

JACOB GRAY

fire PHONE



A Well Established User
Guide for Fire Phone
Learn the Basics
Setup and the

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1 2 3 4 5 6 7

Jacob Gray

William Gore

Christopher Jackson

Daniel James

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Barney Frank

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JACOB GRAY

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A Well Established User
Guide for Fire Phone.
Learn the Basics of
Setup and the Latests
Tips and Tricks

Fire Phone

A Well Established User Guide for Fire Phone. Learn the Basics of Setup and the Latest Tips and Tricks

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Introduction

If you haven't had a phone already that's a touchscreen and has Smart Technology, then learning how to use an Amazon Fire Phone might be intimidating. In this guide, I will tell you the basics of your phone and how to set it up, as well as how to use its amazing features. I know from experience that the Amazon Fire Phone is a great tool when it's used properly, and I've gathered together my knowledge about the phone in order to make your life a lot easier.

I'll also tell you how to connect your phone to other devices in order to streamline Amazon Prime movies and TV shows onto your computer screen or television, and how to troubleshoot your phone when it starts to act up.

Keep reading to the end of Chapter Five to figure out how to get Amazon Prime for free for a year with your Amazon Fire Phone!

BONUS: Your FREE Gift



Thank you for purchasing my book: “*Gatgets Geeks Box Set*“. I want to show you my appreciation by offering an exclusive Special Report “*TOP 10 Gadgets Of The Year*” for FREE.

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Chapter 1 – Basic Startup

You took the step to purchasing an Amazon Fire Phone, so how do you even get it started? First, let's take a look at what you've actually bought so you know a little bit more about the phone.

Specifications

Your new Fire Phone comes with GSM/HSPA/LTE technology. That's probably a bunch of mumbo jumbo to you, so let's take a closer look at those.

GSM stands for Global System for Mobile communications, and it's the backbone of the mobile network your phone will utilize. It has transfer speeds of up to 9.6 kbps, which is pretty fast for a mobile network. They also support your SMS system or your text messaging system.

HSPA stands for High-Speed Pack Access, which is a merger of two telephone protocols known as High-Speed Downlink Pack Access or HSDPA, and High-Speed Uplink Packet Access or HSUPA. These are what control the information sent to your phone and sent from your phone.

LTE stands for Long-Term Evolution, and it's commonly known as 4G-LTE. It means the network your phone is using is pretty fast.

So you know the networks your phone will be using, so what about its battery?

The life of a phone's battery is one of the most important things to techies buying it, so let's break it down. The Amazon Fire Phone can stay alive for 285 hours straight if you're not doing a thing on it. It can keep playing music for 65 hours straight, and it can allow

you to talk to a friend for up to 22 hours. So it has a pretty good battery.

The Amazon Fire Phone uses an Android platform, for those who would like to know, and has a Quad-core 2.2 Gigahertz Krait 400 CPU.

For those concerned about dropping the phone, it's made with Corning Gorilla Glass, both the front and back of the phone. Therefore, with normal wear and tear, you should be good. Just try not to drop it off the Empire State Building.

You have a choice of either 32 or 64 Gigabit memory with a 2 Gigabit RAM, meaning it's quick. You'll also get a 13 Megapixel camera with autofocus and LED flash, plus optical image stabilization, which is pretty neat.

For those of you who are interested in connections, the Amazon Fire Phone is able to connect via Bluetooth, Wi-Fi, near-field communication, and a microUSB port version 2.0.

Overall, it's a good phone if you're looking for something interactive and multi-functional.

Registering the Phone

So you bought the phone. What the next step? Registering the phone so that you can use it!

Registering your new Amazon Fire Phone is pretty simple. Follow these easy steps to get started with your new phone.

-Tap on Settings. You can access the Settings area from your Carousel or your App Page.

-Tap on the text that says: Register Your Phone.

- Note that if you have already registered your phone or someone else registered it, you will see Deregister Your Phone instead. Go to the My Account screen and see if the phone is registered to whom you'd like to be registered to. If not, you will need to follow the Deregistering Process found [here](#).

-Tap Register.

- If you already have an account with Amazon, then enter your e-mail address and password that's associated with that account and tap Register.
- If you don't have an Amazon account, you'll need to click the Start Here button and follow the on-screen instructions.

Deregister Your Phone

If your phone came registered to someone you don't recognize, you might want to contact customer support to see if they sent you a used phone by accident. If you bought a used phone or would like to transfer it to someone else, then you need to follow the deregister instructions here.

-If you're on the Amazon Fire Phone:

- to the Settings area and tap on My Accounts.
- Tap the Deregister Your Phone option and tap Deregister again.

-If you're on a computer:

- Go to the Amazon homepage, www.amazon.com, and login.
- Click on Manage Your Content and Devices found under the Your Account option on the top right of the Amazon homepage screen.
- Now that you're under Devices click Fire Phone and then Deregister.
- Click Deregister again.

Basic Settings

Okay, now that you've got your phone registered, here are some of the basic settings you might be interested in fiddling with or changing. But first, how do you get to the Settings screen for future reference?

You can access the Settings screen many ways. You can:

- Swivel the phone or swipe down from the top and open your Quick Access panel. You'll find the Settings icon there.
- You can start on the Home screen and tap the Settings icon in the app grid or the carousel.
- If you're in an App, you can select Settings from the left panel to go to Settings for the application you're running.

From the Settings menu, you can change the following on your phone:

- Wi-Fi and Networks

You can connect to a Wi-Fi connection, turn on the Airplane Mode, connect a Bluetooth device, look at data usage, and set up a Wi-Fi hotspot.

- Display

You can adjust the screen's brightness and set it to auto, turn off the screen's rotation, show a status bar or turn it off, and share your screen using Miracast.

- Sounds and Notification

You can change a ringtone, manage your notifications, change volume, or change feedback settings.

- Apps and Parental Controls

From this area, you can configure an application's settings, turn on or off product recommendations, and manage your parental controls.

- Battery and Storage

From this area, you can view the usage and available storage left on your phone.

- Location Services

You can configure LBS for your apps and enable the Find My Device feature, which uses GPS to locate your phone.

- Lock Screen

This feature can be used to change the lock screen display background, set a password or PIN, change the amount of time it takes for the phone to lock, and turn on notifications or turn them off when the screen is locked.

- Keyboard

The keyboard settings allow you to change the language, auto-correct and spell-checking settings and add a personal dictionary so that you don't have to constantly tell the phone to not autocorrect.

- Phone

In this area, you can view your phone number in case you forget, set up your voicemail messages and settings for how to handle voicemails, and edit your reply-with-text messages so that you can auto-reply to people.

- My Accounts

This section of the Settings area tells you who is registered to the phone, how to deregister it, how to manage your accounts, and connect your social networking accounts for easier access.

- Device

The device section of your phone allows you to change the date, time, language, install updates, manage accessibility, and back up your phone.

- Voice

This allows you to configure the voice settings so that you can talk to your phone, just like SIRI!

- Help and Feedback

The Help section in your Settings application allows you to connect using the Mayday Feature, discussed in the next chapter.

So as you can see, setting up and learning the basics of our phone is not too difficult if you have a small amount of technical know-how, but just in case, the Amazon Fire Phone has a 24/7 built-in help system called Mayday. Let's look at that in Chapter Two – Using Your New Phone.

Chapter 2 – Using Your New Phone

So you have the basic settings all ready to go and you've registered your phone, but how do you *use* it? First, let's talk about the Mayday feature since this may come in handy if you're not technologically savvy.

How to use Mayday

Amazon's most touted feature for their new Fire Phone is the Mayday feature, which allows you to contact a customer service representative around the clock. Don't be alarmed when their face pops up on your screen as they cannot see you through your camera. They do, however, have the ability to remote access into your phone to show you a feature if you can't seem to get it or don't want to be bothered, and you can talk to them through the microphone.

To access the Mayday feature, simply turn your phone to the side so that the menu pops up and you'll see the Mayday button in the quick access tools. You can also swipe down from the top of your screen to find the Mayday feature.

How to Transfer Contacts, Photos, Music, and Videos

You may have an old phone that you want to transfer information from to your new Amazon Fire Phone. It's pretty simple, actually. You can download an application from AT&T and follow these steps.

From an Android Phone to the Fire Phone

1. Be sure you have the latest operating system on your phone by swiping down and going into your Settings. From there, click on Device, Install System Updates, and Check Now. If you need an update, it will automatically update, so be prepared.
2. Download and install a content migration application such as AT&T Mobile Transfer or Amazon Transfer Assist from the Appstore.
3. Open the application and follow the on-screen instructions to transfer content.

From an iPhone to the Fire Phone (AT&T Customers)

1. Be sure you have the latest operating system on our phone via the aforementioned steps.
2. Be sure the phones are on the same wireless network and download and install the AT&T Mobile Transfer app on your iPhone.
3. Open up the application and follow the on-screen instructions.

From an iPhone to the Fire Phone (Non-AT&T Customers)

1. Find the Amazon Cloud Drive Photos application on your iPhone and download it. Sign in with the Amazon account and password. Tap OK so that you can sync your photos and videos to the cloud.
2. After everything has been uploaded, open the Photos application on the Fire Phone to be sure the photos and videos are there.

How to Take a Screenshot

This is going to come in handy if you want to share a screenshot with a customer service representative trying to help you, or if you want to share something new and exciting with a friend. Screenshots are pretty easy to take on the Amazon fire Phone.

1. Hold down the Power button and Volume Down buttons at the same time.
2. You'll hear a sound and there will be an animation that will let you know the phone has taken a screenshot.
3. You can share it from the notification option or you can find it in your gallery application later where it'll be stored in a folder named 'Screenshots'.

How to use the Status Bar

You can turn the Status bar at the top of your phone either on or off. The status bar will show you connections, the time, and your battery life. If you want to change it, follow these simple steps:

1. Find your Settings application.
2. Click on Display.
3. Turn it on if you want it to display or off if you don't.

One Handed Shortcuts

Something pretty neat that the Amazon Fire Phone has is one-handed shortcuts. You can use your phone with just one hand without having to worry about putting down whatever else you might have, or holding onto something for that matter.

Here are the following one-handed shortcuts of the Amazon Fire Phone.

- Peek

You can look at shortcuts to menus on the side of your phone by just tilting it to the left or right. You can look at star ratings of Kindle books while you're in the Kindle store, or you can look at the Quick Actions panel and see the names of the icons. Pretty much every application has a short-cut menu using the peek option.

- Tilt

The tilt feature allows you to look at the left and right panels of your phone, which will have more menus and options.

-To open up the left panel, tilt the left side of the phone toward you and move it back to its starting position all in one fluid motion. To close the left panel, tilt the left side away from you and back to its starting position in one fluid motion.

-To open up the right panel, tilt the right side of the phone toward you and place it back in its starting position fluidly. To close it, tilt it back and to the starting position fluidly.

- Swivel

The swivel option allows you to open the Quick Actions panel from any screen at any time. Just hold the phone in portrait mode and swivel your wrist down to the

left or the right.

- **Go Back**

If you want to go back in any application on the phone, just swipe in an upward motion from the bottom of the screen.

- **Auto-scroll**

The auto-scroll feature allows you to scroll up or down without having to touch the phone. Just angle the phone toward you if you want it to scroll down, and angle it away from you if you want it to scroll up.

How to Customize the Carousel

The carousel is the rotating area at the top of the phone when you're on the home screen. This is where your more recent applications are going to show up so that recent book you read or that game you played will be there. If you don't want something on the carousel, simply hold your finger down on the item for a few seconds until a menu pops up. Then select 'Remove from Carousel'.

You can also add things to your carousel by holding your finger down on the application until a menu pops up. Select 'Pin to Front' so that it shows up in your carousel next time.

How to Sort Your Apps

You're going to eventually have a lot of applications on your phone, and if you're an organized person like yours truly, you'll want to organize them.

To create a folder, simply hold down one application until you can move it and drop it onto another application that looks the same. You'll then be prompted to make a folder.

Your Device tab is all of the applications you have installed, and your Cloud tab is everything you've bought from the Amazon Appstore.

How to Use Email

Whether you're using the Fire Phone for personal or business use, receiving your e-mail on it is most likely going to be an important feature for you. You can choose to have your e-mail notifications pop up on your carousel from the Settings application, or you can choose to have them turned off.

If they're turned on, you can swipe a message from right to left in order to bring up the Delete option in your carousel, or you can tap on it if you want to read more. If you feel the need to delete more than one message in the e-mail application, press on the first message for a few seconds and then tap on all of the messages you'd like to delete.

You can also use the tilt gesture either to the left or to the right in order to open up menus that allow you to do nifty actions without having to search.

How to Backup Photos

You can choose to hook your Fire Phone up to a computer and save your photos that way, but it's a long and tedious process. The best way to save your photos from your Fire Phone is to utilize Amazon's free storage for all Fire Phone taken pictures. For all other pictures not taken with the Fire Phone, you can use their 5GB of free storage.

The Fire Phone pictures will not be compressed when they're uploaded, so you don't have to worry about the resolution or any scaling.

1. Go to the Settings menu.
2. Select Applications and Parental Controls.
3. Tap on Configure Amazon Application settings.
4. Select Photos.
5. And turn on the Auto-Save feature.

This will automatically upload the pictures you take to Amazon's cloud storage.

How to use Firefly

Firefly is a feature of the Fire Phone that allows you to get information about movies or TV shows that is playing, music, and X-Ray information about the actors on the screen. You can use this option when a video or music is playing by pressing and holding down the camera button the side of your phone.

Parental Controls

Yes, the part all of you parents have been waiting for! The Amazon Fire Phone, of course, comes equipped with parental controls so that you can monitor many things that your child may be using their phone for, such as:

- E-mails and SMS messages
- Web Browsing history
- Social networking websites and sharing history
- Calendar information
- The camera
- Purchases and the ability to make them
- Ability to connect to wireless networks and mobile networks
- Location-Based Services

To set up the parental controls, simply follow these steps.

1. In the Settings menu, tap on the Applications and Parent Controls option.
2. Tap on Enable.
3. Tap the switch to turn it to On.

4. Enter a password and confirm it, then tap Submit.

Set up Lock Screen

The lock screen on your phone is the screen that will appear when you first turn your phone on from either sleep mode or being completely off. It will most likely display the current time, date, and any a picture of your choosing. You can choose to add a password or a PIN to the lock screen so that no one can enter your phone but you.

1. In the Settings menu, tap on the Lock Screen option.
2. Tap on Set a Password or PIN.
3. Select the option for a 4-digit numeric PIN or a Password.
4. Enter the PIN or password of your choosing and tap Continue.
5. Confirm and then tap OK.

Chapter 3 – Connections

Your Fire Phone can support the following connections: WiFi, Bluetooth, VPN, and Mirroring.

Connect to WiFi

If you'd like to connect to either a private or public Wi-Fi network, follow these simple steps.

1. Access the Quick Actions panel by swiveling the phone or swiping down from the top of the screen.
2. Press and hold the Wi-Fi icon.
3. Tap On.
4. Tap a network you'd like to connect to. If there's a lock beside it, then you need a network password. Enter the password and tap OK.

Connecting to Bluetooth

You must first verify that a Bluetooth accessory is in range and its compatible with your phone. You'll see an icon appear if it is. Please note that if you have a low energy device such as a fitness band or a smartwatch, it's not support by the Amazon Fire Phone at this time.

1. Access the Settings menu and tap on the Wi-Fi and Networks option.
2. Tap on the Pair Bluetooth Devices option.
3. If you haven't already done so, tap On next to the Bluetooth option.
4. Tap the accessory in the menu you'd like to pair your phone with and follow any additional on-screen instructions. If you see that the Bluetooth indicator is gray, it's not paired with your phone and something is wrong.

Setting Up A VPN

A VPN is a virtual private network that's usually used by a business or a school. This allows the user into the organization's internal network. The Fire Phone supports the IPSec, PPTP, and L2TP protocols. Be sure to ask the person who set up the VPN what the configuration information is before you begin.

1. Find the Quick Access option by swiveling your phone or swiping down from the top of the screen. Tap on the Settings icon.
2. Tap the Device option.
3. Then Click on Manage Enterprise Security Features.
4. Select VPN and tap the + icon.
5. Enter the VPN information:
 - Name – VPN's name.
 - Type – Security Protocol type.
 - Server Address – The address of the VPN.
 - PPP Encryption (MPPE) – Select this if the MPPE is required.

6. Tap Save. The profile is saved and will appear on your VPN screen.
7. From that screen, tap the VPN profile.
8. Enter the username and password and tap Connect.

Install and Manage Security Certificates

Security certificates make sure that your phone is trusted when you connect to the secure server, and it's provided by the network administrator. You can install these certificates on your device in order to get access to the Wi-Fi and VPN's. The Fire Phone supports .cer, .p12, .crt, and .pfx certificates.

1. In order to do this, you will need a micro-USB cable and a computer. Connect the phone to the computer via the cable and drag and drop the certificate into the Internal Storage folder.
2. Disconnect the USB cable.
3. Open the Quick Actions panel by swiveling the phone or swiping down from the top.
4. Click the Settings icon.
5. Tap on Device.
6. Tap on Manage Enterprise Security Features.

7. Tap on Credential Storage.
8. Click on Install Secure Credentials and find the certificate you want to install. If you are prompted, enter the PIN or password if you haven't set one up yet.
9. Enter a name and then tap OK.

Mirroring

Mirroring the phone allows you to connect to a TV or a media streaming device that allows a wireless connection. You must be sure that the device you want to connect to is turned on and discoverable before you begin. With the Fire Phone, only a Miracast certified device can be used.

Please note that if your television or other device is not compatible with Miracast, you may still be able to use the HDMI display by using an adapter or a wireless dongle.

1. Access the Quick Actions panel by swiveling the phone or swiping down from the top of the screen.
2. Select the Settings icon.
3. Tap on Display.
4. Tap on Share Your Screen via Miracast.
5. Once the phone has found the device, tap the name of the device to connect to it.

6. It can take up to twenty seconds for the phone to connect, and then it will show mirroring under the device's name during the session. You'll see the display and hear the audio on the other device.
7. If you want to stop mirroring, simply tap on Stop Mirroring on your phone.

Chapter 4 – Troubleshooting

Despite all of its perks, sometimes you might run across problems with your Amazon Fire Phone. Here are some of the common complaints about the phone and what you can do to fix it.

Frozen Screen or Unresponsive

Try restarting the phone. Press down the Power button and hold it, and then select Restart. If it doesn't come up with the Restart option, continue to press it down to manually restart it.

Purchasing or Accessing Content Issues

First you should confirm that the phone is connected to the internet through a cellular or Wi-Fi connection. The phone must be connected to some type of internet connection in order to purchase movies, television shows, music, books, and any other content on the device.

If you need to view the status of your internet connection, simply hold the phone to a left or right angle and use the peek option. The Wi-Fi icon will tell you the strength of the connection and the cellular connection will tell you its strength. It can be LTE, 4G, 3G, EDGE, or GPRS.

If your Wi-Fi connection appears weak, try turning it off to default back to the cellular connection.

Purchased Content Not Showing Up

The first thing you need to do is verify that the phone is register to your Amazon account, the right one.

1. In order to do this, swivel the phone or swipe down from the top in order to open the Quick Actions panel.
2. Then tap Settings.
3. Tap on My Accounts.
4. And tap on Deregister Your Phone.
5. If it's on the wrong account, tap Deregister and register again.
6. If it's not, then contact customer support.

Issues with a Specific Application

Sometimes you may experience a problem with a specific application and you need to wipe out some of the information in it. To do this, follow these steps.

1. Open the Quick Actions panel from the Home screen by swiveling or swiping down from the top of the phone.
2. Select the Settings icon.

3. Tap on Manage Applications.
4. Tap on the application giving you problems.
5. In this section, you'll be able to:
 1. Clear data
 2. Clear the cache
 3. Force stop
 4. Uninstall
 5. Change application settings

Clearing data will not delete the application, but it will erase saved information like your game scores and account information. So be aware of this before you delete anything.

