

# CONTENTS IN DETAIL

<b>PREFACE</b>	<b>xv</b>
A Note on the Book's Exercises . . . . .	xvi
Who This Book Is For . . . . .	xvi
What's in the Book? . . . . .	xvi
<b>ACKNOWLEDGMENTS</b>	<b>xix</b>
<b>1</b>	
<b>AN INTRODUCTION TO CYBERSECURITY</b>	<b>1</b>
What Is Cybersecurity? . . . . .	2
Cybersecurity and Privacy . . . . .	2
What Cybersecurity Isn't . . . . .	3
Black Hats vs. White Hats . . . . .	4
Types of Black Hats . . . . .	4
Types of White Hats . . . . .	6
<b>Exercise: Learning More About Cybersecurity and Threats . . . . .</b>	<b>10</b>
Conclusion . . . . .	11
<b>2</b>	
<b>ATTACK TARGETS ON THE INTERNET</b>	<b>13</b>
How the Internet Works. . . . .	14
TCP/IP: The Backbone of the Internet . . . . .	15
Public vs. Private Networks. . . . .	16
How the Internet Looks to a Black Hat . . . . .	17
The Black Hat Attack Methodology . . . . .	18
Reconnaissance . . . . .	18
Weaponization . . . . .	19
Delivery . . . . .	19
Exploitation and Installation . . . . .	20
Command and Control, and Attack on Objectives . . . . .	20
How Black Hats Find You . . . . .	21
Example 1: The Merger . . . . .	21
Example 2: Social Media Hunting . . . . .	21
How to Hide from Black Hats. . . . .	22
The Internet Is Open . . . . .	22
The Internet Is Public . . . . .	23
The Internet Is Forever . . . . .	24
<b>Exercise: Analyzing Your Network . . . . .</b>	<b>25</b>
Network Command Line Tools . . . . .	25
Using Shodan . . . . .	31
Conclusion . . . . .	34

<b>3</b>		
<b>PHISHING TACTICS</b>		<b>35</b>
What Is Phishing?		36
An Obvious Phish		36
Not All Phishing Is Obvious		37
Using Details for a More Convincing Phish		37
Vishing and Other Non-Email Phishing		38
How to Protect Yourself Against Phishing		38
How Black Hats Trick You with URLs		39
Typosquatting		39
Complex URLs and Redirects		40
Modifying DNS Records		40
Hoaxes		41
Why Black Hats Love Phishing		42
Think Twice to Avoid Phishing		42
Take an Alternate Route		43
Listen to Your Spidey Sense		43
<b>Exercise: Analyzing a Phishing Email</b>		<b>43</b>
Phishing Email Indicators		44
Header Analysis		46
URL Analysis		50
Conclusion		53
<b>4</b>		
<b>MALWARE INFECTIONS</b>		<b>55</b>
What Is Malware?		56
Types of Malware		56
Viruses		56
Worms		57
Trojans		59
Ransomware		59
Spyware and Adware		60
Rootkits and Bootkits		60
Polymorphic Malware		61
How Black Hats Deploy Malware		62
How to Defend Against Malware		63
<b>Exercise: Analyzing Malware and Managing Antivirus Settings</b>		<b>65</b>
Analyzing Malware in Attachments		66
Reviewing Antivirus Settings		70
Conclusion		74
<b>5</b>		
<b>PASSWORD THEFTS AND OTHER ACCOUNT ACCESS TRICKS</b>		<b>75</b>
Authentication		76
Types of Authentication		76
Multi-Factor Authentication		80
Authorization		81
Mandatory Access Control		82
Rule-Based Access Control		82
Role-Based Access Control		82
Attribute-Based Access Control		83

Discretionary Access Control . . . . .	84
Accounting . . . . .	84
Logging . . . . .	85
Auditing . . . . .	86
Indicators of Attack . . . . .	87
<b>Exercise: Setting Up Accounts in Windows 10 and macOS . . . . .</b>	<b>89</b>
Windows 10 . . . . .	89
Access Control on macOS . . . . .	98
Conclusion . . . . .	101

