

Index

Boldface numbers indicate illustrations, code listings, and tables.

A

ActiveRecord, class in Ruby, 80-82, 84, 86, 88, 90
ActiveXMLService, class in Ruby, 80-82, 84, 90
Agile development, 109-110
AIX, 8
 PASE and, 2, 5, 9, 46, 79-80, 101, 112
Anonymous function, 55, 158, 186-187, 196, 206
Apache
 PHP and, 138-139
 Tomcat and, 213-220
 using with XMLSERVICE, 19, 22-24, 26
App folder
 PHP and, 140
 Rails and, 107-108
Arrays, 40
 hashes and, in JavaScript, 181-186
 hashes and, in PHP, 119
 hashes and, in Ruby, 53, 56-58, 64, 75
 in JavaScript (Node.js), 173, 181-186, 207, 211

 in PHP, 119-120
 in Python (lists and tuples), 148-149, 163
 in Ruby, 40, 53-56, 64, 75

B

Bartell, Aaron, 110, 223-224
BASH, 7, 10, **44**, **47**, 63-64, 114
Bin folder, 219
 in Rails, 107
Binding (in ILE), 14-15
Block, 55
 catch, in PHP, 130
 in Python, 152, 157, 159
 in Ruby, 43, 55-56, 64, 70, 77, 159
 try, in JavaScript (Node.js), 206
Blog, Pete Helgren's, 147
Bolhuis, Larry, 224
Built-in functions
 in JavaScript (Node.js), 177
 in PHP, 122
 in Python, 148, 152-154, 162
 in Ruby, 52-53
Bundler, 100-101

C

C programming language, 2, 5, 9, 11-12, 14-15
Cairns, Tony, 20, 27
Calling a program
 in JavaScript (Node.js), 207-211
 in PHP, 133-138
 in Python, 165-168
 in Ruby, 83-85
Case keyword, in Ruby, 70-72
Case-sensitivity, in programming language, 25, 46, 116
CGIDEV2, 19, 213, 216-218, 220
Class, 34-38
 in JavaScript (Node.js), 173, **177-181**, 186, **188**
 in PHP, 112, **122**, 130
 in Python, 152, **159-161**
 in Rails, 108-109
 in Ruby, 49, 59-61, 62, 80, 82, 88-90, 91, 94-96
 variables, in Ruby, 49, 50-52
COBOL, 2, 9, 14-16, 152
Code reuse, 15, 106, 177, 181
COMMON user group, 19, 85, 147, 222-223

Common Gateway Interface (CGI),
19, 22, 27, 116, 138, 213-214,
216, 218

Community

IBM i, 2-3, 15, 221-224
open source, 100, 190

Config folder, in Rails, 107

Constants

in JavaScript (Node.js) 177
in PASE, 12
in Ruby, 48-49, 73

Container, in Ruby, 40, 53-56

Controller (MVC), in Rails, 105-106,
108, 110

Creating a table, in Ruby, **86-90**

CRUD (Create, Read, Update, and
Delete) operation, 72

Ctl value (in XMLSERVICE), 27

D

Data types

in JavaScript (Node.js), 176, **209-210**, 211
in PHP, 133-134, 137
in Python, 147-151
in Ruby, 56, 71, 84
in XMLSERVICE, **21**, 29, 134,
137

Database access

in Node.js, 204-211
in PHP, 124-127
in Python, 164-165
in Ruby/Rails, 108-110

DataVision, 39

db folder, in Rails, 107, 109

DB2 for i, 6, 40, 80, 85, 124, 164,
167, 170, 204

XMLSERVICE and, 17, 20, 27

developerWorks (IBM), 147, 164,
208

Dictionary, in Python, 151, 163, 168

Differences between PASE and ILE
environments, 7

Dollar-slash (\$/) variable, in Ruby,
75

DRY (Don't Repeat Yourself), 15,
106, 177

Dynamic typing

in JavaScript (Node.js), 173, 176,
181
in PHP, 115, 118
in Python, 158, 163
in Ruby/Rails, 48, 106