Chapter 5 – The Perks

So your Amazon Fire Phone comes with a few perks that you may not have known about. Encryption is one of them, and backing up automatically is another. But did you know you can get Amazon Prime for free for a year?

Encryption

Before you begin this process, you want to make sure your phone is charged to at least 80% and it's plugged into its charging device so that it doesn't run out of juice before you're finished. Keep the phone plugged in throughout the entire process as this can take about an hour to complete. Your phone will restart twice during this time period. If you interrupt the process, you could lose all or some of your information permanently.

1. Swipe down from the top of the phone to access the Settings area.
2. Tap on Device.
3. Tap Manage Enterprise Security Features.
4. Tap Encryption.
5. Then tap Encrypt.
6. Enter the lock screen password or PIN if you have one and tap Next.
-If you haven't created a PIN or password, you'll be asked to make one.

7. Create the encryption Pin or password and tap Continue.

-Your encryption password will be different from your lock screen or parental controls password and you will need to place it in every time you turn on your phone. You must have one letter, one number, and it has to be six characters long.

-If you enter into the incorrect password thirty times, the phone will be reset to its factory default and all encrypted data will be lost.

8. Tap Continue.

-The device will restart for the first time and begin to encrypt the data. If you unplug it or turn it off, you will lose all of your data. So be sure you have 80% battery and the phone is plugged in!

Backing Up

If you have the Cloud storage enabled on your phone, most of your information will be backed up automatically; however, you may want to back up some things manually. For those things, follow these steps.

1. The must has to be connected to a Wi-Fi connection in order to back up.

2. The backup system backs up your:

-Home Screen – the carousel, collections, and application grid layout.

-Applications – installed, call history, SMS and MMS messages, bookmarks in the browser, E-mail and Calendar settings, notes, settings, and much more.

-Device Settings – Wi-Fi, Bluetooth, parental controls and passwords, and much more.

3. Turn on the automatic device backup with these steps:

-Tap on Settings.

-Tap Device.

-Select Enable backup.

-Use the switch to turn on the Device Backup.

-The phone will automatically back up when it enters sleep mode one a day and has a wireless connection.

-To manually back up the phone:

1. Enter the Settings area.

2. Tap Device.

3. Select Enable Backup.

4. Tap Back Up Now.

5. The phone will back up all the content on your device as long as you have a Wi-Fi connection.

How to Get Your Free Year of Amazon Prime

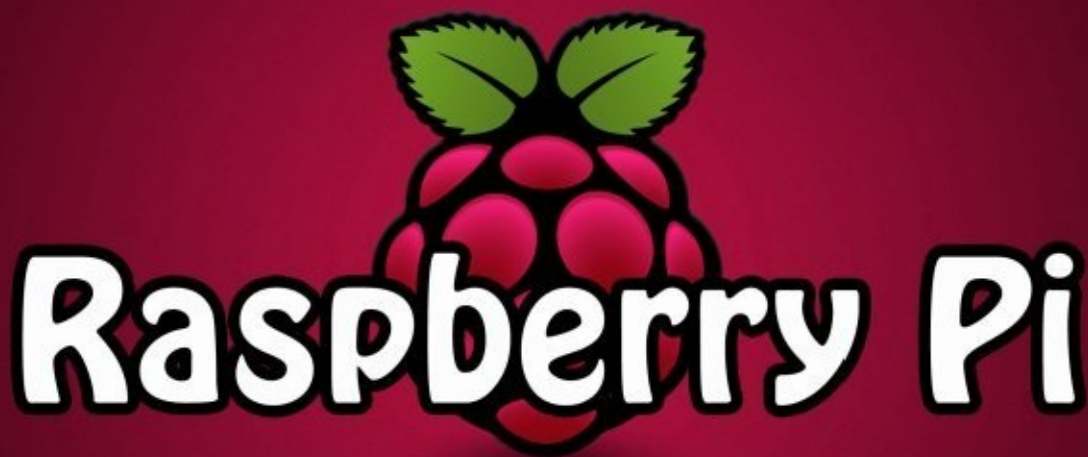
The best has been saved for last. You can get a free year's worth of Amazon Prime when you purchase an Amazon Fire Phone. When you register your Amazon Account with your Fire Phone, you will automatically set up Amazon Prime. However, be careful as Amazon Prime renews yearly and you will be charged automatically, so if you want to get rid of it you have to manually unsubscribe from it when the year is up.

Conclusion

As you can see, using the Amazon Fire Phone is not as difficult as you may have first thought. It's a touchscreen, Smart device like any other with awesome features that will allow the use of your phone to be streamlined. I know I love my new Amazon Fire Phone, and I'm sure that you will, too!

If you enjoyed this guide on how to use your new Amazon Fire Phone, please leave a review at your online eBook retailer's website.

Thank you for reading!



Guide For Simple Python & Projects Programming



William Gore

Raspberry Pi

Guide For Simple Python & Projects Programming

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Introduction

How about three cheers for the magic of low-energy embedded computing driven projects?

Raspberry Pi is the clear leader in embedded computing platforms. With this small, easy to program computer, you can create countless projects. Our goal in this book is to introduce you to embedded computing, explain how to program and get you started.

But first a quick word about why people should know how to code. Software development has been the path to creative disruption for decades now. One of the skills necessary is fluency in simple object-oriented programming languages. These languages empower programmers to realize the vision of new technological advances. With costs of embedded computing platforms dropping, your projects can be easy to build, inexpensive to manufacture, and profitable to sell.

So let's get started with a quick history of embedded computing. We'll tour past incarnations of small programmable personal computers that fit inside and powered other devices. We'll discuss the necessary elements of building a system. Afterwards we will go through the basics of programming in Python, a simple to learn, yet remarkably powerful programming language. Many languages are either object oriented or command/function based. Python can be either. Besides, Python also has an extensive standard library of functions that you can draw on to create your application.

Finally, I will walk you through a few simple Python-Raspberry Pi projects to get you thinking. I want to inspire you to create applications that are interesting, functional and profitable. Developing a useful tool can be the basis of a fledgling business. Maybe you can get crowd funded to bring a product to market. After that, you could score a big investment from a venture capitalist.

That investor will help you scale the production of the device and get better distribution. Suddenly, you've got a business. Soon, your business is growing and appreciating in value. Before you know it, you've got offers for your business and they aren't tiny little offers. There's a lot of zeroes in the price some bigger company is willing to pay for your idea. That's disruptive change. So, let's get disrupting!

Chapter 1 – Embedded Computing Basics

Embedded computing seems like a complicated topic, so let's simplify it some. An embedded computer lives inside a larger device. It has a specific, dedicated function within that device. Embedded computers are in effect the brains of many commonly used vehicles, appliances even our homes.

A typical embedded computer consumes very little power. They are small in size and inexpensive to make. They are just a component and their specialized function is all they do. Because they can be in a variety of environments, they tend to be more ruggedly designed.

In early iterations, embedded systems limited processing resources to keep costs low and improve reliability. That is all changing thanks to innovative embedded computers like Raspberry Pi. Instead of the older, difficult to program systems that were challenging to interface with, new systems are geared toward the do it yourself and amateur developer communities.

In other words, embedded systems are now for you and me. And with them we can build amazing things.

One aspect of embedded computing that hasn't changed, is that we can still interface multiple embedded computers to existing sensors. In doing so, we better manage our resources. This allows amateur developers to substantially increase the functionality of a device with embedded systems.

Embedded systems eschew the typical computer architecture of a main board with expansion slots. Instead they rely on either a single-board computer or an embedded system on a chip architecture. The various versions of Raspberry Pi for example are based on the Modern embedded systems are often based Broadcom's system on chip

microcontrollers.

What makes embedded systems most interesting is their focus. Embedded computers do a specific task. Developers optimize the computer for that function. As a result, the units can be made smaller. Additionally, these embedded computers can be mass-produced. This in turn drives the cost down. Most critically, designers build them to be more reliable than a typical PC.

Consider, if your computer crashes while you are online it's an inconvenience. If the embedded system that controls the way your car's engine works fails, your car will fail. The consequence of that type of failure could be lethal.

Consumers can find embedded computers in portable devices like their smartphones. They also drive more complex appliances like dishwashers, refrigerators or home HVAC units. Embedded computers also serve to power industrial applications.

They can be as varied as healthcare equipment, automation at a manufacturing plant or more modern cars. In fact, a fairly cool project is to build a device that takes readouts from the on-board computer in a car and return a diagnosis. That way you know what exactly is going on with your car when the check engine light comes on.

And the applications don't end there. Embedded systems pop up everywhere. Applications as varied as cooking appliances, office equipment even military avionics are all powered by embedded computers.

One of the better areas for hobbyists is the realm of home automation. Built on a network of both wired and wireless devices, people can control all aspects of their home remotely or from their couch. As an added bonus, a properly programmed embedded computer system will control the most creative and inspired holiday light display your neighborhood has ever seen.

One aspect of embedded computers that make them valuable is their isolation from broader networks. Because they do not need to interact with external systems, they are more difficult to hack. Some embedded systems have begun to use wireless connectivity to communicate data in real-time. This opens them up to potential mischief from hackers. But for the most part an embedded system can be designed to function in a closed digital ecosystem. This makes them particularly appealing to designers of safety and security systems as they are less likely for outsiders to compromise them.

Embedded computers can also tolerate wider temperature variations. These rugged systems are ideal for extreme environments. They are also easier to secure in water tight containers to shield them from external elements. Self-sufficient embedded computers are even able to operate when power and communication have been disabled.

One of the limited factors in embedded computers was the requirement of manually operated buttons, dials or switches to provide inputs. Think back to the old game consoles like the original NES or the Atari 2600 for an example. As microprocessors grew less expensive, they replaced analog switches in consumer products. Further advances put memory and input and output components onto a single chip with the CPU. These “microcontrollers” went into devices where a full-blown computer would cost too much.

Enter the Raspberry Pi. It's a very low-cost microcontroller that can easily handle the tasks of several components. For example, the recently announced Raspberry Pi 2 Model B includes a 900MHz Quad Core processor and a full gig of RAM. It also includes 4 USB ports, an HDMI port, a network interface controller with a standard RJ-45 port, on-board audio and video controllers and a memory card slot that works with micro SD form factor disks. It will run all ARM GNU/Linux distributions. As an added bonus it will also run Windows 10 when it is released.

The power and versatility offered by the Raspberry Pi 2 makes it ideal for developers and hobbyists. Additionally, it's \$35 price tag is not prohibitive for an onboard embedded computer in a commercial product, even one aimed at consumers.

Because the Raspberry Pi manages the system hardware complexity, very few, if any components are necessary to attain full functionality. As a result, product development is largely the province of software engineers, rather than hardware manufacturers. Once a stable code base is developed, the system the costs associated with manufacturing product are fixed. As production scales, per unit costs decrease exponentially. And because software development and testing happens far faster than the development of new circuits outside the microcontroller, product design times are cut to days and weeks, instead of months and years. This gets you to market quicker than your competition.

Chapter 2 – Python Programming

The primary supported programming language for Raspberry Pi development is Python. And this is not in reference to the very large snakes. Python in this instance is a hip shout out to the British comedy troupe collectively known as Monty Python. Like the Pythoneers, Python is more free form and open than its major competitor in the realm of scripting languages - Perl.

In the first decade of the 21st century, Python and Perl staged a battle for the hearts and minds of entry-level code jockeys. Neither language would ever replace C and C++ as software development languages or Java for rich internet applications. But they provided an introduction to multiparadigm programming languages. Entry level developers as well as hobbyists and do it yourself software engineers had a versatile tool to create. And create they did.

What made Python intriguing was its philosophy. Python does not present an abundance of options. For example, in Python, there are extensive libraries. Those libraries provide developers an obvious path on how to do something. That led to a simpler and easier path to the goal.

Perl on the other hand allowed developers more freedom to improvise. It also set up language constraints that made it difficult to get to the end goal of development. When there are many paths, each with differing pitfalls along the way, only the most well-versed will find their way. Contrast that reality with the target audience. Perl was giving all the tools in the tool box to guys who wanted a hammer and a screwdriver. And a lot of duct tape.

Python was their roll of duct tape. Python had less structure, but more obvious routes to developers objectives. Because these code jockeys were not advanced developers, that clear way forward was ideal. Perl suffered from an overabundance of versatility. Python's straightforward approach eventually allowed it to overcome Perl as the language of choice

among entry-level developers.

So what is Python? It is several things. It is first widely used. It is both a general-purpose and high-level, programming language. It is also a multiparadigm programming language.

Like many languages, it was created with a foundational philosophy. Those tenets pushed concepts of easy to understand code readability. Additionally, the language allows the creation of functions and concepts in fewer lines than other languages. As a result, Python includes tools that give developers the ability to write clear programs regardless of scale.

Python's multiparadigm support includes numerous styles. Among them is the gold standard of paradigms, object-oriented programming. Most importantly for developers, Python includes a massive library of comprehensive standards.

Python includes many supports for other programming paradigms, including imperative programming. Functional programming support is somewhat limited, but still present. In addition, Python can support aspect-oriented programs. Developers using extensions can produce programs through logic programming and design by contract. The number of paradigms supported makes Python appealing to coders with a wide variety of expertise.

To begin programming in Python, you must download and install the latest release from the Python Software Foundation. After you have done so, open up the python shell, which is called the IDLE. The IDLE is where most programming in Python is done. IDLE is an acronym for the integrated development environment. When you use the IDLE, you are writing Python code.

So how about we start with the simplest and easiest to understand coding done in Python. One-line commands are programs. They use existing functions within Python to perform a simple task. Math functions already exist in Python so typing `1 + 1` at the command prompt line will return 2. Programming in Python begins with those simple foundational commands.

One of the most useful commands in Python is `print`. Programmers familiar with other introductory programming languages like Turing or Pascal will remember `print` commands. This is the same concept. Tell Python what you want it to print and it will display those words or numbers or results on the screen. So simply typing `print ("Good morning")` will return the words Good morning in the IDLE.

So what happens when you start to combine `print` functions with math functions? That's when the fun starts in Python. So let's try this. Type the following line into the IDLE at the command prompt:

```
print (1 + 1, "can be as sad as 1. It's the loneliest number since the number 1")
```

That command will return this:

```
2 can be as sad as 1. It's the loneliest number since the number 1
```

You are now programming in Python.

Before we move onto the fundamentals of programming in Python, I want to stress to you the importance of good coding etiquette. Many software developers ignore good coding etiquette. They think to themselves, this is my code, I understand what I am trying to do here. The issue is not so much making sure everyone understands what is being written in the code. But when you hit a wall and need help, the easiest way to make sure another developer can figure out what you want to do is through clean code and comments.

Comments are in every programming language. Their lines do not get executed when the program is compiled. They exist so programmers can explain what is going on inside the code to another developer. This way it is easy for another programmer to pick up where the original author of the code left off. This is ideal for collaborative projects among several different programmers, or if you run into trouble and need to get help.

Commenting in Python is simple. All it takes is a hash mark (#) at the front of your comment in the program. So let's grab our example from above and add a comment:

```
print(1 + 1, "can be as sad as 1. It's the loneliest number since the number 1") #3dognite
```

The return remains the same:

```
2 can be as sad as 1. It's the loneliest number since the number 1
```

The commented code does not print. Comments are good to include to document features of a program. Additionally, if a bug in the program returns a useful result, by commenting and documenting it, you can turn your bug into a feature. Which as the saying goes is the secret of all programming effort.

Chapter 3 – Basic Python Programming

In the last chapter, we began to understand some basic programming functions in Python. I want to get more advanced, but also want to keep this at a very high-level. Python programming is best learned by doing. As you work through this chapter, spend time practicing in the IDLE, so you can improve your syntax.

This chapter is geared to enable you to learn some of the most important functions in Python. It is also going to start you down the road of programming. There are many ways to write code. Some books claim to teach the hard way, the simple way, the fast way or the right way. The reality is that there is no simple way. There is not hard way. There is no fast way. We learn coding like we do foreign languages, by doing. That's the only way to become a programmers.

As a result, I will give you the basics, explain different functions and show you how to use them. But you will only learn them by practicing and experimenting in the IDLE. So with that out of the way, I want to look at some of the most important functions in Python.

We will begin with mathematical functions. These are fairly simple. We know them from our interaction with basic math. One of the most remarkable benefits of computing power is that it has made complex math simpler. As the saying goes, Algebra was created when basic math got too big. With computers doing the math, basic math never gets too big.

So the basic mathematical functions are addition, subtraction, multiplication and division. Each of these functions exist within python already. And in the familiar forms that we know from any mathematical expression typed into a computer.

Addition is the + sign. Subtraction is the - sign. Multiplication is the * sign. Division is the / sign. Division will produce remainders, so there is a remainder function as well. It is the % sign. Finally, there is a an exponent function that will raise a number to a power. For

example, 10 to the third power is 1,000 and is expressed as `10**3`.

Math functions can be influenced by order of operations. The process moves left to right across the line of code. But as with basic math, exponents are the first order of operations, followed by multiplication and division and then finally addition and subtraction.

So typing `4 + 6 * 4 ** 2` returns 100 while `(4 + 6) * 4 ** 2` returns 160. Take a moment and tinker with these functions in the IDLE. When you feel comfortable with the mathematical functions we will pick up with loops.

In any programming language, loops are where things get done. Loops repeat certain commands until a result is achieved. One of the basic loops counts a variable up or down. The loop continues as long as a certain condition is met. This is called a while loop.

So let's practice with while loops. Inside the IDLE, let's open a new file so we can enter multiple command lines into one single runtime file. Under the file menu select new file and then type the following into the screen that appears.

```
x = 1
while x < 10:
    print (x)
    x = x + 1
    print ("We added 1 more to x. It now equals"), x
    print ("And we're done here.")
```

Save the file as `loopexample1` and then hit the F5 key to run the program. This will have counted the variable X up from one all the way to nine. As long as x is less than 10, the loop will continue. Once x is equal to 10, the loop stops and the next command line is run.

If you noticed, as you typed the commands into the compiler, Python automatically formatted the language for you. This is one of the things that makes Python particularly user friendly.

Next, I want to teach you about conditional statements. Conditional statements only run if certain requirements are met. These requirements are evaluated through the use of Boolean expressions. They return a true or false value for certain arguments. For example, in the while loop above, we have a Boolean expression. While $x < 10$ resolves as true until x equals 10. Then the loop stops. But what if we want to enforce a condition within the loop, without stopping the loop. That's where we nest the conditional statement within the loop itself. So, for example, if I want to display only odd numbers that are less than 50 and greater than 25, here's the code I enter in my runtime file.

```
print ("Here is a list of odd numbers between 25 and 50:")  
  
x = 25  
  
while x <= 50:  
  
    if x % 2 == 1:  
  
        print (x)  
  
        x = x + 1  
  
print ("And that is the full list.")
```

Save the file and then hit F5 again and you have now created a conditional loop. Within our conditional statement, there was a natural default response if the Boolean expression evaluated false. False meant don't do this. But what if we want to perform a specific command or return a certain value when the result is false? At that point we need to turn to if's partner in crime — else.

If...then...else statements are the basics of programming. Many years ago, out of respect to the visual nature of program flows, developers began creating diagrams of the conditions within their programs. These diagrams were called flow charts. They represented a variety of potential outcomes and ensured that the code produced was nice

and clean and did not lead to an unsupported end.

