

Index

- O, 130
- Ω , 133
- Θ , 134
- π , 69
- abacus, 106
- abstraction, **15**, 38, 44, 102
- accumulate, 59
- accumulators, 84
- algorithm, **2**, 53
- aliasing, 190, **190**
- alphabet, **19**
- Analytical Engine, 35, 123
- any-uple, 81
- Apollo Guidance Computer, 12
- append, 88
- application, 46
- apply, 199
- arguments, **42**
- assignment, 179, **179**, 214
- asymptotic operators, 130
- authentication, 22
- axiomatic system, **237**
- Backus-Naur Form, 26
- base case, **28**, **57**
- begin, 180
- belittle, 19, 22
- best-first-sort, 153
- bigger, 76
- binary numbers, **8**
- binary question, **4**
- binary search, 168
- binary tree, **5**, 161, 168
- binomial expansion, 92
- bit, **4**
- Bletchley Park, 122
- Boolean, 40, 75, 108
- Boolean logic, **108**
- brute force, **93**
- busy beaver problem, 249
- car, 77
- cdr, 77
- class, **200**, 226
- coffee, 2
- compiler, **38**
- complete, **238**
- compose, 55
- composition, 54
- computability, **237**
- computable, 237, **241**
- computer, 3
- computing machines, 106
- cond, 198
- conditional expression, 198
- cons, 77
- consistent, **238**
- constant time, **139**
- constructors, **200**
- Corner the Queen, 72
- countable, **9**
- counter, 181, 196
- counting, 106
- data abstraction, **92**
- datatype, **75**
- debugging, **67**
- defensive programming, **86**, 95
- definition, 44, 180, 199
- depth, **6**, **162**
- derivation, 27
- diagonalization, **9**
- dictionary, 218
- digital abstraction, **110**
- Digital Equipment Corporation, 208
- discrete, 9
- display, 68
- divide-and-conquer, **54**
- domain names, 29
- DrRacket, 40
- dynamic dispatch, **206**
- dynamic programming, **129**
- eager evaluation, **230**
- Elements, 237
- else, 198
- encapsulation, 196, **196**
- ENIAC, 207
- Enigma, 122
- Entscheidungsproblem, 122
- environment, **182**
- Epimenides paradox, 240
- eq?, 94, 191
- equal?, 155
- evaluation, **40**

evaluation stack, 66
evaluator, **211**, 223
exponential, 147
expression, **40**
expt, 70

factorial, 58, **58**, 90
fcompose, 55
fibonacci, 127, 131
filtering, 87
flattening lists, 90
format, 94
Fortran, 26
frame, **182**
function, **41**
functional programming, 188

games, 71
global environment, 182
Goldbach's Conjecture, 242
grammar, **26**
growth rates, 139

halting problem, 241
higher-order procedure, **46**, **55**

immutable, **186**
imperative programming, 188, **188**
inc, 55
incompleteness, 240
indexed search, 169
information, 3
information processes, 2
inheritance, **196**
inherits, **202**
instance variables, **199**
interpreter, **38**, **211**
intractability, 147
intsto, 89
invoke, **200**

khipu, 106

lambda, 45
Lambda calculus, 122
language, **19**
lazy evaluation, 229, **229**
length, 83
let expression, 156
linearly, **140**
LISP, 39
list, **81**, 81–82

List (Python), 216
list procedures, 82
list-append, 88, 190
list-flatten, 90
list-get-element, 85
list-length, 83
list-map, 86
list-product, 84
list-reverse, 89
list-search, 168
list-sum, 84
logarithm, **5**
logarithmic growth, 160

machine code, 38
magnetic-core memory, 208
map, 86
mccons, 186
means of abstraction, 21, 37
means of combination, 20
measuring input size, 136
messages, 197
methods, **200**
Methods (Python), 219
MIT, ix, 207, 208
mlist, 187
mlist-append, 190
modulo, 61
morpheme, 20
mutable lists, 187
mutable pair, 186
mutators, **179**

name, 44
natural language, **19**
natural languages, 36
newline, 68
Nim, 71
noncomputable, 237, **241**
null, **81**
null?, 81
Number, 75
numbers, 40

object, **199**
object-oriented programming, **195**
Objects (Python), 219
odometer, 22
operands, **42**
Organon, 237
override, **204**

