

Arduino Programming Cheat Sheet

Primary source: <http://arduino.cc/en/Reference/>

Structure & Flow

Basic Program Structure

```
void setup() {  
  // Runs once when sketch starts  
}  
  
void loop() {  
  // Runs repeatedly  
}
```

Control Structures

```
if (x < 5) { ... } else { ... }  
while (x < 5) { ... }  
for (int i = 0; i < 10; i++) { ... }  
break; // Exit a loop immediately  
continue; // Go to next iteration  
switch (var) {  
  case 1:  
    ...  
  break;  
  case 2:  
    ...  
  break;  
  default:  
    ...  
}  
return x; // x must match return type  
return; // For void return type
```

Function Definitions

```
int, type, name(parameters) { ... }  
e.g. int double(int x) {return x*2;}
```

Operators

General Operators

- assignment
- add + subtract -
- multiply * divide /
- modulo %
- equal to == not equal to !=
- less than < greater than >
- less than or equal to <= greater than or equal to >=
- and && or ||
- not !

Compound Operators

- increment ++
- decrement --
- compound addition +=
- compound subtraction -=
- compound multiplication *=
- compound division /=
- compound bitwise and &
- compound bitwise or |

Bitwise Operators

- bitwise and &
- bitwise or |
- bitwise xor ^
- bitwise not ~
- shift left <<
- shift right >>

Pointer Access

- dereference: get a pointer
- dereference: follow a pointer

Built-in Functions

Pin Input/Output

```
digital I/O - pins 0-13 AH-AJ  
pinMode(pin,  
  [INPUT, OUTPUT, INPUT_PULLUP])  
int digitalWrite(pin,  
  digitalWrite(pin, [HIGH, LOW])
```

Analog I/O - pins AH-AJ

```
int analogRead(pin)  
analogReference(  
  [DEFAULT, INTERNAL, EXTERNAL])
```

Pulse-Width Modulation - pins 2-5 & 9-13

```
analogWrite(pin, value)
```

Advanced I/O

```
tone(pin, freq_hz)  
tone(pin, freq_hz, duration_ms)  
noTone(pin)  
shiftOut(dataPin, clockPin,  
  [MSB0, LSB0, MSBFIRST], value)  
unsigned long shiftIn(pin,  
  [MODE, MODE])
```

Time

```
unsigned long millis()  
// Overflows at 50 days  
unsigned long micros()  
// Overflows at 70 minutes  
delay(ms)  
delayMicroseconds(us)
```

Math

```
sin(x, y) sin(x, y) sin(x)  
sin(rad) cos(rad) tan(rad)  
exp(x) pow(base, exponent)  
constrain(x, lowest, highest)  
map(val, from_low, from_high, to_low, to_high)
```

Random Numbers

```
randomSeed(seed) // long or int  
long random(max) // 0 to max-1  
long random(min, max)
```

Bits and Bytes

```
lowByte(x) highByte(x)  
bitRead(x, bit)  
bitWrite(x, bit, bit)  
bitSet(x, bit)  
bitClear(x, bit)  
bitWrite(x, bit, bit)  
bitRead(x, bit)
```

Type Conversions

```
char(val) byte(val)  
int(val) word(val)  
long(val) float(val)
```

External Interrupts

```
attachInterrupt(interupt, func,  
  [LOW, CHANGE, RISING, FALLING])  
detachInterrupt(interupt)  
interrupts()  
noInterrupts()
```

Libraries

```
Serial - coms, with PC or via RS485  
begin(long speed) // up to 115200  
end()  
int available() // bytes available  
int read() // -1 if none available  
int peek() // Read w/o removing  
flush()  
print(data) println(data)  
write(byte) write(char * string)  
write(byte * data, size)  
SerialEvent() // Called if data rdy
```

```
SoftwareSerial.h - coms, on any pin  
SoftwareSerial(rxPin, txPin)  
begin(long speed) // up to 115200  
listen() // delay 0 sec listen  
isListening() // at a time  
read, peek, print, println, write  
// Inherited to Serial library
```

```
EEPROM.h - access non-volatile memory  
byte read(addr)  
write(addr, byte)  
EEPROM[addr] // Access as array
```

```
Servo.h - control servo motors  
attach(pin, [min_us, max_us])  
write(angle) // 0 to 180  
writeMicroseconds(us)  
// 1000-2000, 1500 is midpoint  
int read() // 0 to 180  
bool attached()  
detach()
```

```
Wire.h - I2C communication  
begin() // Join a master  
begin(addr) // Join a slave @ addr  
requestFrom(address, count)  
beginTransmission(addr) // Step 1  
send(byte) // Step 2  
send(char * string)  
send(byte * data, size)  
endTransmission() // Step 3  
int available() // Bytes available  
byte receive() // Get next byte  
onReceive(handler)  
onRequest(handler)
```

 by Mark Liffiton

Adapted from:
- Original: Gavin Smith
- SVG version: Frederic Dufourg
- Arduino board drawing: Fritzing.org