To clean up the code, they used if...then...else statements to provide a path for false returns in Boolean expressions. Here's an easy to understand example of an else response. Let's start a new runtime file. Type the following command language into the file.

```
a = 5
b = 12
if a == b:
    print ("a is the same as b")
else:
    print ("a is not equal to b")
```

Let's save this file as ifthenelse1 and then hit F5 to run it. The result printed on the screen is the else command. Likewise, we can continue to evaluate the expression by using the elif command, which is an abbreviation for else, if. There is no then if abbreviation, if your initial statement evaluates to true, you can nest as many additional if statements below it. Likewise, you can embed as many elif statements to create numerous branches on the decision tree. Let's try one out. We'll stick with our basic if...then..else above and make one modification.

```
a = 5
b = 12
if a == b:
    print ("a is the same as b")
elif a < b:
    print ("a is less than b")
else:
    print ("a is greater than b")
```

By adding the elif statement, we are able to determine how a relates to b with greater specificity. The use of if...then...else statements allows for greater complexity in your programming. Through the use of loops, you can perform tasks in your program to change certain values.

Take some time before we move on to practice with loops and conditions. Nest multiple options within the program and see what happens as you go through the loops.

At this point, you are no doubt seeing ways you can produce certain results. But what is missing is user input. With information a user supplies, you can begin to generate results that when exported through a digital input/output chip on the Raspberry Pi device will allow you to control certain movements. Now you can create the functional tools for a human-machine interface. And now things start to get really exciting.

Chapter 4 – Intermediate Python Programming

Being able to accept user input is the first step in building programs that tap into the functionality of a Raspberry Pi device. To make that input do things, we will need to utilize functions. Python is flexible in that functions can be created on the fly within programs. As a result, you can configure your program to do just what you want it to do by accepting information from an external source. Again, Raspberry Pi is perfect because it has a digital input/output to take incoming digital signals and then process the data to produce a new outcome.

Additionally, Python comes with functions built into the language. As a result, we can reference those functions in our programs. We have been making use of these pre-programmed functions already. When we reference the mathematical or Boolean operators, we making use of Python's native functions.

So let's get started with understanding functions. Functions do specific work within a program. If it is a one off function, there is no need to define it. It's simple enough to just code the work in directly. But if it is a repetitive task the way to save the hassle of repeating a few lines of code over and over is to define the function and then reference it as needed.

Likewise, you can call any function that exists in Python to perform that task. Built-in functions are the basis of what makes Python easy to use, powerful and so popular. If I want to compare numbers, I don't need to write a function that shows the absolute value of their difference, I can just call the `abs()` function.

The most common built-in function is `print()`. But there are many others. Among them are `max()` and `min()`. These functions allow you to take inputs and return results. Since we want to begin to acquire input from user, let's start with the `input()` function.

Open a new runtime file in the IDLE and type the following in.

```
a = input("What is your name?:")
b = input("What is your quest?:")
print ("Hello,", a, ". If you wish to", b, "surely you know")
c = input("what the airspeed velocity of an unladen swallow is?:")
```

This short program will ask my name and quest and then provide a cheeky reference to Monty Python and the Holy Grail. If the inputs are based on user responses, you will need some manner of input device, keyboard, touchscreen, buttons, what have you.

One of the simplest programs you can write will allow a user to perform string words together in Python. Because all these functions are pre-defined, you can call to each as you go. So let's write a mad lib generator.

Open a new file in the IDLE and type in the following code:

```
#variables

#cycle tells the program to continue running. The while loop will run as long as cycle
equals 1.

#option is the function the user selects

cycle = 1

command = 0

while cycle == 1:

    print ("Want to play a game?")

    print ("I promise that it's fun")
```



```
print (" ")
print ("Just give me a list of words")
print ("and soon it will be done")
print (" ")

command = input("Press 1 to play or 2 to quit and then hit return:")
if command == "1":
    noun1 = input("I need a noun: ")
    verb1 = input("and now a verb: ")
    adjective1 = input("how about an adjective: ")
    adverb1 = input("cool, not give me an adverb: ")
    name1 = input("excellent, just one more, a person's name: ")
    print ("Okay here's what we wrote:")
    print (" ")
    print ("I went walking along a ", noun1, "one afternoon. My pet dog", verb1, "with me
through the", adjective1, "afternoon. It was a", adverb1, "hot day and I missed my friend",
name1, "very much.")

elif command == "2":
    cycle = 0

print ("Well that was rather silly, wasn't it? Bye bye!")
```

Save the file as madlib and then hit F5 to run. You can make up your own silly little mad libs as you go. And even set the cycle to different numbers with each iteration of the program so your user is constantly entertained by the silly stories the mad lib generator spits out.

Chapter 5 – Sample Projects

So when you get started with your projects, the things you can do are literally limitless. But let's start out with three simple and potentially profitable gadgets you can build easily with your Raspberry Pi and some basic Python programming.

1) The Personal Web Server – Building your own web server can be daunting. And Raspberry Pi is not up for major hosting requirements. If you want to build a site to draw in lots of traffic, you need something with more power than the Pi can offer. However, for those seeking work, especially in the tech fields, this is the ideal way to make a great first impression. So you can share with a prospective employer your personal Pi site and invite them to take a look.

On it, you are displaying your ability to code, manager technological applications, even impress them with a specific subsite to highlight how you could help their business. And it is far more effective than a paper resume. But of course, give them a PDF of your actual resume that they can print out from your server. What's better is if you are doing career counseling, you can set up other folks with their own personal marketing site to promote their career prospects.

2) Home Automation Pi – So the wave of the future is the Internet of things. And why not. Life is nothing if it isn't online. You are. Your friends are. Why shouldn't your lights be, too? Set your Pi up on the web and from there access your net-enabled Raspberry Pi via your laptop or desktop PC. Once there you can connect remote control power sockets to the digital I/O connectors on the Raspberry Pi. This will require some understanding of the I/O boards. There are detailed hacks out there that will take you through it step by step. But instead of shelling out a few hundred dollars for a system that switches off your lights from your smartphone, you have done it yourself with a minimal cost in time and labor. And maybe you can package this bundle to sell to other folks who like what you're doing.

3) The Computer Control the Camera – So the first step is to attach the Pi to a camera. It can be point and shoot, or a DSLR, but it needs to be digital. Among the things you can do with the Pi attached to your camera is set up wireless transfer of pictures from the camera to your main PC, back up all images taken to USB, use a tablet, smartphone or PC to remotely control the camera, capture multiple images, while adjust settings to create spectacular time-lapse effects. The potentials are limitless. You can even turn your camera into a high-end digital security system that feeds images in real time to your PC to safeguard your home. And if you think that would be useful to you, imagine how many other people would benefit from a device like that.

Conclusion

Python is a simple language to learn and an easy one to work with to create simple hacks or complex gadgets and gizmos. The beauty of combining an effective programming language with an inexpensive, powerful embedded computing platform means you can create virtually anything you want. And it just takes basic mastery of a simple programming language and some easy to obtain hardware.

For fledging inventors, Raspberry Pi creates the ultimate entry level solution to build a basic gadget. It's low cost makes the gadget affordable. Then once you have created the code you can begin to market and sell these devices. They may not change the world, but they create the credibility to show potential business partners that you can take an idea from inception to completion. And that ensure whatever you want to do will be funded and supported and successful.

I hope you have enjoyed learning about Python and Raspberry Pi and that all your projects are tremendous successes.

Chromecast DEVICE

Christopher Jackson



Ultimate Guide on How
to Set Up and Use a
Chromecast Device

Chromecast Device

Ultimate Guide on How to Set Up and Use a

Chromecast Device

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Introduction

In today's tech-savvy marketplace, developers are discovering new ways for us to incorporate the technology we love into our day to day lives. For connecting with friends, sharing photos or simply having fun, what you want can often be found just a few clicks away. Google Chromecast has rapidly become the hottest must-have gadget, seamlessly melding all of our favorite media with one tiny, user-friendly device.

Google Chromecast is a small USB-like device that plugs directly into your television quickly and easily. Once your TV is paired with Chromecast, you can “cast” pretty much anything on a smaller device straight to the big screen. From your phone or computer, you can control your television with ease. With friends or on your own, you'll enjoy your favorite movies, music, news and games.

Whether you have your Chromecast device now or are preparing to buy one, you'll find there's a lot to love with this new Google offering. It's easily affordable at \$35.00 per Chromecast, so it fits in your palm and in your budget. It's also easy to install – no wires, no mounts, and no hassle. The versatility of the Chromecast is also something that users love. If a friend wants to show you a YouTube video, they can cast it directly to your home's TV. Want to get up and move? Download a multi-player Chromecast compatible game like Just Dance Now, and cast it to your television.

The only thing you'll find that's missing from your Chromecast box is the user's manual. Google wants to encourage its users to go online for the answers they need, but for some, this can add a level of frustration that they may not want to deal with, and that's not something you want when starting off with a new piece of technology.

That's where this book comes in handy. In this comprehensive, user-friendly guide, we'll guide you through the installation of your Chromecast device. This includes the hardware and software you'll need to fully utilize this great new gadget. We'll take you step by step through the process of using the device. With *The Ultimate Guide on How to Set Up and*

Use a Chromecast Device, you will have a full understanding of everything Chromecast can do and how to do it, so you get the most out of your purchase.

Chapter 1 – Getting Started With Chromecast

Congratulations on your new Google Chromecast device! You've got countless hours of media streaming, photo sharing and app exploration ahead of you, so let's go over the basics of Chromecast installation.

What do you need to get started?

Your Chromecast should come prepackaged with the Chromecast unit, a USB power cable with adapter, and an HDMI (High Definition Multimedia Input) extender. Unlike other smart TV adapter devices, Chromecast does not come with a remote control. This is because your smart device is the controller, and via a wide selection of apps, it will let you interact with your television.

Chromecast is preset to interface with a wide variety of operating systems. On an Android device, the system is compatible with Android 2.3 and higher. If you're trying to work Chromecast with an iPhone or iPad, you will need iOS 7.0 and higher. Don't worry about updating; future versions should be able to support this as well. If you're doing Chromecast from your computer, you will need Windows 7 and higher (which for most shouldn't be a problem), and on a MacBook, please use Mac OS 10.7 and higher. All of these listed operating systems should give you a similar experience. Finally, you can of course use Chromecast on a Chromebook, provided it's at least running Chrome 28.

One common question is what is the quality of the Chromecast signal? The standard is 480p, but you can adjust your Chromecast's settings to go up to high, which is at 720p, and extreme, which shows at 720p High Bitrate. Don't worry if you have something beyond this, as the device will work fine on a 1080p screen. In fact, the maximum listed output for the Chromecast is 1080p. As newer software is released for the Chromecast and automatic updates (which are free) are installed, you should start to see higher resolution options offered in the menu.

Most people have difficulty telling any difference between 720p and 1080p. The difference is the number of available image lines in your screen. As many cheaper HD TV's run 720p, this was considered a safe resolution to run at for the Chromecast. To be fair, most 1080p TV's aren't even displaying at their full potential, and are running devices such as Blu-Ray players that think they only need to transmit at 720p. In other words, don't worry too much if your TV can technically display more than your Chromecast seems capable of putting out. After a certain level of resolution, the human eye cannot tell the difference.

If you have a newer TV, especially one that is running at 1080p, you will want to see if your TV has a Game Mode that needs to be activated. Many HD TV's run on a delay so that they can properly process a signal and store it in a package. This cuts down on any problems the TVs might have in converting a signal that is coming in with poor quality. The downside to this is that you will have a notable delay between your device and the TV.

To accommodate for this, shut off that packet feature by turning on Game Mode. This lets the TV directly stream the signal coming in with a minimum of scrubbing, which means that pesky 1 second delay should be a thing of the past. Don't worry, on most modern TV's, you should only have to set Game Mode one time. This can change if you unplug the Chromecast device from the TV, so keep that in mind, especially if you like to travel.

While on the subject of TV screen resolution, remember that most HD TV's have different color and sharpness settings, and many of them weren't built with smart devices such as the Chromecast in mind. You may want to cycle through the various display modes to see what works the best with your signal. Also, remember to experiment with your aspect ratios. Many TV's will automatically sense what is best, but sometimes they can be a little off. While you're should sync by itself, it never hurts to make sure your TV and smart device are both showing video at the same size.

Chapter 2 – Installing Your Chromecast Device

Chromecast is designed to integrate with any HDTV that has an HDMI port. As long as you have one port free, you should be able to Plug and Play with your device. The Chromecast does require an external power supply, but this can be accomplished in one of two ways. First, the Chromecast can be plugged into a wall outlet via an extended cable. If this is not an option you want, consider using the USB power port on your television (provided that it has one.)

If you have a newer TV with an HDMI 1.4 setup, there is a chance that the TV may be able to provide power directly through the HDMI slot. While this is still sketchy depending on updates and hardware, HDMI 1.4 is listed as Chromecast compatible, and may be worth your time to check. Unfortunately, each TV is different, so don't get rid of that USB cable until you know for sure.

Also, as of the time of this manual's writing, it is unknown if this means you will be able to use certain features through your Chromecast if you're solely connected via the HDMI 1.4. The biggest feature this may impact is the ability to work your TV with your phone like a remote. While there are numerous apps that do this, the Chromecast allows for it with ease, provided it is connected to an external power source. When using the HDMI 1.4, you may not be able to power the TV on without an AC adaptor.

Inserting the Chromecast device can prove difficult, depending on the shape of your TV and how many available HDMI slots you have. To that end, Google has included an HDMI extender to help you get to your plug without having to disconnect all your other devices.

Once the device is plugged in and has power, set your TV to the proper HDMI input, and you should see the Chromecast login screen. From here, you will need to access your local Wi-Fi connection. Chromecast will remember your network password.

The setup process can be done from any Android or iOS device. Also, you can work your Chromecast from any tablet, iPad, laptop, or desktop. To begin, go to <http://chromecast.com/setup>. From here, you will be asked to download a Google Play app.

The Google Play app not only gives you the ability to sync with Chromecast and use its features, but it also gives you access to the Google Play store. From here, you can find thousands of apps, many of which now support Chromecast. On top of this, Google Play routinely offers many top apps, songs, and videos for free. All of this type of media should be compatible with your Chromecast, so feel free to look around.

If you're on an iOS device, you may have to go to your settings and search for the Chromecast signal. Look for the matching address that your Chromecast will display on your TV and select it. Once you've done this, the Chromecast app on your device will recognize your unit, and you can begin to follow the on-screen setup directions.

As you're setting up your device, you may be prompted with a code, both on the TV and on your device. Your device will ask you if you see the code. If so, press "I See the Code." This is how the device confirms that it is talking to the correct Chromecast unit. After this has been confirmed, you can enter a name for your Chromecast device and enter your Wi-Fi password.

Chromecast is an extremely compatible device when it comes to working with router signals, and can interface with over 50 top name routers. For a complete list of what routers your Chromecast can interface with, see <https://support.google.com/chromecast>.

The Chromecast requires a connection with an outside peripheral, such as a computer, laptop, tablet, or smart device. This device will become your hub, or controller, for your Chromecast experience.

Note that if you run into difficulties, or you feel that your Chromecast device is not

responding properly, you can initiate a factory reset. Simply hold its power button for 25 seconds. This will force a factory reboot, and put your devices settings back to what they should have been when it came out of the box. Beyond this, you should contact the Google help line.

Chapter 3 – Broadcasting to your TV

Chromecast integrates with many of the top Chrome apps, including YouTube. When you're ready to sync your phone with the television, click the sync button at the top of your app, confirm, and your YouTube video will appear on the TV screen. To navigate, you use your phone. You can even use it to change the volume on your video by adjusting the volume settings on the side of your device.

So, what if you're not the one who needs to broadcast to your TV? If you have a friend over, you can open your Chrome app and select the Guest mode. Once this is turned on, your guests will be able to broadcast out to the nearest Chromecast device just like you can.

Guest mode is nice, in that it cuts down on people having to go through an installation process with their own devices, but it can also mean that more devices are synched up to your TV, so make a judgement call on whether or not to go this route.

Another great feature about Guest Mode is that it doesn't require the other users to be on your Wi-Fi network. Once the devices are authenticated via inaudible pings, the Chromecast will allow for direct streaming from your guest's devices to the Chromecast, cutting down on home traffic and helping you to not have to share your wireless password. Please note, you still have to have a Wi-Fi synched device to get the full functionality out of your Chromecast.

Along the lines of Guest Mode, you can have multiple users on your Chromecast and host a YouTube party. This is where multiple users can post YouTube channels to your Chromecast at once. This functionality isn't a secret; in fact, it's offered when you sync your devices. This can lead to some fun and interactive sharing of your favorite videos on your TV, and further widens your options when using the Chromecast.

The Chromecast app isn't just for video. If you like, you can access the Chrome app on your device and choose Cast Screen, which will allow you to show your device's main screen on your TV. This changes your TV into a copy of your device, and from here, you could also open up your video apps and view them, full screen.

As far as which is better? Again, that is up to you. If you're going to be switching between applications and want to show what you're doing, you may want to go with the Cast Screen option to cut down on steps. If you don't want to share everything you're up to and are just looking to view some videos, go with the traditional sync. Either way, the video quality will be the same when you view your media on the TV.

Browsing for media doesn't just have to be an act that's restricted to your phone. If you have Chrome installed on your laptop, you can use the Chromecast extension (located at g.co/castextension), and then click the Cast icon located at the top of your browser. This will transmit whatever is on your screen to the TV.

This is the beauty of the Chromecast plugin. It can seamlessly interface with every major type of smart device and PC on the market, making your TV an extension of your computer and smart devices. If you can do it on your screen, you can do it on your TV.

Now, what if we're not talking about your TV? When Google designed Chromecast, they realized that people might want to take it with them when they travel. To this end, Chromecast is not digitally tethered to your TV. As long as you are on a network that is capable of supporting unrestricted data usage, such as a Wi-Fi or home network, you shouldn't have any issues setting up your Chromecast on a different TV. Also, the device works with a wide array of TV options, and can work with Dolby Digital Plus units, provided that it is plugged into a device that supports DD plus.

If you're an avid traveler, there are numerous Wi-Fi routers that are \$25 and under that you can take with you. While not ideal and sometimes slower than other networks, using your own Wi-Fi router can guarantee your security when using your Chromecast on the road. Plus, you never have to worry about streamed content being blocked by a public

router.

Another purchase you may want to consider is a hotspot. Most 4G hotspots run around \$100, but they can allow multiple device to connect to the internet while bypassing existing, restricted public networks. Plus, a hotspot means that you'll never have to worry about throttled speeds or losing a signal due to massive usage. When streaming content on the road, this may be an option worth exploring.

So, what about when you're not watching TV? When you have the Chromecast device plugged in, the TV becomes more like a computer monitor. This means you will have an image displayed for your backdrop, and Chromecast comes ready to provide you with whatever image you might want.

Case in point, the Backdrop feature. If you go to your Chromecast app and open the menu, you can choose Backdrop. Then, you can choose a background image for your TV. Even if you're not actively using your Chromecast device, you can still have it display a pleasant image. This makes your TV behave more like a desktop background, and helps to enforce the feeling that your TV is no longer a monitor, but instead, a part of a complex operating system.

Chapter 4 – Chromecast Apps

When the Chromecast debuted, there were 14 applications that were compatible. Since then, that number has skyrocketed into the hundreds. As developers see the benefit to having your content transmitted to your TV, the library for Chromecast compatible content has continued to grow. So, with all the new choices, which applications should a user consider?

Chromecast lets you work with a wide variety of applications, many of which are specially geared towards being displayed on your TV. Everything from business to entertainment to personal health can be monitored and tracked via your Chromecast plugin.

For starters, Google gives you access to your documents anywhere in the world via the Google Drive. With this free app, you can store, share, and edit any document file you have via the cloud. These files can then be shown on your TV, allowing you to browse files in a much larger environment than your phone or monitor.

For the office-savvy, Chromecast gives you access to a multitude of productivity tools. From the interactive and Microsoft-friendly Calendar to the continually upgrading and flexible Google Docs, you can look at, edit, create, and send important documents and appointments. Your Calendar integrates with other top programs, and Google can sync with multiple devices, meaning you're never out of touch from your schedule.

Of course, there is also Gmail. With a massive amount of storage space and a globally-friendly platform, you can send and receive messages to anyone at any time, and with Chromecast, you can see not only your messages, but also your attachment files in vibrant HD.

