

# Index 索引

## (英文术语, 中文术语, 英文教科书页码)

### A

ABC features, 计算思维三特征, 9  
absolute file name, 文件绝对路径, 206  
abstract computer, 抽象计算机, vii, xi  
Abstraction, 抽象, xiii, 191-213  
Access Point (AP), 无线接入点, 255  
accumulator, 累加器, 64  
Acu-Exams, 计算思维八理解, 14  
address, 地址, 64, 185  
Addressing Mode, 寻址模式, 201-206  
algorithm, 算法, 1, 132  
Algorithmic thinking, 算法思维, 15, 131  
ALU, 算术逻辑单元, 61  
Amdahl's Law, 阿姆达尔定律, 234-241  
analog values, 模拟值, 41  
antivirus software, 杀毒软件, 282  
application layer, 应用层, 266  
application software, 应用软件, 227  
array, 数组, 52-53, 198-200  
ASCII, 美国信息交换标准代码, 47  
assembly language, 汇编语言, 64  
assignment, 赋值, 54  
asymptotic notation, 渐近记号, 136  
Automata, 自动机, 104-115  
Automatic execution, 自动执行, xiii, 9  
average case, 平均情况, 162  
average time complexity, 平均时间复杂度, 167  
axiomatic systems, 公理系统, 103

### B

Babbage's problem, 巴贝奇问题, 25  
bandwidth, 带宽, 275  
barber paradox, 理发师悖论, 120  
base register, 基址寄存器, 64  
Batch, 批式, 28  
bees metaphor, 蜜蜂隐喻, xiii  
Bell's law, 贝尔定律, 27  
benchmarks, 基准程序, 187  
best case, 最好情况, 162  
big endian, 大端, 185  
binary, 二值、二进制, 43-46, 61  
binary search, 二分搜索, 165  
Binet's formula, 比内公式, 10-11  
BIOS, 基础输入输出系统, 228  
bit, 比特, 1, 10  
Bit accuracy, 比特精准, 10  
bit-shift, 移位操作, 96  
BMP, 一种图像格式, 207  
Boolean algebra, 布尔代数, 85  
Boolean expressions, 布尔表达式, 85

Boolean function, 布尔函数, 85  
Boolean Logic, 布尔逻辑, 82-104  
bottleneck, 瓶颈, 235  
broadcasting, 广播, 262  
Bubble Sort Algorithm, 冒泡排序算法, 134-136  
Bugs, 错误, 6  
bus, 总线, 261  
Bush's problem, 布什问题, 25  
business computing, 企业计算, 29  
byte, 字节, 47, 53, 199  
byte-addressable, 字节寻址的, 42

### C

cache, 高速缓存, 62, 236  
Caesar cipher, 凯撒密码, 282  
camel notation, 驼峰符号法, xviii  
certificate authority, 证书授权中心, 285  
character, 字符, 47, 198-200  
Church-Turing Thesis, 邱奇-图灵论题, 116  
Circuit switching, 线路交换, 263  
client, 客户、客户端, 26, 255  
clock cycle, 时钟周期, 220, 230  
clock frequency, 时钟频率, 220  
cloud computing, 云计算, 28  
code, 代码, 2, 5  
COG properties, 抽象三性质, 191  
combinational circuit, 组合电路, 214-217  
command-line prompt, 命令行提示符, 49  
comments, 注释, 4  
Compilation, 编译, 5  
compile-time errors, 编译时错误, 6  
Complexity class NP, 算法复杂度的NP类, 175  
Complexity class P, 算法复杂度的P类, 175  
Computability, 可计算性, 115  
computable problem, 可计算, 116  
computational lens, 计算透镜, 30  
computational process, 计算过程, 1  
Computational Thinking, 计算思维, 8-19, 30-31  
computer application, 计算机应用, vii, xi  
Computer Science, 计算机科学, 1-38  
Computer simulation, 计算机模拟, 24  
Computer System, 计算机系统, 5  
computer virus, 计算机病毒, 279  
conditional, 条件语句, 212  
conjunctive normal form, 合取范式, 87  
Connectivity, 连通性, 253, 256-262  
Consistency, 一致性, 120  
constant, 常数, 52  
constrained, 受限, 192  
Constructive abstraction, 构造性抽象, 12  
constructs, 结构, 58  
consumer computing, 消费者计算, 29  
context, 上下文, 213

