

Index

- access control lists, 276
- access management, 276
- accountability, 277
- adder, 73
- addition. *See* binary numbers, addition
- Adeleman, L. M.*, 281
- Aiken, Howard*, 23
- ALE. *See* annualized loss expectation
- alpha channel, 55
- alphanumeric code, 46
- alteration (security), 271
- AND function, 66
- AND operator, 64
- AND symbol, 71
- annualized loss expectation, 272
- arithmetic logic unit, 96
- arithmetic right shift, 78
- Aryabhata*, 24
- ASCII, 47
- aspect ratio, 173
- assembler, 95
- assembly language, 95
- asserted, logic control line, 98
- associative law, 32
- asymmetric clock, 84
- asymmetric key cryptography, 281
- auditability, 268
- authentication, 268
 - biometric, 275
 - defined, 274
 - factors, 275
 - multi-factor, 276
- authorization (defined), 276
- availability (security), 267
- backward compatibility, 92
- Bardeen, John*, 69
- base ten. *See* decimal system
- Becker, Joe*, 48
- big-endian, 50
- binary numbers, 27–40
 - addition, 33
 - addition of signed numbers, 37
 - conversion from decimal, 30
 - fractions, 39
 - integers, 27
 - negative numbers, 34
 - sign extension, 37
 - subtraction, 38
 - why used in computers, 29
- biometric authentication. *See* authentication, biometric
- bistable, 81
- bit (defined), 27
- bit-depth, 52
- bitmap image, 54
- Boole, George, 63
- Boolean algebra, 63
- Boolean product. *See* AND function
- Boolean sum. *See* OR function
- branch instruction, 108

Computing Concepts for Information Technology

- Brattain, Walter*, 69
- brute force attack, 283
- byte (defined), 47
- CADET, 73
- central processing unit. *See* CPU
- certificate authority, 286
- channel. *See* I/O channel
- characteristic number, 65
- chip. *See* integrated circuit
- cipher, 279
- circuit, 68
- circuit equivalence, 78
- CJK (Chinese, Japanese, and Korean characters), 48
- clock, 83
 - signal, 83
- clocked D-latch. *See* D-latch
- code pages, 47–48
- code point, 49–50
- codec, 54
- codes distinguished from ciphers, 279
- collating sequence, 47
- collision, hash, 283
- color depth, 54
- combinational circuit, 72, 75
- comparator, EQUIV gate as, 72
- completeness, functional. *See* functional completeness
- compression of sound files, 53
- confidentiality (security), 266
- control hazard. *See* branch hazard
- control unit, 96
- controlled inverter, XOR as, 72
- controls, technical, 270
- core, within CPU, 89
- CPU
 - description, 89
- cryptographic hash, 283
- cryptography, 279
- data integrity, 266
- datapath
 - defined, 103
- De Morgan, Augustus*, 80
- De Morgan's theorem, 80
- decibel, 52
- decimal system, 25
- decoder, 76
- defense in depth, 269
- demultiplexor, 77
- denial (security), 271
- denormalized number, 45
- detection (security), 269
- digital certificates, 285
- digital logic gate, 63, 70
- digital signatures, 284
- direct risks, 273
- disclosure (security), 271
- distinctive shape symbols, 71
- distributive law, 32
- D-latch, 82
- edge-triggered, 83
- EDVAC, 30, 69
- eight-to-fourteen modulation, 168
- enable function, AND gate as, 71, 82
- encoder, 77
- ENIAC, 30, 69
- EQUIV function, 66, 67
- EQUIV symbol, 72