Some of the world's most popular games are on the Google Play store. Feel like destroying some pigs in Angry Birds? What about defending your garden in Plants vs.

Zombies? Everything from Bejeweled to Temple Run appears larger than life on your TV, making your phone or computer a gaming console.

In terms of entertainment, Chromecast can give you all the excitement of Netflix and Pandora, while also allowing you to access Amazon Prime, Hulu, and a number of other entertainment sites. The best part is that most major applications that come out on the Google Play store and on the iPhone are now geared towards not only being on a handheld screen, but also on a larger monitor, like your TV. Plus, many of these apps are now designed with HD in mind, making them appear even more beautiful on your screen than you might have imagined.

There are literally thousands of apps that you can use with your Chromecast device, and as the OS improves, even more will become available.

Chapter 5 – Advantages of Chromecast

As the technology behind digital transfers becomes more and more readily available, more devices have started to hit the market. Go to any electronics store and you'll find dozens of different Smart-TV conversion kits, offering you ready-to-go apps and a friendly user interface. So, with all of the choices out there, what makes Chromecast so special?

One of the biggest advantages that Chromecast has over the boxed units is that those units, which are generally larger and more expensive than Chromecast, come with a set amount of applications pre-programmed into them. They are mainly for getting apps like Netflix and Hulu on your screen, and really aren't geared towards the massive interactivity you can achieve with Chromecast. Even the ones with games are limited to what came installed on them, while Chromecast is releasing new apps daily for users to enjoy.

The biggest contender to Chromecast is the Amazon Fire Stick. While similar to Chromecast and offering a pleasant user interface, the Fire Stick is limited to Amazon-ready applications. Yes, Amazon Prime is very nice, but you can just as easily access it through your Chromecast. Also, the Fire Stick requires the use of the Amazon remote, whereas Chromecast can sync with a multitude of devices.

The biggest selling point behind the Amazon Fire Stick is the internal memory offered, which is roughly twice that of the Chromecast. While Amazon makes a huge deal about this, please note that the Chromecast doesn't need a lot of memory. Unlike the Fire Stick, the Chromecast isn't holding onto data or apps. All the displayed content on the Chromecast comes from your devices, and not the Chromecast itself. To that end, it only requires so much internal memory, whereas the Fire Stick has a lot of its software preloaded. This also helps to account for the massive price difference between the two products.

While Amazon doesn't like to advertise it, their Kindle Fire OS is technically running on an Android-based platform. That means that even though they may want you to use their

Fire Stick, you can still stream content from certain 3rd party apps to your Chromecast. Look on YouTube the next time you're on your Fire, and check for the sync button. You'll find that all Android devices should be compatible, even the Kindle Fire. Just don't expect to see the same level of versatility that you might get on a Galaxy. Amazon has tried very hard to steer clients away from any Chromecast compatibility, as it's the competition, but major players like YouTube and Netflix have sized on Chromecast's functionality, and the sync buttons are now here to stay.

The beauty of the Chromecast, and what sets it aside from the rest of the devices out there, is its simplicity. All the other devices out there come with their apps ready to go, whereas the Chromecast is unrestricted, and can show virtually any new app that you happen to download. With this kind of versatility, the other competitors haven't been able to keep up in terms of diversity. Also, because you're mainly purchasing the hardware with the Chromecast and not the multitude of applications out there (like with Amazon), your device is going to be cheaper than practically any other unit on the market. That, combined with the compatibility your Chromecast offers concerning all known devices, makes the Chromecast a fantastic choice for your streaming needs.

Chapter 6 – Chromecast Secrets

As the Chromecast becomes more and more popular and more updates come out for the hardware and software, more tricks are being discovered with the Chromecast. Some deal with the technical aspects of the Chromecast, while others make it just plain fun.

One cool feature that most don't realize is the ability to do local media playback using an app called Plex. Plex is a combiner app that allows you to stream all your movies, TV episodes, pictures, and music to your TV. When Chromecast first debuted, people complained about media not being in one central location. Plex fixes this. The downside is that you have to sign up for the service, but the upside? Having all your media in one place is more than worth it to most, and considering how much media you probably have on your phone, this is an app to have.

Second, consider that your Chromecast can make any device you have into a TV remote. While there are some apps already out there that can do this, not all of them work as well as they could, and some of them are a bother to sync and operate. If your TV has an HDNI-CEC mode, this can let your Chromecast interface with it much like your TV remote does. Different brands of TVs will have this feature, and some of them might call it something completely different, so do your homework and research before blindly stumbling through your menu screens.

Are you a photo nut? If so, Chromecast is great with an app called PhotoCast, which was designed to help make beautiful slideshows and presentations of your picture files on your TV. While there are several apps that can do this, PhotoCast was specifically designed for use with your Chromecast device, and the resolution on your photos through this tool is spectacular.

As mentioned before, the Chromecast has some settings that allow you to be more technical with your device. Despite the fact that many home networks are unhindered when it comes to streaming content, that doesn't mean the Internet content your device is

pulling is coming in at the speed you want.

Earlier, it was discussed how you could change the image settings on your Chromecast by going into your menu. If your video is coming through choppy or stalling out on your TV, you may want to scale it back to 480p. This may look a little blurry, but the standard setting is geared towards the speeds commonly associated with average house networks, and will guarantee a better streaming experience with apps like Netflix and YouTube.

Netflix actually adjusts its quality depending on the available bandwidth, and this will carry over to your Chromecast. YouTube, on the other hand, doesn't care. If your connection slows, the HD video on YouTube you've been trying to watch will still attempt to push through at the same resolution it did when things were smooth. In cases like this, it is up to you to make the adjustments.

With Netflix, your system will try to automatically make the adjustments for you, but there's a way to find out exactly what is going on with your Netflix connection without being a tech wizard. The next time you're on Netflix, look for Example Short 23.976. This will display the current bit rate being used as well as the current resolution. If you suspect that your signal is being slowed down and you want to be proactive with your Netflix streaming, this is a great network test to run. This isn't something commonly advertised by Netflix, but it is doable on all devices that stream the service.

Speaking of video, another complaint about Chromecast is that you cannot use your device independently from what is being displayed on the TV. You can't...unless you're on a Windows computer. Simply hit Alt-Tab if you want to do something while your Chromecast video streams in the background, and your computer monitor will be freed up. Mac has a similar feature, and while this isn't yet available on your handheld devices, future updates are coming.

A huge hang-up for users of the Chromecast that have poured money into home theater systems is the single HDMI input. For those that aren't aware, HDMI is the combination of audio and video into one fiber optic stream. It is the clearest signal you can presently

get from a wired device, and is considered the gold standard in video transmission over a solid connection. You will find HDMI in everything from gaming systems to receivers, to your newer audio setups.

A quick aside, let's talk about your HDMI connection. Chromecast comes with an extender, but if for whatever reason you decide to add length to your HDMI cable, don't be fooled by expensive, gold-plated options. HDMI is literally sending a light signal to your device, which is then broken down and interpreted as video and audio. Light doesn't care if it's travelling to a gold-plated receptor; it's just light. A \$6.00 cable is just as effective as a \$200 cable. This is a common scam that many stores will try to push on unsuspecting shoppers, but don't be taken in. Your Chromecast will not see one speck of quality difference on an expensive connector, so save your money.

Unless you have an extremely expensive receiver unit, you're out of luck with the Chromecast. The single HDMI lead is good for your TV, but not for an independent audio system. This is where an HDMI audio extractor comes into play. The audio extractor is a splitter that allows for your HDMI audio to go to one channel, while your video goes to another. Essentially, it's doing the job of a receiver, but not as cleanly.

With a receiver, you can adjust levels, switch between multiple signals, and control everything about your signal from a central hub. The extractor just splits the signal in real time, but the result is that you can route your audio from your Chromecast into a custom HDMI sound system, and yes, as mentioned before, this is a Dolby compatible device. While a receiver can cost hundreds of dollars and take up a lot of cabinet space, a standard HDMI audio extractor typically runs about \$50, and is the size of a paperback novel.

Before you go this route, please make sure your Chromecast device is in fact compatible with your HD audio extractor. While most devices nowadays are, not all of them fall under this umbrella, and there's no reason to spend \$50 on something that's just going to sit there.

We've discussed a lot of video tricks you can do with your Chromecast, and some of them

have gotten pretty technical. One fun trick you can do (if you have the patience for it) is to use your Google Now to voice activate your TV. Google Now is an app that can be found on newer Android and iPhones, and allows you to run complex searches with vocal commands. If you're running a newer version of the app, you can command it to turn your TV on and off, and to search for shows. This feature, while intriguing, is a bit time-consuming, and it can be a bit frustrating when background noise interferes with your watching. Unfortunately, Siri and Cortana, while very helpful, aren't quite as tied into the Chromecast as Google Now, so you may be limited to this particular vocal translator.

One interesting secret to the Chromecast is that the receiver unit for the device doesn't need to be a TV. Admittedly, not all Android devices are the same, and some tablets can be pretty limited. If you're trying to get some functionality out of a device and can't seem to, you can turn nearly any Android-based device into a Chromecast receiver by downloading the CheapCast app. CheapCast will sync with any Android device, but not entirely. You will have problems streaming with Plex and Netflix. Aside from that, the device can become a secondary peripheral, and that can be handy in an office or travel environment.

All of these tricks seem to revolve around being able to get a better video experience out of your Chromecast, but there is another use for the device. If you've grown tired of limited browser functionality on your TV (Xbox users can relate), you'll be pleased to know that you can sync your device's browser to the Chromecast, and through it, make your TV a 100% unhindered browser window.

This means that sites that would have been restricted by other devices won't be kept from you on your Chromecast. Everything from video services to interactive games are visible, and as long as it's a site that works on Chrome, it's a site that you can display on your TV.

Now, what secrets are there concerning games? While not an "official" use of the Chromecast, there are a number of motion-based games, similar to what you might find on the Wii, that only work on a Chromecast device. Your smartphone has the same general sensor equipment in terms of motion and direction as a Wii controller, and certain games, such as Super Sync Sports, are designed with this in mind.

While fun, the motion controls aren't going to win any awards. These are meant to be for generic actions, and please keep in mind, your phone was not designed to be handled in this fashion. Unlike the Wii controller, there is no strap to keep your phone from flying off. Also, unlike the Wii controller, it's not a mere \$40 to replace your phone if it breaks. Just keep that in mind before you decide to explore the motion sensor capabilities of your Chromecast. Still, all that aside, the games are pretty addictive, and you'll quickly adapt to the controller differences.

Finally, for those who are looking to treat their TV like a background piece of art, check out the app Revision3. This will allow you to turn your TV into a lava lamp, display striking photos, or beautiful video loops to add some atmosphere to a room. These look good on a phone or a computer, but they were specifically designed for a streaming experience.

Conclusion

The Chromecast admittedly came late to the game of digital streaming. With so many devices on the market, Google had their work cut out for them. They succeeded in standing out by offering a device that was endlessly upgradable. As your phones, tablets, and other devices become more and more advanced, so too will what you can push out to your TV. In this, Google has made themselves stand out from the herd, and as a result, the Chromecast is quickly becoming the tool of choice for the media savvy.

In this guide, we have talked about the technical requirements for your Chromecast device. We explored getting set up, what steps you may need to go through to make your device sync properly with your Chromecast, what kinds of devices are compatible, how to make your videos appear on the screen, and more. We discussed applications that are Chromecast compatible, how to push images, music, and your desktop to the Chromecast environment, and how to get the most out of your new multimedia experience via tips, tricks and specialized applications. We talked about how it is similar to other devices in the field, and now it leaves them behind.

The Chromecast is a solid entertainment investment. As the Google Play and iOS stores continue to add great apps and features, the library of what will make the Chromecast special will only continue to grow. Also, so will your enjoyment of one of the finest streaming receivers on the market today.

So, what are you waiting for? You're only a few clicks away from having your entire multimedia library ready to go on your TV. As for what to do with it? As we've shown in this comprehensive start-up guide, the possibilities are endless.

HACKING

for Beginners

48 Things Every Hacker Must
Know About **HOW TO HACK**



Daniel James

Hacking

Hacking for Beginners: 48 Things Every
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Introduction

Hacking. For some people, an art. For others, a dreaded curse. For certain groups, a necessity. For the celebrities and the famous people a blatant disrespect of their privacy. For the politicians a two edge sword that can work both in their favor and against. For the information technology professionals, another two edged sword as some of them may get a job trying to fight hackers and some others will get a salary out of trying to hack protected systems. For many youngsters just a pass time and something to do for fun.

The philosophical issues behind hacking are many and the debate is strong with meritorious points for both sides of the coin. However, this is not the scope of this book nor what will be discussed. This book will focus on the technical and practical issues that every hacker should know about, before his first attempt to break through even the lowest levels of network or web security.

The one objective concept that characterizes hacking is knowledge. Knowledge of the way software works, knowledge of the thinking behind the security systems, knowledge of the algorithms upon which the security systems and software are based and knowledge on how to bypass, circumvent or overwhelm the barriers that safeguard the information to be accessed.

Most of all hacking requires a specific state of mind. One that commands no hesitation in breaking the rules and the laws should the case be that you may not be interested in anything other than money and profit.

As the saying goes “if you can’t do the crime, don’t do the crime”. Make no mistake. Hacking outside the teaching class, a controlled contest or a business arrangement is illegal and is subject to imprisonment sentences depending upon the severity of the action taken.

It is not under any circumstances to be considered that the contents of this book intend to provide motivation or a basis to any person or group to engage in illegal activities. The contents are solely for informational and educational purposes and they are not to be viewed under any other context.

Now that this point has been made clear, it is time to proceed to the basics that every person that wants to learn about hacking should become aware of.

Chapter 1 – Hacking

To put it simply hacking refers to the processes used to overcome the barriers raised by security software and other methods for the purpose of safeguarding any and all pieces of information that must remain private and confidential.

Most constitutions and legal systems have put in place laws that decree that personal details like names, addresses, telephone numbers, credit card numbers, pin numbers, judicial information, photographs, videos and every other piece of information that was not produced for public use, are not to become known to the general public without the express and written permission of the person that the information pertains to.

The same stands true for governmental information, professional and corporate plans and projects, military information, business ventures, online stores and in general for any condition that requires information that must be kept safeguarded at all costs.

The question of why do people want to hack such security systems has a lot of responses. Some youngsters do it just to pass their time and for no other reason than hacking for the sake of hacking. Some others want to gain profit out of it by stealing credit card numbers and buying things without having to pay out of their own pocket.

More serious hackers do it for reasons of blackmailing or for reasons of divulging secret information to the general public based on a notion that says that the people have a right to know what their government is doing at all times.

Other reasons that hackers do what they do have to do with an aversion to corporate policies that want to make a profit out of services and software that should be offered for free, or as a resistance to governmental policies that are considered as restricting the rights of freedom and personal disposition.

The first thing to know about hacking is that there is not network that is completely safe and that there is no computer that cannot be hacked unless it is turned off and disconnected from a power socket.

With these two details in mind let's begin with the background that a hacker should have in order to begin exploring the possibilities of hacking.

Chapter 2 – The Background

An everyday user that opens up a personal computer, a tablet or a laptop, surfs the internet, downloads a few files and photos, uploads info to a cloud drive, writes a few documents or edits a few videos and pictures cannot be considered as a person who knows enough to become a hacker.

Neither does an employee going to work and spending eight hours per day for five days a week typing into a specific application on a most probably locked hard drive as required by his or her employer.

There are three things that are considered as prerequisites for the first step of becoming a hacker.

Knowledge of operating systems

Each operating system works differently and may have a different set of weaknesses that can be exploited. Keep in mind that hacking is nothing more than exploiting those weaknesses.

All operating systems have knowledge bases that describe such weaknesses as they are been discovered by users or by the creators of the operating system.

While the specific weaknesses may have been corrected, they show a hacker which aspects of the operating system were not paid enough attention to, by its creators. And always the best way to hack an operating system is from the inside.

Knowledge of security software

The security suites released for the general public and the security systems build in to routers and switches are rather easy to overcome once you become

acquainted with how they work.

More advanced system administrators use a process called SIEM (security information and event management) which should be thoroughly studied as it is a multi-stage multi-layered security system. Furthermore, hackers need to seek information on paranoid levels of system administration which include turning off ICMP protocol and laying down traps and honeypots for hackers to fall in.

Knowledge of a programming language

Actually this is incorrect. You should learn at least three languages beginning with assembly which will allow you to get in touch with the processor directly, C which will allow you to learn exactly how memory works and bash scripting which will allow you to write scripts that will do all the work for you. Assembly has been released in many variations. The more of them you learn the better.

Other languages that can be very useful in hacking are Python, Ruby, Perl and of course PHP which will allow you to break through the security of internet pages.

Assuming that you got yourself familiar with all of the above, the next important step to be aware of is how not to walk barefoot on glass. That means how to protect yourself.

Chapter 3 – Self Protection

The point of the exercise in hacking is to acquire the information you want and not get caught in the process. In fact if it is very easy to penetrate the security and walk away unscathed, it will never let you become a good hacker.

The part of not getting caught in the process requires three more basic level issues that need to be discussed:

A) Secure your computer

Securing your computer means implementing security measures that will not allow someone else to get inside your system. In this case you need to consider your computer as your target, attack it, find out about its vulnerabilities and shut them down.

If you are not in a learning class or in a contest which implies that you already have permission to try hacking another system, if you are trying to test your skills, make sure that you have written permission from the person who owns the system you are trying to attack.

B) Secure your identity

While your computer could be secure, this is not necessarily the case with your identity. There are tracking systems that can follow your signal and determine your ip address and from there your physical address and consequently who you are.

Using proxies or spoofing your ip address are good ways to mask your location and by extension your identity.

C) Cover your tracks

The system administrator or the system owner must never know that you were ever inside their system. If you break user names and passwords make sure that they are hard-coded. Do not erase files, do not create files or user accounts and stay in the system only as long as it is absolutely necessary.

Remember that every activity is recorded in a log file. Do not erase the entire log file but just the dangerous entries along with some other random lines. Do not forget to look for a backup log file and hope that there is no tertiary log file kept somewhere else.

Now you are ready to begin. And the first thing to do is learn everything there is to know about TCP/IP protocols and networking as every network and every internet connection is based on this protocol. And off course you will need a fast running computer, an optional but strongly recommended proxy server and an IP scanner.

Chapter 4 – TCP/IP

All modern networks, the internet, even private networking works over TCP/IP protocol. For the uninitiated it stands for transmission control protocol / internet protocol. Its purpose is to determine how the data transmitted from one computer to another is packetized, routed, transmitted, addressed and received.

TCP/IP does not recognize any specific operation system. It just needs that the sending and receiving computers have some kind of hardware and some kind of software installed that can identify and translate the packets of data sent back and forth.

Through this neutral property, TCP/IP has become the standard for communication of all devices including personal computers, laptops, netbooks, smartphones, tablets and every other device that can communicate through any network.

Programmers that create the applications for the common users acquire access to the four layers of TCP/IP through internet sockets and APIs.

The internet socket is a combination of an ip address and a port. An ip address is the single number that is assigned by a DHCP (dynamic host configuration protocol) server to identify a single computer. It has the format of xxx.xxx.xxx.xxx, subnet (usually) 255.255.255.0 and it is unique for any computer in a network or the internet. A port is like the door that allows the data packets to go back and forth.

API stands for application programming interface and it is the platform provided by every operating system to allow the applications that are based upon this interface to control and transmit data through TCP/IP protocol.

Just like programmers, hackers use exactly the same tools and similar processes to acquire access to TCP/IP protocol and consequently to the information they need. So it is actually

more than imperative that the more you know about how TCP/IP works, the better hacking you will be able to do. Especially with the IPsec architecture that has been implemented with IPv6.

Deep knowledge of the protocol will actually render the new concept of a third access prerequisite irrelevant. The current encryption concept requires two elements of identification (user name and password). The new concept will require a third element which will be determined by each user. It too will be based on TCP/IP and therefore on the same processes.

