A GIFT OF FIRE

Social, Legal, and Ethical Issues for Computing Technology

FOURTH EDITION

SARA BAASE

San Diego State University

International Edition contributions by **ATRIYA SEN**Indian Statistical Institute, Kolkata

CONTENTS

	Pre	eface	13
	Pro	ologue	19
1	UN	WRAPPING THE GIFT	21
	1.1	The Pace of Change 22	
	1.2	Change and Unexpected Developments 24 1.2.1 Connections: Cellphones, Social Networking, and More 25 1.2.2 E-commerce and Free Stuff 33 1.2.3 Artificial Intelligence, Robotics, Sensors, and Motion 35 1.2.4 -Tools for Disabled People 39	
	1.3	Themes 41	
	1.4	Ethics 44	
		1.4.1 What Is Ethics, Anyway? 44	
		1.4.2 A Variety of Ethical Views 46	
		1.4.3 Some Important Distinctions 54	
		Exercises 58	
2	PR	IVACY	65
	2.1	Privacy Risks and Principles 66	
		2.1.1 What Is Privacy? 66	
		2.1.2 New Technology, New Risks 68	
		2.1.3 Terminology and Principles for Managing Personal Data 74	
	2.2	The Fourth Amendment, Expectation of Privacy, and Surveillance	
		Technologies 78	
		 2.2.1 The Fourth Amendment 79 2.2.2 New Technologies, Supreme Court Decisions, and Expectation of Privacy 81 	
		2.2.3 Search and Seizure of Computers and Phones 84	
		2.2.4 Video Surveillance and Face Recognition 86	
	2.3		
		2.3.1 Marketing and Personalization 88	
		2.3.2 Our Social and Personal Activity 93	
		2.3.3 Location Tracking 97	
		2.3.4 A Right to Be Forgotten 100	

Contents

2.4	Gover	nment Systems 102			
	2.4.1	Databases 102			
	2.4.2	Public Records: Access versus Privacy 108			
	2.4.3	National ID Systems 109			
2.5	Protecting Privacy: Technology, Markets, Rights, and Laws 113				
		Technology and Markets 113			
		Rights and Law 118			
		Privacy Regulations in the European Union 128			
2.6		nunications 130			
		Wiretapping and Email Protection 131			
	2.6.2	Designing Communications Systems for Interception 133			
	2.6.3	The NSA and Secret Intelligence Gathering 134			
	Exercis	ses 137			
DD.	EEDO	M OF CREECH			
FK.	EEDO	OM OF SPEECH			
3.1	Comn	nunications Paradigms 152			
	3.1.1	Regulating Communications Media 152			
	3.1.2	Free Speech Principles 155			
3.2		olling Speech 157			
	3.2.1	Offensive Speech: What Is It? What Is Illegal? 157			
		Censorship Laws and Alternatives 159			
		Child Pornography and Sexting 164			
		Spam 166 Challenging Old Regulatory Structures and Special Interests			
2 2		Challenging Old Regulatory Structures and Special Interests			
		g, Selling, and Leaking Sensitive Material 171			
	Anony	-			
3.5		Filobal Net: Censorship and Political Freedom 181 Tools for Communication, Tools for Oppression 181			
	3.5.2				
	3.5.3				
3 6		eutrality Regulations or the Market? 187			
3.0	Exerci	, ,			
	LACICI	363 167			
INT	relli	ECTUAL PROPERTY			
4.1	Princi	ples, Laws, and Cases 198			
	4.1.1	What Is Intellectual Property? 198			
	4.1.2	Challenges of New Technologies 200			
	4.1.3	A Bit of History 203			
	4.1.4	The Fair Use Doctrine 204			
	4.1.5	Ethical Arguments About Copying 205			
	4.1.6	Significant Legal Cases 208			

