

List of Sidebars

Part I

CHAPTER 1 Systems

Sidebar 1.1: Stopping a Supertanker	6
Sidebar 1.2: Why Airplanes can't Fly	6
Sidebar 1.3: Terminology: Words Used to Describe System Composition	9
Sidebar 1.4: The Cast of Characters and Organizations.....	14
Sidebar 1.5: How Modularity Reshaped the Computer Industry	21
Sidebar 1.6: Why Computer Technology has Improved Exponentially with Time	32

CHAPTER 2 Elements of Computer System Organization

Sidebar 2.1: Terminology: Durability, Stability, and Persistence	46
Sidebar 2.2: How Magnetic Disks Work.....	49
Sidebar 2.3: Representation: Pseudocode and Messages	54
Sidebar 2.4: What is an Operating System?	79
Sidebar 2.5: Human Engineering and the Principle of Least Astonishment	85

CHAPTER 3 The Design of Naming Schemes

Sidebar 3.1: Generating a Unique Name from a Timestamp.....	125
Sidebar 3.2: Hypertext Links in the Shakespeare Electronic Archive.....	129

CHAPTER 4 Enforcing Modularity with Clients and Services

Sidebar 4.1: Enforcing Modularity with a High-Level Languages.....	154
Sidebar 4.2: Representation: Timing Diagrams	156
Sidebar 4.3: Representation: Big-Endian or Little-Endian?.....	158
Sidebar 4.4: The X Window System.....	162
Sidebar 4.5: Peer-to-peer: Computing without Trusted Intermediaries.....	164

CHAPTER 5 Enforcing Modularity with Virtualization

Sidebar 5.1: RSM, Test-and-Set and Avoiding Locks.....	224
Sidebar 5.2: Constructing a Before-or-After Action without Special Instructions	226
Sidebar 5.3: Bootstrapping an Operating System	239
Sidebar 5.4: Process, Thread, and Address Space	249
Sidebar 5.5: Position-Independent Programs.....	251

Sidebar 5.6: Interrupts, Exceptions, Faults, Traps, and Signals.....	259
Sidebar 5.7: Avoiding the Lost Notification Problem with Semaphores	277

CHAPTER 6 Performance

Sidebar 6.1: Design Hint: When in Doubt Use Brute Force	301
Sidebar 6.2: Design Hint: Optimize for the Common Case	307
Sidebar 6.3: Design Hint: Instead of Reducing Latency, Hide It.....	310
Sidebar 6.4: RAM Latency	323
Sidebar 6.5: Design Hint: Separate Mechanism from Policy	330
Sidebar 6.6: OPT is a Stack Algorithm and Optimal.....	343
Sidebar 6.7: Receive Livelock	350
Sidebar 6.8: Priority Inversion.....	358

PART II [ON-LINE]

CHAPTER 7 The Network as a System and a System Component

Sidebar 7.1: Error Detection, Checksums, and Witnesses
Sidebar 7.2: The Internet
Sidebar 7.3: Framing Phase-Encoded Bits
Sidebar 7.4: Shannon's Capacity Theorem
Sidebar 7.5: Other End-to-End Transport Protocol Interfaces
Sidebar 7.6: Exponentially Weighted Moving Averages
Sidebar 7.7: What does an Acknowledgment Really Mean?
Sidebar 7.8: The Tragedy of the Commons
Sidebar 7.9: Retrofitting TCP
Sidebar 7.10: The Invisible Hand

CHAPTER 8 Fault Tolerance: Reliable Systems from Unreliable Components

Sidebar 8.1: Reliability Functions
Sidebar 8.2: Risks of Manipulating MTTFs
Sidebar 8.3: Are Disk System Checksums a Wasted Effort?
Sidebar 8.4: Detecting Failures with Heartbeats.

CHAPTER 9 Atomicity: All-or-nothing and Before-or-after

Sidebar 9.1: Actions and Transactions
Sidebar 9.2: Events that Might Lead to Invoking an Exception Handler
Sidebar 9.3: Cascaded Aborts
Sidebar 9.4: The Many Uses of Logs

CHAPTER 10 Consistency

CHAPTER 11 Information Security

Sidebar 11.1: Privacy

Sidebar 11.2: Should Designs and Vulnerabilities be Public?

Sidebar 11.3: Malware: Viruses, Worms, Trojan Horses, Logic Bombs, Bots, Drive-by Downloads, etc.

Sidebar 11.4: Why are Buffer Overrun Bugs so Common?

Sidebar 11.5: Authenticating Personal Devices: the Resurrecting Duckling Policy

Sidebar 11.6: The Kerberos Authentication System

Sidebar 11.7: Economics of Computer Security

Sidebar 11.8: Secure Hash Algorithm (SHA)