Numerical Analysis

	An Introduction to Numerical Methods and Analysis
	Introductory Concepts and Calculus Review
02	Basic Tools of Calculus – Topics 2
05	Error, Approximate Equality, and Asymptotic Order Notation – Topics 3
06	A Primer on Computer Arithmetic
07	A Word on Computer Language and Software
08	Simple Approximations
09	Application: Approximating the Natural Logarithm
10	A Brief History of Computing
11	Literature Review
12	References
	A Survey of Simple Methods and Tools
13	Horner's Rule and Nested Multiplication
14	Difference Approximations to the Derivative
15	Application: Euler's Method for Initial Value Problems
16	Linear Interpolation
17	Application – The Trapezoid Rule
18	Solution of Tridiagonal Linear Systems
19	Application: Simple Two-Point Boundary Value Problems
20	Root-Finding The Bisection Method
21	Newton's Method: Derivation and Examples
22	How to Stop Newton's Method
23	Application: Division Using Newton's Method
24	The Newton Error Formula
25	Newton's Method: Theory and Convergence
26	Application: Computation of the Square Root
27	The Secant Method: Derivation and Examples
28	Fixed-Point Iteration
29	Roots of Polynomials, Part 1
34	Special Topics in Root-finding Methods – Topics 5
35	Very High-order Methods and the Efficiency Index
36	Literature and Software Discussion
37	References
	Interpolation and Approximation
38	Lagrange Interpolation
39	Newton Interpolation and Divided Differences
40	Interpolation Error
41	Application: Muller's Method and Inverse Quadratic Interpolation
42	Application: More Approximations to the Derivative
43	Hermite Interpolation
44	Piecewise Polynomial Interpolation
46	An Introduction to Splines – Topics 2
47	Application: Solution of Boundary Value Problems
48	Tension Splines
49	Least Squares Concepts in Approximation
50	An Introduction to Data Fitting

51	Least Squares Approximation and Orthogonal Polynomials
54	Advanced Topics in Interpolation Error – Topics 3
55	Literature and Software Discussion
56	References
	Numerical Integration
57	A Review of the Definite Integral
58	Improving the Trapezoid Rule
59	Simpson's Rule and Degree of Precision
60	The Midpoint Rule
61	Application: Stirling's Formula
62	Gaussian Quadrature
63	Extrapolation Methods
67	Special Topics in Numerical Integration – Topics 4
68	Literature and Software Discussion
69	References
	Numerical Methods for Ordinary Differential Equations
70	The Initial Value Problem: Background
71	Euler's Method
72	Analysis of Euler's Method
76	Variants of Euler's Method – Topics 4
77	Single-Step Methods: Runge-Kutta
79	Multistep Methods – Topics 2
81	Stability Issues – Topics 2
83	Application of Systems of Equations – Topics 2
84	Adaptive Solvers
87	Boundary Value Problems – Topics 3
88	Literature and Software Discussion
89	References
	Numerical Methods for the Solution of Systems of Equations
90	Linear Algebra Review
91	Linear System and Gaussian Elimination
92	Operation Counts
93	The LU Factorization
97	Perturbation, Conditioning, and Stability – Topics 4
98	SPD Matrices and the Cholesky Decomposition
99	Iterative Methods for Linear Systems: A Brief Survey
101	Nonlinear Systems: Newton's Method and Related Ideas – Topics 2
102	Application: Numerical Solution of Nonlinear Boundary Value Problems
103	Literature and Software Discussion
104	References
	Approximate Solution of the Algebraic Eigenvalue Problem
105	Eigenvalue Review
106	Reduction to Hessenberg Form
107	Power Methods
108	An Overview of the QR Iteration
110	Application: Roots of Polynomials, Part 2
111	Literature and Software Discussion
112	References
	A Survey of Numerical Methods for Partial Differential Equations
115	Difference Methods for the Diffusion Equation – Topics 3
116	Finite Element Methods for the Diffusion Equation

119	Difference Methods for Poisson Equations – Topics 3
120	Literature and Software Discussion
121	References
	An Introduction to Spectral Methods
122	Spectral Methods for Two-Point Boundary Value Problems
123	Spectral Methods for Time-Dependent Problems
124	Clenshaw-Curtis Quadrature
125	Literature and Software Discussion
126	References
	Appendix: Proofs of Selected Theorems, And Additional Material
128	Proofs of the Interpolation Error Theorems
129	Proof of the Stability Result for ODEs
130	Stiff Systems of Differential Equations and Eigenvalues
131	The Matrix Perturbation Theorem