contrapositive, 逆反命题, 94  
 control abstractions, 控制抽象, 183, 192, 212-213  
 converse, 逆命题, 94  
 correctness, 正确性, xiii, 81  
 CPU, 中央处理器, 61  
 creative expression, 创造性表达, xi  
 crossbar switch, 交叉开关, 261  
 cryptography, 密码学, 285  
 current directory, 当前目录, 206  
 Cyberspace, 赛博空间, 2

## D

D flip-flop, D触发器, 220  
 data, 数据, 2, 213  
 data abstractions, 数据抽象, 183, 192-212  
 data cache, 数据高速缓存, 236  
 Data compression, 数据压缩, 276  
 data link layer, 数据链路层, 265  
 data representation, 数据表示, 185-186  
 data types, 数据类型, 51, 192  
 Decidability, 可判定性, 120  
 decimal, 十进制, 43-46  
 Decryption, 解密, 282  
 denial-of-service attack (DOS), 拒绝服务攻击、阻断服务攻击, 281  
 dereference, 解引用, 201  
 dictionary, 字典, 163  
 digital certificate, 数字证书, 285  
 digital economy, 数字经济, 20  
 digital infinity hypothesis, 数字无穷性假说, xiii  
 digital symbol, 数字符号, 1  
 Digital Symbol Manipulation, 数字符号操作, 41-80  
 digit, 数位、数字, 1, 193-194  
 directory, 目录, 206  
 discretization, 离散化, 41  
 disjunctive normal form, 析取范式, 86  
 distributed denial-of-service attack, 分布式拒绝服务攻击, 281  
 Divide-and-Conquer Algorithms, 分而治之算法, 138-151  
 DNS, 域名服务, 257  
 documentation, 文档, 57  
 domain name, 域名, 257  
 dot notation, 点记号, xviii  
 Dynamic networks, 动态网络, 261  
 dynamic programming, 动态规划, 59, 151-154  
 dynamic webpage, 动态网页, 269

## E

edges, (网络的)边, 256  
 embedded system, 嵌入式系统, 27  
 encoding, 建模, 2  
 encryption, 加密, 282  
 enterprise computing, 企业计算, 29  
 Entscheidungsproblem, 判定问题, 117  
 Evolutionary networks, 演化网络, 261  
 exceptions, 异常, 234  
 exclusive-or, 异或, 84  
 exponent, (浮点数的)指数部分, 195  
 expression, 表达式, 54

## F

Fibonacci Computer, 斐波那契计算机, 63, 225  
 Fibonacci numbers, 斐波那契数, 9  
 File Abstraction, 文件抽象, 206-212  
 file system, 文件系统, 206  
 finite automaton, 有限自动机, 106  
 Finite states, 有限状态, 114  
 firewall, 防火墙, 282  
 firmware, 固件, 228  
 flip-flops, 触发器, 217  
 floating-point number, 浮点数, 195-197  
 FLOPS, 每秒浮点运算, 187  
 for loop, for循环, 53, 212  
 formatting verbs, 占位符, 51  
 full adder, 全加器, 90, 216  
 full-duplex, 全双工, 262  
 function, 函数, 5, 58-59, 212-213

## G

gates, 门、门电路, 214  
 gateway, 网关, 256  
 GDPR, 欧洲数据保护法规, 286  
 generalizable, 可泛化, 192  
 Gödel's Incompleteness Theorems, 哥德尔不完备定理, 120  
 gold metaphor, 22  
 Goodstein theorem, 古德斯坦定理, 123  
 graph, 图, 256  
 graph coloring problem, 图着色问题, 177  
 greatest common divisor, 最大公因子, 134  
 Greedy Strategy, (设计算法的)贪心策略, 154-159  
 GUI, 图形用户界面, 28

