

Index

- 4-color theorem, 202
 activation, 124
 adjacency
 lists, 100
 matrix, 100
 arithmetic series, 46
- betweenness, 120
 binary search, 49
 birthday paradox, 68
 bit depth, 151
 breadth first search (BFS), 113
 brute-force algorithm, 59
- circadian clock, 138
 clique cover. *See* clustering
 clustering, 103
 clique cover, 103
 hierarchical, 108
 k-means, 105
 Collatz conjecture, 190
 collisions, 64–66
 chaining, 66
 open addressing, 67
 common substring, 57, 75
 compression, image, 152
- denoising. *See* noise reduction
 deterministic finite automata (DFA). *See* finite state machine
 dilation, image, 174
- Erdős–Rényi* graph, 101
 erosion, image, 174
 Eulerian path, 96, 206
 exhaustive algorithm. *See* brute force algorithm
- FIFO (first in first out), 114
 fingerprint, 71
 finite state machine (FSM), 86
- Gaussian noise. *See* noise graph, 93
 bipartite, 98
 clique, 99
 connected, 95
 degree, 93
 distance, 96
 hubs, 112
 isomorphism, 110
 path, 95
 random, 101
 representation, 100
 tree, 99
 weighted, 94
 gray-level image, 149
 greedy algorithm, 104
 GUI, 147
- halting problem, 189
 Hamiltonian path, 96, 206
 hashing
 collisions, 66
 hash functions, 63
 hash tables, 64
 heuristics, 104
 high-order functions, 175
- inhibition, 124
in-silico, 123
- k*-means. *See* clustering
- labeling, 182
 local means, 181
 local medians, 180
 longest common substring, 76
- maps, coloring, 198
 memory overflow, 69
 meta-character, 81
 model
 Boolean, 123
 discrete, 123
 morphological operators, 172
 most frequent *k*-mer, 73
Mycobacterium leprae, 70, 74, 76
Mycobacterium tuberculosis, 54, 57, 70, 76
- naïve solution. *See* brute force algorithm
 noise
 Gaussian, 180
 reduction, 179
 salt and pepper, 180
- O notation, 47
 Otsu, segmentation, 168
- P vs. NP problem, 205
 palindrome, 45
 pattern matching, 79
 phylogenetic trees, 108
 PIL (Python library), 146
 pixel, 149

- preferential attachment* graph, 102
- processing, image, 166
- Python
- 'time' library, 42
 - assignment. *See* Python: operators
 - casting. *See* Python: types: conversion
 - classes, 21
 - conditions, 25
 - containers, 32
 - dictionary. *See* Python: types
 - docstring, 7
 - files, 35
 - functions, 19
 - built-in, 19
 - class methods, 21
 - default parameters, 25
 - library, 36
 - return value, 24
 - user-defined, 20
 - general explanation and installation, 3
 - hashing, 57
 - imaging library (PIL), 146
 - interactive user input, 31
 - 'itertools' library, 136
 - libraries, 36
 - list. *See* Python: types
 - loops, 27
 - for, 27
 - while, 28
 - operators
 - assignment, 12
 - comparison, 10
 - logical, 10
 - numerical, 9
 - precedence, 10
 - sequences, 15
 - packages. *See* Python: libraries
 - 'random' library, 36
 - range, 29
 - return value. *See* functions
 - scientific computing library (*scipy*), 146
 - sequences, 32
 - set. *See* Python: types
 - slicing, 17, 51
 - string. *See* Python: types
 - types, 8
 - classes, 9
 - conversion, 13
 - dictionary, 32, 57, 67, 73
 - floating point (float), 8
 - integer (int), 8
 - list, 9, 15
 - mutability, 18, 32
 - set, 32, 57, 67
 - string (str), 8, 15
 - tuples, 35
 - variables, 8
 - regular expressions, 80
 - repeating *k*-mer, 53
 - resolution, 149
 - RGB (Red–Green–Blue) format, 149
 - running time of algorithms, 42
- S.Cerevisiae*, 38, 41
- Salmonella enterica*, 57, 76
- salt and pepper noise. *See* noise
- scheduling, problem, 203
- Scipy* (Python library), 146, 182
- segmentation, image, 166, 168
- sequences. *See* Python: list, Python: string
- shortest path, 113
- silent mutation, 39
- simulation, 123, 125
- sorting, 51, 198
- Swampy* (Python library), 147
- The seven bridges of Königsberg. *See* Eulerian path
- thresholding. *See* segmentation
- time complexity, 43
 - best-case, 48
 - exponential, 50, 198
 - linear, 44, 197
 - logarithmic, 49
 - O notation, 47
 - polynomial, 197
 - quadratic, 44, 197
 - worst-case, 48
- tractability, 50
- tree, 99
- tree of life, 109
- Turing machines, 194
- undecidable, problem, 193
- yeast cell cycle, 137