Variables, Arrays, and Data

Data Types

Data Type	Value
boolean	true false
char	-128 - 127, 'a' 'b' etc.
unsigned char	0 - 255
byte	0 - 255
int	-32768 - 32767
unsigned int	0 - 65535
word	0 - 65535
long	-2147483648 - 2147483647
unsigned long	0 - 4294967295
float	-3.4028235e+38 - 3.4028235e+38
double	currently same as float
void	1.e.g. no return value

Strings

```
char str[8] =  
  {'A', 'r', 'd', 'u', 'i', 'n', 'o', '\0'};  
// Includes null terminator  
char str[8] =  
  {'A', 'r', 'd', 'u', 'i', 'n', 'o', '\0'};  
// Compiler adds null terminator  
char str[] = "Arduino";  
char str[8] = "Arduino";
```

Numeric Constants

Constant	Value
128	decimal
0x01158B1	hexary
0x71	octal - base 8
0x7F	hexadecimal - base 16
128L	force unsigned
128LL	force long
128LL	force unsigned long
128.f	force floating point
1.234e5	1.2375e5 = 123750

Qualifiers

Qualifier	Location
static	globals between calls
volatile	in RAM (value for I/O)
const	read-only
mutable	in flash

Arrays

```
int myData[] = {0, 4, 8, 3, 4};  
int myData[5]; // Array of 5 ints  
myData[0] = 40; // Assigning first  
// Index of myData  
myData[4] = 10; // 00000 Indexes  
// are 0 through 4
```



Arduino Programming Guide

Ryan Turner



Arduino Programming Guide:

Arduino Programming Damon Parker, Are you new to Arduino programming Would you like to expand your knowledge base about Arduino programming Do you desire to enjoy the fantastic features of Arduino technology If you said YES to any or all of the questions above this book is all you need Starting Arduino programming allows you to rapidly and intuitively develop your programming abilities through sketching in code This book provides you with an understanding of the standard structure for developing Arduino code including the functions syntax structure and libraries needed to produce future tasks It is specifically written to help you get the understanding required to master the fundamental aspects of writing code on the Arduino platform and will have you all set to take the next step to explore new project ideas new kinds of hardware and contribute back to the open source community and even take on more programming projects With this book you can go from an Arduino beginner to an Arduino pro in a much shorter time This is a resource book to get started with if you want to find out about the world of Arduino and how it changes the world we live in This book will help you comprehend the basic principles of Arduino its advantages benefits and applications in numerous markets and platforms Completely simplified for easy understanding this bestselling guide explains how to compose well crafted sketches using Arduino s modified C language You will discover how to configure software and hardware develop your own sketches deal with built in and custom made Arduino libraries and check out the Internet of Things all with no prior programming experience required It teaches you everything you require to become proficient in Arduino from scratch Learn the variants in Arduino find out how to select Arduino boards and their technical specs learn how to install Arduino IDE That s what you ll find What Is Arduino Programming Introduction to Arduino Programming Language How to Configure Arduino Why Arduino The Arduino KIT Arduino Board Description Arduino Program Structure Arduino Variables and Constants String Arrays Character Manipulating String Arrays Functions to Manipulate String Arrays Arduino String Object Stating Arrays Pins Configured as INPUT Benefits and Disadvantages of Identical Communication And a lot more You will also find out how to configure your Arduino interface board to pick up the physical world control light movement and sound and create objects with interesting features This ultimate guide gets you up to speed quickly teaching all the concepts and syntax through simple language and clear guidelines developed for outright beginners It contains lots of top quality illustrations and easy to follow examples Are you ready to explore the amazing benefits of this book Grab your copy now [Arduino Programming](#) Ryan Turner,2020-04-12 Are you looking for a simple programming language that will allow you to develop your computer skills Have you heard about Arduino and think it could be right for you Do you need a straight talking book that will help you get started quickly For anyone who wants to enter the world of computer programming a decent programming language that is easy to understand is usually a good place to start Arduino Programming delivers a step by step lesson on a simple platform that is perfect for anyone who wants to become skilled in this language and put it to good use Inside the pages of Arduino