Ethics of Information Technology

	Tables in Information Technology
	Ethics in Information Technology
04	An Overview of Ethics
01	Vignette Cisco Chairman and CEO Advocates Ethical Behavior
04	What is Ethics? – Topics 3
08	Ethics in the Business World – Topics 4
13	Including Ethical Considerations in Decision Making – Topics 5
14	Ethics in Information Technology
	Summary
	Key Terms
	Self-Assessment Questions
	Discussion Questions
	What Would You Do?
	Cases
	Ethics for IT Workers and IT Users
15	Vignette New York City Payroll Project Riddled with Fraud
22	IT Professionals – Topics 7
25	IT Users – Topics 3
	Summary
	Key Terms
	Self-Assessment Questions
	Discussion Questions
	What Would You Do?
	Cases
	Computer and Internet Crime
26	Vignette The Reveton Ransomware Attacks
30	IT Security Incidents: A Major Concern
36	Implementing Trustworthy Computing – Topics 6
	Summary
	Key Terms
	Self-Assessment Questions
	Discussion Questions
	What Would You Do?
	Cases
	Privacy
37	Vignette What Is The National Security Agency (NSA) Up To?
39	Privacy Protection and the Law – Topics 2
44	Key Privacy and Anonymity Issues – Topics 5
	Summary
	Key Terms
	Self-Assessment Questions
	Discussion Questions
	What Would You Do?
	Cases
	Freedom of Expression
45	
	Vignette Reputation Changer, Online Reputation Management Company First Amondment Bights Topics 2
47 52	First Amendment Rights – Topics 2
52	Freedom of Expression: Key Issues – Topics 5
	Summary

	Key Terms
	Self-Assessment Questions
	Discussion Questions
	What Would You Do?
	Cases
	Intellectual Property
53	Vignette Sinovel Steals Millions in Trade Secrets from American Superconductor
54	What is Intellectual Property?
63	Copyrights – Topics 9
66	Patents – Topics 3
68	Trade Secrets – Topics 2
74	Key Intellectual Property Issues – Topics 6
74	Summary
	Key Terms
	Self-Assessment Questions
	Discussion Questions
	What Would You Do?
	Cases
	Software Development
75	Vignette Stock Markets Susceptible to Software Glitches
76	Strategies for Engineering Quality Software – Topics 1
78	Software Product Liability – Topics 2
80	Key Issues in Software Development – Topics 2
80	
	Summary Key Terms
	Self-Assessment Questions
	Discussion Questions
	What Would You Do?
	Cases
	The Impact of Information Technology on Productivity and Quality of Life
81	Vignette Problems with the E-Rate Program
83	The Impact of IT on the Standard of Living and Worker Productivity – Topics 2
87	The Impact of IT on HealthCare Costs – Topics 4
	Summary
	Key Terms
	Self-Assessment Questions
	Discussion Questions
	What Would You Do?
	Cases
	Social Networking
88	Vignette Wanelo: Social Shopping Web Site Headed for Success
89	What Is a Social Networking Web Site?
93	Business Applications of Online Social Networking – Topics 4
97	Social Networking Ethical Issues – Topics 4
99	Online Virtual Worlds – Topics 2
	Summary
	Key Terms
	Self-Assessment Questions
	Discussion Questions
	What Would You Do?
	Cases

	Ethics of IT Organizations
100	Vignette HP Finds Autonomy a Tough Pill to Swallow
101	Key Ethical Issues for Organizations – Topics 1
105	Contingent Workers – Topics 3
108	H-1B Workers – Topics 3
111	Outsourcing – Topics 3
114	Whistle-Blowing – Topics 3
115	Green Computing
116	ICT Industry Code of Conduct
	Summary
	Key Terms
	Self-Assessment Questions
	Discussion Questions
	What Would You Do?
	Cases
	Appendix: A Brief Introduction to Morality
117	Introduction
118	The Knotty Question of Goodness
119	Relativism: Why 'Common Sense' Won't Work – Topics 1
120	Deontology, or The Ethics of Logical Consistency and Duty
121	Happy Consequences, or Utilitarianism – Topics 1
122	A Return to The Greeks: The Good Life of Virtue – Topics 1
123	Pluralism
	Summary

