https://www.arduino.cc/en/Reference/Serial)
* [Stream](https://www.arduino.cc/en/Reference/Stream)

USB (32u4 based boards and Due/Zero only)

* [Keyboard](https://www.arduino.cc/en/Reference/MouseKeyboard)
* [Mouse](https://www.arduino.cc/en/Reference/MouseKeyboard)

Looking for something else?

See the [libraries page](https://www.arduino.cc/en/Reference/Libraries) for interfacing with particular types of hardware. Try the list of [community-contributed code](http://www.arduino.cc/playground/Main/GeneralCodeLibrary). The Arduino language is based on C/C++. It links against [AVR Libc](http://www.nongnu.org/avr-libc/user-manual/modules.html) and allows the use of any of its functions; see its [user manual](http://www.nongnu.org/avr-libc/user-manual/index.html) for detail