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Arduino Miles Price,2018-04-18 Heads up it s the twenty first century It s easier than ever to make your own gadgets The Arduino is a hardware and software package that allows you to create your own gadgets from scratch It s essentially a microcomputer that you can hook all sorts of neat things up to and that you can make full fledged projects out of Programming your Arduino projects isn t terribly difficult but there are a lot of underlying concepts that you need to grasp if you really want to propel yourself forward as a programmer You re going to be working with pretty low level concepts so it s important that you familiarize yourself with all of these before you jump into Arduino programming Take action today to take advantage of our limited time offer **Arduino Programming** Rama Nolan,2025-02-02 Master Arduino Programming A Hands On Guide to Electronics and Coding Have you ever wanted to control switches LEDs sensors and more with just a few lines of code without the hassle of replacing an entire circuit when something goes wrong Arduino is the ultimate platform for building electronic projects trusted by beginners and experts alike for its simplicity flexibility and affordability With its microcontroller based board you can create modify and experiment with ease Whether you re designing interactive gadgets automating tasks or learning to code hardware Arduino makes it accessible But here s the challenge many beginners struggle because they lack clear step by step guidance They either try to figure it out alone and get frustrated or follow confusing tutorials that don t explain the fundamentals properly That s where this book comes in Designed for complete beginners this

hands on guide breaks down Arduino programming in a simple practical way You ll learn How to set up your Arduino board and understand its components The basics of coding with Arduino and writing your first program How to control LEDs sensors motors and other components effortlessly Troubleshooting techniques so you can fix issues without replacing your board How to bring your own creative electronics projects to life Don t let confusion or lack of experience stop you from mastering Arduino Whether you re a hobbyist student or aspiring engineer this book will equip you with the knowledge and confidence to start coding and building right away Unlock the power of Arduino and turn your ideas into reality get started today Programming Arduino Upskill Learning,2016-11-10 Learn Arduino Programming in Less Than 24 Hours This book Programming Arduino Beginners Guide To Get Started With Internet Of Things will teach you to become an Arduino Master through proven step by step programming guide This book teaches you everything you need to become proficient in Arduino from scratch Learn the variants in Arduino learn how to select Arduino boards and their technical specifications learn how to install Arduino IDE and the complete programming manual to learn Arduino Programming and getting started with Your Own Project What You ll Learn From This Book Introduction to Arduino Programming Chapter 1 Arduino Chapter 2 Variants in Arduino Chapter 3 Arduino Boards Technical Specifications Chapter 4 Guide To Board selection Chapter 5 Step by step guide to Installing IDE Chapter 6 Get Started With Arduino Programming Chapter 7 Real time Examples for Arduino programming Chapter 8 Project Chapter 9 Moving Toward A Smarter Internet The Internet Of Things Chapter 10 Sculpting Your Career In IOT Learn how to use the Arduino to build Internet of Things IoT projects Using this book you can go from Arduino Beginner to Arduino Pro in a shorter time If you want to learn about the world of IOT and how it changes the world we live in this is a resource book to get started with This book will help you understand the basic concepts of IOT its benefits advantages and applications in various industries starting from Home Automation to Healthcare Monitoring to Industrial Transformation

Arduino Daniel Bell,2019-12-16 Arduino is the largest open source hardware platform in the world Arduino provides unlimited possibilities that can be achieved using microcontroller based products This short and easy read book is a perfect way to dive into electronics and programming as you get all the basics that are required to start working with Arduino Download your copy NOW Book Objectives This book is about Arduino programming The following are the objectives of the author To help you know the various parts of the Arduino board To help you understand the uses of the various parts of the Arduino board To help you know how to program the Arduino board To help you understand how to create various projects by programming the Arduino board Who this Book is for This book as written with the following groups of people in mind Anyone who needs to understand the basics of the Arduino board Anyone who needs to be equipped with Arduino programming skills Anyone who needs to advance their Arduino programming skills Anyone who needs to learn how to develop hardware projects by programming the Arduino board Requirements You are required to have an Arduino board The author also expects you to have a computer The author will guide you on how to download the Arduino IDE and begin to use

it on your computer for writing codes and uploading them to the Arduino board What is inside the book ARDUINO BASICS ARDUINO DATA TYPES VARIABLES AND CONSTANTS ARDUINO OPERATORS CONTROL STATEMENTS ARDUINO LOOPS ARDUINO FUNCTIONS ARDUINO ARRAYS ARDUINO STRINGS TIME IN ARDUINO I O FUNCTIONS IN ARDUINO From the back cover In this excellent guide the author introduces you to the basics of the Arduino board The goal is to help you understand what Arduino is where the board is used and familiarize you with the various parts of the board Then the author discusses the foundations of Arduino programming You will know what you need so as to begin programming the Arduino board The process of downloading and setting up the Arduino IDE has been discussed The various features that you can enjoy when programming Arduino has been discussed in depth including data types variables loops decision making functions operators etc The author has organized the book into chapters with each chapter having many sub chapters Codes have been added accompanied by thorough explanations of the code This book is recommended for absolute beginners