## H

halting problem, 停机问题, 117  
 Hamiltonian path problem, 汉密尔顿路径问题, 177  
 Harvard architecture, 哈佛体系结构, 233  
 Hash search, 哈希搜索, 167-173  
 hashing, 哈希, 167  
 heap, 堆, 213  
 hexadecimal, 十六进制, 45  
 high-level language program, 高级语言程序, 5  
 Hockney's formula, 霍克尼公式, 275  
 home directory, 主目录, 206  
 homepage, 网站首页, 260  
 Host, 宿主机, 255  
 HTTP, 超文本传输协议, 260  
 HTTPS, 安全超文本传输协议, 260, 285  
 Hub, 集线器, 255  
 hypertext, 超文本, 27

## I

I/O devices, 输入输出设备, 61, 63, 186  
 Incomputable Problems, 不可计算问题, 117-120  
 index, 索引, 53, 64, 193  
 index register, 索引寄存器, 64  
 indirect addressing, 间接寻址, 201

inference rules, 推理规则, 103  
 information and communication technology (ICT), 信息与通信技术, 20  
 information hiding principle, 信息隐藏原理, 183, 215  
 information society, 信息社会, 21  
 information technology (IT), 信息技术, 20  
 infrastructure software, 基础软件, 227  
 Insertion Sort Algorithm, 插入排序算法, 139-140  
 instruction cache, 指令高速缓存, 236  
 instruction cycle, 指令周期, 230  
 Instruction driven, 指令驱动, 62  
 instruction pipeline, 指令流水线, 224  
 Instruction Register (IR), 指令寄存器, 235  
 instruction set, 指令集, 64, 224  
 integer, 整数类型, 198  
 Integer Multiplication, 整数乘法, 146  
 Interactive, 交互式, 28  
 Internet, 互联网、因特网, 253, 257  
 interpreter, 解释器, 6  
 inverse, 否命题, 94  
 IP address, IP地址, 257  
 IPv4 addresses, IPv4地址, 258  
 IPv6 addresses, IPv6地址, 258  
 ISP, 互联网服务提供商, 255  
 IT industry, 信息产业, 20  
 IT professionals, 信息技术专业人员、计算机专业专业人员, 21

## K

Keck's law, 凯克定律, 23  
 keys, 键, 282  
 Kleene algebra, 克莱因代数, 91  
 Kleene expressions, 克莱因表达式, 91  
 Kleene function, 克莱因函数, 93  
 Kleene logic, 克莱因逻辑, 91-93  
 Knuth's Characterization of Algorithm, 高德纳算法定义, 132-134  
 Knuth's Test, 高德纳测试, xvi, 18

## L

latency, 延迟、延时, 275  
 liar paradox, 说谎者悖论, 119  
 linear search, 线性搜索, 164  
 little endian, 小端, 185  
 local area network (LAN), 局域网, 254  
 locality, 局部性, 236  
 Logic thinking, 逻辑思维, 15, 81-129  
 loop, 循环, 52  
 loop body, 循环体, 54  
 loopback domain name, 回环域名, 260  
 loopback IP address, 回环IP地址, 260  
 Lossless compression, 无损压缩, 276  
 Lossy compression, 有损压缩, 276  
 Low-level language program, 低级语言程序, 6

## M

machine code, 机器代码, 二进制代码, 5

Magic numbers, 魔数, 56  
 main memory, 内存, 62  
 make, Go语言提供的make函数, 199  
 Manipulation, 操作、操纵, 1  
 Mantissa, 浮点数中的尾数部分, 195  
 MAR, 内存地址寄存器, 235  
 Matrix Multiplication, 矩阵乘法, 148-150  
 MDR, 内存数据寄存器, 235  
 Mechanical Theorem Proving, 定理自动证明, 104-105  
 memory cell, 内存单元, 218-219  
 Merge Sort Algorithm, 归并排序算法, 140-143  
 messages, 消息, 263  
 metadata, 元数据, 207  
 Metcalfe's law, 梅特卡夫定律, 277-279  
 metropolitan area network (MAN), 城域网, 254  
 middleware, 中间件, 227  
 Mobile Internet, 移动互联网, 28  
 modeling, 建模, 2  
 Modularity, 模块化, xiii  
 modules, 模块, 183, 190  
 Modularization, 模块化, 214-228  
 Moore's law, 摩尔定律, 23  
 Morris worm, 莫里斯蠕虫, 288  
 Motherboard, 主板, 62  
 multicore, 多核, 63  
 Multimedia, 多媒体, 28  
 multiplexer, 多路选择器, 217