Pair, 77–80
pair, **77**
parse tree, **27**
parser, **211**
parsing, 221
Pascal's Triangle, 91
Pascaline, 106
pegboard puzzle, 151, 167
pixel, **11**
place, **182**
postulate, 237
power set, **148**
precedence, **215**
primitive, 20
primitive expressions, 40
primitive procedures, 40, 41
primitives, 223
Principia Mathematica, **240**
printf, 68
printing, 68
problem, **53**
procedure, 2, 45, 76
programmability, 107
programming language, **37**
proof, **238**
proof by construction, **30**
proposition, **238**
Python, 192

quadratically, **145**

random, 157
recursive definition, 17, 23, 56–67, 102
recursive descent, 222, **222**
recursive grammar, 27
recursive transition network, **22**
reducible, **246**
reduction, **246**
relaxation, **178**
repeat-until, **193**
reverse, 89
rules of evaluation, 50
Russell's paradox, **239**

scalar, **75**
Scheme, 39
searching, 167
set, 179
set-mcar, 186
set-mcdr, 186
shag, 22
side effects, **69**, 179

Simula, 208
Sketchpad, 208
Smalltalk, 209
sorted binary tree, **161**
sorting, 153–167
special form, **48**
square, 46
square root, 62
stack, **24**
state, 45
String, 170
string, **19**, 217
subclass, **201**
substitution, 181
superclass, **201**
surface forms, 19
Survivor, 71
syllogisms, **237**
Symbol, 94
symbol, 198

tagged list, **94**
tail recursive, **62**
thunk, 230, **230**
token, **213**
tokenizer, **213**
tracing, 69
transitive, **153**
tree, 161
truth table, **109**
truthiness, 21
Turing Machine, 118, 138
types, 75

universal computing machine, **120**
universal programming language, **102**,
245
Universal Turing Machine, **244**
universality, 102
URL, 173

virus, 246

web, 173
web crawler, **177**
web-get, 173
well-balanced, **163**
while loop, **192**
Whirlwind, 207
worst case, **138**

xkcd, 235

People

- Ada, Countess of Lovelace, 35, 107,
 123
- Adams, John, 22
- Aristotle, 237
- Babbage, Charles, 107, 130
- Backus, John, 26
- Bonacci, Filius, 127
- Boole, George, 108
- Brown, Gordon, 123
- Carroll, Lewis, 211
- Church, Alonzo, 122
- Colbert, Stephen, 21
- Dahl, Ole Johan, 208
- Davis, Miles, 35
- Dijkstra, Edsger, 75, 211
- Einstein, Albert, 35, 73
- Engelbart, Douglas, 208
- Erdős, Paul, 2
- Euclid, 61, 237
- Euler, Leonhard, 242
- Feynman, Richard, 70
- Fisher, George, 14
- Forrester, Jay, 207
- Franklin, Benjamin, 35
- Gödel, Kurt, 240
- Gardner, Martin, 72
- Gauss, Karl, 59
- Goldbach, Christian, 242
- Heron, 62
- Hilbert, David, 122, 237
- Hopper, Grace, 35, 38, 68
- Isaacs, Rufus, 72
- Jefferson, Thomas, 22
- Kay, Alan, 208, 209
- King, Martin Luther, 35
- Leibniz, Gottfried, 69, 105, 106
- Lin, Maya, 35
- Lockhart, Paul, 1
- Mādhava, 70
- McCarthy, John, 39
- Mockapetris, Paul, 29
- Newton, Isaac, 35, 62, 107, 209
- Nygaard, Kristen, 208
- Olson, Ken, 208
- Pólya, George, 53
- Paine, Thomas, 138
- Pascal, Blaise, 37, 91, 106
- Perlis, Alan, 125
- Radó, Tibor, 249
- Roebling, John, 35
- Russell, Bertrand, 239
- Shakespeare, William, 35
- Steele, Guy, 39
- Sussman, Gerald, ix, 39
- Sutherland, Ivan, 208
- Turing, Alan, 118, 122
- von Kármán, Theodore , 14
- Weimer, Westley, x
- Wozniak, Steve, 125
- Wulf, William, 14