Software Security

Software Security: Reference-1

	Convitor in Communities
	Security in Computing
	Introduction
02	What is Computer Security? – Topics 2
07	Threats – Topics 5
09	Harm – Topics 2
10	Vulnerabilities
11	Controls
12	Conclusion
13	What's Next?
14	Exercises
	Toolbox: Authentication, Access Control, and Cryptography
21	Authentication – Topics 7
25	Access Control – Topics 4
35	Cryptography – Topics 10
36	Exercises
	Programs and Programming
46	Unintentional (Nonmalicious) Programming Oversights – Topics 10
48	Malicious Code – Malware – Topics 2
53	Countermeasures – Topics 5
54	Exercises
	The Web- User Side
56	Browser Attacks – Topics 2
59	Web Attacks Targeting Users – Topics 3
62	Obtaining User or Website Data – Topics 3
67	Email Attacks – Topics 5
68	Exercises
	Operating Systems
73	Security in Operating Systems – Topics 5
82	Security in the Design of Operating Systems – Topics 9
88	Rootkit – Topics 6
89	Conclusion
90	Exercises
	Networks
93	Network Concepts – Topics3
94	Part-1: War on Network: Network Security Attacks
99	Threats to Network Communication – Topics 5
103	Wireless Network security – Topics 4
113	Denial of Service – Topics 10
127	Distributed Denial-of-Service Attacks – Topics 4
128	Part-2: Strategic Defenses: Security Countermeasures
134	Cryptography in Network Security – Topics 6
144	Firewalls – Topics 8
150	Intrusion Detection and Prevention Systems – Topics 6
152	Network Management – Topics 2
153	Conclusion
154	Exercises
134	Databases
	Databases

157	Introduction to Databases – Topics 3
164	Security Requirements of Databases – Topics 7
169	Reliability and Integrity – Topics 5
172	Database Disclosure – Topics 3
174	Modification – Topics Security Versus Precision
176	Data Mining and Big Data – Topics 2
177	Conclusion
178	Exercises
170	Cloud Computing
180	Cloud Computing Concepts – Topics 2
184	Moving to the Cloud – Topics 4
187	Cloud Security Tools and Techniques – Topics 3
190	Cloud Identity Management – Topics 3
192	Securing laaS Public laaS Versus Private Network Security
194	Conclusion – Topics 2
195	Exercises
	Privacy
197	Privacy Concepts – Topics 2
205	Privacy Principles and Policies – Topics 8
207	Authentication and Privacy – Topics 2
209	Data Mining – Topics 2
216	Privacy on the Web – Topics 7
222	Email Security – Topics 6
227	Privacy Impacts of Emerging Technologies – Topics 5
228	Where the Field is Headed
229	Conclusion
230	Exercises
	Management and Incidents
234	Security Planning – Topics 4
237	Business Continuity Planning – Topics 3
239	Handling Incidents – Topics 2
242	Risk Analysis – Topics 3
248	Dealing with Disaster – Topics 6
249	Conclusion
250	Exercises
	Legal Issues and Ethics
254	Protecting Programs and Data – Topics 4
258	Information and the Law – Topics 4
260	Rights of Employees and Employers – Topics 2
262	Redress for Software Failures – Topics 2
270	Computer Crime – Topics 8
273	Ethical Issues in Computer Security – Topics 3
282	Incident Analysis with Ethics – Topics 9
283	Conclusion of Computer Ethics
284	Conclusion
285	Exercises
	Details of Cryptography
290	Cryptology – Topics 5
293	Symmetric Encryption Algorithms – Topics 3
295	Asymmetric Encryption with RSA – Topics 2
298	Message Digests – Topics 3

301	Digital Signatures – Topics 3
305	Quantum Cryptography – Topics 4
306	Conclusion
	Emerging Topics
309	The Internet of Things – Topics 3
312	Economics – Topics 3
315	Electronic Voting – Topics 3
318	Cyber Warfare – Topics 3
319	Conclusion