## N

namespace, 名字空间, 256-257  
 naming, 命名, 256  
 negation, 取非, 94  
 negation properties, 针对量词的取非性质, 100  
 network, 网络, 28, 254  
 Network effect, 网络效应, 277  
 network layer, 网络层, 266  
 Network Thinking, 网络思维, 254-296  
 Network Topology, 网络拓扑, 261-262  
 networking devices, 组网设备, 255  
 nodes, 节点, 254  
 Nordhaus's law, 诺德豪斯定律, 22  
 Normal forms, 范式, 86-87  
 Normalized significant, 规格化浮点数中的有效数, 196  
 NP-complete, NP完全, 178

## O

object, 对象, 272  
 offset, 偏移量, 64  
 operations, 操作、运算, 1  
 overflow, 溢出, 17

## P

Packet switching, 分组交换、包交换, 263  
 packets, 分组、消息包, 263  
 Palindromes, 回文, 106  
 parallel computing, 并行计算, 240

parity, 奇偶性, 96  
 peak speed, 峰值速度, 238  
 Peano Arithmetic, 皮亚诺算术, 121  
 peering interface, 对等接口, 267  
 persistence, 持久性, 206  
 phishing, 钓鱼网站、钓鱼邮件, 281  
 physical layer, 物理层, 265  
 pixel, 像素, 207  
 Pointer, 指针, 201-206  
 positional number systems, 位置计数系统、按位记数制, 193  
 Postel's Robustness Principle, 波斯特鲁鲁棒性原理, 211  
 Precedence, 优先级, 212  
 predicate, 谓词, 98  
 Predicative Logic, 谓词逻辑, 98-104  
 prime factorization problem, 素数分解问题, 284  
 Princeton architecture, 普林斯顿体系结构, 233  
 Principle of Harmony, 扬雄和谐原理, 30  
 privacy, 隐私, 285  
 private key, 私钥, 282  
 Problem Solving, 解题、问题求解, 1-8  
 process, 进程, 188  
 processor, 处理器, 61  
 program, 程序, 1  
 program counter (PC), 程序计数器, 64  
 program cycle, 程序周期, 230  
 program status register, 程序状态寄存器, 64  
 Programming, 程序设计、编程, 3  
 proposition, 命题, 83  
 Propositional Logic, 命题逻辑, 83-97  
 protocol stack, 协议栈, 253, 263  
 public-key encryption, 公钥加密, 295

## Q

quantifiers, 量词, 99  
 quicksort, 快速排序, 160

## R

Randomization Strategy, 随机化策略, 160  
 reducible, 可归约, 116  
 redundancy, 冗余, 268  
 Reed's law, 里德定律, 277-279  
 relative file names, 相对文件名, 207  
 representation, 表示, 42  
 Responsible Computing, 负责责任的计算, 274-288  
 RFCs, 互联网标准文档, 257  
 ripple-carry adder, 波纹加法器, 216  
 root directory, 根目录, 206  
 rounding error, 舍入误差, 14  
 routers, 路由器, 255  
 RSA method, 公钥加密的RSA方法, 282  
 runtime errors, 运行时错误, 6  
 Russell's paradox, 罗素悖论, 120