E

each method, in Ruby, 55, 64, 75, 77

ECMA, 171

ECMAScript (ES), 171

else statement, in Ruby, 65, **66**, 67,
68

elsif statement, in Ruby, **65**, 67

Encapsulation, 34-36

.erb file, in Rails, 106, 108

Error handling

in JavaScript (Node.js), 206
in PHP, 130
in Ruby, 71-74

express, in Node.js, 192, 195, **201**,
212

extend keyword, in JavaScript, 179,
180, 181

F

Fastcgi, 112, 139-140, **215**

File access

in PHP, 122-123
in Python, 161-163
in Ruby, 74-79

foreach function

in JSON, 185, 211
in PHP, **120**, **128**, **131**, 133

Fortran, 2, 9, 14

Free-format RPG, 16, 41, 58, 83

Function

anonymous, 55, 158, 186-187,
196, 206

built-in, 52-53, 122, 148-149,
162, 177

foreach, **120**, **128**, **131**, 133, 185,
211

in JavaScript (Node.js), 173-176,
179, 181, 186-190, 193,
195-211

lambda, 158-159

OO programming and, 37

in PHP, 116-117, 121, 130

in Python, 148-149, 152-155, **157-159**, 162-163

in Rails/Ruby, 100, 108-109

in Ruby, 40, 49-50, 55-56, 61, 63

G

Gem, 81, 85, 88, 100-101, 107, 190

Gemfile, 100, 107

GET, 25, 26, 110

GitHub, 136, 191

Global variable

in PHP, 116, **117**, 118
in Ruby, 49, 50, 52, 73

GNU compiler, for PASE, 9

H

Hash

in JavaScript, 181-186
in PHP, 119-120
in Python, 151, 168
in Ruby, 53, 56-58, 64, 75

“Hello World” program example
in PHP, **115**

in Python, **146**
in Ruby, **43-46**

Hoisting, in JavaScript, 187-188

HTML, 19-20, 106, 110

Apache and, 213, **215-216**

JavaScript and, 170-171, 186,
196-197, **199-202**

PHP and, 112, 115-116, 121, 138,
140-141

XMLSERVICE and, 25-26, 32

I

IBM i

- Apache and, 213
- architecture, 6-7
- command line, 10, 12
- community, 2-3, 15, 221-224
- ILE and, 13-16
- Open Source for IBM i product (5733OPS), 8-9, 147, 192
- Node.js and, 169-170, 192-193, 196-197, 203, 207, 210, 212
- performance, 3
- PHP and, 111-115, 124, 127, 129-131, 138
- Python and, 146-147, 163-165
- Rails and, 99-100
- reasons to use open source on, 2, 97
- Ruby and, 39-42, 46-47, 63, 73, 79-81, 85, 90, 95
- Tomcat and, 219-220
- user groups, 222
- virtual communities, 223
- XMLSERVICE and, 17-18, **20-22**, 27, 129

if statement, in Ruby, **64-65**, 68

ILE, 13-16, 152

- binding in, 14-15
- and PASE, 6, **7**, **8**, **10**, **11**
- origins, 13

Indentation, in code, 67, 154

Inheritance, 34, 36-37, 59, 88, 177, 179, 181

Instantiation, 34, 36, 63, 89, 96, 194

Integration, IBM i and, 2, 16, 103

ipc value (in XMLSERVICE), 27

irb (interactive Ruby) command, 42-48, 58, 73, 79

iToolkit, 164, 167, 208

J

Java, 34, 37, **91**, 95, 168, 210, 213, 214, 219, 220

JavaScript, 48, 55, 66, 108, 111, 115, 116, 118, 151, 158, 169-209

- arrays in, 173, 181-186, 207, 211
- built-in functions in, 177
- calling a program in, 207-211
- class in, 173, **177-181**, 186, **188**
- constants, 177
- data types in, 176, **209-210**, 211
- dynamic typing in, 173, 176, 181
- error handling in, 206
- extend keyword, 179, **180**, 181
- hash in, 181-186
- history, 170
- hoisting in, 187-188
- module in, 169-170, 190-191, 193, 195-197, 203, 207, 210
- Node.js and, 169-190
- programming concepts, 173
- scope in, 175-176
- scripting and, 170-171, 192
- strings in, 175, 197, 203-**204**, **207**
- syntax, 176, 182, 206
- try block in, 177