Software Security: Reference-2

Introduction O1 The Cast of Characters O3 Alice's Online Bank - Topics 2 O7 About This Book - Topics 4 O8 The People Problem O9 Principles and Practice O9 Principles and Practice 10 Problems Crypto Crypto Basics 11 Introduction 12 How to Speak Crypto 20 Classic Crypto - Topics 8 21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptography 24 A Taxonomy of Cryptography Problems Symmetric Key Crypto 1ntroduction 26 Stream Ciphers - Topics 2 34 Block Ciphers - Topics 7 35 Integry Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA - Topics 3 41 Diffie-Hellman 38 Elliptic Curve Cryptography - Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto - Topics 3 48 Public Key Notation 49 What is a Hash Function? 50 The Birthday Problems Public Key Notation 48 Public Key Notation 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographie Hashes 52 Tiger Hash 10 HMAC 55 Uses of Hash Functions - Topics 3 Summary Figer Hash 10 HMAC 55 Uses of Hash Functions - Topics 3 Summary Summary Problems 50 Other Crypto-Related Topics - Topics 3 Summary Summary Problems 51 Other Crypto-Related Topics - Topics 3 Summary Summary Summary Other Crypto-Related Topics - Topics 3 Summary Other Crypto-Related Topics - Topics 3 Summary Summary Summary Other Crypto-Related Topics - Topics 3 Summary Summary Summary Summary Other Crypto-Related Topics - Topics 3 Summary Summar		Information Security
01 The Cast of Characters 03 Alice's Online Bank — Topics 2 07 About This Book — Topics 4 08 The People Problem 09 Principles and Practice 10 Problems Crypto Crypto Crypto Crypto Basics 11 Introduction 12 How to Speak Crypto 20 Classic Crypto — Topics 8 21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptography 24 A Taxonomy of Cryptography 25 Symmetric Key Crypto 26 Introduction 27 Introduction 28 Symmetric Key Crypto 29 Introduction 20 Introduction 20 Introduction 21 Introduction 22 Introduction 23 Integrity Summany Problems Public Key Crypto 10 Introduction 35 Integrity Summary Problems Public Key Crypto 16 Introduction 17 Knapsack 18 Introduction 18 Introduction 18 Introduction 19 Veryptography — Topics 2 19 Veryptography — Topics 3 10 Introduction 19 Veryptography — Topics 3 10 Introduction 10 Veryptography — Topics 3 11 Introduction 11 Veryptography — Topics 3 12 Veryptography — Topics 3 13 Veryptography — Topics 3 14 Diffie-Hellman 15 Uses for Public Key Crypto — Topics 3 16 Veryptography — Topics 3 17 Veryptography — Topics 3 18 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 19 What is a Hash Function? 11 Non-Cryptographic Hashes 15 Tiger Hash Functions — Topics 2 15 Uses of Hash Functions — Topics 2 15 Uses of Hash Functions — Topics 2		
03 Alice's Online Bank – Topics 2 07 About This Book – Topics 4 08 The People Problem 09 Principles and Practice 10 Problems Crypto Crypto Basics 11 Introduction 12 How to Speak Crypto 20 Classic Crypto – Topics 8 21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptography 24 A Taxonomy of Cryptography 25 Problems Symmetric Key Crypto 26 Stream Ciphers – Topics 2 27 Introduction 28 Stream Ciphers – Topics 7 39 Integrity Summary Problems Problems Public Key Crypto 30 Introduction 31 Knapsack 32 Napsack 34 Diffie-Hellman 35 Introduction 36 Introduction 37 Knapsack 38 Anapsack 39 RSA – Topics 3 41 Diffie-Hellman 41 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 45 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash Functions – Topics 2 55 Uses of Hash Functions – Topics 2 55 Uses of Hash Functions – Topics 2 56 Other Crypto-Related Topics – Topics 3	01	
07 About This Book – Topics 4 08 The People Problem 09 Principles and Practice 10 Problems Crypta Crypta Crypta Crypta Crypto Basics 11 Introduction 12 How to Speak Crypto 12 Classic Crypto – Topics 8 11 Modern Crypto History 12 A Taxonomy of Cryptography 12 A Taxonomy of Cryptography 12 A Taxonomy of Cryptanalysis 12 Summary 12 Problems 13 Symmetric Key Crypto 14 Introduction 15 Stream Ciphers – Topics 2 16 Stream Ciphers – Topics 7 17 Summary 18 Problems 19 Problems 10 Problems 10 Problems 10 Problems 11 Problems 12 Public Key Crypto 13 Integrity 13 Summary 14 Problems 16 Introduction 17 Kanpsack 18 RSA – Topics 3 18 Introduction 19 Introduction 19 Uses for Public Key Crypto – Topics 2 10 Introduction 19 Uses for Public Key Crypto – Topics 3 10 Uses for Public Key Infrastructure 10 Summary 11 Problems 12 Public Key Infrastructure 13 Summary 14 Problems 15 Summary 16 Problems 17 Problems 18 Public Key Infrastructure 18 Summary 19 Problems 19 Uses for Public Key Crypto – Topics 3 18 Public Key Infrastructure 19 What is at Hash Functions and Other Topics 19 The Birthday Problem 11 Non-Cryptographic Hashes 15 Tiger Hash 15 Uses of Hash Functions – Topics 2 15 Uses of Hash Functions – Topics 2		
08 The People Problem 09 Principles and Practice 10 Problems Crypto Crypto Crypto Crypto Basics 11 Introduction 12 How to Speak Crypto 20 Classic Crypto — Topics 8 21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptography Problems Symmary Problems Symmetric Key Crypto 24 Introduction 26 Stream Ciphers — Topics 2 38 Block Ciphers — Topics 7 35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA — Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography — Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto — Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions — Topics 2 55 Uses of Hash Functions — Topics 3 55 Uses of Hash Functions — Topics 2 56 Other Crypto-Related Topics — Topics 3		·
09 Principles and Practice 10 Problems Crypto Crypto Crypto Basics 11 Introduction 12 How to Speak Crypto 20 Classic Crypto – Topics 8 21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptography 24 A Taxonomy of Cryptography 25 Problems Symmetric Key Crypto 26 Introduction 27 Stream Ciphers – Topics 2 28 Block Ciphers – Topics 2 39 Block Ciphers – Topics 7 30 Integrity Summary Problems Public Key Crypto 30 Introduction 31 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash Functions – Topics 2 55 Uses of Hash Functions – Topics 2 56 Other Crypto-Related Topics – Topics 3 56 Uses of Hash Functions – Topics 2 57 Uses of Hash Functions – Topics 2		
Crypto Crypto Crypto Basics 11 Introduction 12 How to Speak Crypto 20 Classic Crypto - Topics 8 21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptography 24 A Taxonomy of Cryptography 25 Symmary 26 Problems Symmetric Key Crypto 27 Introduction 28 Stream Ciphers - Topics 2 29 Al Block Ciphers - Topics 7 29 Integrity Summary Problems Public Key Crypto 30 Introduction 31 Knapsack 40 RSA - Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography - Topics 2 44 Public Key Notation 45 Elliptic Curve Cryptography - Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions - Topics 2 56 Other Crypto-Related Topics - Topics 3 56 Uses of Hash Functions - Topics 2 57 Uses of Hash Functions - Topics 2		·