The learning process will actually need to take into account two aspects. The first one concerns TCP/IP administrator processes and the second one the TCP/IP blueprints which will explain everything in full detail.

Let's discuss now the first steps that you need to take in a first attempt to become a hacker.

Chapter 5 – First Steps

Computer technology has not yet advanced to the point of receiving commands through someone's thoughts. Hacking still requires that you type commands to the keyboard of a computer. This computer, to understand your commands, needs to be running on an operating system. And here lies the first choice you need to make.

If you are working with Windows you will need a *nix terminal or Cygwin to type your commands in. What they do is actually import a Linux, BSD or Unix environment inside your Windows environment. The environment is similar to a virtual machine one only simpler and faster. It could be a better choice to work directly on a Linux or BSD operating system which offer a plethora of embedded applications and tools that you can use.

The second step is to know your target. In hacking terminology the process of gathering information for a target is called enumeration. For your first few attempts you should opt for another computer in your own network or for a computer of a friend that has been advised of what you are trying to do before you do it.

The next set of steps has to do with testing and identifying the specifics of your target. A simple ping command may show you if the target is active but it is not reliable as it is based on ICMP protocol which may have been turned off. Instead you may want to try running a scan for open ports.

Use nmap or Nmap to run the scan if you are working with Windows, or one of the tools embedded with Linux or BSD. This scan will tell you which ports are active, what the target operating system is and it can even identify the router used and the type of firewall. You will need all this information to plan what you are going to do next.

This plan will be based on whether or not you will be able to find an open path to your

target. Ports like FTP 21 or HTTP 80 are usually well protected and should be avoided even if they seem open. Some paranoid administrators may leave them open deliberately to set a trap. Some others may have put in place warning processes sounding the alarm whenever anyone tries to do anything with these ports.

Instead, try to find TCP and UDP ports like Telnet or gaming ports that may have been forgotten or left open as required by the game they are playing.

If you find port 22 open this usually indicates that there is a secure shell running which is susceptible to brute force decryption. If you find an open port in the range of 47000 this could mean that a torrent client is in operation which means that you can piggyback the packets received and go straight in.

All secure networks will ask for a user name and password before they allow access. It is now time to discuss what to do to overcome this initial barrier.

Chapter 6 – Cracking a Password

Most beginner hackers fall into the trap of trying to crack the passwords that allow access to the information they want. The newer encryption protocols do not even allow for weak passwords. However, if you insist on trying to crack someone's password, this is what you need to know.

Password cracking works after you are able to get the hashing algorithm that the passwords are based upon. Most cracking techniques are based on brute force that uses a pre-defined set of passwords in a dictionary. This process may take too long which is contrary to the instruction of staying inside a system only as long as absolutely necessary. It will be easy to get discovered.

You can increase the speed of brute force cracking by cutting down the MD5 algorithm to ¼ or by using the graphics card processor which is many times faster. You can also try to use Rainbow Tables which at this time is considered as the fastest technique.

Trying to crack a password will violate a second of the self-protection rules. Brute forcing techniques get recorded to the log files completely polluting them, which means that you will not be able to cover your tracks.

There are alternative methods to try to discover a password. One of them pertains to a rooted tablet equipped with a TCP scanner. Uploading the signal to the secured location will open the ip address and the password will appear on your proxy.

It could be a far easier process to try to get into the router menu or gain super user or administrator privileges. Most people forget to change the passwords to their routers or do not set passwords for accounts with administrator rights. This situation is gradually changing as the router manufacturers start shipping their products with unique passwords that are printed on the shipping box.

However there still are a lot of older routers that still keep the “admin” “admin” as user name and password. If you can get in the router menu you can get access to the stored password which will also give you access to an internet connection. Gaining super user or administrator rights will give you access to all the files including the password file which you can open and see all the passwords for all users.

To gain the super user or administrator rights it may be necessary to trick the machine. One such trick is a buffer overflow which will force the memory to dump consequently allowing you to run a higher level programming and load scripts that will give you the access you need.

Supposing that your first attempts on friendly systems were successful, it is crucial to keep in mind a few things before attempting any sort of hacking to an unknown system.

Chapter 7 – Things to keep in mind

Let's face it. Hacking is illegal unless you receive a written permission from the owner of a system or a system administrator. Some of the most experienced hackers will tell you that there is no chance of becoming a good hacker unless you take a risk of facing a real time challenge and do something illegal. We strongly advise against something like this.

If you have decided to learn more about hacking opting to become what is called a white hat hacker, then there are some things that must be brought to your attention before your first unfriendly hacking endeavor:

- 1) There is only one practice legally acceptable to hack a system. To sign a contract with the owner of a system or with the system administrator of a company that will allow you to try to hack their system for the purpose of improving their security.**
- 2) Never remain confident that once you have gained access to a system and managed to come out of it unscathed, you went unnoticed. Many administrators allow you to gain further access in an effort to make you further incriminate yourself before they take legal action against you. A repeat offense gets a higher punishment than a single attempt.**
- 3) The people that create the security systems and are behind all attempts to keep the information that must be protected safe, are quite knowledgeable and they will do their best to keep you out. This means that you must follow a learning path that will constantly improve your skills. You actually must listen to master Yoda's advice here: "There is no trying. You either do or do not!"**
- 4) There is a major distinction that you must decide upon. Those who deserve the title "hacker" do what they do to gain knowledge through exploration and**

exploitation not necessarily for evil purposes. “Crackers” do what they do for money. A “hacker” is actually a person to respect. A “cracker” deserves nothing more than a cell in prison.

5) Never bite more than you can chew. In this case do not attempt to hack a system if you are not completely confident in your abilities and skills that you can pull it off.

6) Even very experienced and seasoned hackers avoid hacking systems that have to do with governmental or military networks. Even if you succeed, they have the money and the resources to hunt you down, catch you and throw you in jail. There has never been a case of hacking to such networks that did not result in the perpetrators eventually getting caught.

What all the above should tell you is that to become a successful hacker you need to accumulate knowledge. The first hackers accumulated this knowledge through trial and error and experimentation that got most of them behind bars.

However, one way or another, they managed to transmit what they learned to others who added more knowledge on top, so that now you can have access to the database of many years of experience.

This database is given to you mostly in published books that you need to read and through some other means that you need to be aware of, in your effort to become a better hacker. Let's take a look at these resources.

Chapter 8 – The database of hacking resources

We have already discussed that you need to study how the operating systems work, how the security suites work and how to program. We also talked about acquiring a deep knowledge of TCP/IP protocol. Are those enough? Certainly and most definitely not! If you ever visit a hacker's house you will find an entire library of relevant books. Without referencing specific titles and authors let's discuss what they talk about:

The mindset

This is probably the most important issue. If you want to become a hacker you must learn to think like one. These books talk about the mindsets of the White Hat hackers and the Black Hat hackers (those we called crackers) but most of all they will teach you how to protect your own system by someone who thinks the same way you do.

The tricks

In the previous chapters we used the term “buffer overflow” mentioning that it is a trick used in hacking. There are a lot more such tricks to learn and a lot of books to read on that subject as the deeper you go into hacking, the more advanced and complicated these tricks become.

The concepts

Let us introduce you to some terms:

Footprinting and social engineering

Session hijacking

Sniffers

SQL Injection

Denial of service

Evasion

Cryptography

These are just a few of the concepts explored in hacking. You will actually have to read a couple of books on each of these concepts.

Web specific hacking

Hacking a web site or an online store requires the same way of thinking but a different approach than hacking a network or a computer. There are other issues involved and other methodologies to follow. Actually most books that have been written about this kind of hacking refer to both attacking and defending against a web attack.

Probably the most important source of information and insights about all kinds of hacking is provided in the blogs of the hacking community. Whenever something new comes up, a new weakness to be exploited discovered, a new tool to use has been released, there will always be a relevant posting with details and all the pertinent information. So you need to make it a point to always keep visiting these blogs to remain informed with the latest in hacking technology.

The last place that you need to look into to gain knowledge, is the publications presenting the latest updates in the development of security software and techniques. If you know what is been deployed to stop you, it is easier to find out how to circumvent it beforehand.

Hacking is all about knowledge. Remember that it was hackers who created Linux, hackers who created the internet and hackers who created open source software. Being a hacker commands the respect of a person who knows a lot. Consequently you need to

learn a lot if you want to enjoy this respect and acknowledgement.

Conclusion

The topic of this book and its context is hacking for beginners. Therefore the approach chosen was the one that assumed that you had no prior knowledge of any of the issues involved in hacking. This approach required that a presentation was made on the initial steps that a person would need to take in his journey to becoming a hacker.

It also required that we introduced you to what you needed to know before even thinking of becoming a hacker. To put all the issues discussed in a simple list:

- 1) There is no network that is completely safe**
- 2) There is no computer that cannot be hacked**
- 3) You need to have deep knowledge of operating systems**
- 4) You need to have deep knowledge of SIEM**
- 5) You need to learn at least three programming languages**
- 6) You need to secure your own computer**
- 7) You need to hide your identity**
- 8) You need to cover your tracks**
- 9) Acquire the deepest possible knowledge of TCP/IP protocol in both blueprint and administrator levels**
- 10) To begin hacking you need a fast computer, an IP scanner and a proxy server (optionally)**
- 11) Choose the operating system that you will work with**
- 12) Acquire knowledge of your target**
- 13) See if your target is active**
- 14) Determine which ports are active**
- 15) Find out what kind of security safeguards are in place**

- 16) Find an open path to your target**
- 17) Try to crack a password only if you have the hash of password**
- 18) Increase your brute force password cracking speed by cutting down the MD5 algorithm to $\frac{1}{4}$ or by using the graphics card processor or by using Rainbow Tables**
- 19) There are better and easier ways to gain access to a computer or a network than trying to crack usernames and passwords**
- 20) Gaining super user or administrator privileges will give you access to all the files stored**
- 21) There is only one legal way for hackers. To cooperate with companies to improve on their network security**
- 22) Never assume that you were not noticed hacking a system even if it appeared so**
- 23) When hacking do not try. Do or don't**
- 24) You need to decide if your title is going to be "cracker" or "hacker"**
- 25) Never attempt any hacking if you are not confident of your own skills and abilities**
- 26) Stay away from governmental and military networks**
- 27) Read books that will introduce you to the mindset of a hacker**
- 28) Read books that will introduce you to the tricks that you will need to use**
- 29) Read books that will introduce you to the concepts and the terminology**
- 30) Read books that will introduce you to the methods of hacking web pages**
- 31) Always visit the blogs of the hacking communities**
- 32) Read books that present the updates in security software**

All the above is just the tip of the iceberg. Some of the deeper issues of hacking cannot be discussed unless you have acquired a level of understanding first. It would be pointless to present issues that you would not be able to understand.

The purpose of this book was to inform you of the basics and to present the learning process that you would need to get involved in. A process that once you get yourself into, will never end unless you remove yourself from the ranks of the people who deserve the respect of being called hackers.

HACKING

**Learn the Basics of Ethical
Hacking and Penetration
Testing**



MARTIN DONOVAN

Hacking

Learn the Basics of Ethical Hacking and
Penetration Testing

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Introduction

Ethical hacking is a way to turn your mischievous thoughts into legal work that pays quite well. Businesses will pay you generously to do what malicious hackers want to do – to access their systems and steal valuable information. You won't steal the information, however. When you find vulnerabilities, you will report them to the IT departments of the companies for which you work, so that they can repair the problems.

Ethical hacking, also known as white hat hacking, is a way for organizations to ensure that they are compliant with government and corporate mandates, to keep customers' information safe and private. You'll learn all the tools of the hacking trade, both automatic and dynamic, so that you can keep your employers as safe as they possibly can be against hacker attacks and information breaches.

Chapter 1 – What is Ethical Hacking?

Computer hacking can occur in many ways. The intent may be malicious or benign. Benign hacking by workers in the security industry is called ethical hacking, which describes attacking a public or private network or system benevolently, to check on the security of the system or network for its owners. Ethical hackers may sometimes be referred to as white hat hackers. This distinguishes them from people who hack into systems with the intent of harm or exploitation. Those are black hat hackers.

One not-so-clear part of hacking is known as hacktivism. In these cases, a hacker will detect and report on security vulnerabilities, but may also exploit them for social activism. In cases like these, sometimes called gray hat hacking, the hacker may not be motivated by money, but rather the goal of calling attention to injustices or issues that the hacker feels merit social change. The victim may not be as receptive of the message.

True ethical hacking should be done with the consent of the organization being targeted, even though some black hat hackers may claim to be working as ethical hackers if they are caught.

Why do Companies Use Ethical Hackers?

Why would someone pay a hacker to attack their own website or application? The reason is to expose any vulnerability they may have. Anyone in law enforcement knows that in order to prevent criminal activity, it's best to think like criminals do. Ethical hackers who test security systems use methods just like illegal hackers do, but instead of disrupting the company, they report any problems they find.

The Federal government utilizes many ethical hackers. Larger companies employ entire teams of white hat hackers as part of their plans for information security. If you are tech savvy, or a computer programmer, you can take classes that will help you learn ethical

hacking, and you can even be certified in the skills.

Application testing utilizes ethical hackers who try to compromise an app and then report their findings. Various tests are performed, including information gathering attempts, all the way up to outright attacks that would damage a company or agency if they were done maliciously. Ethical hacks may include techniques like emailing company staff to see if they will reveal their passwords or other details of their accounts.

Ethical Hacking Tools

Ethical hackers use tools that expose vulnerabilities like software coding errors that are threatening to accounts, critical data and the functionality of the applications. Some of this hacking is done manually and some is done with automated tools, like dynamic and static analysis. These will find insufficient encryption or malicious code that could allow security breaches. Ethical hackers can spend time prioritizing problems and remediating them.

Companies find Ethical Hackers Valuable

Large companies have used ethical hackers for many years to test their internal and external security. They are especially valuable in checking new systems being launched. Beyond their testing, they can find overlooked vulnerabilities that could bring damage to the company.

Businesses hire white hat hackers, never black hat hackers. Black hat hackers attacking their systems may very well find vulnerabilities, but they will also take advantage of them.

Most companies find it quite safe to employ white hat hackers, whose skills are used to improve security. They will have the explicit permission of management, and they will test their systems just as if they were malicious hackers. They can perform vulnerability assessments, quantify risks and threats, and disclose their findings so that the problems

can be repaired.

If you enter white hat hacking, you will use most of the same tools as malicious black hat hackers do. You will need to train in the area, and keep your knowledge and skills up to date, so that you know the latest exploit possibilities. You do not need to be certified after you train to do white hat hacking, but it will put company managers at ease when they hire you.

Early Discovery of Security Issues is Essential for Business

Some major vulnerabilities are discovered before they can be exploited. Security team members work diligently to rid their system of flaws before a black hat hacker finds them.

Well-intentioned ethical hackers work together with business management to probe networks for holes in their security systems. They use the mindset of a black hat hacker who has criminal motivations.

Companies hire ethical hackers or retain them on staff to determine how real criminals would attack their system. They know all types of tricks that will allow them to sneak in. Some of them include:

- Hacking their way in
- Conning employees through email or on the phone
- Using false paperwork to walk right in

Any business can be compromised on some level. From hospitals to banks and even Fortune 500 companies and government agencies, everyone is vulnerable.

Is Ethical Hacking a Full Time Job?

White hat hacking can be a full time source of income, and the work is challenging and

interesting. It rewards you, since you're protecting companies from malicious black hat hackers who could otherwise break into a system.

Most ethical hackers have worked with computers for some time. They value persistence and hard work and they set their own goals. They may enjoy teaching non-damaging tricks in schools and eventually settle into companies or freelance arrangements to help people and companies with computer security.

An interest in and skills with computers give you great potential to be a white hat hacker. You'll learn not to allow obstacles to rattle you, but instead to use logic and technology to overcome issues. If you enjoy working in the field of technology, you can actually do good work, and that's a rewarding experience.

Who can become an Ethical Hacker?

Many people have been drawn to white hat hacking. They come from all background types and with various motivations. Basically, if you're drawn to intricate technology and you enjoy the challenge of bypassing problems, you can make it a career.

How do you get a Job in Ethical Hacking?

White hat hacking isn't a "normal" job. You don't need a college diploma to do it. You just need a familiarity with computers, programming languages and software. You must be creative and driven.

Many people who worked in IT jobs until the dotcom bubble burst have found a new career in ethical hacking. To keep criminals out of the company for which you work, you must learn how they operate – their tricks. Taking ethical hacking courses will give you more specific skills.

Are Certifications or Licenses Required?

You do not need certification to work as an ethical hacker, but you will find more companies willing to hire you if you are certified. It proves your experience, your knowledge and your good intent. The type of certification you choose will depend on the type of business you will be working with. Research any classes or certifications before you sign up.

There is one exception to not needing a license for white hat hacking. If you perform investigations for your clients, your state will probably require that you hold a private investigator license. As long as you have good communication skills, persistence, problem solving abilities and are skilled in the field, you can be a competent ethical hacker.

Chapter 2 – What will you do as an Ethical Hacker?

White hat hackers go inside company networks in major companies like utilities, hospitals and banks, to see how vulnerable their systems are if an attacker targeted them. You may find some important systems being run on older hardware and software. A company may have un-patched programs that leave them vulnerable, or old default passwords that have never been changed.

The network of business computers, which you count on to protect your records and keep your utilities on, is actually a patchwork of systems with problems that are much easier to exploit than you might like to think.

Catching Attacks before they hit the News

Much of the time in an ethical hacker's day is spent scanning or probing networks, seeking vulnerabilities. You will also need to communicate effectively with clients and document what you have found and what you have done. The final report is something your clients will keep and ponder over long after your job is done.

Clients can see most of what you do as an ethical hacker. The process is open, and they may learn from your perspectives about their network.

People have Misconceptions about your Job

Most people, when they hear the term “hacker”, immediately think of a malicious hacker, or a criminal. Hackers like to tinker with software and tools, and learn new means of problem solving. They can open up new ways to use existing technology. Hackers who steal are criminals. Ethical hackers do not associate themselves with criminal hackers.

The managers for whom you work will also feel like your simulated attacks are magic. You will learn that computers just do what you tell them to, and sometimes those actions are not in the best interest of company management. They may run software that is not properly coded or click on a spam email that promises them money. Most users are not aware of the scary, dangerous things they can do to their system.

Business owners also may have a lack of knowledge about what ethical hacking will include. They are learning more today to pay ethical hackers before black hat hackers attack their systems, though.

How long do Ethical Hackers Work on a Project?

This is dependent on what you are performing. If you are hired to check for all types of penetration issues, you may work between eight and 10 hours a day. The project may run between two weeks and two months, or even longer. You may find, as many white hat hackers do, that they have to remind themselves when to go home for the day, since the work is challenging and interesting.

If a company calls you in after their security has been breached, this is known as crisis mode or incident response work. You may be working day and night to help in controlling the damage and helping to get the business back on its feet.

Are there different Levels of Ethical Hacking?

Some companies only scan a system for vulnerabilities and that's all. There is a problem here. They're not telling the company owners about which programs are vulnerable and how attackers would work to take advantage of the vulnerability. How much damage could be done?

Most white hat hackers are very goal-oriented. They feel that their work helps companies understand real world consequences for any vulnerability in their system. What would

attackers do with the information they find? Would they steal data, interfere with computer programs or perform wire transfers of cash?

When ethical hackers find network vulnerabilities, they also check for practical consequences of those shortcomings. Creativity is needed to understand a security flaw's full potential. You must be able to put the pieces together and figure out the ways in which criminals could pull off a financial or data heist.

Does the Work cause any Frustration or Stress?

It can be frustrating when clients prefer not to know they are vulnerable. They may believe that it will be cheaper to fix a problem after they are breached than to spend money on better security before they are hacked. Usually their delay is based on fear.

You know how your car begins making funny noises but you turn the radio up because the repairs could be costly? That's how many businesses deal with potential security threats. In addition, senior IT executives may be worried about how problems will make them look, and they are worried about their career.