Index

- fail-safe defaults, 276
- feedback, 81
- fetch, decode, execute. *See*
 - instruction cycle
- finite-precision arithmetic, 31
- flash translation layer, 161
- floating-point numbers, 41–46
- FTL. *See* flash translation layer
- full adder, 74
- functional completeness, 78
- gamut, color model, 56
- Garfinkel, Simson*, 265
- gate. *See* digital logic gate
- gate delay, 75
- gibibyte, 28
- goals of information security, 268
- grapheme, 46
- half adder, 73
- hard disk. *See* magnetic disk
- hash. *See* cryptographic hash
- hazard, 83
- hexadecimal numbers, 39
- Hopper, Grace Murray, 23
- I/O channel, 145
- identifier (defined), 274
- identity proofing, 274
- IEEE standard 754, 41
- images, 54–58
- indirect risks, 273
- instruction cycle, 95
- instruction set, 92
- integrated circuit, 69
- integrity, 266, 267
- ISO 8859, 48
- Kennesaw State University, 265
- Kerckhoffs, Auguste*, 271
- key exchange problem, 280
- keyboard, 180
- kibibyte, 28
- Kilby, Jack*, 69
- laser printer, 177
- latency of magnetic disk access,
 - 160
- least privilege, 277
- Lehovec, Kurt*, 69
- level-triggered, 83
- little-endian, 50
- logical right shift, 78
- Łukasiewicz, Jan*, 64
- machine identification code
 - (printer), 178
- machine language, 91
- magnetic disk, 156
- magnetic ink character
 - recognition, 178
- MAID, 172
- mebibyte, 28
- mickey (mouse movement)**, 181
- MICR. *See* magnetic ink character
 - recognition
- microarchitecture, 93
- mojibake*, 48
- Mouse (computer), 181
- multi-factor authentication, 276
- multiplexor, 77
- NaN (not a number), 46
- NAND, 78
- NAND function, 66, 67
- negation bubble, 71
- negation operator, 66

Computing Concepts for Information Technology

- negative overflow. *See* overflow,
 - negative
- non-repudiation, 268
- NOR, 78
- NOR function, 66, 67
- NOR symbol, 71
- normalized floating-point numbers, 43
- NOT function, 65
- NOT symbol, 71
- not-equal function. *See* XOR
 - function
- Noyce, Robert*, 69
- Nyquist, Harry, 53
- octet. *See* byte
- odd function, 72
- OLED display, 175
- OR function, 66, 67
- OR symbol, 71
- origin integrity, 267
- overbar, 66
- overflow, 32, 100
 - negative, 44
 - positive, 44
 - rule, 38
- overflow rule, 101
- parity, 72
- pebibyte, 28
- Peirce, C. S.*, 64
- period (of a clock), 83
- Pfleeger, Charles P.*, 265
- Pfleeger, Shari Lawrence*, 265
- pixel, 54
- pixel density, 173
- pixilation, 54
- plane (Unicode), 50
- policy, information security, 269
- positional number systems, 24
- positive overflow. *See* overflow,
 - positive
- precision, loss of, 45
- prevention (security), 269
- principal (defined), 274
- privacy, 266
- private key, 281
- procedures, 270
- program counter**, 91, 106, 108
 - contents of, 94
- program integrity, 267
- propagation time. *See* gate delay
- properties (of a secure information system), 266
- public key, 281
- quantum computers (and cryptography), 282
- Ranum, Marcus*, 270
- refresh rate, 173
- register, 85, 95, 102
- registers, 96
- reliability of binary circuits, 29
- residual risk, 274
- resolution, 173
- resolution of image, 54
- resource hazard. *See* structural hazard
- response (security), 269
- response time, 173
- RGB color model, 55
- ripple carry adder, 74, 75
- risk (defined), 272

Index

- risk management, 271
- Rivest, R. L.*, 281
- rotational latency, 159
- rounding of floating-point numbers, 44
- RSA algorithm, 281
- scientific notation, 40
- secret dots. *See* machine identification code (printer)
- seek time, 159
- sequential circuit, 81
- Shamir, A.*, 281
- Shannon, Claude*, 53, 64, 68, 271
- shifter, 77
- shingled magnetic recording, 160
- Shockley, William*, 69
- sign extension. *See* binary numbers
- significant, 43
- size (of display), 173
- SMR. *See* shingled magnetic recording
- solid-state drive, 161
- Sounds, storage of, 52–54
- Spafford, Eugene, 265
- S-R latch, 81
- SSD. *See* solid-state drive
- subtraction rule, 38
- switching algebra, 64
- symbols, digital logic (table), 70
- symmetric key cryptography, 280
- Tanenbaum, Andrew*, 73
- tebibyte, 28
- thermal printer, 180
- transfer time, of hard disk, 160
- transformation format (Unicode), 49
- transistor, 69
- tristate buffer, 85
- truth table, 64
- two's complement, 34–39
 - shortcut, 36
- underflow, 45
- Unicode, 48–52
- UTF-16, 49
- UTF-8, 51–52
- vector images, 57
- video, 58
- von Neumann architecture, 69, 90
- von Neumann, John*, 30, 69, 90
- web of trust, 286
- WebM, 59
- Windows Metafile, 265
- wobble frequency, 169
- word, computer, 31
- XNOR function. *See* EQUIV function
- XOR function, 66, 67
- XOR symbol, 72
- yellow dots. *See* machine identification code (printer)