4.2	Responses to Copyright Infringement 214	
	4.2.1 Defensive and Aggressive Responses From the Content Industries	214
	4.2.2 The Digital Millennium Copyright Act: Anticircumvention 219	
	4.2.3 The Digital Millennium Copyright Act: Safe Harbor 222	
4.3	4.2.4 Evolving Business Models 224 Search Engines and Online Libraries 226	
	-	
4.4	Free Software 229 4.4.1 What Is Free Software? 229	
	4.4.2 Should All Software Be Free? 231	
4.5	Patents for Inventions in Software 232	
4.3	4.5.1 Patent Decisions, Confusion, and Consequences 233	
	4.5.2 To Patent or Not? 236	
	Exercises 238	
CR	IME	247
		2-17
5.1	Introduction 248	
5.2	Hacking 248	
	5.2.1 What is "Hacking"? 248	
	5.2.2 Hacktivism, or Political Hacking 2545.2.3 Hackers as Security Researchers 255	
	5.2.4 Hacking as Foreign Policy 257	
	5.2.5 Security 259	
	5.2.6 The Law: Catching and Punishing Hackers 263	
5.3		
0.5	5.3.1 Stealing Identities 269	
	5.3.2 Responses to Identity Theft 271	
	5.3.3 Biometrics 275	
5.4	Whose Laws Rule the Web? 276	
	5.4.1 When Digital Actions Cross Borders 276	
	5.4.2 Libel, Speech, and Commercial Law 280	
	5.4.3 Culture, Law, and Ethics 283	
	5.4.4 Potential Solutions 284	
	Exercises 285	
****	NPV.	
WC	DRK	293
6.1	Changes, Fears, and Questions 294	
6.2	Impacts on Employment 295	
	6.2.1 Job Destruction and Creation 295	
	6.2.2 Changing Skills and Skill Levels 300	
	6.2.3 Telecommuting 302	
	6.2.4 A Global Workforce 305	

6.3	Employee Communication and Monitoring 311 6.3.1 Learning About Job Applicants 311 6.3.2 Risks and Rules for Work and Personal Communications 314 Exercises 322	
EV	ALUATING AND CONTROLLING TECHNOLOGY	329
7.1	Evaluating Information 330 7.1.1 The Need for Responsible Judgment 330 7.1.2 Computer Models 339	
7.2	The "Digital Divide" 347 7.2.1 Trends in Computer Access 347 7.2.2 The Global Divide and the Next Billion Users 349	
7.3	Neo-Luddite Views of Computers, Technology, and Quality of Life 350 7.3.1 Criticisms of Computing Technologies 351 7.3.2 Views of Economics, Nature, and Human Needs 354	
7.4	Making Decisions About Technology 360 7.4.1 Questions 361 7.4.2 The Difficulty of Prediction 362 7.4.3 Intelligent Machines and Superintelligent Humans—Or the End of the Human Race? 365	he
	7.4.4 A Few Observations 368 Exercises 368	
FR	RORS, FAILURES, AND RISKS	379
8.1		373
8.2	Case Study: The Therac-25 395 8.2.1 Therac-25 Radiation Overdoses 395 8.2.2 Software and Design Problems 396 8.2.3 Why So Many Incidents? 398 8.2.4 Observations and Perspective 400	
8.3		
8.4	Dependence, Risk, and Progress 410 8.4.1 Are We Too Dependent on Computers? 410 8.4.2 Risk and Progress 411 Exercises 413	

Contents	11

)	PR	OFESSIONAL ETHICS AND RESPONSIBILITIES	421
-		What Is "Professional Ethics"? 422	721
	9.2	Ethical Guidelines for Computer Professionals 423	
		9.2.1 Special Aspects of Professional Ethics 423 9.2.2 Professional Codes of Ethics 424	
	0.2	9.2.3 Guidelines and Professional Responsibilities 425	
	9.3	Scenarios 428	
		9.3.1 Introduction and Methodology 428	
		9.3.2 Protecting Personal Data 430	
		9.3.3 Designing an Email System With Targeted Ads 432	
		9.3.4 Webcams in School Laptops ¹ 433 9.3.5 Publishing Security Vulnerabilities 434	
		9.3.5 Publishing Security Vulnerabilities 4349.3.6 Specifications 435	
		9.3.0 Specifications 433 9-3.7 Schedule Pressures 436	
		9.3.8 Software License Violation 439	
		9.3.9 Going Public 440	
		9.3.10 Release of Personal Information 441	
		9.3.11 Conflict of Interest 442	
		9.3.12 Kickbacks and Disclosure 444	
		9.3.13 A Test Plan 445	
		9.3.14 Artificial Intelligence and Sentencing Criminals 445	
		9.3.15 A Gracious Host 448	
		Exercises 448	
		Exercises 448	
	E	9	455
	Еþ	ilogue	455
	TIT.	T COPTWA DE ENCHIPEDING CODE	
4		E SOFTWARE ENGINEERING CODE	
	AND THE ACM CODE		457
	A.1	Software Engineering Code of Ethics and Professional Practice 457	
		ACM Code of Ethics and Professional Conduct 465	
	Ind	lex z	473