To deal with these companies, do your absolute best, and report clearly where they are most vulnerable, and what it means for them. If business executives are not sure about taking the necessary steps to protect their companies and their customers, you just will hope they will do the right thing.

What do Ethical Hackers Enjoy about their Jobs?

Most white hat hackers become excited about knowing their job would be illegal except for the contracts with companies that allow them to hack with permission. Some of these people think like criminals, and that's really what you need to do, in order to find areas where companies are most vulnerable.

You will work with some amazing people, and the work is hard but fun. You'll learn together. You will be making a difference in the mindset of companies and their security, and you will also save thousands of customers money and hassle. You may be surprised at how good the pay is, too.

How would you Advise Companies who are thinking of Using your Service?

You must make it clear to company executives that you are not a superhero. Some clients will believe that once they hire you, everything will be cleaned up, every problem will be fixed and they will be 100% secure.

In today's world of malicious hackers, there are no 100% secure companies or systems. The realistic goal is figuring out what assets are the most critical to them and what types of risks they are willing to accept. No one can prevent every possible attack, even if you're an excellent ethical hacker. Eventually, someone will figure out a way to get through the defenses. You will not only be preventing attacks, but also you'll figure out the steps that can be taken to limit damage in the case of any successful attack.

To do the best job possible, you need to know all of the company's information, systems and risk assessment documents that have looked at the overall risks of the company. These are important tools you'll need to do your job effectively.

Testing a client's systems has a goal of finding weakness, then exploiting it, which shows how an unacceptable, critical risk can be realized. This includes removing sensitive information from their network and placing it on your secure network. In this way, you can better expect to remediate company risks. The most difficult work for your client will come after you have tested their systems, and teach them to do their business in a way that is less risky.

Do Ethical Hackers Make good Money?

If you do your job well and hone your skills, you can make good money working as a white hat hacker. Freelancers may not make as much as hackers who work for one company. However, if one company employs you, then they “own” you. They can force you to travel and they won’t worry about your lack of time to sleep.

If you want to balance life and work, you’ll first need to have experience in conventional IT work and in the field of security, before you’ll make big bucks. Your location will also affect how much you make. Areas with higher costs of living usually have higher pay.

Can a person move up and advance as an Ethical Hacker?

This is a subjective question. Some hackers will specialize in key areas, including:

- Industrial control systems (manufacturing plants, utilities, etc)
- Software security (web and mobile apps)
- Social engineering (hacking individual people)
- Management skills (running teams of white hat hackers)

In all of these scenarios, you must focus on increasing your knowledge of the field and gaining as much experience as you can. Certifications will help, but nothing replaces experience.

You can also make yourself stand out to potential clients by conducting your own research into the largest security issues and presenting them at industry conferences. Running training camps at conferences to teach key security skills is also advantageous.

What do Hackers’ Clients overvalue or undervalue?

Your clients will generally undervalue their role in the security process. They think that if

they have hired you, that you'll keep all the bad guys out. They usually undervalue their assets, too. Some small companies have the mistaken belief that they are not large enough to be of worth to malicious hackers. Many executives think it won't happen to them until it does.

Executives also compare their companies to others in their area or type of operation, which is a mistake. They don't want to spend more on their security than others in their area, or they think it's money wasted.

Company management may also undervalue compliance standards. This could be HIPAA for healthcare companies or PCI for retail companies. Meeting a standard of compliance does not make a business secure. Compliance standards are simply the baseline of what companies have to do if they don't want to be fined. To be as secure as they can possibly be, they must go much further.

Chapter 3 – Learning to become an Ethical Hacker

There are various companies that offer courses in ethical hacking. The basic courses last five days or so and will certify you under Certified Ethical Hacker (CEH) certification, the standard for ethical hacking certification.

The best courses on information security and ethical hacking will cover the methods used by malicious hackers, and you will have lectures to attend, along with lab exercises to give you hands-on experience. The classes teach you the same skills that are used for malicious hacking, and how to use them in performing white hat ethical hacks for the companies for which you work.

You will finish these classes with an ability to assess and accurately measure threats to most information assets. You will also have the skills to discover where your employers are most vulnerable to black hat hacking. The course goals are to assist you in mastering a documentable, repeatable method for hacking systems to use in white hat hacking situations.

Black hat hackers constantly change their tactics to stay one step ahead of you. Courses in ethical hacking update course materials on a regular basis, so that you will learn more about the current threats to your employers' systems and networks.

Course Teachers are Experts in Information Security

The instructors in the best CEH courses have experience in the industry and are recognized experts. The course you choose should have a high percentage of passing students, who are certified in the latest levels of CEH.

What do you learn in Ethical Hacking Courses?

In the best classes, you will learn how to run hack attacks in the labs, and become hackers for a week while still in training. Some of the most important skills you learn include:

- Stealthy network reconnaissance
- Penetration testing methods
- Exploiting remote root vulnerability
- Passive identification of online traffic
- Remote access Trojan hacks
- Privilege escalation hacking
- Running shellcode in RAM and on disc
- Abusing Windows pipes for impersonation
- Wireless insecurity
- Removing evidence
- Anti-forensics
- Brute force hacking
- Network infrastructure hacking
- Hacking web apps
- Breaking into unsecure databases
- Defensive techniques

What will you do in class?

Instructors lead hands-on lab exercises in hacking in:

- Abusing DNS for host identification
- Capturing the flag hacking
- Windows cache poisoning
- Leaking system information
- Password cracking on Cisco and Windows
- Stack versus heap overflows
- Impersonating other system users

- Attacking remote desktop protocol in Windows
- Data mining
- Remote keylogging
- Hijacking SSL encrypted sessions
- Calculating Return on Investment for ethical hacks

Compliance and Certification

In any ethical hacking course, you need to be afforded the chance to prove to potential employers that you can use the skills in which you are certified. Good courses will prepare you fully for passing the latest CEH certification tests. They go beyond CEH material as well, to give you more exposure to white hat hacking.

What must you know before you attend CEH Courses?

Before you spend the time and money to take certification testing, course work will teach you an understanding of Windows OS, Linux or Unix-based OS. You should understand IP protocols and have a desire to learn more about network security.

Look for courses with smaller class sizes (usually between 10 and 20 students), so that you'll have more one on one time with expert instructors.

Choose courses with exemplary records and full-day training sessions.

Some courses include the exam fees for the CEH examination.

Hacking lectures are often available online in addition to in-person. This allows you to go back to information you may not have retained in class, since so much information is presented.

The best courses are built on a commitment to ongoing education for ethical hackers. Some courses offer a research and development site, where they post articles, labs, tutorials and white papers that will help in your continuing CEH training. Forensics videos are often available.

Some of the skills you learn will include:

Hacker Tool Kit

This is a set of hacker tools placed on compromised systems so that you can learn how to attack the systems or escalate privileges. The kit itself generally contains a tool for creating back doors and listeners, and a port scanner. It will also include other tools used during the course for discovery and exploitation of weaknesses.

Creating Host System Directories

You will learn to create directories disguised by names that won't alter system administrators or general users. You will also be taught to stream or hide files to avoid detection.

When you have access as an administrator on a compromised host, you will be able to run your tools remotely from that host, or use it to redirect ports. This involves taking traffic from one network on one port and redirecting it out from the host of another port.

Holes in Applications

These are general categories that refer to specific oversights or programming errors that will allow you to penetrate business systems. You will conduct penetration testing to identify the apps running on a remote system. Once you identify them, you can look for

exploits and vulnerabilities that will affect the apps. You can often capture an app banner, to perform the app identification.

In searching the Web and databases for exploits, you may find processes or exploits that will lead to a compromised system. You will be taught to gain access, where possible, to systems in a business demilitarized zone (DMZ) to identify versions and apps run on that system. You will research vulnerabilities in management services that will enable you to capture SAM files from the repair directory on a system.

Testing outside Firewalls

On testing systems outside firewalls, you can make a connection to the Web with a different port not filtered by that firewall. Then a listener can be established and the connection can be redirected. Using this type of port redirection, you will be able to bypass filter rules on routers. You can also use a remote compromised host to test the advantages of trust relationships.

Buffer Overflow Attacks

These are also known as data-driven attacks, and you can run them remotely to escalate privileges and gain local access. Buffer overflows are generally designed for UNIX, since OS knowledge is needed when writing a buffer overflow. Windows also has buffer overflows, but they are more commonly found in a UNIX environment.

Where source code is available, you can study and learn what you need to create the buffer overflows for UNIX. These attacks attempt to force target hosts to change execution flow and execute the code you specify, as the attacker. You can do this by forcing the designated target to place too much data into a target buffer with a finite capacity. This creates the overflow.

This will usually crash or stall the application through which data is loaded. Buffer

overflow training usually only needs to be downloaded onto a target system before it is compiled and then executed. You won't always need root privileges to run them successfully. The most difficult part of these tasks is finding an overflow that will work on your specifically chosen target.

Buffer overflow attacks are effective and dangerous. If you launch an attack of this type against a target that is susceptible, you may need to tweak it, but it will usually work. Use them only when you know what they will do, and what the consequences might be. In addition, experiment only on your own machines. These overflows may cause system crashes, which leads to the condition of denial-of-service. Be sure to get written permission from clients before you run buffer overflows on their systems.

Chapter 4 – What is Penetration Testing?

Penetration testing involves an authorized and proactive evaluation of IT infrastructure security by using hacking methods to exploit any vulnerability in the system. These include risky behavior by end-users , improper configurations, applicant and service flaws and Operating System problems. These assessments will also validate the success of defense mechanisms and the way company users adhere – or do not adhere – to security policies put into place by their employers.

These tests are usually done with automated or manual technologies that compromise mobile and network devices, wireless networks, web applications, endpoints, servers and other exposure points. Once any vulnerabilities are exploited on a system, the testers may try to utilize the now-compromised system to achieve higher security resource levels and more intimate access to information and electronic assets via the escalation of privileges. Ethical hackers are often called upon to conduct penetration testing.

Security vulnerability information that is exploited successfully through penetration testing will usually be gathered and presented to the network systems and IT managers. This will assist them in making strategic conclusions and prioritizing related efforts at remediation. The main purpose of this type of testing is measuring the feasibility of systems and evaluating any consequences that these incidents could have on operations and resources.

Why should your Company have Penetration Testing Performed?

Service interruptions and security breaches cost companies big money. Interruptions in performance of apps may result in losses financially, and threaten the company reputations by eroding customer confidence. They can also trigger penalties and fines and attract negative media coverage.

The average total cost for companies with data breaches averages a staggering \$3.5 million. For larger breaches like the 2013 Target data breach, though, the costs can be higher – theirs have already gone over \$148 million.

No one can protect a Company 100% of the Time

Many businesses have tried to prevent breaches through the installation and maintenance of defensive security layers. They include firewalls, cryptography and user access controls. However, new technology and its complexity make it more difficult to protect a system against security problems and to eliminate all vulnerability. Newer vulnerabilities are being discovered nearly every day, and this means that attacks are constantly evolving in their social and technical sophistication.

Identifying and Prioritizing Security Risks

Penetration testing will evaluate a company's abilities in protecting their users, applications and networks from internal or external attempts to get around security controls with the purpose of gaining privileged or unauthorized access to their protected assets.

This type of testing will provide validation that there are risks posed by flawed processes and security vulnerabilities. This allows security and IT management professionals to more easily prioritize their efforts at remediation. By using more comprehensive and frequent testing, companies can anticipate risks more effectively and be more likely to be able to prevent any unauthorized access to valuable information and critical systems.

How often is Penetration Testing Performed?

This type of testing needs to be done frequently, if companies hope to ensure security that is more consistent with threats. There are always new threats that can be capitalized on by black hat, malicious hackers. Companies should also run tests each time:

- Policies for end users are modified
- Security patches have been applied
- New locations are opened
- Significant modifications or upgrades have been applied
- New applications or network infrastructure is added

How can Penetration Testing Benefit a Company?

This type of testing provides businesses with multiple benefits, which allows them to manage vulnerabilities. Detailed information provided on exploitable threats in security through penetration testing proactively identifies the most critical vulnerabilities. With this information, a company can apply security patches where needed and allocate their resources efficiently.

Penetration testing helps businesses to avoid fines and meet regulatory requirements. An organization can be helped in addressing the compliance and auditing aspects of their business. It can specifically address requirements documented within federal mandates. Testing results are given in report form to help companies learn the best ways to avoid fines and perform due diligence by maintaining proper security controls.

Recovering from security breaches is expensive, and can cause network downtime. Customer retention and protection and IT remediation, along with legal work, can reduce the company's revenue. When a business proactively identifies risks before breaches or attacks occur, they will avoid the financial pitfalls.

Preserving customer loyalty and a good corporate image are vital to any business. Even one compromised data incident can cost a great deal in lower sales and in loss of a positive image. No business wants to lose customers that they have always worked hard to keep.

Penetration Testing versus Vulnerability Scanning

Company executives are sometimes confused by the difference between penetration testing and vulnerability scanning. They don't have the same meaning. Vulnerability assessments only identify and report vulnerabilities. Penetrating testing exploits vulnerabilities, if possible, to see whether malicious attacks are possible.

Penetration Testing Tools

These are used as an integral part of penetration testing. They will automate some tasks, improve the efficiency of testing and allow for the discovery of issues that may be hard to find if you're only using manual techniques.

Ethical hackers may use dynamic or static analysis tools. They both will help in finding vulnerabilities in security like malicious code and problems in functionality. These tools help you in determining whether the encryption used is sufficient or whether a software component contains back doors through which malicious hackers could gain access.

Manual Penetration Testing

This testing includes professional tools and software along with human expertise.

Manual penetration testing layers human expertise on top of professional penetration testing software and tools, such as automated binary static and automated dynamic analysis, when assessing high assurance applications. A manual penetration test provides complete coverage for standard vulnerability classes, as well as other design, business logic and compound flaw risks that can only be detected through manual testing.

Penetration testing is one vital method by which you will be able to help organizations maintain their security, after you have been trained as an ethical hacker.

Conclusion

Are you ready to become a white hat hacker yet? We've given you some compelling reasons to choose this job, and helpful information about how to study and become certified in this lucrative field.

To fight back against all the malicious, black hat hackers out there, organizations need ethical hackers to find vulnerabilities in their information systems. Then they can use the information you provide to fix any leaks or malfunctions in their networks, to avoid being attacked by tech-savvy hackers who want to steal information to use for their own purposes.

Ethical hacking is a way to make a living in a challenging and interesting employment field. You may find out that it's quite rewarding to protect organizations and help them to keep their important information safe from black hat hackers.

Amazon ECHO

Learn How to Use Amazon
Echo With This Outstanding
User Guide



Barney Frank

Amazon Echo

Learn How To Use Amazon Echo With This
Outstanding User Guide

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Introduction

The Amazon Echo is one of Amazon's most recent and hottest products. At first glance, it appears to simply be a speaker, with minimalistic cylindrical design. However, it is in fact much more – it uses voice recognition software to organize and schedule an array of computer and software related tasks to make your domestic life easier. Whether you want to make a to-do list for all those chores that are causing you to procrastinate, receive real-time information about the weather or nearby traffic, or just manage your music, Amazon Echo can do it.

The Amazon Echo is also made especially unique as the underlying Alexa voice recognition software can be implemented into a range of devices. Owing to this property, tech enthusiasts are excited about how Alexa can be embedded or made responsive to almost any piece of modern software. Alexa is constantly being updated and expanded to be better and do more – expect to see Alexa everywhere and anywhere in the following years.

This eBook teach you everything you need to know about how to use the Amazon Echo. Learn where all the important buttons are on the device and the key voice commands, as well as how to alter the Settings of your device. You will also be taught how to connect the device to your Wi-Fi, link it to your smart-phone, tablet or Amazon remote and the intricacies of the Alexa app. Finally, you will be given a crash-course in how the Amazon Echo can be used to listen to music as well as perform a range of helpful and handy tasks.

Chapter 1 – Amazon Echo Hardware

This chapter aims to give you a brief run-down of the design of the Amazon Echo and where you should find the key buttons and details of the device.

The Amazon Echo is a 9.25 inches tall cylinder. When facing upright, the speaker should reside towards the lower end of the cylinder.

On the top of the Amazon Echo should be two different buttons, the action button and a microphone button. The action button is a plain button with a dot in the middle, the microphone button has a small symbol of a microphone upon it.

The action button serves multiple purposes. If the action button is held down for at least five seconds, it causes the Amazon Echo to enter a mode where Wi-Fi settings can be configured. Pressing the action button once wakes the Amazon Echo from sleeping mode. The action button is also involved in disabling timers and alarms which have been set.

The microphone button allows you to turn on or off the microphones. Naturally, it is impractical if Alexa (the voice recognition software) responds to everything you say. On a related vein, many people feel uncomfortable about the fact that Amazon stores all recordings that are made when Alexa is awake. Therefore the microphone button is used to manually control whether the Amazon Echo is listening to you.

In addition to the action and microphone buttons, the top surface of the Amazon Echo should also have a ‘Light Ring’, which spans the circumference of the top. This is used to signal the current status of the Amazon Echo.

If there is no light on the light ring, the Amazon echo is active but waiting for a request or query. If the light ring is blue colored, the echo is currently processing a request. If the light ring is orange, the echo is attempting to connect to a Wi-Fi network. If the light ring

is red, the microphones are disabled. If the light ring is white, it signals that the volume level is being adjusted. Finally, the light ring also flashes when the Amazon Echo is first starting up.

Towards the very top of the cylinder's length (but not on the top surface itself) is the volume ring. This ring can be turned to increase or decrease the volume of sound produced – clockwise turning increases the volume, anti-clockwise decreases the volume.

Finally, at the very bottom of the Amazon Echo, just above where the power cable attaches to the device, is the Power LED. This small light is used to signal the current Wi-Fi access the Amazon Echo has. If this light is white, the Amazon Echo has a Wi-Fi connection. If the light is orange, the echo doesn't have a Wi-Fi connection. If the light is flashing orange, there is an internet connection but Alexa cannot use it (it may be too weak in signal, or some other problem).

Chapter 2 – The Alexa App

Most things you do through the Amazon echo will be in conjunction with Alexa, the voice recognition system software that controls the echo. Alexa is downloaded as an app on your smartphone or tablet and will display all of these results that the echo cannot output. Ultimately, in order to use the Amazon echo you need to learn to also use the Alexa app. This chapter will teach you how.

The first thing you need to know is how to interpret the home screen. The home screen provides you with all your recent activity but it also presents ‘cards’ which are bite-size information snippets that are produced as a response to Alex queries. For example when you ask Alexa what the weather forecast is for the week, you should receive a weather card that will appear on your home screen. You can remove cards from your home screen at any time.

The home screen also suggests content that you might find useful, based upon your previous searches. Similarly, the home screen will also prevent internet links that will expand upon a topic you have previously inquired about.

Finally, the home screen should also provide a method to offer feedback about the Alexa service. Alexa is still a nascent technology and Amazon are eager to continually improve the software. If Alexa bugs out or you simply have constructive criticism, this is your go to place to speak your mind.

You can also navigate to the other areas of the Alexa app through the home screen via the navigation panel, which is on the left hand side. The “Now Playing” option will show you the current album or playlist you are listening to. You can also access your lists, manipulate your alarms and timers and alter the settings for your devices.

Most of the Settings you can change with Alexa will be mentioned throughout this guide

when they are relevant. There are however a couple you should take note of immediately. The device name option allows you to rename a particular Amazon Echo device, which is useful for distinguishing between multiple devices should you have them. You can also alter the wake word via the settings. As previously mentioned the wake word can be changed, but presently, only support one other option - “Amazon”.

Additionally, you can also create household profiles. These profiles are useful for sharing and transferring content between multiple Amazon users. For example, if you have two or more individuals in the same house who purchase music from the Amazon music store, you can use a house profile to allow everyone to access all the music you collectively own.