JDBC, 90, 95

JRuby, 80, 90-97, 100

JSON, 17, 20-21, 57, 151, 176, 181, 184, 191, 206-211

- foreach function in, 185, 211

jsonlint.com, 207, 211

JTOpen, 80, 90, 95

JVM, 219

K

Key, 56-58, 168, 183, 190, 207

Key-value pair, 56-58, 181, 183

Klement, Scott, 223

L

Lambda function, 158-159

Linux, 3, 10, 42, 63, 80, 100-101, 112, 192

Lists in Python, 148

LISUG (Long Island System User's Group), 222

ls "list files" comand, 10

M

Matsumoto, Yukihiro (Matz), creator of Ruby, 39-40

Method, 35-38

- in JavaScript (Node.js), 178, 183, 189, 193-194, 197, 199-200, 203, 206, 208
- in PHP, 130-131, 133-134, 139
- in Python, 159, 167
- in Ruby, 46, 52, 55-57, 60, 64, 66, 70, 73-75, 77, 79, 82, 84, 89, 90, 93, 96, 110

Model, in MVC, 36, 105-106, 108-109

Modular code, 13-15, 58-59, 61, 63, 106, 110, 136, 177

Module, 14-15

- in JavaScript (Node.js), 169-170, 190-191, 193, 195-197, 203, 207, 210
- in PHP, 138-139
- in Python, 152, 154-165, 167
- in Rails, 100, 107
- in Ruby, 48, 52-53, 59-64

MVC (Model-View-Controller), 105-106, 108, 112

MySQL, 111

N

Node package manager. *See* npm

Node.js, 169-212

- chat demo program, 195, 197, 199, 200-203
- database access in, 204-211
- dynamic typing in, 173, 176, 181
- error handling in, 206
- express in, 192, 195, **201**, 212
- JavaScript and, 169-190
- PASE and, 170, 203, 212
- route in, 196

system access in, 203
versions, 192
npm, 190-191, 195, 197

O

Object-oriented (OO) programming, 33-34, 38-41, 49, 59, 112, 120-122, 127, 130, 145, 148, 162, 168, 170-171, 173, 177, 193

Object, characteristics of, 34

OCEAN (Orange County Educational Advancement Network), 222

OMNI, 222

Original Program Model (OPM), 13-15

Open source
community, 100, 190, 223-224
IBM i and, 5, 12, 14, 16-17, 20, 42, 80, 97, 113-114, 147, 164, 221
languages. *See* JavaScript, Node.js, PHP, Python, Rails, Ruby
reasons for using, 1-3, 97
tools, 10, 12, 18-19, 39, 218. *See* also PASE, XMLSERVICE

Open Source for IBM i product (5733OPS), 8-9, 147, 192

P

package.json file, 191-192

Parentheses, in code, 37, 52, 67, 149, 152, 189-190

Partials, in Rails, 106, 108

PASE, 2, 5-12, 213
AIX technology available in, 9
applications, 8
ILE and, 6-7, 10
constants in, 12
installing, 8
Node.js and, 170, 203, 212
PHP and, 111-112, 114, 123-124, 127, 130

Python and, 147, 163
Ruby and, 45-47, 79-81
using, 10
XMLSERVICE and, 14

PHP, 3, 6, 9, 17, 19, 106, 111-144, 145, 168-169, 171, 208, 213, 216-217, 220
accessing system resources in, 122
app folder and, 140
arrays in, 119-120
built-in functions in, 122
calling a program in, 133-138
catch block, 130
class in, 112, **122**, 130
data types in, 133-134, 137
database access in, 124-127
dynamic typing in, 115, 118
error handling in, 130
file access in, 122-123
foreach function in, **120**, **128**, **131**, 133
global variable in, 116, **117**, 118
hash in, 119-120
“Hello World” program, **115**
installation, 113
iteration, 119
module in, 138-139
operators, 118
PASE and, 111-112, 114, 123-124, 127, 130
programming, 115
running system commands in, 123
scripting and, 111-112, 115-116, 127
strings in, 118, 120-122, **137**
syntax, 112, 122, 126
toolkit, 127
using in a Web app, 138
var_dump in, **129**, **131**, 133, **135**, 137
variables in, 116
XMLSERVICE toolkit for, 32