## **6 NETWORK TAPPING 103**

The Basics of Network Design . . . . .	104
Attacking Your Network . . . . .	106
How Black Hats See Your Traffic . . . . .	106
Man-in-the-Middle Attacks . . . . .	108
Denial of Service . . . . .	110
Distributed Denial of Service . . . . .	110
Defense Against Network Attacks . . . . .	112
Firewalls . . . . .	113
Intrusion Detection Systems . . . . .	115
Intrusion Prevention Systems . . . . .	116
<b>Exercise: Setting Up Your Firewall . . . . .</b>	<b>117</b>
Windows . . . . .	117
macOS . . . . .	122
Conclusion . . . . .	124

## **7 ATTACKS IN THE CLOUD 125**

How Cloud Computing Works . . . . .	126
Software as a Service . . . . .	127
Platform as a Service . . . . .	127
Infrastructure as a Service . . . . .	127
Security as a Service . . . . .	128
Attacking the Cloud . . . . .	128
Web Application Attacks . . . . .	129
Defending the Cloud . . . . .	133
<b>Exercise: Performing SQL Injection on the Damn Vulnerable</b>	
<b>Web Application . . . . .</b>	<b>134</b>
Installing Docker and the DVWA . . . . .	134
Listing Users . . . . .	137
Finding Database Table Names . . . . .	138
Finding Passwords . . . . .	139
Conclusion . . . . .	139

## **8 WIRELESS NETWORK PIRATING 141**

How Wireless Networks Work . . . . .	142
Wireless Standards . . . . .	144
Wireless Security . . . . .	145

Wireless Authentication . . . . .	145
Wireless Encryption . . . . .	146
Wireless Attacks . . . . .	147
Rogue Access Points . . . . .	147
Disassociation Attacks . . . . .	148
Jamming . . . . .	149
Setting Up a Wireless Network with Security in Mind . . . . .	149
<b>Exercise: Secure Your WAP . . . . .</b>	<b>151</b>
Setting Up Your Access Point . . . . .	151
Setting Up Wireless Security . . . . .	152
Enabling Filtering . . . . .	154
Conclusion . . . . .	156

## **9 ENCRYPTION CRACKING 157**

What Is Cryptography? . . . . .	158
What We Encrypt . . . . .	158
Early Cryptography . . . . .	159
Substitution Ciphers . . . . .	159
Transposition Ciphers . . . . .	160
Modern Cryptography . . . . .	160
Symmetric Cryptography . . . . .	161
Asymmetric Cryptography . . . . .	163
Validating Public Keys . . . . .	164
Hashing . . . . .	166
What Happens When You Visit a Website? . . . . .	167
How Black Hats Steal Your Keys . . . . .	168
Cryptanalysis . . . . .	169
Asymmetric Algorithm Attacks . . . . .	170
Protecting Your Keys . . . . .	170
How Black Hats Break Hashes . . . . .	171
Salting Your Hashes . . . . .	172
<b>Exercise: Encrypting and Hashing Files . . . . .</b>	<b>172</b>
Encrypting and Hashing a File in Windows 10 . . . . .	172
Protecting Files Using macOS . . . . .	174
Using ssh-keygen to Generate a Public Key (Windows 10 or macOS) . . . . .	176
Conclusion . . . . .	177

## **10 HOW TO DEFEAT BLACK HATS 179**

What's the Worst That Could Happen? . . . . .	180
Risks . . . . .	180
Threats . . . . .	182
Controls . . . . .	183
Risk Management Programs . . . . .	184
Putting It All Together . . . . .	186
<b>Exercise: Conducting a Risk Analysis . . . . .</b>	<b>187</b>
Farewell and Good Luck . . . . .	188

## **INDEX 189**