When attempting to create a house profile you may be prompted for a passcode. If you haven't already established one, you may need to do so before you can continue. Creating a passcode will be covered in chapter 5 under the label ‘Buying Products’.

Once you have done this, select the Household Profile option in the Settings menu. This will allow you to add accounts to the profile and it will guide you through the process. Ensure that anyone being added to the profile has their Amazon account information ready at hand.

You can remove users from your household profile, however once you have done so, all accounts involved cannot be linked to another household profile for 180 days. This is to prevent abuse of the system. However, it can be unfortunate if you add another user by mistake and you need to remove this. If this occurs, it is necessary to contact customer support.

To remove a user, simply navigate to Settings, Account, Manage Amazon Household and select remove upon the profile which you want to eliminate. You will be prompted to confirm your choice before anything else occurs.

Once a household profile can be established, you can freely switch between all accounts on that household profile via Alexa. Utter the voice command ‘Switch Accounts’ and you should swap to the next account. If you become confused, the voice command ‘Which account is this’ will confirm whose account you are currently accessing.

The Alexa app also allows to voice train Alexa, which helps the software understand the peculiarities of your voice and recognize your commands with greater accuracy.

To voice train Alexa, ensure there is no ambient noise around you. Navigate to the Voice Training option via the navigation panel and press the start button on the screen. The voice training feature will ask you to say 25 different phrases in turn, with each phrase designed by linguists to cover different aspects of your pronunciation. Once you have uttered each phrase, select the next button to continue.

If you misheard a phrase or need a phrase repeated, press pause and select the repeat phrase option.

The process of installing the app will be covered in the next chapter.

Chapter 3 - Setting Up Amazon Echo

To first establish the Amazon Echo, plug the device into a socket, using the power adapter that should be included in your purchase. Next, start the Alexa app on your iPhone, Android, Fire OS or through a desktop. The Alexa app can be downloaded for free through any of the popular app stores, such as Amazon, Google or Apple.

Once the app has started, it should provide you with instructions to connect your Amazon Echo to your local Wi-Fi. Start by navigating to the Update Wi-Fi option through the Settings, Echo options. Then select the 'set up a new echo' option to initiate the process of connecting to Wi-Fi.

Once you have selected this option through the Alexa app, press the action button for five seconds. This will attempt to connect your mobile or device to your Amazon Echo. When successful the light ring should change to orange. On your mobile or desktop you will now have the option to choose from available networks.

Select your home network and enter the relevant security details (such as your password) then press connect. If your Wi-Fi isn't appearing on the list of available networks, press the Rescan options or attempt to manually add a network through the Add a Network option.

If your Amazon echo is still struggling to connect or recognize the local Wi-Fi, try unplugging it and plugging it into the power socket.

The Amazon echo will connect to most home and domestic networks, but it does not support alternative networks such as those used in public places or those which require browser-authentication.

Once you have connected your Amazon Echo to your Wi-Fi you should be able to talk

directly to your echo. Each echo has a 'wake word' which tells the device to wake up from a sleeping status and respond to input. By default, the wake word of every Amazon Echo is set to 'Alexa'. Say 'Alexa' and then start speaking your instructions – congratulations your Amazon Echo is now functional.

You may also wish to connect to the Amazon Echo remote. Amazon Echo remotes are sold separately from the echo itself, but you may wish to purchase one to make your echo usage easier. Everything that can be done with the echo remote can also be done via the Alexa app on your smartphone or tablet, however the remote provides another option to work with. This is useful if you do not want to hand your smartphone around every time someone in your household needs to use the Amazon Echo.

Firstly, to use the echo remote you must enter two AAA batteries into the backside of the remote. To do this, gently push on the back of the remote and remove the back cover. Ensure you position the batteries in the correct fashion and return the back panel to its rightful place.

Now all you have to do is navigate to the Settings on your Alexa app (covered in later chapters) and select the Pair Remote option. This should link your remote to your echo device. If this is not working, try holding down the play button on your remote, which also attempts to connect the remote to nearby echo devices.

The echo remote has your standard control options (Play, pause, previous, next, volume increase & volume decrease) but it also supports voice commands. Above the control buttons should be a microphone button, hold this down whilst you talk and you will be able to use all the voice commands that work with the Amazon Echo through the remote.

Chapter 4 – Music

The Amazon Echo primarily works through being connected or ‘paired’ with a smartphone. Once you have paired your smartphone and echo, you can then stream a variety of services on your mobile through echo, including popular music services such as Spotify.

To pair your devices, wake your echo with it’s designated wake word. Then say aloud the order ‘pair’. Your echo should note that it is ready to pair.

Continue by navigating to the bluetooth options on your smartphone. On the list of options of devices you can connect to, select your echo. If you manage to successfully pair your smartphone with your echo, the echo should note that you have been successful by saying so.

You can unpair your smartphone once you have completed whatever task you were accomplishing by saying aloud your wake word, followed by the ‘disconnect’ order.

Whilst you are paired, most music apps support voice controls. Use the following, self-explanatory orders after your designated wake word to influence what track is being played:

Play

Pause

Previous

Next

Stop

Resume

Restart

Be aware that your Amazon echo is unable to read or interpret phone calls and texts from your phone. Likewise any audio input the echo receives through its microphones cannot be sent to your mobile or tablet device.

Amazon echo can stream audio from a range of sources including;

Amazon Music

Prime Music

TuneIn

iHeartRadio

Pandora

Audible

Once you have linked your Amazon account with your Amazon echo you will, by default, have access to all music within your Amazon Music and Audible library. To stream audio from a different service you will have to link your accounts on those services to your Amazon Echo.

To do this, open your Alex app. Navigate to Settings, Music & Media then click on the option to add the music service you desire. This will take you to the platform-specific process of linking those accounts to the Amazon Echo.

Chapter 5 – Functions & Features

Manage Alarms

The Amazon echo is more than just a fancy, voice controlled speaker for your smartphone. The echo can be used to interact with a range of software and perform a myriad of tasks. In this chapter learn about all the functions that the Amazon echo is capable of.

Firstly, your Amazon Echo can be used to create timers or alarms. Use the following voice controls to initiate an alarm, with the triple dots designating a specific time:

‘Wake me up at ...’

‘Set an alarm for ...’

‘Sent an alarm for ... from now’

You can order any alarm to snooze, by saying snooze. Be aware that the Amazon Echo snooze only lasts for 9 minutes, as opposed to the typical 5 or 10 minutes most snooze and dismiss alarm options provide.

You can turn of your alarm when it is activating through the command ‘Stop the alarm’. Similarly you can check what time your alarm is currently set for with the command “What time is my alarm set for?”.

In addition to the voice commands, you can also control and manipulate alarms directly through the Alexa app on your smartphone. This is particularly useful if you want to delete an alarm altogether or alter the volume of an alarm, as there are no voice commands for these options.

In a similar manner to the alarm system, you can also set a timer. Establish a timer with the “Set a timer for ...” command. You can dismiss timers through the ‘stop the timer’ command.

If you need more sophisticated timer controls, you can also use the Alexa app for more granular options, such as timer volume.

Create, Edit & Delete Lists

If you like making lists and you want them conveniently read out to you whenever you desire, then the Amazon Echo is your new best friend. You can control two different lists via the Amazon Echo; a to-do list and a shopping list (which is associated with the shopping list on your Amazon account).

To append your list with a new item say the command ‘Add ... to my shopping list’ or ‘Put ... on my to-do list’. You can also have your list recalled by saying aloud the commands “What’s on my shopping list” or “what’s on my to-do list”.

If you want to make other changes to your lists, you will have to do so through the Alexa app which allows you to Open, Append, Edit, Remove items, Mark Tasks as complete or Print lists.

Ask For The Weather

If you want to know the weather, than you can give your Amazon Echo various voice commands which will cause it to display relevant information on your paired smartphone.

However, before you can use these voice commands you will need to enter your address into the Alexa app so it can pull regional-specific weather information.

To do this, navigate to Settings in your Alexa app. Choose the Device Location option and edit this information by supplying your full address. Ensure you save this information before you navigate elsewhere.

Once you have done this you can use the following voice commands to receive weather information. ‘What’s the weather’ provides the weather of your current, but you can also specify a timeline such as;

“What’s the weather for this weekend”

“What’s the weather for this week?”

“What’s the weather for Friday?”

Alternatively, you can even request the weather in different regions or countries as well as specific queries such as ‘Will there be snow tomorrow?’.

Buying Products

The Amazon Echo can also be used to buy products directly from the Amazon store, presuming your echo associated account has your credit card details and a shipping address to send the product to. However, you must have purchased the product you are trying to buy previously. Alexa isn’t sophisticated enough to be able to search and find particular products that you may be looking for – instead it can only cycle through products it knows you have purchased.

Furthermore, purchasing physical products can only be performed if you are a Amazon prime member. Amazon prime has a range of benefits across all the various Amazon platforms, but it also affects how fast items can be delivered to your doorstep and also whether you can buy them in the first place.

Providing you have met the previous criteria, simply say aloud “Reorder ...” with the

triple dots referring to the product you desire. If there are similar items that meet the item or description you provide, Alexa may show multiple responses if you do not accept the first response. Likewise, occasionally Alexa may suggest items of it's own accord.

If you wish to cancel an order you have made simply say aloud your wake word then 'cancel order'. Alexa may not be able to cancel your order depending on whether it has already been processed or not and you will be linked to various solutions on your smartphone if this is the case.

In addition to buying physical products through the Amazon store, you can also buy music through the digital music store. To do this, you will first need to enable voice purchasing. Navigate to Settings, Voice Purchasing on your Alexa app via your smartphone or tablet. You will be prompted for a 4 digit passcode, which will be used in future when you wish to purchase music. Ensure that you save this code before you navigate away from this screen.

Once you have completed this configuration, you can then purchase music via the 'Shop for song ...', "Shop for album", "Shop for artist ..." voice commands.

Please bear in mind to use Alexa in this way, you must have a U.S billing address as well as some payment method associated with the U.S (either a U.S based credit card or a gift voucher from the U.S).

Requesting Information

Using your Amazon Echo, Alexa can also respond and answer a variety of questions. This feature doesn't quite match a powerful search engine like Google in terms of the accuracy and range of the answers it produces, but it is nonetheless rather quick and easy.

Alexa can interpret most grammatically correct questions with starting with who/when/what format. Generally speaking, Alexa is strong at answering questions with

definitive results that could be considered general knowledge – such as unit conversions, the distance of locations, the current time, ect.

Alexa is also designed for quick access to the results of recent sporting events, which are covered by North American organizations.

If-this then-that

This bizarrely named service is a third party service that can create rules and habits for your devices, which is useful if you want your Amazon Echo to perform a feature that isn't available by default. A popular if-this then-that rule, for example, is to make Alexa ring your phone when you say the voice command "Where is my phone?". The if-this then-that database has a large range of 'recipes' which are the rules and patterns that other users have created. You can also create your own recipes.

To start using if-this then-that patterns, you must sign up with the service (commonly abbreviated IFTTT), which can be accessed [here](#). Once you have done this, then you must sign into your IFTTT account. Choose the activate option and follow the steps to connect your Amazon Account to your IFTTT account. Once you have completed this, you should be able to effortlessly use your IFTTT recipes with Alexa.

Local Business Search

Alexa can be used to scout or gather information about local businesses which is useful when you are looking for shops, bars or restaurants. You can ask queries such as "What restaurants are nearby" or "Find the address for a nearby restaurant". Alexa uses Yelp as a source of information.

Alexa Skills

Alexa comes with the before mentioned inbuilt functions. However, Alexa can also be programmed and altered to perform new tasks via the Alexa skills kit. Unless you are software developer, it is highly unlikely that you want to tinker with this kit yourself, as the process of creating a new function is rather complicated.

To simplify the entire process, essentially the software code that Alexa uses to interpret voice commands is not within Alexa itself, but in an Amazon server. Whenever you enter a voice command, Alexa then reaches that server, via Amazon cloud, which then interprets this command and sends back the appropriate Alexa response.

The reason why this is useful to you is because you should be keeping an eye out for those who are using the Alexa skill kit. These people are essentially creating services for you to capitalize on.

Alexa and the Amazon echo have only been available since June 2015, which at the time of writing, is only around 6 months. As time progresses you can expect to see new Alexa skills develop and pop up more frequently as the Amazon Echo hardware and software become more ubiquitous.

Chapter 6 – Settings & Configurations

You can connect a variety of home device to Alexa. Be aware that this poses potential security risks, especially for computer controlled locks, doors and dangerous appliances – potentially anyone who utters a command whilst in your Amazon Echo range may activate these devices.

Therefore when linking your Amazon Echo to your home devices, be extra careful. Consider making liberal use of the microphone button to turn your Amazon Echo input off when you are not using it, but also ensure that you ask the Amazon Echo whether your home device successfully completed the action. After all, if there is an issue with one of your appliances, you will want to know about it sooner rather than later.

If you do not have a home security system, then currently you will find yourself using Alexa to turn off and on light switches and electrical plugs. However, you will need to buy and install compatible devices before you can do this, as normal light switches and sockets are not capable of receiving signals. As of now, there are four companies that produce Alexa compatible products:

Wink

SmartThings

Insteon

Philips Hue

With the exception of PhilipsHue products you will also need to buy a hub to manipulate these devices remotely.

To set up one of these hubs, you will need to download the hub app from an app store, with the exact process varying depending upon the hub. Nonetheless, instructions and

guidelines should be provided from the companion app itself.

Once you have installed the hub app, Navigate to Settings, Connected Home, Device Links. Click on the Link with and choose the hub which you desire to connect to. At this point you will need to enter your account details and other relevant information in the browser that should appear.

Once you have done this, you can now connect individual home devices to your Alexa, via the hub. These devices should appear as options when you select the discover devices button on the Alexa app or say aloud the voice command 'discover my devices'. Alexa will begin searching for all devices which it can connect too, which should now include your light switches and other relevant home devices. Once the search is completed, Alexa will recall all devices it has found.

Whenever you disconnect a home device from the main power, it may take some time before Alexa can discover it. If a device doesn't appear, sometimes the best solution is simply to wait. Alternatively, seek guidance from the app of the company from which you bought the product you are trying to link to.

Presuming everything has gone all according to plan, you should be able to control the discover devices through voice commands.

If this isn't enough for you, you can also create home device groups. This is useful if you want to activate or turn off a group of devices at once – such as turning off all the lights downstairs before you retire for the evening.

To create a device group, navigate to Settings, Connected Home in the Alexa app. Click the Groups button and the Create Group option. Choose whatever name you desire for said group and enter it.

Amazon recommends choosing names which are easily identifiable. This means they

should have multiple syllables and avoid peculiar sounds.

Once you have named your device group, press the Add option to add all the home devices you want into the group.

After you have completed this, you should be able to utter voice commands for that group and affect every single member.

Conclusion

The Amazon Echo is the gateway to the future. In older science fiction books and films, it is not unusual for visionaries to imagine houses and vehicles controlled almost entirely by voice commands and computer software. The echo may not quite at this level of finesse, but it is more than a mere gimmick. The underlying voice recognition software, Alexa, is capable of recognizing human voice patterns as well as intent to make your desires reality.

The Amazon Echo has only existed for just over a year, but it is rapidly becoming more powerful and capable of more clever operations. It may be the case that for now, you only use the Amazon Echo as a neat trick for playing music and turning on your household devices. However, you should look forward to watching how Alexa and the Amazon Echo grow into full household management systems.

In the meantime, this guide has provided you with the tools and techniques to use the features and services the Amazon Echo currently provides. Whether you want to create a to-do list, buy Amazon products, scour the local area for the best restaurants or find the answer to that questions thats been bugging you, the Amazon Echo is your versatile solution.

Raspberry Pi

The Ultimate Guide to Raspberry Pi!

Plus Raspberry Pi
Projects, Tutorials,
Troubleshooting,
and Much More!



Eva Romans

Raspberry Pi

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Introduction

The Raspberry Pi is an excellent piece of hardware. The small bare-bones computer can be used as a personal desktop, but also made into a variety of homemade hand held machines for an array of purposes. Using the power of Raspberry Pi, people have built robots, weather stations, private internet servers and much more.

This guide aims to give a complete introduction to the world of Raspberry Pi. The first chapter will give you insight into the purpose and the history of the Raspberry Pi, such as its relationship with Linux.

In the second chapter, you will learn about the hardware of the Raspberry Pi itself. This chapter will cover the different models of the Raspberry Pi, the different cables and equipment needed to use a Raspberry Pi and the components that the Raspberry Pi is made of.

The third chapter will teach you how to setup and install NOOBs and Raspbian, the software and operating system the Raspberry Pi relies upon.

Meanwhile, the fourth chapter will give you the run-down of a handful of Raspberry Pi projects, aimed at complete beginners to all things programming and computer science.

In the fifth and final chapter, common tech problems and troubleshooting solutions will be covered. In this chapter, learn what to do if your power supply is iffy, or if you are having problems with your SD memory card.

Chapter 1 – What is the Raspberry Pi?

- Raspberry Pi is the name of a small credit-card sized computer. Raspberry Pi was developed by the Raspberry Pi foundation, a UK based charity, for the sole purpose of helping people learn and develop computer science, as well as numerous programming languages, most notably Python. Raspberry Pi runs on Linux, a free open-source operating system which has been developed and improved over numerous decades.

-

Linux comes itself comes in numerous sub-varieties, some of which are also open-source and others which are commercial. Macintosh computers, and other Apple products, for example run on an operating system originating from Linux.

In addition to the Raspberry Pi computer itself, there are also various modules and add-ons that can be purchased for the Raspberry Pi foundation and other associated organizations. These add-ons range from LED light bundles, to music makers, to infra-red sensors and much more.

Owing to this, Raspberry Pi is a fantastic way to get to grips with programming and see fast, real-world results. This is especially useful for teaching children, who may tire of the highly abstract, theoretical and data-based paradigms which are used to teach standard computer science.

Although the Raspberry Pi is advocated as a method of learning computer science, it is increasingly being used for other purposes. The small-size of the Raspberry Pi computer, it's ease of use and its low-cost allow for the Raspberry Pi to be used for an array of useful computing purposes, even in professional environments.

Chapter 2 - Raspberry Pi Hardware

There are four models of Raspberry Pi available, all with minor differences, such as the number of USB ports. The first model, A+ is the most basic and retails at around \$20. However, this model has only 256 RAM, a single USB port, no GPIO pins and no module for Ethernet cables.

The second model, B+ costs \$25, but has twice the RAM of the previous model, as well as 4 USB ports, 40 GPIO pins and an Ethernet cable.

The third and model, the Pi 2 costs \$35. The Pi 2 uses a more powerful processor than the A+ or B+ models and uses different slightly different software. Nonetheless, the Pi 2 is compatible with previous models.

The fourth and final model is the Raspberry Pi Zero. This model is half the size of the other Raspberry Pi models but still offers 512MB of RAM. The Raspberry Pi offers micro-USB and micro-HDMI cables instead of the regular-sized counterparts. The main advantages of the Raspberry Pi Zero is that it is ultra-cheap; it only costs \$5! The Raspberry Pi Zero is best for projects where you need to fit your computer into a tight space.

There are also the A and B models, which are no longer in production. Essentially these models were replaced by the superior A+ and B+ models respectively. All Raspberry Pi models are roughly 85.60mm*56mm*21mm in size and weight around 45g.

In addition to the cost of the Raspberry Pi, you will also have to pay for whatever tax is appropriate for your region as well as shipping fees.

For the purposes of this guide, it will be presumed you are using either a Raspberry Pi B+ or Raspberry Pi 2.

All Raspberry Pi modules come with various, necessary components. Firstly, there is a SD card module. SD cards are typically used as memory storage devices for Cameras. The SD card module serves a similar purpose with the Raspberry Pi; it is where your files and programs will be stored. You will need a SD card quality of 10 or higher for a Raspberry Pi.