POLA, 40-41, 48, 55, 59

Polymorphism, 34, 37-38, 177

Portable Application Solutions Environment. *See* PASE

POST, 25-26, 83, 110

POWER chip, 2-3

POWER8, 2, 6

PowerRuby, 19, 32, 42, 80, 99-100, 105-106, 192

puts, 43, **45-46**, **50**, 55, **58**, **60**, **62**, **66**, **76**, **82**, 85, **87**, **90**, **92**, 96

PuTTY, 10, **47**, 115

Python, 2-3, 32, 34, 37, 39-40, 55, 111, 145-168, 192, 208, 220
2to3 conversion tool, 146
accessing RPG in, 165
anonymous functions in, 158
arrays (lists and tuples) in, 148-149, 163
block in, 152, 157, 159
built-in functions in, 148, 152-154, 162
calling a program in, 165-168
class in, 152, **159-161**
data types in, 147-151
database access in, 164-165
dictionary in, 151, 163, 168
dynamic typing in, 158, 163
file access in, 161-163
hash in, 151, 168
“Hello World” program, **146**
installation, 146
lambda function in, 158-159
module in, 152, 154-165, 167
numbers in, 148, 151
PASE and, 147, 163
scope in, 154-157
scripting and, 111, 145, 164, 167
strings in, 146, 148, 151-152, 162-163
syntax, 145-146, 148, 154
system access in, 163
tuples in, 149-151, **153-154**, 157, 163
variables in, 157