Crypto Crypto Basics 11 Introduction 12 How to Speak Crypto 20 Classic Crypto – Topics 8 21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptography 24 A Taxonomy of Cryptography 25 Symmetric Key Crypto 26 Stream Ciphers – Topics 2 27 A Taxonomy of Cryptography 28 Introduction 29 Stream Ciphers – Topics 2 29 Integrity 29 Summary 20 Problems 20 Public Key Crypto 20 Introduction 21 Royal Face of Company 21 Problems 22 Public Key Crypto 23 Integrity 24 Introduction 25 Integrity 26 Summary 27 Problems 28 Public Key Crypto 29 Introduction 29 Public Key Crypto 20 Introduction 20 Introduction 21 Public Key Cryptography – Topics 2 29 Public Key Notation 20 Uses for Public Key Crypto – Topics 3 20 Public Key Infrastructure 20 Summary 21 Problems 22 Hash Functions and Other Topics 23 Integrity Infrastructure 24 Public Key Infrastructure 25 Integrity Infrastructure 26 Summary 27 Problems 28 Public Key Infrastructure 39 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 55 Uses of Hash Functions – Topics 3		
Crypto Basics 11 Introduction 12 How to Speak Crypto 20 Classic Crypto – Topics 8 21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptanalysis Summary Problems Symmetric Key Crypto 24 Introduction 26 Stream Ciphers – Topics 2 34 Block Ciphers – Topics 7 35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems What is a Hash Function? 50 The Birthday Problem Hash Functions and Other Topics 49 What is a Hash Function? 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 55 Uses of Hash Functions – Topics 2 56 Other Crypto-Related Topics – Topics 2 57 Other Crypto-Related Topics – Topics 3	10	
11 Introduction 12 How to Speak Crypto 20 Classic Crypto – Topics 8 21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptanalysis Summary Problems Symmetric Key Crypto 24 Introduction 26 Stream Ciphers – Topics 2 34 Block Ciphers – Topics 7 35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMA/C 55 Uses of Hash Functions – Topics 2 56 Other Crypto-Related Topics – Topics 3 56 Uses of Hash Functions – Topics 2		
12 How to Speak Crypto 20 Classic Crypto – Topics 8 21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptography 24 A Taxonomy of Cryptography 25 Problems Symmetric Key Crypto 26 Stream Ciphers – Topics 2 37 Block Ciphers – Topics 2 38 Block Ciphers – Topics 7 39 Integrity Summary Problems Public Key Crypto 30 Introduction 31 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 55 Uses of Hash Functions – Topics 2 55 Uses of Hash Functions – Topics 2	11	
20 Classic Crypto – Topics 8 21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptography 24 A Taxonomy of Cryptanalysis Summary Problems Symmetric Key Crypto 24 Introduction 26 Stream Ciphers – Topics 2 34 Block Ciphers – Topics 7 35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 55 Uses of Hash Functions – Topics 2 56 Other Crypto-Related Topics – Topics 3		
21 Modern Crypto History 22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptography 24 Summary 26 Problems 27 Symmetric Key Crypto 28 Introduction 29 Block Ciphers – Topics 2 30 Block Ciphers – Topics 7 31 Integrity 31 Summary 32 Problems 43 Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffle-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure 50 Summary 80 Problems 91 Public Key Infrastructure 92 Summary 93 Problems 94 What is a Hash Function? 95 The Birthday Problem 95 Tiger Hash 95 Uses of Hash Functions – Topics 2 96 Other Cryptographic Hashes 97 Uses of Hash Functions – Topics 2		
22 A Taxonomy of Cryptography 23 A Taxonomy of Cryptanalysis Summary Problems Symmetric Key Crypto 24 Introduction 26 Stream Ciphers – Topics 2 34 Block Ciphers – Topics 7 35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 Other Crypto-Related Topics – Topics 3		
23 A Taxonomy of Cryptanalysis Summary Problems Symmetric Key Crypto 24 Introduction 26 Stream Ciphers – Topics 2 34 Block Ciphers – Topics 7 35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3		
Summary Problems Symmetric Key Crypto Introduction 26 Stream Ciphers – Topics 2 34 Block Ciphers – Topics 7 35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 Other Crypto-Related Topics – Topics 3 Other Crypto-Related Topics – Topics 3 Other Crypto-Related Topics – Topics 3		
Problems Symmetric Key Crypto 24	23	
Symmetric Key Crypto Introduction Stream Ciphers – Topics 2 34 Block Ciphers – Topics 7 35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 Other Crypto-Related Topics – Topics 3		
24 Introduction 26 Stream Ciphers – Topics 2 34 Block Ciphers – Topics 7 35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Rolated Topics – Topics 3		
26 Stream Ciphers – Topics 2 34 Block Ciphers – Topics 7 35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 50 Other Crypto-Related Topics – Topics 3	24	
34 Block Ciphers – Topics 7 35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3		
35 Integrity Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3		
Summary Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMMC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3		
Problems Public Key Crypto 36 Introduction 37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3	33	
Public Key Crypto Introduction Knapsack RSA – Topics 3 Iliptic Curve Cryptography – Topics 2 Public Key Notation Vuses for Public Key Crypto – Topics 3 Public Key Infrastructure Summary Problems Hash Functions and Other Topics What is a Hash Function? Non-Cryptographic Hashes Tiger Hash MAC Summary Version of Hash Functions – Topics 2 Tiger Hash MAC Summary Description of Hash Functions – Topics 2 Description of Hash Functions – Topics 2 Topics 2 Tiger Hash Tunctions – Topics 2 Tiger Graphic Hash Functions – Topics 3		, ,
36Introduction37Knapsack40RSA – Topics 341Diffie-Hellman43Elliptic Curve Cryptography – Topics 244Public Key Notation47Uses for Public Key Crypto – Topics 348Public Key InfrastructureSummaryProblemsHash Functions and Other Topics49What is a Hash Function?50The Birthday Problem51Non-Cryptographic Hashes52Tiger Hash53HMAC55Uses of Hash Functions – Topics 258Other Crypto-Related Topics – Topics 3		
37 Knapsack 40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3	36	
40 RSA – Topics 3 41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3		
41 Diffie-Hellman 43 Elliptic Curve Cryptography – Topics 2 44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3		
44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3	41	·
44 Public Key Notation 47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3	43	Elliptic Curve Cryptography – Topics 2
47 Uses for Public Key Crypto – Topics 3 48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3	44	
48 Public Key Infrastructure Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3		
Summary Problems Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3	48	
Hash Functions and Other Topics 49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3		Summary
49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3		Problems
49 What is a Hash Function? 50 The Birthday Problem 51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3		Hash Functions and Other Topics
51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3	49	
51 Non-Cryptographic Hashes 52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3	50	The Birthday Problem
52 Tiger Hash 53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3	51	
53 HMAC 55 Uses of Hash Functions – Topics 2 58 Other Crypto-Related Topics – Topics 3	52	7. 3
58 Other Crypto-Related Topics – Topics 3	53	
	55	Uses of Hash Functions – Topics 2
Summary	58	Other Crypto-Related Topics – Topics 3
		Summary
Problems		Problems
Advanced Cryptanalysis		Advanced Cryptanalysis
59 Introduction	59	Introduction