If you buy an SD card from the Raspberry Pi foundation or a licensed distributor, you can purchase an SD card with the “NOOBs” software, which stands for “new out of the Box”. NOOBs handles the startup and installation process for you. Naturally, this is useful for less tech-savvy users who might need a little help before they get to grips with the software and hardware. However, the NOOBs operating system is available for download for free on the Raspberry Pi website.

There will also be a micro-USB module, which is used to provide power to the device through connection to main electricity or through another larger device (such as a desktop computer). Micro-USB chargers are commonly used for most modern mobile phones.

Additionally, there are also at least 2 USB slots in every Raspberry Pi, which allows it to connect to most other hardware. Typically, these USB slots will be for connecting your Raspberry Pi to a mouse and keyboard. Certain models of the Raspberry Pi come with 4 USB slots by default, which is fantastic if you plan on connecting to numerous devices at once. However, you also have the option of using a USB hub, which provides more USB slots if and when you need them.

On top of this, there is also a HDMI module, which allows you to connect the Raspberry Pi to a monitor. On the same vein there is also an analog module, which will allow you to connect to displays which use analog cables.

Next, there is an Ethernet module. This module will allow you to connect to the internet through directly plugging your Raspberry Pi into your modem. Alternatively, you can also connect a Wi-Fi adapter to your Raspberry Pi to connect to the internet from afar. There is

also the option of connecting your Raspberry Pi to another device which receives internet connection, which will also allow the Raspberry Pi to connect to the internet.

You will also find GPIO pins on the Raspberry Pi. GPIO stands for general purpose input/output and serves a huge range of purposes. These pins can connect to certain devices physically, but are also capable of receiving and transmitting signals wirelessly.

Finally, there is also a special camera module. This module is used to connected the unique Raspberry Pi camera component to the Raspberry Pi.

To use the Raspberry Pi, you will need a display. This display can be a separate monitor or a modern TV. On top of this you will need a HDMI cable or an Analog cable, depending on how your chosen display connects to other devices.

You will also need a mouse & keyboard – ensure that you select mouse & a keyboard which can be connected through USB. Finally you will also need a micro-USB charger and an Ethernet cable for power supply and internet connection respectively.

Although not entirely necessary, you might also want to purchase a case for your Raspberry Pi. The Raspberry Pi comes with no innate casing or protection and is therefore very fragile. Cases can be bought from the Raspberry Pi foundation, but also several other third-party platforms. As there are different Raspberry Pi models, with slightly different modules, you will need to ensure that you purchase the correct case for your model.

If all these different pieces sounds like too much trouble, you can buy starter and beginner bundles from the Raspberry Pi foundation, which include all the necessary gear.

Chapter 3 – Getting Started

This chapter will guide you through the process of installing and setting up a new Raspberry Pi.

To start with, you will need an SD card of at least 8GB in size and a Raspberry Pi. Additionally, you will need a computer which is both connected to the internet and has an SD card reader.

On your computer, navigate to the Raspberry Pi website and go to the downloads section (or click on the shortcut [here](#)). This page will list numerous different operating systems and types of software which you can install on Raspberry Pi. Ignore, most of these downloads and find the NOOBS software download, which should be at the top of the page.

There are two different NOOBS download options; you must download the option on the left (which is sub-labeled Offline & Network Install). You will want to download the ZIP file, rather than the torrent. Once you have pressed the downloaded ZIP button, you will be prompted to choose the location to save the NOOBS file. On most computers this will be in your Downloads folder. Save the NOOBS file in your chosen location, this may take several seconds or even a few minutes.

Once the NOOBS folder is saved, double click on the folder to open it and look inside. You should see a range of files, which constitute the necessary operating system for Raspberry Pi.

Your SD card might have files or software contained within, which can interfere with the Raspberry Pi. Therefore, you will also want to cleanse (format) your SD card and remove these files. To do this, go to the downloads page on the website sdcard.org and navigate to the SD formatter tab (or click on the shortcut [here](#)). Download the SD card formatter

software, ensuring you select the Windows version for Windows and the Mac version for Mac. You will be re-directed to a terms and condition page; scroll down to the bottom of the page and click the accept button to download. Save the formatter software in your downloads folder (or your designated folder of choice).

After the download has finished, double click on the SD formatter zip folder to open it. Next, click on the setup file to run the software installer. Place your SD card into your computer, and click the run button on the software installer. You will need to remember or discover what letter your SD card is assigned. You can do this by checking the available devices in your Computer folder – your SD card should be available, with a chosen letter.

Ensuring that the software formatter is formatting the correct drive (i.e. the same drive letter as your SD card) click the format button. This will delete all the files from your SD card (so if there are files you want to save, make sure you have transferred them elsewhere before you format the SD card).

Once formatted, navigate back to the NOOBS file in your download folder. Double-click to enter the NOOBS folder and then drag and drop all the files from the NOOBS folder into your newly formatted SD card. This may take several moments, as the transferred files are relatively large.

If all this sounds like too much trouble, as previously mentioned you can purchase an SD card with NOOB software already present straight from the Raspberry Pi foundation.

After the files have transferred to your SD card, safely remove your SD card from your computer. Place your SD card into your Raspberry Pi SD card slot.

Now you will need to connect your Raspberry Pi to a monitor, a mouse and a keyboard. You will also need to connect the Raspberry Pi to a power supply via the micro-USB.

Once you have connected the Raspberry Pi to a power supply, the software install will

automatically begin (therefore you might want to connect the Raspberry Pi to the monitor, keyboard & mouse first).

You will be shown the Raspberry Pi screen (a blank page with a Raspberry on the middle). Then, after a few seconds you will be prompted to install an operating system. Choose Raspbian, which should be the first operating system. The other operating system choices tailor to advanced users, who know what features they are looking for. Raspbian, however, is a general purpose Linux-based operating system suitable for both beginners and regular users.

Double click on Raspbian and select “Yes” to install. The installation process for Raspbian will begin, which will take a sizeable amount of time. As the installation is progressing, basic Raspbian & Linux tips will be presented on the monitor. Therefore if you are a first time Raspbian or Linux user, it might be useful to read these tips as Raspbian installs.

Once the installation has finished, click OK. Raspbian will now begin loading. This will cause a terminal to appear on the monitor, with a bunch of scary-looking computer text, which will keep appearing. This is perfectly normal; it is just booting process for Raspbian. Leave it alone until it has finished.

Once the boot process has completed, you will be prompted for customization options (such as time, date, location, password and so on.). Navigate through this menu with your arrow keys and tab button. Enter the relevant information in each category. Once you have entered all information, press enter to continue.

You will be returned to the terminal with the booting text. At the very bottom there should be prompt at the terminal line:

```
pi@rasberrypi ~ $
```

Type in the single-word command: startx

This command will initialize the GUI, or graphical user interface, for Raspbian. The GUI looks like and functions like a normal desktop GUI, with a few program icons already present and various navigation menus towards the bottom left of the screen.

Congratulations – you have successfully set-up your Raspberry Pi!

Chapter 4 – Raspberry Pi Projects

This chapter will take you through three Raspberry Pi projects. These projects will be aimed at complete beginners, with little or no computer science skills.

Physical Computing With LED's

Physical computing is the term used for projects and computing tasks that involve hardware and real-world interactions, rather than just mere manipulation of data.

Most physical computing projects will use the GPIO pins on your Raspberry Pi. One of the first physical computing projects you will learn is how to manipulate LED's. With simple programs you can cause the LED lights to blink, turn on and off and display various patterns.

For this project, you will need the following equipment:

2* Male-to-female jumper leads

1* LED

1*RasPIO label

You will also need to install the GPIO zero software, which allows you to program interacts with your GPIO pins. To install GPIO zero, simply enter these commands into a Raspbian terminal:

```
sudo apt-get install python3-pip python3-wlthermsensor python3-spidev
```

```
sudo pip-3.2 install gpiozero
```

Using the male-to-female jumper leads, connect your LED light to GP17 and a GND pin.

The numbered GPIO pins are special pins that can use programming input. GND, stands for ground, and it is used to complete a circuit.

With your LED attached to the GPIO pin, it is now time to code! Open Python 3 from your Raspbian menu or desktop. Python is a powerful programming language, which is designed to be easy to read and write. This project will use Python 3 to code simple instructions for your LED light.

Python has two different ways it can be used. The first option, the interpreter (or shell) will automatically be loaded when you open Python. The interpreter executes commands as you input them to the screen. The interpreter is generally used to experiment and practice small pieces of code.

Type the following instructions into the Python interpreter:

```
from gpiozero import LED
```

```
led = LED (17)
```

After this, press enter. This simply connects the interpreter to the GPIO pin, which is connected to the LED. Now you can turn the LED on and off by entering the following commands:

```
led.on()
```

```
led.off()
```

However, you can program much more sophisticated interactions with the LED! On the top right corner of the Python interpreter, click File > New File. This will open up a text editor, which will allow you to write longer pieces of code. This is the second (and most used) way to write Python.

Type the following code into the text editor:

```
from gpiozero import LED
from time import sleep

led = LED(17)

while True:
    led.on()
    sleep(1)
    led.off()
    sleep(1)
```

Save the code by either clicking Save at the top right hand corner or pressing Ctrl + S. You can now run the program by pressing F5. Running the program should cause the LED to turn on for a second and then turn off for a second for as long as the program is running. You can exit the program by pressing Ctrl + C.

Setup A Local Minecraft Server

Minecraft is a hugely popular building game that comes with the Raspberry Pi. Minecraft is also an excellent way to get into programming, as you can use simple pieces of code to alter the gameplay and create your own rules and content.

This project, however, goes one step further and creates your own private Minecraft server. This server can be accessed by anyone within range.

Start by ensuring that your Raspberry Pi is fully up to date. This isn't always necessary, but it is easy and good practice for most of your Raspberry Pi projects. Enter the following commands into the Raspbian terminal:

```
sudo apt-get update
```

```
sudo apt-get upgrade
```

Next, you will need to edit the configuration settings for your server to work. Open the customization menu by entering the following command into your terminal:

```
sudo raspi-config
```

Firstly, enable boot to Desktop/Scratch.. Secondly, enter the overclocking option and change the value to High. Next, in the advanced options, enter the memory split change the number value to 16, which will allow for a greater level of memory to be used for the server. Also in advanced options, enable SSH, which allows for the Pi to be accessed remotely.

Once you have changed all these settings, you will need to reboot your Raspberry Pi for these changes to take place.

After you have rebooted your Raspberry Pi, enter the following command into the terminal:

```
sudo hostname -I
```

This should produce a series of numbers; take note. This is your IP address for the Raspberry Pi and it will be important for later.

Next, you must install java on your Raspberry Pi. Java is required for a Minecraft server to work properly. Enter the following command on a single line:

```
sudo wget --no-check-certificate
```

```
http://www.java.net/download/jdk8u60/archive/b25/binaries/jdk-8u60-ea-bin-b25-linux-arm-vfp-hflt-21\_jul\_2015.tar.gz
```

After this you will need to enter the following command to open the file you just downloaded.

```
sudo tar zxvf jdk-8u60-ea-bin-b25-linux-arm-vfp-hflt-21_jul_2015.tar.gz -C /opt
```

Now you are going to download a file which will be used to build the minecraft world. To do this enter the following commands into the terminal:

```
sudo mkdir /home/minecraft
```

```
cd /home/minecraft
```

```
sudo wget
```

```
https://hub.spigotmc.org/jenkins/job/BuildTools/lastSuccessfulBuild/artifact/target/BuildTools.jar
```

Now you must enter the following command to build the new minecraft server.

```
sudo /opt/jdk1.8.0_60/bin/java -jar BuildTools.jar
```

Now you are almost there! You will need to enter the following command to launch the minecraft server:

```
sudo /opt/jdk1.8.0_60/bin/java -Xms512M -Xmx1008M -jar /home/minecraft/spigot-1.8.8.jar nogui
```

Finally, you must accept the minecraft terms and conditions before you can actually enter the server by typing the following command:

```
sudo nano eula.txt
```

This command will raise the terms and conditions. Alter them from FALSE to TRUE.

Finally enter the launch command once more:

```
sudo /opt/jdk1.8.0_60/bin/java -Xms512M -Xmx1008M -jar /home/minecraft/spigot-1.8.8.jar nogui
```

And voilà! A permanent minecraft server you and you friends should be able to hop in and enjoy whenever you feel like!

Connecting Your Raspberry Pi to a Watch or Smartphone

This project allows you to connect your Raspberry Pi to an Apple watch or Smartphone, which can then receive messages and alerts from your Pi.

The first step is installing an app called Pushbullet on either your Android phone or an iPhone. This will require to use a Facebook or Google account to set up the Pushbullet app, so you will also need to create these accounts if necessary.

Linking your Pi to the Pushbullet app uses what is called an Access Token. Your access token can be found by logging into pushbullet.com and navigating to your account settings. Your access token will be a long list of letters and numbers.

Test whether your account token is working by using the following command into a Pushbutton terminal:

```
curl -u [access token] https://api.pushbullet.com/v2/pushes -d type=note -d title="Raspberry Pi" -d body='Testing Testing
```

Press the return button on the Pushbutton website and enter your Pushbutton password when prompted.

If this works then you a test notification should be sent to the device where you installed the pushbutton app.

After having received the test notification, you then need to create a script which sends an alert to your device whenever you desire. Open a terminal and enter the command:

```
touch pushbullet.sh
```

The script is as follows:

```
#!/bin/bash
```

```
# API = "[Access Token]"
```

```
MSG = "$1"
```

```
curl -u $API: https://api.pushbullet.com/v2/pushes -d type=note -d
```

```
title = "Raspberry Pi" -d body "$MSG"
```

You will need to replace the words access token with the alphanumeric string you received from the Pushbutton website (i.e. your actual access token without the brackets). As of yet you have just written the script; you will need to make it executable. To do this, enter the following command:

```
sudo chmod 755 pushbullet.sh
```


Save the file and then move the file to the /usr/bin folder. You can either drag and drop said file or move the file through the command:

```
sudo mv pushbullet.sh /usr/bin
```

Now enter the command:

```
/usr/bin/pushbullet.sh "Testing Testing"
```

This should produce an alert which says "Testing Testing". If this is the case, the script is working! By itself, this script isn't particularly useful. However it is easy to work code into your Python programs that will allow your Raspberry Pi projects to send alerts based on the activity of your other programs. Simply start your Python programs with:

```
import os
```

```
buttonpush = raw_input("Press Enter to send alert...")
```

```
os.system("/usr/bin/pushbullet.sh "Alert from your Raspberry Pi")
```

When input is entered into the buttonpush variable, that information is then saved and delivered as an alert when the third line of code is executed. You will need a little more Python know-how to properly incorporate this into other programs, but once you do, it will be utterly invaluable.

Chapter 4 – Common Problems & Solutions

Power Supply Problems

The symptom of a power supply problem is usually flashing rainbow colored light when you attempt to start your Raspberry Pi. A power supply problem does not mean that your Raspberry Pi is not receiving electricity, rather it may mean that the electrical current is too weak, strong or otherwise unsuitable. Power supply problems can cause a whole range of other defects, so it is important to check these problems first.

One likely cause of power supply problems is poor quality power cables. Cheap micro-USB cables have a tendency to break rather easily. Others are simply built from poor quality materials and have inconsistent output (or do not match the specifications they are said to match). Certain micro-USB cables might include tiny strips of plastic to make them more flexible, but this increases the risk of power supply problems. Always attempt to buy a high quality cable, which is relatively non-malleable and stiff.

Power supply problems can also occur if you blow your polyfuse. The polyfuse is a simple piece of hardware that protects the Raspberry Pi when it receives too much voltage. If this is the case, leave your Raspberry Pi without electricity supply for 1 day. However, keep your Raspberry Pi plugged into to your micro-USB cable and electrical mains. Try turning your Raspberry Pi on by turning the electrical socket on with the Pi already plugged in, rather than plugging in the micro-USB with the electrical socket already activated.

Monitor Problems

By default, the Raspberry Pi is programmed to use HDMI output over other methods, such as analog cables. If your chosen monitor requires a different video format, you are likely

to experience difficulties getting your Raspberry Pi to display output on the screen.

The simple way to fix this is to change the Raspberry Pi's output method. Press 1 on your keyboard to select HDMI preferred mode, 2 to select HDMI safe mode, 3 to select composite PAL mode and 3 to select composite NTSC mode. If you are not sure which version you need, simply try each of them in turn to see whether you can fix the video output.

Keyboard Problems / Mouse Problems / Ethernet problems

This fix only applies to the B+ and Pi 2 models. These newer models use slightly different software than the older models which can prevent devices being recognized through the Ethernet cable or USB cables if an older version of NOOBs is being used.

To fix this problem, simply replace the older NOOBs software on your SD card with the latest NOOBs download from the Raspberry Pi download page, which can be accessed [here](#).

Keyboard Output Is Wrong

The Raspberry Pi foundation is a UK based foundation and therefore uses U.K based keyboard settings. If you failed to appropriately alter the location settings when you first booted the Raspberry Pi, than you will be using the U.K keyboard settings by default.

This is often interpreted as the wrong output for U.S users, but it is relatively easy to change keyboard output to U.S settings. First, you must open a terminal in Raspbian. After this type the following:

[`sudo raspi-config`](#)

This should open menu. Choose the internationalization menu and then navigate to the keyboard setup menu. Scroll down on the country of origin page to change your keyboard settings from English (UK) to English (US).

Once you have selected this option, you must reboot your Raspberry Pi.

Adobe Flash Problems

Adobe flash is the software used to load and watch a wide range of videos on the internet. It is also associated with a range of browser games. However, adobe flash is not compatible with the Raspberry Pi in any way. Simply put, as a commercial company, Adobe has no interest in making their software open-source and therefore convertible to the Raspberry Pi. Therefore, don't expect Adobe Flash to ever work with Raspberry Pi.

However, there is the alternative of HTML5. HTML5 is also supported by most video players, including youtube. Even if you cannot watch the same exact video, you are likely to be able to find a HTML5 alternative somewhere on the web.

SD Card Memory Problems

Raspbian, the Raspberry Pi's operating system, uses Linux. Linux software is not compatible with Windows. This can lead to problems when the SD card used for Raspberry Pi is put into a Windows Computer. The linux "partitions" (fancy computer speak for folder hierarchies) will not be recognized by the Windows software, which can give the impression that your SD card has not available space or content.

You can solve this by expanding the partition, which will allow Windows to recognize the Linux software you have installed. Simply put your SD card into your Raspberry Pi and open a Raspbian terminal. Type the command:

`sudo raspi-config`

This command will open the customization menu that you will have seen the first time you attempted to boot Raspberry Pi. Select the `expand_rootfs` option, which should expand the linux partitions and make Windows able to read your SD card.

Conclusion

Computer science and programming doesn't have to be boring. In fact, the opposite is true. There is little more thrilling than seeing your own creation coming to life, whether it be a program you have designed or a computer-based machine of your own machinations.

Raspberry Pi is the gateway to learning how to create and design these programs and computer based devices of your own. You can start by finding projects that match your own knowledge and skill level to slowly cultivate your understanding and ability. Before you know, you will be creating your own robots and building programs that other people will ask for and share across the internet.

This guide has just scratched the surface of the Raspberry Pi and its true potential. In the first chapter of this guide, you got to grips with the basics of the Raspberry Pi such as the mission and purpose of the Raspberry foundation and its status as a Linux based operating system.

In the second chapter you delved into the details of the Raspberry Pi specs itself. From memory to USB ports to models and more, you will now never be in the dark when it comes to the details of Pi.

In the third chapter taught you how to set up the Raspberry Pi, such as how to format an SD disk as well as installing and booting Raspbian.

The fourth chapter provided you with three newbie-friendly Pi projects to sink your teeth into.

Finally the fifth chapter tackled common problems that might occur when you first start to use your Raspberry Pi.

There is a lot more to learn, but now you should be well equipped to start testing the waters. I wish you the best of luck on your Raspberry Pi journey!

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