Q

QP2TERM, 10, 46-47
QSHELL, **46**

R

- Rails, 3, 6, 15, 57-58, 72, 85, 99, 190, 195, 217, 220
 - app folder and, 107-108
 - bin folder in, 107
 - building an application in, 101-110
 - class in, 108-109
 - controller, 105-106, 108, 110
 - database access in, 108-110
 - dynamic typing in, 106
 - generate command in, 108
 - module in, 100, 107
 - MVC and, 105
 - project, 107-108
 - routes in, 102, 107, 109-110, 196
 - Ruby and, 99-110
 - Rakefile, 107
 - Read-eval-print loop (REPL), 42-44, 47, 73, 171
 - Reasons for using open source, 1-3, 97
 - Reflection, 210
 - REST, 18, 20, 27, 80, 82, 88, 167-168
 - RESTful, 19, 109-110, 196
 - Reuse of code. *See* Code reuse
 - Reverse proxy, 214, 217
 - Routes
 - in Node.js, 196
 - in Rails, 102, 107, 109-110, 196
 - RPG, 2, 5, 9, 34, 39, 41-42, 48-49, 53, 55-56, 58, 68, 70, 109, 145, 170-171, 181, 193, 213, 224
 - Apache and, 218, 220
 - free-format, 16, 41, 58, 83
 - ILE, 13-16, 112, 169
 - JavaScript (JSON) and, **208-210**
 - PHP and, 116, 118, 133, 136
 - Python and, 151-152, **165-168**
 - Ruby and, 40, 83-85
 - XMLSERVICE and, 17, 19, 21, 27-29, **208-210**
 - RSTLICPGM (Restore Licensed Program) command, 114
 - Ruby, 3, 6, 15, 19, 32, 34, 37, 39-97, 111, 145, 157-158, 168, 190, 195, 208
 - ActiveRecord class in, 80-82, 84, 86, 88, 90
 - ActiveXMLService class in, 80-82, 84, 90
 - arrays in, 40, 53-56, 64, 75
 - block in, 43, 55-56, 64, 70, 77, 159
 - built-in functions in, 52-53
 - calling a program in, 83-85
 - case keyword in, 70-72
 - case-sensitivity, 46
 - class in, 49, 59-61, 62, 80, 82, 88-90, 91, 94-96
 - class variable in, 49, 50-52
 - constants in, 48-49, 73
 - container, 40, 53-56
 - control flow in, 64
 - creating a table in, **86-90**
 - data types in, 56, 71, 84
 - database access in, 108-110
 - dynamic typing in, 48, 106
 - each method in, 55, 64, 75, 77
 - else statement in, 65, **66**, 67, **68**
 - elsif statement in, **65**, 67
 - error handling in, 71
 - file access in, 74-79
 - gem in, 81, 85, 88, 100-101, 107, 190
 - Gemfile in, 100, 107
 - global variable in, 49, 50, 52, 73
 - hash in, 53, 56-58, 64, 75
 - “Hello World” program, **43-46**
 - I/O in, 73
 - installing, 42
 - language basics, 48
 - module in, 48, 52-53, 59-64
 - PASE and, 45-47, 79-81
 - program structure in, 58
 - Rails and, 99-110
 - scope in, 49-53
 - scripting and, 39, 47, 63, 106, 111
 - strings in, 43, 53, 66, 70-72, **71**, **72**, **75**, **86**, **88**, **94**
 - syntax, 45-46, 55, 69-70, 80, 109
 - system commands and, 79
 - unless keyword, 66, 68
 - variables in, 48-49
 - Ruby Toolkit, 80-85
- S**
- Scripting language, 12, 39-40, 111, 164, 170
 - JavaScript, 170-171, 192
 - PHP, 111-112, 115-116, 127
 - Python, 111, 145, 164, 167
 - Ruby, 39, 47, 63, 106, 111
 - Secure Shell (SSH), 10, 47, 167
 - Service program, 14-15, 28, 59, 152, 216
 - Shebang, 45, 63-64
 - SmallTalk, 34, 39
 - OO programming and, 34
 - SQL, **21**, **31**, 85, **95-96**, **124-126**, **143-144**, 165, 206
 - STDERR, **12**, 73-74
 - \$stderr, **73**
 - STDIN, 73, 75
 - \$stdin, 73
 - STDOUT, **12**, 73, 75
 - \$stdout, **73**, 75-77
 - String, 37, 163, 203, 207
 - in JavaScript, 175, 197, 203-**204**, **207**
 - in PHP, 118, 120-122, **137**
 - in Python, 146, 148, 151-152, 162-163
 - in Rails/Ruby, **100**
 - in Ruby, 43, 53, 66, 70-72, **71**, **72**, **75**, **86**, **88**, **94**
 - XMLSERVICE and, 21, 26
 - Syntax
 - JavaScript, 176, 182, 206
 - PHP, 112, 122, 126
 - Python, 145-146, 148, 154
 - Ruby, 45-46, 55, 69-70, 80, 109
 - Subclass, 36-37, 88
 - Sublime Text, 42, 171, 193

T

Tomcat, 169, 213, 218-220
Tuple, 149-151, **153-154**, 157, 163

U

UltraEdit, 44
Uniform Resource Identifier (URI),
109-110
UNIX, 3, 46, 112
 *NIX, 80, 111, 114-115, 122
unless keyword, 66, 68
Untyped, 70, 115, 170, 175
User groups, IBM i, 222

V

var_dump, **129**, **131**, 133, **135**, 137
Variable
 global, 49, 50, 52, 73, 116, **117**,
 118

 in JavaScript, 173
 in PHP, 116
 in Python, 157
 in Ruby, 48-49
View, in MVC, 105-106, 108
Virtual communities, IBM i, 223

W

WMCPA (Wisconsin Midrange
 Computer Professional
 Association), 222
WRKSYSVAL command, **81**, **82**,
 128, **132**

X

XML, 17, 20-21, 25, 28, 208-210
 xml:in, **28**, **32**
 xml:out, 31-**32**
XMLSERVICE, 17-32
 ctl value, 27

 data interchange layer, 20
 data types in, **21**, 29, 134, 137
 examples, 22-32
 installing, 18
 ipc value, 27
 PASE and, 14
 strings and, 21, 26
XSL, 25, 28

Y

YAML (Yet Another Markup
 Language), **80-82**, **84**, **86**,
 88, 92
Young i Professionals (YiPs), 9, 18-
 20, 22, 136-137

Z

Zend, 113
Zend Server (zendsvr), 114, 127,
 129, 134, 140