66 Linear and Differential Cryptanalysis – Topics 7 67 Side Channel Attack on RSA 68 Lattice Reduction and the Knapsack 72 Hellman's Time-Memory Trade-Off – Topics 4 Summary Problems Access Control Authentication 73 Introduction 74 Authentication Methods 80 Passwords – Topics 6 84 Biometrics – Topics 4 85 Something You Have	
68 Lattice Reduction and the Knapsack 72 Hellman's Time-Memory Trade-Off – Topics 4 Summary Problems Access Control Authentication 73 Introduction 74 Authentication Methods 80 Passwords – Topics 6 84 Biometrics – Topics 4	
72 Hellman's Time-Memory Trade-Off – Topics 4 Summary Problems Access Control Authentication 73 Introduction 74 Authentication Methods 80 Passwords – Topics 6 84 Biometrics – Topics 4	
Summary Problems Access Control Authentication 73 Introduction 74 Authentication Methods 80 Passwords – Topics 6 84 Biometrics – Topics 4	
Problems Access Control Authentication 73 Introduction 74 Authentication Methods 80 Passwords – Topics 6 84 Biometrics – Topics 4	
Access Control Authentication 73 Introduction 74 Authentication Methods 80 Passwords – Topics 6 84 Biometrics – Topics 4	
Authentication 73 Introduction 74 Authentication Methods 80 Passwords – Topics 6 84 Biometrics – Topics 4	
73 Introduction 74 Authentication Methods 80 Passwords – Topics 6 84 Biometrics – Topics 4	
80 Passwords – Topics 6 84 Biometrics – Topics 4	
80 Passwords – Topics 6 84 Biometrics – Topics 4	
84 Biometrics – Topics 4	
86 Two-Factor Authentication	
87 Single Sign-On and Web Cookies	
Summary	
Problems	
Authorization	
88 Introduction	
90 Access Control Matrix – Topics 2	
92 Multilevel Security Models – Topics 2	
93 Multilateral Security	
94 Covert Channel	
95 Inference Control	
96 CAPTCHA	
101 Firewalls – Topics 5	
103 Intrusion Detection – Topics 2	
Summary	
Problems	
Protocols	
Simple Authentication Protocols	
104 Introduction	
105 Simple Security Protocols	
111 Authentication Protocols – Topics 6	
112 Authentication and TCP	
113 Zero Knowledge Proofs	
114 The Best Authentication Protocol?	
Summary	
Problems	
Real-World Security Protocols	
115 Introduction	
118 Secure Socket Layer – Topics 3	
127 IPSec – Topics 9	
129 Kerberos – Topics 2	
135 GSM – Topics 6	
Summary	
Problems	
Software	
Software Flaws and Malware	
Software Flaws and Malware 136 Introduction 139 Software Flaws – Topics 3	