## S

scientific computing, 科学计算, 29  
 seamless execution, 无缝执行, 183, 190

seamless transition, 无缝衔接, xiii, 228  
 Search Algorithms, 搜索算法, 163-173  
 search engine, 搜索引擎, 262  
 Selection, 选择, 212  
 Sequencing, 顺序, 212  
 sequential circuit, 时序电路, 217, 220-221  
 sequential computers, 串行计算机, 240  
 Serial adder, 串行加法器, 221-224  
 Serial execution, 串行执行, 62  
 server, 服务器, 255  
 service interface, 服务接口, 267  
 shell, (操作系统的)外壳、命令行界面, 7, 50  
 significant, (浮点数的)尾数部分, 195  
 Simulation, 模拟, 24  
 Single Factor Optimization, 单因素优化, 143-146  
 slice, 切片, 58-59, 198-200  
 software stack, 软件栈, 227  
 Sorting Problem, 排序问题, 134-136  
 spams, 垃圾邮件, 281  
 Spatial locality, 时间局部性, 188  
 speedup, 加速比, 234  
 spyware, 间谍软件, 282  
 stable matching problem, 稳定匹配问题, 155  
 stack, 栈, 188, 213  
 Standard Error, 标准错误, 50  
 Standard Input, 标准输入, 50  
 Standard Output, 标准输出, 50  
 state circuit, 状态电路, 217  
 state transition, 状态转移, 63  
 state-transition diagram, 状态转移图, 106  
 state-transition table, 状态转移表, 106  
 statement, 语句, 5  
 Static networks, 静态网络, 261  
 Steps, 步骤, 131-132  
 stored program architecture, 存储程序计算机体系结构, 60  
 Strassen's algorithm, 施特拉森算法, 149  
 string, 符号串、字符串, 52-53  
 subtractor, 减法器, 221-224  
 supercomputers, 超级计算机, 187  
 sustained speed, 实际速度, 238  
 Switch, 交换机, 255  
 symmetric-key encryption, 对称加密, 282  
 synchronous sequential circuits, 同步时序电路, 224  
 system heterogeneity, 系统异构性, 190  
 system organization, 系统组成, 190  
 system scale, 系统规模, 190  
 system software, 系统软件, 227  
 system variation, 系统变异, 190  
 Systems thinking, 系统思维, 15, 183-251

## T

TCP/IP protocol stack, TCP/IP协议栈, 265  
 Temporal locality, 时间局部性, 187  
 text, 文本、(进程的)代码段, 213  
 Time complexity, 时间复杂度, 138  
 TLS, 传输层安全协议, 285  
 topology, 网络拓扑, 261  
 transport layer, 传输层, 266  
 Trojan horses, 特洛伊木马, 282

Truth table, 真值表, 84  
 Turing computable, 图灵可计算, 116  
 Turing machine, 图灵机, 104-115  
 Turing Test, 图灵测试, 29  
 Turing's problem, 图灵问题, 28  
 two's complement, 二进制补码, 46  
 type cast, 类型转换, 54

## U

uint8, 8位无号数, 53, 199  
 Unicode, 统一码、万国码, 192  
 unsigned integer, 无号整数、自然数, 46  
 URL, 统一资源定位符, 260  
 usage mode, 使用模式, 28  
 User Experience, 用户体验, 275  
 UTF-8, 统一码转换格式-8, 198

## V

variable, 变量, 52  
 vertex, 图的顶点, 256  
 Viral marketing, 病毒性市场, 279  
 virtual worlds, 虚拟世界, 24  
 von Neumann architecture, 冯诺依曼体系结构, 60

von Neumann bottleneck, 冯诺依曼瓶颈, 236  
 von Neumann's Exhaustiveness Principle, 冯诺依曼穷尽原理, 232-234  
 VPNs, 虚拟私有网, 282

## W

web address, 万维网地址, 260  
 Web over Internet Stack, 由万维网和因特网组成的协议栈, 263-269  
 web resource, 万维网资源, 260  
 wide area network (WAN), 广域网, 254  
 WiFi router, WiFi无线路由器, 289  
 Wonder of Cyberspace, 赛博之妙、虚拟之妙, 24  
 Wonder of Exponentiation, 指数之妙, 22  
 Wonder of Simulation, 模拟之妙, 21  
 word, 字, 42  
 word length, 字长, 17, 42  
 World Wide Web, 万维网, 260  
 worst case, 最坏情况, 162

## Y

Yang's Cycle Principle, 扬雄周期原理, 229-230