Arduino for Beginners Ethan Thorpe, 2019-07-19 Quite a few technology boards are responsible for building digital devices They are actually the bedrock of how these devices function However Arduino boards are making immense waves in the digital production world nowadays as it is now primarily used for creating digital devices as well as other interactive materials with the capacity to control things physically around the human sphere To make things more clear this book will enlighten the readers to know more about what Arduino is all about and encourage the best practices for learning and executing Arduino programming from scratch This book will be a pathway where you ll learn everything you need to know about Arduino programming step by step Some of the few things you will be learning about Arduino in this book include Arduino s software and hardware as well as several others of the applications that you will be able to make use of in and about the Arduino board Different Arduino data types available Strings and Functions Codes for buildup Arrays and sensors Important necessities to remember so you can avoid making mistakes And a whole lot more This expansive book on Arduino programming for beginners is laced with quite a lot of useful information that will guide the readers throughout their Arduino programming journey holding you by hand and explaining in specific detail including visual aids to guide you So what are you waiting for Go get a copy now

Arduino Programming Daniel G ron, 2021-03-09 Are you looking for an easy way to learn programming one that can help you to really work on some strong programs and applications but will be easy enough for a beginner to understand Have you looked at some of the other options out there and feel like they are too in depth or hard to use for some of the basics that you want to know Have you been able to look at some of the circuit boards out there but they are not powerful enough or will not work with the operating system that you like to use There are a lot of people who want to work with coding and programming but they are stopped for one reason or another It is too hard they don t have the experience it doesn t work with the coding they want to do and so on This is where the Arduino technology can come into play and help us to finally learn some of the coding that we want This technology was actually designed for the

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Arduino Programming Daniel Geron
Geron,2019-11-13 Are you looking for an easy way to learn programming one that can help you to really work on some strong programs and applications but will be easy enough for a beginner to understand Have you looked at some of the other options out there and feel like they are too in depth or hard to use for some of the basics that you want to know Have you been able to look at some of the circuit boards out there but they are not powerful enough or will not work with the operating system that you like to use There are a lot of people who want to work with coding and programming but they are stopped for one reason or another It is too hard they don t have the experience it doesn t work with the coding they want to do and so on This is where the Arduino technology can come into play and help us to finally learn some of the coding that we want This technology was actually designed for the beginner for those who have no technical experience at all to help them get a good grasp on the basics of coding This guidebook is going to explore more about this Arduino technology and how we are able to use it for our own needs Some of the topics that we are going to explore will include What the Arduino technology is all about and how even beginners are able to learn with it in no time Some of the benefits of working with this technology What types of boards are available for us to purchase and use based on the programming needs that we have How to get started with this language by learning some of the common terms that will help guide us through this process How to hook up the board to your computer so you can get started How to turn this board into a machine that is able to work on various projects Understanding how to work with a sketch and even some examples of how you can create some of your own sketches as well The basics of creating a basic user based function for your coding A look at the different functions that we are able to use in

the Arduino language and what they all mean How to work with the Arduino API and some of the functions that help bring more power to this And so much more There are a lot of options out there when you are looking to get started with coding But if you are brand new to the process you may worry that they are going to be too hard and too difficult to focus on and get the results that you would like When you are ready to learn how to work with Arduino a system that was designed with the beginner and non technical person in mind make sure to check out this guidebook to help you get started Would you like to know more Scroll to the top of the page and select the BUY NOW button

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Table of Contents Arduino Programming Guide

1. Understanding the eBook Arduino Programming Guide
 - The Rise of Digital Reading Arduino Programming Guide
 - Advantages of eBooks Over Traditional Books
2. Identifying Arduino Programming Guide
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Arduino Programming Guide
 - User-Friendly Interface
4. Exploring eBook Recommendations from Arduino Programming Guide
 - Personalized Recommendations
 - Arduino Programming Guide User Reviews and Ratings

- Arduino Programming Guide and Bestseller Lists
- 5. Accessing Arduino Programming Guide Free and Paid eBooks
 - Arduino Programming Guide Public Domain eBooks
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 - Arduino Programming Guide Budget-Friendly Options
- 6. Navigating Arduino Programming Guide eBook Formats
 - ePub, PDF, MOBI, and More
 - Arduino Programming Guide Compatibility with Devices
 - Arduino Programming Guide Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Arduino Programming Guide
 - Highlighting and Note-Taking Arduino Programming Guide
 - Interactive Elements Arduino Programming Guide
- 8. Staying Engaged with Arduino Programming Guide
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Arduino Programming Guide
- 9. Balancing eBooks and Physical Books Arduino Programming Guide
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Arduino Programming Guide
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Arduino Programming Guide
 - Setting Reading Goals Arduino Programming Guide
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Arduino Programming Guide
 - Fact-Checking eBook Content of Arduino Programming Guide
 - Distinguishing Credible Sources

13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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