147	Malware – Topics 8
151	Miscellaneous Software-Based Attacks – Topics 4
	Summary
	Problems
	Insecurity In Software
152	Introduction
154	Software Reverse Engineering – Topics 2
157	Software Tamper Resistance – Topics 3
164	Digital Rights Management – Topics 7
167	Software Development – Topics 3
	Summary
	Problems
	Operating Systems and Security
168	Introduction
171	Operating System Security Functions – Topics 3
174	Trusted Operating System – Topics 3
177	Next Generation Secure Computing Base – Topics 3
	Summary
	Problems
	Appendix
184	Network Security Basics – Topics 7
188	Math Essentials – Topics 4
189	DES S-Boxes

Software Security: Reference-3

	The Web Application Hacker's Handbook
	The Web Application Hacker's Handbook Introduction
01	
01	Web Application (In)security The Evolution of Web Applications Taxing 2
03	The Evolution of Web Applications – Topics 2
08	Web Application Security – Topics 5
09	Summary
	Core Defense Mechanisms
12	Handling User Access – Topics 3
16	Handing User Input – Topics 4
20	Handling Attackers – Topics 4
21	Managing the Application
22	Summary and Questions
	Web Application Technologies
33	The HTTP Protocol – Topics 11
36	Web Functionality – Topics 3
42	Encoding Schemes – Topics 6
43	Next Steps
44	Questions
	Mapping the Application
49	Enumerating Content and Functionality – Topics 5
53	Analyzing he Application – Topics 4
54	Summary and Questions
	Bypassing Client-Side Controls
60	Transmitting Data Via the Client – Topics 6
63	Capturing User Data: HTML Forms – Topics 3
69	Capturing User Data: Browser Extensions – Topics 6
72	Handling Client-Side Data Securely – Topics 3
73	Summary and Questions
	Attacking Authentication
74	Authentication Technologies
87	Design Flaws in Authentication Mechanisms – Topics 13
90	Implementation Flaws in Authentication – Topics 3
98	Securing Authentication – Topics 8
99	Summary
	Attacking Session Management
100	The Need for State – Topics 1
103	Weaknesses in Token Generation – Topics 3
109	Weaknesses in Session Token Handling – Topics 6
112	Securing Session Management – Topics 3
113	Summary and Questions
	Attacking Access Controls
119	Common Vulnerabilities – Topics 6
125	Attacking Access Controls – Topics 6
126	Securing Access Controls – Topics 1
127	Summary and Questions
	Attacking Data Stores
128	Injecting into Interpreted Contexts – Topics 1
142	Injecting into SQL – Topics 14
- '-	injecting into out. Topics 11

148	Injecting into XPath – Topics 5
151	Injecting into LDAP – Topics 3
152	Summary and Questions
	Attacking Back-End Components
159	Injecting OS Commands – Topics 7
161	Manipulating File Paths – Topics 2
165	Injecting into XML Interpreters – Topics 4
167	Injecting into Back-end HTTP Requests – Topics 2
171	Injecting into Mail Services – Topics 4
172	Summary and Questions
	Attacking Application Logic
173	The Nature of Logic Flaws
185	Real-World Logic Flaws – Topics 12
186	Avoiding Logic Flaws
187	Summary and Questions
	Attacking Users: Cross-Site Scripting
190	Varieties of XSS – Topics 3
193	XSS Attacks in Action – Topics 3
196	Finding and Exploiting XSS Vulnerabilities – Topics 3
198	Preventing XSS Attacks – Topics 2
199	Summary and Questions
	Attacking Users: Other Techniques
201	Inducing User Actions – Topics 2
204	Capturing Data Cross-Domain – Topics 3
207	The Same-Origin Policy Revisited – Topics 3
212	Other Client-Side Injection Attacks – Topics 5
221	Local Privacy Attacks – Topics 9
223	Attacking ActiveX Controls – Topics 2
233	Attacking the Browser – Topics 10
234	Summary and Questions
	Automating Customized Attacks
235	Users for Customized Automation
239	Enumerating Valid Identifiers – Topics 4
240	Harvesting Useful Data
241	Fuzzing for Common Vulnerabilities
242	Putting It All Together: Burp Intruder
244	Barriers to Automation – Topics 2
245	Summary and Questions
	Exploiting Information Disclosure
251	Exploiting Error Messages – Topics 6
252	Gathering Published Information
253	Using Inference
256	Preventing Information Leakage – Topics 3
257	Summary and Questions
	Attacking Native Compiled Applications
261	Buffer Overflow Vulnerabilities – Topics 4
264	Integer Vulnerabilities – Topics 3
265	Format String Vulnerabilities – Topics 1
266	Summary and Questions
	Attacking Application Architecture

268	Tiered Architectures – Topics 2
272	Shared Hosting and Application Service Providers – Topics 4
273	Summary and Questions
	Attacking the Application Server
280	Vulnerable Server Configuration – Topics 7
285	Vulnerable Server Software – Topics 5
286	Web Application Firewalls
287	Summary
	Finding Vulnerabilities in Source Code
289	Approaches to Code Review – Topics 2
299	Signatures of Common Vulnerabilities – Topics 10
303	PHP – Topics 4
304	JavaScript
306	Database Code Components – Topics 2
307	Tools for Code Browsing
308	Summary and Questions
	A Web Application Hacker's Toolkit
311	Web Browsers – Topics 3
314	Integrated Testing Suites – Topics 3
319	Standalone Vulnerability Scanners – Topics 5
323	Other Tools – Topics 4
324	Summary
	A Web Application Hacker's Methodology
325	General Guidelines
331	Map the Application's Content – Topics 6
335	Analyze the Application – Topics 4
338	Test Client-Side Controls – Topics 3
352	Test the Authentication Mechanism – Topics 14
362	Test the Session Management Mechanism – Topics 10
366	Test Access Controls – Topics 4
374	Test for Input-Based Vulnerabilities – Topics 7
381	Test for Function-Specific Input Vulnerabilities – Topics 7
386	Test for Logic Flaws – Topics 5
388	Test for Shared Hosting Vulnerabilities – Topics 2
395	Test for Application Server Vulnerabilities – Topics 7
399	Miscellaneous Checks – Topics 4
400	Follow Up Any Information Leakage